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Bycatch in trawl-fisheries

Sub-project 3

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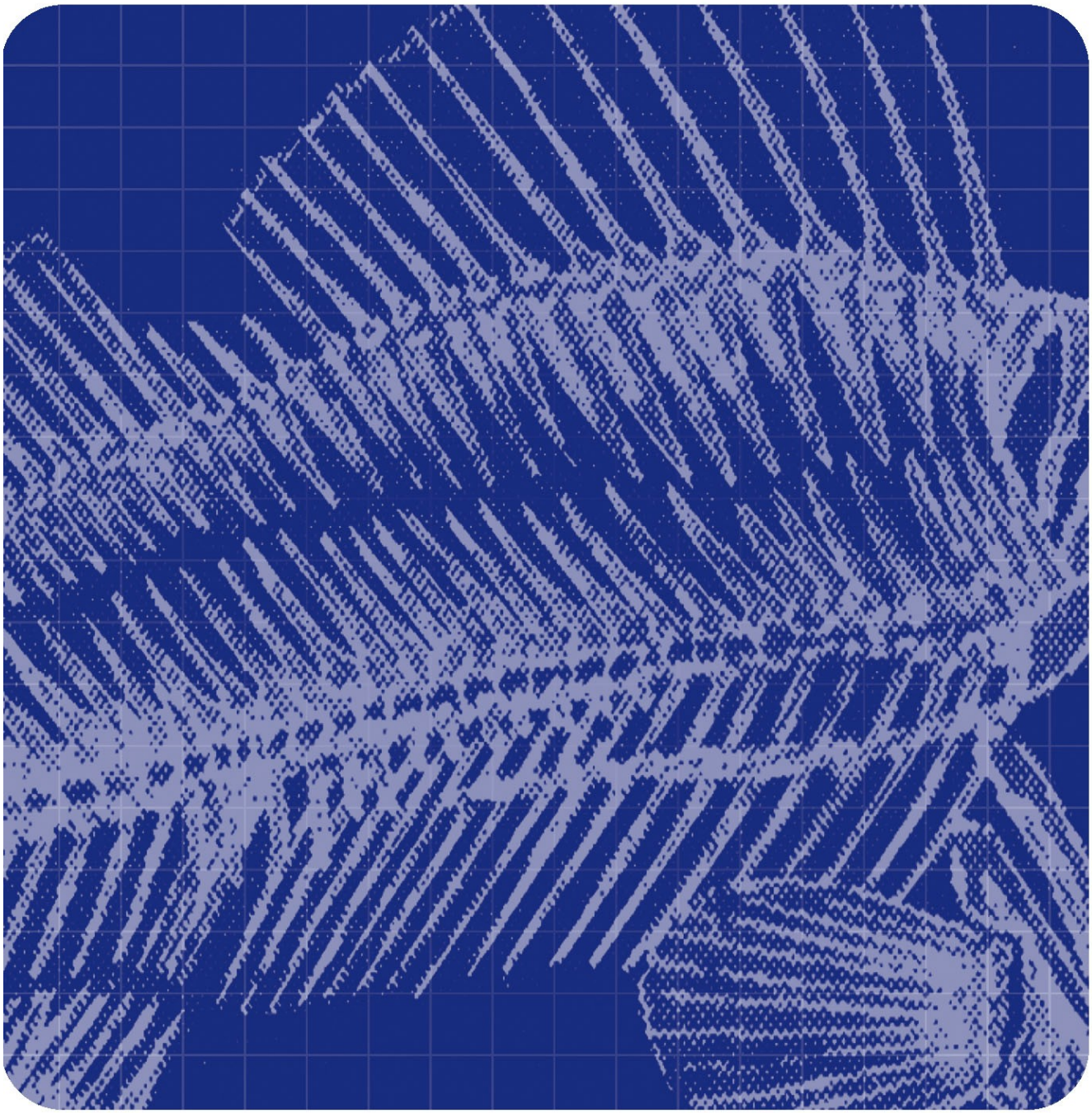

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Summary:

The main goals of this sub-project were to evaluate whether interviewing fishers could be an appropriate method to reveal quantities of the bycatches in the Norwegian trawl fisheries, and to describe the knowledge about and the fishermen's attitudes to the bycatch problem.

In total 11 crew members on trawlers from a fishing company in Lofoten were interviewed.

The data from the interviews showed that the trawl fishermen had very little focus on bycatch as we defined it, and the interviews gave only partly information on reliable quantities of the different species. Interviews are a good method revealing the fisher's knowledge, norms and attitudes, but should be accompanied by practical recordings when it comes to quantitative estimates.

No differences in the attitudes to bycatch were found between officers and fishers among the informants. But there seem to be a difference both in knowledge of species and the attitude to exploitation of bycatch, between fishers with experience from the coastal fishery and those with a strict trawl fishery career.

The shipping companies are much more crucial in defining the premises for a future exploitation of the bycatch in the trawl fishery than the fishermen onboard the trawlers.

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1 BACKGROUND

The history of bycatch problems in the Norwegian trawl fishery were usually connected to catch and discard of illegal sized target species such as the Northeast Arctic cod. During the cod crisis in the Barents Sea in the 1980 – ties several trawl fishermen stood up in media telling stories about a massive bycatch and discard of undersized fish. Since then, the bycatch problem in trawl fisheries has occurred in connection with endangered species (e.g. Greenland halibut) and ruling the TAC's for other fish species than the target species (Olsen 1995). In Norway, however, almost no emphasis has been put on bycatch of other non-target or non-commercial species. This underlines the fact that bycatch in fisheries, is one of the most complex issues facing fisheries today and that it involves an element of regarding the definition of bycatch (Rawson 1996). In the Norwegian fishery management terminology there is no doubt that bycatch means catches of other commercial species along with a target species. In the Norwegian fishery legislation the bycatches of non-commercial species or trash fish such as rays, long rough dabs etc, are governed only by an inversion of the laws: No fishery is permitted unless it is explicit stated in the law.

Although, in this investigation, the main issue is to deal with the trash fish part of the catches, therefore the trash fish will therefore also be defined under the term bycatch.

The main goal of this project is to achieve a comprehensive description of the bycatch problems in the Nordic fisheries where the tasks of this sub-project was to reveal if bycatches could be estimated using alternative methods for quantifying discards of all species. In particular, we intended to evaluate whether interviews with trawl fishermen could turn out to be an appropriate method. In addition, we try to describe the attitude to the bycatch and discard problems, among trawl fishers. By interviewing both fishermen and officers on trawlers we also plan to highlight any differences in opinions between the two groups.

2 THEORY AND METHODS

Trawl fishers standing up in newspapers telling stories about bycatch and discards of undersized fish indicate that there are a kind of conscience among this group of fishermen about the fish stocks and also that they recognise what comes up with the trawl. This conscience indicate that they take notice of what is caught by the trawl during fishing and may therefore possess knowledge that could make it possible in some ways to quantify the different bycatch species. A comprehensive study of fishermen's ecological knowledge among coastal fishers in Northern Norway revealed that they have a detailed and profound knowledge of the ecosystems they were operating in based on the observation they have done through performing fishery (Maurstad and Sundet 1998). This kind of user knowledge is said to differ greatly from scientific knowledge by being intuitive as opposed to analytical and subjective rather than objective. These differences are a great challenge to us as scientist when trying to utilise this knowledge in a scientific way and makes it necessary to extract and validate the information we get through the lenses of science (Berkes 1993, Pinkerton and Weinstein 1995).

Fishermen's knowledge are mainly based on their empirical observations and the facts they claim are probably a result of own observations combined with their attitude to a current topic, such as bycatch. The stories told us through the interviews could then also indicate the attitudes among trawl fishers to the bycatch problem. Revealing each informant's attitude to this topic is a subjective exercise highly dependent on the frankness of each person and our way to interpret the stories told by the informant. As scientists we also possess certain opinions connected to this issue and will never be able to behave neutral and unbiased.

In total 11 crew from trawlers were interviewed during five days in July 1997. The crew was working on trawlers belonging to one of the fishing companies in Lofoten. Two of the informants were captains; one on a fresh fish trawler and the other on a freezing trawler. The rest were either ordinary fishermen on board or trawlmaster.

Names of informants were obtained from the shipping company and each was contacted by telephone for appointments.

The interviews were recorded on tape and each interview was typed up before further treatment of the data. Focus of the interviews was primarily on the seasonal geographical distribution of the fishery and their observation of catches of all kinds of trash fish in different areas. Through direct questions we also tried to obtain estimates of the amount of trash fish in each haul. Usually we talked of particular species or groups of trash fishes using common names, leaving a quite large group of species unmentioned because the fishers were not familiar with these species. When making quantitative estimates of bycatch we always make proposals to the informants on alternative amounts, such as: one box, half a box etc. Trawl fishers usually count their catches, either for the whole trip or one haul, in boxes.

3 RESULTS AND DISCUSSION

3.1 What is bycatch

In this research project the term bycatch is defined as all catches except for the commercial part caught during fisheries. However, when we started to use the term bycatch in the dialogs with the fishermen everyone thought we meant catches of commercial species other than the target species. The fishermen neither included undersized specimens of commercial species in the term bycatch, nor trash fish. Therefore, at the onset of the interviews there were a totally different perception of the term bycatch between us as scientists and the fishermen. During each interview we therefore had to introduce our definition of the term and to adopt their meaning of the word bycatch. To illustrate this we got replies to our initial questions such as: "No, the bycatch in the fishery today is next to nothing, I believe …." The fishermen neither included undersized specimens of commercial species nor trash fish in the term bycatch. They had three different explanations for neglecting the bycatch being a problem; fear, sorting grid and low prices. Firstly they argued that if they got too much illegal sized fish in a haul, they were obliged to leave the area immediately which they also did out of fear of being arrested by the coast guard. Secondly, the informants also meant that the new sorting grid developed for the fish trawl effectively sorted out undersized fish. Finally there were no motivation among the fishers for fishing small sized fish because of low prices.

The fishermen's neglecting of bycatch being a problem is obviously in great contrast to the importance of the term used in the management of the Norwegian trawl fishery. In the management of the trawl fishery bycatch exclusively means commercial species only. As far as we know trash fish is not mentioned at all in these management rules. It is therefore important to question which impacts these differences in definition of bycatch have on how the fishing activity is carried out.

Hence, the project defines bycatch as trash fish and undersized fish, while the fishermen only includes catches of commercial value by neglecting the presence of any bycatch. The fishermen's definition of bycatch is therefore identical with the management rules, where this term exclusively means commercial species.

3.2 Catch categories

3.2.1 Target species

All the fishermen worked on trawlers having individual quotas on cod, saithe and haddock. They operates in the off shore coastal areas of Northern Norway including the Barents Sea north to the Bear Island.

As already mentioned, the fishermen recognised the bycatch to be "insignificant" or "nothing". The difference in the interpretation of the term bycatch required a systematic and detailed questioning during the interviews. We had to question the fishermen about every commercial and non-commercial species appearing in the catches. A comprehensive marine biological knowledge was therefore of great value in this situation.

The next challenge dealt with quantifying the bycatch where a high level of specification was needed.

All our data are unambiguously showing that the fishermen do not see bycatch of undersized target species, such as cod, saithe and haddock as a problem.

3.2.2 By-products from target species

The main by-products from the target species in the trawl fishery are the head, roe, liver and viscera. The fish head, liver and the roe are commonly used in the northern Norwegian diet in coastal areas. Of these three products, only the roe is included in the catch of the vessels. The roe are frozen, while the head and the rest are discarded. Some fishermen told that during a short period in the late 1980-ties all by-products were landed as a part of the catch. The roe were frozen while liver and heads were stored in tanks onboard. To day, low prices do not defend the handling and use of cargo space for these products.

3.2.3 Non-target commercial species

The most abundant non-target species seem to be the redfish. There are two commercial species *Sebastes marinus* and *S. mentella*. Due to low prices, these species were not caught by Norwegian trawlers 10 – 15 years ago, but to day all redfish exceeding a certain size are taken. Some of the fishermen told about catches of more than 1000 boxes a week, although the fishers also said that the redfish stocks are seriously decimated. This observation is in accordance with the reports from the fishery scientists (Fisken og Havet 1999).

Throughout the recent 10 – 15 years, the Norwegian trawl fleet has been accused for being responsible for over fishing the Greenland halibut stock in the Norwegian and Barents Sea. This stock has been so strongly depleted that it to day is said by the ICES to be beyond its safe biological limits. Due to this, the bycatch of Greenland halibut is limited to 5 % of the catch in each haul. Due to the ongoing controversy between the trawl fishers and the fishery authorities in Norway according to this species, we were especially interested in the answers to our questions about the Greenland halibut.

Compared to other non-target species, the fishermen hesitated to mention the Greenland halibut. Actually they showed an aversive attitude to discuss this species. Although they stressed the 5 % bycatch rule in the trawl fishery. The Greenland halibut is normally distributed at greater depth that the main target species for the trawlers. Some of the fishermen tell that they sometimes make hauls on deep water due to echo-sounder registrations of fish in the area. The common experience of such hauls is a significant catch of the Greenland halibut. By this way they manage to fulfil the 5% bycatch quota.

Other deep-water species such as ling and tusk seem to be common in the trawl catches, although not abundant. These species are taken in small amounts particularly in the southern part of the operating area.

3.2.4 Trash fish

The term trash fish covers species, which are not perceived as edible and species, which actually are not for human consumption. In the first category we find several flatfishes, rays and some Liparidae. The non-edible trash fish group are mainly jellycat and different sharks.

The most abundant and common trash fish in the trawl fishery is the long rough dab, *Hippoglossides platessoides*.

3.3 Estimates

The main target species are continuously recorded in the catch log obligatory for all trawlers. It is obvious for us that all fishermen onboard at any time during the trip are aware of the accumulated catch, which are proportional to their income. This knowledge of the catch and their ability to estimate the size of each haul contradict the fishermen's awareness of the proportion of all kinds of bycatch questioned by us.

When asking the informants to quantify the overall amount of trash fish in the trawl hauls they were not able to give an estimate. Usually, we more or less had to push them and suggest alternative quantities. However, when we start talking about particular species they were able to give estimates of minimum and maximum numbers of each fish species per haul.

Several informants also states that ".. we get more thrash fish in long lasting hauls and when there are a bad fishery." Which could mean that while the relative amount of trash fish increase in these situations, the fishers judge it to be more in absolute quantities because the trash fish becomes more apparent. There are no biological reasons why trash fish should aggregate when commercial species such as cod, haddock or saithe are absent. However, when it came to the amount of commercial fishes, all fishermen were able to recall catches in exact numbers for each haul and trip.

The fishermen claim, due to their experiences, that the quantities of trash fish in the trawl hauls have decreased significantly after the introduction of the sorting grid.

There seem to be a difference in the ability among the fishermen to quantify the bycatch between groups of species. Lumpsucker, which have a well known commercial value, are often quantified in numbers or boxes, while other such as Greater argentine and several flatfishes are communicated in uncertain quantities. For the more anonymous fish species such as the Liparidae, the fishers had almost no idea about the amount.

It seems likely from the interviews that a quantification of the bycatch of trash fish may be possible using interviews for the most conspicuous species. There might however be great variations in estimates from one fisherman to another. It also seems necessary to use certain interview skills to be able to reveal the most realistic estimate of bycatch. In spite of getting particular figures for the bycatch of different species in this investigation, we are not pleased with having to push the informants on these questions. They sometimes were very unwilling to mention any figures at all.

The answers we got, clearly shows that the trawl fishermen have very little focus on bycatch as we define the term including both undersized fish and trash fish. We therefore conclude that interviews give a broad knowledge of species caught in the trawl fishery. Interviews may only partly give information on reliable quantities of the different bycatch species. This method should be accompanied by practical recording on the vessels during the fishery. However, interviews are a brilliant method revealing the fishermen's norms, values and attitudes.

4 KNOWLEDGE AND ATTITUDES

Introducing the goals of the investigation to the fishermen, the immediate response to the term bycatch was that the bycatch problem was negligible to day. All informants interpreted the term bycatch as undersized commercial fish or/and catches of illegal species. They claimed that the bycatch problem in the trawl fisheries was solved for two main reasons. The sorting grid prevents too much undersized commercial fish, and closures of fishing areas and meddling rules prevent unwanted catches of illegal species. Our impression from the interviews is that everybody knows the legislation and that they interpret the rules literally. In addition, there is a positive attitude to the regulations of the trawl fisheries. This is emphasised with the expression from one of the informants: "… it is a need for regulations (….) if everybody do the right things and obey the law, both the trawlers and the fish will survive well".

It seems like the inversative aspect of the Norwegian fishery legislation is not an active part of the fishermen's understanding of the law. When it comes to bycatch rules they are rather focused on two main explicit parameters; undersized fish and catch of illegal species. The fishermen are mainly preoccupied by the commercial fish species.

Due to their understanding of the bycatch, a lot of effort was needed to create a reasonable dialog about less abundant species of commercial value and of trash fish. What we call bycatch, they named "junk – fish" and "muck".

In this situation we were dependent on a broad marine biological knowledge. We had to introduce species by species when questioning about abundance and quantities.

All fishermen seem to possess a general knowledge about all commercial fish species in their fishing areas. As a contrast it was interesting to observe that when it came to trash fish, the situation was different. It appears to be two groups among the informants according to the nomenclature of trash fish. There was a distinct difference between the fishermen that had earlier experience from the small-scale coastal fisheries and those, which only have been, trawl fishers. Those with coastal fishery experience possessed a broad knowledge of all trash fish species. This knowledge entails both the species name and major parts of the biology of some of the species. Fishermen with an exclusive trawl fishery career, however, did not have the same skills according to fish names and biology.

Similar differences between the fishermen were also evident in the stories about the usefulness of the trash fish and by-products. Those with experience from the coastal fishery express several times that many of the trash fish species or f ex. the liver, should be taken care of. Whilst the strict trawl-fishers were more indifferent to this question.

In general, such knowledge is higher in middle aged people that young ones, but in this case the distinctions were due to their experience from different kinds of fisheries. An explanation for this may be that there is a high degree of specialisation of the jobs in the trawl fishery. In addition, the prevailing attitude among the crew and their company is to focus on the commercial catch. Where the role of each individual crewmember is very limited and strictly coupled to the main goal; catch as much as possible during shortest possible time.

It is also interesting to observe that the fishermen revealed an own nomenclature for some of the most conspicuous species, while other species did not have any names at all. The last ones being not very abundant in the catches.

One of the trash fish species we questioned about was the jellycat (*Anarhichas denticulatus*), which has no commercial value. This species showed up to be caught in small numbers quite frequently in particular areas. In spite of its lack of value, the fishermen came up with several different names of the species. The most common name was "buffalo", which describe the size and appearance. Some times they extended the name to "water-buffalo", which in addition refer to the high water content of the fish.

It is also sometimes named "wool – pig". This term has no obvious meaning; the two words "wool" and "pig" give association to something not edible. The use of this name probably also refer to that this species is totally useless as catch.

A fourth name they use is "ibo", which we are not able to interpret the meaning of some of the fishermen also use the name "Greenland shark- catfish". Probably due to the fact that the jellycat has a distinct smell of ammonia as in the Greenland shark.

It is well known that a pet child gets many names. This seems to be an example of the opposite. It is remarkable that due to its appearance, the trouble it causes and despite being a fish without commercial value, the fishermen have made an effort to label it. This shows that fish species gain a lot of attention in spite of being of any commercial value.

On the other hand we find examples of miss-denomination of some fish species. The long rough dab were for instance called by the common name of another plaice species (*Platichtus flesus)* by all fishers but one. The long rough dab is probably the most common and abundant trash fish in all operating areas of these fishermen. Nevertheless, it is never given its official name. It neither seems to have any nicknames.

An important theme of interest in this study is the problem with undersized commercial target species such as cod and haddock. When we raised the question about undersized fish, the fishermen denied this being a problem. They argued that the obligatory catch logbook and the inspection routines on sea and on land, prevented the possibility to keep undersized fish. In addition, the sorting grid result in catches with very little amounts of undersized cod, haddock etc. None of our informants told about own experiences with discards of undersized commercial fish. Nevertheless, they expressed that discard existed among other trawlers. They also told about the use of illegal small mesh nets in the trawls long time ago.

When it comes to by-products of target species, several reasons are given for not taking care of the liver, heads etc. The main arguments are shortage of time, cargo space and working facilities. These arguments are mainly a consequence of maximising the profit for the vessel as a unit. We were however told that during a period with extremely low fishing quotas (1989/90), all by-products from the fishery were taken care of and landed. This practice seems to terminate as the quotas increased again.

Our general impressions were that all fishers would take care of the by-products if the prices were the same as on the ordinary catch. Their conclusion was that putting the by-products in boxes demands the same work as discarding it. The same attitude was shown towards non-target commercial species. These were usually taken care of as a part of the catch since the prices are at the same level as the target species. Some of the non-target species appear only in small numbers, such as the Atlantic halibut. In these situations the fish were taken either for private consumption or as food for the crew.

We are not able to reveal any difference in attitudes according to the bycatch problems, between the officers and the fishers. The only dear distinction is between fishermen recruited from the coastal fisheries and those with a strictly trawl-fishing career.

This may be due to the fact that the officers also had a background being ordinary fishers on a trawler before they became captains and mates.

Both officers and fishers claims to obey the rules strictly and as long as the rules do not mention by-products, trash fish or non-target commercial species, these groups becomes of little meaning for the fishermen. Therefore, in order to obtain more information about these parts of the trawl catches, it is up to the fishery authorities to create other and more specific legislation for the trawl fishery.

The economical and labour pressure put on the crew seem to leave little space for inventive thoughts or ideas of exploiting other parts of the catches except for the target species. The shipping companies are therefore crucial in defining the premises for the exploitation of the bycatch. The fishermen would obviously not be an obstacle in such a process. Their main concern is a reasonable income.

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