Fishers sharing real-time information of "bad" fishing locations – A tool for quota optimisation under a regime of landing obligations.

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There is an increasing pressure on the fisheries to avoid bycatch and discards, recently expressed through a landing obligation in the new EU Common Fisheries Policy. The European fishers are thus under pressure to fish selectively, in order to adjust the catch to the individual or collective quota combination and to optimise their economic outcome. The standard solution is to increase the selectivity of the gear, but we propose supplementing with the strategy of time-place selectivity by sharing real-time data and information about areas with high abundance of unwanted species and/or sizes (Hot Spots).

Time-place regulation

Time-place regulation has historically been used in self- and centrally regulated fisheries, and a couple of different types are used today. Marine Protected Areas are often established for protection of stock or spawning grounds of more permanent character or of reefs, sea bottom and localised eco-systems. Regular seasonal closures of certain areas are used generally to protect spawning species or juveniles in a certain period, and these closures are thus based on regular and predictable stock dynamics. Finally, in the latest years a measure for handling the more random stock behaviour has been developed, which is the real-time closure. Several countries have regulations which require the fishers to leave the fishing area if their catch contains more than a predefined level of bycatch, but real-time closures take this a step further and result in area closures for a shorter period of time (often three weeks) if too high levels of unwanted bycatch are registered in the area.

Although more flexible, the fishers are generally critical of real-time closures: It can be questioned how representative just one haul is for deciding to close an area – maybe the next haul will show a wholly different catch composition? How well does a three week closure fit the dynamic of the protected stock?

And finally, especially for nephrops trawl fishery, there seems to be situations where the mobile bycatch species are fished or scared away after a few hauls, which leaves the relatively immobile nephrops to be fished with low bycatch in the following hauls (Danish fisher interview). A voluntary system of real-time information sharing between fishers about bycatch would produce more data on hauls (addressing the first issue) and allow them to test the areas again after a shorter period (addressing the second issue). Such real-time information sharing systems will be developed below.

Sharing information about fishing places

Knowing where to fish or where not to fish is central to the success of the vessel and the responsible skipper. Information about good fishing grounds is therefore regarded as critical by the fishers. Modern technology like AIS (Automatic Identification System), trackers etc. helps the skippers to navigate, to track the fish and to communicate. But the technology also allows the skippers to keep track of each other via information shared in direct communication or IT-based tracking of location and speed (e.g. marinetraffic.com).

The information sharing that we discuss is not as much about the good fishing place, as it is about the "bad" fishing place, where there is a high abundance of unwanted species or sizes. Under a closely monitored landing obligation, the skipper tends to flee the area if he realises that the unwanted bycatch is high and that he will waste the available quota on fish with a low or no market value. He will therefore not lose a good fishing opportunity by sharing this information with other skippers – on the contrary – he might even gain social capital in the relationship with those who gained from not wasting their quotas on trying out the "bad" place as well. Even still, sharing information with other groups implies a risk of increased competition from other fisher groups, harder regulations (e.g. more obligatory real-time closures), increased public attention etc.

Experiences from voluntary real-time information sharing for avoidance of bycatch

There are several examples of voluntary information sharing initiated by the fishers to avoid bycatch hotspots. The fundamental incentive for the fishers to engage in establishing information sharing systems has generally been a threat from management of reduction in the fishing opportunities if bycatch levels were too high. This could be by closing the target fishery when the collective bycatch quota was exhausted, by reducing days-at-sea or by temporarily closed areas for precautionary reasons. Of lesser importance are market incentives in form of eco-labels on the documented lower bycatch or social incentives.

Technological requirements for reporting are likely not a problem in most European or North American fisheries today, but the institutional issues about organisation and incentives are still relevant.

Most examples of fisher-initiated information sharing systems have been covered by observer programs in which the observers would gather information on catch and bycatch anyway, meaning that data collection could be done at hardly any extra cost. If data instead has to be collected by the skippers for the sole purpose of sharing information about hotspots, they should be willing not only to share information but also to bear the workload of collecting and sharing data. For fisheries without observer coverage (or a corresponding systems), the data collection is then an issue of cooperative behaviour among the common pool resource users.

The skippers´ confidence in data collection and handling is central to their volunteering in participation in the information sharing. In general the data collection, handling and distribution have been taken care of by an independent program manager and not by a public authority. The skippers and vessel owners should trust the program manager, as information regarding location and catch volumes and rates can be regarded as confidential in relation to fellow fishers or the authorities. What information should be shared with whom therefore has to be agreed upon in each specific case, and the independent manager should ensure this. In light of this, it is obvious that the fishing industry (the relevant parts) needs to be relatively well organised, in order to be able to organise a voluntary program, as well as the information gathering and sharing. As there should be a relatively high rate of participation to be able to get sufficient data to identify the hotspots, a strong organisation with a high level of legitimacy among the participants is important in securing this high level of fleet participation.

Models for fishers sharing information about hotspots

Based on the above-mentioned experiences, four models of information sharing between fishers have been developed. (table 1)

Table 1: Overview of the four models for information sharing

Model	Data	Participants and data ownership	Communication type and recipient	Outcome
1. Automated information sharing	Electronic logbook data by haul collected for control of quota use	Data collected for- and owned by the authorities	Authorities (or private) information manager produces hotspot maps with logbook data: - public good, available for all - or for skippers only	Hotspot maps - indicating critical areas - possibly also detailed bycatch data
2. Semi-automated information sharing	Electronic logbook data Plus additional necessary data on catch area etc. collected specifically for this purpose	Skippers willing to participate Data owned within the group	An information manager produces hotspot maps for participating skippers Skippers can decide if they want the information shared with third parties	Hotspot maps - indicating critical areas - possibly also detailed bycatch data
3. Organised information sharing	Bycatch observations described in predefined codes Codes are defined within the group	Skippers willing to participate Information owned within the group	Direct communication via facebook/cell phone chains etc. Skippers can decide if they want the information shared with third parties	Systematic warnings about hotspot areas
4. Informal information sharing	Direct skipper observations in local codes/anecdotal	Skippers within a "kinship" group Data owned within the group	Direct communication via mobile phones, facebook, quay-talk, radio	Anecdotal warnings about hotspots

We depart from a situation of strong incentives to avoid the unwanted bycatch, (in the EU because of the landing obligation and, (assuming) a relatively strong enforcement hereof) and therefore to share information about hotspots. Furthermore, the models presuppose availability of affordable communication technology and network coverage. In other regards, the models can be seen as generic. The models differ in the way information regarding bycatch is collected and distributed, ownership of the information, type of information about the hotspots and incentives to participate.

Conclusion

With increasing public focus on avoiding discards, the fishers can no longer use this as a tool to adjust their actual catch according to the available quotas/legal landings. To get the best economic outcome with the available quotas, they therefore have to be highly selective in their fishing activities. As a supplement to selective gear, we have discussed four models of how fishers can share information about hotspots – areas with high abundance of unwanted species and sizes.

The models represent qualitatively different ways of collecting and sharing the information. Still there are a number of technical and organisational questions to be answered; how to interpret catch data and define hotspots? Are there legal obstacles for using data collected for quota control for maps? How should the administration be organised and financed? Etc.

Nevertheless, the central issue is whether the incentives are strong enough for the individual fisher to make the effort to collect and send data for maps or to warn fellow fishers about experienced hotspots. This can only be determined in the specific case; the weight and character of the regulative pressure for selectivity, the specific characteristics and behaviour of the target and bycatch species, the skippers´ assessment of the value of the hotspot maps/warnings for their planning of fishing activity, the level of trust between the participating vessels and groups etc.

We offer the models as a point of departure for discussions among fishers (and researchers) about how to handle the pressure of reduced or banned discarding and still maintain economically sustainable fisheries. As such we will initiate a discussion among fisher representatives of Skagerrak and Kattegat in 2014 and invite to open discussions among other groups of fishers.

The work is a result of the INTERREG 4 project ØBJ FISK (contract number 167206). Findings are discussed with project partners as well as managers and fishers around the Skagerrak and Kattegat. The authors though bear the full responsibility for the abstract.