

An individual based model of fisher behaviour for management scenario prediction in the Isle of Man scallop fishery.

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Scallop dredging can be a highly destructive practice, but considering its economic importance to the UK it is necessary to find both economic and ecologically sustainable management solutions. Fisher behaviour is an area of considerable uncertainty in marine management; developing predictive models capable of forecasting the displacement of fishing effort following management would reduce some of this uncertainty. Data were collected from Isle of Man scallop fishers to be input directly to an individual based model (IBM) of their behaviour to predict their response to management. Using fisher data to parameterise the model could allow more realistic predictions of behaviour.

Face to face interviews and a conjoint analysis gave a comprehensive understanding of patch choice and the foraging and environmental variables that influence fishing activity (e.g. sea state and distance to port). Three behavioural types were identified, termed quantity maximisers, quality maximisers, and efficient fishers. Survey data were validated against vessel monitoring system and logbook data, demonstrating a good level of accuracy in the behavioural patterns identified. Using a pattern oriented modelling approach to IBM construction, the most appropriate set of fisher behavioural rules were determined, to recreate the spatial distribution of effort, fishery economics, and variability between fishers. A user interface makes the model suitable for participatory modelling of management measures.

Keywords: fisheries, individual based model, patch choice behaviour, pattern oriented modelling, fisher participation

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