Baltic Marine Environment Protection Commission

Group on Ecosystem-based Sustainable Fisheries

Copenhagen, Denmark, 26-26 June 2019

FISH 10-2019

Document title	Seafloor integrity and by-catch in the HELCOM ACTION Project
Code	3-6-Rev.1
Category	CMNT
Agenda Item	3 – Implementation and update of the Baltic Sea Action Plan
Submission date	17.06.2019
Submitted by	Secretariat
Reference	

This Rev.1 document includes more detail on the progress made and scenarios being developed within the project to provide further background prior to the presentations that will be given. The new text sections below are provided in grey highlight.

Background

The HELCOM ACTION Project is an EU co-funded project for which HELCOM is the coordinator. The project works closely with the HELCOM Sufficiency of Measures Platform (SOM Platform), and two topics on which the ACTION project will focus are by-catch and impacts on the seafloor (separate Work Packages, WPs). The by-catch WP will focus on identifying areas of high risk, evaluate technical measures to reduce by-catch of harbour porpoise and estimate the cost and effectiveness of the measures. The impacts on the seafloor WP will look at pressures and activities on the seafloor and focus on aspects related to spatial regulation of offshore fisheries (utilizing the DISPLACE model) and restoration measures in coastal areas, including effects on benthic communities and the cost of measures. Furthermore, the two WPs will also cooperate to assess the impact of spatial fisheries closures on by-catch.

The two topics are briefly introduced in the document below, and the inception report, the outcome of the project partner kick of meeting, in which methods and plans for the work for each WP is available at this link.

Action requested

The Meeting is invited to:

- take note of the information provided;
- provide suggestions on additional scenarios that could be tested using the model used.

The HELCOM ACTION Project

The HELCOM ACTION Project is an EU co-funded project for which HELCOM is the coordinator. Two work packages (WPs) in the project focus on by-catch and impacts on the seabed, respectively. The by-catch WP will focus on identifying areas of high risk, evaluate technical measures to reduce by-catch of harbour porpoise, and estimate the cost and effectiveness of the measures. The impacts on the seafloor WP will look at pressures and activities on the seafloor and focus on aspects related to spatial regulation of offshore fisheries (utilising the DISPLACE model) and restoration measures in coastal areas, including effects on benthic communities and the cost of measures. Furthermore, the two WPs will also cooperate to assess the impact of spatial fisheries closures on by-catch.

The outcome of the project partner kick of meeting, in the form of the inception report, in which methods and plans for the work for each WP is available at this link.

WP1 By-catch

By-catch of marine mammals (and birds) has been documented in many gillnet fisheries and is regarded as a major anthropogenic impact on marine mammals. This work package (WP1) will identify high-risk areas for by-catch of marine mammals and birds, focussing on the south-western Baltic Sea, though other co-operations to expand this region of study are being explored. By identifying these high-risk areas, and by-catch estimates, it will be possible to evaluate the level of pressure on non-target populations from the fisheries industry and/or identify areas where monitoring of bycatch needs to be intensified. To facilitate this approach density data of harbour porpoises combined with gillnet fishing effort data will serve as input to model high-risk areas. To further verify the model CCTV footage will be used to confirm actual porpoise by-catches from commercial gillnet vessels. In other areas where the data depth or possibility to validate the models are not available (e.g. limited monitoring or no CCTV footage) then the possibility to predict high risk areas by combining fishing effort data and harbour porpoise distribution data will be explored. Overall, the work will aim to provide estimates of total by-catch of harbour porpoises.

A similar approach will be applied to explore the by-catch of certain bird species and other mammals. Although Baltic Sea scale density maps of sea birds (eider ducks, cormorants, and scoters) and seals (grey seal and harbour seal) are incomplete, the by-catches of these species are available from video footage. For these species by-catch estimates will be made as well as a gap analysis on the additional needs for data to identify high-risk by-catch areas.

The work on the above items is ongoing, with further details and the approach to be taken (e.g. data collection from logbooks and AIS databases) set out in the inception report (see page 8).

In order to enhance the understanding of potential mitigation measures an evaluation of measures to reduce by-catch of harbour porpoises will be carried out. Existing approaches are generally quite limited, principally fisheries closures, alternative fishing gears and acoustic deterrents. For example, with the harbour porpoise the main method to reduce by-catch is the use of acoustic deterrent devices, so called pingers. Gaining a greater understanding of the effectiveness of these and their cost effectiveness will be furthered, considering the cost in terms of possible catch/landings losses and implementation (e.g. via the DISPLACE model analysis).

The data collection and rationalisation phase of this work is ongoing and progressing well. A number of technical issues are currently being addressed such as the handling of seasonal data, appropriate gridding of data, how to handle gaps (e.g. for offshore bird data) during the further assessment work, and how to most suitably combine variable data sets (e.g. species density, fishing effort, CCTV, AIS and logbook data) in the final evaluation. In combination with this work a gap analysis is also being carried out.

WP2 Brief overview of the DISPLACE model and its application

The impacts on the seafloor WP will look at pressures and activities on the seafloor and focus on aspects related to spatial regulation of offshore fisheries (utilizing the DISPLACE model) and restoration measures in coastal areas, including effects on benthic communities and the cost of measures.

DISPLACE (www.displace-project.org) is an impact evaluation platform developed to support marine spatial planning (MSP) and marine fisheries-related management issues through an underlying agent-based simulation model (Bastardie *et al.* 2014, 2015, 2017). The model primarily simulates individual fishing agents as a function of individual incentives and the spatial availability of fisheries´ resource, and further projects scenarios of alternative harvest control rules with the consequent time and space redistribution of fishing effort. It allows a detailed evaluation of the fisher´s decision-making process when confronted to particular management measures, together with evaluating the economic viability related to these policy decisions constrained by the conditions of the underlying harvested stocks. The benefit of the approach is to helping predicting the most likely displacement of the fishing pressure in reaction to measures and changes in stock distributions, within the space of possibilities that make economic sense to the fisheries, and therefore anticipate the effects on the Common Fisheries policy (CFP) and the Marine Strategy Framework Directive (MSFD) related estimates and indicators. Informing the modelling platform with existing monitoring systems is used to benchmark the effectiveness of alternative management measures and spatial plans affecting fisheries, and pressuring other ecosystem components (e.g. link to WP1 bycatch). The model is designed so that other human activities than fishing and creating pressure on the seafloor such as shipping lanes can also accumulate to the impact.

Within HELCOM ACTION WP2 (Impacts on the seabed), this benchmarking should support the identification of areas most suitable for implementing spatial fishery regulations. Analysis of where fishing effort distributes shows that the effort typically concentrate on the same areas (fishing grounds) while low but potentially highly impacting effort could apply on their margins. To reduce the impact on the Baltic seafloor, spatial management scenarios can be investigated that would limit the extent of current fishing grounds especially from their margins. Instead of just removing effort, such measures might create some concentration of fishing effort on the remaining narrowed opened areas that may or may not offset the benefit obtained from released pressure on conservation areas. Unfortunately, if the net effect is negative, it will move the system further away from Good Environmental Status (GES). Hence, the relationships between benthos state (e.g. expressed as the ratio of measured benthos abundance over a carrying capacity) and the reduction in fishing pressure will be investigated by testing a gradient of effort cut and make sure the effort cut is followed by a reduction in impact on the sea floor.

The investigation under WP2 should further report on the cost and effect of mitigating or displacing the fishing pressure in the Baltic Sea, also including economic distributional effects, information of direct relevance to WP6. Consistent with the MSFD (Art. 13.3) we should conduct impact assessment for concerns on social and economic effect for setting/testing environmental targets, anticipate the socio-economic effects of choosing targets and alternative pathways to achieve GES, while GES being achieved might sometimes have adverse effects on some economic components. Anticipating these aspects should help informing the policy makers about the impacted stakeholders and prepare facilitation for acceptance/compliance to the identified measures most likely to close the gap towards GES. The aim is to contribute integrating to the transboundary context for consistent and coordinated measures across the Baltic subregions. By testing and analyzing the effectiveness of measures and by identifying potential new measures, the project is expected to contribute directly to the update of the HELCOM BSAP and the implementation and tentative update of MSFD Programs of Measures in the Baltic Sea for countries being EU Member States There is a need for “greater coherence with related EU legislation, in particular the Habitats and Birds Directives (92/43/EEC and 2009/147/EC) and the Water Framework Directive (2000/60/EC), and for more coherent and coordinated approaches within and between marine regions and subregions” and Article 11(1) in particular creates a direct link from the CFP to the MSFD.

Current scenarios and progress

Within this WP there are a number of scenarios that are being currently considered and being tested using the DISPLACE model. Utilising the model to examine the impacts of a reduction of bottom-contact fishing pressure on marginal areas (i.e. areas on the periphery of major fishing grounds) at several different scales - including the whole Baltic Sea, per EUNIS broad habitat type, or by National Exclusive Economic Zone (EEZ) - can give an indication of the possible change in status for the marine environment. Furthermore, by running multiple related scenarios, such as reduction of fishing effort by 5 (see Figure 1), 10, 15 and 20% can provide a gradient of the impacts and thus a gradient of respective status improvements. The probability for status improvements, or the likely developments towards achieving a perceived Good Environmental Status (or based on some inferred threshold values), can thus be deduced from components of the model output that relate to major species components of the benthic habitat. In addition, the catch/landings and economic impact evaluation of such spatial restriction to the fishing, or fishing reductions, can also be predicted by the model and the model can explore maintaining these parameters (i.e. the economic aspects or maximising the catch allocation) while displacing the fishing activities to already impacted areas.

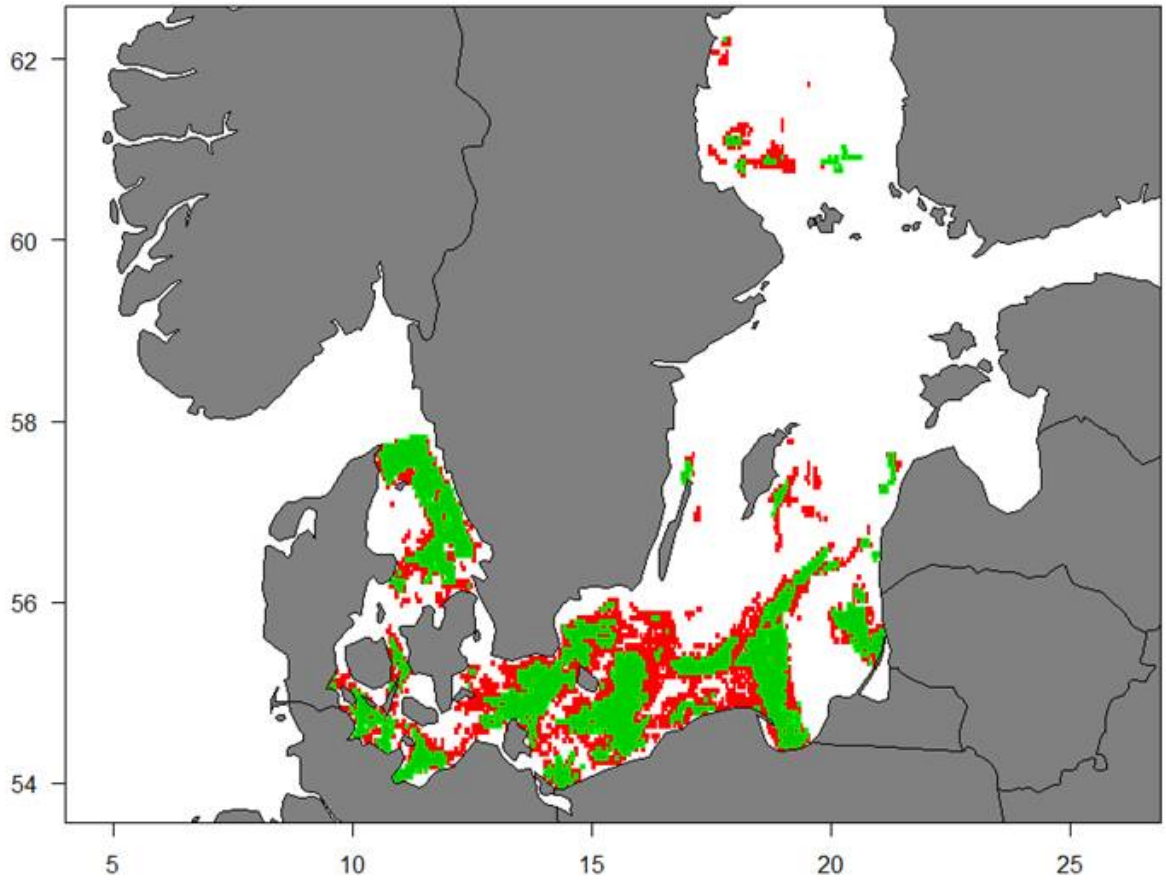

Figure 1. Example of the effects of a 5% reduction of fishing effort in marginal areas of existing fishing areas in the EEZs of Baltic Sea countries (bottom trawling data). Red = no-go areas from the reduction, and Green = fishing areas available after the imposed reduction. Note that as effort is concentrated it is likely that a 5% cut in effort will correspond to more than 5% surface area cut.

Further scenarios that are being explored in the project, and at different spatial divisions (i.e. subdivisions of the Baltic Sea), include:

1. An overall reduction of the spatial extent of fishing pressure and displacement effect.
2. Closure of passive gears fisheries in identified by-catch hotspots (harbour porpoise).
3. Temporary closure of passive gears fisheries in areas significant for breeding birds.
4. Including the effects of hypoxia on benthos recovery rates and impact of this on fisheries activities.
5. Indirect impact on the seafloor, such as sediment remobilisation from fishing or commercial shipping.

These scenarios are being considered to include in the standard output from the model that will inform the economic impact (e.g. catch/landings value, increased operating cost for fishing), and the relative impact evaluation of alternatives on the recovery of benthic habitats and biota, and the potential to maintain these parameters by displacing the fisheries pressure in a way that would maintain a larger area of undisturbed seabed.

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