Exploring habitat credits to manage the benthic impact in a mixed fishery.

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Abstract

Dynamic state variable models (DSVM) have been applied to predict the behaviour of animals as well as fishers. The DSVM uses an individual based modelling approach in which individuals are modelled by formulating specified behavioural rules, allowing the estimation of an individual's optimal choice in response to management regulations and economic opportunities. Here, a DSVM is used to explore the performance of a combined catch quota and habitat credit system to manage the sustainable exploitation of a mix of demersal fish species and reduce the benthic impacts of bottom trawl fisheries. The model was parameterised for the Eastern English Channel demersal mixed fishery using otter trawls or dredges. Restricting catch quota for plaice and cod had a limited effect on benthic impact, except when reduced to very low values, forcing the vessels to stay in port. Quota management had a minimal influence on fishing behaviour and hence resulted in a minimal reduction of benthic impact. Habitat credits may reduce the benthic impacts of the trawl fisheries at a minimal loss of landings and revenue, as vessels are still able to reallocate their effort to less vulnerable fishing grounds, while allowing the fishery to catch their catch quota and maintain their revenue. Only if they are reduced to extremely low levels can habitat credits potentially constrain fishing activities to levels that prevent the fisheries from using up the catch quota for the target species.

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