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Revised egg production time series for western horse mackerel stock

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Introduction

The international mackerel and horse mackerel egg surveys take place every 3 years and cover the spawning grounds for mackerel and horse mackerel in the NE Atlantic.

One of the objectives of the triennial egg surveys is to cover the entire spawning area in space and time and produce an estimate for horse mackerel egg production. This is used as a relative index in the assessment for western horse mackerel.

The western horse mackerel stock was defined as that found in the ICES divisions: IIIa, IVa, IIa, Vb, VIa, VIIa-c,e-k and VIIIa-e. Since 2004 a new geographic definition of the horse mackerel western stock has been adopted that also includes ICES Division VIIIc as part of the distribution area of the western horse mackerel stock (ICES, 2005a).

Material and Methods

WGMES carried out a revision of the mackerel and horse mackerel historical egg survey database for years 1992 to 2013 in 2014 (ICES, 2014b). A recalculation of the whole time series of the TAEP (Total Annual Egg Production) was also performed in 2015. Over this revised time series was applied the horse mackerel egg development rate described by Pipe et al. (1987) in order to recalculate western horse mackerel egg production.

The revised horse mackerel egg production estimates of the whole time series were calculated using a new updated code in R that has been developed in recent years (ICES, 2015).

Results

The revised time-series of horse mackerel egg production estimates and their standard deviations are showed in Tables 1. In Figure 1 are plotted the update estimates and the reported estimates. The updated time-series is reported in table 2. For 1992, 1995 and 1998 the revised estimates represented a substantial increase on the original reported estimates (21%, 9% and 10%, respectively).

- The reported 1992 estimate had not included the egg production from the southern part of the stock (Div. VIIIc) so it was corrected to include those data. In addition, the 1992 survey just covered a denoted “standard area” that was defined in previous reports (ICES, 1993).
- In the original calculation of the 1995 reported estimate only the data from the “standard area” corresponding to that used in 1992 (ICES, 1996) were used. The revised estimate in 2015 includes all the data collected from the entire surveyed area, thus providing more complete coverage of the spawning distribution in the western area.

Discussion

The egg abundance estimate provided by the MEGS survey is used by western horse mackerel assessment as a tuning index for abundance and catch-at-age data. Previously, the temporal index of egg production estimates corresponded to the years 1983, 1989, 1992, 1995, 1998, 2001, 2004, 2007, 2010 and 2013 (ICES, 2005b; ICES, 1014) . This preliminary new revised index corresponds to the years from 1992 onwards. It should be noted that years prior to 1992 did not including the southern part of the stock (division VIIIc). Consequently, for western horse mackerel egg production estimates during these early years could have been underestimated.

Results of this provisional horse mackerel egg production will be revised by WGMEGS.

References

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	1992	1995	1998	2001	2004	2007	2010	2013
STOCK	west	west	west	west	west	west	west	west
egg_prod	2.16*e15	1.39*e15	1.26*e15	8.49*e14	9.32*e14	1.69*e15	1.06*e15	4.06*e14
se	2.20*e14	6.16*e14	1.02*e16	1.64*e14	1.48*e14	6.83*e14	1.80*e14	7.91*e13
cv	10%	44%	14%	19%	16%	40%	17%	19%

Table 1. Revised western horse mackerel time series estimates of egg abundance.

year	1983	1989	1992	1995	1998	2001	2004	2007	2010	2013
STOCK	west	west	west	west	west	west	west	west	west	west
egg_prod. (*e14)	5.13	17.62	17.12	12.65	11.36	8.21	8.89	16.4	10.93	3.97
variation			21%	9%	10%	3%	5%	3%	-3%	2%

Table 2. Horse mackerel Egg production REPORTED (in WGMEGS reports). Variation means % divergence between reported and recalculated estimates

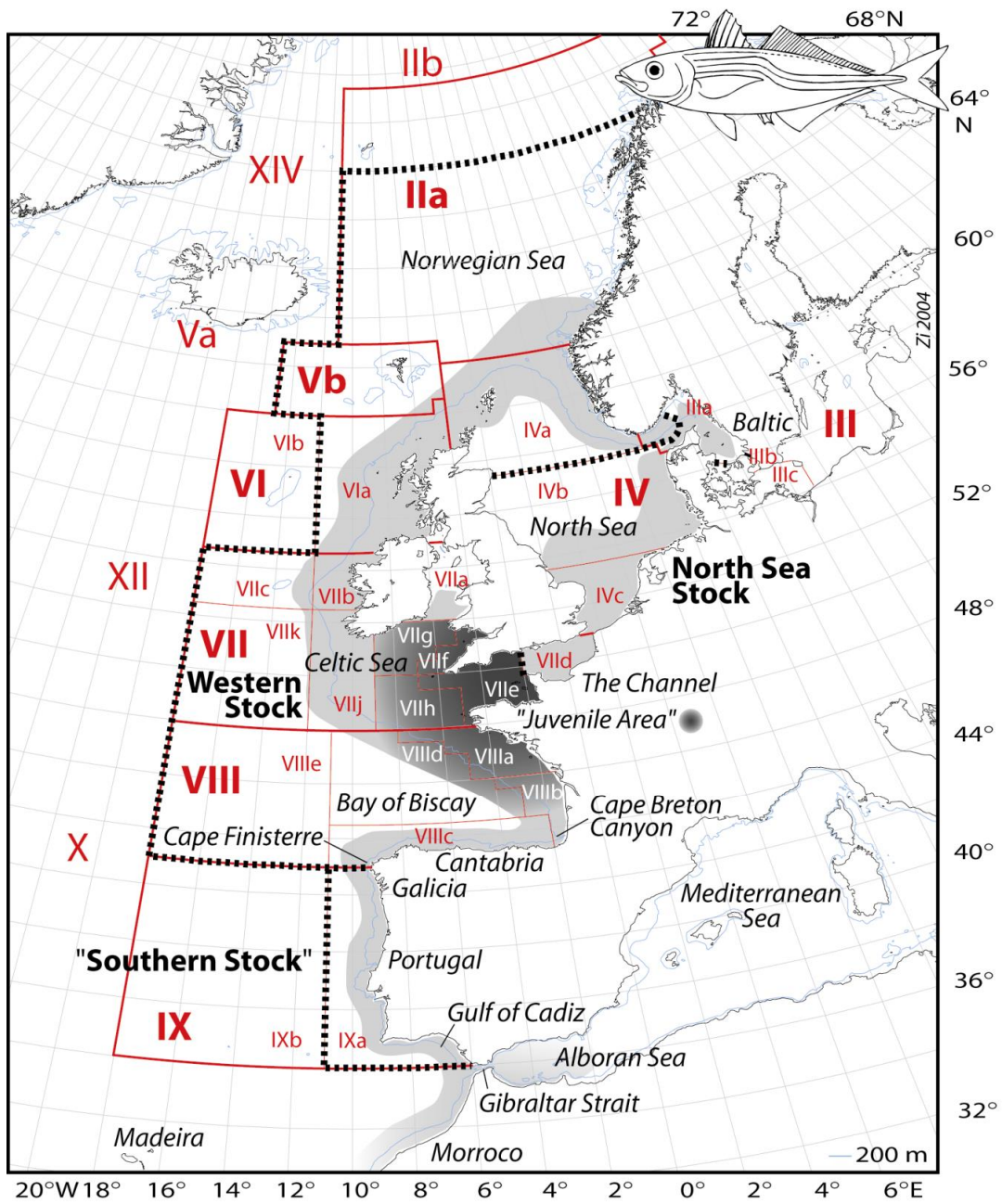


Figure 1. Geographical delineation by ICES division of horse mackerel stock components.

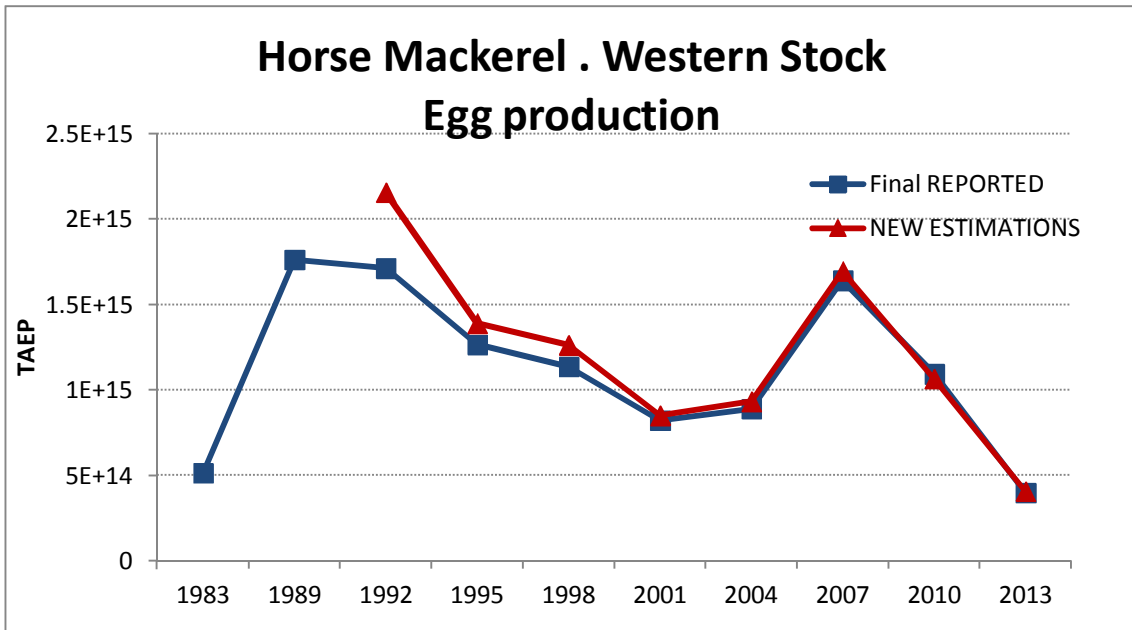


Figure 2. Comparison between revised and reported egg production estimates (1983 – 2013) for western horse mackerel.