

# Exploring the viability of innovative fishing technologies as an alternative to bottom trawling in European marine protected areas

Fisheries in the European marine environment use various types of mobile and static fishing gears, many of which interact with the seabed. These include mobile bottom-contacting gears (MBCGs) towed through the water and across the seabed. The main study addressed by this options brief delves into the potential of innovative fishing gears and practices to serve as a viable alternative to excluding bottom trawling in marine protected areas (MPAs) in the EU. It examines the efficacy and feasibility of implementing such innovations and contrasts their performance with alternative policies that would exclude MBCGs from MPAs or shift towards the use of passive fishing techniques. This briefing summarises policy options for introducing innovative fishing technologies and practices to reduce impacts in European MPAs.

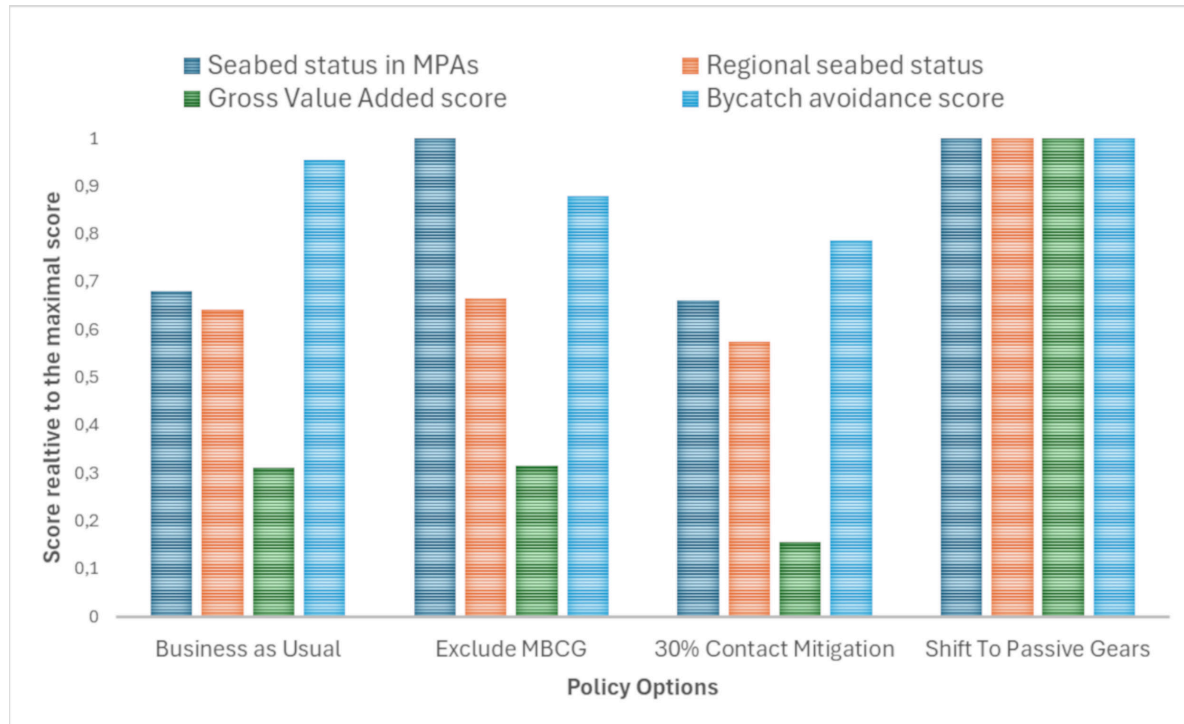
MBCGs have a large footprint and physical impact when sweeping the seafloor, with additional issues concerning species- and size-related selectivity (bycatch and undersized specimens). However, certain specific marine spaces must be protected when these areas constitute stable hotspots for marine life and supportive habitats with dependent, vulnerable species, including species that are of commercial interest to fisheries. The European Commission's proposed response, described in the fisheries package of early 2023, is to exclude all mobile bottom-contacting fishing gears from the designated MPAs and any future MPAs.

While a large body of research has recently been devoted to developing more selective fishing with bycatch reduction devices, research focusing specifically on reducing the impact on the seabed has been relatively limited. This is despite the fact that several options for mitigating the effects of MBCGs on the seabed were identified a long time ago. One of the most promising gear modifications is the replacement of otterboards with (semi-)pelagic ones, which can significantly reduce bottom contact with the seabed and, consequently, the benthic impact (impact on the bottom of a body of water). The resulting reduced seabed drag may also lead to decreased fuel consumption. Some innovations on passive gears, to limit their effect on the seabed (e.g. raising bottom-set trammel nets off the bottom), have also been identified, but the passive gear effect on the seabed is much smaller than that for MBCGs.

The study reviews the viability of alternatives to MBCGs in European MPAs, and explores several policy options to reduce the impact of MBCGs. It reports on progress in adopting existing innovations, while making a quantitative analysis of economic costs and environmental benefits. It assesses the effectiveness of restrictions in reducing the impact on the seabed while minimising possible side effects such as bycatch and sustainability. Among other things, the study carries out a quantitative analysis and focuses on a data-rich ecoregion – the EU waters in the Northeast Atlantic area, based on publicly available fisheries-related data on a regional scale.



Relative scoring of policy options ('1' gives a maximum score) against four indicators: seabed status inside the MPAs, regional seabed status averaged over economic exclusive zones (including inside the MPAs), gross value added averaged over fleet segments, and the incidental bycatch avoidance score. Note that a maximum score of 1 does not mean the bycatch effect is null or the seabed status is at its maximum carrying capacity, as only relative scores are given here.



## Policy options

### Option 1: Continue fishing within MPAs without restrictions

Most MPAs designated in EU waters still allow MBCGs within the protected areas. Fisheries management measures often involve collecting data that would contribute to preserving fish but do not cover the effects of fishing on the benthic habitats as such. A policy gap is likely to arise whenever the EU environmental policy for protecting marine habitats is in place, but is not sufficiently related to the EU common fisheries policy. However, the experts consulted (marine scientists, MPA practitioners, non-governmental organisations and fisheries representatives) acknowledged a need to define control measures for fishing techniques used in MPAs, to balance conservation and sustainable exploitation. For scientists, only small-scale fishing techniques should be used in MPAs, and bottom-impacting techniques should be excluded in areas with sensitive seabed features (those that are not naturally disturbed, being already adapted to disturbance). Large MPAs require spatial planning of fishing techniques and effort in order to find a trade-off between conservation and sustainable exploitation. However, most think the precautionary principle should be followed, and impactful fishing techniques should no longer be allowed in MPAs. In general terms, eliminating MBCGs and replacing them with passive high selective gears is believed to improve the protection of sensitive benthic habitats and species.

## Option 2: Force the use of innovative MBCGs with reduced seabed contact

This policy would enforce the use of innovative MBCGs with reduced seabed contact, within and outside of the MPAs, even if it would result in a 20 % decrease in catch efficiency. This would also come with an assumed 20 % fuel savings induced by less contact with the seabed. Implementing innovations that would reduce the contact of the fishing gear with the seabed can benefit the living communities on the seabed within the MPAs.

However, the study's findings show that mitigating the impact on the seabed with innovations will likely not suffice to reach the conservation objectives, and would also require making their use mandatory, given the lack of voluntary uptake of the most promising innovations. Reducing contact with the seabed will likely result in a reduced catch efficiency for most MBCGs fisheries. Therefore, it will likely not improve the status of the living communities on the seabed at the regional scale, whenever effort is increased to break even and compensate for the potential loss in revenue. Mitigating contact with the seabed increases the risk for vulnerable species and spreads the pressure on larger areas, as it comes with a net increase in effort to compensate for the assumed 20 % loss in catch rate induced by modifying gear selectivity. Following such a policy, the challenge will therefore be to continue innovating for MBCGs with less contact, without affecting the catch rate, while none have been identified.

## Option 3: Exclude the use of all MBCGs from the MPAs

This policy – effectively excluding the use of all MBCGs from the MPAs deemed vulnerable to mobile bottom fishing – would improve the benthic biotope in those MPAs without affecting the surrounding habitats, and the fishing effort displacement effect would be minimal. To what extent such effort displacement and increase will occur depends on the degree to which reduced spatial catch opportunities will affect incomes. However, this loss of opportunities will likely come with a short-term decrease in economic return before the marine ecosystem can recover and be more productive. Excluding MBCGs from future MPAs would also best be accompanied by overall effort reduction, to avoid inducing effort displacement and an unwanted increase of pressure on surrounding habitats.

## Option 4: Force a switch towards using alternative, passive gears

The most effective policy option that could be used as an alternative in order to minimise the negative impact of MBCGs on the seabed is to mandate the use of passive gears to substitute all MBCG activities, both within MPAs and on a regional scale. This will significantly improve the benthic biotope in the short term, allowing it to recover to levels consistent with natural disturbances after several years. However, shifting EU MBCG fisheries towards passive gears may increase the risk of bycatch of vulnerable species.

Before transitioning, a feasibility study is recommended, considering the current fleet structure and value chain, upfront conversion costs, and required payback time. The payback time for such a transition could be short, as seen in polyvalent small-scale fisheries that switch gears seasonally alongside fish stock seasonal fluctuations. Consequently, whenever passive gears can still be used in MPAs, there is no need to innovate in order to continue fishing with MPAs without impacting the seabed.

Therefore, the study recommends excluding MBCGs from the currently designated MPAs deemed vulnerable to bottom fishing, and planning some investigation to convert towards low-impact, low-carbon fishing techniques. So far, no innovation exists for lighter, less impacting mobile bottom-fishing gears that do not affect catch efficiency, that would not induce a net increase in the impact when fishers attempt to compensate for their loss in catch efficiency. Excluding MBCGs likely comes only with a limited displacement effect in changing the ecological seascape and socioeconomics of the affected fisheries; this might be larger if future MPA designations were to better match higher productivity areas

or more sensitive features requiring protection. Following this logic, future MPAs must also consider whether protecting the seabed is one of their objectives before restricting access to these fishing techniques. For now, it is not necessary to discontinue using other fishing techniques such as passive gears, since they do not impact MPAs where vulnerable seabeds are found. However, some currently designated MPAs are sensitive to the use of passive gears, and these techniques should be limited there, if innovations do not reduce the bycatch of vulnerable species to levels deemed acceptable under the EU common fisheries policy and Marine Strategy Framework Directive.

Continuing research efforts on trawling-related technologies with a view to minimising MBCGs' impacts outside of MPAs can help determine the maximum acceptable loss of catch rate by the fishing sectors, balanced against savings on fuel expenses. This research should be conducted locally, as the optimal strategy will depend on the target species and other local circumstances. Effort research could also continue to help the sector reduce the bycatch risk induced by those gears and alternative gears. Shifting all MBCG activities to passive gears would give the best local and regional anticipated outcomes. However, resistance to such a transition will likely be high, given the low mobility of the invested capital in fisheries-related assets and upfront costs for conversion. This policy option can help face those substitution costs for the EU fishing sector's long-term, sustainable development.

This document is based on the STOA study 'Exploring the viability of innovative fishing technologies as an alternative to bottom trawling in European marine protected areas'. The study was written by François Bastardie at the request of the Panel for the Future of Science and Technology (STOA), and managed by the Scientific Foresight Unit within the Directorate General for Parliamentary Research Services (EPRS), European Parliament. STOA administrator responsible: Vasco Nuno Guedes Ferreira.

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