Stock Annex: Plaice (*Pleuronectes platessa*) in subdivisions 24–32 (Baltic Sea, excluding the Sound and Belt Seas)

Stock specific documentation of standard assessment procedures used by ICES.

Stock: Plaice

Working Group: Baltic Fisheries Assessment Working Group (WGBFAS) / Benchmark Workshop on Plaice (WKPLE)

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A. General

A.1. Stock definition

The Eastern Baltic plaice covers the ICES Subdivisions SD24 to SD32.

A.2 Fishery

Plaice is mainly caught in the area of Arkona and Bornholm basin (SD 24 and SD 25). ICES Subdivision 24 is the main fishing area with Denmark and Germany being the main fishing countries. Subdivision 25 is the second most important fishing area. Denmark, Sweden and Poland are the main fishing countries there. Minor catches occur in Gdansk basin (SD 26). Marginal catches of plaice in other SD are found occasionally in some years, but were usually lower than 1 ton/year. The highest total landings of plaice in SD's 24 to 32 were observed at the end of the seventies (4530t in 1979) and the lowest around the period between 1990 and 1994 (80 t in 1993). Since 1995 the landings increased again and reached a moderate temporal maximum in 2003 (1281t) and again in 2009 (1226t). After 2009 the landings decreased to 748t in 2011, slightly increased in 2012 to around 848 tons and decreased to 738 tons in 2013.

Plaice are caught by trawlers and gillnetters mostly. The minimum landing size is 27 cm in 2013, active gears provide most of the landings in SD 24 (ca. 65%) and SD 25 (ca. 77%), whereas landings from passive gears are low. However, in SD 26, passive gears provided 76% of total plaice landings in 2013. Only a few occasional landings from trawl-fisheries took place in SD 26.

A.2.1. General description

Countries involved: Denmark, Sweden, Poland, Germany, Finland, Latvia

A.2.2. Fishery management regulations

A.3. Ecosystem aspects

Plaice catches are regulated by a catch quota. This quota however, accounts for the whole Baltic Sea area. No differentiation is made between the two stocks PLE-2123 and PLE-2432.

B. Data

B.1. Commercial catch

The landing data of plaice in the Eastern Baltic (ple 24-32) according to ICES Subdivisions and countries are presented in Table 5.1. The trend and the amount of the landings of this flatfish are shown in Figure 5.3. Plaice and dab have the greatest proportions of the total landings of flatfish when excluding flounder.

B.1.1. Landings data

All countries having a fishery on PLE-2432 were asked to upload their landings, discards estimations and biological data from sampling.

B.1.1.1. Danish landings

Denmark is the main fishing country with about 600 tons landed plaice in 2013. All landings arose out of SD24 and SD25.

B.1.1.1.1. Data coverage and quality

Landings are usually sampled directly at the port ('harbour-sampling') or at sea. The sampling covers the most important fisheries, i.e. active trawling in SD24 and increased since 2007. The earlier years of the time series have a bad coverage in time and space. Recent years did not cover the trawling fleet in SD25 (only in discards).

B.1.1.2. Swedish landings

Sweden is the second-most important fishing nation for plaice in the Eastern Baltic and landed about 62 tons of plaice in 2013. All landings arose out of SD24 and SD25.

B.1.1.2.1. Data coverage and quality

Landings are usually sampled directly at the port ('harbour-sampling') or at sea. The sampling covers only length distributions, as Sweden is not sampling age of plaice. For the benchmark, these length data were not used due to missing conversion factors (age-length-keys) and a fitting format, only landings and discard estimations were used in the process.

B.1.1.3. Polish landings

Before 2004, plaice landings were not separated from other flatfishes, only a general landing of flatfish is available. Since 2004, plaice is landed as a separate species, landings in 2013 were around 50 tons.

B.1.1.3.1. Data coverage and quality

Sampling covers the 1st and 4th quarter in active fisheries in SD25 and, to a lesser extent, the passive fisheries. SD24 is only partially covered in time and space.

B.1.1.4. German landings

Germany landed about 45 tons of plaice in 2013, which was mostly caught by active trawling in SD24 and to a minor extent from SD25.

B.1.1.4.1. Data coverage and quality

Sampling of biological data started in 2008 and concentrates on the active fleet (esp. 1st and 4th quarter). Before 2008 only occasional length data and very few age data are available.

B.1.2. Discards estimates

Discard in the commercial fisheries can be high and seems to vary greatly between countries. For example the trawl-fishery targeting cod in SD 26 may have a 100% discard rate of plaice throughout the year.

However, the available data on discards are incomplete for all subdivisions. In 2013, no discard-data from the commercial fisheries of Finland, Estonia, Lithuania, Latvia and Russia were uploaded to InterCatch (although those countries have a cod-targeting trawl-fishery which may have some bycatch of plaice). The quality of the discard data cannot be assessed because countries only uploaded discard-data of strata, where landings took place. In strata no having landings assigned, usually no discard-information were given.

Sampling coverage, esp. in the passive-gear segment is low, especially on discard in SD 25 and SD 26, where only Danish data were available.

B.1.2.1. Danish data

Denmark reported discard estimates back to 2002. Discard varied between years, quarters, gears and subdivisions.

B.1.2.1.1. Data coverage and quality

Discard estimations covered most of the active fishery in SD24 and SD25, although the 3rd quarter is often missing; the passive fishery is usually not covered by estimations. Biological sampling took mostly place in the active fisheries segment, some quarter are not well covered or not sampled at all. Passive fisheries discard is usually not sampled.

B.1.2.2. Swedish data

The coverage of Swedish discards estimations increased between 2002 and 2013, covering most strata in SD24 and SD25. The estimation of discard was often done based on just one trip in the respective stratum as stated by the national data submitter in InterCatch.

B.1.2.2.1. Data coverage and quality

Discard estimations covered most of the active fishery in SD24 and SD25, although the 3rd quarter is often missing. Biological sampling took not place, only length measurements were taken, usually were also landings has been sampled.

B.1.2.3. German data

Germany started reporting discard estimations together with biological sampling in 2008, before that time, only scattered information were available.

B.1.2.3.1. Data coverage and quality

The estimated discards cover the most major fishing gears and quarter in SD24 and SD25 (active fisheries in 1st and 4th quarter) Passive fisheries are not well covered until

recent years. Biological samples of discards are usually taken together with the landings-samples, the coverage is adjusted to the landings.

B.1.2.4. Polish data

Poland started reporting plaice in 2004, discard estimation were first given in 2007. Estimations were given for the most important fishing grounds and quarter, also partially covering passive gears.

B.1.2.4.1. Data coverage and quality

An estimation of discards was first given for landings in 2007, the amount and quality is increasing since then. The coverage of biological samples in the discard fraction is scattered and often lack a sufficient number of individual plaice.

B.1.2.5. Other countries data

Latvia, Estonia and Finland have <1% of the landings, but fisheries take place in the stock area. All three countries provided discard estimations for zero-landings.

B.2. Biological sampling

The sampling for the Eastern plaice stock (PLE-2432) concentrates on SD24 and SD25 where >99% of catches (Landings and Discards) are taken. The main countries involved in the biological sampling are Denmark, Poland and Germany. All three countries sample biological information such as individual age and length; Sweden only samples length distributions despite the fact that plaice is a quota species and belongs to DCF species group 1.

Overall, the sampling coverage is poor, esp. in the years 2002 to 2005. The following years show an increasing coverage in age-samples and length-distribution in both landed and discarded fractions. But still, 50-70% of the strata is not sampled or lack reliable/usable data. However, PLE-2432 is still categorized as a data limited stock (DLS).

B.2.1. Maturity

Maturity is measured in the surveys and in German biological sampling. No further information from other countries was available.

B.2.2. Natural mortality

No information on natural mortality were submitted by MS-

B.2.3. Length and age composition of landed and discarded fish in commercial fisheries

B.3. Surveys

B.3.1. Survey design and analysis

The data of the Baltic International Trawl Survey (BITS) from 2001 onwards were used to evaluate the current stock structure of Baltic plaice. Since 2001 standardized gear types TV3 #930 (TVL) and TV3 #520 (TVS) have been used by al countries which participate in the BITS. Survey-CPUE from 2000 and backwards can't be compared directly, although the difference in catchability between the gear types is quite small. The positions of the hauls have been allocated based on a standard method since 2002. The allocation of the stations by ICES subdivision and depth layer is dependent on the area

of the depth layers and the 5-years running mean of the density of cod age group 1+ in quarter 1 (ICES 2008 / WGBIFS) because cod is more important for the commercial use.

The procedures for analyzing the hauls are given in the BITS manual (ICES, 2014: WGBIFS). The data are uploaded to the ICES database DATRAS where the source data and different catch per hour estimates by length and age are provided.

B.3.2. Survey data used

The data of the Baltic International Trawl Survey (BITS) from 2001 onwards were used to evaluate the current stock structure of Baltic plaice

B.4. Commercial CPUE

Commercial CPUE were no uploaded by all countries and also the format varied, so effort was not used in the assessment and only used as an indicator to determine strata with a fisheries (e.g. to borrow discards ratios and assign biological samples)

B.5. Other relevant data

C. Assessment methods and settings

C.1. Choice of stock assess model

Given the poor coverage in discard estimations and the high variability in discards, together with the poor sampling-coverage (esp. in early years of the time series), it was decided by WKPLE to keep the stock as data-limited (Cat. 3 following the ICES DLS approach).

In the last years, only the trends of the survey index were used; since 2014, the effort of the commercial fisheries is used as an additional confirmation for these trends.

C.2. Model used of basis for advice

The model used is a trend analysis, using general trends in SSB of an exploratory SAM. Commercial effort data and fishery-independent surveys might be additionally used to confirm the trends found in the assessment model.

Discards are highly variable, depending on the calculation method. The InterCatch database does not allow a borrowing of amount/ratios for strata not having a landing attached (zero-landings), causing an underestimation of discards. If using a manual way of calculation (using the average discard per country, area, gear, area and quarter), discards are higher, in some strata the amount doubles.

C.3. Assessment model configuration

TYPE	NAME	YEAR RANGE	AGE RANGE	VARIABLE FROM YEAR TO YEAR YES/NO
Caton	Catch in tonnes	2002 - 2013	1-10	Yes
Canum	Catch at age in numbers	2002 - 2013	1-10	Yes
Weca	Weight at age in the commercial catch	2002 - 2013	1-10	Yes

West	Weight at age of the spawning stock at spawning time.	2002 - 2013	1-10	Yes
Mprop	Proportion of natural mortality before spawning	2002 - 2013	1-10	No
Fprop	Proportion of fishing mortality before spawning	2002 - 2013	1-10	No
Matprop	Proportion mature at age	2002 - 2013	1-10	No
Natmor	Natural mortality	2002 - 2013	1-10	No

Age group 0 has been excluded in input because mean weights of age 0 is highly inconsistent and is seldom even in discards. Age group 10 has been recalculated to be +group.

Landings (tons) are available from all countries back to 2002. Discards (CANUM, WECA) are only available back to 2002. The majority of discard weights was extrapolated from similar strata. Landing (CANUM and WECA) are also available back to 2002.
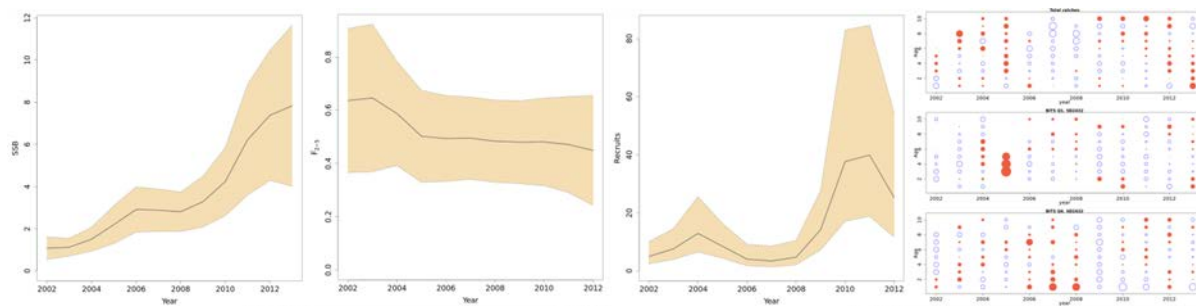
Fbar= 2-5.

Annually maturity ogive was taken from PLE-2123 (running mean of 3 years)

Additional options for each individual run:

Coupling of catchability of age 6-10+ for all surveys

Each of the two surveys used as individual tuning fleet

Additional runs were performed, using the manually calculated (higher) discards. Although the total amount in CANUM is higher, the influence on the SAM output is small.
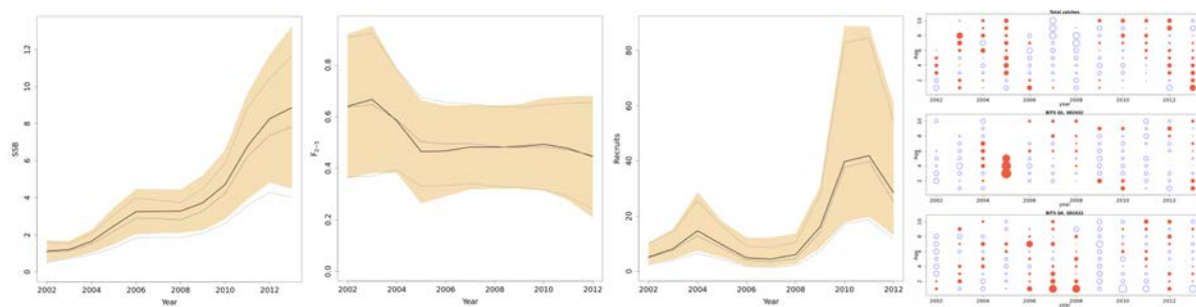
D. Short-term prediction

Model used:

Software used:

Initial stock size:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Procedures used for splitting projected catches:

E. Medium-term prediction

Model used:

Software used:

Initial stock size:

Natural mortality:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Uncertainty models used:

1)   Initial stock size:

2)   Natural mortality:

3)   Maturity:

4)   F and M before spawning:

5)   Weight at age in the stock:

6)   Weight at age in the catch:

7)   Exploitation pattern:

8)   Intermediate year assumptions:

9)   Stock recruitment model used:

F. Long-term prediction

Model used:

Software used:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Procedures used for splitting projected catches:

G. Biological reference points

No biological reference points were set or determined during WKPLE

	TYPE	VALUE	TECHNICAL BASIS
MSY	MSY Btrigger	xxx t	Explain
Approach	FMSY	Xxx	Explain
	Blim	xxx t	Explain
Precautionary	Bpa	xxx t	Explain
Approach	Flim	Xxx	Explain
	Fpa	Xxx	Explain

H. Other issues

H.1. Biology of species

YEAR (Y)	2007	2008	2009	2010	2011	2012
Assessment Model	ICA model	ICA model	ICA model	ICA model	ICA model	SAM Nielsen et al., 2012
Software						
Catch data range	19-?					1947-Y
CPUE Series 1 (years)	PT-TRF9a (1977-?)					
CPUE Series 2 (years)						
Index of Biomass (years)	PT-TRC9a (1989-2006)					
Error Type	Condition on yield					
Number of bootstrap	500					
Maximum F	8.0 (y-1)					
Statistical weight B1/K	1					

Statistical weight for fisheries	1,1
B1-ratio (starting guess)	0.5
MSY (starting guess)	3000 t
K (starting guess)	20 000 t
q1 (starting guess)	1d-5
q2 (starting guess)	1d-4
q3 (starting guess)	
Estimated parameter	All
Min and Max allowable MSY	2000 (t) -10000 (t)
Min and Max K	5000 (t) -500000 (t)
Random Number Seed	1964185

H.2. Current fisheries

H.3. Management and advice

H.4. Others (e.g. age terminology)

(The historic perspective, as well as all the other section on the stock annex, should only update in a benchmark workshop. If there is any reason to deviate from the stocks annex, this should be explain in the Working Group report and only update this deviation in the historic perspective after consultation with ICES Secretariat and WG Chair).

Add Data call table extract for this specific stock to identify which data was asked/used and which countries involved in fishing.