Fishers sharing real-time information of "bad" fishing locations (hot spots): A tool for quota optimisation under a regime of landing obligations.

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Summary
There is an increasing pressure on the fisheries to avoid bycatch and discards, recently expressed as a landing obligation in the new EU Common Fisheries Policy. The standard answer is selective gear development. We propose a supplementing strategy of time-place selectivity by sharing real-time data and information about areas with high abundance of unwanted species and sizes (hotspots). The voluntary information sharing for avoiding hotspots is discussed in relation to existing time-place regulations as well as incentives for sharing of such information. Experiences from previous real-time information sharing systems are examined for a departure for development of four models for fishermen's sharing of information. The models differ in data and information collection methods, ownership of data and recipients of hotspot maps and warnings. The models are discussed in regard cost/effort to collect data, type of information outcome and not least ownership and incentives for the individual fisher to participate by providing information. The models are offered as possible tools for the fishing industry to react on the increasing pressure for selective fishing.

Introduction

Reduction of discard has been central target for management for years. With the recently adopted EU Common Fisheries Policy (CFP) a system of landing obligation – discard ban is under implementation over a few years covering most of the commercial species (European Parliament and the Council 2013). Implementation plans are not yet known, but it seems clear that some fisheries will face hard economic consequences of the discard ban if the present fishing pattern is continued. It will therefore create a strong incentive for the fishers to augment the selectivity of their fishery to optimise the economic yield of the quota, and in the mixed fishery to avoid choking species, which can close further fishery despite of remaining quota on other species (Cappell, Macfadyen 2013). Selectivity is often seen as a quality embedded in the fishing gear, here the focus will be on time-place selectivity; choice of place and time for the fishing activity in order to avoid places where the abundance of unwanted species and sizes are high at the given moment (hotspots). Information about hotspots will be an input for the skipper to decide where and when to fish along with a long range of other information and his experience.

Materials and methods

The work is based on data and interviews regarding nephrops fishery in Skagerrak and Kattegat (as a part of the Interreg IV project nr 167206), but formed as generic considerations and models to be discussed under different natural, management and institutional conditions. The initiating idea of information sharing came from a fisher initiative from the Kattegat region in 2008 (Eliasen 2014). The models are based on literature review of fleet communication system and information sharing in the fisheries (Gauvin et al. 1995, Maurstad 2002, Gilman et al. 2006, O'Keefe, Cadrin et al. 2014) as well as general institutional literature (Ostrom 2000). Further desk research on technical opportunities for knowledge sharing (Squires, Vestergaard 2013). The models have been developed over time and tested via semi-structured interviews with fishers, scientists and managers in Denmark, Sweden and Norway. The fishers were interviewed during visits in ports of Kattegat and Skagerrak, at the DanFish

exhibition 2013 and supplementing telephone interviews. The researcher and managers were interviewed mainly during visits at the ministries.

Results and discussion

The information sharing system should be able to collect information about hotspots and distribute it so fast that the skippers can take action based on the information; as close to real-time as possible. The models especially differ in two parameters: 1) data basis for hot spot identification; a) catch data to be interpreted to maps or b) direct warnings regarding certain areas and 2) ownership of information; a) public ownership based on the catch control data, b) a fisher controlled organisation to gather catch data and/or warnings or c) owned by- and informal shared between the involved fishers.
This lead to development of four models:
1) Full automation of data collection and sharing; Catch data owned and processed by authorities and offered in public.
2) Semi-automated information sharing; Catch data supplemented by detailed geo-specific data collect by the skippers. Owned and processed by fisher organisation
3) Organised information sharing among fishers; Warnings about hotspots, based on codes defined by the involved fishers and shared in personal, but structured communication.
4) Informal information sharing between peers, as often today; Direct and personal communication of warnings and anecdotes between peers and friends.

Interviews with fishers in Kattegat/Skagerrak regarding the four models indicate that to some degree information are already shared (model 4). Before the implications of the discard ban are known there is reluctance to implement a formalised information sharing system. The opportunities of sharing knowledge between fishers for avoiding hot spots at a voluntary basis are recognised (model 2 and 3). But involving the authorities (model 1) is refused due to risk of obligatory closures. In a Nordic context, technology for information sharing seems to be available, but institutional barriers might occur; the structure of some fleets and lack of strength of fisher organisations to organise information sharing.

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