Determining seasonal target species assemblages of bottom otter trawlers from fishing effort and commercial species distributions

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Managing mixed fisheries requires understanding fisher's behaviour to allow predicting future fisheries distribution and impact on marine ecosystems. We developed a new approach to compare the fishing effort distribution of Eastern English Channel (EEC) bottom otter trawlers, derived from VMS data, to the quarterly- and spatially-resolved abundance distributions of important commercial species obtained in a previous study, over the period 2008-2012. First, we calculated a target species assemblage (TSA) index by weighting and combining the individual species abundance distributions. Second, based on the Ideal Free Distribution theory, the different species-specific weights (reflecting targeting intensity) were estimated by maximizing the overlap, measured by Local Index of Collocation, between TSA and fishing effort distributions. Results emphasized a clear seasonality in the targeting of squids, cod or red mullet. Finally, TSA fluctuations have been investigated using time series analyses and cross-correlation, in relation to various factors including economics and management.

Keywords: fishing effort, target species assemblages, seasonality, time series analyses, Eastern English Channel

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