

CM-code: ICES CM 2019/F

Title: Interactions in a fishery socio-ecological system revealed by a Bayesian Belief Network approach

Name(s) of authors: Silvia de Juan, Andres Ospina-Alvarez, Montserrat Demestre, Francesc Maynou

Abstract text

Coastal fisheries are complex socio-ecological systems controlled by the interaction between humans and the environment. Benthic ecosystems are shaped by trawling activities that are mainly driven by fishermen decisions on where to fish, by market demands and by fishing regulation. In return, changes in benthic ecosystems feedback on fishermen through their ability to provide food demands. In this complex interacting matrix, small decisions such as fishing over certain habitats, discarding fractions of the catch, or increasing effort can have significant and cascading effects through the system, with ultimate returns to the fishermen through overall catches and profits. We use a Bayesian Belief Network approach (BBN) to illustrate these multiple interactions in a Mediterranean trawling ground. The model relies on multiple data sources, including empirical data, long-term fishery registers, bio-economic models and expert knowledge. This approach is used to explore the linkages between ecosystem structure, services, human activities and welfare in a coastal fishing area. Major drivers identified by the BBN should be used to identify management priorities and trade-offs, and develop strategies to achieve a balance of management targets. The novelty of the approach is its ability to explore interactions by the integration of human dimensions into studies of ecosystem change, while it provides an illustrative interface for stakeholders.

Keywords: benthic communities; trawl fisheries; catch composition; by-catch; fishing effort; fisheries profits; fisheries management

Contact author: Silvia de Juan; Marine Sciences Institute (ICM-CSIC), Barcelona, Spain; sdejuanmohan@icloud.com

Twitter username of the author/s (@sdejuan; @andresospina; @maynouf)