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Mapping the ecological status of the fish community in the pelagic habitat: spatio-temporal trends of size-based indicators in the Baltic Sea

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The status of fish communities is usually monitored using scientific bottom trawl surveys, whereas the pelagic habitat is often overlooked. Here we analysed, using data collected by an international acoustic survey and Generalized Additive Models the spatio-temporal changes of several size-based indicators in the offshore Baltic Sea fish community. The results evidenced a drop in Mean Length, Maximum Length and Large Fish Indicator after the early 1980s picturing the shift of the Baltic Sea from being dominated by large predatory fish to small planktivorous fish. The drop in the indicators was not simply due to a change in species composition, but also to a decline in the individual growth rates of each species. The drop in the indicators was common for the northern areas of the Baltic Sea, whereas in the southernmost area where the main predatory fish is still present the indicators largely oscillated during the study period. By extending back to the end of the 1970s, the trends from our study constitute the longest fishery-independent indicator time-series available for the pelagic offshore Baltic Sea. We also predicted the spatial distribution of the indicators in the Baltic seascape providing fine-resolved maps of the environmental status of the system. Our approach could be used to investigate the status of the fish community in the pelagic habitat of other marine ecosystems, for example in the framework of the EU Marine Strategy Framework Directive.

Keywords: pelagic habitat, acoustic surveys, food-web indicators, ecosystem state, spatial and temporal variability, MSFD

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