

EVALUATING CPUE SERIES GENERATED BY THE NORWEGIAN LONGLINE FLEET FOR THE PERIOD 2000-2009

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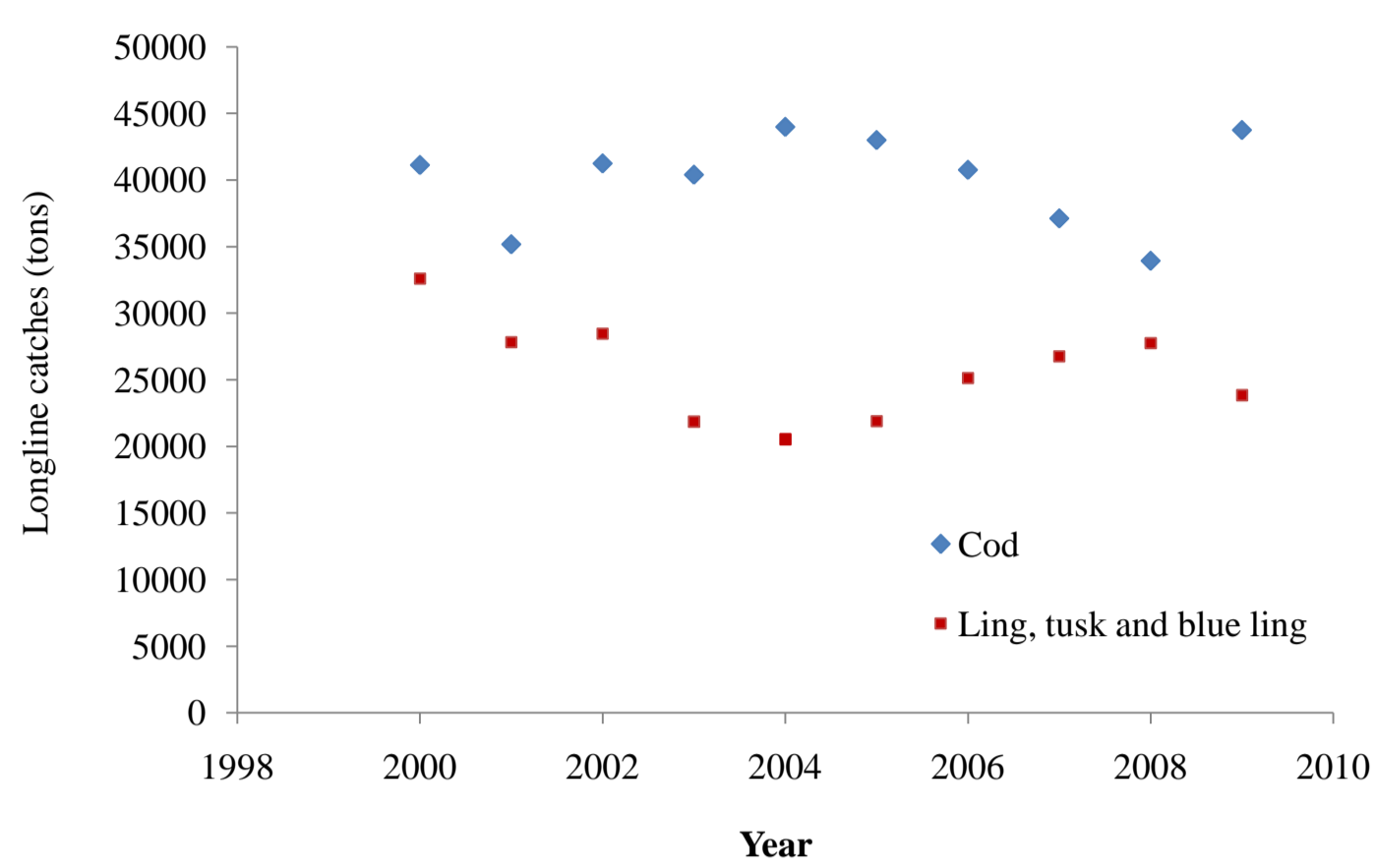


Figure 1. Total catch by longliners of cod (diamonds) and the combined total catch of ling, tusk and blue ling (squares).

- Ling and tusk have been fished by Norwegians for centuries, and the total landings have been recorded since 1896.
- The major Norwegian fisheries for these species use long lines in areas where trawling is impossible and therefore data from traditional scientific bottom trawl surveys do not exist.
- The fishery for these species is influenced by the size of various quotas for other species, such as Arcto Norwegian cod (Figure 1) and the number of vessels participating in the fishery (Figure 2).
- Therefore, the total catch is not a good indicator of the state of these stocks.

•Based on a “historical” CPUE time series and a few years of a new CPUE series, ling was in 2006 put on the Norwegian Red List in the category, Near Threatened (NT).

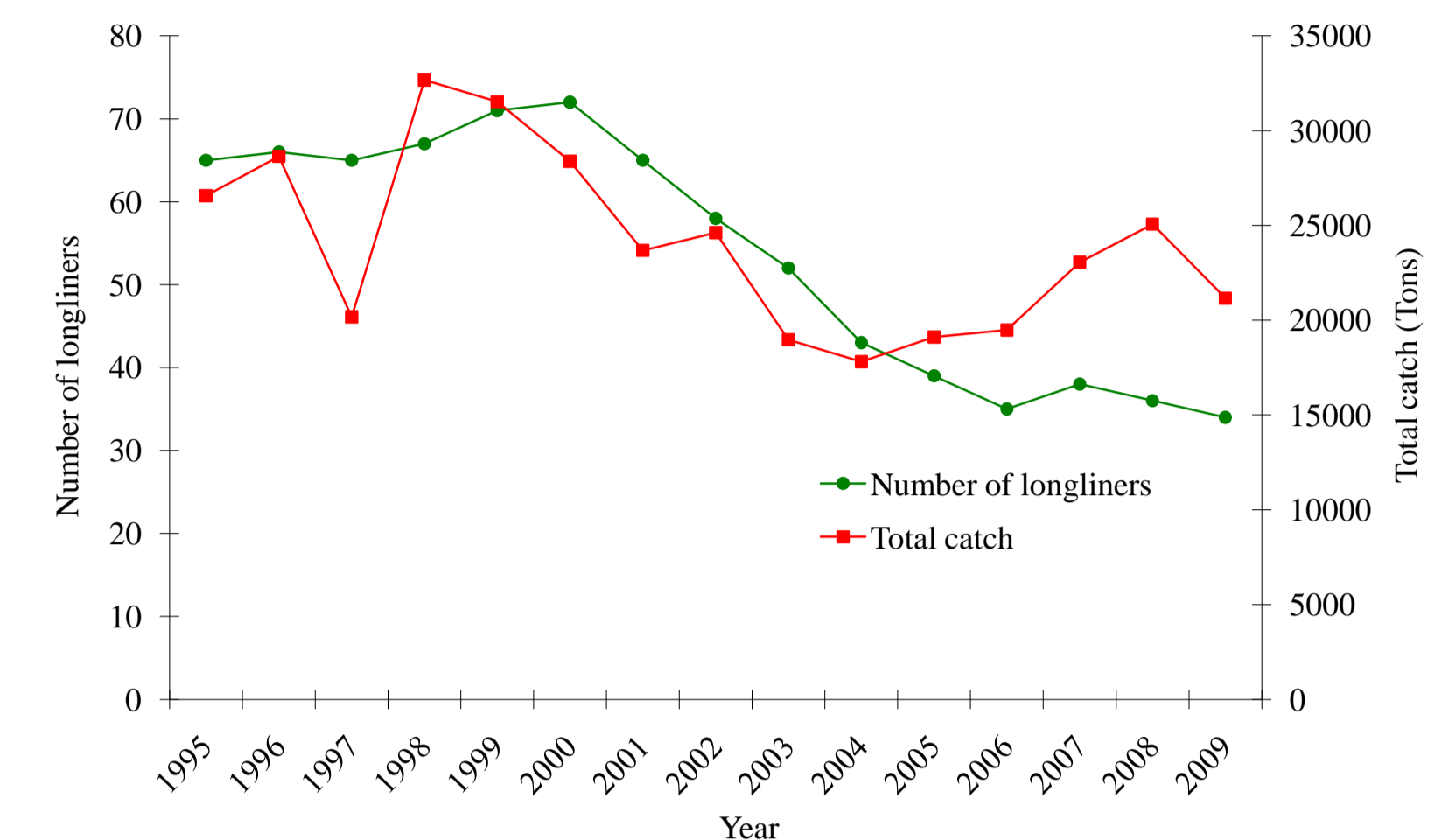


Figure 2. The number of longliners and total landings of ling and tusk in the period 1995-2009.

Data:

- For the period 2000 - 2009 logbooks of longliners larger than 21 m with a total landed catch of ling, tusk and blue ling that exceeded 8 tons in a given year were collected.
- The Norwegian Directorate of Fisheries provided data on total catch and the number of longliners.

Effort

- The logbooks recorded the position, date, the catch in kg of each species per day and the number of hooks used each day.
- Based on these data, a CPUE was calculated as: $([\text{kg}/\text{hooks}] * 1000)$.

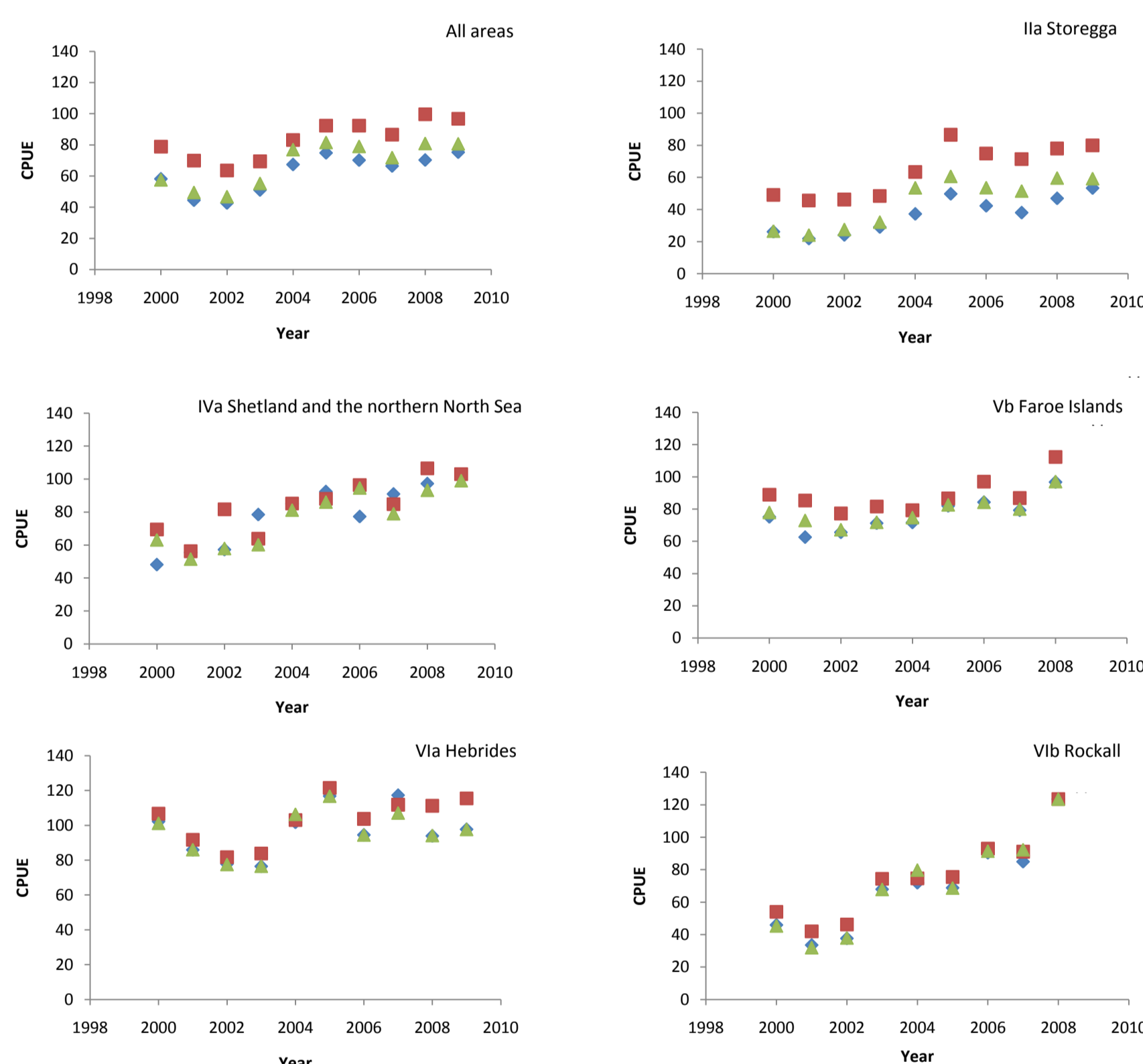


Figure 3. CPUE estimates for ling using all available data (blue diamonds), CPUE estimates based on data if the total day catches of ling and tusk exceeded 50% (green triangles) and CPUE estimates if the total day catches of ling exceeded 30% (red squares).

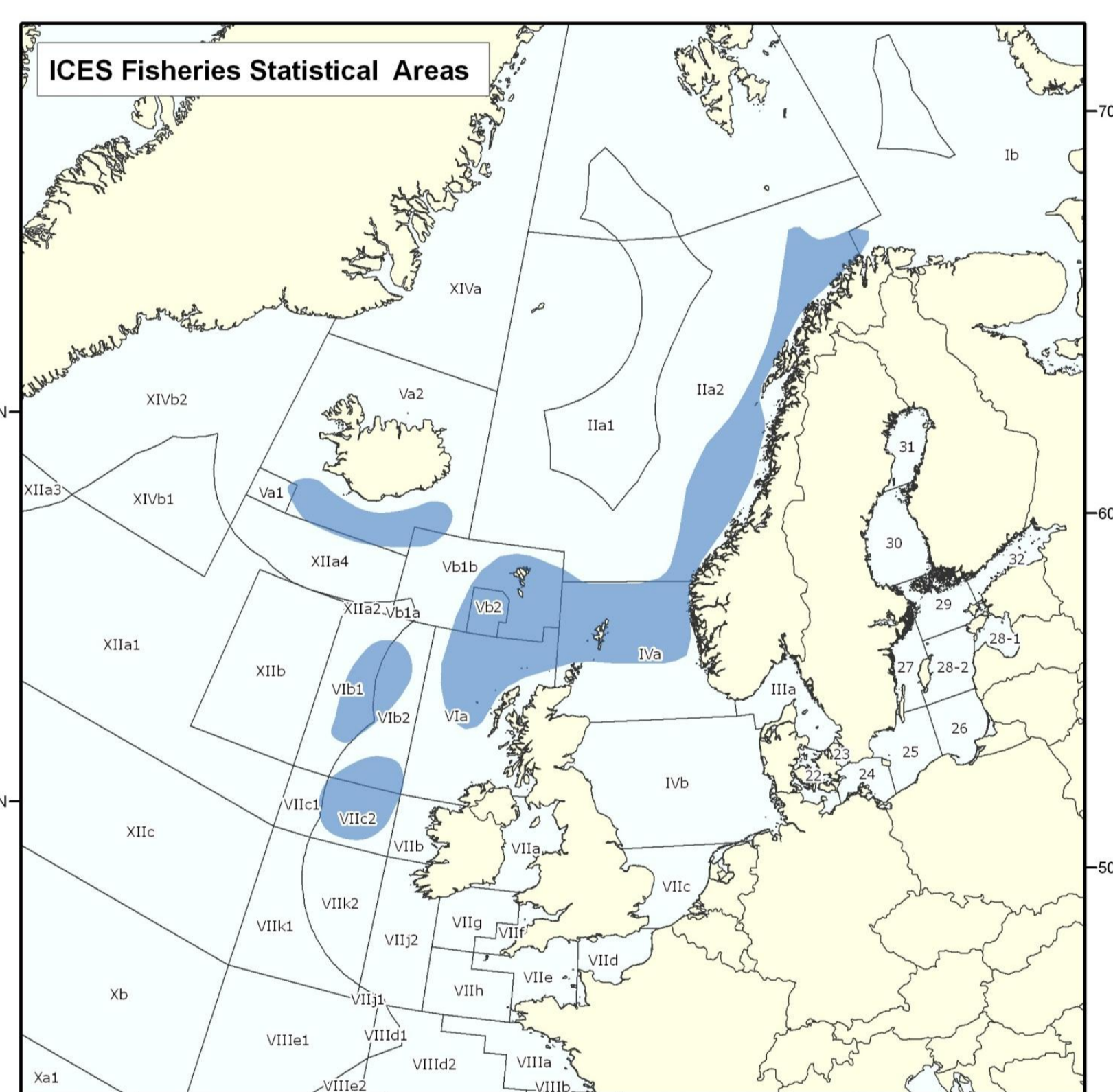


Figure 4. ICES Fisheries Statistical Areas. The blue areas are the traditional Norwegian longline fishing areas for ling and tusk.

Direct catch vs bycatch

- The fishery for ling and tusk is a mixture of direct catch and bycatch which may influence the CPUE estimates.
- It is not clearly stated in the logbooks whether a species is targeted or not.
- Based on discussions with fishermen two different options for estimating a CPUE series were examined: first, when one of the species makes up at least 30 percent of the total catch and secondly, if the catch of both species combined was more than 50 percent of the total catch.

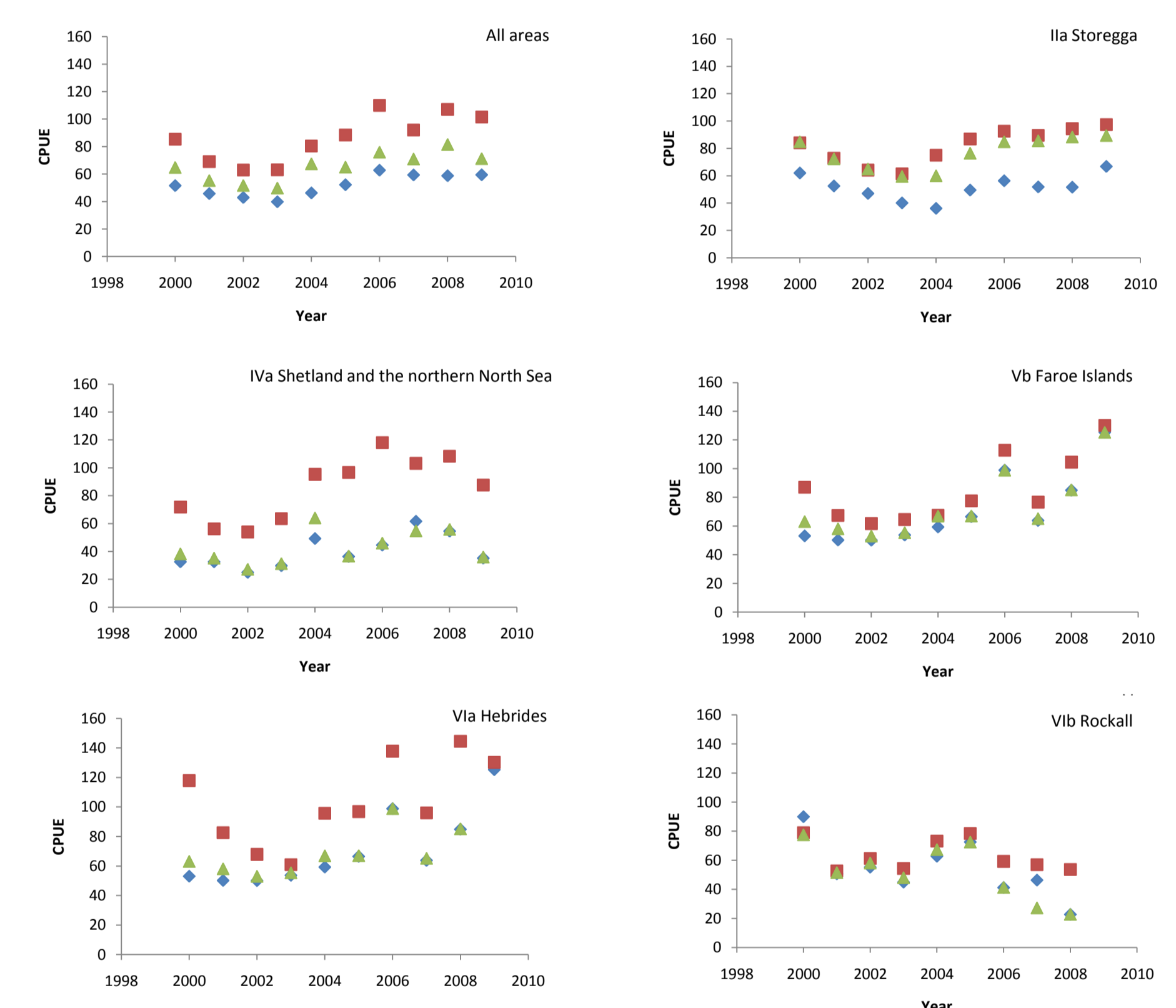


Figure 5. CPUE estimates for tusk using all available data (blue diamonds), CPUE estimates based on data if the total day catches of ling and tusk exceeded 50% (green triangles) and CPUE estimates if the total day catches of ling exceeded 30% (red squares).

Results

Direct catch vs by-catch

The largest effect on trends in the estimated CPUE series was achieved when the catch of one of the species was more than 30 percent of the total catch.

Ling

In all areas except area Ila ling was the targeted species. Even though the CPUE estimates when ling made up more than 30% of the total catch were considerably higher than the two other CPUE series, it followed the same trend. For all areas there has been a positive trend in the CPUE.

Tusk

Tusk was in most areas a bycatch species and the CPUE estimates clearly indicate this. Also tusk had an overall positive trend.

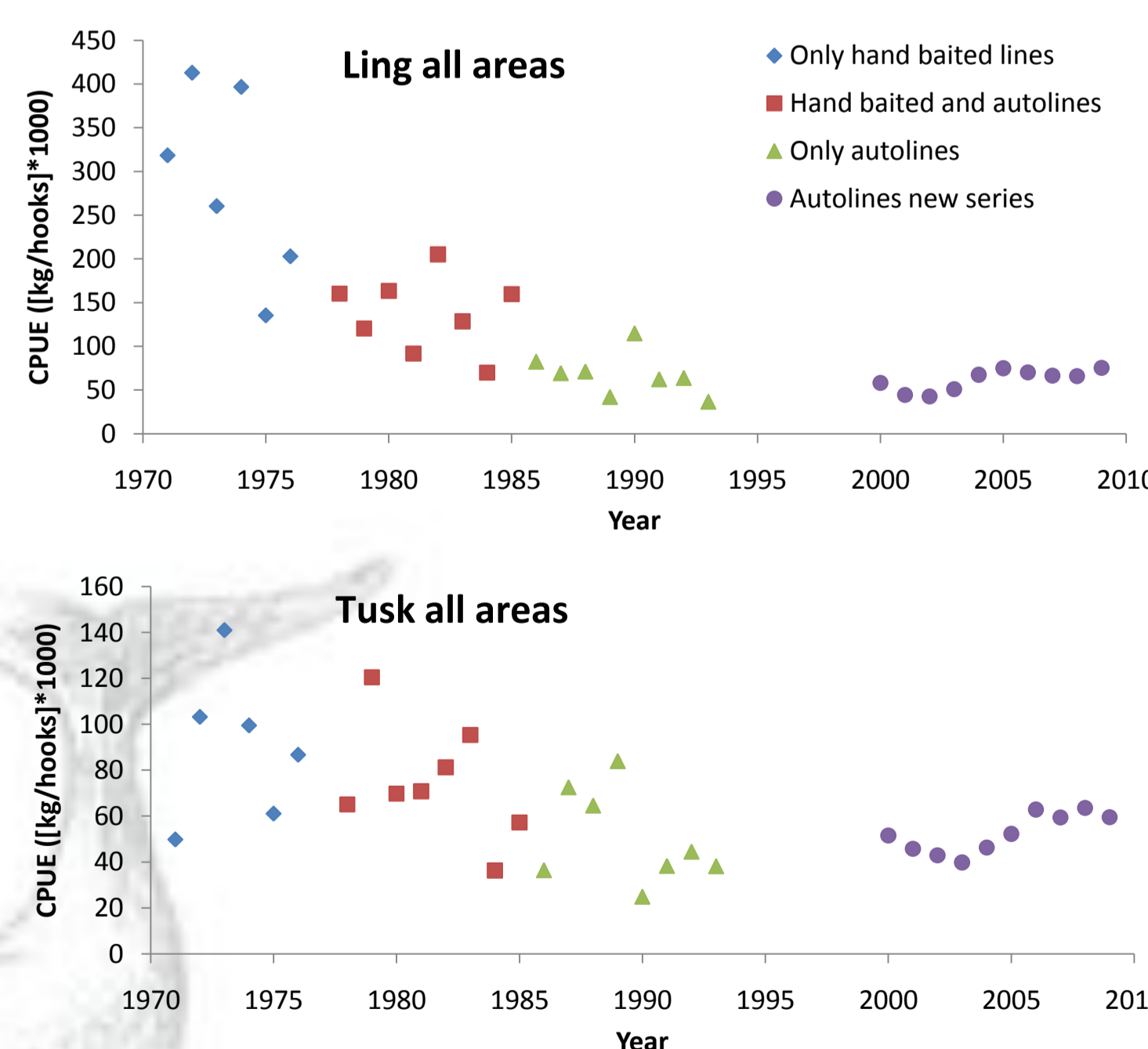


Figure 6. CPUE $([\text{kg}/\text{hook}] * 1000)$ for tusk for all the ICES subareas combined for the period 1971 through 1993 and for 2000 through 2009. The data used for the period 1971-1993 were, early on only hand baited lines (blue diamonds), then a mix of both hand baited and autolines (red squares) and finally only autolines (green triangles). The new data series is denoted by purple circles.

The “Historical” CPUE series vs the new CPUE series

The “historical” series showed a large decline in CPUE from the 70ies to the mid-80ies. It is, however, uncertain if this decline was caused by a real CPUE decrease or because the changes in fishing gear were not properly taken into account. The CPUE series based only on the period using only autolines, indicates that the CPUE for both species has been stable since the mid 80ies.

Conclusions

- The old CPUE series after 1985 and the subsequent new CPUE series together indicate that ling should be taken off the Red List*.
- Whether a species is targeted or is a bycatch in a subarea must be taken into account when estimating CPUE.
- Changes in: fleet composition, quotas for others species, management regulations, and fisheries technology need to be followed closely and taken into account when interpreting CPUE estimates.