

MareFrame: what, why and how?

MareFrame is an EC funded RTD project which aims at applying Ecosystem Approach to Fisheries Management in order to develop alternative management strategies in co-creation with stakeholders for several case studies across Europe (see <http://mareframe-fp7.org/>). The overarching aim is to achieve fisheries which are biologically sustainable (i.e. exploited stocks at safe levels), economically viable (i.e. sustain employment), and reach Good Environmental Status (GES) as required by the CFP (i.e. healthy ecosystems). This is achieved through two consecutive steps: (1) firstly ecosystem models are applied to each case study in order to simulate candidate management strategies designed, in collaboration with stakeholders, to specifically address existing management issues, (2) secondly a Decision Support Framework (DSF) is built in order to facilitate the comparison of the outcomes of the various management options identified by the model regarding a wide array of outcomes (biological, economic and social). The end result is a management tool which stakeholders can use to address management issues whilst considering several objectives for the fishery.

The west of Scotland case study: status and objectives

One of the MareFrame case studies is the West of Scotland fisheries which encompasses the shelf (< 200m) of the ICES area VIa. The West of Scotland is currently plagued by depleted stocks of cod and whiting which are likely to jeopardise the entire fishery amid the soon to be implemented landings obligation. The case study was launched during the first stakeholders meeting on the 22nd of May 2014 in Dublin. The stakeholders identified the following management issues to be addressed in priority: (i) what would be required to recover the cod and whiting stocks in the context of landings obligation and increased seal predation and (ii) how can the long-term economic optimum for the fisheries be achieved.

Since then we have been working on the up-to-date parameterisation of an ecosystem model for the West of Scotland. We now have an ecosystem model including GES indicators which can be employed to perform management simulations. The model was used to carry out preliminary analyses by simulating alternative effort distribution among fishing fleets. These results were presented during the 2015 ICES Annual Conference.

A second stakeholders' meeting took place on the 30th of September 2015 in Aberdeen. The results from the preliminary analyses were presented. The Multi Criteria Analysis

(MCA), a tool allowing the comparison of management alternatives with regard to how they are likely to perform regarding multiple objectives and criteria, was also presented. MCA will form the basis for the DSF to be employed in the West of Scotland case study. Following the management issues identified during the first meeting, three management alternatives were identified by the stakeholders during this second meeting:

- Current path: fishing at MSY, landings obligation from 2019 onwards
- Mixed fisheries Maximum Economic Yield (MEY): fishing at MSY whilst relaxing MSY constraints on cod and whiting (choke species), optimize MEY across stocks
- Different cod stock definition: cod VIa managed together with cod IV as a single stock entity (akin to how haddock is now managed)

It is yet to be established how this last alternative would work in practice and how it can be implemented in the model. In the meantime, MareFrame researchers will propose a replacement alternative, in consultation with stakeholders.

We're now at the stage where the candidate management alternatives will be simulated with the ecosystem model in order to assess how they are likely to perform with respect to various objectives. The outcomes can then be systematically analysed using the DSF approach in order to identify the best management alternative. The ultimate goal would be to develop a proposal for a management plan. The preferred alternative identified through DSF can be improved through further discussions with stakeholders in order to provide the basis for a draft management plan proposal. If successful, this proposal could contribute to a multispecies plan, like the one recently adopted by the European Commission for the Baltic Sea (see http://www.europarl.europa.eu/meetdocs/2014_2019/documents/com/com_com%282014%290614_/com_com%282014%290614_en.pdf).

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