



Tracking changes in the ling and tusk populations using CPUE estimates from logbook data



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Introduction

- Norwegian long liners conduct a large fishery in the Northeast Atlantic for two deep-water species: tusk (*Brosme brosme*) and ling (*Molva molva*).
- Scientific surveys do not cover the spatial distribution of these species, and until recently the principal source of information on these stocks was from sale receipts from the commercial fleet.
- The sale receipts do not give any information about effort.
- Logbooks from long-liners larger than 21 meters that had a total catch of ling, tusk and blue ling exceeding 8 tons have been collected and data from 2000 though 2005 are now available.

Can this information together with old logbook/effort data tell anything about the state of the two stocks?



Figure 1. Distribution area of tusk and ling.

First some information about the Norwegian long-liner fleet:

- From 2000 to 2005 there was a steady decline in the number of vessels from 72 to 39. The decline was due to new quota regulations for cod that was introduced in 2000.
- The total catch has gone down during this period, while the average catch per vessel has remained relatively stable (Helle, 2006).

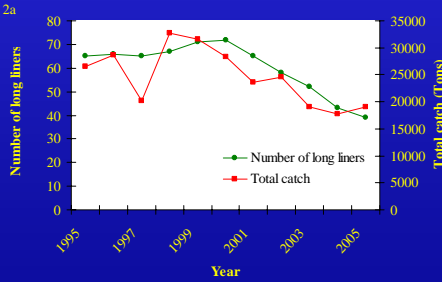


Figure 2a) The number of long liners and the total reported catch.

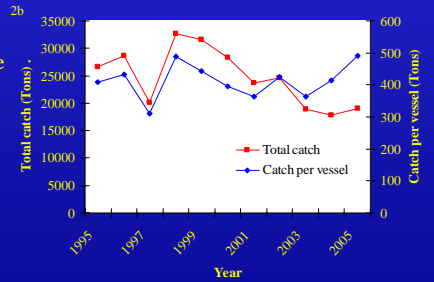


Figure 2b) The total catch and the catch-per-vessel.

So, with a large decrease in the number of vessels participating, decreasing total catch and a stable catch per vessel, does this mean that the effort has been reduced and the stocks are doing OK? Let's look at the logbook data:

Effort: Hooks

- The average number of hooks used per vessel per day increased from 2000-2003 then decreased.
- Although the number of vessels had decreased the number of hooks used per year has remained stable.

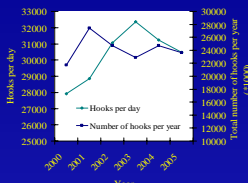


Figure 3. Number of hooks used per vessel per day and total number of hooks used per year.

Effort: days/weeks in the fishery

- The total number of weeks in the fishery has remained stable.
- The average number of days each vessel has been fishing for ling and tusk has doubled.

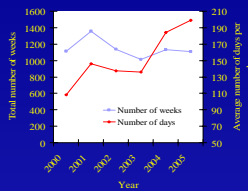


Figure 4. Average number per day each vessel participated in the fishery per year and number of weeks the fleet fished.

CPUE

- Tusk showed a slight downward trend in most of the subareas from 2000 to 2004 and then an increase in 2005.
- For ling there was a slight downward trend from 2000 through 2002 and perhaps an upward trend from 2003 through 2005.

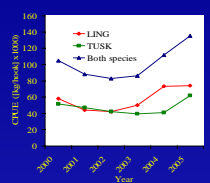


Figure 5. CPUE for ling, tusk and both species combined.

How does these data compare to "historic" data from Bergstad and Hareide (1990)

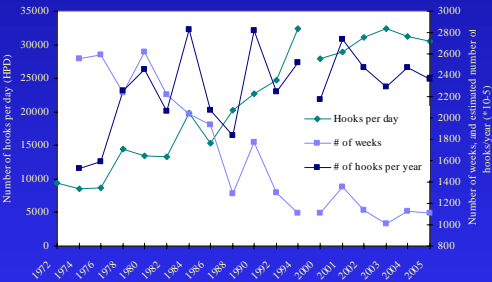


Figure 6. Combined time series 1972-1994 and the new data from 2000-2005. The numbers of hooks used per day, total number of hooks per year and the total number of weeks the long liners participated in the fishery for ling and tusk

Even though there is a time gap of six to seven years between the old and the new time series the new data seem to correspond and reflect the trends in the fishery quite well.

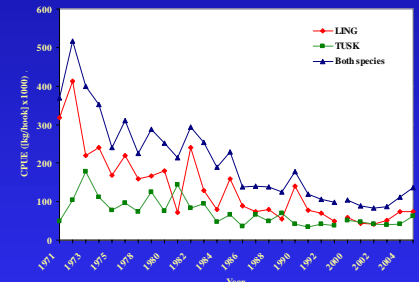


Figure 7. CPUE ((kg/hook) x1000) for ling, tusk and both species combined for the period 1971-1993 and for 2000- 2005.

Conclusion

- Although the number of vessels has gone down in the period 2000 to 2005, the total effort has remained stable.
- The data from 2000-2005 show that the total catch has declined while the average catch-per-vessel has remained relatively constant.
- The almost constant catch rates for the remaining vessels suggest that fishers maintain a certain catch rate but are apparently unable to increase the rate despite the reduction in number of vessels.
- Both the pre-2000 and the new data indicate an increase in effort and a decrease in CPUE indicating that abundance may be declining.

References:

Bergstad, O. A. and Hareide, N.-R. 1996. Ling, blue ling and tusk of the North-East Atlantic. *Fisken og havet* nr. 15. 126 pp.
Helle, K. 2006. Estimating the relation between effort and the commercial catch of ling, blue ling and tusk. Working Document to the ICES Working Group on The Biology and Assessment of Deep-Sea Fisheries Resources. 17 pp.