

ICES Strategy for Mixed Fisheries (Technical Interactions) and Multi-species (Biological Interactions) advice

Background

The European Commission has asked ICES for mixed fisheries (technical interactions) and multi species (food web interactions) advice. This is already being done for the Baltic (MS) and North Sea (MF). However the approaches in these areas are unlikely to be applicable in all other areas. The European Commission asked for:

- *quantification of catches and discards (where relevant) at a sufficiently detailed level to support analysis of technological interactions between the main demersal fisheries;*
- *development of mixed-fisheries TAC advice, where annual TAC advice is provided that is consistent with conforming to the MSY framework for all species in the mixed fisheries, taking account of plausible ranges in the choice of MSY targets ;*
- *development of multiannual plans with harvest rules governing the setting of TACs for the species in a mixed fishery and (where appropriate) effort levels for the relevant gear types*
- *development of the multiannual plans to include biological interactions (competition and predation) as well as technological interactions*
- *quantification of the effects of the fisheries managed under multiannual plans on non-target species.*

Priority

High: The Commission has asked for this. It also is central to the ICES new strategic plan, the Science Plan and the ACOM Strategic Plan

Mixed fishery advice (technical interactions)

This advice is required for 3 eco regions, North Sea, Celtic Seas, Biscay/Iberia. It is already being provided for in the North Sea, so this text is more devoted towards the remaining areas. There are two approaches to this issue. One approach is where advice for one stock (usually cod) drives the management. In this case advice is simply a presentation of the consequences for all the other stocks, predicated on the cod advice. A more involved approach is where a range of options are provided, allowing managers and stakeholders to explore tradeoffs between different choices. Whatever approach is taken it should take account of plausible ranges in the choice of MSY targets, for the main species, and a looser precautionary approach to the remainder. This is because we are unlikely to deliver MSY advice for absolutely every stock. It is obvious that all MSY targets cannot be achieved simultaneously and that the MSY itself will depend on multispecies and mixed fishery interactions. However ICES will be respectful of the need for MSY advice on the part of the Managers, and appropriate variants of MSY will be provided.

The timelines for introducing mixed fisheries advice will vary from region to region. In the North Sea, ICES has provided quantitative advice in 2012. For the Celtic Seas, Biscay and Iberia the process to provide such advice is not yet mature. An initiative in this area is being supported by the EC-funded project *GEPETO*. However some work is underway in all regions, and is expected that quantitative advice can be provided by 2015. In the meantime, ICES can provide qualitative or semi quantitative advice in these areas.

The advice can be developed by:

- 1) Carry out a detailed review of mixed fisheries interactions including spatial analyses (e.g. VMS) and metier interactions.
- 2) Transparently provided integrated information on landings, discards and effort at an appropriate scale (i.e. spatially resolved métiers). Where data gaps exist e.g. in discards modelling approaches should be developed.
- 3) Develop a decision support modelling framework to support discussions with stakeholders and managers about options and tradeoffs in mixed species fisheries.
- 4) Provide advice to managers and stakeholders about key data deficiencies where possible suggesting remedial solutions.

Mixed fisheries work will proceed in two waves:

- 1 Choke species driven advice.
- 2 Wider technical interaction advice considering spatial and technical effects across the species assemblage.

The first wave of advice is already proceeding for the North Sea, and will progressively be rolled out for VIa, VIIa and Iberia. In these areas there are choke species that act as advice drivers (cod, southern hake, Nephrops in Iberia)

The second wave requires an interactive process involving managers and stakeholders. This will involve the establishment of appropriate fora within ICES, or outside and involving the RACs. Spatial and technical solutions may be advised upon. It requires clear objectives to be set, and agreed, and of course will include the choke species advice. This kind of work is being dealt with for the Celtic Sea, Biscay and Iberia by the appropriate RACS and the *GEPETO* project.

It should also be noted that mixed fisheries advice is not relevant for the Norwegian and Barents Seas, Iceland, Faroe Islands and the Baltic.

Biological interactions (multi-species) advice

Some ICES advice already has such interactions built-in. Examples are cod and capelin in the Barents Sea. In the case of the Baltic, multi-species advice has been provided in 2012.

For the North Sea, the underlying science is well developed and sufficient for the provision of advice, although up-to-date stomach analyses are required. It is expected that ICES can provide such advice over the period 2012-2015. A format for provision of advice can be decided quickly. However it is expected that some special requests will have to be dealt with in the North Sea, in the near future.

In the Norwegian Sea there is a very good understanding of the food web and predator-prey interactions. However there is no multi-species advice at present. Two issues arise here related to the relationship between zooplankton and pelagic fish. 1) It has been observed that zooplankton abundance has decreased significantly since 2008 in this area. It is believed that this is related to the high abundance of pelagic stocks (herring, mackerel and blue whiting) which are grazing on zooplankton. 2) In addition there is a wish by industry to increase harvesting of zooplankton in the area. Consequently, ICES should therefore assess the status of zooplankton and provide information on the relationship between plankton and the growth and recruitment of pelagic fish, and provide advice for the management of the exploitation of zooplankton. The preliminary steps for assessment should address the following issues: how data on zooplankton in this area can be improved, assessment methodology, what are the main interest and conduct an exploratory assessment of *Calanus finmarchicus*.

In all cases there are three aspects to food web studies:

1. Predation on adult fish
2. Predation on larvae
3. Carrying capacity studies

In the Celtic, Biscay and Iberian regions the timeline will be somewhat longer than in the above regions. In Biscay and Iberia there is a better availability of data (e.g. stomachs) than in the Celtic Seas, where stomach data do not exist. In these regions additional research is required, in order to complement work already underway. While the science matures over the next four years, some advice can already be given, based on published studies. A framework and format for provision of such advice in the intervening period can be developed in parallel with the scientific work. Thus, advice development should take place in parallel with developments in the science, not waiting until the end.

A number of considerations arise with respect to achieving MSY:

- Do we choose FMSY for a few key stocks
- Do we aim for sustainable protein yield from the entire ecosystem

Multi-species advice, hereafter referred to as Biological Interactions Advice (BI) will develop along two parallel strands:

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| Strand 1 | Single species advice incorporating biological interactions. |
| Strand 2 | Ecosystem-scale advice incorporating biological interactions. |

The timeline towards completion is different for each strand.

Strand 1 will be developed on an ongoing basis, using the single species benchmark process. The main developments will include progressive incorporation of M1 and M2 natural mortality, and framing of Fmsy reference points that are consistent with predator prey considerations.

Strand 2 will proceed in three phases.

- 1 North Sea advice will be provided in 2013, following the format used in 2012 for the Baltic. The next eco-region to be rolled out will probably be VIIc and IXa. This is because there are better data (stomach) available here than elsewhere. Finally the Celtic Seas and Biscay will mature, but there are data and modelling issues to be overcome
- 2 Adaptive improvements to advice for each region, on a year to year basis. This will be assisted by ecoregion ecosystem benchmark processes, just beginning in 2013.

- 3 Pending additional research work, consider the extent to which it will be possible to give advice on managing biological interactions (manipulating the ecosystem to achieve certain objectives).

Wider ecosystem advice and its drivers

The Marine Strategy Framework Directive and the Marine Spatial Planning initiatives are strong drivers for ecosystem advice. The exact mechanism of how the MSFD requirements will influence advice and management will become clear when the reform of the CFP is completed. The **obligation is on individual MS to put in place measures** to achieve Good Environmental Status by 2020. Recital 39 of the MSFD refers to such fisheries measures and Article 14 of the Directive makes provision for a Member State to identify to the Commission instances where GES cannot be achieved due to “action or inaction for which the MS concerned is not responsible”. MS are required to define and report on GES by 2012 and to initiate a programme of measures to achieve or maintain GES by 2016. There is a 6 year reporting cycle and the next report on GES will be in 2018. It is the second iteration of the MSFD that will be influenced by these proposals. In 2013, good environmental status (GES) must be defined.

As the advice develops other drivers may suggest themselves. The advice should provide information on the **impacts on the ecosystem and also the interactions between these** (additive vs. multiplicative etc.). Much of this may come from the Regional Seas programme in bottom-up type initiatives from the scientific community. This development may be of a longer term nature (after 2016).

Research Needs

- Study of indicator-based metrics for data poor species (without forecasts).
- Modelling approach to discard estimation*.
- Mixed fisheries interactions in Celtic/Biscay/Iberia to complement work already underway:
 - International review of mixed fisheries interactions.
 - Develop a decision support modeling framework
 - A series of case studies of possible approaches, involving iterative management plan development with stakeholder interactions.
- Updated stomach sampling in the North Sea
- Better understanding of the foodweb (western and southwestern waters especially). This should involve stomach sampling, or possible molecular markers for identification of diet items.
- Development of indicators of foodweb structure and function and size-based models of ecosystem function, e.g. size-based metrics.
- DCF support for attendance at WGSAM and Regional Seas SCICOM groups.

* Current sampling levels for discard estimation are not adequate. Yet it is recognised that substantial increases are not financially feasible. Modelling approaches could be explored to estimate discarded quantities and changing patterns of fleet behaviour on discarding.

Frequency of assessments and of advice

To streamline the process, it will be necessary to consider the frequency of assessments and advice provision. For these stocks, ICES must reduce the frequency of advice provision from annual to biennial or triennial. The provision of bi- or triennial advice should be organised on a

rolling basis to avoid a traffic jam of advices in the same year. The results of WKFREQ and WKLIFE are central to this process.

Resource requirements

The micro management applied internationally and nationally to the "TAC machine" is a great drain on resources. Of course we need to service it, but we need to time-saving measures to free space for the MS.

Need a forum or several fora to bring RACS, managers and scientists around the table. The approach taken in developing pelagic single species management plans can serve as a template.

WGSAM is dealing with the North Sea. The decision remains whether we need a separate group for the western areas.

Participants

Participants will come from national laboratories. But we need key stakeholders.

It will be important to avoid duplication between ICES and STECF.

RAC membership is a key incubator of the new advice. A threat to the process is the decision making difficulties in some of the RACs.

Secretariat facilities

Meeting with RACS may require meeting space not available in the secretariat.

Financial

Work will be at national expense, or under FW and LOT project funding from the EC.

Linkages to other committees or groups

The MIRIA and MIRAC meetings will be important fora to exchange information and ensure that duplication does not occur.

Marine Spatial Plan: will be especially important for mixed fisheries, e.g, closed areas.

WGSAM

Linkages to other organizations

The North Sea, NWW and SWW RACS will be the key to the entire process

STECF has already convened expert groups to deal with mixed fisheries plans.

GEPETO project is a framework project aiming to develop mixed fisheries management in Biscay, Iberia and the Celtic Sea.

IN SUMMARY

Overview of timelines for provision of mixed fisheries and multi-species advice.

Advice Type	Mixed fishery	Multi species
Norwegian Sea	na	2013-onwards
Barents Sea	na	2011-2013 (cod/capelin) 2014+ (entire ecosystem)
North Sea	2012	2013-2014
Baltic Sea	na	2012 onwards
Pelagic	na	2014 onwards
Deepsea	?	?
Biscay Iberia	2013-2015	2013-2016
Celtic Eco Region	2013-2015	2014-2018
Iceland /Faroe	2011 (Faroe)	2012+
Iceland	Na	2012+

Action Plan

1. Reduce frequency of advice for stocks to free-up time in the advisory process.
2. Agree a format for the advice for MS and MF from 2013 onwards. This may be a departure from normative advice, and exemplars may have to be proposed.
3. Convene task groups at appropriate regional level. These to be composed of scientists, gear technologists, stakeholders, managers and economists.
4. STECF reports: regional spatial units defined, should be followed. The approach is metier based.
5. Celtic Sea Overarching Principles Document is a guidance on how to proceed
6. We must begin to deliver MS and MF advice (however rudimentary) from 2013 onwards. This will assist with the process of stakeholder and manager engagement. It is necessary to have a multi-way dialogue to discover what people want and discuss policy choices.
7. Clear agreement of roles and responsibilities within and without ICES.
8. Visualise what we want from the MF and MS advice.
9. Be aware of other policy drivers viz. MSFD, the proposed discard ban, and especially achieving FMSY by 2015.