



## Relaxing technical regulations under the Landings Obligation – effects on the discard ratio

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## Relaxing technical regulations under the Landings Obligation – effects on the discard ratio.

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### Summary

The landings obligation (LO), currently being implemented in the new CFP, puts major constraints on fishers, by making the landing of unwanted catch mandatory. Less restrictive technical rules (TR) in a results-based management frame have been suggested as a mechanism to release some of these constraints. To investigate the effects of the existing TR, some fishers were relaxed from TR during the trial and could freely choose and develop alternative gears, aiming to optimize annual catch value, while reducing discards. The study included 14 demersal fishing vessels, operating in the North Sea, Skagerrak and the Baltic Sea. Fishers used test and control gears interchangeably or in pairs and were required to sort and weight all discard of seven common target species on a haul by haul basis. All vessels were equipped for Fully Documented Fisheries, including cameras. Collected data were analyzed to investigate differences in landings, discards, discard ratio, CPUE, VPUE and DPUE, between conventional (control) and new gears (test). The results showed a varying degree of success, depending both on area and on choices made by the individual fisher. The best results were observed in the Baltic Sea, where relaxing technical rules led to major improvements in fishing patterns. But gear changes did not contribute much in fisheries where initial discards rates were already low.

### Introduction

The LO included in the new the CFP, is changing the European fisheries from landing quota to catch quota management. This brings several challenges for mixed fisheries, as fisheries may be forced to stop fishing, when the first quota is exhausted (Ulrich et al. 2011). Additionally, the current management schemes, with extensive (TR) on fishing operations and fishing gears, leaves few options for the fishers to avoid unwanted catches. Thus, in the current study, we analyze the current discard rates from some Danish demersal fisheries and contrast how catch quota management scheme without TR may affect landings, discards, discard ratio (DR), catch-per-unit-of-effort (CPUE), value-per-unit-of-effort (VPUE) and discard-per-unit-of-effort (DPUE). We expect that combining knowledge and knowhow from fishers and trawl makers may result in innovative solutions to reduce unwanted catches, thus creating the possibility to reduce discards and increase or stabilize revenues in the transition to the new CFP.

### Materials and Methods

Trial fisheries were conducted over a 6 months period (between winter 2014 and summer 2015), by 12 demersal trawlers and 2 Danish seiners from the North Sea, Skagerrak and Baltic Sea. The fishers were challenged to reduce the discard ratio by own means. All participating vessels were equipped for fully documented fisheries (FDF), including CCTV, using the Anchorlab technology.

Fishers were instructed to use the test gear and standard gear (control gear), interchangeably each week. Discard of seven species (Cod, Plaice, Haddock, Saithe, Dab, Hake and *Nephrops*) were to be sorted into baskets and weighed before discarding. Fishers were instructed to report landings and discards on a haul by haul basis. Discards were subsequently verified by video inspection, as fishers were required to show discards to cameras before discarding.

The primary measure of performance for the gears were the discard ratio, which here is defined as the proportion of fish discarded of the total catch:  $Discard\ ratio = \frac{Discard}{Discard+Landing}$ , however, data on landings, discards, CPUE, VPUE and DPUE were also analysed and used for evaluation.

All participants continuously developed and tested various alternative gears, but the subsequent analysis, analysis focused only on the declared outcomes (catches) of control vs. test gears, regardless of their technical specifications. All comparisons were done using a Welch t-test, as this test allows for unequal variances and unequal sample sizes in the two compared groups. Data were analyzed for differences between test and control gears across different scales (all vessels, by area and individually).

## Results and Discussion

A total of 2007 tons of the included species were landed during the total of 805 fishing days and 2344 hauls recorded in the trial. The primary landed species were plaice (1024 t) and cod (507 t). In the same period 85 tons were discarded, primarily cod (60t) and plaice (21 t). The average DR across all vessels and trips was 10.3% ( $\pm 24.7$ sd). Overall landings were higher in the control gears than in the test gears (average difference = 103 kg/haul,  $p < 0.01$ ) and discards were lower (average difference = 18 kg/trip,  $p < 0.01$ ). The average DR per haul was, thus smaller in the control gears ( $p < 0.01$ ). Hence, from an overall perspective the trial did not meet its objective, as the average free choice gear generated more discard than the average constrained gear. However, this result hides for major differences across participants, with some fishers having been more successful than others.

The area effect was investigated, revealing a gradient in the performance of test gears. Better results were achieved in the Baltic Sea compared to the North Sea. However, regions also had different challenges, when trying to adapt new fishing gears.

In the North Sea, discards are generally low already (average discard ratio in trial control gear = 1.04%), but across a large variety of species, making it is difficult to reduce discard further. Furthermore, landings in the North Sea were unaltered between the gears, indicating that the demersal fisheries are already optimized for being profitable under current TR with highly selective gears. The conventional gears are likely to miss a proportion of target species with suitable landing size, however faced with free gear selection, no fisher seemed to reduce selectivity noticeably to land a larger proportion of the missed target species.

In Skagerrak, both landings and discards were less in test gears, which indicates that while discards are reduced, fishers may suffer economically from reduced landings in the case of free gear selection. However, detailing the landings and discards to species level demonstrated that reductions mainly affected landings of cod and plaice has been reduced. The participating vessels in the Skagerrak are primarily targeting *Nephrops* and they perceive cod as a likely choke species. Thus, reducing landings on cod lowers the risk of choking the fisheries with an overexploitation of the cod quota. Current TR may therefore act as a constraint on the Skagerrak *Nephrops* fisheries, when cod gets included in the landings obligation.

Lastly, the Baltic Sea demonstrated increased landings and reduced discards. In contrast to other areas, Danish demersal fisheries in the Baltic Sea are almost exclusively targeting cod. Additionally, the Baltic Sea cod stock was already subject to the landings obligation at the time of trial. It is therefore likely that the improved performance of the test gears in the Baltic Sea were due to increased pressure to find solutions the constraints imposed by the LO in synergy with a less mixed fishery.

## References

Ulrich C, Reeves S a., Vermard Y, et al (2011) Reconciling single-species TACs in the North Sea demersal fisheries using the Fcube mixed-fisheries advice framework. ICES J Mar Sci 68:1535–1547. doi: 10.1093/icesjms/fsr060