



CSA
OCEANS
JPI Oceans support action


SEVENTH FRAMEWORK
PROGRAMME

Mapping and preliminary analysis of policy needs for evidence

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1. INTRODUCTION

JPI Oceans is a coordination and integrating process open to all EU Member States and Associated Countries who invest in marine and maritime research. By bringing together the interested Member States and Associated Countries JPI Oceans aims to:

1. Enable the advent of a knowledge based maritime economy, maximising its value in a sustainable way;
2. Ensure Good Environmental Status of the seas and optimise planning of activities in the marine space;
3. Optimise the response to climate change and mitigate human impacts on the marine environment.

This report uses the input from a series of stakeholder consultations to provide an insight into how different groups view specific policies and the science to policy process in general. An outline of the different consultations and information on how they were conducted are found in section 2.

The main content of this report is divided into two sections: Section 3 investigates specific policies pertinent to the interests of JPI Oceans and Section 4 discusses the general science to policy process (see section 1.2). In addition to the main discussions, this report contains extensive annexes which are presented as factsheets to provide information on the different policies discussed.

1.1 BACKGROUND

During the preliminary phase of JPI Oceans initiative, a common Vision "JPI Oceans vision"⁽¹⁾ was developed by the participating Member States outlining the long-term goals and objectives of JPI Oceans. One of JPI Oceans' stated goals from the outset was to improve the exchange of knowledge between policy-makers and scientists in the marine and maritime sphere. To ensure policy decisions are made using the best available scientific evidence, the research community needs to be informed and understand the requirements of policy-makers. Policy-makers and their scientific advisers also need to be able to efficiently access and interpret a wide range of scientific information to understand its implications and potential applications. JPI Oceans could help to strengthen the science-policy interface by developing better ways of understanding and addressing the specific needs of scientists and policy-makers.

1.2 OBJECTIVES OF DELIVERABLE 5.1

This CSA deliverable aims to provide two main outcomes. It will provide a state of play of different marine and maritime policies pertinent to JPI Oceans and identify the requirements, as stated by stakeholders, to fulfil their objectives. The deliverable also aims to identify examples of science to policy mechanisms which stakeholders view as particularly effective; the outcome will be used in the

future to make recommendations on how existing mechanisms can take advantage of new approaches.

A key aspect of the work package is to develop options to improve knowledge transfer between science and policy to ensure current knowledge can be used to inform policy making and to ensure that policy needs are considered in the development of science programmes. This deliverable reports on the mapping exercise conducted by CSA Oceans and aims to deliver a compendium of information to support the science-policy interface development of JPI Oceans.

2. WORK PACKAGE METHODOLOGY

The CSA project was set up as a group of separate but closely integrated work packages, each addressing a different aspect of interest for JPI Oceans. The CSA is designed to underpin the development of the Strategic Research and Innovation agenda. Initial identification of the evidence needs highlighted that in the first phase a common approach to stakeholders across the work packages would be preferable to avoid multiple contacts and stakeholder fatigue. To this end the consortium members worked together to identify the key stakeholders at national, regional, European and international levels and three separate stakeholder consultation exercises were designed and undertaken to fulfil the requirements of several work packages. These exercises were:

- National funding agencies questionnaire;
- Stakeholder workshops;
- Online open consultation.

Desk-based research followed to examine the responses to the three exercises and provide the results of further research.

2.1 NATIONAL FUNDING AGENCIES QUESTIONNAIRE

This questionnaire was developed collectively in the CSA consortium and sent to Member States and Associated Countries. It comprises of 89 questions in six sections relating to different aspects of the JPI's interests. The questionnaire was sent on 31 May 2013 to national funding agencies. By February 2014, 10 member countries had responded, shown in Table 1.

Table 1: Respondents to the national funding agencies questionnaire

Country	Responding organisation	Status	Date received
Belgium	Belgian Science Policy Office www.belspo.be	Final	11/10/2013
Belgium	Fund for Scientific Research www.frs-fnrs.be	Partial response	11/10/2013
Belgium	Flanders Marine Institute http://www.vliz.be/en/	Draft	11/10/2013
Denmark	Danish Council for Strategic Research fivu.dk/en/research-and-	Final	02/12/2013

	innovation/councils-and-commissions/the-danish-council-for-strategic-research		
Estonia	Ministry of the Environment www.envir.ee	Final	11/09/2013
Finland	Academy of Finland http://www.aka.fi/en-GB/A/	Not final version	19/09/2013
Ireland	Marine Institute www.marine.ie	Final	10/10/2013
Italy	National Research Council of Italy www.cnr.it	Final	25/11/2013
Lithuania	Research Council of Lithuania www.lmt.lt	Final	25/11/2013
Netherlands	Netherlands Organisation for Scientific Research (NWO) www.nwo.nl/en	Final	19/12/2013
Norway	The Research Council of Norway www.forskingsradet.no	Form F only	12/11/2013
Poland	National Science Centre www.ncn.gov.pl National Centre for Research and Development www.ncbir.pl	Final	24/07/2013
Portugal	Foundation for Science and Technology www.fct.pt	Final	23/09/2013
Romania	Ministry of National Education http://www.research.edu.ro/	Final	12/08/2013
Turkey	The Scientific and Technological Research Council of Turkey www.tubitak.gov.tr	Final	16/09/2013
UK	National Environmental Research Council www.nerc.ac.uk	Final (Not official)	05/02/2014

2.2 STAKEHOLDER WORKSHOPS

CSA Oceans hosted a series of workshops in 2013. Some 150 stakeholders were initially identified and these were grouped and invited to six workshops in June 2013 relating to their different stakeholder groupings. Over 50 stakeholders took part in the workshops. The participants were asked to complete a pre-workshop questionnaire and were then encouraged to elaborate their responses through the online open consultation. Some stakeholder organisations that were not able to participate on the day provided written inputs.

Work Package 5 planned the workshop “UN-International Organisations, Policy and Regional Conventions” specifically to look at science to policy mechanisms. Since the discussions are particularly relevant to this report, the attending organisations are provided in Table 2. The attendees to the other workshops can be found on the JPI Oceans’ website.

Table 2: Organisations represented at the "UN-International Organisations, and Regional Conventions" workshop

Organisation	Website
United Nations Environment Programme (UNEP)	http://www.unep.org/
The Commission on the Protection of the Black Sea Against Pollution	http://www.blacksea-commission.org/
International Hydrographic Organisation (IHO)	http://www.iho.int/srv1/
Partnership for Observation of the Global Oceans (POGO)	http://www.ocean-partners.org/
OSPAR Commission	http://www.ospar.org/
Intergovernmental Oceanographic Commission (IOC) of UNESCO	http://ioc-unesco.org/
The Global Ocean Observing System (GOOS)	http://www.ioc-goos.org/
Global Climate Observing System (GCOS)	http://www.wmo.int/pages/prog/gcos/index.php
GEOHAB (Global Ecology and Oceanography of Harmful Algal Blooms)	http://www.geohab.info/

2.3 ONLINE OPEN CONSULTATION

The online open consultation allowed individuals and stakeholders from the marine and maritime community to respond to a detailed questionnaire regarding their views on the priorities and agenda for JPI Oceans. In total 49 stakeholders responded to the online questionnaire and up to 33 answered questions relating to the science-policy section. The content of the questionnaire can be found on the JPI Oceans website www.jpi-oceans.eu.

2.4 DESK-BASED RESEARCH

To fulfil the objectives of this deliverable, this report also includes the results from substantial desk based research. While the consultation procedure has provided valuable information, it is also useful to compliment the findings with a certain level of desk-based research and experience-based input.

3. MARINE POLICIES MOST RELEVANT TO JPI OCEANS

The JPI Oceans is expected to contribute strongly to the EU2020-objectives by helping the EU Integrated Maritime Policy (IMP) to maximise the value of the maritime economy and secure the good environment status of European seas through the Marine Strategy Framework Directive (MSFD). The IMP and the MSFD call upon a strong science base to support their objectives, which is echoed in the EU Marine and Maritime Research Strategy. JPI Oceans can help to provide this knowledge base, in particular to help support the implementation of the MSFD and IMP by fostering concerted dialogue between the scientific community and maritime policy-makers as well as

management authorities as indicated in the Communication on an Integrated Maritime Policy for the European Union⁽²⁾.

This chapter sets out the state of development of each of the key European Marine and Maritime policies. It is intended that these pages could form the basis for the ‘policy reference’ for JPI oceans and might subsequently be developed into a web based knowledge bank resource for the JPI Oceans community. Further work to identify ‘knowledge gaps’ is anticipated as part of deliverable 5.2 of this work package.

3.1 INTEGRATED MARITIME POLICY

Since its creation in 2007, the IMP has sought to enhance the sustainable development of the European maritime economy and to better protect the marine environment by facilitating the cooperation of all maritime stakeholders across sectors and borders⁽³⁾.

PROGRESS

The European Commission has published a progress report on the IMP, five years after its inception. Since 2007 the economic climate has radically changed. With the Europe 2020 strategy, the EU is seeking to get the European economy back on track to deliver employment, competitiveness and social cohesion. Since 2009, the EU has launched key initiatives in all policy areas related to the seas in order to strengthen Europe’s competitiveness. The progress report highlighted several relevant reports and programmes associated with the IMP including:

- **The contribution of the maritime economy to growth and employment**
 - *Blue Growth*: Opportunities for marine and maritime sustainable growth.
 - *Maritime Transport*: White Paper for Transport, European maritime transport space without barriers, new guidelines for Trans-European Networks.
 - *Energy*: Strategic Energy Technology Plan, Intelligent Energy programme, Interoperability of trans-European energy networks.
 - *Shipbuilding*: LeaderSHIP, Framework on State Aid to Shipbuilding
 - *Fisheries and aquaculture*: Reform of the Common Fisheries Policy, European Maritime and Fisheries Fund

- **Cooperation across sectors and borders to ensure optimum growth conditions for the maritime economy**
 - *Maximising the sustainable deployment of activities on coasts and at sea*: Maritime Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), ICZM Protocol to the Barcelona Convention.
 - *Protecting European citizens and maritime industries against sea-related threats*: Common Information Sharing Environment (CISE), Third Maritime Safety Package, European Border Surveillance System.
 - *Maritime employment and career mobility*: Task force on Maritime Employment and Competitiveness, Agenda for new skills and jobs and Youth on the move.

- **Research, knowledge and end-users: bridging the gap between research and industry**
 - *Ensuring European maritime leadership through innovation and research:* EC communication on an EU Strategy for marine and maritime research, the FP7 Ocean of Tomorrow calls, specific projects such as MARCOM+ forum and EMAR2RES
 - *Sharing marine knowledge to facilitate innovation, investment and sound policy-making:* European Marine Observation and Data Network (EMODnet)

- **The territorial benefits of maritime policy**
 - *Regional policy:* Regional Policy contributing to smart growth in Europe 2020.
 - *Sea basin strategies:* EU strategy for the Baltic Sea Region, Maritime Strategy for the Atlantic, Maritime governance in the Mediterranean, Adriatic and Ionian Seas.

- **Protecting marine ecosystems — a condition and factor for growth**
 - *The challenge of healthy marine ecosystems:*
 - Marine Strategy Framework Directive (MSFD) 2008/56/EC
 - Water Framework Directive (WFD) 2000/60/EC
 - Habitats (92/83/EEC) and Birds' Directives (2009/147/EC) - Natura 2000 Network
 - Common Fishery Policy
 - Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones
 - Integrated Pollution Prevention and Control Directive (IPPC Directive) 2008/1/EC
 - EIA/SEA Directives 2011/92/EU and 2001/42/EC
 - Directive on Port State Control 2009/16/EC
 - Directive on waste reception facilities in EU ports 2000/59/EC
 - International Convention for the Prevention of Pollution from Ships (MARPOL)
 - International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC Convention) and its OPRC-HNS protocol to pollution incidents by Hazardous and Noxious Substances

 - *Adaptation to and mitigation of climate change:* European Climate Adaptation Platform
 - *Addressing air pollution from ships:* Directive 1999/32/EC- relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC

- **Better management of maritime affairs**
 - *Developments in Member States:* Member States are increasingly applying coordinated approaches for the development of their maritime economy, through national strategies, such as in France, Portugal or Germany, or through specific initiatives, such as the Marine and Coastal Access Act 2009, and its Scottish equivalent in the UK, the Danish Maritime Strategy or the Irish science strategy.
 - *Developments at EU level:* European Parliament and Council Regulation establishing a Programme to support the further development of an EU IMP
 - *Developments at international level:* EU has pushed for more ambition in the Resolutions on Oceans and the Law of the Sea and on Sustainable Fisheries
 - *Awareness and visibility of maritime Europe:* Eurostat, Maritime Forum or the Atlas of the Sea

Research requirements

In each of the stakeholder engagement activities, participants were asked to summarise the research requirements needed in order to create an IMP.

National Funding Agencies

Romania sees the need for a coherent pan-European policy of development for environmentally friendly economic activities. Romania suggests the need for dedicated programs to increase cooperation between major elements of the maritime economy including R&D organisations, stakeholders and companies. Ireland called for more support for pilot Maritime Spatial Planning initiatives which would include multi-use of maritime space (e.g. aquaculture and marine renewable energy infrastructures) and related Environmental Impact Assessments.

Stakeholder Workshops

In a pre-workshop questionnaire for the UN-International Organisations, Policy and Regional Conventions workshop, respondents gave several different requirements to fulfil the objectives of an IMP. The International Maritime Organisation (IMO) reported that there is a lack of investment in ocean research and new technologies. The BONUS¹ response suggested that education systems are not designed for integration of maritime activities. The response stated that university education in marine and maritime fields is too scattered, not problem oriented and is confined to uni-disciplinary fields. It was suggested that summer schools and professor workshops could help align a curriculum towards interdisciplinary studies which include management aspects. MARTEC II² considered that a long term maritime policy can only be developed by relatively independent researchers or organisations and that young and experienced researchers could be involved in discussions of future needs.

During the workshop, the European Aquaculture Technology and Innovation Platform (EATip) representative suggested that it would be useful to have a map of actual maritime clusters and that it is important to make infrastructures accessible to industry. This could lead to more cooperation in developing monitoring infrastructure.

¹ BONUS integrates the Baltic Sea system research into a durable, cooperative, interdisciplinary and focused multinational programme in support of the regions sustainable development

² The objective of ERA-Net MARTEC II is to strengthen the European Research Area in waterborne research by coordinating and developing synergies between national and regional maritime research programmes and policies.

Coordinated monitoring

National Funding Agencies

The response from Portugal called for integrated maritime information and communication technologies. They suggested that there is a need for streamlined information sharing between marine monitoring, maritime surveillance and Earth observation systems, improving maritime communications and supporting in-situ and remote sensing, and decision making, as well as robotics. They also called for methodologies to analyse cumulative impacts and the relationship between pressures and environmental indicators. At a regional sea basin level, the Irish response suggested that synergies between National Programmes, such as the Integrated Marine Plan for Ireland: Harnessing Our Ocean Wealth, need to be identified. They suggested that there needs to be joint funding between Member States in areas of mutual interest which require a regional / pan-European approach.

Stakeholder Workshops

The representative from BONUS argued that monitoring is largely uncoordinated between various sectors like environment, energy, fisheries, mining, and defence. It was suggested that the coordinated development of a fleet of multi-purpose European Regional research ships would be useful. The response from MARTEC II suggested that databases on national and regional level are often closed and that they should be more centralised and include also national information. Community Research and Development Information Service (Cordis) was suggested as an example of a centralised database, but the respondent suggested that it was not efficient in the science/policy context. The response from European Dredging Association (EuDA)-WATERBORNE agreed that monitoring data should be shared. To aide this goal, the ARIEMA/ European Fisheries Technology Platform (EFTP) representative suggested that monitoring regulations should be harmonised.

3.2 POLICY FOR MARINE ENVIRONMENT PROTECTION

European and international dimensions to policy-making

Much environmental policy originates at the European and international level. In Europe, new environmental legislation is generally proposed by the EC, then scrutinised and decided upon by the Council of the European Union and the European Parliament. The Member States Governments and parliaments have opportunities to scrutinise EU legislation as it is being developed by the European Commission, this is informed by scientific opinion within those countries.

EU Directives and Regulations

The main forms of EU law are directives and regulations. Directives establish a common aim for all member states, but each state decides for itself how to transpose the directive into national law. Each directive specifies the date by which the national laws must be adapted - giving national authorities flexibility within the deadlines necessary to take into account the unique national

situation. Directives may concern one or more Member States, or all of them. Regulations are directly applicable throughout the EU as soon as they come into force without further action by the Member State. Regulations have binding legal force on a par with national laws.

Much of the existing European environmental legislation takes into account the need to minimise transboundary environmental effects. MSFD and related marine science-policy interfaces could draw on the approaches and lessons learnt by such communities.

THE DEVELOPMENT OF A DIRECTIVE AND THE LINK TO SCIENCE

The open framework of Directives

Concerning environmental protection, a long tradition of European Community legislation has existed since the seventies, usually expressed in Directives. A directive is binding in the result to be achieved, but shall leave to the national authority the choice of form and methods. Directives normally leave member states with a certain amount of leeway as to the exact rules to be adopted. Framework Directives set up a framework in the sense that this prescribes steps to reach the common goal rather than adopting the more traditional limit value approach. Only a few Framework Directives exist, the 1st being the Waste Framework Directive in 1975, concerning environmental protection followed by the WFD in 2000 and the MSFD in 2008. The latter two concern marine waters. There are several opportunities for scientific input in these policy processes, not only during the development and negotiation of a (Framework) Directive, but also during the implementation phase. The science-policy cycle does not stop with the adoption of a (Framework) Directive. During the implementation a vast opportunity and necessity exists to let science feed into the policy implementation.

During the development of a (Framework) Directive before adoption

The text of a draft directive is prepared by the European Commission after consultation with its own and national experts and scientists. The draft is presented to and negotiated with the Council, composed of relevant ministers of member governments, and the European Parliament, initially for evaluation and comment, then subsequently for approval or rejection. During this negotiation process, Commission and/or Member States may also continue to consult scientists.

During the implementation of a (Framework) Directive after adoption

The implementation of the WFD and MSFD is organised through a Common Implementation Strategy (CIS), shown in Figures 2 and 3. The aim of the CIS process is to allow, as far as possible, a coherent and harmonious implementation of the WFD and MSFD within the EU⁽⁴⁾. In the CIS three governance levels can be distinguished with decreasing legal or formal power: the Comitology Committee, the Strategic Coordination Group and technical working groups. Scientific advice and projects are needed or followed up at some of these different levels during the implementation of a Directive: in the Strategic Coordination Groups, the Project Coordination Group (for the MSFD) and in some of the technical working groups of the Common Implementation Strategy.

CIS Organisation 2013-2015

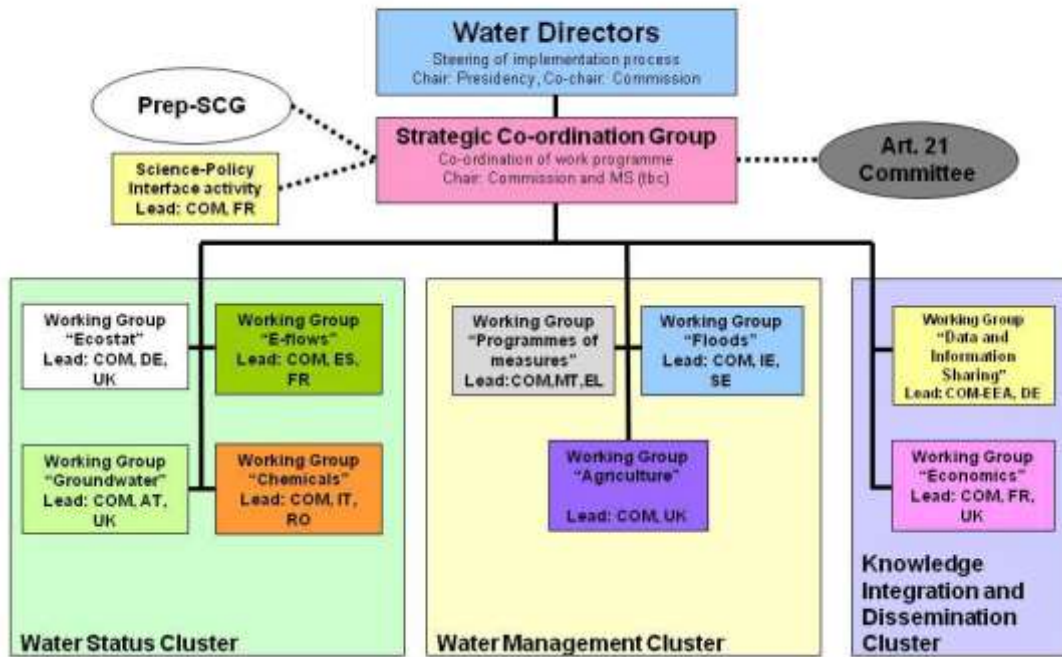


Figure 2: Common Implementation Strategy for the WFD

MSFD Common Implementation Strategy Organisational structure – 2014 and beyond

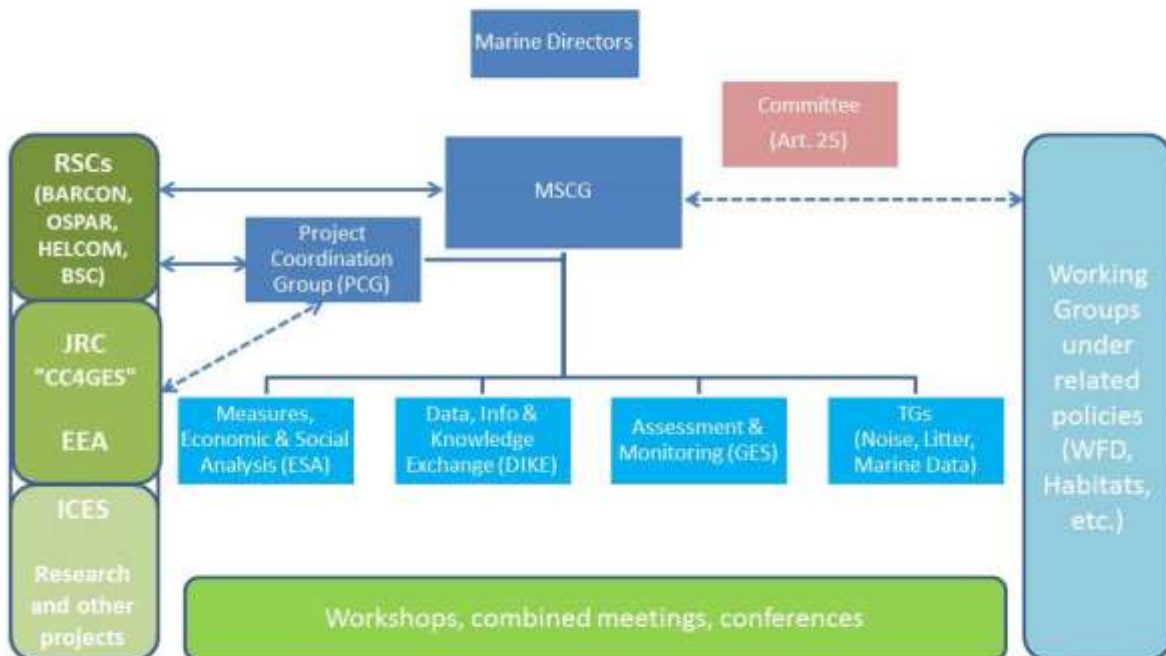


Figure 3: MSFD Common Implementation Strategy (MSCG = Marine Strategy Coordination Group, TG = Task Group, CC4GES = Competence Centre for Good Environmental Status)

How policy implementation decisions in this CIS can and should also be based on scientific input is explained as follows.

1. The Committee procedure (closed meetings with nominated formal representatives)

The European Commission is assisted by committees in implementing Community decisions and therefore, (Framework) Directives include comitology prescriptions. Comitology committees are part of the EU's broader European Union Committee System that assists in the making, adoption, and implementation of EU laws. There are about 300 committees that operate according to five different types of procedures. Comitology refers to a process by which EU law is modified or adjusted and takes place within "comitology committees" chaired by the European Commission. The official term for the process is committee procedure. The Commission must act in conjunction with these committees of representatives of member states who often have the power to block the Commission and refer the matter to the Council in case no agreement on implementation aspects would be reached. These comitology committees for WFD or MSFD, for example, adopt Commission Decisions that prescribe specific implementation aspects of the (Framework) Directives and are directly binding. These Commission Decisions are of much more prescriptive detailed value than the Directive itself and often specify legally binding technical specifications, like for good ecological or chemical status for the WFD and good environmental status for the MSFD. The Comitology Committee or Regulatory Committee, according to the specific procedure followed for WFD and MSFD, is part of a Common Implementation Strategy that also consists of a formal Strategic Coordination Group, an informal high-level Directors group and several technical working groups to negotiate on reporting obligations and technical or scientific aspects of the implementation of a (Framework) Directive, to develop the prescriptions of reporting from the Member States to the Commission and the legally binding details to be published in Commission Decisions.

These opportunities for technical/scientific additions or adjustments are formulated as follows in the Water Framework Directive, for example:

- Technical specifications and standardised methods for analysis and monitoring of water status shall be laid down in accordance with the procedure laid down in Article 21. According to Article 21 of the Directive the Commission shall be assisted by a committee (referred to as "the Committee").
- Technical adaptations to the Directive
 1. Annexes I, III and section 1.3.6 of Annex V may be adapted to scientific and technical progress in accordance with the procedures laid down in Article 21 (the Committee), taking account of the periods for review and updating of the river basin management plans as referred to in Article 13. Where necessary, the Commission may adopt guidelines on the implementation of Annexes II and V in accordance with the procedures laid down in Article 21.
 2. For the purpose of transmission and processing of data, including statistical and cartographic data, technical formats for the purpose of paragraph 1 may be adopted in accordance with the procedures laid down in Article 21 (the Committee).

For the Marine Strategy Framework Directive:

- GES: Criteria and methodological standards to be used by the Member States, which are designed to amend non-essential elements of this Directive by supplementing it, shall be laid down, on the basis of Annexes I and III, in accordance with the regulatory procedure with scrutiny referred to in Article 25(3) by 15 July 2010 in such a way as to ensure consistency and to allow for comparison between marine regions or subregions of the extent to which good environmental status is being achieved. Before proposing such criteria and standards the Commission shall consult all interested parties, including Regional Sea Conventions.
- Monitoring programmes: Specifications and standardised methods for monitoring and assessment which take into account existing commitments and ensure comparability between monitoring and assessment results, and which are designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(3).
- Technical adaptations:
 1. Annexes III, IV and V may be amended in the light of scientific and technical progress in accordance with the regulatory procedure with scrutiny referred to in Article 25(3), taking into account the periods for the review and updating of marine strategies laid down in Article 17(2).
 2. In accordance with the regulatory procedure referred to in Article 25(2):
 - (a) methodological standards may be adopted for the application of Annexes I, III, IV and V;
 - (b) technical formats may be adopted for the purposes of transmission and processing of data, including statistical and cartographic data.
- For the MSFD the CIS process could also help ensure that the necessary evidence has been gathered to prepare for a review of the MSFD if and when it is decided (at the latest in 2023 as required by Article 23).

2. The Strategic Coordination Groups in the Common Implementation Strategy (with nominated formal representatives and open to observers on invitation)

The Strategic Co-ordination Groups (SCG) play a crucial role in coordinating the joint activities between the European Commission and the EU Member States to support the implementation of the WFD and MSFD, as laid down in the Common Implementation Strategy (CIS) of these two Directives.

The European Commission also organised Science-Policy Interface (SPI) initiatives through this SCG within the CIS for the WFD to advise DG RTD on priorities for future research funding. This input has served the elaboration of research programmes in DG RTD. Since some CIS-SPI actors were also part of the Stakeholder Advisory Group of JPI Water, they also passed the list of identified research needs to JPI Water to feed their process for the elaboration of their SRIA. A similar exchange between DG ENV and JPI Oceans could help to jointly pick up the internationally defined scientific needs to define good environmental status of the WFD and MSFD, potentially through the PCG.

The SCG should also ensure that activities such as the European Semester and Science- Policy Interface are further developed and that a voluntary peer-review system is put in place for the WFD by 2014 for draft river-basin management plans to enhance mutual learning between Member States.

For the MSFD another important strategic group is the Project Coordination Group (PCG). The mandate of this group within the CIS of the MSFD is to give advice and consider practical means to improve the coherence of projects related to the implementation of the MSFD. In particular, the PCG seeks to maximise synergies with other relevant activities, on-going and planned, at national, regional and EU level and improve coordination and information exchange between the EU and Regional Sea Conventions (RSCs). The project coordination group reports and, where appropriate, can make proposals to the MSCG (Strategic Coordination Group of the Marine Strategy as explained above).

Key activities of the PCG:

- Consider future needs for MSFD implementation support to which the IMP Programme or other EU financial instruments could contribute.
- Advise the European Commission on a medium to long term planning for possible assignments under projects discussed in the PCG, starting with projects directly linked to MSFD implementation.
- Exchange information on relevant activities/projects at European, regional (RSCs) and national level.
- Receive technical reports and other documents produced by the projects for comments, when appropriate.
- Members of the PCG are expected to share information on PCG activities with relevant colleagues in each Regional Sea Convention.

Members to this group are appointed in their personal capacity. JPI Oceans has been invited ad-hoc to the 2 meetings of this group taking place in 2013.

3. The technical working groups in the Common Implementation Strategy (CIS) (closed meetings with nominated technical representatives and open to external experts on invitation)

These working groups (as indicated in the CIS of the WFD and MSFD) work out the ecological and chemical (for WFD) and environmental status assessments, pressures and impacts and socio-economic analyses, monitoring and coordination of related assessment and monitoring under water-related directives (e.g. good environmental status descriptors 5 and 8), reporting and data sharing, developing and disseminating knowledge and tools under the umbrella of the Water Information System for Europe (WISE), the identification, planning and implementation of measures, while ensuring coordination with the programmes of measures developed under the WFD, MSFD and coherence with other policies.

In this entire implementation governance, there are two key topics for which scientific input and evidence provision is important, i.e.:

- 1) The marine water status assessment, that needs to feed into the WG GES for MSFD and into WG ECOSTAT and WG Chemicals for WFD;
- 2) The impact of measures in the marine water management, with its restoration potential problem setting, that needs to feed into the WG ESA for the MSFD and into the WG on Programmes of measures for the WFD.

3.2.1 MARINE STRATEGY FRAMEWORK DIRECTIVE

The aim of the European Union's MSFD (EU, 2008) is to protect the marine environment across Europe. It establishes a framework within which Member States shall take the necessary measures to achieve or maintain good environmental status (GES) in the marine environment by 2020. The process by which Member States are set to achieve GES is shown in Figure 1. GES involves protecting the marine environment, preventing its deterioration and restoring it where practical, while using marine resources sustainably. It aims to protect the resource base upon which marine-related economic and social activities depend. The MSFD constitutes the environmental pillar of the IMP, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment.

The Directive is very wide-ranging and sets out 11 descriptors of GES relating to biological diversity, non-indigenous species introductions, commercially exploited fish and shellfish populations, food webs, human-induced eutrophication, sea floor integrity, hydrographical conditions, concentrations of contaminants, contaminants in fish and other seafood, litter and noise.

The potential effectiveness of the MSFD has been debated since it was unveiled by the Commission. In 2006 the German Advisory Council on the Environment (SRU) concluded that the strategy would not form a sufficient pillar of a European maritime policy ⁽⁵⁾. The report published by the SRU argued that because the definition of GES is left to Member States, some could end up setting very weak objectives.

PROGRESS

Member States have commenced the process of implementing the MSFD. The MSFD is delivered by Member States through a variety of national ministries or departments, and regional bodies, known as competent authorities. These have been reported to the Commission as specified in Art.7 Annex III of the Directive. Member States have carried out an initial assessment (Art.8), defined GES characteristics (Art.9) and drafted targets and indicators (Art.10). The initial assessment takes into account existing evidence about the state of the seas and, together with the draft targets and indicators, is the basis for the development of further evidence gathering and monitoring programmes to meet the objectives of the Directive. These activities are carried out by Member States, with regional and sub-regional collaborations, coordinated through structures such as the Regional Seas Conventions.

Member States are required to implement the MSFD to a specified time-line in the following process: develop descriptors; monitoring programmes; programmes of measures; achievement of GES. A visual example (from the UK) is shown in Figure 1.

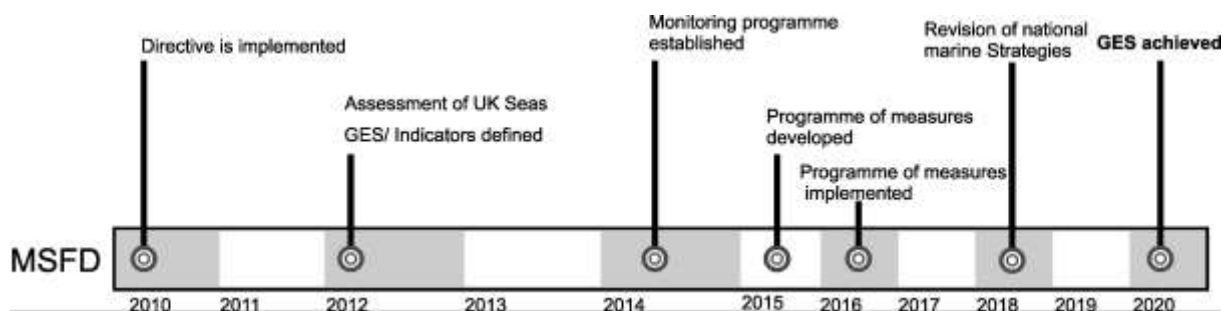


Figure 1: An example of a MS’s time-line for delivering the MSFD

By 2014, Member States have to put in place monitoring programmes to measure progress towards GES (Art.11). By 2016 management measures must be implemented in order to achieve GES by 2020 (Art.13). There is also an obligation to hold public consultations of proposals for monitoring programmes and programme of measures.

The European Commission assesses whether the elements reported by Member States, together constitute an appropriate framework to meet the requirements of the Directive. The “MSFD 2012 Baseline assessment” is a preliminary analysis by the European Environment Agency (EEA) that was presented to the Marine Directors in December 2013. The report is expected to be finalised by January 2014 and available for the marine conference on 3rd–4th March 2014. A summary of the marine baseline assessment will be made available at the marine conference. There will be a consultation on this baseline assessment.

The state of play in implementation, at the time of writing, is summarised in Table 3.

Table 3: State of play of Member States in their implementation of five Articles of the MSFD.

Reported: **green** = received, **yellow** = part received, **red** = not received.

Conformity: **green** = complete OK, **yellow** = ongoing, **red** = update not received.

Member State	Transposition into law (Art.26)		Competent Authorities (Art.7)		Initial Assessment, GES characteristics, Targets and Indicators (Art.8, 9, 10)	
	Reported	Conformity	Reported	Conformity	Reported	Conformity
Austria				Green		Green
Belgium	Green	Green	Green	Green	Green	Green
Bulgaria	Green	Yellow	Green	Green	Green	Yellow
Croatia					Yellow	Yellow
Cyprus	Green	Available 2013	Green	Yellow	Green	Green
Czech Republic				Red	Yellow	Green
Denmark	Green	Yellow	Green	Green	Green	Green
Estonia	Green	Available 2013	Green	Green	Green	Green
Finland	Green	Available 2013	Green	Yellow	Green	Green

France		Available 2013				
Germany		Available 2013				
Greece		Available 2013				
Hungary						
Ireland		Available 2013				
Italy						
Latvia						
Lithuania						
Luxemburg						
Malta		Available 2013				
Netherlands						
Poland						
Portugal		Available 2013				
Romania						
Slovenia						
Slovakia						
Spain						
Sweden						
UK						

When establishing specifications and standardised methods for monitoring programmes (Art.11) and programmes of measures (Art.13) for MSFD, Member States are required to take into account existing commitments to ensure comparability. At the time of writing Member States are finalising their MSFD monitoring programmes in fulfilment of Art.11. In general Member States are basing their monitoring programmes on monitoring arrangements already in place for extant instruments such as national commitments, Regional Seas Conventions (e.g. the OSPAR Co-ordinated Environmental Monitoring Programme, CEMP) and European Directives (e.g. WFD integrated monitoring programme for each river basin district) (see Stakeholder Responses, below). There are indicators for some MSFD Descriptors that have not previously required regular monitoring under existing instruments, particularly Descriptors 10 (Litter) and 11 (energy, including underwater noise). In these cases new monitoring programmes are likely to have been developed to fulfil Art.11. Member States must report their monitoring programmes to the Commission by autumn 2014.

Member States' MSFD programmes of measures (Art.13) should integrate with measures that have been established under existing Community legislation, for example the Urban Waste Water Treatment Directive (1991) and the Bathing Waters Directive (2006). For most Member States this process is at the time of writing; programmes of measures are to be developed by 2015 and implemented by 2016. For example, the UK has produced a Business As Usual report (ABPmer & eftc 2012), which considers how sufficient the existing measures would be for achieving GES targets. In the UK a process is underway in which policy, scientific and technical leaders meet to

discuss the extent to which existing measures will help the UK to reach GES in its waters and to identify what and/or where existing measures will be insufficient. As is the case for monitoring programmes some of the MSFD Descriptors such as litter (D10) and noise (D11) are unlikely to have fit-for-purpose programmes of measures under existing legislation, because there has been no previous requirement for these. In these cases programmes of measures may need to be adapted or new ones put in place.

REGIONAL COOPERATION FOR MSFD

Due to the scientific difficulties and acknowledged initial underestimation of the effort needed to show comparability between different ecological assessment methods for the WFD, the prescriptions for regional comparability of ecosystem based assessments were requested to be more open for the MSFD and not bound to detailed prescriptions. The transboundary nature of the marine environment means the MSFD requires Member States sharing a marine region or sub region to cooperate to ensure that, within each marine region or sub region, the measures required to achieve the objectives of this Directive are coherent and coordinated across the marine region or sub region concerned.

Implementing the MSFD is first and foremost a Member State responsibility. Each Member State faces specific questions and challenges related to national, regional and/or local situations and conditions, which can be resolved only by that particular Member State. Nevertheless, each Member State sits within and shares one or more marine (sub) regions and is explicitly required by the Directive to both determine GES at the level of the marine (sub) region and to work with neighbouring Member States and third countries in order to implement the Directive, ensure the coordinated development of marine strategies for each marine region or sub region and achieve GES. A common understanding and approach is therefore crucial to successful implementation, and is required by the MSFD not only to ensure a sufficient degree of commonality in the determination of GES, but also to ensure a 'level playing field' for economic uses of the marine environment. A common understanding also limits the risks of poor, diverse or inadequate implementation of the Directive and of subsequent disputes and should encourage proactive and apparatusional implementation. Where practical and appropriate, existing institutional structures established in marine regions or sub regions, in particular Regional Sea Conventions, should be used to ensure such coordination (Common Implementation Strategy MSFD⁽⁴⁾).

The Regional Seas conventions have a role in ensuring the cohesion of assessments within their regions. Both OSPAR and HELCOM have established specific coordinating platforms for the regional implementation of the MSFD, striving for harmonised national marine strategies to achieve good environmental status and implementing their overall agreed commitment to an ecosystem approach.

For the North-East Atlantic, the regional cooperation for the MSFD is coordinated in the Inter-sessional Correspondence Group for the Implementation of the MSFD (ICG MSFD) of the OSPAR Convention governance structure.

Other Working Groups or Inter-sessional Correspondence Groups ([ICG](#)) that contribute to cooperate for determining GES or other aspects of the MSFD are:

- ICG on the Coordination of Biodiversity Assessment and Monitoring (ICG COBAM)
- ICG on Environmental Assessment Criteria (ICG EAC)
- ICG on Marine Protected Areas (ICG MPA)
- ICG on Marine Litter (ICG ML)
- ICG EUT 2013/14 (on eutrophication)
- ICG on Noise
- Working Group on Monitoring and on Trends and Effects of Substances in the Marine Environment (MIME)
- ICG on Marine Spatial Planning (ICG MSP)
- ICG Close to zero

Specific workshop can also be held, such as one on the OSPAR Economic and Social Analysis Coordination.

In the Baltic Sea, the following working groups of HELCOM (the Helsinki or Baltic Marine Environment Protection Commission) address different aspects of HELCOM's work in relation to the MSFD :

- Group for Implementation of the Ecosystem Approach ([GEAR](#))
- The Nature Protection and Biodiversity Group ([HABITAT](#))
- The Land-based Pollution Group ([LAND](#))
- The Maritime Group ([MARITIME](#))
- The Monitoring and Assessment Group ([MONAS](#))
- The Response Group ([RESPONSE](#))

HELCOM has also established the following “interaction” platforms to complement the work of the main groups:

- HELCOM Agriculture and Environment Forum ([AGRI/ENV FORUM](#)) enhances dialogue between agricultural and environmental authorities.
- HELCOM Fisheries and Environment Forum ([FISH/ENV FORUM](#)) serves as a platform for dialogue between fisheries and environmental authorities .
- Joint HELCOM-VASAB Maritime Spatial Planning Working Group ([HELCOM-VASAB MSP WG](#)) is developing coherent Maritime Spatial Planning Principles.

There are also other (*ad hoc*) expert groups:

- *ad hoc* Seal Expert Group (HELCOM SEAL)
- Joint HELCOM/OSPAR task group on Ballast Water Management Convention Exemptions
- Expert group on environmental risks of hazardous submerged objects

For the Mediterranean, the United Nations Environment Programme – Mediterranean Action Plan (UNEP-MAP) is the regional platform for coordination between the Mediterranean countries for the MSFD implementation:

- The Ecosystem Approach (EcAp) Coordination Group reviews and comments on the work of 4 Correspondence Groups related to the MSFD:
 - Correspondence Group on GES and Targets – Pollution and Litter Cluster
 - Correspondence Group on GES and Targets – Biodiversity and Fisheries Cluster
 - Correspondence Group on GES and Targets – Coast and Hydrography Cluster
 - Correspondence Group on Economic and Social Analysis

For the Black Sea, the following advisory groups work on issues related to the MSFD implementation:

- PMA - Advisory Group on the Pollution Monitoring and Assessment
- LBS - Advisory Group on Control of Pollution from Land Based Sources
- IDE - Advisory Group on Information and Data Exchange

- CBD - Advisory Group on the Conservation of Biological Diversity
- FOMLR - Advisory Group on the Environmental Aspects of the Management of Fisheries and other Marine Living Resources
- or ICZM: Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management

The Black Sea Commission has also paid particular attention to the WFD through the establishment of an *ad hoc* Working Group on the Water Framework Directive and connections between the river system and the Black Sea in the Joint *Ad hoc* Technical Working Group (Danube/Black Sea Joint Technical Working Group). The WFD has not been focused upon by the other Regional Conventions.

STAKEHOLDER RESPONSES

Progress in implementation

National Funding Agencies

Several Member States responded to the NFA question related to progress in implementation of MSFD. The respondents were asked to provide an account of the current status of the MSFD in their country; these responses are shown in Table 4.

Table 4: Progress in the implementation of MSFD by Member States, from the RFA questionnaire.

Member State	Progress in implementation of MSFD
Belgium	<p>MSFD:</p> <p>Last year, Belgium reported to the Commission its ‘Initial assessment’ (in accordance with Art. 8 (section 1a & 1b)), ‘Definition of good environmental status’ and ‘Environmental targets’ (in accordance with clauses in Art. 9 & 10). The initial evaluation also includes a socio-economic analysis of the use of the Belgian marine waters and of the costs associated with damage inflicted on the marine environment, pursuant to Art. 8 (section 1c) of the MSFD. The next step in the implementation of the Marine Strategy is the production of a monitoring program by 2015, and a program of measures by 2016.</p> <p>MUMM is responsible for the drafting of an overall, integrated monitoring program, covering all the necessary monitoring needs for the MSFD, WFD and Natura 2000. The draft monitoring program will be presented in a public consultation in spring 2014.</p> <p>The Marine Environment Service published a public tender for the preparation of the program of measures. The consultancy office ARCADIS Belgium will perform the study which will result in a first draft list of measures for the marine environment, necessary to work towards a good environmental status by 2020. This list of measures will provide the basis for further consultations and discussions with competent authorities and stakeholders. The consultation procedure and the finalisation of the program of measures will be coordinated by the Marine Environment Service.</p> <p>More information can also be found in the Compendium for Coast and Sea – Chapter 3.</p>

	<p>MSP: The preliminary draft MSP has been submitted by the Minister for the North Sea to the Advisory Council, end January 2013.</p> <p>The Advisory Council has transmitted an advice to the Minister for the North Sea, beginning March 2013.</p> <p>The advice has lead to some modifications to the preliminary draft of the MSP and has been adopted by the federal Council of Ministers, converting the preliminary draft in the draft of the MSP.</p> <p>In parallel, a Strategic Environmental Assessment Procedure on the draft MSP is conducted.</p> <p>Both documents, the draft MSP and the Strategic Environmental Report have been put in a public consultation procedure, beginning July 2013. The neighbouring countries (UK, FR, NL) have also been contacted to get involved in the Belgian MSP process.</p> <p>The end of the public consultation procedure is planned for end September 2013. Thereafter, the comments will we considered and potentially inserted into the draft MSP. The draft MSP will be adopted by Royal Decree, on the proposal of the Council of Ministers. This is foreseen for end 2013.</p>
Ireland	Regular progress updates prepared by the Inter-Departmental Marine Coordination Group.
Poland	<p>The progress can be described as follows:</p> <ol style="list-style-type: none"> 1. There are pieces of national legislation that are fundamental for successful implementation of ICZM in Poland. They include the Act of Parliament on coastal protection until 2024, Ordinance of the Government of Technical and Protection Belts in coastal zones and the establishment of coastal and maritime administration (Maritime Offices) within the Ministry relevant for maritime economy, now the Ministry of Transport, Construction and Maritime Economy. Maritime Offices are prerequisites of successful management of coastal zones, because having overwhelming jurisdiction in the technical belt and shared jurisdiction in the protection belt they guarantee rudimentary order in coastal zones and prevent excessive coastal squeeze. One of the provisions of the coastal program is bi-annual monitoring of near shore seabed from +2 till -6m; it provides data on long-term evolution of seabed in coastal zones all along the polish coast. The Maritime Offices also collaborate with local authorities of coastal communes on introduction of areas endangered by marine floods due to climate change; these areas are defined as land below 2.5 m above the current mean sea level – this definition is transmitted into local spatial management plans of coastal communities and prevent wrong locations of dangerous facilities, susceptible to inundations by seawater. The positive role of Maritime Offices is also associated with the maritime spatial planning; they developed pilot plans, whose basic concept is the division of a large basin into sub-basins, where primary, secondary, tolerated and banned uses are determined individually for each sub-basin. The experience achieved during pilot plans will be used when preparing marine spatial plans for the entire coastal and exclusive economic zones of Poland.

	<p>2. The success related to ecology of the Baltic Sea is basically related to the implementation of provisions of the HELCOM convention. Poland has committed to reducing the inputs of nutrients below thresholds determined by HELCOM. For example since July 2013 the purchase of detergents containing phosphates is no longer possible.</p> <p>The success associated with the implementation of CFP is related to substantial reduction of fishing vessels by scrapping or conversion to non-fishery uses and re-training of many ex-fishermen to tourism-related business, such as recreational angling instead of commercial fishing.</p>
Lithuania	It is an on-going process that is hard to describe in brief.
UK	<p>We've completed the first 2 of these requirements in the UK Marine Strategy Part One.</p> <p>We'll consult on: proposals for the UK monitoring programmes for good environmental status in autumn 2013 UK programmes of measures for achieving good environmental status in autumn 2014</p> <p>How the directive fits with other marine policies</p> <p>For the UK, the directive is part of a set of policies to help us meet our aim to achieve clean, healthy, safe, productive and biologically diverse oceans and seas. Policies like the implementation of the Marine and Coastal Access Act, and the reform of the Common Fisheries Policy, will help us achieve good environmental status.</p> <p>More information</p> <p>More information about the directive is available: Marine Strategy Framework Directive consultation: UK initial assessment and proposals for good environmental status questions and answers Factsheet 1: Links between the Marine Strategy Framework and the Water Framework Directives Factsheet 2: Links between the Marine Strategy Framework Directive and other legislation Factsheet 3: What the Marine Strategy Framework Directive means for marine industries Factsheet 4: What the Marine Strategy Framework Directive means for the fishing industry Factsheet 5: What the Marine Strategy Framework Directive means for conservation Factsheet 6: Links between the Marine Strategy Framework Directive, the Shellfish Waters Directive and the EU Food Hygiene Regulations Economic and social assessment for the Marine Strategy Framework Directive Public consultation on the transposition of the Marine Strategy Framework Directive in 2009, summary of responses to the consultation, published on 22 June 2010, and the associated impact assessment Contact Defra at MSFDTeam@defra.gsi.gov.uk</p>
Italy	<p>MSFD: The MSFD has been implemented in Italy by Legislative law no. n. 190 of 13 October 2010. This law states that for Italy the Competent Authority for MSFD is the Ministry of the Environment the land and the sea (MATTM), with functions of national coordination. MATTM signed a special convention with the Institute for Environmental Protection and Research (ISPRA) to support the ministry in scientific-technical coordination activities. CNR and the other Italian research organisations (e.g. CONISMA, INGV etc) is supporting ISPRA providing scientific data and</p>

	<p>necessary expertise. The MATTM has set up a technical committee to ensure coordination between national and local authorities. To technical committee, participate a representative of all the relevant Italian ministries, the regional and local authorities as well as ISPRA and the scientific community.</p> <p>Italy has sent April 30, 2013 the results of the implementation of Articles 8, 9 and 10 of the Directive, providing the initial evaluation of the GES. Despite the large number of data and information relating to the marine environment collected at national level, on the basis of existing data and information it was possible to develop a comprehensive assessment of the state of the marine environment. This meets only partially the Directive requirements. This is mainly due to the inadequacy of such data / information is characterised by spatial and temporal scales inadequate and in-homogeneities in the methodologies adopted. The MATTM with the help of ISPRA and scientific community is presently design the future monitoring program to be delivered to the EU by July 2014.</p> <p>ICZM Strategy is still in the preparation phase. The Ministry for the Environment, Land and Sea, in order to overcome the fragmentation of responsibilities for the different levels of government has therefore implemented a comprehensive institutional cooperation in the field of Integrated Coastal Zone Management, through the involvement of regional and local authorities about the planning and management of coastal areas, in view of the definition of the strategy required, as well as the preparation of Plans / Programs or Guidelines for ICZM Strategy.</p>
Sweden	<p>EU WFD was implemented 2004, and the EU Marine directive 2012. There are now development of measures programmes for the marine environment for the forthcoming cycle starting 2015. However there is still gaps in the marine environment mapping, particularly the biotope inventory.</p>

Stakeholder workshops

Analyses have previously been carried out on the issues of gaps in science. For example the BONUS project, ‘Science for a better future of the Baltic Region’, carried out a policy framework analysis in the fields relevant to the BONUS programme.

3.2.2 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (WFD) was adopted in 2000. The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries and lagoons), coastal waters (to one nautical mile for ecological status and including territorial waters for chemical status) and groundwater. The overall aim for these surface and groundwater ‘water bodies’, including protected areas in the river basins, is to achieve good chemical and ecological status by 2015.

To meet the objectives of the WFD Member States had to establish River Basin Districts and develop Plans and Programmes of Measures that detail the actions that need to be taken within each District to avoid deterioration or improve the water quality where it has moderate status or worse.

The MSFD is closely aligned to the Water Framework Directive (WFD) to define good environmental status of coastal and marine waters. The MSFD also covers the marine waters where the WFD needs to be implemented, as set out in Article 3.1.b of the MSFD: “*marine waters means also coastal waters as defined by Directive (WFD) 2000/60/EC, their seabed and their subsoil, in so far as particular aspects of the environmental status of the marine environment are not already addressed through that Directive or other Community legislation*”. This means that the WFD and MSFD are complementary in marine waters and require consistent quality assessments.

WFD INTER-CALIBRATION

The WFD is the legislation tool with the strongest emphasis on regional cooperation and comparability, which had to be shown through a scientifically underpinned intercalibration exercise. The essence of intercalibration is to ensure that the high/good and the good/moderate boundaries of ecological status in all Member States’ assessment methods for biological quality elements correspond to comparable levels of ecosystem alteration. During the negotiation of the Directive at the Council, several Member States wanted to continue using their traditionally used methods in historical monitoring series, where established already, for assessment of water quality and would not be keen in adopting one common set of European wide assessment methods. Still, Member States needed to prove that the ecological status classification results of the WFD assessment methods developed by the Member States were comparable, even if they wanted to use different monitoring protocols or assessment methods for the biological quality elements. For this reason, the intercalibration exercise was aimed at ensuring this comparability and needed to establish values for the boundary between the classes of high and good status, and for the boundary between good and moderate status, that also needed to be consistent with the normative definitions of those class boundaries described in the WFD. The intercalibration aimed mainly at obtaining this comparability within the regional sea basins (North-East Atlantic, Baltic, Mediterranean and Black Sea). Apart from high, good and moderate status, also poor and bad status needed to be established, adding up to five classes on the ecological quality ratio scale for the Member States’ monitoring systems.

After 2 phases of intercalibration, still significant gaps exist for mainly coastal and transitional waters. The analysis of the relationship between the assessment methods and combined pressures in the marine environment and calibrating for regional differences is more complex than and not as straightforward as in lakes and rivers. Existing scientific knowledge for this intercalibration process is recognised to be important in the practical intercalibration guidance protocol adopted by the Water Directors in December 2010, since scientific arguments need to be provided when it is not possible to develop a WFD-compliant method or when an alternative intercalibration approach would need to be found if the adopted options would be insufficient, as it is sometimes very difficult to solve the comparisons solely with adopted routine calculation tasks. Susan P. Davis, one of the reviewers of the 2nd cycle of intercalibration concluded that some unevenness in the results of intercalibration across Europe undoubtedly reflects also historical differences in the degree to which nations have been politically willing, and/or economically able, to prioritise basic and applied aquatic research, and investments in water resource management⁽⁶⁾. Clearly, it would be of benefit to all to search for mechanisms to ensure continual improvements and reductions in uncertainty, for all countries and sea basins, especially those that may not share a strong tradition of aquatic science (Peer review of the intercalibration exercise phase II⁽⁶⁾).

3.2.3 DRIVER FOR JOINT ASSESSMENT ON REGIONAL BASIS

JOINT ASSESSMENT IS OBLIGATORY IN WFD, MSFD AND CFP

Due to the transboundary nature of the marine environment, assessing the quality of marine waters and taking measures to improve its quality are some of the challenges that no single country could address on its own. Regional cooperation, and by preference joint assessment of marine environmental quality are a necessity to obtain transparent, cost-efficient and reliable quality assessments and an identification of effective measures.

The European Framework Directives on marine environment protection and sustainable exploitation of marine resources have further stimulated regional cooperation, initiated already in the seventies by some Regional Sea Conventions. How regional cooperation was stipulated in the European legislation is explained above, leaving still a lot of underexplored terrain for further scientific cooperation, developments and input, including for modelling contributions.

Solutions are currently discussed or already being developed/in place at regional sea level, especially for the MSFD, but this needs to be brought back to the European level - so the creation and maintenance of a forum to ensure continued knowledge sharing and coherence is necessary.

Concerning the knowledge flow from north to south several initiatives are running. The outcome of these support actions should lead to a more coherent level of assessments (therefore not strictly harmonised methodology) between north and south, which can be followed up and assessed in the same European forum.

For this reason, a JRC-based Competence Centre on GES (CC4GES) will be established to manage flexible experts networks responding to needs and requests of Member States and Regional Sea Conventions identified through the MSFD Common Implementation Strategy with the aim to produce predefined deliverables feeding directly to the implementation of the MSFD. The CC4GES could, inter alia, contribute to several activities of the MSFD implementation, such as compiling an agreed glossary of MSFD terms, developing an inventory of methodological standards and supporting the WG GES in the possible revision of the GES Decision 2010/477/EU⁽⁴⁾.

Relevant international organisations, in particular the International Council for the Exploration of the Seas (ICES), are also invited to provide a systematic scientific input to deliverables under the MSFD Common Implementation Strategy according to their expertise and in close collaboration with the CC4GES⁽⁴⁾.

3.3 COMMON FISHERIES POLICY

The Common fisheries Policy (CFP) was formally created in 1983. Essentially, the policy was created to grant mutual access to the newly created Economic Exclusive Zones (EEZs) of Member States. It covers the conservation, management and exploitation of marine resources, and the processing and marketing of fishery and aquaculture products. It provides for coherent measures concerning:

- Conservation, management and exploitation of living aquatic resources;
- Limitation of the environmental impact of fishing;
- Conditions of access to waters and resources;

- Fleet capacity;
- Control;
- Aquaculture;
- Common organisation of the markets;
- International relations.

The most important areas of action of the CFP are:

- laying down rules to ensure Europe's fisheries are sustainable and do not damage the marine environment; there are three types of fishing rules:
 - Fishing effort limitations restrict the size of the fleet that sets to sea and the amount of time it can spend fishing.
 - Catch limits restrict the quantity of fish that can be taken from the sea before fishermen need to stop fishing.
 - Technical measures regulate how and where fishermen can fish. They can, for example, be used to protect young fish (juveniles), encourage the use of more selective fishing gear or prevent serious damage to the marine environment.
- providing national authorities with the tools to enforce these rules and punish offenders;
- monitoring the size of the European fishing fleet: all EU fishing vessels are registered in the Community fleet register, which is updated every quarter;
- providing funding and technical support for initiatives that can make the industry more ecologically and economically sustainable;

Member States have an obligation to adjust their fishing capacity in order to balance fishing capacity with fishing opportunities. The CFP sets quotas for how much of each species can be caught (in a certain area). Each country is allocated a quota based upon the total available stock (Total Allowable Catch, TAC) and their traditional share. Given the critical situation of many stocks in European waters, the total capacity of the Community fleet has been 'frozen' since 31 December 2002. Community fishing vessels all enjoy equal access to waters and resources except in the 12-mile zone, which falls within the sovereignty of the Member States

Decisions and Regulations concerning fisheries are taken by the European Parliament and the Council on a proposal from the Commission after consulting the Economic and Social Committee and the Committee of the Regions. In some cases, a decision will be taken with the consent of the Advisory Committee on Fisheries and Aquaculture in accordance with the procedure established by Decision 1999/468/EC laying down the procedures for the exercise of implementing powers conferred on the Commission or involving other bodies.

The European Commission and the Member States may take emergency measures in the event of a serious threat to the conservation of resources or to the ecosystem for periods of up to six months. The Member States' decisions may apply only to waters falling under their sovereignty. They may also take non-discriminatory conservation measures, within the 12-mile limit, to preserve the ecosystem.

CFP PROCESS

1. The Committee procedure

In contrast to WFD and MSFD, at present there is no regulatory committee assisting the Commission in the implementation of fisheries policy. Three management committees assist the Commission in

developing management measures that it needs to take, relating to the application of the CFP or to the implementation of programmes with substantial budgetary implications:

I. The Committee for Fisheries and Aquaculture (CFA) provides opinion upon request on subjects dealing with the general implementation of the CFP such as conservation measures, control and enforcement, some structural measures and data collection programmes.

II. The Committee on Structures for Fisheries and Aquaculture (CFAS) is convened for issues dealing with EU fisheries aid (FIFG), in particular those related to joint enterprises, producer organisations and implementation rules.

III. The Management Committee for Fisheries Products (MCFP) assists the Commission on subjects related to the common organisation of the markets in fishery and aquaculture products, such as the level of intervention schemes.

These committees are composed of representatives of the Member States and are chaired by a representative of the Commission. Reference to the full Council is possible in the event of disagreement between the Commission and a majority of Member State representatives. These committees meet once a month, and while three committees exist on paper, in practice they are generally comprised of the same national civil servants, each meeting sequentially over two days. Fisheries policy is generally developed through management committees much less than in other policy areas. This is perhaps because of the political nature of fisheries policy, which means that Council working groups largely take a lead. Even where management committees are delegated power under legislation, the Council working groups often lead with negotiations and effectively hand over outcomes to the committees for official adoption as a Commission decision or Regulation (EU Fisheries Decision Making Guide of IEEP⁽⁷⁾).

Figure 4 illustrates how the management committees are related to the other bodies involved in the implementation of the CFP.

2. Technical – Scientific input combined with input from stakeholders

When proposing new fisheries rules and regulations, the European Commission seeks scientific advice from a number of bodies. Facts and figures collected by EU countries under the Data Collection Framework form the basis for these bodies' work. Specialised institutions produce formalised knowledge, which is then used as a basis for management decisions and implementation by a centralised bureaucracy for the CFP⁽⁹⁾. The process is explained below about how the Council Regulations on the TACs are established. The CFP sets quotas for how much of each species can be caught in a certain area. Each country is given a quota based upon the total available stock, known as the Total Allowable Catch (TAC), and their traditional share. TACs are fixed annually by the Council of Ministers. They consider proposals drawn up by the European Commission, after an advisory and consultation process involving several scientific and stakeholder bodies.

International Council for the Exploration of the Seas (ICES)

Within the EU, the main source of scientific knowledge for the CFP is ICES, which uses biological data collected by national research institutes from research programmes and landing records to assess the state of the main commercial stocks. ICES is an intergovernmental body founded in 1902 to

conduct and coordinate research into the marine ecosystems of the North Atlantic. ICES provides advice to a number of governments and regional fisheries management organisations, including the EU. It publishes Popular Advice by fish species and by region on its website.

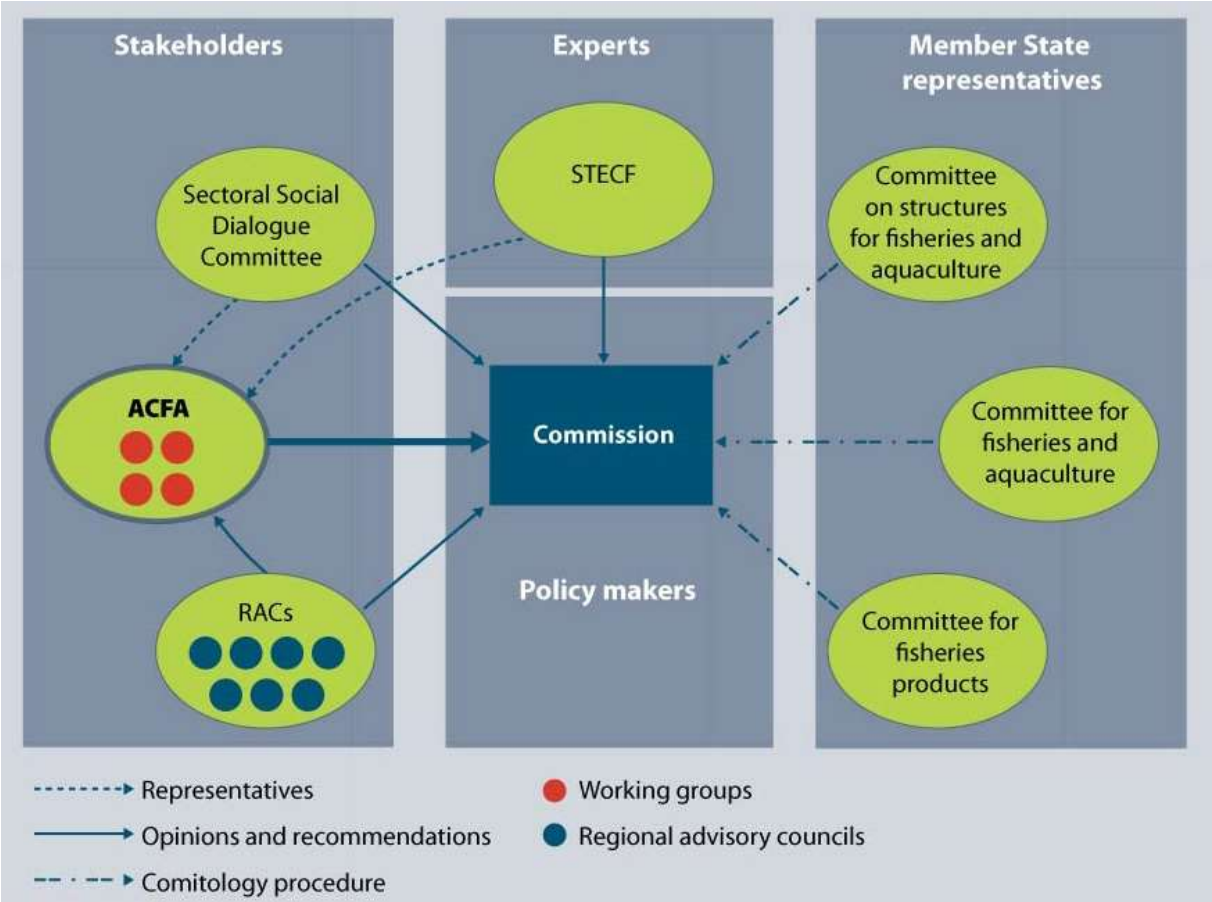


Figure 4: Advisory and consultation bodies for the CFP⁽⁸⁾

The Scientific Advisory Committee (SAC) of the General Fisheries Commission for the Mediterranean (GFCM)

GFCM is a regional fisheries management organisation established in 1952 whose structure and mandate were renewed in 2004. SAC advice forms the basis for binding GFCM recommendations on fisheries management and the conservation of marine resources in the area for which it is responsible, comprising the Mediterranean, the Black Sea and connecting waters.

Scientific and Technical and Economic Committee on Fisheries (STECF)

After getting the input from ICES, the Commission subsequently consults its own advisory Committee STECF, which is comprised of national experts, mostly scientists (biologists and economists), on this ICES advice. It was set up in 1993 to advise the Commission on fisheries management. It is not a permanent body, but a pool of experts who contribute to its work either on a temporary basis as members, or on a demand basis as experts in working groups. The Members of the STECF are employed by national research institutes and nominated by the Commission from highly qualified scientific experts having competence in these fields (marine biology and ecology, fisheries science,

gear technology, aquaculture, and fisheries economics). The term of a Member of the Committee is 3 years and is renewable. The current STECF Members and reserve list was adopted on 27 October 2010 and can be found on the STECF webpage. Acting in co-operation with officials of the Commission the Committee may form internal working groups, whose meetings can also be attended by invited experts. The Commission provides the secretariat of the Committee and of the working groups.

The STECF may be consulted by the Commission on all problems connected with the provisions governing access to zones and resources of EU fisheries and the regulation of fisheries activities. The opinion of STECF is crucial in the process of setting annual Total Allowable Catches TACs and quotas.

The STECF may also on its own initiative provide opinions in the areas of its expertise and produces an annual report on the situation as regards fisheries resources and on developments in fishing activities. It also reports on the economic implications of the fishery resources situation.

Advisory Committee for Fisheries and Aquaculture (ACFA)

TACs are also discussed in the ACFA, where stakeholder views are identified. This committee gives the main stakeholders in the CFP the opportunity to analyse issues and take common positions, to provide policy advice. They can also pass on to the Commission their opinions on issues arising from the implementation of CFP legislation. Their input is mainly political⁽⁸⁾. The ACFA consists of a committee, a bureau and four working parties, of which working group 2 are in charge of Aquaculture. Figure 5 illustrates the composition and interests of this Advisory Committee. As a forum for EU interests, members are recruited from amongst European organisations. Representation of specific stakeholder groups assumes that these groups at national, regional or individual levels hold membership of the relevant European organisations. They consist of a myriad of types of national organisation, with membership drawn from amongst companies, lower level organisations and individual citizens – the latter, for example, would be the norm for NGOs.

Regional Advisory Councils (RACs)

The RACs are also consulted on the annual fishing opportunities. They were established as part of the 2002 CFP reform to enable the European Commission to benefit from the knowledge and experience of stakeholders in the formulation and implementation of fisheries management measures by the European institutions, and hence to increase stakeholder participation in the policy process. Representatives of the fisheries sector and other interest groups, like environmental protection and consumer groups, constitute the RACs. These organisations are relatively autonomous. Their main task is to prepare recommendations and suggestions on fisheries stock management related to the geographical area that they cover, and present them to the Commission and/or relevant national authorities⁽⁸⁾. Scientists also participate in the work of the Regional Advisory Councils. They may be consulted by the Commission, for example on the implementation and preparation of management and recovery plans. They will also, on their own initiative, present recommendations where necessary and inform the Commission and the Member States about problems associated with implementing the CFP.

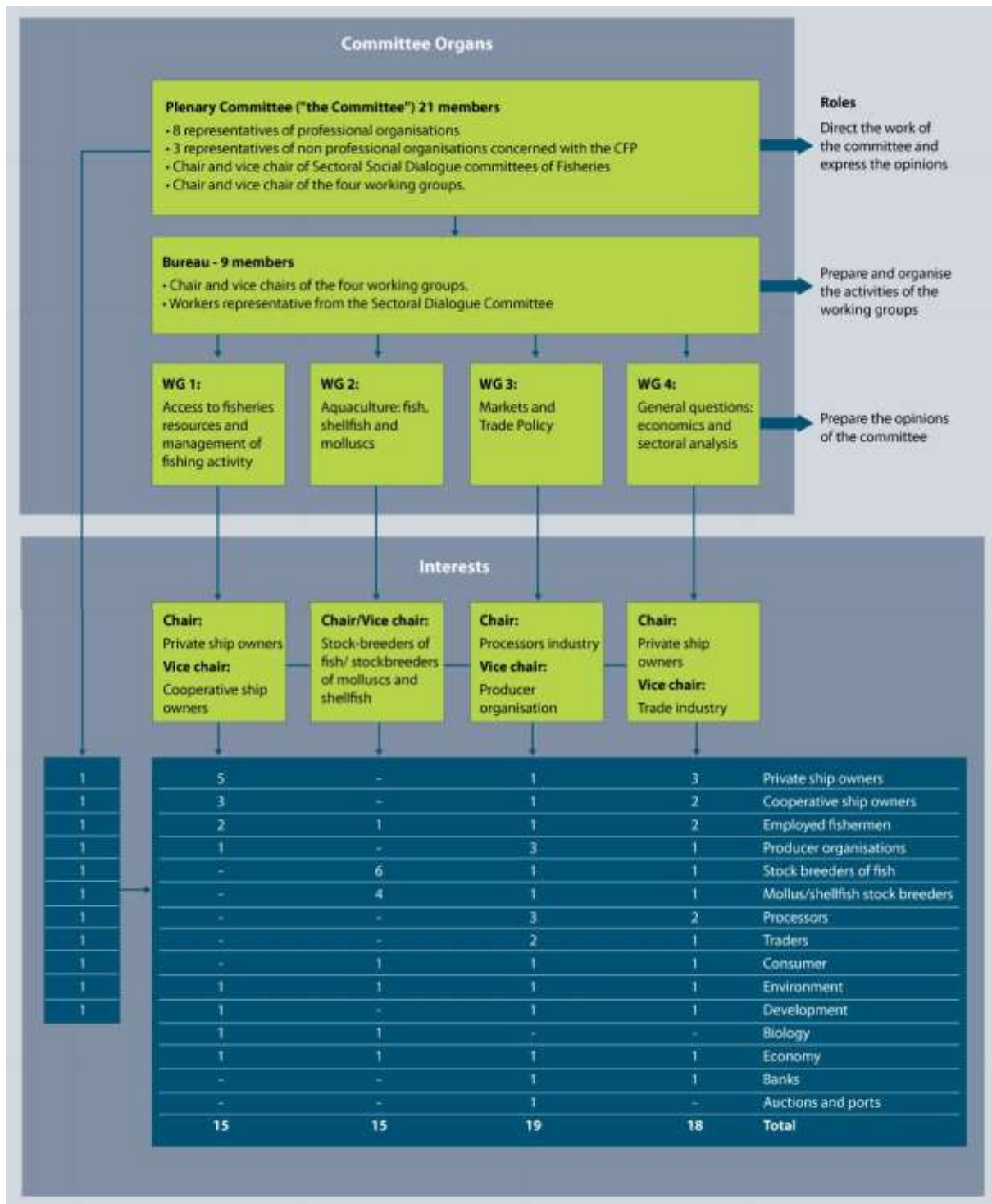


Figure 5, consisting of two parts - the lower part illustrates the organisation of ACFA, i.e. the Plenary Committee, the Bureau and the Working Groups; the upper part illustrates the interests represented and their respective number of seats in the Working Groups and the Plenary. The Commission services participate in the meetings of the Plenary, and the Working Groups. The Secretariat function is provided by the Commission⁽⁶⁾.

In the end, a Commission proposal is put to the Council of Ministers, including the following year's TACs and the conditions under which they should be caught⁽⁹⁾. The Council of Ministers furthermore (when relevant) takes account of the views of non EU fishing nations and the advice coming directly from ICES, which is independent of EU institutions. After negotiations in the working groups and COREPER, the Council of Ministers then takes the final decision on TAC levels and any related measures (usually in late December). It is typical for the Council to adopt TACs different from those proposed. In the run up to Council meetings, industry and NGOs typically engage in intensive lobbying to try and influence the Ministers of their respective countries. These annual TACs are subsequently divided between Member States according to fixed proportions following the 'principle of relative stability' based on historical catch records⁽⁹⁾. After quotas are fixed by the Council of Ministers, each EU member state is responsible for policing its own quota. Different countries distribute their quota among fishermen using different systems.

Standing Committee on Agricultural Research's strategic working group SCAR-Fish

In 2012, SCAR agreed on the establishment of a policy-driven strategic group with the objectives to advise the Commission and Member States on research policies and research themes in order to better coordinate and direct these activities in support of the revised CFP. The group should also develop collaboration between Member States on a more long-term basis in order to support cost efficient science and advice. It is expected to achieve potentially significant improvements such as providing economy of scale, avoiding duplication and improving research efficiency at EU level, sharing research results, linking existing work more closely, and jointly funding strategic areas⁽¹⁰⁾. According to the SCAR-Fish report *Science in support of the European fisheries and aquaculture policy*:

“Although several research networks, Associations, Committees and International Organisations play an important role in promoting research at EU level, they mainly represent the scientific community and the industry and are *de facto* end users of the EU research programmes and related budgets. None include ministry representatives nor have the capacity to define strategic research agenda and/or to mobilise national funds for launching joint initiatives between Member States. There are also funding organisation collaborative activities such as SEAS-ERA and JPI Oceans, but the memberships of these are much wider than the fisheries and aquaculture ministries.

The SWG would help to link the national donors, primarily the Member States' ministries in charge of fisheries and aquaculture, with the European Commission, to develop collaboration beside the existing structures including facilitation of co-operation between existing and new collaboration instruments and initiatives.”⁽¹⁰⁾

2013 CFP REFORM

Europe's fisheries policy was in urgent need of reform. Vessels were catching more fish than can be reproduced sustainably, thus exhausting individual fish stocks and threatening the marine ecosystem. Today 80% of Mediterranean stocks and 47 % of Atlantic stocks are overfished and the fishing industry is experiencing smaller catches and facing an uncertain future. By bringing fish stocks

back to sustainable levels, the new CFP aims to provide EU citizens with a stable, secure and healthy food supply for the long term.

The new CFP intends to radically transform fishing practices in Europe and includes:

- Firm dates to ban fish discards;
- A legally binding commitment to fish at sustainable levels;
- De-centralised decision making, allowing Member States to agree the measures appropriate to their fisheries.

For the first time the CFP also includes a legally binding commitment to fish at sustainable levels, achieving 'maximum sustainable yield' by 2015 where possible, and by 2020 at the latest. This should ensure that annual quotas will be underpinned by scientific advice, to achieve healthy fish stocks and a prosperous fishing industry.

The new laws will also allow countries to work together regionally to implement measures appropriate to their own fisheries, this will replace the over-centralised system that currently hinders progress in EU fisheries.

In June 2012, the Council of the European Union developed concrete text amendments for several outstanding issues, relating to the latest reform of the CFP, includes:

Maximum sustainable yields (MSY): the compromise aims to achieve MSY by 2015 where possible (e.g. when scientific advice on the stocks are available at the necessary detail) and by 2020 at the latest. Consultation with the third countries concerned will be initiated in case where the stocks are shared, with a view to finding an agreement on MSY exploitation if possible.

Multiannual plans: the compromise establishes that multiannual plans should manage fisheries in more detail through quantifiable targets linked to biological parameters as well as safeguard and remedies. It applies the MSY to the significant stocks in mixed fisheries while specific measures apply to other stocks with an approach taking into account interactions between stocks.

Landing obligation and discards ban: Discarding will be phased out. The practice of throwing unwanted fish overboard is estimated at 23 % of total catches and substantially more in some fisheries. Fishermen will be obliged to land all the commercial species that they catch. This will lead to more reliable data on fish stocks, support better management, and improve resource efficiency. It is also an incentive to avoid unwanted catches by means of technical solutions such as more selective fishing gear. A gradual approach of the policy is proposed but the aim is still the elimination of discards. With regard to the landing obligation in identified fisheries a specification through multiannual plans within a fixed timeframe is laid down.

Regionalisation: this concept is supported by a vast majority of member states as it accepts that one size does not fit all. The compromise also introduces an alternative model for regionalisation where member states adopt national measures through regional cooperation.

Advisory councils: the compromise envisages the creation of additional advisory councils namely one for the Black Sea and one for outermost regions of the EU.

Transferable fishing concessions (TFCs) and capacity management: as requested by many delegations, the agreement stipulates that TFC systems should be voluntary. Exemptions to fleet

management rules is possible where TFCs are established and access to funds from the European Maritime and Fisheries Fund is strictly conditioned by follow-up on a reinforced reporting on capacity management.

Storage aid: The concept of storage aid provides a mechanism to store excess produce which would otherwise be lost. However, no major change was made to the Commission proposal concerning the remaining intervention instrument storage aid. The EMFF, on which a general approach was not foreseen, envisages the phase-out of this instrument over time.

Consumer information: in addition to the horizontal food information regulation (1169/2011), conditions for displaying voluntary information are highlighted. The framework allowing the Commission to develop an EU sustainability label is established.

Use of fish not conforming to marketing standards: all caught fish may be used for purposes other than human consumption.

STAKEHOLDER RESPONSES

Research requirements

National Funding Agencies

The UK views the reform of the CFP as a necessity to end unsustainable fishing practices which has resulted in the overfishing of EU fish stocks and damage to the marine environment. In the UK, the inshore fleet - fishing boats mostly under 10 metres in length which operate in coastal waters - has particular difficulties. Fish stocks are at historically low levels, with essentially too many boats chasing too few fish. The UK sees the CFP reform as part of a set of policies which will help to achieve clean, healthy, safe, productive and biologically diverse oceans and seas. The UK is deeply involved in the [fundamental reform of the CFP](#) is also negotiation to ensure that the [European Maritime and Fisheries Fund](#) will include funding to help implement a new CFP. They are also [managing fish stocks](#), by negotiating at fisheries councils and through measures to control and [reduce waste of fish \(fish discards\)](#) and implementing the [EU regulation](#) to prevent the import of illegal, unregulated and unreported fish and fish products into the EU.

The Poland response views the successes associated with the implementing the CFP to be related to a substantial reduction of fishing vessels by scrapping or converting to non-fishery uses and re-training of many ex-fishermen to tourism-related business, such as recreational angling instead of commercial fishing.

The Irish response suggested that the use of existing state maritime infrastructure should be maximised through multi-purpose usage and sharing to support the Data Collection Framework for the CFP and implementation of measures including the conservation, management and rebuilding of fish stocks

Stakeholder Workshop

During the UN International Organisations, Policy and Regional Conventions workshop the representative SCARFISH provided several insights into the CFP. The suggestion was that the science

to policy mechanisms for fisheries are well developed and that there is progress in sharing sensitive data between Member States such as discard numbers. However, it was noted that there are still issues surrounding the use of the MSY, notably that fishing below MSY is a risk to food security and that fishing above MSY is in breach of CFP. It was also stated that the problem with regional scientific committees is that the science is being imparted to the fishers themselves, not their higher level representatives.

3.4 MARITIME SPATIAL PLANNING AND INTEGRATED COASTAL ZONE MANAGEMENT

Maritime spatial planning (MSP) and integrated coastal management (ICZM) should be complementary tools. Their geographical scope overlaps in the coastal and territorial waters of Member States. Where Maritime spatial plans will map existing human activities and identify their most effective future spatial development, integrated coastal management strategies ensure the integrated management of these human activities. Applied jointly, they both improve sea-land interface planning and management. It is envisaged that MSP and ICZM will strengthen and compliment existing marine legislation such as the MSFD, Habitats Directive, IMP and the reformed CFP.

In order to further promote sustainable development of coastal zones, on the 12th of March 2013 the Commission adopted a draft proposal for a Directive establishing a framework for maritime spatial planning and integrated coastal management.

The proposed instrument will require Member States to establish coastal management strategies that build further on the principles and elements set out in the Council Recommendation on ICZM of 2002 and the Protocol to the Barcelona Convention on ICZM, ratified by the EU in 2010.

Integrated coastal zone management (ICZM)

Coastal zones are also among the most vulnerable areas to climate change and natural hazards. Risks include flooding, erosion, sea level rise as well as extreme weather events. These impacts are far reaching and are already changing the lives and livelihoods of coastal communities.

Integrated coastal management aims for the coordinated application of the different policies affecting the coastal zone and related to activities such as nature protection, aquaculture, fisheries, agriculture, industry, off shore wind energy, shipping, tourism, development of infrastructure and mitigation and adaptation to climate change. It will contribute to sustainable development of coastal zones by the application of an approach that respects the limits of natural resources and ecosystems, the so-called 'ecosystem based approach'.

Integrated coastal management covers the full cycle of information collection, planning, decision-making, management and monitoring of implementation. It is important to involve all stakeholders across the different sectors to ensure broad support for the implementation of management strategies.

Coherent application with maritime spatial planning will improve the sea-land interface planning and management; for instance connection of offshore wind energy installation to the electricity network on land or effects of infrastructure works to protect coastlines against erosion or flooding on activities in coastal waters such as aquaculture or protection of marine ecosystems.

Maritime spatial planning (MSP)

Competition for maritime space, for renewable energy equipment, aquaculture and other growth areas, has highlighted the need for efficient management, to avoid potential conflict and create synergies between different activities.

Maritime spatial planning is commonly understood as a public process for analysing and planning the spatial and temporal distribution of human activities in sea areas to achieve economic, environmental and social objectives. The ultimate aim of maritime spatial planning is to draw up plans to identify the utilisation of maritime space for different sea uses.

STAKEHOLDER RESPONSES

Research requirements

National Funding Agencies

The response from Estonia stated that MSP and ICZM should not compromise the achievement of GES. They suggest that these policies should ensure the social and economic livelihood of coastal communities but that knowledge gaps (including insufficiency of research, data and personnel) exist. The response from Ireland proposed that investment in capacity to implement MSP and ICZM could speed up licensing, providing business certainty and protecting ecosystems. The respondent from Poland stated that a comprehensive ICZM database is missing, which includes climate change driven processes, pressures and impacts on the land-sea interface. They suggest the need for a gradual development of detailed pan-EU ICZM stocktaking that will include climate change related problems.

Coordinated monitoring

National Funding Agencies

The Belgian response confirmed that a procedure has been established, shaped by a Royal Decree, to adopt a MSP for Belgian marine waters. The response also stated that the Management Unit of the North Sea Mathematical Models and the Scheldt estuary (MUMM) is considered as an authority having competency at sea and participates on the Advisory Council, this Council formulated advice to the Minister on the preliminary draft of the MSP.

Stakeholder Workshops

In the pre-workshop questionnaire, the European Marine Board suggested that there needs to be an integrated approach to dealing with multiple stressors at various levels, including regulation and planning of activities (MSP, MPAs, ICZM, etc), monitoring of cumulative impacts and development and implementation of robust and reliable risk management strategies.

During the workshop, UNEP-MAP stated that it has a, Mediterranean ecosystem roadmap, ecological objectives (11 agreed) and ICZM roadmap. Currently UNEP-MAP is working on methodologies for: determination of GES for the 11 ecological objectives; preparing an integrated monitoring system; and completing an integrated assessment that includes socio-economic assessment. The IOC representative informed the workshop that the Global Ocean Observing System (GOOS) has developed a document on integrated observations for multiple purposes.

The representative from the Black Sea Convention stated that EU legislation is not fully integrated. The suggestion was that this lack of integration arises from:

- A need to assess approaches at national, regional and international level;
- Differences at each level makes coordination difficult;
- A lack of general coordination;
- A need to unify approaches to increase coordination between different levels.

Web consultation

The IHO reported that the coastal zone is an area of specific concern as most existing data have been collected to meet the requirements of navigation and that the coverage and the quality is insufficient for proper MSP and ICZM. They also noted that the IHO and the European Commission signed a Memorandum of Understanding in 2012. The purpose of this MoU is to provide a framework ensuring continuing liaison between the two sides in the specific areas of common interest including surveillance activities, offshore renewable energy, MSP, ICZM, marine observation and data networks, implementation of the MSFD, marine research, data standards (including those specified by INSPIRE Directive (2007/2/EC) and co-operation with third countries.

3.5 BLUE GROWTH

Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. It recognises that seas and oceans are drivers for the European economy with great potential for innovation and growth. It is the Integrated Maritime Policy's contribution to achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth⁽¹¹⁾.

The 'blue' economy represents 5.4 million jobs and a gross added value of just under €500 billion a year. However, further growth is possible in a number of areas which are highlighted within the strategy.

The strategy consists of three components:

1. Specific integrated maritime policy measures
 - a. marine knowledge to improve access to information about the sea;
 - b. maritime spatial planning to ensure an efficient and sustainable management of activities at sea;
 - c. Integrated maritime surveillance to give authorities a better picture of what is happening at sea.
2. Sea basin strategies to ensure the most appropriate mix of measures to promote sustainable growth that take into account local climatic, oceanographic, economic, cultural and social factors:
 - a. Adriatic and Ionian Seas
 - b. Arctic Ocean
 - c. Atlantic Ocean
 - d. Baltic Sea
 - e. Black Sea
 - f. Mediterranean Sea
 - g. North Sea
3. Targeted approach towards specific activities:
 - a. aquaculture (Fisheries website)
 - b. coastal tourism
 - c. marine biotechnology
 - d. ocean energy
 - e. seabed mining

STAKEHOLDER RESPONSES

National Funding Agencies

Throughout the questionnaire respondents gave answers relating to the development of a Blue Growth strategy. The response from Romania stated that there needs to be a coherent pan-European policy for the development of environmental friendly economic activities. To do this, they propose dedicated programs to push forward the cooperation among major players in maritime economy (R&D organisations + stakeholders + companies). Additionally, the response suggests that economic growth relies on knowledge transfer, from its creators (R&D organisations) to its users (companies, public administration, etc.). Fostering knowledge transfer facilitates job creation, protection of environment as well as social protection. The response from Denmark calls for governance and policies to underpin sustainable industry growth based on life cycle analysis and cradle to cradle principles to minimise environmental footprint. The Portuguese response suggested that Stakeholders lack awareness and mobilisation around the National Ocean Strategy and objectives to be achieved regarding the blue growth. They see that barriers at a European level are mainly bureaucratic and that top down action in Europe takes years to be effective, the perception is that roughly 30% of time and money is lost in paper work. They also see the need to develop and increase research in the field of economy and social sciences associated to blue growth. Other issues relating to the Blue Growth agenda were raised by Belgium and Turkey who expressed concern over future requirements of policy for deep sea mining and piracy respectively.

Stakeholder Workshops

A consistent theme which appeared through the stakeholder workshops was the need for stable framework conditions to enable Blue growth. During the ERANETS workshop it was suggested that the current regulatory framework is not suitable to ensure that activities are conducted in a sustainable way and that it is also necessary to ensure a level playing field for industry. In the Technology Platforms workshop, the current legal framework was not considered suitable to implement technological advances into the relevant industries; it was thought that there is a need for long term, stable framework conditions with the flexibility to adapt to market changes. During the EU projects workshop, it was suggested that policy regulations need to be harmonised at national and international levels in the collection of marine data. This view was echoed in the Technology Platforms workshop, where it was suggested that there is a lack of harmonisation in the fishing sector because all the vessels should have the same monitoring regulation.

During the Infrastructures workshop, it was recognised that in other areas of the world, marine sectors are experiencing rapid growth, like aquaculture in China, compared with the EU and that this needs to be addressed. Since the fishing industry will not grow, the role of aquaculture will be the only way to produce more seafood. The nature of aquaculture is different to fishing and as such the environmental impacts are different. There needs to be a way to co-exist between this productive activity the preservation of the environment. It was thought that this could be tackled at EU and sometimes institutional level. For example, IFREMER are said to be developing methods of productive aquaculture which will not harm the environment.

Web consultation

EuroGOOS believes that the lack of knowledge and knowledge transfer is the most important barrier to Blue Growth. Innovation and growth of maritime economy can be facilitated by a more structured interaction between knowledge producers and users. Experience from the aquaculture sector has shown that when there are well-defined issues that can be addressed by short to medium-term research then this interaction is active and efficient. When longer term issues have to be addressed, where impacts and benefits are not easily visible, then additional mechanisms (such as JPI-Oceans) are needed for strategic planning and relevant investments.

The Sclerochronology and Scleroclimatology group at Bangor University considers that the policies may be conflicting and will impact industries in different ways. For example, subsidies for marine renewables are positive but restrictions on fisheries are negative. It was thought that the most promising aspect of Blue growth is to change the focus of policies such as the Common Fisheries Policy and develop integrated and sustainable fisheries policy. The end result for this should be to reduce the total take and impact of fishing while increasing the economic value of fisheries.

4. THE SCIENCE – POLICY INTERFACE

The science policy interface may be seen as a boundary between knowledge producers and knowledge users and can be described in terms of a simple economic model of supply and demand⁽¹²⁾. The model sees science (knowledge producers) and governance (policy) as different systems with boundary organisations⁽¹³⁾ acting as intermediaries between scientists who produce information, and decision makers who use the information. These organisations operate in a dynamic environment, essentially “straddling the shifting divide between politics and science”.

However, if considered in terms of information flow, and Luhmann's theory of 'ecological communication', such boundary organisations may become self replicating systems in their own right. They will generate their own programs and codes by which data and information are transformed into useable information that lead to decisions. Consequently, they lead to deterioration in the information flow from science to policy, which now needs translation twice. In this context programs (that could be algorithms) are regarded as mechanisms for ‘filtering’ data to extract meaning and used to create evidence whereas codes can be seen as mechanisms for weighing evidence to decide an outcome. By analogy, within a legal framework the process of gathering evidence will require screening (filtering) of data that will be turned into evidence and the rules governing this process equate to the programs. The evidence is weighed according to set of codes (rules) in order to determine if it is sufficient to indicate guilt or innocence.

An EC Framework 6 programme SPICOSA (**S**cience and **P**olicy Integration or **CO**astal **S**ystem **A**ssessment), an EU integrated project, has provided an important analysis of the science policy domain as part of a larger programme that developed an operational research approach framework for the assessment of policy options for the sustainable management of coastal zone systems. The Science-Policy Interface can be seen as a communications space, a forum in which governance, civil society and science interacts (Figure 6). Each of the large rectangles represents an institution; the smaller, rounded-corner, rectangle represent 'actors': groups or organisations of people operating according to the rules of these institutions. The parenthetical words (knowledge, decision, and deliberation) refer to the main attribute of each institution (in relation to environmental problems). So the key attribute of Science is knowledge obtained according to defined procedures: there is, of course, also knowledge elsewhere, but it is not defining as in the case of Science. Civil society is also shown to contain decision-making institutions for environmental co-management, which are part of the collective arrangements. SPICOSA's SAF (Systems Approach Framework) is a set of rules with two main functions: to open a space for communications between the actors (playing the roles of stakeholder, scientist or government (official)/environment manager); and to evaluate policy options or management choices relating to a socio-ecological Issue.

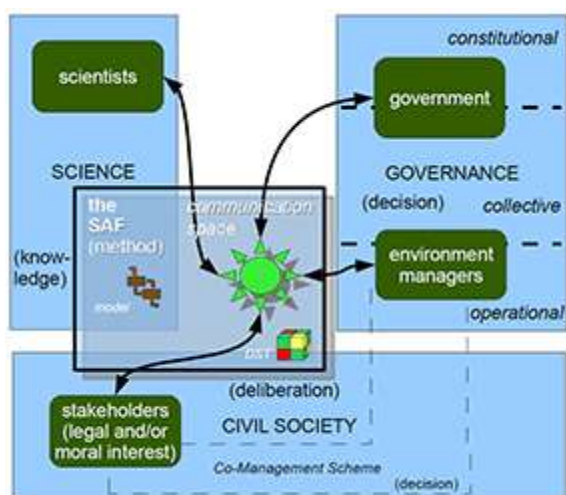


Figure 6: Interactions between governance, civil society and science^[24]

RESEARCH

A range of research funding mechanisms all have a role to play in generating the science required to generate new knowledge needed to inform policy. At the most direct level policy-makers may commission research or fund provision of advice to address a well defined need or policy response. Commissioned research may have longer (2-5 y) or shorter (<1-2 y) term aims and objectives or be shorter term. Longer term research may, for example, set out to provide improved understanding of phenomena of strong relevance to policy that may not be carried out elsewhere (e.g. eutrophication, ecosystem consequences of overfishing). Such work may draw in collaborators from other research groups based in institutions and universities. Shorter term research projects (1-3 y) are likely to be commissioned where answers to more specific questions are required (e.g. evaluate and recommend models for use to predict oil spill movement, work to develop an indicator of ecosystem status). Projects may be either directly commissioned (e.g. single tender actions) or tendered through a competitive process. Many policy making departments have their own strategic programmes for funding research (e.g. Defra's). For the longer term and broader questions policy-makers look to the scientific community's funded activities to draw out knowledge and evidence to inform their needs.

Conversely the science community's approaches, funding mechanisms, outputs and even performance judgements are based generally on supporting combinations of blue skies and strategic research projects and/or programmes with criteria based on research excellence usually having greater emphasis than impact or immediate application. Yet the drivers and pressures to demonstrate impact and make use of science for a range of policy and financial reasons are growing. The need for effective science/policy interfaces between the science community, the science community funders and the policy-makers are becoming ever more critical.

Both of the main research modes result in new knowledge but commission (or applied) research are directed towards specific aims and objectives.

WHAT DO WE MEAN BY POLICY?

A policy can be considered a plan or measure which is intended as a response to a perceived need and is implemented to achieve a particular outcome.

For example, regulatory agencies often provide guidance or establish official rules and procedures (regulations); organisations develop strategies to focus their activities; and governments introduce legislation to achieve a range of social, economic and environmental goals.

Evidence-based policy-making

Government departments increasingly stress the need for evidence-based policy, and it is clear that sound policy-making relies upon the government receiving a flow of reliable information from all relevant sectors, public and private.

At the same time, policy-makers and scientists need to recognise that policy may have to be decided in the absence of complete information. Indeed the scope of policies such as the MSFD is so wide it will be difficult to ever have all of the information that is theoretically required to answer the questions posed. A more feasible approach is to recognise that the information required must be fit for purpose and legally defensible. The decision with regard to what is fit for purpose primarily lies with the policy user of scientific information. Scientists may need to qualify the advice they give, but be ready to form opinions on the possible options.

Policy should be...

- Evidence based
- Fit for purpose
- Defensible
- Ongoing process
- Iterative

Policy implementation is an ongoing process. Although the process varies, it commonly involves an iterative cycle. Since scientific findings can contribute to the evaluation as well as the initial development and implementation of policy, it is appropriate for scientists to be involved not only early on, but also in reviewing policy and proposing amendments to improve it. An overview of the process by which policies are developed and implemented is shown in Figure 7.

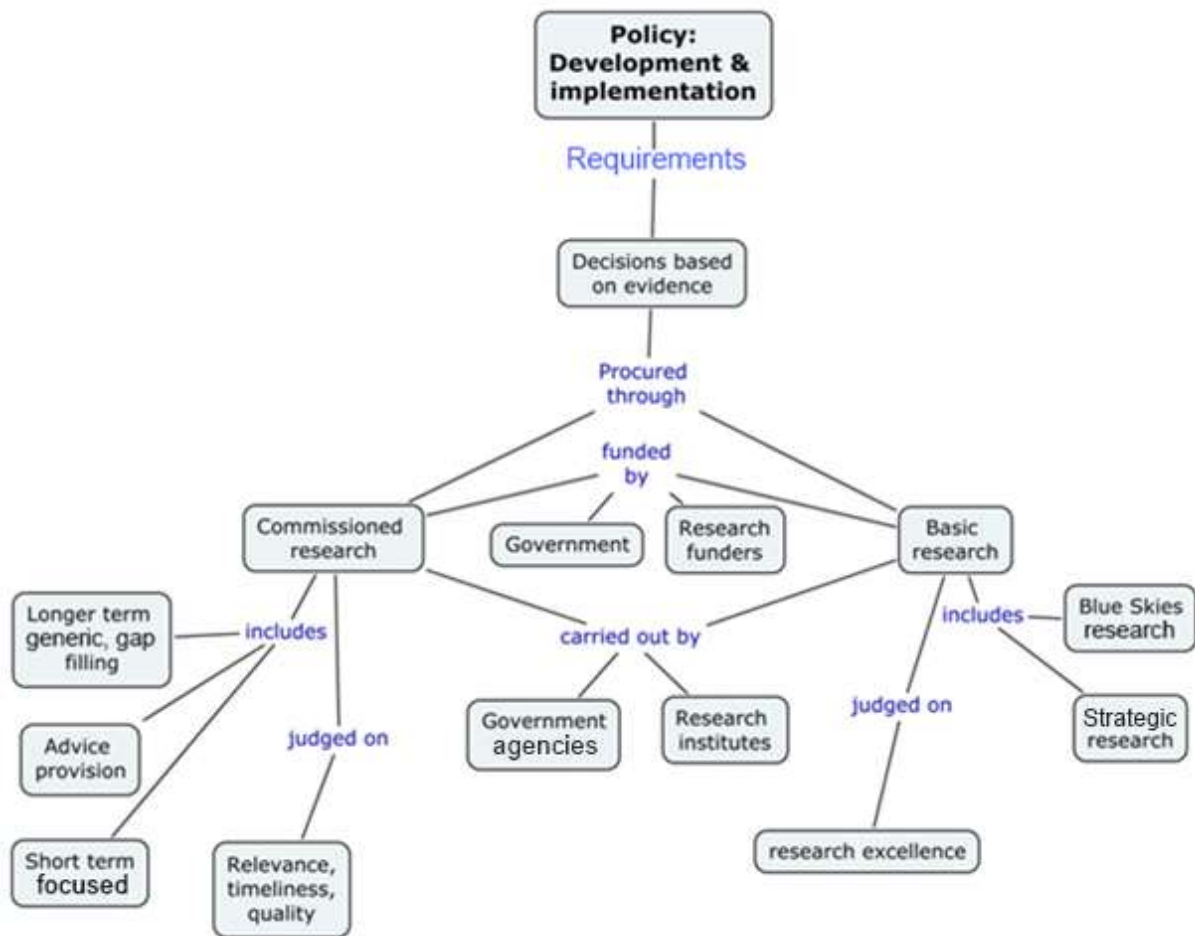


Figure 7 How science is used to inform and implement environmental policies. The figure shows the different sources of research and how this is funded.

Most environmental science is potentially relevant to policy, it is not always obvious if it will be relevant immediately or in the long term. Specific findings can have a direct policy impact, such as the observation of the Antarctic ozone hole which led to the development of the Montreal protocol, a specific regulatory tool. Or in more complex ways, environmental science supports broader high-level policy developments such as the aggregation of knowledge and scientific consensus. An example is the build up through the IPCC process which will inform future climate policies and which underpins global agreements such as the Kyoto Protocol to the United Nations Framework Convention on Climate Change.

The science policy interface is complex and multifaceted. Science findings, reports and publications are only a starting point in providing evidence to policy-makers; scientists and policy-makers must also work together to ensure research outcomes are understood, relevant and achieve maximum uptake and impact. Judgements of risk and uncertainty come into play, as well as wider political drivers. Engaging policy-makers in science doesn't just mean making research results available. It also means helping them understand the implications and working with them to decide how to respond, and what additional research, monitoring or other activities are needed. The information flow needs to be in two-directions.

The needs of policy-makers should be framed in ways which the science community can respond to – both in terms of specific questions to be posed and addressed and in the provision of effective

funding mechanisms and frameworks for dialogue to enable the necessary research to be specified, delivered and assimilated into policy developments on an ongoing basis. The science to policy process is non-linear and can be unpredictable. New scientific discoveries, such as ocean acidification, call for rapid policy development as the scale and implications of the environmental change are becoming apparent. New technological advances, such as the use of nano-particles and micro-plastics in a range of novel products and processes are having unforeseen consequences in ocean ecosystems and may require additional regulation. In some areas the policy imperative for action sets goals for attainment which themselves pose new challenges for scientific understanding; for example the MSFD is often cited as an example of where ‘the policy leads the science’.

This raises a series of challenges which must inform, implicitly and explicitly, the development of any effective science/policy interface activities. These include:

- How policy-makers judge the validity of scientific advice:
 - Demonstrable impartiality or the opposite,
 - Strength of track record of advice provision,
 - Scientific standing of advice giver,
 - Trust, mutual respect and understanding,
- Need to distinguish between different types of scientific knowledge and how it may be used:
 - Prior knowledge residing in different repositories with different stakeholder interests– scientific literature, people (expert opinion), a knowledge reservoir,
 - Knowledge and insight gained through discussion (e.g. ICES WG) – community analysis,
 - Advice based on scientific knowledge for *ad hoc* questions,
 - An evidence base incorporating information derived from data acquired through:
 - observations carried out as part of a monitoring programme,
 - observations carried as part of research programme,
 - model simulation(s),
 - integrated data and/or assimilated into models.
- The need to consider the nature of the requirement and the timescale of policy responses:
 - *Ad hoc* requirements e.g. emergency response,
 - Policy development,
 - Policy implementation,
 - Interpretation and evaluation of evidence,
 - Repeated/iterative advice based on recurring requirements.

Guidelines for policy-makers on using science

In 2010, the UK government’s Chief Scientific Adviser produced revised Guidelines on Scientific Analysis in Policy Making. These address how government departments should obtain and use scientific analysis and advice in policy-making⁽¹⁵⁾.

A major concern for policy-makers is the need to assess risk and uncertainty. The issue was investigated in 2006 by the former House of Commons Science & Technology Committee in its inquiry Scientific Advice, Risk and Evidence-Based Policy Making⁽¹⁶⁾.

It has also been considered by the UK's Parliamentary Office of Science & Technology. This highlighted the different types of risk and uncertainty, the benefits of public engagement, and the guidance that uncertainties should be made explicit and their implications transparently taken into account in decision-making.

At European Level the Commission has recently recognised the need for high profile leadership through the appointment of Professor Anne Glover as the first European Chief Scientific Adviser. Her mandate is:

- To provide independent expert advice on any aspect of science, technology and innovation as requested by the President;
- Upon a request by the President, to provide analysis and opinion on major policy proposals being submitted to the College touching upon issues of science, technology and innovation; in particular the Chief Scientific Adviser will provide authoritative guidance on interpretation of scientific evidence in presence of uncertainty, and will be involved in strategic emergency planning;
- To build relationships with high-level advisory groups (e.g. European Research Area Board), the scientific Committees of the Commission, the EU agencies (European Medicine Agency, European Food Safety Authority, the European Chemicals Agency and the European Centre for Disease Prevention and Control), the European Group on Ethics in Science and New Technologies;
- To build relationships with similar structures in Member States and other countries;
- To advise on novel science, technology and innovation issues arising both in the context of the EU and internationally; to serve as an early warning conduct point on issues that might arise when scientific progress entails either opportunity or threat for the EU;
- To communicate the scientific values on which specific Commission proposals are based in order to enhance public confidence in science and technology, and in general to promote European culture of science and technology widely within Europe and abroad;
- To chair the [President's Science and Technology Advisory Council](#).

4.1 INCREASING SIZE AND COMPLEXITY OF POLICIES

There is an increasing number of articles being published by the marine science academic community relating to the scientific requirements of European policies. Within this body of literature one can find critiques of policies, calls for action and suggestions of how to implement specific aspects of different policies.

A criticism of policies such as the MSFD relates to how science should be used to assess the health of an ecosystem⁽¹⁷⁾. Unlike the WFD, which indicates four ways in which the condition of an ecosystem can be addressed, the MSFD leaves the development of assessment criteria and methodology up to member states⁽¹⁸⁾. In addition to the issue of intercomparability, there is also some scepticism to

whether the scientific understanding of marine ecosystems and their responses to human activities is currently sufficient to fully implement policies such as the MSFD⁽¹⁷⁾.

Another area of debate relates to the governance structures which exist for European marine legislation, namely the concept of Multi-Level Governance⁽¹⁹⁾. The nature of the marine environment is creating an increasing level of interdependence between governments operating at different territorial levels and as a result, the level of interdependence between governments and non-governmental organisations is also increasing. It has been suggested that as policies move away from established institutional mechanisms a certain level of ambiguity will arise^(19, 20). This ambiguity can be seen as discrepancy between the implementation of different policies by an institution⁽¹⁹⁾.

4.2 COMMUNICATION OF UNCERTAINTIES AND RISK

The communication of scientific uncertainty to policy-makers can easily lead to misunderstandings. The problem arises from different understandings of the term “certain”. While scientists use the term in a scientific and statistical sense, policy-makers, the media and the public tend to have a looser definition. When presenting their findings, a scientist will give an uncertainty relating to potential errors that can result from a range of factors, such as the accuracy of the instruments used to collect the data.

It is important that evidence is presented to policy-makers with uncertainty attached to allow them to make an informed decision. But how can this mechanism be improved? What can be done to ensure that scientists present uncertainty in a way that policymakers understand and how can policy-makers be educated to better understand what uncertainty means in scientific terms?

Perhaps the most high profile science to policy mechanism is the IPCC assessment reports. To ensure consistency between multiple authors of the final report, the IPCC issues guidance notes such as the *Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties*⁽²¹⁾. This document provides the scientists with advice on how to translate scientific uncertainty into terms that would be understandable to policy-makers; one example (shown in Table 5) shows the terminology to be used to substitute the percentage likelihood of an event taking place.

Table 5: Provides calibrated language for describing quantified uncertainty⁽²¹⁾.

Likelihood Scale	
Term	Likelihood of the Outcome
Virtually certain	99-100% probability
Very likely	90-100% probability
Likely	66-100% probability
About as likely as not	33-66% probability
Unlikely	0-33% probability
Very unlikely	0-10% probability
Exceptionally unlikely	0-1% probability

Figure 8 is also taken from the IPCC guidance notes and depicts summary statements for evidence and agreement and their relationship to confidence. Whereas Table 5 is able to provide an exact translation for numbers to terminology, this Figure tries to correlate agreement and evidence into a

“confidence” scale. There is more flexibility in this relationship, which is shown by the shading, but it is also recognised that confidence should not be interpreted as probability and that it is not the same of “statistical confidence”.

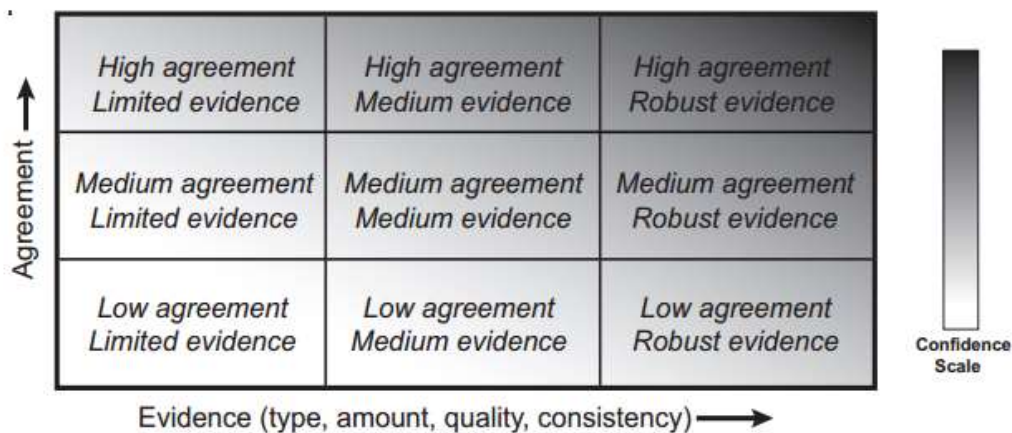


Figure 8: A depiction of evidence and agreement statements and their relationship to confidence. Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Generally, evidence is most robust when there are multiple, consistent lines of high quality evidence⁽²¹⁾.

In European policy, the Water Framework Directive requires an estimate of the level of confidence achieved in classification of the status of a water body. A specific technical approach on achieving and reporting adequate confidence and precision has been addressed in the Ecological Classification Guidance⁽³⁾. It indicates how a level of confidence is recommended to be assigned and specifies that monitoring results that do not include an estimate of their errors should not be used in classification. Information on confidence and precision in monitoring results, using the normal methods by which scientists estimate the errors and confidence limits in the numerical results produced by their monitoring, will help to quantify the uncertainty from errors and gaps in data and allow to estimate the level of confidence as a percentage of probability, that the true class of a water body is:

- (a) As reported;
- (b) Worse than reported; or,
- (c) Better than reported.

The main recommendation of the guidance is that the estimates for (a), (b) and (c) should always be made. It is recommended that the main sources of uncertainty in the class assigned should be identified, with particular reference to monitoring frequencies and taxonomic resolution and how these have been used to achieve adequate confidence. The aim is to reduce errors, where necessary, using more and better monitoring and assessment.

Also in the OSPAR eutrophication assessments, efforts have recently been made to include estimations of confidence in the assignment of eutrophication problem areas. In the 2013 update of the Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime

Area³ confidence of assessment against area-specific thresholds as well as of representativeness of monitoring stations in space and time will be assessed.

1) Confidence rating of the individual assessment parameters will be applied to indicate the reliability of the monitoring data. The confidence is assigned using either a quantitative (e.g. for the parameters nutrients, chlorophyll-a) or a descriptive approach (e.g. for the parameters macrophytes and macrozoobenthos).

2) To document the representativeness in space and time of the existing monitoring array a gridded approach can be used where appropriate. The approach requires an iterative procedure on the basis of subdividing space (e.g. stations along transects) and time (assessment period under consideration) in grid elements and assigning a score to the monitoring density in grid elements in relation to the gradients evident in that space/time. The procedure is not suitable for highly dynamic environments (where instead of transects of fixed stations e.g. high-frequency sampling from automated buoys might be employed), nor for marine areas where water masses are highly discontinuous and cannot be applied to monitoring strategies that are relying on novel observation tools. In case the proposed method is not suitable for certain assessment areas it should be explicitly described how the monitoring design addresses the particular typology and main hydrographical dynamics in the area, so as to provide evidence on the representativeness of monitoring in space and time.

4.3 STAKEHOLDER ENGAGEMENT IN THE MARINE AND MARITIME SECTOR AT EU LEVEL

The need for urgent efforts to construct a stakeholder dialogue at EU level across the marine and maritime policy stakeholder communities was recognised in the *An Integrated Maritime Policy for the European Union -Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM* (also known as the 'Blue Book'). Amongst its many actions, the Commission committed to presenting a comprehensive European Strategy for Marine and Maritime Research in 2008⁽²²⁾; to launch joint cross-cutting calls under the 7th Research Framework Programme to promote an integrated approach and improve understanding of maritime affairs; and to supporting the creation of a European marine science partnership for a concerted dialogue between the scientific community, the industry and policy-makers.

In response to the latter commitment, one of the actions was the creation of a European Maritime Day. First launched in 2008 and now in its seventh year (Bremen May 2014) the associated high level stakeholder conferences have provided a platform for dialogue across the marine and maritime communities, policy-makers and industry, helped to raise the visibility of maritime sectors and support an integrated approach to maritime affair. Participants come from ports, shipping industries, clusters, environmental associations, trade unions, scientific and research institutions, education, and local, regional, national and European authorities, amongst others. At the 2009

³ OSPAR, 2013. Common Procedure for the Identification of the Eutrophication Status of the OSPAR Maritime Area http://www.ospar.org/documents/dbase/decrecs/agreements/13-08e_common_proc_eutrophication.doc

Meeting in Rome a workshop on ‘**An all-embracing stakeholder platform for a holistic Maritime Policy**’⁴ concluded that there was strong support for dialogue between maritime stakeholders, and between them and public authorities; the need to take into account the diversity of interests of stakeholders; and support for a coordinating group based on the five pillars of science, industry, environmental NGOs, regions, and users of the sea.

Participants in the discussion recognised that to be successful any such platform(s) should be able to act around specific thematic foci and demonstrate added value, the one size fits all’ approach was not seen as being achievable. In subsequent years the European Maritime days have adopted themes which reflect this – and are increasingly focused on the blue growth agenda. As a now recognised ‘brand’ bringing together key stakeholders the European Maritime days represent one mechanism that the JPI Oceans community might build upon in reinforcing cross sectoral, multi-stakeholder dialogue at the science/policy interface

The commission, under FP7, also put in place calls for coordination and support actions to facilitate stakeholder dialogue across the marine and maritime communities. The funded projects which arose for these calls, in particular MARCOM + and EMAR²RES, now both concluded, brought together a range of intermediary and representative organisations and platforms themselves consisting of a range of member of stakeholders.

The MARCOM+ project⁵, coordinated by ICES, aimed to support the marine and maritime science communities to test mechanisms for the establishment of a European marine science partnership that would contribute to developing interactions between partners (Member States, regional authorities, the research community, industry and other stakeholders). The EMAR²RES project brought together stakeholders with a focus on maritime transport⁶.

On 22 March 2012 these two projects held a final conference entitled "Fish and Ships". The detailed deliverables, efforts and experiences of the consortium members participating in these two projects provide a valuable resource and source of lessons that should be drawn on to inform the development of any future marine/maritime science to policy and stakeholder engagement interfaces.

4.4 STAKEHOLDER RESPONSES ON SCIENCE-POLICY INTERFACES

National Funding Agencies

The respondents to the national funding agencies questionnaire gave specific examples of mechanisms which exist to help channel advice from researchers to policy-makers. The respondents were also asked to explain why the science to policy mechanisms they gave as examples were effective. The questions asked relating to the science policy interface can be found in Annex V.

⁴ - <http://ec.europa.eu/maritimeaffairs/maritimeday/en/2009> (proceeding pages 74-79)

⁵ http://cordis.europa.eu/projects/rcn/94699_en.html

⁶ <http://www.emar2res.eu/>

Belgium reported that projects of the research programmes of BELSPO are followed by a "user committee" composed of potential users of the research outcomes. The objective of this committee is to provide an active follow-up of the project and to determine the value of the research. It carries out its role through the exchange and provision of data and information, giving advice, suggesting possibilities to valorise the research, etc. The committee is composed of potential users of the results, such as representatives of public authorities at national, regional, European, or international level, social actors, scientists, industrial actors, etc. The committee is formed at the beginning of a project and its composition is proposed by the researchers during the project proposal stage. Several meetings and contacts are organised during the course of the project between the researchers and the committee.

In Flanders, the Flanders Marine Institute (VLIZ) uses different mechanisms which range from information portal (website), to study and expert groups, conferences, debates and policy informing briefs. VLIZ has recently published *The Compendium for Coast and Sea* which contains the socio-economic, ecological and institutional aspects of the coast and the sea in Flanders and Belgium. The Compendium aims to aggregate objective and scientifically-underpinned information and data from Flemish/Belgian marine and maritime research and intends to increase the accessibility and visibility of this research. This initiative is the result of intense cooperation with a network of experts and was coordinated by the (VLIZ). Chapter 3 of the Compendium provides an overview of the existing mechanisms, authorities and platforms for the implementation of research results into marine/maritime policy choices and policy decisions. The respondent felt that the Compendium is effective because it gives full access to information about the socio-economic, ecological and institutional aspects of the coast and the sea in Flanders and Belgium. It is a one-stop-shop for policy-makers to find relevant scientific information.

Flanders also publishes annual reports on the state of the environment (VMM Milieurapporten MIRA) and on Nature (INBO- Natuur rapporten NARA). The Flemish governments department for Agriculture and Fisheries has published a report on Fisheries (VIRA). Annual reports on fisheries (landings, value of landings, fleet and economic output) are also published. The Flanders Port Commission (Vlaamse Havencommissie) publishes six-monthly statistics and annual extensive reports on the Ports activities on turnover, employment and investments.

In **Ireland** the main channels of communication used by researchers to advise national policy are:

- Research Outputs (Policy Reports)
- Focus Groups
- Workshops/Conferences

Policy-makers also directly commission reports pertaining to particular policy issues. It is thought that these mechanisms are effective to a point but that improvements could be made so that the dissemination of science-to-policy is more co-ordinated and streamlined.

The Prime Minister's Office in **Finland** organises 2-4 meetings a year for marine and maritime stakeholders (governmental offices, NGOs and business and trade organisations). The meetings are designed to inform and discuss national comments on EU initiatives.

In **Romania** Ministries request researchers with specific expertise on an *ad hoc* basis. As an example, the response cited monitoring in the Black Sea which is performed in Romania by National R&D

Institute for Marine Sciences “Grigore Antipa” from Constanta. Ministry of Environments provide financial resources to this institute for receiving up to date information on this issue. Data regarding air quality (low level) are provided by National Agency for Environment Protection (ANPM) on regular basis. While in Romania there is a continuous interaction between R&D organisations (that are part of the National R&D System) and policy-makers on specific issues. The role of science within the policy making process should be strengthened and science input in policy making process should be done on regular basis.

In **Turkey** fisheries advisory group including fishermen associations, scientists, ministerial staff and NGOs affect the final management decisions made by the Ministry. This is thought to be effective since all parties take part in the meetings and final decisions.

Managers of scientific institutions in **Poland** cooperate with policymakers to seek additional funding. They see this activity in the scientific sector as a symptom of the ability to survive in an environment where multiple sources of funding must be pursued. The negative side of this situation is that some research avenues are sometimes stopped before being fully explored due change in policy-driven topics. It is thought that these mechanisms would be more efficient, accurate and thorough if data access is less restricted.

The **Portuguese** response stated that it is accepted that marine knowledge in Portugal is transferred:

- By interested scientists, using conferences, newspapers or other similar tools;
- Using scientists contracted as advisor staff to the different administration offices;
- through high level advisory boards, such as the National Council for the Environment and Sustainable Development;
- Through a governmental body (Portuguese Institute for the Sea and Atmosphere – IPMA; web link: <https://www.ipma.pt/en/index.html>), which is part of the central administration, and is responsible for producing political and technical advice and environment monitoring.

In addition, The Azorean Government body dedicated to the maritime affairs has also launched an annual conference where scientists are invited to share their knowledge and achievements (“[To know the sea of the Azores](#)”). In Portuguese: “Conhecer o Mar dos Açores”.

In the case of FCT, the Scientific Councils, namely the Scientific Council for Natural and Environmental Sciences, provide the FCT Board with strategic advice and recommendations on developing, implementing and modifying science and technology support programmes. The scientific councils’ advice and recommendations draw on a range of perspectives from across key stakeholder groups including academia, business, third sector organisations and Government and meets on a regular basis (usually every two months). It is the Scientific Councils’ remit to:

- Advise on FCT’s strategic plans for research, training and knowledge exchange, in order to increase Portugal’s scientific competitiveness;
- Advise FCT on building a multidisciplinary research community and supporting internationally competitive science in Portugal;
- Provide an appropriate environment for testing new ideas.

However, the respondent stated that the mechanisms are not effective or organised at a national level. They believe that the Portuguese Government should organise an annual conference similar to the one that the regional government of the Azores already organises. At such a conference,

scientists would share the pathways leading to the creation of knowledge aligned with the marine and maritime national strategies.

The **UK** response provided several examples including:

- Examples include: UK climate change partnership [CCIP](#);
- Marine climate change impacts partnership ([MCCIP](#));
- The Government's Marine Science Coordination committee (MSCC) and its subgroups;
- Living with Environmental Change [LWEC](#);
- Co-design of new research programmes e.g. Defra/DECC/NERC for Arctic science;
- Plus consultation responses, a wide range of committees, briefing notes to [parliamentarians](#).

These mechanisms are specific, focused and have a considerable degree of agreement and support. They are thought to work well when the science is done for a specific purpose with realistic expectations of what the science will deliver. Scorecards deliver science to policy information in a clear and precise way and on a timescale to be usable which makes them good for an aggregation of indicators. However, the respondent reported that this does not have so much scope for strategic input into evidence, that has to be handled in different ways through the evidence groups. The response also stated that the communication and understanding of uncertainty is necessary to avoid bias.

In **Norway** research programs funded through the Research Council of Norway arrange conferences for researchers and policy-makers, where the results from new research are presented. In addition research institutes publish reports with an overview of relevant research.

The Norwegian response also provided portals presenting relevant research including:

[Environment.no](#): The Web site - State of the Environment Norway - aims to provide you with the latest information about the state and development of the environment. The service presents environmental topics in a simple and easy-to-follow way and provides access to more detailed scientific presentations. On most of the pages you will also find further information about legislation and international agreements, environmental targets, references and relevant links. In addition you may download the latest data sets.

[Matportalen.no](#): The web sites present information about food, health and physical activity to consumers from the Norwegian health and food authorities. The objective of matportalen.no is to help the consumers make enlightened choices.

[english.vkm.no](#) : The Norwegian Scientific Committee for Food Safety (VKM) carries out independent risk assessments for the Norwegian Food Safety Authority (Mattilsynet) across the Authority's field of responsibility as well as environmental risk assessments of genetically modified organisms for the Directorate for Nature Management.

The Norwegian response stated that there is always the need to improve science to policy mechanisms, but that within the fisheries management there is a quite efficient science to policy mechanism in place. This was confirmed in a recent evaluation of the Institute of Marine Research.

The national funding agencies were also asked if there are examples of European or international science-to-policy mechanisms or processes which are particularly effective and could be investigated as case studies.

Norway, the UK and Turkey suggested that ICES as a good science-policy mechanism. The Norwegian response elaborated further that the system for developing scientific advice for fish populations through ICES WG/EGs and finally advice given by ICES through the Advisory Committee where selected scientists from member countries of ICES give their scientific approval, is a good example of an efficient science to policy mechanism in Europe. The UK also provided the IPCC as an independent scientific perspective which is peer reviewed. The Portuguese response suggested that the participation of the national funding agencies in European or international science-to-policy organisations or Committees is an example of best practice. These include the European Science Foundation (ESF), Science Europe (SE), European Cooperation in Science and Technology (COST) and Joint Research Centre (JRC).

While the other responses to this question did not give specific examples, they suggested additional mechanisms that exist. As a relatively new EU member, Poland has found the very obligation of having to adopt EU marine standards is very effective and that these would not have been implemented due to the associated social costs, which are alleviated by the access to EU funds.

The Irish response suggested that open access to online research repositories has increased the information available to both researchers and policy-makers, which has provided better knowledge transfer across member states. The Estonian respondent stated the mechanisms where key experts can participate in management/policy meetings and directly transfer the knowledge and advice are effective. However, they reported that this does not always occur, especially in situations where science is created by universities, but the country is officially represented by governmental departments who do not hold scientific excellence. It is thought that in several countries scientific excellence is located in universities and involvement of university scientists in science-to-policy mechanism is of essential and increasingly important.

The response from Italy suggested that implementation of the new IOC GOOS programme could be an effective method to establish the science to policy European link. It was reported that the GOOS Steering Committee is designing an enhanced global sustained ocean observing system over the next decade, integrating new physical, biogeochemical, biological observations while sustaining present observations. This new concept will consider the political and social issues as main requirements of the ocean observing system as well as the possibility to sustain present research observations, expand to new variables to serve new requirements, and identify regional priorities, capacity, and addressing gaps. The Italian response identified lack of off-shore data, poor quality of coastal data, no common data quality control and quality assurance as barriers to implementing marine policies. It was suggested that observing infrastructures are limited and that there is no design for the optimal spatial distribution of infrastructures.

The response from Denmark stated that there is a lack of data and information sharing between ministries responsible for each industry sector within each country to implement the MSFD and a possible MSP, so to coordinate at an international level is challenging and that Member States do not share similar organisational structures which adds to the complexity. The response also recognised that while the mechanisms to provide sound, credible and transparent advice on fisheries

management is available in Europe, coordinated through ICES, the resources to deliver the scientific basis and the advice are overstretched due to increasing demands on the advisory process with respect to time and spatial scales to be addressed, and the delineation of ecological, economical and social consequences of suggested and implemented management measures. In combination with above problems in the implementation of the MSFD as environmental pillar of the CFP, and interlinkage to other maritime activities, there are major challenges ahead in delivering science and advice underpinning European policies.

The response from Sweden suggested four issues relating to the implementation of EU marine and maritime policies. Lack of basic environmental and biotope data, restrictions in terms of distribution of depth data, research institutions are not following the Open data directive and a lack of common metadata sets, and central storage directives

Stakeholder Workshop

UN-International Organisations, Policy and Regional Conventions

One area where it was felt that communication could be increased between scientists and policy maker is fisheries. The CFP currently aims to achieve the MSY in fisheries to ensure sustainable food security. However, there are several scientific issues with this concept, such as how to achieve MSY in a mixed fishery. Without understanding how to achieve MSY in a mixed fishery, food security is at risk if fishing is below the MSY whereas to over fish would be in breach of the CFP. The aspiration should be to input scientific knowledge into fisheries management.

There are tools available, such as the Ocean Health Index, to integrate all the relevant data to make policy level assessments. However, these tools lack the data to underpin effective analysis and there are some tools available, such as DIVA, which are not shared between Member States. There is an urgent need to explain the role of the oceans sub-surface to policy-makers, especially deep-ocean and its role as a heat and carbon sink.

Some systems, such as OSPAR, have a legal obligation to have science to policy dialogue. However, it was suggested that the modes of practice in OSPAR could benefit from a more dynamic involvement. Policy-makers are not seen to be good at asking the right questions to be addressed by scientists and yet science based policy development is central to good management. Other examples of almost legal requirement of science to policy dialogue exist in Australia, where the connection between the fishing industry and scientists is effective. In Europe, SCARFISH brings fisheries stakeholders together to solve problems and involves experts from science and policy.

It was recognised that political support for environmental issues is closely linked to public opinion. It was suggested that scientists could utilise media outlets to encourage public understanding, and therefore political support, of environmental issues. To be effective, scientists need to ensure that their information is presented clearly and accurately. The importance of publicising key issues, such as CO₂ crossing the 400ppm threshold in the atmosphere, ensures that environmental concerns remain in the public interest and therefore at the forefront of government decision making.

It was suggested that industry should be involved in the science-policy cycle since the development of new policies may lead to new market opportunities. For example, industries have emerged to add value to the data from basic monitoring requirements and this potential should be considered in the development of a monitoring strategy. The key issue is how science-policy mechanisms can connect producers and potential users of data. An example is the the COPERNICUS Marine Core Service, which covers monitoring and provides operational forecasting of the ocean. Core information outputs of COPERNICUS are being utilised by industry to develop services and products for a range of end users⁷.

Several limitations to effective science-policy mechanisms were identified by the stakeholders. It was thought that for some environmental issues there is a lack of scientific understanding and data to inform policy. It was suggested that in the case of ocean acidification, scientists are still trying to understand the signal-to-noise relationship and therefore the data is cannot be used to provide advice to policy-makers. It was also acknowledged that environmental management decisions are not based solely on scientific advice and while this is not a failure of the science or the mechanism, it can lead to ineffective policy decisions. It was suggested that this is evident in relation to fisheries management.

One barrier that exists in science to policy mechanisms is that scientists, policy-makers and public use different 'languages'. It was suggested that JPI Oceans could facilitate the communication between these groups by utilising professionals. Australia already uses 'knowledge brokers' to facilitate this intercommunication. While OSPAR talks to environmental departments, the JPI could take a broader perspective to engage industry, government and scientists at the same time.

It was recognised that the European landscape is fragmented with overlaps between different organisations, it is therefore essential that the JPI has a clear message. The JPI needs to do things that national members are not able to achieve alone; it should address issues that require collaboration between Member States like fisheries issues. It is also important for the JPI to communicate and raise awareness of what it is doing to foster cooperation with organisations that could benefit from its efforts. The example given was that within GEO there is a coordinating marine task that is ignorant of what JPI is doing or will do. It is hoped that the JPI can come to IOC as 'good citizen's' representing Europe. It could also insist that Member States make observational data freely available to extract as much value as possible from the cost of monitoring. To achieve its goals of promoting the Blue Economy, JPI could outreach to industry to ensure that marine resources are exploited sustainably.

There needs to be a distinction between science research and operational knowledge when talking about science-to-policy mechanisms as some organisations, like DG MARE, focus on operational knowledge.

It needs to be recognised that the policy side of the science-to-policy interface should include managers/operators as not all decisions are made by policy-makers. When designing a 'user platform' where information can be accessed to develop products, it is important to consider who will be using it and to make it as user friendly as possible to make best use of the data. It is also

⁷ Examples of the benefits that Copernicus can bring to users in various domains: www.copernicus.eu/pages-principales/applications/

important to bench-mark data to ensure maximum usage between Member States. When using the best available technologies it is important to know the unit cost of producing data.

Web consultation

As part of the open consultation, stakeholders were asked to provide examples of particularly effective science-policy mechanisms. The Institute of Marine Research (IMR) in Norway considers the ICES system as an example of good practice which offers two services, advice and science. ICES uses MOUs with clients and member states to communicate advice about relevant issues. However, ICES does not have any ways for funding science. They also felt that the ICES system is an effective method for filtering scientific knowledge to end users as advice is developed by consensus and is a single point of contact. The IMR response considered that high level, experienced scientists should communicate with policy-makers using 'soft' scientific language, which should be understandable to someone with only basic scientific education. The response also suggested that that uncertainty is not communicated very well to policy users in most cases. They also suggested that policy-makers do not want to receive uncertainty, they need a concise recommendation, such as the total allowable catch (TAC). When asked how policy-makers require uncertainty to be communicated, IMR responded that it should not be quantitatively.

The Instituto Español de Oceanografía (IEO) believes that it is extremely important to reinforce the role of Regional Fisheries Organisations by providing the necessary economic means and by guarantying continuity of the regular activities of the different working groups. They also consider that it is important to assure the proper participation of qualified EU scientists in the regular work of the RFOs scientific bodies as well as to facilitate training of scientists to provide them with the required skills. It is also important to assure the correct coordination in the implementation of EU marine and maritime policies both at the administrative and scientific levels. The IEO believes that scientific advice for policy-makers should be fully funded by governmental organisations and that the process is time consuming and costly and should be well funded by the national and international organisations. The scientific advice in support EU policies should be 100 % funded by European Commission who should provide the funds to research institutions responsible for scientific advice through suitable mechanisms (e.g. through share management of funds involving the responsible national authorities/institutions). When scientists communicate advice to policy-makers, they should use non scientific language, but without compromising accuracy and objectivity. There is a perceived duplication of science to policy efforts in different Ministries and regional governments and that there is a lack of instruments, mostly affecting the coordination between different administrations (national and regional), with competences in marine and maritime issues.

The IOC of UNESCO gave several examples of effective science-policy interfaces and mechanisms including: AR from IPCC, the SOFIA from FAO, the Summary for Policy-makers on Ocean Acidification from IOC, IGBP, SCOR, IPBES on biodiversity and WOA for Ocean (coordinated by DOALOS, UNEP and IOC). At European level they suggested OSPAR Status Report and HELCOM reports and also the MSFD national reports as good examples. They suggest that good advice should be able to detect emerging issues and problems in time to implement correction measures and decisions made by stakeholders. Barriers to effective scientific advice appear to come from:

- Different levels and types of risk tolerance and time frames of politicians and scientists;
- Conflicting priorities and policies, particularly at a national level;
- Ineffective enforcement of obligations at the national level.

The IOC considers the proliferation of NGOs with ambition to be influential at policy level is creating some duplication and repetition of messages and dilution of more legitimated organisations. This can result in undesirable noise and confusion in the flow of scientific advice. It is thought that science has to be well communicated, but a reciprocal attitude and intellectual effort from the audience is expected at policy level. They believe that scientific advice should be made as simple as possible, but not simpler. The IOC also responded that science is always presented with confidence levels and that this indicates the level of uncertainty. However, the IOC also stated that policymakers like to have associated uncertainty in scientific advice because it grants them more flexibility when choosing the policy response. To this end, uncertainty must be given and explained to avoid incorrect use of scientific information.

EFARO responded that institutes which have a close working relationship with policy officials, but have strong links with the wider research community are probably most successful in translating science into policy as they understand both policy needs and the science. EFARO institutes provide examples that range from being within government to executive agencies or private institutions. They believe that there is an overlap between advisory bodies (e.g. STECF and ICES) that provide advice in the same field. There is also overlap between fisheries and environmental ministries that results in duplication especially in relation to conservation and fisheries. EFARO believes that science to policy mechanisms should be funded by a mixture of public funds directly from government, research council funding to support more underpinning research, and industry funding from those industries that benefit from the appropriate science. The languages used should depend on the subject and the audience, it is thought that scientific language does not work well with a lay audience, but equally purely non-scientific is not adequate to convey rigour. Like the IOC response, EFARO calls for intelligent customers and the development of understandable scientific language.

The Finnish Meteorological Institute considers that good science advice to policymakers should be clear, easily understandable, timely, and comes with an action suggestion. They suggest that it is the role of a scientific expert to condense scientific evidence for policymakers. Like EFARO, the FMI believes that the language used depends on the knowledge to be transferred and the target audience. They also state that the two groups should communicate directly without an interpreting mechanism and that the funding should be part of the political decision making budget. The FMI response stated that they explain, in simple terms, that there is uncertainty associated with scientific information and that the importance of uncertainty must be communicated to the end user.

The FP7 project Euromarine suggested that the foresight and priority-setting tools (e.g. expert working group) of the European Marine Board are good examples of best practices. They also stated that the vision documents produced by various consortia/project (such as EMBC, the networks of Excellence, Euromarine) are also quite relevant and useful bottom-up mechanisms for informing policy-makers about priorities and recommendations from the scientific community.

SUSFOOD ERA-Net suggested that the best advice is often a quick response to challenges. While they do not believe that the current science-policy mechanisms are fit for purpose, they suggest that

websites, articles and meetings are the best methods of communication and that the mechanism should be funded through common calls.

Other advice given on the subject of timeliness, responsiveness and the communication of uncertainty and risk included the Sclerochronology and Scleroclimatology group at Bangor University who stated “keep it short”. They also suggest the policy-makers find evidence which supports a pre-conceived opinion. Urmas Lips from the Tallinn University of Technology suggested that instead of increasing researchers engagement in dissemination, more closer involvement of media experts in projects could be a solution. He considered it important to give very concrete advice at the local level but more general at the European level.

Other stakeholders cited the communication between GEOHAB and IOC/IPHAB and the IPCC as examples of good science to policy mechanisms. However, it was noted that the IPCC is too one way (science informing policy) but that it may be possible to develop a similar format for selected marine topics that includes closer links to the requirements of the policy-makers. One stakeholder suggested that the German brochure “maritime success stories” contains information on how policy-makers condense evidence. It was suggested that there are probably too many general science to policy conferences and that it would be more useful to have focused events. SSG (Bangor) supported the view that policy-makers don’t like uncertainty and that uncertainty should be communicated with caution. Euromarine reported that scientist generally do not take uncertainty into account when communicating to policy-makers. The Belgian federal DG Environment considered the communication of uncertainty essential, but that expert judgement is also valuable.

The Institute of Marine Research (Norway) believes that uncertainty is not communicated very well to policy users in most cases. They also suggested that policy-makers do not want to receive uncertainty, they need a concise recommendation, such as the total allowable catch (TAC). SSG (Bangor) supported the view that policy-makers don’t like uncertainty and that uncertainty should be communicated with caution. Euromarine reported that scientist generally do not take uncertainty into account when communicating to policy-makers. However, the Finnish Meteorological Institute (FMI) stated that they explain, in simple terms, that there is uncertainty associated with scientific information and that the importance of uncertainty must be communicated to the end user. The IOC also responded that science is always presented with confidence levels and that this indicates the level of uncertainty. However, the IOC also stated that policymakers like to have associated uncertainty in scientific advice because it grants them more flexibility when choosing the policy response. To this end, uncertainty must be given and explained to avoid incorrect use of scientific information.

When asked how policy-makers require uncertainty to be communicated, the Institute of Marine Research (Norway) responded that it should not be quantitatively. The FMI stated that method of communication varies from one policy maker to the next. The Belgian federal DG Environment considered the communication of uncertainty essential, but that expert judgement is also valuable.

5. CONCLUDING REMARKS

The objective of this deliverable was to provide a state of play of marine and maritime policies pertinent to JPI Oceans and identify the requirements, as stated by stakeholders, to fulfil their objectives. The deliverable also aimed to use stakeholder inputs to identify examples of effective science to policy mechanisms. The outcome of the stakeholder engagements has provided several interesting examples and some degree of consistency between different groups.

This deliverable has provided information about different European marine and maritime legislation. It has provided details of how different legislation is formed and implemented. It was also important to consult with stakeholders to find out the perceived barriers to implementing the policies. Several themes were expressed which generally suggested that there is a lack of integration between marine and maritime activities. It was suggested that new technologies, information technology and greater data sharing could be the key to developing truly holistic marine management.

When asked about general science to policy mechanism, stakeholders considered conferences to be particularly effective. But as one stakeholder pointed out, conferences need to be focused on a specific topic, avoid being too broad and have well targeted audiences. It was generally recognised that there needs to be more data sharing and open access to online data repositories. An area which divided stakeholder opinions was fisheries. Some stakeholders considered the science to policy mechanisms to be effective and well developed whereas others felt that communication needs to be increased. The different opinions may be caused by the fact that the science-policy interface for the CFP is well established in some seabasin regions but not in others but also that it was a relatively closed circuit, where external scientists may encounter difficulties to contribute with innovative improvements. For the WFD and MSFD, there are mechanisms in place that may provide more opportunity to harvest from scientific European and national projects, but those pathways are not yet sufficiently known to the scientific community. For the CFP the scientific opinion can also be more easily overruled by national politically influenced interests than for the other existing legislation.

One organisation which was suggested by multiple stakeholders as a particularly effective science-policy mechanism is ICES. Other examples of effective processes regularly cited included IPCC assessment and the foresight and science/policy activities undertaken by the European Marine Board.. It was also suggested that the European Union lacks a single focus point to engage on an international level in the science/policy process and it was suggested that greater engagement with the IOC GOOS programme could be one effective method to establish linkage.

The next phase of this Work Package will be discussed in deliverable 5.2. The next deliverable will further investigate the examples of science to policy mechanisms identified here and provide detailed case.

As a Work Package of CSA Oceans, the deliverables are intended to reduce the time for JPI Oceans to move from the preliminary to the operational phase in three ways, namely:

- Supporting the governance structures in its work to establish JPI Oceans;
- Facilitating the development of a Strategic Research and Innovation Agenda (SRIA) and an Implementation Plan (IPlan) according to JPI Oceans vision and goals;

- Proposing procedures and tools for cooperation which provide the basis for joint transnational actions based on variable geometry.

Stakeholder inputs are at the core of this deliverable to ensure that the SRIA and the IPlan are developed in parallel with the opinions of the marine and maritime community. This deliverable has provided examples of what stakeholders consider best practice which will be used to develop procedures and tools for cooperation. Together with Deliverable 5.2, this report will directly inform the content of the SRIA and IPlan in order to reflect the stakeholder community in the future actions of JPI Oceans.

6. ANNEXES

ANNEX I - POLICIES PERTINENT TO JPI OCEANS INTERESTS

The following table of policies have been selected as policies pertinent to the interests of JPI Oceans.

Political driver	Economic and societal driver	JPI impact
Marine Strategy Framework Directive (MSFD)	Legal obligation which needs long-term scientific monitoring/data related to the identified 11 indicators and the integrated approach as support to policy	High
Integrated Maritime Policy COM(2007) 575	12-18 billion Euro/year economic damages in European coastal areas by 2080, high emission scenario) Adaptation could significantly reduce the risk to around Euro 1 billion	High
Europe 2020 Flagship Initiative Innovation Union COM (2010) 546	Need for 1 million scientists it to reach the 3% goal	High
ERA EU Strategy for Marine and Maritime Research, COM(2008) 534	Synergies with and between Member States, regions and marine and maritime research sectors are necessary to address major cross-thematic marine research challenges 2000+ marine and maritime institutes and universities ref. ECORYS studies	High
Raw material initiative, COM(2008) 699	Securing reliable and undistorted access to raw materials is increasingly becoming an important factor for the EU's competitiveness. Part of the solution could be the sustainable exploitation of the seabed. Sectors worth €1 324 billion/30 mill jobs rely	High
Challenges on Raw Materials, COM (2011) 25	On minerals, some with 100% import dependency	
An Energy Policy for Europe, COM(2007) 1 2020 by 2020 Europe's climate change opportunity, COM(2008) 30 Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources	By 2020, 20% renewable energy from sea, by 2050 Europe could get up to 50% of its electricity needs from renewable marine sources, ESF MB	Medium
Europe 2020 Flagship Initiative Innovation Union, COM (2010) 546	Marine biotech was globally valued at EUR 2.2 billion by the Marine Industries Global Market Analysis in 2005. By 2009, the global market is projected to surpass EUR 2.6 billion.	Medium-High
Marine Knowledge 2020, COM (2010) 461	Replace the present fragmented marine observation system estimates a benefit of €300 million per annum, approx. €100 million for science, €56 million for public authorities and €150 million for the private sector	Medium-High

Integrated Maritime Policy COM (2007) 575	EU tourism and sectors linked to it is estimated to generate 10% + of EUs GDP and 19 million jobs, SMEs, important to coastal regions, 370 million international tourists in 2008 and will increase significantly (WTO). Rising sea levels could bring changes for tourism in coastal areas.	Medium
Strategic goals And recommendations for the EU's maritime transport policy until 2018, COM (2009)8 Europe 2020 Flagship Initiative, Innovation Union, COM (2010) 546	By 2018, the world fleet could count some 100,000 vessels (500 dwt and more) in operation (77,500 vessels in 2008) expected to reach a total capacity of more than 2,100 million dwt in 2018 (up from 1,156 million dwt in 2008). Europe's maritime leadership should be maintained by quality shipping	Medium
Marine Strategy Framework Directive (MSFD) Regulation (EC) No. 178/2002 COM(2007) 539 Animal Health Strategy	Food safety and animal health and science based risk management	Medium
Europe 2020 Flagship Initiative Innovation Union COM (2010) 546	On the whole, professors, researchers and students have poorly developed entrepreneurial mind-sets in Europe, preferring to be employees rather than employers	Medium
Integrated Maritime Policy COM (2007) 575 MSP in the EU, COM (2010) 771	The increasing demand of the maritime space for different economic activities on Europe's seas leads to competition and conflicts between sectors. This competition for the space hampers the growth of maritime economies, as shipping, offshore energy, ports, fisheries, aquaculture and environmental concerns.	Medium
Evaluation of ICZM in EU, COM(2007) 308 Council decision (2010/631/EU)	ICZM aims to improve the economic and social development of coastal areas through an integrated management of the activities that takes place in these areas, including the management of interface land-sea.. The deterioration of the coastal zone by human activities and the threaten posed by climate change all call for an integrated management for a sustainable development while taking appropriate adaptation measures to climate change.	Medium
EU Emissions Trading Scheme, COM(2010) 796	International scheme for the trading of greenhouse gas emissions. Goal: Cut emissions by 21 % in comparison to 2005.	Medium

ANNEX II - POLICY REFERENCE SHEETS

The table below is intended as a factsheet to complement the discussion in section 3 of this report. The key documents and website for each policy are provided with a list of Framework Programme (FP) projects. The list of projects is not intended to be fully comprehensive, but gives a sample of what is available.

MSFD	
Key Documents	DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)
Website	ec.europa.eu/environment/water/marine/directive_en.htm
FP projects (Current examples)	<p>STAGES: Science and Technology Advancing Governance of Good Environmental Status. FP7: 2012- 2014 www.stagesproject.eu</p> <p>ODEMM: Options for Delivering Ecosystem-Based Marine Management. FP7: 2010- 2013 http://www.liv.ac.uk/odemmm/</p> <p>PERSEUS: Policy-oriented marine Environmental Research in the Southern EUropean Seas. FP7: 2012-2015 http://www.perseus-net.eu</p> <p>COMMON SENSE: Cost-Effective Sensors, Interoperable With International Existing Ocean Observing Systems, To Meet Eu Policies Requirements. FP7: 2013- 2017</p> <p>ECSAFESEAFood: Priority environmental contaminants in seafood: safety assessment, impact and public perception. FP7: 2013-2017 http://www.ecsafeseafood.eu/</p> <p>BENTHIS: Benthic ecosystem fisheries Impact Study. FP7: 2012-2017 http://www.benthis.eu</p> <p>FIXO3: Fixed Point Open Ocean Observatories Network. FP7: 2013-2017 http://www.fixo3.eu/</p> <p>SONIC: Suppression Of underwater Noise Induced by Cavitation. FP7: 2012-2015 http://www.sonic-project.eu/</p> <p>AQUATRACE: The development of tools for tracing and evaluating the genetic</p>

	<p>impact of fish from aquaculture. FP7: 2012-2016 https://aquatrace.eu</p>
EC directly Commissioned projects	<p>See Marine Knowledge Gate http://www.kg.eurocean.org/ Overview for the Project Coordination Group of the MSFD, See https://circabc.europa.eu/w/browse/7e4036ec-36b5-43b6-aafe-ce8b6e6d02c0</p>

Integrated Maritime Policy	
Key Documents	<p>Progress of the EU's Integrated Maritime Policy (2012)⁽³⁾</p> <p>Concerning the adoption of the Integrated Maritime Policy work programme for 2011 and 2012</p> <p>Blue Growth: opportunities for marine and maritime sustainable growth</p> <p>A European Strategy for Marine and Maritime Research: A coherent European Research Area framework in support of a sustainable use of oceans and seas</p>
Website	<p>ec.europa.eu/maritimeaffairs/policy/</p>
FP projects (Current examples)	<p>FIXO3: Fixed Point Open Ocean Observatories Network. FP7: 2013-2017 http://www.fixo3.eu/</p> <p>EUROSUR: Sea Border Surveillance. FP7: 2010-2014 http://www.seabilla.eu/cms/</p> <p>MESA: Maritime Europe Strategy Action. FP7: 2013-2016</p> <p>DOLPHIN: Development of Pre-operational Services for Highly Innovative Maritime Surveillance Capabilities. FP7: 2011-2013 http://www.gmes-dolphin.eu/</p>
EC directly Commissioned projects	<p>DOLPHIN, MARCOM+, NEREIDS,</p> <p>Concerning the adoption of the Integrated Maritime Policy work programme for 2011 and 2012</p>

Common Fisheries Policy	
Key Documents	http://eur-lex.europa.eu/en/legis/latest/chap0410.htm
Website	ec.europa.eu/fisheries/cfp/
FP projects (Current examples)	<p>ECOFISHMAN: Ecosystem-based Responsive Fisheries Management in Europe. FP7: 2011-2014 http://www.ecofishman.com/</p> <p>DIOMFISH: Design and Implementation of Optimal Management Systems for European Fisheries. FP7: 2010- 2014 http://diomfish.com/</p> <p>MYFISH: Maximising yield of fisheries while balancing ecosystem, economic and social concerns. FP7: 2012- 2016 http://www.myfishproject.eu/</p> <p>COFASP: Strengthening cooperation in European research on sustainable exploitation of marine resources in the seafood chains- ERANET FP7: 2013-2017</p> <p>BENTHIS: Benthic ecosystem fisheries Impact Study. FP7: 2012-2017 http://www.benthis.eu</p> <p>COMMON SENSE: Cost-Effective Sensors, Interoperable With International Existing Ocean Observing Systems, To Meet EU Policies Requirements. FP7: 2013-2017</p> <p>COMFISH: Strengthening the impact of fisheries related research through dissemination, communication and technology transfer. FP7: 2012-2015</p>
EC directly Commissioned projects	COMMON SENSE, MIDTAL, Socio economic effects of management measures of the future CFP, MYFISH, IMAGE, DIOMFISH, MOFISH, RESPONSIBLE, FISHPOPTACE, ECOFISHMAN, TEMEC

Integrated Coastal Zone Management	
Key Documents	<p>Establishing a framework for maritime spatial planning and integrated coastal⁽²³⁾</p> <p>Protocol on Integrated Coastal Zone Management in the Mediterranean⁽²⁴⁾</p> <p>Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe⁽²⁵⁾</p>
Website	ec.europa.eu/environment/iczm/
FP projects (Current examples)	<p>IGIT: Integrated geo-spatial information technology and its application to resource and environmental management towards the GEOSS. FP7: 2011-2015</p> <p>LAGOONS: Integrated water resources and coastal zone management in European lagoons in the context of climate change. FP7: 2011-2014 http://lagoons.web.ua.pt/</p> <p>PEGASO: People for Ecosystem Based Governance in Assessing Sustainable Development of Ocean and Coast. FP7: 2010-2014 http://www.pegasoproject.eu/</p>
EC directly Commissioned projects	AICZM 2001, BIOHAB, Coastal monitoring and management (COAST), COASTBASE, COASTMAN, CONSCIENCE, INCAM, INCOFISH, NAME, PEGASO, SPICOSA, STRATEGY, TRANSMASP,

The Habitats and Birds Directives	
Key Documents	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
Website	http://ec.europa.eu/environment/nature/legislation/habitatsdirective/
FP projects (Current examples)	<p>DIALECT EVOLUTION: Principles of dialect evolution in killer whales. FP7: 2013-2015</p> <p>GEO-HABIT- Geo-acoustic mapping of benthic habitat distribution. FP7: 2012-2014</p> <p>ODEMM: Options for Delivering Ecosystem-Based Marine Management. FP7: 2010-2013 http://www.liv.ac.uk/odemm/</p>
EC directly Commissioned projects	

Water Framework Directive	
Key Documents	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
Website	http://ec.europa.eu/environment/nature/legislation/habitatsdirective/
FP projects (Current examples)	<p>QWATER: Bioassay integration under the European Water Framework Directive: A step towards an ecological approach. FP7: 2013-2014</p> <p>FRESHMON: High Resolution Freshwater Monitoring: FreshMon GMES Downstream Services. FP7:2010-2013 http://www.freshmon.eu/</p> <p>LAGOONS: Integrated water resources and coastal zone management in European lagoons in the context of climate change. FP7: 2011-2014 http://lagoons.web.ua.pt/</p> <p>AQUAWARN: Deployable early warning pollution device for application in water. FP7: 2013-2015</p> <p>L4CW-DEMO: Demonstration of a novel system to breakdown hazardous substances in wastewater streams into harmless bio-friendly compounds using multi-chromatic UV light. FP7: 2012-2014 http://www.l4cw.eu/</p> <p>WATERDISS2.0: Dissemination and uptake of FP water research results. FP7:2011-2013 http://www.waterdiss.eu/</p>
EC directly Commissioned projects	See WISE-RTD portal http://www.wise-rtd.info/en/guide/wfd-water-framework-directive-200060ec?show_related

ANNEX III - SCIENCE TO POLICY MECHANISMS

The following list provides examples of how different science to policy mechanisms work, the list is by no means comprehensive but is designed to give a sample of the types of mechanisms that exist⁽²⁶⁾.

Mechanism	Method of Operation	Examples
Events and workshops	These can be used to disseminate research outputs and gather stakeholders' views.	World Maritime Day 2013
External media	Highlighting current scientific research through public media streams. It can be one of the most effective ways of reaching policy-makers.	Press offices
Facilitators, translators, science communicators	In this context, facilitators can be seen as a 3 rd party which bridges the gap between science and policy by having an understanding of the language differences between each group.	European Sea ambassadors
Databases	Databases can be used to collate examples of the social, policy and economic impact of scientific work, and can be made available online. A base of case study impacts can be used to highlight the importance of science-policy interactions.	European Marine Observation and Data Network (EMODnet) EuroOcean
Guidelines	Guidelines support scientists and policy-makers by giving examples and advice on how to communicate effectively.	Science into Policy: Taking part in the process ⁽²⁶⁾
Strategic appointments	Individuals or teams are employed to give advice on the implications of scientific research on policy or how policy decisions affect scientific research.	Chief scientific advisor
Co-design/ co-funding	Co-design encourages scientists and policy-makers to work together to create policies which are built on scientific evidence and have achievable goals.	UK Programme on shelf seas biogeochemistry (Defra and NERC)
Horizon scanning/ foresight	Horizon scanning attempts to predict the societal needs of policy and science to pre-empt future requirements	Navigating the Future IV ⁽²⁷⁾

ANNEX IV - RELEVANT SCIENCE- POLICY STRATEGIES, DOCUMENTS AND PROJECTS

Name	Organisation	Website
Navigating the future IV	European Marine Board	www.marineboard.eu/science-foresight/navigating-the-future
UK marine science strategy	Defra	www.defra.gov.uk/mscc/files/uk-marine-science-strategy-.pdf
National Ocean Strategy	Ministry of Defense (Portugal)	webgate.ec.europa.eu/maritimeforum/system/files/National_Ocean_Strategy_Portugal_en.pdf
Policy framework analysis in the fields relevant to the BONUS programme	BONUS	http://www.bonusportal.org/files/2654/Publication_No._13.pdf
Guide to Research and Innovation Strategies for Smart Specialisation (RIS 3)	European Union	s3platform.jrc.ec.europa.eu/en/c/document_library/get_file?uuid=e50397e3-f2b1-4086-8608-7b86e69e8553
Making sense of uncertainty: Why uncertainty is part of science	Sense about science	www.senseaboutscience.org/resources.php/127/
Handling uncertainty in science	The Royal Society	royalsociety.org/events/2010/uncertainty-science/
Guide to Citizen Science	UK Environmental Observation Framework	www.ukeof.org.uk/
Sea Level Rise and Variability: A Summary for Policy-makers	GOOS	www.ioc-goos.org/index.php?option=com_content&view=category&layout=blog&id=45&Itemid=100180&lang=en
Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties	IPCC	www.ipcc.ch/pdf/supporting-material/uncertainty-guidance-note.pdf
The Compendium for Coast and Sea	Flanders Marine Institute	www.compendiumcoastandsea.be/en/downloads
Plenty more fish in the sea? A working paper on the legal issues related to fishing beyond maximum sustainable yield: A UK case study	University of the West of England	eprints.uwe.ac.uk/22111/1/pmf_final2%20%283%29.pdf

The questions answered by the national funding agencies in form F are provided below:

1. Dept responsible for implementing
2. Dept responsible for monitoring, assessment and providing scientific advice to support EU policies
3. Please explain briefly what is the progress in the development and implementation of these policies in your country?
4. Please explain briefly what is the progress in the development and implementation of these policies in your country?
5. Which other national or EU marine or maritime related policies are being implemented in your country?
6. Please provide an explanation of how marine monitoring, data collection and data management are organised, funded and coordinated in your country?
7. Are there specific research and monitoring activities commissioned or anticipated to support marine and maritime-related policies and their implementation?
8. Leading government department or organisation responsible for representing your country in the following conventions
9. How does your country participate in coordination activities related to regional conventions?

Is the participation delegated to other national organisations?

10. Are there other specific mechanisms in place in your country to help channel advice from researchers to policy-makers either nationally, on a basin level or on a European level?
11. Please explain briefly why in your opinion the above science-to-policy mechanisms are effective. If you consider they are not effective, what mechanisms do you think would be more helpful?
12. In your opinion, what particular European or international science-to-policy mechanisms or processes do you regard as particularly effective and which might be investigated as case studies or examples of best practice?
13. In your opinion how else might the EU draw on expertise from research and industry to strengthen its science-to-policy process?
14. Are there knowledge or information gaps or other barriers (e.g. lack of research, lack of data, limited observing infrastructure or human resources) impacting on the implementation of the above mentioned policies?
15. Is there unnecessary duplication and overlaps to inform policy?
16. Could JPI Oceans have a role in overcoming the above mentioned gaps and barriers through new ways of cooperation?
17. Please explain briefly if you provide training schemes or other guidance to help researchers and policy-makers address the science-to-policy interface?
18. In your opinion, how can JPI Oceans play a role in facilitating science-to-policy?
19. *Please use the space below if you wish to make any specific or general comment on the questionnaire.*

7. REFERENCES

1. JPI_Oceans (2011), "Vision Document: Joint Programming Initiative Healthy Seas and Oceans" (JPI Oceans, Brussels).
2. EC (2007), "Communication from the Commission: An Integrated Maritime Policy for the European Union" (European Commission, Brussels).
3. EC (2012), "Progress of the EU's Integrated Maritime Policy" (European Commission, Brussels).
4. EC (2013), "Marine Strategy Framework Directive (MSFD) Common Implementation Strategy (CIS)" (European Commission, Brussels).
5. SRU (2006), "The European Commission Proposal for a Marine Strategy: Shying European Responsibility?" (German Advisory Council on the Environment, Berlin).
6. Davis, S.P. [Ed.] (2012), Peer Review of the Intercalibration Exercise Phase II, European Water Framework Directive. Final draft report, Joint Research Centre - European Commission, 261 pp.
7. I. Lutchman, C. Adelle (2008), "EU Fisheries Decision Making Guide" (Fisheries Secretariat, Stockholm).
8. DG_Maritime_Affairs_and_Fisheries (2008), "Intermediate Evaluation of the Advisory Committee for Fisheries and Aquaculture (ACFA)" (DG Maritime Affairs and Fisheries, Copenhagen).
9. D. Reyntjens, J. Brown, C. Bowyer (2005), "EU Fisheries Decision Making Guide" (Institute for European Environmental Policy, London).
10. SCAR-Fish (2013), "Science in support of the European fisheries and aquaculture policy" (Strategic Working Group on Fisheries and Aquaculture, Brussels).
11. EC (2007), "An Integrated Maritime Policy for the European Union" (European Commission, Brussels).
12. D. Sarewitz, R. A. Pielke Jr (2007), The neglected heart of science policy: reconciling supply of and demand for science. *Environmental Science & Policy* **10**, 5.
13. E. C. McNie (2007), Reconciling the supply of scientific information with user demands: an analysis of the problem and review of the literature. *Environmental Science & Policy* **10**, 17.
14. P. Tett *et al.* (2011), in *Proceedings of 2nd ICZM symposium, Arendal*. pp. 3-7.
15. BIS (2010), "The Government Chief Scientific Adviser's Guidelines on the Use of Scientific and Engineering Advice in Policy Making" (Department for Business, Innovation and Skills, London).
16. House_of_Commons (2006), "Scientific Advice, Risk and Evidence Based Policy Making" (House of Commons, London).
17. A. Borja *et al.* (2013), Good Environmental Status of marine ecosystems: What is it and how do we know when we have attained it? *Marine Pollution Bulletin* **76**, 16.

18. D. Hering *et al.* (2010), The European Water Framework Directive at the age of 10: a critical review of the achievements with recommendations for the future. *Science of the total Environment* **408**, 4007.
19. J. Van Leeuwen, L. van Hoof, J. van Tatenhove (2012), Institutional ambiguity in implementing the European Union Marine Strategy Framework Directive. *Marine Policy* **36**, 636.
20. M. Hajer (2003), Policy without polity? Policy analysis and the institutional void. *Policy sciences* **36**, 175.
21. M. Mastrandrea *et al.* (2010), Guidance note for lead authors of the IPCC fifth assessment report on consistent treatment of uncertainties. *Intergovernmental Panel on Climate Change (IPCC)*.
22. COM (2008), "A European Strategy for Marine and Maritime Research: A coherent European Research Area framework in support of a sustainable use of oceans and seas" (Commission of the European Communities Brussels).
23. EC (2013), "Establishing a framework for maritime spatial planning and integrated coastal" (European Commission, Brussels).
24. EU (2009), "Protocol on Integrated Coastal Zone Management in the Mediterranean" (Official Journal of the European Union, Brussels).
25. EP (2002), "Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe" (European Parliament, Brussels).
26. H. Clayton, F. Culshaw (2013), "Science into policy: Taking part in the process" (Natural Environment Research Council, Swindon).
27. EMB (2013), "Navigating the Future IV" (European Marine Board, Ostend).