

**Seasonality in depth and habitat use of Western Baltic cod (*Gadus morhua*) revealed by fishers' ecological knowledge**

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**Abstract**

Sound knowledge on the spatial and temporal distribution and habitat use of a fisheries target species can help to guide its monitoring as a basis for reliable stock assessments and management decisions. Cod (*Gadus morhua*) is the commercially most important demersal fish species in the Western Baltic Sea. However, its spatio-temporal distribution is still unclear due to the costs and difficulties of spatially and temporally highly resolved sampling in shallow water areas. Fishers' ecological knowledge may provide a cost-efficient and practical alternative to traditional biological sampling. Here we modelled patterns in seasonal depth and habitat use of cod in the Western Baltic Sea using non-linear regression approaches based on interviews with commercial gill net fishers and an at-sea observer data base. Our results revealed significant relationships between sea surface temperature (SST), thermal stratification and depth distribution of cod. We furthermore found a strong seasonality in depth distribution indicating two up- and down-slope movements during the year. Eventually, multinomial log-linear modelling revealed cod habitat use to be strongly dependent on depth and SST. Our study highlights the presently neglected importance of shallow water habitats for Western Baltic cod, and demonstrates how fishers' ecological knowledge can be used in habitat models to guide fish stock monitoring and to improve ecosystem-based management.

**Keywords:**

Cod, spatio-temporal distribution, fishers' ecological knowledge, habitat modelling, Western Baltic Sea

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