

Hope for recovery of the soft-bottom ecosystem after cessation of fishery disturbance?

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In this study we assessed the impact of seabed-disturbing fisheries on the soft-bottom fauna on both regional and local scales in the framework of the OSPAR 2017 intermediate assessments and the MSFD 2018 GES evaluation. The assessments are based on indicators combining pressure, as footprint of bottom trawling on the seafloor, and impact, combining pressure and underlying sensitivity of benthic habitats. Besides some local discrepancies, all indicators appointed to the same areas of high vs. low fisheries impact on the benthic habitat, with a rather high impact in the Belgian part of the North Sea (BNZ) compared to other parts of the Greater North Sea.

This is the first coherent fishery pressure and impact evaluation for the North Sea and BNZ, leading to the conclusion that we probably won't reach a good environmental status for the benthic habitats in 2020, due to seabed-disturbing fishery pressures. In the meantime, the Belgian federal government already took action to restore the local benthic ecosystem by proposing fisheries measures in four zones in the 'Vlaamse Banken' N2000 area, which most probably will come into force in 2018. As a baseline study prior to cessation of the seabed-disturbing fishery, we examined the soft-bottom status in protection zone 1 in the 'Vlaamse Banken' area and saw potential for recovery. Mainly mud and sand and biologically valuable benthic communities characterize zone 1. For the baseline dataset, we collected 30 extra benthic samples in autumn 2016 in an area characterized as *Abra alba* habitat. Compared to previous studies and long-term monitoring data from the surrounding area, we observed unexpected high macrobenthic species diversity, densities and biomass in the area. All MSFD indicators scored well, indicating a locally good environmental status, despite the relative intense fishing pressure in the area. However, when looking into more detail, we noted that the seabed-disturbing fishing pressure was not equally distributed over the study area, being most intensive in the shallow zone around Nieuwpoort and decreasing towards the Nieuwpoort bank. This decrease in fishing pressure was inversely correlated with an increase in macrobenthic species diversity and density. As this biological variation was not related to natural variation in depth or sediment characteristics, we could accept that fishery pressure really plays a role. As such, this indicates that the benthic ecosystem may evolve to a better status if bottom disturbance can be further reduced.

Further investigations in regional and local pressure and impact assessments of seabed-disturbing (and other) fisheries were needed to imply appropriate fishery management plans in support of the N2000 and MSFD targets.

Keywords: seabed-disturbing fisheries; soft-bottom fauna; impact assessment