Stock Annex: Horse mackerel (*Trachurus trachurus*) in divisions 3.a, 4.b–c and 7.d (Skagerrak and Kattegat, southern and central North Sea, eastern English Channel)

Stock specific documentation of standard assessment procedures used by ICES.

Stock:	Horse mackerel
Working Group:	Working Group on Widely Distributed Stocks (WGWIDE)
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A. General

A.1. Stock definition

Stock Identity

Horse mackerel in the north east Atlantic is considered to be separated into three stocks: the North Sea, the Southern and the Western stocks. As a consequence of results from de HOMSIR EU project the current boundaries of these stocks were established in 2004. The HOMSIR was a project on the stock structures of horse mackerel from the North-eastern Atlantic to Mediterranean Sea using a holistic approach from 2000 to 2003. Techniques they were used were: various genetic approaches, parasites (biological Tags), body morphometrics, molecular, otolith shape analysis, tagging, the comparative study of life history traits (Growth, reproduction and distribution)(Abaunza, 2008b). One of the consequences of this project was that horse mackerel in the North Sea could constitute a stock well differentiated, especially by using body morphometrics and parasites as biological tags, from the western areas, although a limited mixing between them could exist (Murta, 2008; Abaunza, 2008a).

Hence the current boundaries of these stocks are:

- Western stock: northeast continental shelf of Europe, from Norway to the northwest of Iberian Peninsula (Galician coasts: Cape Finisterre at 43º N latitude).
- North Sea stock: in the eastern Eng-lish Channel and North Sea area
- Southern stock: The Iberian coast from the Strait of Gibraltar to Cape Finisterre in Galician waters (ICES division 9.a)

However, the population structure for horse mackerel in the western european coasts could be more complicate and more research is needed to clarify the migration patterns within the Northeast Atlantic Ocean (ICES, 2005). This is especially relevant to the boundary areas between the North Sea Stock and the Western stock (Northern North Sea and English Channel). Unfortunately, we have no enough information to look for possible migrations and/or mixing areas in southern North Sea and English Channel (ICES, 2005; Abaunza 2008b)

Moreover, the batch fecundity values for the North Sea were much lower than those in adjacent areas (Abaunza et al., 2008-a; Gordo et al., 2008), reinforcing the perception of a differentiated resident population.(Abaunza et al. , 2008b)

Allocation of catches to stock

Based on spatial and temporal distribution of the horse mackerel fishery the catches were allocated to the North Sea stock as from ICES divisions 3.a and 4.a in the 1st and 2nd quarters and all catches from ICES divisions 4.b,c and 7.d.

It seems strange that only part of catches of Division 3.a and 4.a are allocated to North Sea stock. The reason for this is that the catches in the western part of these divisions taken in the 3rd and 4th quarters usually are taken in neighbouring area of catches of horse mackerel Western stock. This is a minor problem because the catches in these areas during 3rd and 4th quarters often are small (ICES, 2001).

A.2. Fishery

A.3. Ecosystem aspects

B. Data

B.1. Commercial catch

Catch in numbers

Commercial catch data and the associated sampling are obtained from national laboratories of nations exploiting North Sea horse mackerel (carried out under the DCF in EU countries). Prior 2014 the data exchange spreadsheets were submitted to the stock coordinator. The data in the exchange spreadsheets were allocated samples to catch using the SALLOC-application (Patterson, 1998). This application produced the standard outputs on sampling status and biological parameters.

Since 2014 national data submitters have been uploading this information into InterCatch using the standard exchange files. The information is supplied aggregated to ICES subarea/division/subdivision and quarter. The total International catch at age was available through the InterCatch web system. The allocations for those countries reporting unsampled catches, were generally made using all available data for

the same ICES division and the same quarter. In cases where this was not possible, data from the nearest divisions and the same quarter were used. The aggregated output files can then be downloaded to the stock coordinators. The files will be used as input for the stock assessment models.

Over the years usually only one and sometimes two national submiters more have been providing data on catch at age. In addition an adequate sampling has never been conducted in all fishing areas during the fishing season.The lack of sampling data for relatively large portions of the horse mackerel catches have a serious effect on the accuracy and reliability of the annual catch at age matrix.

Discards

Over the years, the available estimates of discards are based on information provided by only one or two countries and the total discards are considered to be not representative for the total fishery. Reported discards have been highly variable over time.

Information from national data submitters suggest that discard rates for the directed fishery are low with the majority of discards from non–directed demersal fisheries.

B.2. Biological

Mean weight at age in the stock

Maturity ogive

Natural mortality

B.3. Surveys

Egg survey estimates of biomass

Bottom trawl surveys

Acoustic surveys

B.4. Commercial CPUE

B.5. Other relevant data

C. Historical Stock Development

D. Short-Term Projection

E. Medium-Term Projections

F. Long-Term Projections

G. Biological Reference Points

Biomass reference points

Fishing mortality reference points

MSY reference points

H. Other Issues

I. References

Abaunza, P., Murta, A.G., Campbell, N., Cimmaruta, R., Comesaña, A.S., Dahle, G., García Santamaría, M.T., Gordo, L.S., Iversen, S.A., MacKenzie, K., Magoulas, A., Mattiucci, S., Molloy, J., Pinto, A.L., Quinta, R., Ramos, P., Sanjuan, A., Santos, A.T., Stransky, C., Zimmermman, C., 2008b. Stock identity of horse mackerel (Trachurus trachurus) in the Northeast Atlantic and Mediterranean Sea: integrating the results from different stock identification approaches. Fisheries Research. 89, 196 – 209.

ICES. 2005. Report of the Working Group on the assessment of mac kerel, horse mackerel, sardine and anchovy (WGMHSA). 7 -16 September 2004, ICES Headquarters, Copenhagen. ICES CM 2005/ACFM:08.

ICES. 2001. Report of the Working Group on the assessment of mac kerel, horse mackerel, sardine and anchovy (WGMHSA). 7 -16 September 2004, ICES Headquarters, Copenhagen. ICES CM 2005/ACFM:06.

Abaunza, P., Gordo, L., Karlou-Riga, C., Murta, A., Eltink, A. T. G. W., García Santamaría, M. T., Zimmermann, C., Hammer, C., Lucio, P., Iversen, S. A., Molloy J., and Gallo, E. 2003. Growth and reproduction of horse mackerel, Trachurus trachurus (carangidae). Reviews in Fish Biology and Fisheries, 13: 27–61.

Abaunza, P., Gordo, L.S., Garc´ıa Santamar´ıa, M.T., Iversen, S.A., Murta, A.G.,Gallo, E. 2008. Life history parame ters as an important basis for the initial recognition of stock management units in horse mackerel (Trachurus trachurus). Fish. Res 89, 167-180.

Murta, A.G., Pinto, A.L., Abaunza, P. 2008. Stock identification of horse mackerel (Trachurus trachurus) through the analysis of body shape. Fish. Res., , vol. 89 (pg. 152-158).

Gordo, L.S., Costa, A., Abaunza, P., Lucio, P., Eltink, A.T.G.W., Figueiredo, I. 2008Determinate versus indeterminate fecundity in horse mackerel. Fish. Res., 89, pp. 181–185