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How demersal fish might benefit from new marine protected areas in the North Sea

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Abstract

By the end of this decade, new marine protected areas will be implemented in many northern European waters after complex decision-making processes. Their designation was mainly driven by the Birds and Habitats Directives of the European Union aiming to protect sensitive habitats and species from adverse human impacts. However, the Habitats Directive only includes anadromous fish species and therefore the associated marine reserves (Natura 2000 sites) are not tailored to protect marine fish species. Furthermore, it is commonly argued that many marine fish species in temperate waters are highly mobile and thus may not benefit from spatial conservation measures. To analyse the overlap between MPA and core habitats of demersal fish, this study presents a simple and robust approach to map the distribution of 56 demersal fish species in the North Sea. The spatial distributions of each species were calculated for each year in summer and winter using a simple geospatial smoothing algorithm. From the spatial distributions a species' core area was identified containing 80 % of the population biomass. Core areas in summer, winter and in both seasons (inter-seasonal) were identified for each year and aggregated to identify persistent core area of each species. Depending on season no more than six species' persistent core areas overlapped, and these areas were located in the Kattegat and Skagerrak. Our results suggest that spatial clustering of fish diversity in the North Sea is low, but that the designated MPA may provide conservation benefits for several demersal fish species.

Keywords

Core area; distribution; diversity; marine reserves; marine protected areas; Habitat Directive; Natura 2000

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