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TITLE: Towards a framework for the quantitative assessment of trawling impact on the seabed and benthic ecosystem

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ABSTRACT:

Abstract A framework to assess the impact of mobile fishing gear on the seabed and benthic ecosystem is presented. The framework that can be used at regional and local scales provides indicators for both trawling pressure and ecological impact. It builds on high-resolution maps of trawling intensity and considers the physical effects of trawl gears on the seabed, on marine taxa, and on the functioning of the benthic ecosystem. Within the framework, a reductionist approach is applied that breaks down a fishing gear into its components, and a number of biological traits are chosen to determine either the vulnerability of the benthos to the impact of that gear component, or to provide a proxy for their ecological role. The approach considers gear elements, such as otter boards, twin trawl clump, and groundrope, and sweeps that herd the fish. The physical impact of these elements on the seabed, comprising scraping of the seabed, sediment mobilization, and penetration, is a function of the mass, size, and speed of the individual component. The impact of the elements on the benthic community is quantified using a biological-trait approach that considers the vulnerability of the benthic community to trawl impact (e.g. sediment position, morphology), the recovery rate (e.g. longevity, maturation age, reproductive characteristics, dispersal), and their ecological role. The framework is explored to compare the indicators for pressure and ecological impact of bottom trawling in three main seabed habitat types in the North Sea. Preliminary results show that the Sublittoral mud (EUNIS A5.3) is affected the most due to the combined effect of intensive fishing and large proportions of long-lived taxa.

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