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|----------------------------|--|--------------|------------|--------------------------|
| Author/Task Leader         | Rosa Chapela   | CETMAR       |            | RCH                      |
| Authors                    | Rosa Chapela, Marta Ballesteros, Begoña Martínez                       | CETMAR       |            | RCH, MB, BM              |
| Authors                    | Paulina Ramirez-Monsalve, Troels Hegland, Jesper Raakjær, Poul Degnbol | IFM-AAU      |            | PR, TH, JR, PD           |
| Author                     | Kåre Nolde Nielsen   | UiT          |            | KNN                      |
| Authors                    | Unn Laksá  | SYNTESA      |            | UL                       |
| WP leader/Author           | Rosa Chapela   | CETMAR       | 26/12/2016 | RCH                      |
| Coordinator                | Anna K. Daniélsdóttir  | Matis        | 28/12/2016 | AKD                      |
| Administrative Coordinator | Oddur M. Gunnarsson & Kristinn Ólafsson                                | Matis        | 27/12/2016 | OMG, KÓ                  |
| Scientific Coordinator     | Gunnar Stefánsson  | UI           | 27/12/2016 | GS                       |

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<sup>3</sup> The initials of the revising individual in capital letters



## **Deliverable D1.3**

# **EAFM Fisheries Advice in relation to the CFP and MSFD**

28/12/2016



## Executive Summary

The debate on the Ecosystem Approach to Fisheries Management (EAFM) has shifted from definition of the concept towards implementation. In the European Union (EU) challenges and barriers coming from the scientific knowledge base and the institutional framework have been analysed elsewhere. However, in the current playing field other challenges have gone unnoticed. These relate to the way in which advice is provided and how the EAFM has been embedded within it. Moving a step back from science-policy interaction, this paper explores the advisory process developed by the International Council for the Exploration of the Sea (ICES) to support the EAFM in EU policies. By analysing its mandate and implementation strategy we shed light on how this could be improved at an operational level. Although our analysis is limited to the ICES advice, this should be understood within the role of the different links in the advice chain, particularly in exploring the consequences of trade-offs among objectives that are a hallmark of the EAFM. This topic is under on-going research within MareFrame, and will be explored in Deliverable 1.6 on how to improve EAFM advice within the Common Fisheries Policy. The results are presented as a journal manuscript and provide insights and recommendations that are applicable in the current policy process, including ground rules for participatory processes, lessons learnt and identification of critical paths for future development.



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## The manuscript:

### COULD WE DO IT BETTER? IMPROVING ICES ADVICE FOR AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT IN THE EUROPEAN UNION.

Marta A. Ballesteros<sup>1,2</sup>, Rosa Chapela<sup>1</sup>, Troels Hegland<sup>4</sup>, Paulina Ramírez-Monsalve<sup>4</sup>, Kåre N. Nielsen<sup>3</sup>, Unn Laksá<sup>5</sup>, Jesper Raakkjaer<sup>4</sup>, Poul Degnbol<sup>4</sup>

<sup>1</sup>FisheriesSocioeconomicDepartment, Centro Tecnológico del Mar-Fundación CETMAR, Vigo, Spain.

<sup>2</sup> Campus do Mar, International Campus of Excellence, Vigo, Spain.

<sup>3</sup>The Arctic University of Norway, Tromsø, Norway.

<sup>4</sup>Innovative Fisheries Management (IFM) – An Aalborg University Research Center, Aalborg, Denmark.

<sup>5</sup>Syntesa, Gøta, Faroe Islands.

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#### I. Introduction.

The debate about the Ecosystem Approach to Fisheries Management (EAFM) has shifted from definition of the concept towards implementation (Link and Browman, 2014). In the European Union (EU) challenges and barriers coming from the scientific knowledge base (Frid et al. 2006; Symes and Hoefnagel, 2010; Österblom, et al. 2011) and the institutional framework have been analysed elsewhere (Jennings and Rice, 2011; Ramírez-Monsalve, et al. 2016a). However, in the current playing field other challenges have gone unnoticed. These relate to the way in which advice is provided and how the EAFM has been embedded within it. This paper explores the advisory process developed by the International Council for the Exploration of the Sea (ICES) to support the EAFM in EU policies. By analysing its mandate and implementation strategy we shed light on how this could be improved at an operational level.

ICES has a central role in provisioning knowledge for the execution of the Common Fisheries Policy (CFP) -pertaining to the Commission's Directorate General for Maritime Affairs and Fisheries (DG MARE) [see Figure 1]. DG MARE is the implementing EU body regarding the CFP and has, as a Commission body, a core role in the development of proposals for legislation. It can be understood as the 'engine room' of the CFP, providing output for instance in the form of proposals for legislation and policy to be considered by the decision-makers, implementation decisions, oversight of member states' implementation, etc. According to the CFP base regulation, one of the principles for good governance is "the establishment of measures in accordance with the best available scientific advice". Therefore, science-based advice for legislative proposals could be regarded a legal requirement. ICES provides mainly biological advice regarding best international scientific opinion on issues relating to fisheries resources and ecosystems of the North-East Atlantic to a number of clients of which the EU is the largest. Beyond advice in relation to the CFP, ICES' current advice in relation to EU policies also includes advice to Environment Directorate General (DG-ENV) and Member States regarding the Marine Strategy Framework Directive (MSFD), for instance regarding criteria and methodological



standards on good environmental status (GES) as well as the assessment of descriptors D3 (Populations of commercially exploited fish and shellfish), D4 (Foodwebs), D6 (Seafloor integrity), and D11 (Energy, including water noise).

The relationship between ICES and the EU is outlined in a memorandum of understanding (ICES, 2016). This relationship is embedded in the broader EU's advisory landscape, integrated by external bodies (ICES, Regional Fisheries Management Organizations-RFMOs), mandated bodies (Scientific, Technical and Economic Committee for Fisheries (STECF) and Advisory councils(ACs) and in-house expertise (Joint Research Center, JRC). Formally, the Commission acts on input from STECF, which consists of external experts appointed by the Commission itself. Effectively, this means that scientific advice received by the Commission is reviewed by STECF. As shown in Figure 1, this relates to scientific advice received on the background of requests to ICES, but also advice received from the General Fisheries Commission of the Mediterranean (GFCM) and advice from science committees (SCs) of RFMOs to which the EU is contracting party. STECF also provides advice on specific issues not covered by ICES or other external suppliers, e.g. reviews of fleet economy or management plans with exclusively EU partners. The ACs, in contrast, provide knowledge and stakeholder opinion in the form of advice based on stakeholders' (fisheries sector organizations, environmental organizations and others) perspectives and knowledge on particular fisheries or specific regional seas. As stakeholder input rather than 'scientific' knowledge – though often drawing on science - this pool of knowledge is not filtered through STECF. DG MARE is supported by the Joint Research Centre (JRC), a supplier of various services related to science to the different directorates. Finally, following the last reform of 2013 of the CFP, cooperative regional member state structures/groups have been established by member states in response to a legal entitlement to submit joint recommendations for inter alia multiannual management plans. This includes the development and implementation of conservation measures and measures affecting fishing activity in areas protected by environmental law (Council and Parliament 2013). Recommendations from the member state bodies shall draw on advice from the ACs, though presently this relationship appears underdeveloped or unclear in some regions (Eliassen et al. 2015; WEA, 2016). These relate to the way in which advice is provided and how the EAFM has been embedded within it. Moving a step back from science-policy interaction, this paper explores the advisory process developed by the International Council for the Exploration of the Sea (ICES) to support the EAFM in EU policies. By analysing its mandate and implementation strategy we shed light on how this could be improved at an operational level. Not depicted in Figure 1 are the regular commissioning and use by the Commission of tenders and research projects, and –later in the legislative process– the European Parliament's commissioning of reports and use of parliamentary hearings to strengthen the knowledge base ahead of decisions.

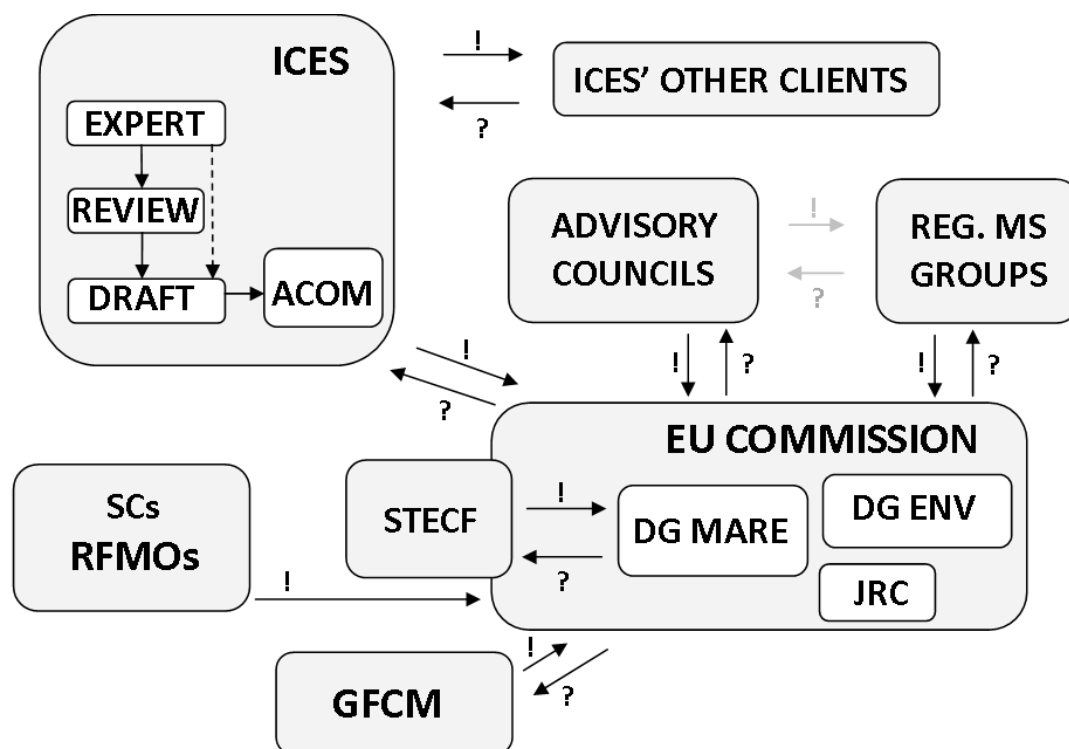


Figure 1: Main Aspects of the knowledge provision system of the Common Fisheries Policy. '?' indicates request for advice or knowledge. '!' indicates delivery of advice, knowledge. The figure draws on Hegland 2006, Wilson 2009 and ICES 2016.

Paving the way for EAFM implies identifying the priorities regarding human impacts and the ecosystem dynamics, as well as to explore policy and implementation alternatives. Although our analysis is limited to the ICES advice, this should be understood within the role of the different links in the advice chain, particularly in exploring the consequences of trade-offs among objectives that are a hallmark of the EAFM<sup>4</sup>.

During the last 15 years ICES has gone through a major reform, driven by a need to improve efficiency and respond to the evolution of policy and science (Stange et al, 2012). The result is an organization focused on science and advice, which still delivers to the sector-specific requirements while considering cross cutting issues such as the ecosystem approach, maritime spatial planning and climate change. The scientific advisory process in support of the ecosystem approach was addressed between ICES and its clients in a "Dialogue meeting" (ICES, 2004), followed by various attempts to develop the science and advice in this direction. The initial part of this process was analysed in Wilson (2009) while the most recent developments are discussed in this paper. A core dilemma in this process was initially the lack of legal frameworks which could trigger requests for advice and later, when both the CFP and the MSFD included relevant law, that there was no formalised process for integration of decision making and advice.

In a context of knowledge politicization and scientification of politics (Carter, 2013), ICES advice has evolved from an exploratory role towards a normative one through the implementation of the precautionary approach (Hoydal, 2007:846). Considering the main changes in the form of

<sup>4</sup>. This topic is under on-going research; the role of the different links in the advice chain is explored in a forthcoming publication and will be included under Deliverable 1.6 How to improve EAFM advice within the CFP.



advice (Nielsen, 2008; Lassen et al, 2012) the ecosystem approach has posed the biggest challenge. A decade ago Rice and Rogers (2006) assessed ICES' progresses to deliver ecosystem advice: creation of an Advisory Committee on Ecosystems<sup>5</sup>, advisory reports on an ecosystem basis and inclusion on ecosystem considerations into analysis and advice; despite it, they concluded that ecosystem issues were only addressed as adds-on in the ICES classic advice. For significant advances they proposed to build on the Memorandum of Understanding (MoU) between the European Commission and ICES. The take home message was clear: the invitation to make ecosystem considerations a core part of advice was there, so why not use it?

Table 1. Dominant forms of ICES advice

| Period | Policy basis   | Dominant forms of advice                           | Assumptions     |
|--------|--|--|-----------------|
| 1980's | Long term optimisation of harvest  | Stock advice                                       | Predictability  |
| 2000's | Precautionary approach regarding harvest from single stocks                  | Stock advice<br>Mixed-species advice               | Uncertainty     |
| 2010's | Precautionary and integrated approach regarding fish stocks in the ecosystem | Stock advice<br>Fishery Advice<br>Ecosystem Advice | Interdependency |

Ten years after Rice and Roger's assessment, the major parts of the puzzle pieces seem to be there: the policy mandate and the enabling structure to generate knowledge sufficient for action (science, advisory and steering groups). The MoU between ICES and the EU mentions ecosystem based advice even beyond what is already integrated in the requests for advice. Therefore, the questions could be rephrased: why is ICES not using fully its entitled capacity to provide ecosystem advice for EU policies?

In order to address this question we first define the concepts that are central for framing the discussion: EAFM and the scientific and knowledge based advice (section II). Second, we describe and review the advice framework set in the MoU (section III), presenting also what ICES is actually delivering (section IV). The findings from qualitative research carried out through structured stakeholders' interactions at EU level provide insights on how they perceive ecosystem advice and what is their role in the process (section V). Finally, we suggest some recommendations to support advances within the current policy context (section VI).

## II. Key concepts.

The capability of ICES to advice the EU in implementing an EAFM is framed mainly through two policies: CFP and MSFD. While the MSFD focuses on the implementation of an EA to the management of all human activities taking place in the marine environment, the CFP narrows the focus to the management of fisheries activities (see Table 2).

<sup>5</sup>. In 2008 all the Advisory committees were merged into a single Advisory Committee (ACOM).





Table 2. The Ecosystem approach in the MSFD and the CFP

| EA in the MSFD  | EA in the CFP:   |
|---|--|
| The concept is presented as an <i>ecosystem-based approach</i>  | The concept is presented as <i>ecosystem-based approach to fisheries management</i> .  |
| It is through an EA to the management of human activities that the MSFD prioritizes the achievement and/or maintenance of Good Environmental Status (GES) in the European marine environment [Long, 2012]. GES can be understood as indicators of performance for most of the biological and environmental attributes of the EAFM [Ramírez-Monsalve, et al. 2016(a)]. | Among the relevant sectoral policies, it is only the CFP which explicitly defines EAFM [CFP, 2013: art 4 par 9].   |
| The MSFD was born after a thematic strategy developed within the 6th Environmental Action Plan adopted 2002, plan which had at its heart the concept of EA and it identified, among other things, priorities for the marine environment, [Jennings and Rice, 2011][Long, 2012].   | The policy mandate to apply an EA to fisheries management (EAFM) was first mentioned explicitly in the 2002 reform to the CFP.                                   |
| Definition of ecosystem: The object of policy is the individual EEZs of MS as the competence for environmental law is with MS   | Definition of ecosystem: The object of policy is the combined EU EEZ, including regional seas within it, as the legal competence for fisheries policy is the EU. |

In both policy documents, the concept is presented as *ecosystem-based approach*. This definition merges the concepts of *approach* and *based*, an issue which is confusing given that each term is associated to different levels of implementation [Prellezo and Curtin, 2015]. A more in depth discussion on the difference between these two concepts can be seen in [van Hoof, 2015][Prellezo and Curtin, 2015][Patrick and Link, 2015].

Beyond the conceptual approach, there are asymmetries between the MSFD and the CFP in terms of competence, discourse, decision making process and definition of an EA. This complicates actors' intentions to implement an EAFM in Europe [Ramírez-Monsalve, et al. 2016(a)]. For example, according to the CFP, fishing is allowed as long as its impact on the ecosystem is limited [[van Hoof, 2015], and according to the MSFD, fishing is allowed so long as its activities are within boundaries compatible with the achievement of GES [Ramírez-Monsalve, et al. 2016(b)].

The MSFD and the CFP also differ significantly in terms of policy design. The former has a maximum ambition, with an all-embracing scope that is still struggling in the implementation



phase. The latter has adopted a more pragmatic angle, using the multispecies approach as a kind of proxy for an incremental implementation of the EAFM (RTD, 2015). In any case, a sudden reorientation to a holistic approach to ecosystem marine management in the EU can be nearly politically unmanageable; a gradual increase in the level of integration is more feasible, e.g. once a move towards multispecies fisheries management has been taken, one can proceed with advancements towards integration with related policies and cross-sectors (RTD, 2015). A marine ecosystem approach across EU policies (CFP, MSFD, WFD, HD, BD, etc.) seems unfeasible, beyond Marine Spatial Planning contributions to the EAFM by specializing territory in the ocean. (RTD, 2015).

Within the ICES community the conceptual debate has also been lively and can be traced through workshops and strategic plans (ICES, 2000; ICES,2004). At a certain stage there was an important conceptual distinction between the two where 'based' was considered to be about ecosystem engineering and 'approach' was interpreted to mean precautionary. However, nowadays the terms ecosystem-based management and ecosystem-based have been generalized (as in the literature worldwide). In this paper the term EAFM will be used and the ICES EBFM should be read as a synonym.

Several streams have come together to impact the way science-based advice is produced and how it interacts with knowledge based-advice in European fisheries. ICES advice is increasingly building bridges between healthy fish stocks and healthy marine ecosystems. At policy level, sources of advice are becoming plural (see Figure 1). This requirement can be traced back as one of the ways in which the EU tried to reach a basic EAFM principle of managing human activities under the best available knowledge [Ramírez-Monsalve, et al. 2016(b)]. Moreover, the reformed CFP appears to have strengthened the advisory position of the ACs: their advice shall be taken into account, requiring detailed reasons for adopting measures that diverge from it [CFP, 2013 art 44]. The limitation is that even when AC's advice represents consensus and complies with certain sustainability criteria, neither the Commission nor the MS are obliged to follow the recommendations of the ACs [Hegland et al, 2015]

As noted by Berkes (2012) an ecosystem approach cannot be based on biological science alone, as this only addresses one of its dimensions. Stakeholders bring experience-based knowledge into the process. Furthermore, an EA is about balancing (often) conflicting objectives and this balance is itself not a biological issue even though the identification of the space within balances may be informed by biological science. EAFM implementation in the EU therefore requires concerted action from multiple players [Ramírez-Monsalve, et al. 2016(a)]. Including stakeholders balances the push and pull between science and policy within an iterative process that ensures cooperation [Watson-Wright, 2005].

Institutional structures are important to be established in order to facilitate stakeholder involvement in the advisory process [Pitcher, et al, 2009][FAO, 2012][Fletcher and Bianchi, 2014]. These structures act as arenas for deliberation with scientific knowledge to deal with complex trade-offs in complex social-ecological settings [Ramírez-Monsalve, et al. 2016(a)].

There is reflection on what kind of advice is provided. Whereas the definition of 'advice' understood as 'recommendations for action supported by information about the status of the stock, fisheries and ecosystems' (ICES MoU, 2016) seems on the surface relatively clear-cut, it nonetheless begs an answer to the question: what is included as 'information'? Clearly, what



comes out as recommendations will be affected by the kind of information that is considered? At least, this seems to be a legitimate assumption.

One take on 'information' would be that only 'scientific' information should be included; in this case advice effectively equates to what we term 'science-based advice' (SBA), where the advice-related part of the governance structures are set up to facilitate that the policy-makers are supplied with the 'purest' scientific information in the shape of advice to base decisions on. However, it is also possible to apply a more encompassing definition of information, which would allow other forms of knowledge, e.g. traditional ecological knowledge (LEK) (Huntington 2000), in the process leading up to advice; we could simply term this kind of advice 'knowledge-based advice'. With reference to Figure 1, ICES has traditionally supplied science-based advice to the EU system (reviewed in STECF), while for instance the establishment of Advisory Councils represents a step towards considering other forms of knowledge (see Long et al., 2016 for combination of knowledge in the EAFM). However, also within ICES there is an ongoing discussion of how open it should be to then inclusion of e.g. (active) outside observers in meetings. Similarly, the building up of internal scientific capacity in the fisheries organisations may also mean that the line between 'pure' scientific knowledge and other forms of knowledge (and classical lobbying) could become blurred.

### III. The EU-ICES MoU (2016): scope, ambition and critical review

The delivery of science-based advice by ICES to the EU is managed through a Memorandum of Understanding, hereafter referred to as the MoU. The MoU without the detailed budget is publicly available on the ICES web site<sup>6</sup>.

#### *The substance matter of an EAFM as defined in the MoU*

The need for an ecosystem approach and inclusion of ecosystem considerations in fisheries advice has been stated in general terms in past MoUs and was described as incremental inclusion of knowledge: *"The advice shall be based on an ecosystem approach. This will be implemented incrementally so that any information on the interactions between fisheries, the fish stocks and the marine ecosystem is considered and incorporated in the advice as it becomes available"*. As the advice deliverables in the MoU were focusing on fishing opportunities for single stocks this incremental stock-by-stock approach in practice meant that the examples of integration of ecosystem considerations which had consequences for the final single stock advice was small, including reference to escapement biomass to support predators. Other advice which may be seen as part of an EAFM included advice on avoidance of bycatches of mammals and on area closures to protect bottom habitat. In the 2008 Data Collection Framework of the EU a set of fisheries ecosystem impact indicators were defined and reference were now made to these as a specific recurrent deliverable. However, these indicators were not legally linked to

<sup>6</sup> [http://www.ices.dk/explore-us/Documents/Cooperation%20agreements/EU/2016\\_MoU\\_EC\\_ICES\\_web.pdf](http://www.ices.dk/explore-us/Documents/Cooperation%20agreements/EU/2016_MoU_EC_ICES_web.pdf)



any regulation of human activities and the delivery of these can therefore not be seen as advice directly linked to policy implementation.

A more formalised and policy-linked inclusion was first introduced in 2007 when the MSFD was initiated and ICES started to be requested to give fisheries advice which includes considerations of this part of EU policy. In the 2016 MoU the text about an ecosystem approach in relation to fisheries now reads *“The recurring advisory deliverables shall be based on an ecosystem approach consistent with the targets and objectives of Good Environmental Status where these have been fixed under the MSFD. This will be implemented incrementally ...”*. In the incremental implementation, there is now specific reference to the MSFD including proposals for reference points for descriptors and assessments of fisheries disturbance of marine ecosystems where reference levels have been established under the MSFD. Regarding the recurrent advice for fish stocks it is further stated that *“the advice should be prepared taking into account the biological interaction between the fish stocks, such as predation or competition”*. The recurring advisory deliverables in the MoU cover that advice for which the MoU also includes a direct financial agreement on a budget. The MoU also enables specific agreements, including payments for costs, to be set up between the EU and ICES about other issues – the so called non-recurring advice. In the 2016 MoU this includes inter alia advice in relation to other aspects of the MSFD.

It thus appears that the science aspect of an ecosystem approach to fisheries in the MoU is defined as 1) consistency between the CFP and the MSFD and 2) that fish stocks advice should consider biological interactions between fish stocks.

#### *The process of an EAFM in the MoU*

The MoU is not specific regarding the process with respect to an ecosystem approach to fisheries. The MoU includes requirements for transparency in relation to stakeholders (and the EU itself) but does not identify dialogue or processes by which interaction with stakeholders and policy makers may help scientists to identify societal choices and preferences regarding an EAFM in more detail than what is already stated in policy documents. Process is thus in the MoU largely seen as a one-way information stream from science to stakeholders where stakeholders may be observers to the process and documentation and data are made public. Commission officials have generally held the view that it is the competence and sole responsibility of law and policy makers to engage with stakeholders and information to scientists regarding societal choices are thus mediated by the competent government bodies.

However, for many issues in relation to an EAFM it is not feasible to -in sufficient detail- specify beforehand which choices of risks and trade-offs are most pertinent for scientific analysis. ICES therefore has either to make its best guess, which may turn out to result in advice being seen as less relevant for subsequent policy discussions and may be seen as scientists overstepping their role by making policy choices, or set up its own process to engage with stakeholders and policy makers as required for each specific request for advice. ICES has in practice chosen to do the latter. The Commission has not opposed this and direct costs for organising such processes can normally be financially covered under the MoU.

#### *Resourcing an EAFM through the MoU*

The MoU includes an agreement about financing the recurrent advice regarding annual fishing opportunities through a set budget and non-recurrent advice on an advice-by-advice basis.



In both cases, the financing covers expenses to set up and manage the process including costs of meetings and supporting staff in the ICES Secretariat. The core resource – the time of the scientists doing the analysis and developing the advice – is not paid through the MoU. The availability of scientists is thus dependent on either that governments fund scientists directly to participate in the ICES advisory work or that individual scientists and the organisations for which they work agree to support the work.

This may create resource problems in relation to an EAFM as the government funding of expertise targeted to support ICES advice tends to align to the policies of yesteryear. There is thus in most EU (and ICES non-EU) countries specific institutes which are funded to support annual fish stock assessments – this may be either specific institutes which receive a core funding to do so or university institutes which have a contract to deliver advice support to fisheries policy. There are generally no similar arrangements for marine ecologists or social scientists, both of which are in high demand whenever processes for EAFM are set up. The result is a bias in the availability to the ICES process to develop and implement an EAFM including in some cases that relevant and necessary expertise regarding specific subjects may not be available to ICES. Furthermore, some of EAFM efforts are pursued through ICES scientific branch (see below), which depends on national funding and therefore aggravates the lack of human resources.

#### **IV. What is ICES currently delivering**

ICES provides the evidence for ecosystem-based decision making for the management of fisheries and other sectors in the ICES area. It is providing the knowledge to explore trade-offs and uses its network, data centre, and advisory role to provide the scientific basis for operational management. As the process is incremental, ICES hopes to respond appropriately to the changing demands of a developing policy landscape and dynamic ecosystem.

Since 1992, the ICES Working Group on Ecosystem Effects of Fishing Activities (WGECO) has considered the framework and application of the ecosystem approach, providing leadership in the development of major concepts, such as those underlying the MSFD and the use of indicators to inform assessment and management action.

Through its data centre and with strategic partners, ICES provides operational information products to underpin the exploration of what can be called the safe-operational space for trade-offs (constrained optima). The data centre is working to bridge the different vocabularies used in the conservation and resource management arenas. It is also working with the ICES working groups on marine spatial planning, habitat mapping, and fisheries spatial data to make the provision of spatial data consistent across various data sources, to enable clear and traceable provenance of information for decision making.

ICES provides three main outputs to support the EAFM: advice on fishing opportunities, fisheries overviews, and ecosystem overviews. These outputs allow to address new information as well as changes in the ecosystem, legislation, and the drivers of fisheries. Spatial management and regional priorities are addressed through the advice being given by ecoregion. The ecoregions reflect both the biogeography of the ICES area and the management of the area by national and regional authorities.



Advice on fishing opportunities has evolved from the traditional focus on single species catch options to now including an assessment of the stock status, the exploitation rate in relation to maximum sustainable yield (MSY), and projections of the consequences of fisheries actions for each stock impacted by fisheries in the European ICES area. The assessments are a mixture of analytical and knowledge-limited (proxy) approaches which encompass target species, bycatch species, and deep sea and elasmobranch fisheries. Where evidence exists of productivity changes in the ecosystem or fish stocks, researchers are encouraged to consider the evidence and implications for management of these changes.

Advice on fishing opportunities uses rules, with associated reference points, that reflect policy objectives. The ecosystem approach is integrated into the reference points, which are based on the current state of the ecosystem and updated to reflect any effects of the ecosystem on stock dynamics. Where appropriate, such as with forage fish or cannibalistic fish, estimates of the temporal variation of natural mortality are built into the stock assessments to consider the implications for fish for top predators or density effects on stock dynamics. ICES builds precautionary into its advice by estimating buffers on biomass limit reference points (lower limits of stocks). For short lived species, an “escapement” approach is used, that accounts for the need to maintain a certain biomass for sustainability and ecosystem functioning.

The catch opportunities can be viewed as “traditional” ICES products, which are now being supplemented by the fisheries and ecosystem overviews. Again, they are published for ecoregions and are being incrementally developed. The first fisheries overviews were published in spring 2016 (Baltic Sea, Barents Sea, Greater North Sea and Celtic Seas) and provide the following: i) summaries of the activities and impacts of the fleets fishing in the ICES area; ii) a regional assessment of the performance of fisheries management with regards to targets and an assessment of Good Environmental Status (GES) for MSFD descriptor 3 (commercial fish and fisheries); iii) a description of the fleets operating in each ecoregion, the composition of their catches, and their interactions with the ecosystem, thus documenting the goods and services derived from fishing; iv) mixed fisheries considerations, which describes the consequences and options for management of mixed fisheries, are part of these overviews. Mixed fisheries advice highlights the impossibility of the objective of maximum sustainable yield for all stocks and provides trade-off options between different management strategies; v) maps of the distributions of fishing by gear type, and maps of the impact on the seabed of trawled fishing gear; and vi) a risk assessment by gear of the impact of bycatch on endangered, protected, or threatened species.

In addition to the fisheries overviews, the ecosystem overviews place fishing in the broader arena with other activities that exert pressure on the marine system. They also put fishing activities into the context of the trends and status of the marine ecosystem as a whole. Four were published in 2016 (Greater North Sea, Barents Sea, Celtic Seas and Iberian coast and Bay of Biscay). Further ecosystem overviews will be published in 2017, including Iceland and the Norwegian Sea. The [ecosystem overviews](#) use qualitative methods to identify and focus on the top five priority human activities and resulting pressures that can be locally managed within each ecoregion. Quantitative methods to further assess these pressures are currently being developed. In many ecoregions, ICES considers that fishing contributes to major anthropogenic pressures on the ecosystem. The approach of assessing activities, pressures, and state of the ecosystem provides the flexibility to monitor for cumulative effects of the pressures on the ecosystem and to accommodate impacts of climate change as they become apparent.





On top of these three main areas of advice, ICES is regularly asked to provide bespoke advice on issues relating to the ecosystem approach. For example, in recent years, methods have been devised to assess the status of information poor stocks, monitor recreational fishing, and explore maximum sustainable yield as a range of catch rather than as a point estimate. Advice has also been issued on the impact of aquaculture. ICES data centre also hosts and maintains the OSPAR and HELCOM impulsive noise register, marine litter datasets (collected in conjunction with ICES coordinated surveys), a biodiversity portal (aimed at seal and bird populations) and the North Atlantic vulnerable marine ecosystem (VME) portal.

Despite the significant advances, overviews have been perceived as rather descriptive and with limited capability to inform actual decision-making. The efforts to move forward come from ICES' advice and science branches:

- Proposals for broader forms of scoping for regional management challenges to feed the advisory system. The discussion is at a preliminary step and would allow for science and knowledge building using a participatory approach. If successfully developed, the output of the scoping exercise would have a long way to be linked to policy implementation.
- Proposals to further advance the scientific knowledge. For instance, a series of Workshops on Developing Integrated AdvICE for Baltic Sea ecosystem-based fisheries management (WKDEICE). WKDEICE has a two years' timeframe to develop a strategy for: i) integrating environmental and economic information in fish stock advice; ii) conducting an integrated environmental assessment; iii) conducting a socio-economic assessment; and iv) conducting short-term projections informed by environmental and economic conditions. This step forward is embedded within the ICES scientific process, focused on exploring tool gaps (models, indicators, etc.) and potential applications well before it could be discussed as a component of the advisory process. The brainstorming prompted by the workshop has questioned to what extent ICES remits are enough to provide EAFM advice or whether there are some components that should be placed at other links of the advisory chain (see figure 1); from scoping exercises to the generation of alternative management scenarios, issues related to societal choices, as well as to the economic and social considerations permeate the process.

Any process that engages with society needs to be transparent, adaptive, and inclusive. Assurances should be given of proper quality control so that personal bias in science and advice is minimized and good professional standards are upheld. Transparency is at the core of science and means that ICES science processes, documentation, and products must be open to observation and scrutiny for the users of the science and advice. The evidence base and methodologies used to provide knowledge products are openly accessible in the highest resolution that the underlying data sources allow. Inclusiveness is at the core of an ecosystem approach.

ICES engages with the users of its science and advice to define the issues of concern, understand interests, bring in other sources of knowledge, and ensure that advice relates to societal choices. Inclusiveness is implemented through scoping processes, where scientists engage with users and stakeholders to ensure that their questions and issues are addressed. ICES works hard to ensure



the legitimacy and credibility of its advice. The “[benchmark](#)” is now widely used throughout the organization to enable stakeholder input into method development and knowledge acquisition. Industry-science partnerships feed information through to ICES products. These efforts have been widely recognized, particularly by the Advisory Councils (ACs, 2014).

A distinct gap in the ICES EAFM approach is the lack of consideration of limits to the carrying capacity of the system. Examples of this approach are the total catch limit that operates in Alaskan fisheries (annual total catch limit of 2 million tonnes; see Dicosimo et al, 2010) and the newly developing Ecological Productivity Units (EPU) being proposed for mixed fisheries management for New England fisheries (NEFMC, 2016). Other than for its catch opportunities, ICES has failed to create a framework for the provision of advice on ecosystem aspects. It has however created a tool to show how assessments are made when delineating Vulnerable Marine Ecosystems in the NEAFC area (see ICES Data Portals, VME available online). This tool shows the evidence base and the decision making process that leads to the determination of VMEs. ICES does not use a suite of indicators (except precautionary and MSY reference points) to quantitatively assess the state of the marine system and the effectiveness of management action. It could be argued that this is not a role for ICES, but the fisheries and ecosystem overviews would benefit from an increase in the use of quantitative methods. However as highlighted by the ecosystem overviews, fishing is the activity that exerts the greatest pressures on many of the ecoregions covered by ICES. Thus any exploration of the trade-offs required for the management of marine activities will probably require intersections with knowledge providers on fishing activity and the impact of fisheries.

## **V. How stakeholders perceive the room for improvement.**

Throughout the implementation of the MareFrame project (Co-creating Ecosystem-based Fisheries management solutions) a total of 22 stakeholder events have been organized at EU (3) and case study level (19) covering all the EU sea basins from the Baltic to the Black Sea ([www.mareframe-fp7.org](http://www.mareframe-fp7.org)). The participants have included fisheries organizations, e-NGOs, EU advisory bodies (ICES, STECF, ACs), decision-makers and scientists. Qualitative research techniques have been tailored for structured dialogue on the EAFM implementation (see Ramírez-Monsalve, et al. 2016(a)).

The stakeholders’ insights provide valuable information in terms of how they perceive fisheries advice framed in the ecosystem approach as well as how they understand their role in the process. Contrary to the overwhelming call to “understand everything”, there is a need for a more focused dialogue to avoid the endless number of options and questions. First, there seems to be a list of “big problems” to be addressed: trade-offs for mixed fisheries, the impact of fisheries on the seafloor, biodiversity and the food web as well as climate change and its impact on ecosystem resilience, not only because of the impacts associated to fishing but also because some of these might affect the viability of fishing activities (RTD, 2015). This list does not always match with the list of “acute problems” perceived by some stakeholders, particularly in relation to the resource allocation and to the uses allocation, when other players are considered in the move from fisheries to marine realms (AC, 2014).

On a broader picture the EAFM advice is seen as an element to structure dialogue in the policy realm (e.g. towards the new reform of the CFP) rather than as a basis for immediate decisions





(e.g. quota allocation). Other players beyond the scientific advisory bodies should lead this debate (WEAF 2016). For the advice suppliers, EAFM needs to explore options and find the 'safe' and 'just' operating spaces; for decision-makers it would benefit from an extra layer of trade-offs taking into account conflicts in terms of resource sharing at MS and fleet level; in other words, "a political device" that would help to translate the advice into actual decision-taking (WEAF, 2016). Although beyond the scope of this paper, the STECF initiative on fleet-based management could be a starting point (Ibid; STECF, 2010; Gascuel et al, 2012).

Within this context, EAFM advice needs to respond to the relevant 'what if' questions, and demonstrate the trade-offs and the consequences of their objectives (RTD 2015). A more focused process could be supported by developing risk assessments to define the potentially most significant disturbance for a given ecosystem, as well as testing social objectives and acceptability (RTD, 2015). The use of qualitative approaches by ICES for the ecosystem overviews is addressing this issue. Apparently, advice suppliers and receivers agree that neither the constant demand for more research and development of new methods, nor the identification of knowledge gaps should restrain actors from "doing EAFM now". Those demands should never be used as a way to postpone giving the best possible advice here and now and engaging on basis of existing knowledge (RTD, 2015). Also, an open attitude towards advances should be taken, that is, acknowledging that progress is progress, instead of focusing on the fact that the target has not been reached (WEAF, 2016).

Considering ICES advice to support the implementation of the EAFM, advocates suggest a selective use of advice typologies described in section IV. For example, single-stock advice (to set the baseline), fisheries advice (to integrate at metier level), and ecosystem advice (to assess the impact). These approaches are not contradictory, one should not replace another down the line – but ecosystem advice may provide the broader framework and limits within which fisheries and single stock advice is necessary for day-to-day policy within those limits (RTD, 2015).

ICES engagement with stakeholders is positively valued by all stakeholders' profiles (ACs, 2014; RTD, 2015; WEAF, 2016). However, some constructive reflections could support improvements in the overall advisory process. For instance, how stakeholders best can participate in identifying the problems to be tackled (WEAF 2016). Scoping processes seem to be a place to articulate meaningful participation, with a flexible, connected and coordinated approach in relation to objectives, path and scientific methodology to ensure the inclusiveness. This inclusiveness refers both to participants and to scientific disciplines (natural and social science) from the outset. Stakeholders show their preference for an on-going process - rather than a one-time scoping exercise- attached to work plan, that will help to remove scepticism regarding the nature of advice and to build more trust between the scientists, their ecosystem models and the fisheries sector (AC 2014).

Participation within ICES advisory process and through the advisory chain leads to the need of setting the scene and the process so that stakeholders can participate at the right scale. Regionalization consistent with the EAFM involves not only regional but also sub-regional and supra-regional approaches. There are specific topics that benefit from an integrated approach rather than an artificial sub-division at regional levels (WEAF, 2016). However, in that connection, ACs (2016) have highlighted there is a lack of regional frameworks and forums for managing marine ecosystems.



Finally, a shadow challenge was pointed out. The changing landscape in the advisory and policy process and the role of the Member States organized in Regional Groups (see Figure 1) has created room for informal advice generated by national scientists; several concerns were expressed on to what extent this could jeopardize the system (RTD 2015; WEAFF 2016). To address this, it was suggested to use the independent advisory system already in place in order to avoid redundancy in scientific advice and to ensure independence from decision makers (WEAFF 2016).

## VI. Could we do it better?

The ecosystem approach has become the almighty panacea (Cardinale and Svedang, 2008: 245). Even further, it seems to be the ultimate panacea to avoid panaceas in fisheries management. Back in 2004 an ICES Dialogue meeting<sup>7</sup> specifically addressed the provision of scientific advice for the EAFM, considering three aspects: a) making it coherent across management of human activities that impact on marine ecosystems; b) making it operational; and c) making it more credible (involves research resources, transparency, clear and effective communication, quality assurance, and inclusiveness in the decision-making process (ICES, 2004). At that point, it was agreed that “the scientific, administrative and institutional capacity was insufficient” (Ibid: 14).

An incremental perspective has guided ICES efforts since then: gradual inclusion of knowledge as it is generated by the scientific community, reformulation of the type of advice delivered, the conception of how the advice is communicated, the process and procedures to balance integrity and transparency, etc. Hence it has aggravated the tension between EAFM focus on the process and the aim to integrate it in the actual management measures. The first should have been translated into an increasing demand for non-recurrent, long-term (vs. case by case) advice for setting policy objectives; the second should have provided consistency between the EU policies and integrate biological interactions between fish stocks in the fish stock advice.

In any case, the tendency to equal EAFM implementation to the setting of actual management measures (particularly annual fishing opportunities) is misleading; as it would be to read any stand-alone ecosystem component consideration in the advice process as the implementation of the EAFM. In a framework defined by policy tensions, plural actors and institutional vacuum at regional level, ICES has taken a leading role.

Relying on its institutional capacity, ICES is somehow generating the EAFM framework in which management decisions could operate, as it has done previously in the environmental realm (see ICES, 2004). The critical review of what ICES is currently delivering, has allowed us to identify the following shortcomings:

- Lack of consistency between the MSFD and the CFP. The advice assessing the good environmental status of a given fish stock for the former does not feed management decisions for the later and vice versa.
- Gaps in the current approach, for instance carrying capacity, that will substantially improve trade-offs exploration and the assessment of opportunity cost for alternative management strategies.

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<sup>7</sup>. Since 1980 ICES has been organizing forums to enable discussions between scientists and managers in relation to the provision of scientific advice (ICES, 2004).



- Dialogue with policy-makers and stakeholders has been facilitated at multiple levels beyond the MoU limits. However, there is a need to set procedures for iterative scoping exercises, which should be integrative both in terms of the participants' profiles and the scientific disciplines involved.
- The lack of resources may hamper how integrative the EAFM becomes: the limited funds allocated to the research needed for ecosystem advice and the fact that all the streams depend mainly on national funding are likely to limit careers development and the network of expertise available.
- The EAFM advice requires further efforts in the integration of the fisheries advice chain (figure 1). Assuming that advice on the environmental, economic and social aspects "will not necessary come from a single source" (ICES, 2004) at least a greater interaction between the science and management process and a solid dialogue among disciplines is requested.

In summary, ICES is struggling for developing a structured process within which feeding its EAFM advice. The actions at the macro level (e.g. regional scoping exercises) are essential but perceived as cumbersome and distant from the operational needs; the actions at the micro level (e.g. exploring tools and indicators) are pertinent but driven by science challenges rather than by the management ones. In order to succeed in an inherently chaotic system (Dickey-Collas, 2014) ICES pushes not only to increase its capacity to produce and evaluate knowledge; to where that knowledge goes and what for is also embedded in its current endeavours.

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