3 Herring in Division 3.a and subdivisions 22–24, spring spawners [Update Assessment]

3.1 The fishery

3.1.1 Advice and management applicable to 2022 and 2023

ICES advised in 2022 on the basis of the MSY approach. This corresponds to zero catch in 2023 (ICES 2022).

Since 2022, the EU, UK, and Norway agreement on herring TAC for human consumption in Division 3.a is based on agreement on maximum catches taken in 3.a with transfer of the remaining TAC (estimated from the 3.a TAC rule) to the North Sea. In 2022 and 2023, the agreement states that the possibility to transfer up to 100% of the human consumption TAC from 3.a to the North Sea and up to 50% for the bycatch small mesh fishery (see Council Regulation (EU) 2023/194 + amendment on 17 March 2023 EU 2023b) for more specifics on area limitations on the transfer within the North Sea).

For 2023, the EU, UK and Norway agreed on a maximum catch in Division 3.a for both the human consumption and the industrial fishery of 1 279 t corresponding to 969 t for EU countries and 310 t for Norway (assuming maximum transfer of 90% of 3102 t).

Prior to 2006, no separate TAC for subdivisions 22–24 was set. In 2022, a TAC of 788 t was set on the Western Baltic stock component in subdivisions 22–24. The TAC for 2023 was kept constant and set at 788 t.

3.1.2 Landings in 2022

Herring caught in Division 3.a are a mixture of mainly North Sea Autumn Spawners (NSAS) and Western Baltic Spring Spawners (WBSS). This section gives the landings of both NSAS and WBSS, but the stock assessment applies only to WBSS.

Landings from 1989 to 2022 are given in Table 3.1.1 and Figure 3.1.1. In 2022, the total landings in Division 3.a and subdivisions 22–24 have decreased to 1 365 t. Landings in 2022 decreased by 95% in the Skagerrak, by 92% in the Kattegat and by 60% in subdivisions 22–24 compared to 2021. As in previous years the 2022 landing data are calculated by fleet according to the fleet definitions used by the working group (see section 3.1.3).

3.1.3 Fleets

One of the unresolved issues from the benchmark in 2018 was the definition of the fleets, which differs between years and countries (ICES WKPELA, 2018).

The definition of the fleets in the EU TAC and quota regulation, since 1998 (e.g., EU 2017/127 and 2016/1903)

Fleet C: Catches of herring in Kattegat and Skagerrak taken in fisheries using nets with mesh sizes equal to or larger than 32 mm.

Fleet D: Exclusively for catches of herring in Kattegat and Skagerrak taken as bycatch in fisheries using nets with mesh sizes smaller than 32 mm.

Fleet F: Not defined directly in the regulation, but landings from subdivisions 22–24. Most of the catches are taken in a directed fishery for herring and some as bycatch in a directed sprat fishery

The definition used by HAWG, since 2010.

Fleet C: Directed fishery for herring in Kattegat and Skagerrak in which trawlers (with 32 mm minimum mesh size) and purse-seiners participate. This fleet also includes the Swedish fishery with mesh sizes less than 32 mm assuming that there is no difference in age structure of the landings between vessels using different mesh sizes.

Fleet D: Bycatch of herring in Kattegat and Skagerrak in the industrial fleet and only including Danish landings. Covering all fisheries with mesh sizes less than 32 mm e.g., the sprat fishery, but also including other fisheries where herring is landed as bycatch e.g., Norway pout, sandeel and blue whiting fisheries.

Fleet F: Landings from subdivisions 22–24. Most of the catches are taken in a directed fishery for herring and some as bycatch in a directed sprat fishery.

Following changes in the management of fishing opportunities of herring in 3a in 2022, the fishery had the possibility to transfer up to 100% of the EU human consumption TAC and 50% of the by catch small mesh fishery TAC to the North Sea. This resulted in a decrease of herring catches in all the main fisheries conducted in 3a, but also altered the relative contribution of the small and large mesh size fisheries to the herring catches in the area. In 2022, the relative importance of small and large mesh size fisheries in 3a became more comparable, with 35% of herring catches as bycatches in the small mesh fishery (48% in the Swedish fishery). To reflect this emerging pattern, the Swedish fishery with mesh sizes less than 32 mm was included in the 2022 D-fleet catches together with the Danish landings.

In Table 3.1.2 the landings are given for 2004 to 2022 in thousands of tonnes by fleet (as defined by HAWG) and quarter.

The text table below gives the TACs and Quotas (t) for the fishery by the C- and D-fleets in Division 3.a and for the F-fleet in subdivisions 22–24.

	TAC	**DK**	**GER**	**FI**	**PL**	**SWE**	**EC**	**NOR**
2022								
Div. 3.a fleet-C	1 136	554	8			407	969	167
Div. 3.a fleet-D	6 659	5 692	51			916	6 659	
SD 22–24 fleet-F	788	110	435	0	103	140	788	
% of 3.a fleet-C can be taken in 4 EU waters							-100%	
% of 3.a fleet-C can be taken in 4 Norwegian waters								-100%
% of 3.a fleet-D can be taken in 4	50%							
	TAC	DK	GER	FI	PL	SWE	EC	NOR
2023								

	TAC	DK	GER	FI	PL	SWE	EC	NOR
Div. 3.a fleet-C	2 248	559	7			403	969	310
Div. 3.a fleet-D	6 659	5 692	51			916	6 659	
SD 22–24 fleet-F	788	110	435	0	103	140	788	
% of 3.a fleet-C can be taken in 4 EU waters							-100%	
% of 3.a fleet-C can be taken in 4 Norwegian waters								-100%
% of 3.a fleet-D can be taken in 4	50%							

3.1.4 Regulations and their effects

Before 2009, HAWG has calculated that a substantial part of the catch reported as taken in Division 3.a in fleet C actually was taken in Subarea 4. These catches have been allocated to the North Sea stock and accounted for under the A-fleet at earlier HAWG meetings. Misreported catches have been moved to the appropriate stock for the assessment. However, from 2009 and on onwards, information from both the industry and VMS estimates suggests that this pattern of misreporting does no longer occur. Therefore, no catches were reallocated from Division 3.a to the North Sea for catches taken in 2022.

Since 2011 the EU-Norway agreement allowed 50% of the Division 3.a quotas for human consumption (Fleet C) to be taken in the North Sea. The optional transfer of quotas from one management area to another introduces uncertainty for catch predictions and thus influence the quality of the stock projections. To decrease the uncertainty industry agreed in the 2013 benchmark to inform HAWG prior to the meeting of the assumed transfer in the intermediate year. In the last few years this information has proved to be highly valuable and consistent with the realized distribution of the catches.

In 2021, 2022 and 2023, following the agreed record from the bilateral consultations between the EU and Norway for Skagerrak, the C-fleet inter-area flexibility from Division 3.a to Subarea 4 has been increased to 100%, and a flexibility of 50% has been given to the D-fleet, in order to protect WBSS herring. In addition, in 2022 and 2023, EU committed to limit overall herring catches in Division 3.a to 969 t and Norway to limit those to 167 t in 2022 and 310 t in 2023.

The quota for the C fleet and the bycatch TAC for the D fleet are set for the NSAS and the WBSS stocks together. The implication for the catch of NSAS must also be considered when setting quotas for the fleets that exploit these stocks.

3.1.5 Changes in fishing technology and fishing patterns

The amount of WBSS herring taken as bycatch in the D-fleet has been varying between years depending on the utilization of the bycatch TAC and the proportion of WBSS in the catches. In 2022 the amount of WBSS taken was 35 t, which is the lowest recorded catch. However, the TAC utilization was 3.8% being also the lowest recorded utilization. Prediction of TAC utilization is further complicated by the merging of the sprat stocks in 3.a and the North Sea (ICES 2018) with

a common management and the optional transfer of 50% of the herring bycatch quota from the D-fleet in 3.a to the B-fleet in the North Sea.

3.1.6 Winter rings vs. ages

To avoid confusion and facilitate comparability among herring stocks with different "spawning style" (i.e., NSAS) the age of WBSS, as well as other HAWG herring stocks, is specified in terms of winter rings (wr) throughout the entire assessment and advice. In the case of WBSS perfect correspondence exists between wr and age with no actual risk of confusion, so that a wr 1 is also an age 1 WBSS herring.

3.2 Biological composition of the landings

The 1 365 t of landed herring were submitted stratified by area, fleet, and quarter, resulting in 52 strata with landings. 11 of these strata were sampled - accounting for 47% of the landings. Some strata with relatively large amounts of landings were unsampled and only 2 samples were from Skagerrak and Kattegat (Table 3.2.1). Further, it seems like it is getting more and more difficult for countries to sample the trawler landings in the F fleet, most of the samples are from the passive fleet (Table 3.2.2). Unsampled strata accounted in total for 728 t and samples from either other nations or adjacent areas and quarters, and for the first time in recent years, samples from the previous year were used to estimate catch in numbers and mean weight-at-age (Table 3.2.2).

Table 3.2.3 show the total catch in numbers and mean weight-at-age in the catch for herring by area. quarter and fleet landed

Based on the proportions of spring- and autumn-spawners in the landings, catches were split between NSAS and WBSS (Table 3.2.4 and the stock annex for more details).

The total numbers and mean weight-at-age of the WBSS and NSAS landed from Kattegat and Skagerrak were then estimated by quarter and fleet (NSAS in Table 3.2.5 and WBSS in Table 3.2.6).

In 2022, the age composition for the A-fleet in the transfer area was taken directly from the transfer area rather than from the entire Division 4aE given that samples were available in the Norwegian catches.

The total catch, expressed as SOP, of the WBSS taken in the North Sea + Division 3.a in 2022 was estimated to be 5 614 t, which represents a decrease of 55% compared to 2021 (Table 3.2.7).

Total catches of WBSS from the North Sea, Division 3.a, and subdivisions 22–24 by quarter, were estimated to be 6 251 for 2022 (Table 3.2.6). Additionally, the total catches of WBSS in numbers and tonnes, divided between the North Sea and Division 3.a and subdivisions 22–24 respectively for 1993–2022, are presented in table 3.2.7.

The total catch of NSAS in Division 3.a amounted to 515 t in 2021, which represents the lowest value in the 28-year time-series (Table 3.2.8).

The catches of WBSS and NSAS from Subdivision 4.aE and Division 3.a in 2022 were reallocated to the appropriate stocks as shown in the text table below:

Area	WBSS (tonnes)		NSAS (tonnes)	
Subdivision 4.aE (A-fleet)	5 402		85 521	
Division 3.a	C-fleet	D-fleet	C-fleet	D-fleet

	180	32	296	219

Catches of WBSS and NSAS from the 4.aE transfer area since 2021 are shown in text table below:

Year	NSAS (t)	WBSS (t)
2021	7 906	3 505
2022	85 521	5 402

3.2.1 Quality of Catch Data and Biological Sampling Data

No quantitative estimates of discards were available to the Working Group from all countries. During the 2022 meeting one country checked their estimated discard of herring in the demersal, *Nephrops* and shrimp fisheries in SD 20-24, and for 2020 the estimated discard constituted 1% of the landings, so an insignificant amount. Therefore, the overall amount of discards for 2022 is assumed to be insignificant, as in previous years.

Table 3.2.1 shows the number of fishes aged by country, area, fishery, and quarter. The overall sampling in 2022 meets the recommended level of one sample per 1000 t landed per quarter, but the coverage of areas, times of the year and gear (mesh size) is problematic, since landings from Kattegat and Skagerrak and the trawlers in area 22-24 are so poorly covered that it was necessarily to use samples from 2021, see section before.

Splitting of 2022 catches into WBSS (Spring spawners) and NSAS (Autumn spawners) in Division 3.a was based on genetic analyses for both Swedish and Danish catches. The use of genetic methods (Sweden used otolith microstructure (OM) until 2021) provides higher resolution in the separation of the main spawning components and a more consistent method of stock assignment now that it is implemented by all the countries with catches in this division. In particular, the winter spawning component from the Downs can be specifically identified and allocated to the catches of the NSAS herring stock while the previous method based on OM was unable to partition this spawning component from other winter spawners which are likely to occur in 3.a (Rosenberg and Palmen 1981).

For Danish data, a genetic stock identification method was used to classify individual fish to genetic stock origin. The total sample size for hatch type was 2028 (674 Danish and 1354 Swedish) with 70% of the samples in Subdivision 20 (Skagerrak) and 30% in Subdivision 21 (Kattegat). Sampling from the Danish fishery had a lower coverage of quarters and subdivisions than sampling of the Swedish fishery. Proportions of WBSS in sampled age classes were weighted by the national catches in the respective quarters and subdivisions. The sampling did not cover all age classes and thus proportions were estimated using information from relevant adjacent age classes, or from cruises in the same quarter and subdivision. Proportions were estimated for commercial catch by country, wr, quarter, and subdivision by a logistic mixed effects regression model. The default model included wr, subdivision, quarter, and cruise as fixed effects and had a random intercept varying by trip/haul[1]. Both commercial and survey samples from both countries were used in the analysis. Due to the properties of the available samples in 2022, it was necessary to combine commercial and IBTS samples in the Cruise factor as well as wr 0 Quarter 3 and wr 0 Quarter 4 in the wr0Quarter. Total composition estimates per wr, quarter, and subdivision were calculated as a weighted average of the country-wise estimates. Total estimates were

[1] In the R formula syntax, the regression model is ~ bs(wr,3) + bs(wr,3) * SubDivision + bs(wr,3) * Cruise + bs(wr,3) * Quarter + wr0Quarter + (1|TripID), where bs(-,3) is a B-spline with 3 knots, and wr0Quarter is a factor with a level per quarter for 0 wr and a combined level for 1+ wr. Winter rings were capped at 8 in the analysis.

only calculated for combinations of wr, quarter, and subdivision with catches. For combinations with Danish or Swedish catches, the country-wise estimates were weighted by the catches. For combinations without Danish and Swedish catches, country-wise estimates were weighted by the sum of catches for the relevant quarter and subdivision.

Random samples of 751 individual herring from Norwegian, Danish and Swedish commercial catches in the "transfer area" in 4.aE are analysed for size at age distribution and stock affiliation based on a genetic stock identification method using an extended SNP panel comparable to Bekkevold et al. 2023. In addition, Norwegian and Danish samples from HERAS and Swedish IBTS samples are included (1510 individuals). A common baseline with small deviations was used for stock identification for Danish/Swedish and Norwegian samples. Based on expected OM/vertebral series counts, genetic stock origin was converted to NSAS/WBSS to continue the historical time series. Catches from the so called "transfer area" are split into proportions of NSAS and WBSS by quarter and wr based on a logistic mixed effects regression model.

A total of 90 923 tonnes of herring was caught in the transfer area in 2022, with catches constituting 83% in quarter 2 and 12% in quarter 3.

For quarter 2 and 3, the same split was applied based on the combined samples from surveys and the fishery in the transfer area (2043 fish). This was done under the assumption that the fishery is restricted to the same period as HERAS/IBTS in June and July and would catch similar proportions of the two stocks in this period. The default regression model included a B-spline on wr with 5 knots and additional dummy variables for commercial samples wr 1, 2, and 3 to account for different selectivities. Finally, a random intercept varying by trip/haul was included. Due to the properties of the specific samples available for 2022, it was necessary to reduce the number of spline knots to 3 to ensure the model was identifiable and converged properly.

Due to lack of sampling data in 2022 the split for quarters 1 and 4 had to be carried over from 2021. Quarter 1 and 4 estimates from 2021 were based on data from the time-series of samples from the commercial fishery with respectively 48 (from 2016 Q1) and 342 herring (from Q4 in 2008, 2012 and 2014) available for the analysis.

Based on the splitting method, 5402 tonnes of WBSS herring were caught in the transfer area in 2022.

There are clear indications from weight at age of mixing with Central Baltic herring in catches from SD 24 throughout the year from most of the countries. However, the catches are dominated by the German directed fishery in the spawning areas where mixing is likely to be minimum.

Catch data were not corrected for this mixing neither for potential catches of Western Baltic Spring-spawning herring in SD 25–26.

3.3 Fishery-independent Information

3.3.1 German Autumn Acoustic Survey (GERAS) in subdivisions 21-24

As a part of Baltic International Acoustic Survey (BIAS); the German autumn acoustic survey (GERAS) was carried out with R/V "SOLEA" between 5–24 October 2022 in the Western Baltic, covering subdivisions 21, 22, 23 and 24. A survey report is given in the report of the 'ICES Working Group of International Pelagic Surveys' (ICES WGIPS, 2022). In the western Baltic, the distribution areas of two stocks, the Western Baltic Spring Spawning (WBSS) herring and the Central Baltic herring (CBH) overlap. Survey results indicated in the recent years that in SD 24, which is part of the WBSS herring management area, a considerable fraction of CBH is present and correspondingly erroneously allocated to WBSS stock indices (ICES 2013/ACOM:46). Accordingly, a stock separation function (SF) based on growth parameters in 2005 to 2010 has been

developed to quantify the proportion of CBH and WBSS herring in the area (Gröhsler et al., 2013; Gröhsler et al., 2016). The estimates of the growth parameters from baseline samples of WBSS and CBH in 2011-2018 and 2020-2022 support the applicability of the SF (Oeberst et al., 2013; WD/WGIPS Oeberst et al., 2014, 2015; WD/WGBIFS Oeberst et al., 2016, 2017; WD/WGBIFS Gröhsler and Schaber, 2018, 2019; WD/WGIPS Gröhsler and Schaber 2021, WD/WGIPS Gröhsler and Schaber 2022, WD/WGIPS Haase and Schaber 2023). The applicability of the SF could not be test-ed in 2019 due some higher degree of mixing of CBH/WBSS in the baseline area of WBSS herring in SDs 21 and 23.

Haul 33 (41G2, SD 23) targeting a large aggregation of herring yielded a substantial sample of almost exclusively large herring a high proportion of individuals that were preparing to spawning (maturity 4-6), and already spent (maturity 8). Since the herring could not be allocated to WBSS, both the hydroacoustic data from that aggregation as well as the biological data from haul 33 were removed from the further analysis for producing a biomass and abundance estimate for WBSS. Genetic samples have been taken and are currently being analysed to identify stock origin of that herring.

Individual mean weight, total numbers and biomass by age as estimated from the GERAS-Index (covering the standard survey area, which generally excludes 43G1/43G2 in SD 21 and 37G3/37G4 in SD 24) are presented in Table 3.3.1. The Western Baltic spring spawning herring GERAS-Index including age classes 1-4 in 2022 was estimated to be 0.25 x 10^9 fish or about 15.79 x 10^3 tonnes in subdivisions 21–24. The biomass index in 2022 represents the lowest in the time series.

The time-series has been revised in 2008 (ICES 2008/ACOM:02) to include the southern part of SD 21. The years 1991–1993 were excluded from the assessment due to different recording method and 2001 was also excluded from the assessment since SD 23 was not covered during that year (ICES 2008/ACOM:02).

Age (wr) classes (1–4) are included in the assessment.

3.3.2 Herring Summer Acoustic Survey (HERAS) in Division 3.a and the North Sea

The Herring acoustic survey (HERAS) was conducted from 22 June to 21 July 2022 and covered the Skagerrak and the Kattegat and the North Sea. The 2022 estimate of Western Baltic Spring Spawning herring 3+ group is 77 000 tonnes and 483 million. Compared to the 2021 estimates of 82 000 tonnes and 639 million fish, this equals a decrease of 24% in biomass. In 2021 the stock was dominated by 2 and 3 winter ring fish. In 2022 these same two year-classes, now at 3 and 4 winter rings together still account for 33% of the total stock. The single largest age component in 2022 however was 2 winter ring fish that accounted for 32% despite the almost complete lack of 1 winter ring fish in 2021. The numbers of older herring (3+ group) accounted for 62% of the total stock in 2022. The results from the HERAS index are summarised in Table 3.3.2.

The 1999 survey was excluded from the assessment due to different survey area coverage.

Ages (wr) 3–6 are used in the assessment.

3.3.3 Larvae Surveys (N20)

Herring larvae surveys (Greifswalder Bodden and adjacent waters; SD 24) were conducted in the western Baltic Sea at weekly intervals during the 2022 spawning season (March–June). The larval index was defined as the total number of larvae that reach the length of 20 mm (N20; Table 3.3.3; Oeberst et al., 2009). With an estimated product of **6 603** million larvae, the 2022 N20 recruitment index is about 1 200 million higher than the time series mean and more than 25 times

higher than that of the record low in 2020. It is the highest value since 2010 (for further details see WD Polte, Kotterba and Haase, HAWG 2022).

The larval index is used as recruitment index age (wr) 0) in the assessment.

3.3.4 IBTS/BITS Q1 and Q3-Q4

Since the recent benchmark (ICES, WKPELA 2018), the IBTS and the BITS data are combined according to the standardization methodology proposed by Berg et al., (2014) (hauls showed in Figures 3.3.1-3.3.2). In addition to the standardization model, two extra modelling steps are included, which consist of splitting the survey length and age data by stock using subsamples of stock- identified individuals (limited to the IBTS and not for the BITS). First, the length distributions are split by haul into WBSS / non-WBSS. Next the individual age samples are split into WBSS / non-WBSS. This gives a stock-specific ALK, which is used to convert the split length distributions from the first step into numbers-at-age by haul. Stock proportions for splitting are based on otolith microstructure (OM) until 2021 and genetics in 2022 from the IBTS samples. The genetic assignment (7 spawning components) was harmonised to the spawning type (3 spawning types) inferred by the OM which assume that only OM4 (Spring-spawning) contribute to the WBSS fraction, while OM9 and OM12 (Autumn and Winter spawning) are considered non-WBSS as follows:

Genetic component	OM spawning type	stock
Baltic Autumn	Autumn (OM9)	NSAS
Central Baltic Spring	Spring (OM4)	WBSS
Downs	Winter (OM12)	NSAS
North Sea Autumn	Autumn (OM9)	NSAS
Norwegian Spring	Spring (OM4)	WBSS
Western Baltic Spring	Spring (OM4)	WBSS

The same formulation was used for the presence/absence and positive parts of the Delta-Lognormal model:

$g(\mu i) = Year(i) + Gear(i) + f1(loni; lati) + f2(Depthi) + f3(timei) + log(HaulDuri)$

where Gear(i) and Year(i) maps the ith haul to categorical gear/year effects for each age group.

Age (wr) classes (1–3) and (2-3) from the surveys in Q1 and Q3-4 are included in the assessment

3.4 Mean weights-at-age and maturity-at-age

Mean weights at age in the catch in the 1st quarter were used as estimates of mean weight-at-age in the stock (Table 3.2.6).

The maturity ogive of WBSS applied in HAWG has been assumed constant between years and has been the same since 1991 (ICES 1992/Assess:13), although large year-to-year variations in the percentage mature have been observed (Gröhsler and Müller, 2004). Maturity ogive has been investigated in the recent benchmark assessment of WBSS (ICES 2013/ACOM:46). WKPELA in 2013 decided to carry on with the application of the constant maturity ogive vector for WBSS.

The same maturity ogive was used as in the last year assessment (ICES CM 2018/ACOM:07):

W-rings	0	1	2	3	4	5	6	7	8+
Maturity	0.00	0.00	0.20	0.75	0.90	1.00	1.00	1.00	1.00

3.5 Recruitment

Indices of recruitment of 0-ringer WBSS for 2022 were available from the N20 larval surveys (see Section 3.3.3).

The strong correlation of the N20 with the 1-wr group of the GERAS ($R^2 = 0.73$, Figure 3.5.1), which also shows a good internal consistency with the GERAS 2-wr group, indicates that the N20 is a good proxy for the strength of the new incoming year class. Since 2010, the N20 recruitment index has been below the long-term average (1992–2021: 5 389 million). However, the 2022 N20 is (by 1 200 million) above the time series average. The 2022 N20 recruitment index is more than 25 times higher than that of the record low in 2020 and the highest value since 2010 (Table 3.3.3).

3.6 Assessment of Western Baltic spring spawners in Division 3.a and subdivisions 22–24

3.6.1 Input data

All input data can be found in Tables 3.6.1–3.6.8.

Only the input landings and weights data differ between the single and multi-fleet model, the rest of the input files are the same for both models.

3.6.1.1 Landings data

Catch in numbers-at-age from 1991 to 2022 were available for Subdivision 27.4.aEast (fleet A), Division 27.3.a (fleet C and D, respectively) and subdivisions 27.3.c–27.3.d.24 (fleet F) (Table 3.6.1.a–d). Years before 1991 are excluded due to lack of reliable data for splitting spawning type and due to a large change in fishing pattern caused by changes in the German fishing fleets (ICES 2008/ACOM:02).

Mean weights-at-age in the catch vary annually and are available for the same period as the catch in numbers (Table 3.6.2.a–d; Figure 3.6.1.1). Proportions at age thus reflect the combined variation in weight at age and numbers-at-age (Figures 3.6.1.2 and 3.6.1.3).

3.6.1.2 Biological data

Estimates of the mean weight of individuals in the stock (Table 3.6.3 (taken from weights in catches in Q1) and Figure 3.6.1.4) are available for all years considered. Since 2019, the mean weight at age in the stock has increased. It is believed to be an artefact of the increase proportion of NSAS herring in the samples and increased proportion of catches from the eastern part of the North Sea which biased positively these values. An attempt to correct this will be performed at the next benchmark.

Natural mortality was assumed constant over time and equal to 0.3, 0.5, and 0.2 for 0-ringers, 1-ringers, and 2+ -ringers respectively (Table 3.6.4). The estimates of natural mortality were derived as a mean for the years 1977–1995 from the Baltic MSVPA (ICES 1997/J:2) as no new values were available as confirmed in the recent benchmark.

The percentage of individuals that are mature is assumed constant over time (Table 3.6.5): ages (wr) 0–1 are assumed to be all immature, ages (wr) 2–4 are 20%, 75% and 90% mature respectively, and all older ages are 100% mature.

The proportions of fishing mortality and natural mortality before spawning are 0.1 and 0.25 respectively and are assumed to be constant over time (Table 3.6.6–7). The difference between these two values is due to differences in the seasonal patterns of fishing and natural mortality.

3.6.1.3 Surveys

Surveys indices used in both the model runs can be found in Tables 3.6.8a–e.

According to the last benchmark of WBSS (ICES WKPELA, 2018), the following age (w-rings) classes (in grey) are used from each survey to tune the assessment of this stock:

Survey	0	1	2	3	4	5	6	7	8+
HERAS									
GERAS									
N20									
IBTS/BITS Q1									
IBTS/BITS Q3-4									

3.6.2 Assessment method

Since the 2018 benchmark (ICES WKPELA, 2018), the WBSS assessment is based on the state-space multi-fleet assessment model SAM. The assessment model presents one fishing mortality matrix for each of the four fleets fishing WBSS herring (A, C, D, and F). The model is designed to handle fleet disaggregated catches, which are available only from year 2000 while the model is run over the time period 1991–2022. The current implementation is an R-package based on Template Model Builder (TMB) and can be found at https://github.com/fishfollower/SAM (branch "multi"), more details in Nielsen et al. 2021.

The benchmark found consistent estimates of SSB, F and Recruitment as well as combined age selections between the multi- and the single-fleet SAM using comparable model settings.

The disaggregation of the fishing catches in the multi-fleet SAM can bring problems of convergence due to the increase of zeros in the fleet observed catches, which are ignored by the model since zeros cannot be fitted with a lognormal distribution. It is therefore important to compare the outputs of both the single and the multi-fleet models every year and check that the results are consistent between the models. For this year update assessment, the corresponding single fleet version is available with a configuration as close as possible to the multi-fleet model. The single fleet model output is represented as an overlay in the SSB, F, recruitment, and total catch plots in the multi-fleet output. Both the multi-fleet (WBSS_HAWG_2023) and the single fleet (WBSS_HAWG_2023_sf) outputs are available at www.stockassessment.org.

Details of the software version employed are given in Table 3.6.9.

3.6.3 Assessment configuration

The model configuration was set as specified in Table 3.6.10.

During the 2020 assessment, problems of convergence occurred with the multifleet model when adding the 2019 data due to difficulties estimating the variance parameter of the F process for the C-fleet (logSdLogFsta). Coupling the variance parameters for all fleets so only one logSdLogFsta

parameter is estimated as a first run and then running the model with the original configuration removed the problem of convergence since 2020.

During the 2018 benchmark it was chosen to replace missing data in catches at age for all fleets by a small value (1 tonne). In addition to the method described in the previous paragraph, removing this constraint for the C-fleet and letting the model handling the zeros as missing data enabled the convergence of the 2021 assessment model.

There was no problem of convergence since 2022 in the multifleet model.

3.6.4 Final run

The results of the assessment are given in Tables 3.6.11–3.6.14. The estimated SSB for 2022 is 75 548 [52 770, 108 157 (95% CI)] t. The mean fishing mortality (ages 3–6) is estimated as 0.05 [0.022, 0.114 (95% CI)] yr-1. This means that the F_{3-6} is estimated to be below F_{MSY} and F_{pa}, and below F_{lim}.

After a marked decline from almost 300 000 t in the early 1990s to a low of about 120 000 t in the late 1990s, the SSB of this stock was above 120 000 t in the early 2000s (Figure 3.6.4.1). After a small peak in 2006 coinciding with the maturing of the last major year-class, the SSB has declined up to 2011 with a SSB of 68.1 kt. SSB has only slightly increased in the following period up to 88.2 kt in 2015 and then has declined to 51.4 kt in 2019, which is the lowest SSB of the time-series. A slight increase in SSB was then estimated since 2020 to around 75.5 kt in 2022.

Fishing mortality on this stock was high in the mid-1990s, reaching a maximum of 0.67 yr-1 in 1996. In 1999–2009, F_{3-6} stabilized between 0.45 and 0.61. In 2010 and 2011, F_{3-6} decreased significantly to a value of 0.43 and 0.29 yr-1, respectively. It stabilized between 0.32 and 0.41 yr-1 for few years until it increased again above 0.52 yr-1 from 2016 to 2018. F_{3-6} then decreased to 0.28 yr-1 in 2019, 0.19 yr-1 in 2020, 0.11 in 2021 and finally 0.05 in 2022, which is the lowest estimated F_{3-6} of the entire time series (Table 3.6.11, Figure 3.6.4.2). This coincides with a change in regulation in Division 3.a that allows since 2021 100% transfer of the human consumption quota to the North Sea.

Recruitment was the highest (~3-5 billion) at the beginning of the time-series (1991-1999) and has been decreasing overall since 1999. The 2021 estimate of 454 304 thousand is the lowest on record and the estimate in 2022 has slightly increased to 537 470 thousand (Tables 3.6.11, Figure 3.6.4.3). However, this keeps being revised downwards every year. The stock-recruitment plot for the WBSS stock (Figure 3.6.4.4) shows three distinct periods of recruitment with an early period of high recruitments varying between 3 and 5 billion coinciding with a declining SSB from 300 kt to 120 kt in the years 1991–1999 and no signs of density-dependence. This is followed by a distinct decline in recruitment to values below 3 billion at a relatively constant spawning-stock biomass between 120 and 160 kt over the period from 2000–2006. In the most recent period, from 2007 to 2022 recruitment has varied from about 1.5 billion to less than 0.9 billion at SSB between 51 kt and 113 kt, with a trend of declining recruitment in 2017-2021 and some slight increased recruitment in 2022.

The total catch is well fitted (Figure 3.6.4.5) as well as the catch per fleet (Figure 3.6.4.6) except for the fleet A where some observations are outside the confidence interval of the estimated catch. In 2021, the model started to accommodate the large catches of the A-fleet in 2019 and 2020 by an increase in the upper limit of the confidence interval on the catches for this fleet. Since 2021, the catch of the A-fleet is well fitted.

The estimated partial fishing mortalities show remarkable differences between the four fleets reflecting the targeted ages of the individual fisheries, increasing with age for the A-fleet and the F-fleet, whereas distinct peaks are found for the C-fleet and the D-fleet at ages 2 and 1-2 (wr) respectively (Figure 3.6.4.7). The fishing mortality increases in the recent years for the A-fleet but

has been decreasing for the other fleets following the ICES zero catch advice since 2018 and the subsequent decrease in quotas and increase in transferable quotas to the North Sea. The selectivity pattern for the D-fleet has a tendency of shifting its highest selectivity from age 1 to age 2 (wr) in later years. Total fishing mortality on the WBSS stock increased with herring age and is variable over time (Figure 3.6.4.8). A clear decrease in fishing mortality at age is seen since 2019 with F well below F_{MSY} since 2020.

The model was constrained to have the same selectivity for the two oldest ages (wr) 7+ in all fleets. The fishing mortality was assumed to be independent across ages for the A-fleet (see $corFlag in Table 3.6.10). The estimated correlation parameter in the F random walk for the C-fleet was estimated to a very high value, which caused convergence problems in initial runs during the benchmark, and it was therefore assigned a fixed high value in the subsequent assessment runs resulting in parallel selection patterns.

The estimated survey catchability is rather different among the surveys (Figure 3.6.4.9). The HERAS and the GERAS surveys are relatively constant over the applied ages (wr) 3–6 and 1–4 respectively. Whereas both IBTS+BITS-Q1 and -Q3.4 surveys show, sharp declines with increasing ages 1–3 and 2–3, respectively. Interpretation of the different catchability patterns is complex, and likely, several reasons including ontogenetic differences in the spatial distribution and behaviour of the different age classes at the time of the surveys may affect their relative availability to the different samplings.

The surveys present some strong correlations notably between the older ages (Figure 3.6.4.10). The same is observed for fleets C and F. The tracking of each cohort can be observed in Figure 3.6.4.11.

The F-fleet (ages 1-8+) has a lower observation variance than the GERAS and the HERAS, the C-fleet (ages 2-8+) is lower than the IBTS+BITS- Q3.4 surveys variance, the IBTS+BITS-Q1 and the N20. Both the D-fleet and the A-fleet have very high observation variances, as well as the age 0 for all fishing fleets (Figure 3.6.4.12).

Residuals for catch in different fleets generally show poorer fit to the youngest year-classes 0–1 wr (Figure 3.6.4.13). The A-fleet shows large positive residuals in 2019-2020 showing that the model underestimates the catches-at-age in those years. The inverse is observed for the C-fleet with large negative residuals in 2019 for ages 3-8+, showing an overestimation of the catches for these ages. The F-fleet presents large negative residuals for ages 0-1 over the entire time-series. Further, the fit by fleet to some degree follows the catches in the fleets with increasingly better fit from A-fleet, D-fleet, C-fleet to the F-fleet (Figures 3.6.4.14–3.6.4.17). The fit to the combined fleets at the beginning of the time-series follows the observations to some degree except for the two youngest age classes 0–1 wr, which exhibit a rather poor fit. (Figure 3.6.4.18).

Inspection of model diagnostics shows the occurrence of high residuals in some years for the surveys (e.g., 2018-2022 in the GERAS and 1991 and 2013–2014 in HERAS; Figure 3.6.4.13). Overall, the agreement between the data and the fitted model appears acceptable throughout the data sources, which are most influential in the model. The individual survey diagnostics show some differences in how the model fit the different survey data, and the level of fitting is widely in agreement with the estimated observation variance for each data component (Figures 3.6.4.19–23). In general, a similar fit is found for all included ages (wr) 3–6 of the HERAS index (Figure 3.6.4.19). In recent years, GERAS shows a clear drop in observed indices for ages (wr) 1–4 that are poorly fitted and show therefore large negative residuals (Figures 3.6.4.13 and 3.6.4.20). The model picks up the overall negative trend of the recruitment index (N20) and is conservative on the high index value estimated in 2021-2022 which are the largest observed since 2013 (Figure 3.6.4.21). Poorer fit is observed for the IBTS+BITS-Q1 for all ages (wr) 1–3, over the entire time-series (Figure 3.6.4.22) and likewise to the IBTS+BITS-Q3.4 for the two ages (wr) 2–3 (Figure 3.6.4.23) with large positive residuals for age (wr) 2 in recent years (Figure 3.6.4.13).

Retrospective patterns are of the same order of magnitude as last year assessment (Figure 3.6.4.24-27). The SSB has a 5 years Mohn's rho of 16% (compared to 21% in 2022) but the retrospective estimates are considerably improved for the 1- to 3-year peels remaining inside the confidence intervals of the SSB estimates. Average fishing mortality retrospective estimates are also outside the confidence bounds for F for the 4 to 5-year peels (Mohn's rho = -4% compared to -14% in the 2022 assessment, Figure 3.6.4.25). The retrospective for recruitment is acceptable having a Mohn's rho = 6% (11% in 2022, Figure 3.6.4.26). Retrospective is very small for total catch (Figure 3.6.4.27).

Since the 2019 assessment, the GERAS survey indices have been the most influential of all surveys on the estimated decrease in the stock. While the GERAS indices are still low in 2022 and continue to show the largest contribution to the estimated SSB level, the small SSB increase in 2022 appear independent from any individual specific survey (Figures 3.6.4.28–31).

Since 2022, the age composition for the A-fleet is taken directly from the transfer area rather than from the entire Division 4aE given that samples are available in the Norwegian catches. Sensitivity runs were performed in 2022 and the same method was used this year without repeating the sensitivity.

The consideration of the haul with spawning fish (SD23) was discussed in depth this year. In 2021, the haul was removed because most of the fish were mature (stage>=6), but the year before only the mature fish were removed. This 2021 sample was this year genetically analysed to be mainly NSAS herring. Two indices were available for 2022, one excluding the haul and the other one including it. However, there was no index available using the usual assumption of only removing the mature fish (stage >=6) since some of these fish could still be WBSS. It was discussed to maybe look at the entire time series at the next benchmark (planned for 2025) and see if we can agree on a method to handle this haul in the acoustic data.

A haul with spawning fish in SD23 has been seen for a few years during the GERAS survey. The haul was removed from the 2021 index because most of the fish were mature (stage>=6), but in 2020, only the mature fish (stage>=6) were removed. This 2021 sample was this year genetically analysed and found to be mainly NSAS herring. Two indices were available for 2022, one excluding the haul and the other one including it. The baseline model (WBSS_HAWG_2023) uses the index excluding the haul but a sensitivity run is available on stockassessment.org (WBSS_HAWG_2023_GerasInclHaul) where the haul is included, and the plots show the difference between both outputs. The main difference in index is on age 2. Both models give very similar outputs but the number at age 2 are larger for the sensitivity run so the differences might increase in future years when the ages enter the SSB. It was agreed to keep the baseline assessment using the index with exclusion of the haul as final assessment and the GERAS time series will be investigated further for the next WBSS benchmark.

3.7 State of the stock

The stock was benchmarked in 2018 with a substantial increase in the chosen value of B_{lim} and a slight downwards revision of the SSB levels. The stock has decreased consistently from mid 2000s to a historical low in 2019 (Tables 3.6.11, Figure 3.6.4.1). With the new B_{lim} (120 kt) the stock has been in a state of impaired recruitment since 2007 but since 2021 is showing a small sign of recovery.

The 2018 benchmark calculated a new F_{MSY} of 0.31. Fishing mortality ($F_{3–6}$) was reduced between 2008 and 2011 from 0.57 to 0.29 (Tables 3.6.11, Figure 3.6.4.2). $F_{3–6}$ has then remained stable above F_{MSY} until 2018 (0.32-0.57). $F_{3–6}$ has decreased since 2019 from 0.28 to 0.05 in 2022, which is the lowest $F_{3–6}$ on records.

Recruitment has been declining since 2014 with a historical low value in 2021 of 454 304 thousand (Tables 3.6.11, Figure 3.6.4.3). Recruitment increased to 537 470 thousand in 2022. Despite the increase in 2022, recruitment is still low compared to the average of the time series and the final recruitment was revised downward this year compared to last year assessment. Low fishing mortality should continue to support a slow rebuilding of the stock given the present levels of low recruitment.

3.8 Comparison with previous years perceptions of the stock

The table below summarizes the differences between the current and the previous year assessment. The addition of the 2022 data resulted in a negative change in the perception of the stock back in time compared to last year assessment of around 0.7-1.8%. The recent estimates of recruitment have however increased by 10 % in the current assessment and F appears to be larger than previously estimated in 2020 (+2.7%) but smaller in 2021 (-34.0%).

Parameter	Assessment in 2022	Assessment in 2023	Difference (2023-2022)/2023
SSB (t) 2020	54 606	53 628	-1.82%
$F_{(3–6)}$ 2020	0.182	0.187	2.67%
Recr. ('000) 2020	550 822	612 037	10.00%
SSB (t) 2021	62 765	62 343	-0.68%
$F_{(3–6)}$ 2021	0.149	0.111	- 33.96%

3.9 Short-term predictions

Short-term projections are possible both as stochastic and deterministic forecasts. While SAM runs with parameter values represented by percentiles, forecasts in multi-fleet SAM have to switch to a representation by means and standard deviations in order for catches in the individual fleets to add up the totals predicted. However, to be in line with the median representation, all values would have to be recalculated back from the representation by means. Although statistically correct, the HAWG did not want to perform these operations without a prior scrutinizing of the effects on the presentation of the advice. Therefore, HAWG in line with all other assessments of the working group calculated deterministic predictions using that forecast option of the multi-fleet SAM and following the settings in the stock annex.

3.9.1 Input data

In the short-term predictions recruitment (0-winter ring, wr) is assumed to be constant, and it is calculated as the mean of the last five years prior the last year model estimate (i.e., for the 2023 assessment, recruitment for the forecasts was calculated on the period 2017–2021, see Table 3.9.1). For all older ages, the stock numbers are projected forward from the last data year to the intermediate year according to the estimated total mortalities based on fleet wise expected catches and natural mortalities. The mean weight-at-age in the catch and in the stock as well as the maturity ogive were calculated as the arithmetic averages over the last five years of the assessment (2018–2022). Based on earlier considerations in HAWG, the different periods were chosen to reflect recent levels in recruitment and weights.

3.9.2 Intermediate year 2023

A catch constraint was assumed for the intermediate year (2023). Predicted 2023 catch by fleet is summarized in the table below and depends on two main assumptions:

- Both NSAS and WBSS herring stocks are caught in the Division 3.a (C and D-fleets) and Subdivision 4.aE (A-fleet) whereas the subdivision 22–24 catch (F-fleet) is assumed to only be WBSS herring.
- The F-fleet utilizes its entire TAC in Subdivision 22-24.

Fleets	TAC 2023 NSAS+WBSS (t)	Predicted 2023 WBSS catch (t)	Predicted 2023 WBSS catch explained (t)
A	396 556	5 282	1.26% (396556+23250-(969+310))
C	23 250	439	57% (0.47x969+310)
D	6 659	154	30% (0.53x969)
F	788	788	100% 2023 TAC
Total	427 253	6 663	

Since the benchmark, the amount of WBSS taken in the transfer area by the A-fleet in the intermediate year was assumed equal to the observed average A-fleet catch over the last 3 years. From 2022, it was chosen to make the assumption for the A-fleet consistent with what is usually assumed for the NSAS advice. This year's assumption results in a total catch of WBSS herring of 5 282 t corresponding to the sum of the A-fleet TAC (396 556 t) and what is transferred from the C-fleet in Division 3.a to the North Sea (23 250 t), scaled by the 3-year average proportion of WBSS in A-fleet catch (1.26%, 2020-2022).

Since 2022, 100% of the human consumption herring quotas for the Division 3.a can be transferred to the North Sea, against 50% the previous years. This results in an important change in the assumed proportion of each fleet in the total WBSS catch compared to what was observed in the past. This is discussed further in part 3.12. The Council Regulation (EU) 2023/194 and the amendment on 17 March 2023 (EU 2023b) stipulate that the catches in Division 3.a should be limited to 1 279 t (969 t of EU catches + 310 t of Norwegian catches) in 2023 as the sum of directed and bycatch fisheries (C- and D-fleets). In 2022, due to difficulties predicted the proportion of each fleet in the total catch in 3.a and given the recent downward trends in the observed D-fleet catches, ICES considered that the bycatch in the D-fleet was negligible in 2022. In 2023, the knowledge acquired in 2022 was used to predict the split of catches in Division 3.a between the C- and D-fleets. Norwegian catches count against catches by the C-fleet, so the 969 t of EU share of the 2023 quota in 3.a are split by the proportion of each fleet in the total EU catches in 2022 (47% and 53% for C- and D-fleets, respectively). Additionally, the C-fleet catches also include the maximum agreed Norway catch of 310 t (10% of 3102 t). Both catches in the C- and D-fleets are scaled by the 3-year average proportion of WBSS in the C-fleet catch (57%, 2020-2022) and D-fleet catch (30%, 2020-2022), respectively.

The catch by the F-fleet fishing for human consumption in Subdivisions 22–24 is usually very close to the TAC and a utilization of 100% is assumed for the intermediate year, hence 788 t.

Misreporting of catches from the North Sea into Division 3.a is no longer assumed to occur after 2008. Therefore, no account was taken in the compilations.

These assumptions give the expected catch by fleet summing up to 6 663 t of WBSS herring in 2022.

3.9.3 Catch scenarios for 2024–2026

The inputs and outputs of the short-term predictions are based on a catch constraint in the intermediate year 2023 of 6 663 t and are given in Tables 3.9.1–3.9.17.

Different catch options for the years after the intermediate year were explored with fleet-wise selection patterns and deterministic forecasts. Before 2022, to most closely resemble current WBSS management, a constraint was added to the forecasts so that, after the intermediate year, for all scenarios (except for the constant intermediate year TAC, the F = 0 and the catch for bycatch fleets only scenarios) the F-fleet is assumed to get 50% of the total catch of WBSS herring. Since 2022, this constraint was removed since it is considered now not representative of the WBSS

management where most of the catch in Division 3.a can now be transferred to the North Sea and the A-fleet is now catching most WBSS herring, while the F-fleet catch keeps decreasing due to the decrease in TAC in Subdivisions 22–24.

3.9.4 Exploring a range of total WBSS catches for 2024 (advice year) to 2026

ICES gives advice according to the F_{MSY} approach for the WBSS stock. Because the forecasted SSB in 2025 is below B_{lim} (120 000 t) even when F=0, ICES advises a zero catch for 2024.

None of the catch scenarios for 2024, including zero catch, is expected to bring SSB above B_{lim} in 2025. For the past 3 years, besides requested standard scenarios HAWG also calculated the potential development of the stock projections for an extra year (2026) with different low F scenarios, where F2025 = F2024. None of these scenarios, even when F = 0, can bring the SSB above B_{lim} in 2026.

Since 2020, two new scenarios were requested by ACOM for zero catch advice stocks: (1) the "Catch for bycatch fleets only" scenario that was renamed this year to "Catch of WBSS by A- and D-fleets only" to avoid the confusion due to the fact that the A-fleet is not a bycatch fishery but a directed fishery for herring in the North Sea, and (2) a scenario where the biomass is constant between the advice year and the year after that. The first scenario is given in the Table below. Similarly, to last year the latter scenario was not run for the following reasons. For a stock with SSB calculated on the 1st of January (and the final year of assessment being 2022), this can be easily done because SSB in 2024 only depends on F in 2023 and F is estimated given a TAC constraint so is the same for all forecast scenarios. As a result, all scenarios tested in the short-term forecast would have the same SSB in 2024 and the F in 2024 can be estimated to obtain a SSB in 2025 equal to 2024. For WBSS, there are complications to this calculation because the advice is annual (Jan-Dec) but the SSB is calculated and reported at spawning time (spring). This means that SSB in 2024 is in fact the result of catches assumed (agreed TACs) for the intermediate year (2023) and some catches in the first months of 2024. In other words, the SSB in 2024 depends on F in 2023 but also on a fraction of the F in 2024, which is the advice year. What to assume for the first months of 2024 is the real issue here. For instance, if a zero catch is assumed in 2024 according to the advice, it will be uninformative because the table of advice would still only show the average F in 2024 (so F = 0). If an F that makes SSB 2024 = SSB 2023 is assumed for 2024, it will be an unrealistic high F needed to compensate for the low catches assumed in 2023. Given the reasons described above, the constant SSB between 2024 and 2025 scenario could not be meaningfully run for WBSS herring and is not included among the catch scenarios presented by the EG

Table number	Basis	Total catch (2024)	$F_{3–6}$ (2024)	SSB* (2024)	SSB* (2025)	% SSB change **	% advice change ***
ICES advice basis							
3.9.2	MSY approach: zero catch	0	0	92 726	103 649	12	0
Other scenarios							
3.9.3	EU Baltic Sea multiannual plan (MAP): F = F_{MSY} × SSB_{2023}/MSY $B_{trigger}$ ^	27 346	0.177	90 148	80 228	-11	
3.9.4	MAP: F = $F_{MSY\ lower}$ × SSB_{2023}/MSY $B_{trigger}$ ^	19 958	0.123	90 919	86 404	-5	
3.9.5	F = F_{MSY}	43 103	0.310	88 265	67 575	-23	
3.9.6	F = F_{pa}	52 915	0.410	86 889	59 887	-31	
3.9.7	F = F_{lim}	56 452	0.450	86 347	57 171	-34	
	SSB (2025) = B_{lim} ^^						
	SSB (2025) = B_{pa} ^^						
	SSB (2025) = MSY $B_{trigger}$ ^^						
3.9.8	F = F_{2023}	7669	0.044	92 074	96 985	5	
3.9.9	Catch of WBSS by A- and D-fleets only^^^	5436	0.028	92 275	99 119	7	

* For spring-spawning stocks, the SSB is determined at spawning time and is influenced by fisheries and natural mortality between 1 January and spawning time (April).
** SSB (2025) relative to SSB (2024).
*** The advised catch in 2022 was 0 tonnes.
^ Because SSB_{2023} is below MSY $B_{trigger}$, the F_{MSY} and $F_{MSY\ lower}$ values in the MAP are adjusted by the SSB_{2023}/MSY $B_{trigger}$ ratio.
^^ B_{lim} and B_{pa} cannot be achieved in 2025, even with zero catch.
^^^ Only the A-fleet that targets North Sea autumn-spawning (NSAS) herring but also catches WBSS herring in the eastern part of the North Sea, and the D-fleet that targets fish for reduction in Division 3.a, assuming the same catch as in the intermediate year 2023 (C- and F-fleets are directed WBSS fisheries so have zero catch in this scenario).

Table number	Basis	Total catch (2024)	Total catch (2025)	$F_{3–6}$ (2024)	SSB* (2024)	SSB* (2025)	SSB* (2026)	% SSB change (2024–2025)	% SSB change (2025–2026
Medium-term catch scenarios									
3.9.10	F = 0	0	0	0	92 726	103 649	115 511	12	11
3.9.11	F = 0.010	1800	2134	0.010	92 577	102 077	112 390	10	10
3.9.12	F = 0.025	4436	5125	0.025	92 355	99 783	107 946	8	8
3.9.13	F = 0.050	8667	9603	0.050	91 986	96 126	101 124	5	5
3.9.14	F = 0.100	16 559	16 944	0.100	91 254	89 386	89 360	-2	0
3.9.15	F = 0.150	23 768	22 576	0.150	90 529	83 326	79 630	-8	-4
3.9.16	Constant catch 2023–2025 **	6663	6663	0.038	92 162	97 926	105 128	6	7

* For spring-spawning stocks, the SSB is determined at spawning time and is influenced by fisheries and natural mortality between 1 January and spawning time (April).
** It is assumed that the fleets' 2023 catches (as defined in Table 1) are kept constant for 2024–2025.

3.10 Reference points

The WBSS stock was benchmarked in 2018 (ICES WKPELA, 2018) with subsequent changes of reference points. B_{lim} was revised from 90 000 to 120 000 t to take account of the new perception that recruitment is impaired when the spawning-stock biomass (SSB) is below 120 000 t. B_{pa} and MSY $B_{trigger}$ were subsequently set to 150 000 t. Using the EqSim software FMSY was estimated to 0.31, F_{lim} 0.45 (5% risk to B_{lim}) and F_{pa} 0.41 (since 2020, $F_{pa}=F_{p05}$; ICES, 2021). The values were based on stochastic simulation of recruitment generated on a combination of Beverton & Holt, Ricker and segmented regression (ICES 2014/ACOM:64).

3.11 Quality of the Assessment

The stock was benchmarked in 2018 (ICES, 2018), which led to a change in perception for the entire time-series. Similarly to the past two year, the 2023 assessment is very consistent with the 2022 assessment.

The herring assessed in subdivisions 20–24 is a complex mixture of populations predominantly spawning in spring, but with local components spawning also in autumn and winter. The population dynamics and the relative contribution of these components are likely to affect the precision of the assessment. Moreover, mixing between WBSS and central Baltic herring in subdivisions 22–24 may contribute to uncertainty in the assessment.

Inter-annual variability of the herring migration patterns and the distribution of the fisheries (including the optional transfer of quotas between divisions 3.a and 4) certainly add uncertainty to the assessment and forecasts of this meta-population. Since these cannot be predicted, recent average proportions between stocks are assumed in projections. It is expected that the implementation of genetic stock separation (which allows for identifying these smaller stock components) will improve data on their contributions to subdivisions 20-22 in years to come.

3.12 Considerations on the 2023 advice

This year assessment shows an SSB consistent with last year's assessment. Recruitment is still low but has slightly increased in 2022 (537 470thousands). However, this increase in recruitment can shift after updating the data, for example the increase in recruitment was in 2021 in last year assessment but is shifted to 2022 this year. Under these conditions the stock is not expected to increase above B_{lim} in the short-term (2025) nor in the medium-term (2026) for any level of fishing mortality (SSB_{2026} = 115 511 t assuming F = 0).

To explore the potential development of the stock, projections until 2026 with different low F scenarios are provided in the Table in section 3.9.4. The development of a rebuilding plan for this stock remains a high priority and it is recommended by HAWG.

The EU–Norway TAC-setting procedure used for herring in Division 3.a (EU–Norway, 2013) calculates the TAC for the combined WBSS and NSAS stocks in the C-fleet as 41% of the ICES MSY advice for WBSS plus 5.7% of the TAC for the A-fleet (see section 3.13 for more details). However, according to a safety clause in the procedure, the method should not apply if serious concerns exist about the status of one of the two stocks, which is the case given the severe overexploitation of the WBSS stock.

This stock is caught across three different management areas, and recovery will be impaired if catches of this stock are not minimized in all areas. Based on agreed catches for 2023 and assumptions on stock mixing, it is predicted that around 79% of the total WBSS catches will be taken in the eastern parts of Division 4.a and 4.b in 2023. For the other two areas, catch shares in 2023 are predicted to be around 9% for subdivisions 20–21 and 12% for subdivisions 22–24.

The catch of WBSS in the North Sea in recent years has been substantial (estimated at 5236 t based on the average over the 2020–2022 period). The catches of WBSS in 2023 are expected to continue to be larger in the North Sea than in subdivisions 20-24. Without additional area and seasonal restrictions on the herring fishery in the North Sea in 2024, catches of WBSS in the North Sea will be unavoidable, an aspect that would delay the recovery of the WBSS stock.

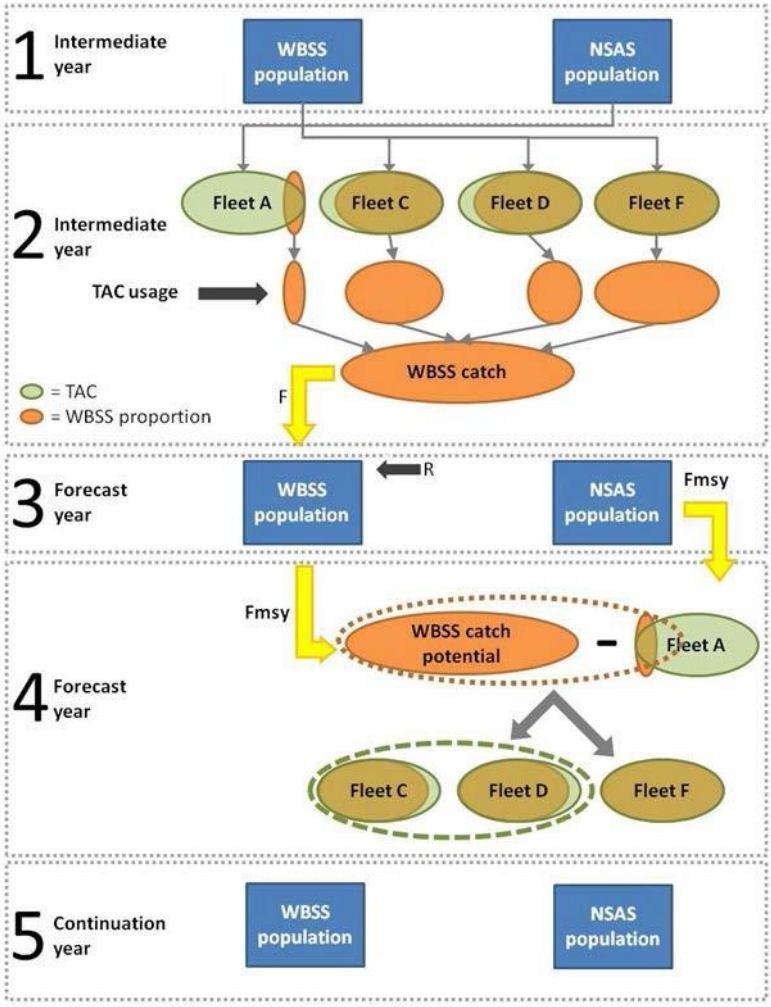
3.13 Management Considerations

3.13.1 Quotas in Division 3.a

The quota for the C-fleet and the bycatch quota for the D-fleet are set for both stocks of North Sea autumn spawners (NSAS) and Western Baltic spring spawners (WBSS) together (see Section 2.7). Since 2011, 50% of the EU and Norwegian quotas for human consumption can optionally be transferred from Division 3.a and taken in Subarea 4. In 2021, the transfer was increased to 100%, effective in 2022. Since then, ICES assumes that most of the quotas in Division 3.a will be transferred to the North Sea resulting in a maximum catch of NSAS and WBSS herring of 1 279 t (969 t of EU catches + 310 t of Norwegian catches) in Division 3.a (cf. part 3.1.1).

3.13.2 ICES catch predictions vs. management TAC

ICES gives advice on catch scenarios for the entire distribution of the NSAS and WBSS herring stocks separately whereas herring is managed by areas (see the following text diagram). The procedure of setting TACs in ICES Division 3.a and SD 22–24 takes into account the occurrence of different fleet's catches of both WBSS and NSAS herring, utilization of TACs and the proportion of NSAS and WBSS that mix in the areas. In the flowchart below, a schematic of the general procedure is presented, although for the present advice it should be interpreted in the light of the zero catch advice and specific agreements for the management of fleets in Division 3.a in 2023:



Box 1: Each year estimations of the WBSS and NSAS stock size are made using a stock assessment model. Stock size estimation together with the estimated pattern of harvesting is used as the starting point for the short-term forecast.

Box 2: To derive at a TAC proposal in the forecast year, first the intermediate year (the year where the TAC has already been agreed on) catches need to be resolved. Four different fleets catch WBSS: the A-fleet (within the transfer area where they take it as a mixture of mainly NSAS and partly WBSS), the C- and D-fleet (within the Division 3.a where they take it as a mixture of mainly WBSS and NSAS), and the F-fleet (within SDs 22–24 where they only take WBSS). Each of these fleets target herring taking into account a fleet share of the total TAC. Only part of this TAC is WBSS catches and not all fleets utilize their full TAC fleet share. This results in an estimate of the intermediate year WBSS catches. Given WBSS stock size and these intermediate year catches, the fishing mortality that the WBSS stock is exploited at can be estimated.

Box 3: Based on the estimated fishing mortality we can now calculate the survivors from the intermediate year to the forecast year assuming an incoming constant recruitment. The calculation of the stock size January 1st in the forecast year is needed to project catches in the forecast year.

Box 4: The management rule for the C-fleet TAC uses the potential WBSS catches calculated from the FMSY advice plus a fraction of the NSAS TAC to define the total TAC in ICES Division 3.a as well as SD22–24 (see Application of the management rule below). Dependent on the relative development of the NSAS and WBSS stocks and the quota transfer from the C-fleet to the A- fleet the realized WBSS catches may deviate from the predictions based on FMSY.

Box 5: The TAC advice from box 4 is taken into the political arena. The result of this will be taken into account to calculate the WBSS population again the year after. Hence box 5 is similar to box 1.

3.13.3 Application of the management rule for the herring fishery for human consumption in Division 3.a

ICES has not evaluated the agreed management rule after revision of reference points in the 2018 benchmark.

The agreed management rule has since 2014 been the basis for setting the C-fleet TAC in Division 3.a and is calculated as the sum of 41% of the WBSS MSY advised catch and 5.7% of the North Sea herring TAC for the A-fleet.

However, given the new B_{lim}, the stock has been below B_{lim} since 2018 raising serious concerns about the status of the WBSS stock. According to a safety clause, which was part of the TAC-setting procedure evaluation, the procedure itself therefore should not be applied and it should be re-evaluated.

Since 2022, the TAC rule is used to predict the transfer of catches from Division 3.a to the North Sea but catches in Division 3.a are predicted following the agreed maximum catches negotiated for Norway and EU in the EU-Norway-UK regulation (see sections 3.1.1, 3.9.2 and updated stock annex).

3.14 Ecosystem considerations

3.14.1 Migration

Herring in Division 3.a and subdivisions 22–24 is a migratory stock. There are feeding migrations from the Western Baltic Sea into the more saline waters of Division 3.a and to the eastern parts of Division 4.a. There are indications from parasite infections that yet unknown proportions of stock components spawning at the southern coast in the Baltic Sea may perform similar migrations (Podolska et al., 2006), and this notion is corroborated with genetic data. Herring in Division 3.a and subdivisions 22–24 migrate back to the Rügen area (SD 24) and other spawning areas at the beginning of winter. Moreover, there are recent indications that Central Baltic herring perform migrations into Subdivision 24 (Gröhsler et al., 2013; Bekkevold et al. in review).

Overwintering is considered to take place in the Öresund (Nielsen et al., 2001). However, recent observations on the acoustic surveys (Gröhsler and Schaber, 2018) indicate changes in distribution and it is currently unclear whether fish still aggregate in the shallow parts of the Sound or whether the density of herring accumulating in the area has changed overall. Whatever the temporal limitation of this survey is and whatever the cause for this observation might be, it may underline the need to validate the multiple-decade-old information on WBSS herring migration patterns.

Similar to the NSAS, the WBSS has produced a series of poor year classes in the last one and a half decade and the declining trend continues. An earlier analysis on different Baltic herring stocks showed that the Baltic Sea Index (BSI) reflecting Sea Surface Temperature (SST) was the main predictor for the recruitment of WBSS (Cardinale et al., 2009). A recent study demonstrated that the later onset and shorter duration of cold periods (below 4°C water temperatures o spawning sites) resulted in reduced reproductive success (Polte et al. 2021). The mechanisms driving this relationship is hypothesized as a mismatch of the initial hatching peaks of larvae in Greifswald Bay and the prey field at the time of first feeding.

A recent review paper on WBSS herring covers the present knowledge on environmental drivers and stressors of early life stage herring productivity (Moyano et al. 2022).

3.14.2 Predation

Predation on larval herring by gelatinous plankton (*Aurelia aurita*) in the Western Baltic Sea was described to a be a major impact on recruitment strength of the population in the 1980s (Möller, 1984). Currently, in the inshore nursery grounds around Rügen the bloom of *A. aurita* is rather seasonally decoupled from major larval production periods as the jelly fish occur in large quantities during summer (July-Sept.). The same is true for the invading ctenophore *Mnemiopsis leidyi*, that appears from August on (Polte and Kotterba, pers. obs.). The seasonal peaks of jelly fish blooms, however, might be subjected to change and should be kept under close surveillance as in the past two years *A. aurita* became more abundant during June therefore increasing the temporal overlap with WBSS larvae (Polte, pers. obs. RHLS).

Besides this potential predator, in Greifswald Bay there is evidently significant predation pressure on herring eggs by three-spined sticklebacks and- to a lower percentage by juv. Perch (*Perca fluviliatis*) and 9-spined stickleback, *Pungitius pungitius* (Kotterba *et al.,* 2014; Kotterba *et al*., 2017a). In contrast the predation on larvae by the sticklebacks was found rather minor (Kotterba *et al.,* 2017b). Unfortunately, there are no historical baseline data available on stickleback densities in the system, but they are considered to have increased speculatively by a trophic cascade including overfishing of predators (Bergstrom *et al*., 2015).

The non-indigenous goby (*Neogobius melanostomus*) has reached extremely high abundances in the coastal Baltic Sea during recent years (Kornis *et al*., 2012). It has been suspected to significantly increase predation pressure on herring eggs. However, a recent study revealed a minor effect by juvenile gobies that would ingest eggs when encountered but *N. melanostomus* in general is rather specialized on mollusc-prey and additionally there is a temporal mismatch among the juvenile gobies and the herring spawning period (Wiegleb *et al*., 2018).

3.14.3 Eutrophication

Estuarine WBSS herring spawning grounds in the Western Baltic Sea are still subject of increased nutrient levels and steady input of agricultural discharge. The resulting increased turbidity leads to a strict vertical limitation of perennial macrophytes in Greifswald Bay to the very littoral zone with a growth limit of about 3.5 m (Kanstinger *et al*., 2018). The major spawning zone in the system is considered to be located in a range of 1-2 m water depth (Moll, 2018). Besides a potential reduction in spawning beds the depth limitation evidently results in increased exposure against storm-induced turbulence and consequently increased herring egg mortality (Moll *et al*., 2018).

Although spring-spawning herring facultative selects other spawning substrates for egg deposition (e.g., stones), the complexity of spawning substrate as provided by macrophytes promotes egg survival by unknown mechanisms (von Nordheim *et al*., 2018). Additionally, increased blooms of filamentous algae (*Pilayella littoralis*) promoted by elevated nutrient levels in synergy with warming spring temperatures cause significant herring egg mortality (von Nordheim *et al*., 2020)

3.15 Changes in the Environment

3.15.1 Climate drivers

There is ample indication that prevailing winter temperature- as expressed by the Baltic Sea Index (BSI) - significantly affect recruitment strength of WBSS herring (Cardinale et al., 2009; Gröger et al., 2014). The exact ecological mechanisms causing this link remains widely unknown. However, for larval herring production in Greifswald Bay it could be shown that the optimal temperature window for embryonic development (Peck et al., 2012) is very important for reproduction success and tends to have contracted in recent years (Dodson et al., 2019). There are strong indications that according to recent mild winter regimes the seasonal timing of spawning migration and reproduction has shifted, and those phenology changes are responsible for limited reproduction success as expressed by larval productivity in Greifswald Bay reflected by the abundance of 1-year juveniles in the outer Western Baltic Sea as expressed by the GERAS 1-wr abundance index (Polte et al., 2021). As currently the initial hatching cohorts are not resulting in significant numbers of larval survivors beyond the critical period after yolk-sac consumption, later cohorts are contributing most to recent recruitment patterns (Polte et al., 2014). However, this might overall result in low recruitment compared to earlier years when the larvae of initial cohorts drove the numbers of survivors. Additionally, those later cohorts (hatching mid-April-early May) are exposed to a suite of different stressors: If the seasonal SST curve is steep and the shallow water heats fast during spring, those larvae are increasingly encountering physiological limits. Moyano et al. (2020) could recently show that WBSS larvae develop cardiac arrhythmia beyond an SST threshold of 16°C and that the number of days above this threshold increased in Greifswald Bay during past decades. Besides those direct temperature effects, synergistic effects of eutrophication and warming (see Eutrophication above) lead to multiple cascades affecting egg survival of those later cohorts in particular.

3.16 Tables and Figures

Table 3.1.1 WESTERN BALTIC HERRING. Both WBSS and NSAS. Total catch in 1989-2022 (1000 tonnes) (Data provided by working group members)

year	area	Den-mark	Faroe Is-lands	Fin-land	Ger-many	Lithua-nia	Nether-lands	Nor-way	Po-land	Swe-den	Total
1989	27.3.a.20	47.40	-	-	-	-	-	1.60	-	47.90	**96.90**
1989	27.3.a.21	57.10	-	-	-	-	-	-	-	37.90	**95.00**
1989	27.3.b.23	1.50	-	-	-	-	-	-	-	0.10	**1.60**
1989	27.3.c.22 & 27.3.d.24	21.70	-	-	56.40	-	-	-	8.50	6.30	**92.90**
1989	**Total**	**127.70**	**-**	**-**	**56.40**	**-**	**-**	**1.60**	**8.50**	**92.20**	**286.40**
1990	27.3.a.20	62.30	-	-	-	-	-	5.60	-	56.50	**124.40**
1990	27.3.a.21	32.20	-	-	-	-	-	-	-	45.20	**77.40**
1990	27.3.b.23	1.10	-	-	-	-	-	-	-	0.10	**1.20**
1990	27.3.c.22 & 27.3.d.24	13.60	-	-	45.50	-	-	-	9.70	8.10	**76.90**
1990	**Total**	**109.20**	**-**	**-**	**45.50**	**-**	**-**	**5.60**	**9.70**	**109.90**	**279.90**
1991	27.3.a.20	58.70	-	-	-	-	-	8.10	-	54.70	**121.50**
1991	27.3.a.21	29.70	-	-	-	-	-	-	-	36.70	**66.40**
1991	27.3.b.23	1.70	-	-	-	-	-	-	-	2.30	**4.00**
1991	27.3.c.22 & 27.3.d.24	25.20	-	-	15.80	-	-	-	5.60	19.30	**65.90**
1991	**Total**	**115.30**	**-**	**-**	**15.80**	**-**	**-**	**8.10**	**5.60**	**113.00**	**257.80**
1992	27.3.a.20	64.70	-	-	-	-	-	13.90	-	88.00	**166.60**
1992	27.3.a.21	33.50	-	-	-	-	-	-	-	26.40	**59.90**
1992	27.3.b.23	2.90	-	-	-	-	-	-	-	1.70	**4.60**
1992	27.3.c.22 & 27.3.d.24	26.90	-	-	15.60	-	-	-	15.50	22.30	**80.30**
1992	**Total**	**128.00**	**-**	**-**	**15.60**	**-**	**-**	**13.90**	**15.50**	**138.40**	**311.40**
1993	27.3.a.20	87.80	-	-	-	-	-	24.20	-	56.40	**168.40**
1993	27.3.a.21	28.70	-	-	-	-	-	-	-	16.70	**45.40**
1993	27.3.b.23	3.30	-	-	-	-	-	-	-	0.70	**4.00**
1993	27.3.c.22 & 27.3.d.24	38.00	-	-	11.10	-	-	-	11.80	16.20	**77.10**
1993	**Total**	**157.80**	**-**	**-**	**11.10**	**-**	**-**	**24.20**	**11.80**	**90.00**	**294.90**
1994	27.3.a.20	44.90	-	-	-	-	-	17.70	-	66.40	**129.00**
1994	27.3.a.21	23.60	-	-	-	-	-	-	-	15.40	**39.00**
1994	27.3.b.23	1.50	-	-	-	-	-	-	-	0.30	**1.80**
1994	27.3.c.22 & 27.3.d.24	39.50	-	-	11.40	-	-	-	6.30	7.40	**64.60**
1994	**Total**	**109.50**	**-**	**-**	**11.40**	**-**	**-**	**17.70**	**6.30**	**89.50**	**234.40**
1995	27.3.a.20	43.70	-	-	-	-	-	16.70	-	48.50	**108.90**
1995	27.3.a.21	16.90	-	-	-	-	-	-	-	30.80	**47.70**
1995	27.3.b.23	0.90	-	-	-	-	-	-	-	0.20	**1.10**
1995	27.3.c.22 & 27.3.d.24	36.80	-	-	13.40	-	-	-	7.30	15.80	**73.30**
1995	**Total**	**98.30**	**-**	**-**	**13.40**	**-**	**-**	**16.70**	**7.30**	**95.30**	**231.00**
1996	27.3.a.20	28.70	-	-	-	-	-	9.40	-	32.70	**70.80**
1996	27.3.a.21	17.20	-	-	-	-	-	-	-	27.00	**44.20**
1996	27.3.b.23	0.70	-	-	-	-	-	-	-	0.30	**1.00**
1996	27.3.c.22 & 27.3.d.24	34.40	-	-	7.30	-	-	-	6.00	9.00	**56.70**
1996	**Total**	**81.00**	**-**	**-**	**7.30**	**-**	**-**	**9.40**	**6.00**	**69.00**	**172.70**
1997	27.3.a.20	14.30	-	-	-	-	-	8.80	-	32.90	**56.00**
1997	27.3.a.21	8.80	-	-	-	-	-	-	-	18.00	**26.80**
1997	27.3.b.23	2.20	-	-	-	-	-	-	-	0.10	**2.30**
1997	27.3.c.22 & 27.3.d.24	30.50	-	-	12.80	-	-	-	6.90	14.50	**64.70**
1997	**Total**	**55.80**	**-**	**-**	**12.80**	**-**	**-**	**8.80**	**6.90**	**65.50**	**149.80**
1998	27.3.a.20	10.30	-	-	-	-	-	8.00	-	46.90	**65.20**
1998	27.3.a.21	23.70	-	-	-	-	-	-	-	29.90	**53.60**
1998	27.3.b.23	0.40	-	-	-	-	-	-	-	0.30	**0.70**
1998	27.3.c.22 & 27.3.d.24	30.10	-	-	9.00	-	-	-	6.50	4.30	**49.90**
1998	**Total**	**64.50**	**-**	**-**	**9.00**	**-**	**-**	**8.00**	**6.50**	**81.40**	**169.40**
1999	27.3.a.20	10.10	-	-	-	-	-	7.40	-	36.40	**53.90**
1999	27.3.a.21	17.90	-	-	-	-	-	-	-	14.60	**32.50**

year	area	Denmark	Faroe Islands	Finland	Germany	Lithuania	Netherlands	Norway	Poland	Sweden	Total
1999	27.3.b.23	0.50	-	-	-	-	-	-	-	0.10	**0.60**
1999	27.3.c.22 & 27.3.d.24	32.50	-	-	9.80	-	-	-	5.30	2.60	**50.20**
1999	**Total**	**61.00**	**-**	**-**	**9.80**	**-**	**-**	**7.40**	**5.30**	**53.70**	**137.20**
2000	27.3.a.20	16.00	-	-	-	-	-	9.70	-	45.80	**71.50**
2000	27.3.a.21	18.90	-	-	-	-	-	-	-	17.30	**36.20**
2000	27.3.b.23	0.90	-	-	-	-	-	-	-	0.10	**1.00**
2000	27.3.c.22 & 27.3.d.24	32.60	-	-	9.30	-	-	-	6.60	4.80	**53.30**
2000	**Total**	**68.40**	**-**	**-**	**9.30**	**-**	**-**	**9.70**	**6.60**	**68.00**	**162.00**
2001	27.3.a.20	16.20	-	-	-	-	-	-	-	30.80	**47.00**
2001	27.3.a.21	18.80	-	-	-	-	-	-	-	16.20	**35.00**
2001	27.3.b.23	0.60	-	-	-	-	-	-	-	0.20	**0.80**
2001	27.3.c.22 & 27.3.d.24	28.30	-	-	11.40	-	-	-	9.30	13.90	**62.90**
2001	**Total**	**63.90**	**-**	**-**	**11.40**	**-**	**-**	**-**	**9.30**	**61.10**	**145.70**
2002	27.3.a.20	25.97	-	-	-	-	-	-	-	26.35	**52.32**
2002	27.3.a.21	18.61	-	-	-	-	-	-	-	7.25	**25.85**
2002	27.3.b.23	4.57	-	-	-	-	-	-	-	-	**4.57**
2002	27.3.c.22 & 27.3.d.24	13.07	-	-	22.40	-	-	-	-	10.72	**46.18**
2002	**Total**	**62.22**	**-**	**-**	**22.40**	**-**	**-**	**-**	**-**	**44.32**	**128.93**
2003	27.3.a.20	15.48	-	-	0.72	-	-	-	-	25.83	**42.03**
2003	27.3.a.21	15.95	-	-	-	-	-	-	-	10.24	**26.19**
2003	27.3.b.23	2.32	-	-	-	-	-	-	-	0.24	**2.56**
2003	27.3.c.22 & 27.3.d.24	6.14	-	-	18.78	-	-	-	4.40	9.38	**38.70**
2003	**Total**	**39.89**	**-**	**-**	**19.50**	**-**	**-**	**-**	**4.40**	**45.69**	**109.47**
2004	27.3.a.20	11.78	-	-	0.48	-	-	-	-	21.81	**34.07**
2004	27.3.a.21	7.56	-	-	-	-	-	-	-	9.63	**17.19**
2004	27.3.b.23	0.09	-	-	-	-	-	-	-	0.32	**0.41**
2004	27.3.c.22 & 27.3.d.24	7.31	-	-	18.49	-	-	-	5.51	9.87	**41.18**
2004	**Total**	**26.74**	**-**	**-**	**18.98**	**-**	**-**	**-**	**5.51**	**41.61**	**92.85**
2005	27.3.a.20	14.77	0.44	-	0.75	-	-	-	-	32.55	**48.50**
2005	27.3.a.21	11.11	-	-	-	-	-	-	-	9.99	**21.09**
2005	27.3.b.23	1.78	-	-	-	-	-	-	-	0.38	**2.16**
2005	27.3.c.22 & 27.3.d.24	5.31	-	-	21.04	-	-	-	6.29	9.17	**41.81**
2005	**Total**	**32.97**	**0.44**	**-**	**21.79**	**-**	**-**	**-**	**6.29**	**52.09**	**113.58**
2006**	27.3.a.20	5.16	-	-	0.60	-	-	-	-	26.00	**31.76**
2006**	27.3.a.21	8.62	-	-	-	-	-	-	-	10.80	**19.42**
2006**	27.3.b.23	1.83	-	-	-	-	-	-	-	0.65	**2.48**
2006**	27.3.c.22 & 27.3.d.24	1.41	-	-	22.87	-	-	-	5.50	9.60	**39.38**
2006**	**Total**	**17.00**	**-**	**-**	**23.47**	**-**	**-**	**-**	**5.50**	**47.06**	**93.03**
2007	27.3.a.20	3.59	-	-	0.45	-	-	3.47	-	19.42	**26.94**
2007	27.3.a.21	9.18	-	-	-	-	-	-	-	11.15	**20.33**
2007	27.3.b.23	2.87	-	-	-	-	-	-	-	-	**2.87**
2007	27.3.c.22 & 27.3.d.24	2.84	-	-	24.58	-	-	-	2.94	7.22	**37.59**
2007	**Total**	**18.49**	**-**	**-**	**25.04**	**-**	**-**	**3.47**	**2.94**	**37.80**	**87.73**
2008	27.3.a.20	3.87	-	-	1.57	-	-	4.02	-	16.50	**25.96**
2008	27.3.a.21	7.02	-	-	-	-	-	-	-	5.21	**12.23**
2008	27.3.b.23	5.32	-	-	-	-	-	-	-	0.33	**5.65**
2008	27.3.c.22 & 27.3.d.24	3.07	-	-	22.82	-	-	-	5.54	7.02	**38.46**
2008	**Total**	**19.28**	**-**	**-**	**24.39**	**-**	**-**	**4.02**	**5.54**	**29.07**	**82.30**
2009	27.3.a.20	12.72	0.55	-	0.26	-	-	3.30	-	12.87	**29.69**
2009	27.3.a.21	4.90	-	-	0.63	-	-	-	-	3.61	**9.14**
2009	27.3.b.23	2.82	-	-	-	-	-	-	-	0.81	**3.62**
2009	27.3.c.22 & 27.3.d.24	2.15	-	-	15.98	-	-	-	5.23	4.05	**27.41**
2009	**Total**	**22.58**	**0.55**	**-**	**16.87**	**-**	**-**	**3.30**	**5.23**	**21.34**	**69.86**
2010	27.3.a.20	5.31	0.45	-	0.15	0.4	-	3.28	-	17.44	**27.02**
2010	27.3.a.21	7.57	-	-	-	-	-	-	-	2.69	**10.26**
2010	27.3.b.23	0.10	-	-	-	-	-	-	-	0.93	**1.03**

year	area	Denmark	Faroe Islands	Finland	Germany	Lithuania	Netherlands	Norway	Poland	Sweden	Total
2010	27.3.c.22 & 27.3.d.24	0.76	-	-	12.24	-	-	-	1.80	2.03	**16.83**
2010	**Total**	**13.74**	**0.45**	**-**	**12.38**	**0.4**	**-**	**3.28**	**1.80**	**23.11**	**55.15**
2011	27.3.a.20	3.58	-	-	0.05	-	-	0.12	-	9.46	**13.20**
2011	27.3.a.21	5.16	-	-	-	-	-	-	-	1.66	**6.82**
2011	27.3.b.23	0.03	-	-	-	-	-	-	-	0.54	**0.57**
2011	27.3.c.22 & 27.3.d.24	3.09	-	-	8.19	-	-	-	1.80	2.18	**15.26**
2011	**Total**	**11.85**	**-**	**-**	**8.24**	**-**	**-**	**0.12**	**1.80**	**13.84**	**35.85**
2012	27.3.a.20	3.24	-	-	0.63	-	-	0.45	-	16.21	**20.53**
2012	27.3.a.21	6.33	-	-	-	-	-	-	-	0.80	**7.13**
2012	27.3.b.23	0.04	-	-	-	-	-	-	-	0.68	**0.72**
2012	27.3.c.22 & 27.3.d.24	4.11	-	-	11.17	-	-	-	2.39	2.71	**20.38**
2012	**Total**	**13.71**	**-**	**-**	**11.80**	**-**	**-**	**0.45**	**2.39**	**20.40**	**48.75**
2013	27.3.a.20	4.89	-	-	0.19	-	-	3.02	-	16.68	**24.78**
2013	27.3.a.21	3.88	-	-	-	-	-	-	-	2.59	**6.46**
2013	27.3.b.23	0.04	-	-	-	-	-	-	-	0.63	**0.68**
2013	27.3.c.22 & 27.3.d.24	5.06	-	-	14.59	-	-	-	3.11	2.07	**24.83**
2013	**Total**	**13.87**	**-**	**-**	**14.78**	**-**	**-**	**3.02**	**3.11**	**21.96**	**56.74**
2014	27.3.a.20	6.45	-	-	0.08	-	-	2.05	-	12.59	**21.17**
2014	27.3.a.21	4.27	-	-	-	-	-	-	-	3.41	**7.68**
2014	27.3.b.23	0.05	-	-	-	-	-	-	-	0.32	**0.37**
2014	27.3.c.22 & 27.3.d.24	4.28	-	-	10.24	-	-	-	2.38	1.08	**17.98**
2014	**Total**	**15.04**	**-**	**-**	**10.33**	**-**	**-**	**2.05**	**2.38**	**17.40**	**47.20**
2015	27.3.a.20	4.14	0.48	-	0.13	-	0.03	2.48	-	12.86	**20.11**
2015	27.3.a.21	3.98	-	-	-	-	-	-	-	3.75	**7.73**
2015	27.3.b.23	0.03	-	-	-	-	-	-	-	0.19	**0.22**
2015	27.3.c.22 & 27.3.d.24	4.49	-	-	13.29	-	-	-	2.65	1.50	**21.92**
2015	**Total**	**12.63**	**0.48**	**-**	**13.42**	**-**	**0.03**	**2.48**	**2.65**	**18.30**	**49.98**
2016	27.3.a.20	3.55	0.32	-	0.12	-	-	3.92	-	13.32	**21.24**
2016	27.3.a.21	2.45	-	-	-	-	-	-	-	6.21	**8.65**
2016	27.3.b.23	0.03	-	-	-	-	-	-	-	0.33	**0.36**
2016	27.3.c.22 & 27.3.d.24	5.71	-	-	14.43	-	-	-	2.92	1.66	**24.72**
2016	**Total**	**11.74**	**0.32**	**-**	**14.55**	**-**	**-**	**3.92**	**2.92**	**21.52**	**54.97**
2017	27.3.a.20	2.70	0.40	-	0.09	-	-	3.34	-	11.94	**18.46**
2017	27.3.a.21	0.91	-	-	-	-	-	-	-	7.43	**8.34**
2017	27.3.b.23	0.26	-	-	-	-	-	-	-	0.36	**0.62**
2017	27.3.c.22 & 27.3.d.24	5.59	-	-	14.69	-	-	-	3.33	2.29	**25.90**
2017	**Total**	**9.46**	**0.40**	**-**	**14.78**	**-**	**-**	**3.34**	**3.33**	**22.01**	**53.31**
2018	27.3.a.20	0.86	0.15	-	0.21	-	-	3.41	-	11.33	**15.96**
2018	27.3.a.21	1.26	-	-	-	-	-	-	-	6.04	**7.30**
2018	27.3.b.23	0.07	-	-	-	-	-	-	-	0.42	**0.49**
2018	27.3.c.22 & 27.3.d.24	4.49	-	-	11.30	-	-	-	1.77	0.94	**18.51**
2018	**Total**	**6.67**	**0.15**	**-**	**11.51**	**-**	**-**	**3.41**	**1.77**	**18.73**	**42.25**
2019	27.3.a.20	0.59	-	-	0.12	-	-	2.47	-	8.51	**11.69**
2019	27.3.a.21	1.50	-	-	-	-	-	-	-	1.73	**3.22**
2019	27.3.b.23	0.01	-	-	-	-	-	-	-	0.35	**0.36**
2019	27.3.c.22 & 27.3.d.24	2.04	-	-	5.57	-	-	-	1.13	0.73	**9.47**
2019	**Total**	**4.14**	**-**	**-**	**5.69**	**-**	**-**	**2.47**	**1.13**	**11.31**	**24.75**
2020	27.3.a.20	3.19	-	-	0.16	-	-	2.12	-	9.07	**14.54**
2020	27.3.a.21	0.67	-	-	-	-	-	-	-	2.57	**3.24**
2020	27.3.b.23	-	-	-	-	-	-	-	-	0.48	**0.48**
2020	27.3.c.22 & 27.3.d.24	0.59	-	-	2.07	-	-	-	0.60	0.23	**3.48**
2020	**Total**	**4.45**	**-**	**-**	**2.22**	**-**	**-**	**2.12**	**0.60**	**12.36**	**21.74**
2021	27.3.a.20	2.87	-	-	0.14	-	-	1.12	-	6.13	**10.26**
2021	27.3.a.21	0.21	-	-	-	-	-	-	-	2.84	**3.05**
2021	27.3.b.23	0.01	-	-	-	-	-	-	-	0.28	**0.29**

year	area	Den-mark	Faroe Is-lands	Fin-land	Ger-many	Lithua-nia	Nether-lands	Nor-way	Po-land	Swe-den	Total
2021	27.3.c.22 & 27.3.d.24	0.15	-	-	0.84	-	-	-	0.25	0.08	**1.31**
2021	**Total**	**3.23**	**-**	**-**	**0.99**	**-**	**-**	**1.12**	**0.25**	**9.33**	**14.92**
2022*	27.3.a.20	0.13	-	-	-	-	-	0.25	-	0.10	**0.48**
2022*	27.3.a.21	0.11	-	-	-	-	-	-	-	0.14	**0.25**
2022*	27.3.b.23	-	-	-	-	-	-	-	-	0.24	**0.25**
2022*	27.3.c.22 & 27.3.d.24	0.01	-	-	0.23	-	-	-	0.15	0.01	**0.39**
2022*	**Total**	**0.25**	**-**	**-**	**0.23**	**-**	**-**	**0.25**	**0.15**	**0.49**	**1.36**

*Preliminary
**2,000 t of Danish catches are missing (HAWG 2007)
***3,103 t officially reported catches (HAWG 2011)

Table 3.1.2 WESTERN BALTIC HERRING. Both WBSS and NSAS. Catch (SOP) in 2004-2022 by fleet and quarter (1000 t)

year	area	fleet	1	2	3	4	Total
2004	27.3.a	C	13.45	2.76	8.18	5.86	**30.26**
2004	27.3.a	D	2.84	3.31	10.82	4.97	**21.95**
2004	27.3.b & 27.3.c & 27.3.d.24	F	20.36	10.45	2.36	8.57	**41.74**
2004	**Total**	**Total**	**36.66**	**16.51**	**21.37**	**19.41**	**93.95**
2005	27.3.a	C	16.56	3.41	23.42	12.03	**55.42**
2005	27.3.a	D	6.14	1.94	3.42	2.65	**14.15**
2005	27.3.b & 27.3.c & 27.3.d.24	F	20.42	15.59	1.87	5.84	**43.72**
2005	**Total**	**Total**	**43.12**	**20.94**	**28.71**	**20.52**	**113.29**
2006	27.3.a	C	15.30	2.57	15.67	8.33	**41.87**
2006	27.3.a	D	5.86	0.14	0.85	2.42	**9.26**
2006	27.3.b & 27.3.c & 27.3.d.24	F	15.06	17.24	3.03	6.53	**41.86**
2006	**Total**	**Total**	**36.22**	**19.95**	**19.55**	**17.28**	**92.99**
2007	27.3.a	C	7.75	3.80	22.38	7.67	**41.60**
2007	27.3.a	D	2.96	0.14	0.80	1.76	**5.67**
2007	27.3.b & 27.3.c & 27.3.d.24	F	18.78	10.49	1.71	9.48	**40.46**
2007	**Total**	**Total**	**29.49**	**14.44**	**24.89**	**18.91**	**87.73**
2008	27.3.a	C	8.17	2.69	14.88	6.54	**32.28**
2008	27.3.a	D	3.91	0.31	0.64	1.04	**5.91**
2008	27.3.b & 27.3.c & 27.3.d.24	F	18.42	11.28	6.02	8.40	**44.12**
2008	**Total**	**Total**	**30.49**	**14.29**	**21.54**	**15.98**	**82.31**
2009	27.3.a	C	11.07	3.14	14.28	5.99	**34.48**
2009	27.3.a	D	2.70	0.12	0.85	0.67	**4.35**
2009	27.3.b & 27.3.c & 27.3.d.24	F	19.46	6.82	1.43	3.32	**31.03**
2009	**Total**	**Total**	**33.24**	**10.08**	**16.56**	**9.98**	**69.86**
2010	27.3.a	C	8.43	3.93	13.44	9.16	**34.95**
2010	27.3.a	D	1.14	0.71	0.41	0.07	**2.33**
2010	27.3.b & 27.3.c & 27.3.d.24	F	10.23	5.43	0.43	1.83	**17.92**
2010	**Total**	**Total**	**19.80**	**10.07**	**14.28**	**11.06**	**55.20**
2011	27.3.a	C	7.01	0.53	6.49	3.39	**17.42**
2011	27.3.a	D	0.54	0.19	0.97	0.90	**2.60**
2011	27.3.b & 27.3.c & 27.3.d.24	F	7.76	4.07	0.85	3.16	**15.83**
2011	**Total**	**Total**	**15.31**	**4.79**	**8.31**	**7.44**	**35.85**
2012	27.3.a	C	4.52	0.27	12.30	5.17	**22.27**
2012	27.3.a	D	1.82	0.73	1.69	1.14	**5.39**
2012	27.3.b & 27.3.c & 27.3.d.24	F	13.98	2.51	1.06	3.55	**21.09**
2012	**Total**	**Total**	**20.32**	**3.51**	**15.05**	**9.86**	**48.75**
2013	27.3.a	C	8.50	1.65	8.37	9.84	**28.36**
2013	27.3.a	D	0.75	0.62	0.98	0.53	**2.88**
2013	27.3.b & 27.3.c & 27.3.d.24	F	11.66	8.50	1.07	4.28	**25.50**
2013	**Total**	**Total**	**20.90**	**10.77**	**10.42**	**14.65**	**56.74**
2014	27.3.a	C	6.23	2.27	10.74	5.68	**24.93**
2014	27.3.a	D	0.24	0.52	2.38	0.82	**3.96**
2014	27.3.b & 27.3.c & 27.3.d.24	F	10.81	2.30	0.84	4.39	**18.34**
2014	**Total**	**Total**	**17.28**	**5.09**	**13.97**	**10.89**	**47.23**
2015	27.3.a	C	8.99	0.97	7.54	4.05	**21.56**
2015	27.3.a	D	1.88	0.15	1.47	2.77	**6.28**
2015	27.3.b & 27.3.c & 27.3.d.24	F	14.21	2.76	0.90	4.27	**22.14**
2015	**Total**	**Total**	**25.08**	**3.88**	**9.92**	**11.10**	**49.98**
2016	27.3.a	C	7.85	0.36	15.75	3.40	**27.37**
2016	27.3.a	D	0.69	0.25	1.33	0.25	**2.53**

year	area	fleet	1	2	3	4	Total
2016	27.3.b & 27.3.c & 27.3.d.24	F	15.48	3.51	1.39	4.69	**25.07**
2016	**Total**	**Total**	**24.02**	**4.12**	**18.47**	**8.35**	**54.96**
2017	27.3.a	C	7.51	0.19	12.13	6.59	**26.43**
2017	27.3.a	D	-	0.05	0.05	0.26	**0.37**
2017	27.3.b & 27.3.c & 27.3.d.24	F	16.83	3.38	0.97	5.33	**26.51**
2017	**Total**	**Total**	**24.34**	**3.63**	**13.16**	**12.18**	**53.31**
2018	27.3.a	C	9.95	0.22	10.23	2.49	**22.89**
2018	27.3.a	D	-	0.11	0.11	0.14	**0.36**
2018	27.3.b & 27.3.c & 27.3.d.24	F	11.96	3.43	0.21	3.40	**18.99**
2018	**Total**	**Total**	**21.92**	**3.76**	**10.55**	**6.03**	**42.25**
2019	27.3.a	C	4.38	0.54	6.49	3.15	**14.56**
2019	27.3.a	D	0.09	0.02	0.21	0.04	**0.36**
2019	27.3.b & 27.3.c & 27.3.d.24	F	6.05	0.43	0.28	3.07	**9.83**
2019	**Total**	**Total**	**10.52**	**0.99**	**6.98**	**6.26**	**24.75**
2020	27.3.a	C	4.31	0.35	9.52	2.69	**16.86**
2020	27.3.a	D	-	0.07	0.60	0.24	**0.91**
2020	27.3.b & 27.3.c & 27.3.d.24	F	1.96	0.19	0.37	1.44	**3.97**
2020	**Total**	**Total**	**6.27**	**0.61**	**10.50**	**4.37**	**21.74**
2021	27.3.a	C	4.38	1.15	6.53	1.12	**13.18**
2021	27.3.a	D	-	0.02	0.05	0.06	**0.14**
2021	27.3.b & 27.3.c & 27.3.d.24	F	0.49	0.17	0.08	0.85	**1.60**
2021	**Total**	**Total**	**4.88**	**1.34**	**6.66**	**2.03**	**14.92**
2022*	27.3.a	C	0.19	0.03	0.15	0.11	**0.48**
2022*	27.3.a	D	0.01	0.11	0.02	0.12	**0.25**
2022*	27.3.b & 27.3.c & 27.3.d.24	F	0.25	0.07	0.02	0.31	**0.64**
2022*	**Total**	**Total**	**0.45**	**0.21**	**0.18**	**0.53**	**1.36**

*Preliminary

Table 3.2.1 WESTERN BALTIC HERRING. Both WBSS and NSAS. Samples of commercial catch by quarter, fleet, and area for 2022 available to the Working Group

year	area	quarter	country	fleet	landings (t)	number of samples	number of fish measured	number of fish aged
2022	27.3.a.20	1	Denmark	C	0.1	-	-	-
2022	27.3.a.20	2	Denmark	C	0.0	-	-	-
2022	27.3.a.20	3	Denmark	C	1.4	-	-	-
2022	27.3.a.20	4	Denmark	C	0.2	-	-	-
2022	27.3.a.20	1	Germany	C	0.0	-	-	-
2022	27.3.a.20	2	Germany	C	0.0	-	-	-
2022	27.3.a.20	3	Germany	C	0.1	-	-	-
2022	27.3.a.20	4	Germany	C	0.0	-	-	-
2022	27.3.a.20	1	Norway	C	49.4	-	-	-
2022	27.3.a.20	2	Norway	C	0.5	-	-	-
2022	27.3.a.20	3	Norway	C	120.4	-	-	-
2022	27.3.a.20	4	Norway	C	78.5	-	-	-
2022	27.3.a.20	1	Sweden	C	51.4	1	75	75
2022	27.3.a.20	2	Sweden	C	12.5	-	-	-
2022	27.3.a.20	3	Sweden	C	14.1	-	-	-
2022	27.3.a.20	4	Sweden	C	20.6	-	-	-
2022	27.3.a.20	1	Denmark	D	0.0	-	-	-
2022	27.3.a.20	2	Denmark	D	111.7	-	-	-
2022	27.3.a.20	3	Denmark	D	17.6	-	-	-
2022	27.3.a.20	4	Denmark	D	0.0	-	-	-
2022	27.3.a.20	1	Germany	D	0.0	-	-	-

year	area	quarter	country	fleet	landings (t)	number of samples	number of fish measured	number of fish aged
2022	27.3.a.20	2	Germany	D	0.0	-	-	-
2022	27.3.a.20	3	Germany	D	0.0	-	-	-
2022	27.3.a.20	4	Germany	D	0.0	-	-	-
2022	27.3.a.20	1	Norway	D	0.0	-	-	-
2022	27.3.a.20	2	Norway	D	0.0	-	-	-
2022	27.3.a.20	3	Norway	D	0.0	-	-	-
2022	27.3.a.20	4	Norway	D	0.0	-	-	-
2022	27.3.a.20	1	Sweden	D	0.0	-	-	-
2022	27.3.a.20	2	Sweden	D	0.0	-	-	-
2022	27.3.a.20	3	Sweden	D	0.0	-	-	-
2022	27.3.a.20	4	Sweden	D	0.0	-	-	-
2022	27.3.a.21	1	Denmark	C	84.1	-	-	-
2022	27.3.a.21	2	Denmark	C	15.7	-	-	-
2022	27.3.a.21	3	Denmark	C	0.5	-	-	-
2022	27.3.a.21	4	Denmark	C	1.4	-	-	-
2022	27.3.a.21	1	Germany	C	0.0	-	-	-
2022	27.3.a.21	2	Germany	C	0.0	-	-	-
2022	27.3.a.21	3	Germany	C	0.0	-	-	-
2022	27.3.a.21	4	Germany	C	0.0	-	-	-
2022	27.3.a.21	1	Sweden	C	8.5	-	-	-
2022	27.3.a.21	2	Sweden	C	0.6	-	-	-
2022	27.3.a.21	3	Sweden	C	10.8	-	-	-
2022	27.3.a.21	4	Sweden	C	4.9	-	-	-
2022	27.3.a.21	1	Denmark	D	6.6	-	-	-
2022	27.3.a.21	2	Denmark	D	0.0	-	-	-
2022	27.3.a.21	3	Denmark	D	0.0	-	-	-
2022	27.3.a.21	4	Denmark	D	0.0	-	-	-
2022	27.3.a.21	1	Germany	D	0.0	-	-	-
2022	27.3.a.21	2	Germany	D	0.0	-	-	-
2022	27.3.a.21	3	Germany	D	0.0	-	-	-
2022	27.3.a.21	4	Germany	D	0.0	-	-	-
2022	27.3.a.21	1	Sweden	D	0.0	-	-	-
2022	27.3.a.21	2	Sweden	D	0.0	-	-	-
2022	27.3.a.21	3	Sweden	D	0.0	-	-	-
2022	27.3.a.21	4	Sweden	D	115.5	1	74	74
2022	27.3.b.23	1	Denmark	F	0.0	-	-	-
2022	27.3.b.23	2	Denmark	F	0.0	-	-	-
2022	27.3.b.23	3	Denmark	F	0.0	-	-	-
2022	27.3.b.23	4	Denmark	F	0.4	-	-	-
2022	27.3.b.23	1	Sweden	F	45.2	-	-	-
2022	27.3.b.23	2	Sweden	F	0.0	-	-	-
2022	27.3.b.23	3	Sweden	F	12.6	-	-	-
2022	27.3.b.23	4	Sweden	F	187.0	10	668	668
2022	27.3.c.22	1	Denmark	F	0.9	-	-	-

year	area	quarter	country	fleet	landings (t)	number of samples	number of fish measured	number of fish aged
2022	27.3.c.22	2	Denmark	F	6.1	-	-	-
2022	27.3.c.22	3	Denmark	F	0.0	-	-	-
2022	27.3.c.22	4	Denmark	F	1.0	-	-	-
2022	27.3.c.22	1	Germany	F	8.4	2	498	107
2022	27.3.c.22	2	Germany	F	1.2	2	743	139
2022	27.3.c.22	3	Germany	F	0.0	-	-	-
2022	27.3.c.22	4	Germany	F	5.4	1	343	78
2022	27.3.c.22	1	Poland	F	0.0	-	-	-
2022	27.3.c.22	2	Poland	F	0.0	-	-	-
2022	27.3.c.22	3	Poland	F	0.0	-	-	-
2022	27.3.c.22	4	Poland	F	0.0	-	-	-
2022	27.3.c.22	1	Sweden	F	0.0	-	-	-
2022	27.3.c.22	2	Sweden	F	0.0	-	-	-
2022	27.3.c.22	3	Sweden	F	0.0	-	-	-
2022	27.3.c.22	4	Sweden	F	0.0	-	-	-
2022	27.3.d.24	1	Denmark	F	0.0	-	-	-
2022	27.3.d.24	2	Denmark	F	0.0	-	-	-
2022	27.3.d.24	3	Denmark	F	0.0	-	-	-
2022	27.3.d.24	4	Denmark	F	0.8	-	-	-
2022	27.3.d.24	1	Germany	F	155.5	8	1751	415
2022	27.3.d.24	2	Germany	F	33.1	4	1128	220
2022	27.3.d.24	3	Germany	F	3.3	-	-	-
2022	27.3.d.24	4	Germany	F	18.3	2	342	118
2022	27.3.d.24	1	Poland	F	36.9	6	892	262
2022	27.3.d.24	2	Poland	F	24.4	1	226	49
2022	27.3.d.24	3	Poland	F	1.8	-	-	-
2022	27.3.d.24	4	Poland	F	87.7	-	-	-
2022	27.3.d.24	1	Sweden	F	1.2	-	-	-
2022	27.3.d.24	2	Sweden	F	0.0	-	-	-
2022	27.3.d.24	3	Sweden	F	0.0	-	-	-
2022	27.3.d.24	4	Sweden	F	5.9	-	-	-
2022	**Total**	**Total**	**Total**	**Total**	**1364.2**	**38**	**6740**	**2205**

Table 3.2.2 WESTERN BALTIC HERRING. Both WBSS and NSAS. Samples of commercial catch by quarter, fleet, and area for 2022 used to estimate catch in numbers and mean weight at age as W-ringers for 2022

year	area	quarter	ctry	fleet	landings (t)	sampling
2022	27.3.a.20	1	Denmark	C	0.1	2022 Sweden 27.3.a.20 fleetC Q1
2022	27.3.a.20	2	Denmark	C	0.0	2022 Sweden 27.3.a.20 fleetC Q1
2022	27.3.a.20	3	Denmark	C	1.4	2021 Denmark 27.3.a.20 fleetC Q3
2022	27.3.a.20	4	Denmark	C	0.3	2021 Denmark 27.3.a.20 fleetC Q3
2022	27.3.a.20	1	Denmark	D	0.0	No landings
2022	27.3.a.20	2	Denmark	D	111.6	2022 Sweden 27.3.a.21 fleetD Q4
2022	27.3.a.20	3	Denmark	D	17.6	2022 Sweden 27.3.a.21 fleetD Q4
2022	27.3.a.20	4	Denmark	D	0.0	No landings
2022	27.3.a.20	1	Germany	C	0.0	No landings
2022	27.3.a.20	2	Germany	C	0.0	No landings
2022	27.3.a.20	3	Germany	C	0.2	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.20	4	Germany	C	0.0	No landings
2022	27.3.a.20	1	Germany	D	0.0	No landings
2022	27.3.a.20	2	Germany	D	0.0	No landings

year	area	quarter	ctry	fleet	landings (t)	sampling
2022	27.3.a.20	3	Germany	D	0.0	No landings
2022	27.3.a.20	4	Germany	D	0.0	No landings
2022	27.3.a.20	1	Norway	C	49.4	2022 Sweden 27.3.a.20 fleetC Q1
2022	27.3.a.20	2	Norway	C	0.5	2022 Sweden 27.3.a.20 fleetC Q1
2022	27.3.a.20	3	Norway	C	120.3	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.20	4	Norway	C	78.5	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.20	1	Norway	D	0.0	No landings
2022	27.3.a.20	2	Norway	D	0.0	No landings
2022	27.3.a.20	3	Norway	D	0.0	No landings
2022	27.3.a.20	4	Norway	D	0.0	No landings
2022	27.3.a.20	1	Sweden	C	51.4	Sampling
2022	27.3.a.20	2	Sweden	C	12.5	2022 Sweden 27.3.a.20 fleetC Q1
2022	27.3.a.20	3	Sweden	C	14.1	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.20	4	Sweden	C	20.6	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.20	1	Sweden	D	0.0	No landings
2022	27.3.a.20	2	Sweden	D	0.0	No landings
2022	27.3.a.20	3	Sweden	D	0.0	No landings
2022	27.3.a.20	4	Sweden	D	0.0	No landings
2022	27.3.a.21	1	Denmark	C	84.0	2021 Sweden 27.3.a.21 fleetC Q1
2022	27.3.a.21	2	Denmark	C	15.7	2021 Sweden 27.3.a.21 fleetC Q1
2022	27.3.a.21	3	Denmark	C	0.5	2021 Denmark 27.3.a.20 fleetC Q3
2022	27.3.a.21	4	Denmark	C	1.4	2021 Denmark 27.3.a.20 fleetC Q3
2022	27.3.a.21	1	Denmark	D	6.6	2021 Sweden 27.3.a.21 fleetC Q1
2022	27.3.a.21	2	Denmark	D	0.0	No landings
2022	27.3.a.21	3	Denmark	D	0.0	No landings
2022	27.3.a.21	4	Denmark	D	0.0	No landings
2022	27.3.a.21	1	Germany	C	0.0	No landings
2022	27.3.a.21	2	Germany	C	0.0	No landings
2022	27.3.a.21	3	Germany	C	0.0	No landings
2022	27.3.a.21	4	Germany	C	0.0	No landings
2022	27.3.a.21	1	Germany	D	0.0	No landings
2022	27.3.a.21	2	Germany	D	0.0	No landings
2022	27.3.a.21	3	Germany	D	0.0	No landings
2022	27.3.a.21	4	Germany	D	0.0	No landings
2022	27.3.a.21	1	Sweden	C	8.5	2021 Sweden 27.3.a.21 fleetC Q1
2022	27.3.a.21	2	Sweden	C	0.6	2021 Sweden 27.3.a.21 fleetC Q1
2022	27.3.a.21	3	Sweden	C	10.9	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.21	4	Sweden	C	5.0	2021 Sweden 27.3.a.20 fleetC Q3
2022	27.3.a.21	1	Sweden	D	0.0	No landings
2022	27.3.a.21	2	Sweden	D	0.0	No landings
2022	27.3.a.21	3	Sweden	D	0.0	No landings
2022	27.3.a.21	4	Sweden	D	115.5	Sampling
2022	27.3.b.23	1	Denmark	F - active	0.0	No landings
2022	27.3.b.23	2	Denmark	F - active	0.0	No landings
2022	27.3.b.23	3	Denmark	F - active	0.0	No landings
2022	27.3.b.23	4	Denmark	F - active	0.0	No landings
2022	27.3.b.23	1	Denmark	F - passive	0.0	No landings
2022	27.3.b.23	2	Denmark	F - passive	0.0	No landings
2022	27.3.b.23	3	Denmark	F - passive	0.0	2022 Sweden 27.3.b.23 fleetF - passive Q4
2022	27.3.b.23	4	Denmark	F - passive	0.5	2022 Sweden 27.3.b.23 fleetF - passive Q4
2022	27.3.b.23	1	Sweden	F - active	0.0	No landings
2022	27.3.b.23	2	Sweden	F - active	0.0	No landings
2022	27.3.b.23	3	Sweden	F - active	0.0	No landings
2022	27.3.b.23	4	Sweden	F - active	0.0	No landings
2022	27.3.b.23	1	Sweden	F - passive	45.1	2022 Sweden 27.3.b.23 fleetF - passive Q4
2022	27.3.b.23	2	Sweden	F - passive	0.0	No landings
2022	27.3.b.23	3	Sweden	F - passive	12.5	2022 Sweden 27.3.b.23 fleetF - passive Q4
2022	27.3.b.23	4	Sweden	F - passive	186.9	Sampling
2022	27.3.c.22	1	Denmark	F - active	0.0	No landings
2022	27.3.c.22	2	Denmark	F - active	0.0	No landings
2022	27.3.c.22	3	Denmark	F - active	0.0	No landings
2022	27.3.c.22	4	Denmark	F - active	0.0	No landings
2022	27.3.c.22	1	Denmark	F - passive	0.9	2022 Germany 27.3.c.22 fleetF - passive Q1
2022	27.3.c.22	2	Denmark	F - passive	6.1	2022 Germany 27.3.c.22 fleetF - passive Q2
2022	27.3.c.22	3	Denmark	F - passive	0.2	2022 Germany 27.3.c.22 fleetF - passive Q4
2022	27.3.c.22	4	Denmark	F - passive	1.0	2022 Germany 27.3.c.22 fleetF - passive Q4
2022	27.3.c.22	1	Germany	F - active	0.0	No landings

year	area	quarter	ctry	fleet	landings (t)	sampling
2022	27.3.c.22	2	Germany	F - active	0.0	2021 Denmark 27.3.d.24 fleetF - active Q1
2022	27.3.c.22	3	Germany	F - active	0.0	2021 Germany 27.3.c.22 fleetF - active Q3
2022	27.3.c.22	4	Germany	F - active	0.1	2021 Germany 27.3.c.22 fleetF - active Q3
2022	27.3.c.22	1	Germany	F - passive	8.3	Sampling
2022	27.3.c.22	2	Germany	F - passive	1.2	Sampling
2022	27.3.c.22	3	Germany	F - passive	0.1	2022 Germany 27.3.c.22 fleetF - passive Q4
2022	27.3.c.22	4	Germany	F - passive	5.3	Sampling
2022	27.3.c.22	1	Poland	F - active	0.0	No landings
2022	27.3.c.22	2	Poland	F - active	0.0	No landings
2022	27.3.c.22	3	Poland	F - active	0.0	No landings
2022	27.3.c.22	4	Poland	F - active	0.0	No landings
2022	27.3.c.22	1	Poland	F - passive	0.0	No landings
2022	27.3.c.22	2	Poland	F - passive	0.0	No landings
2022	27.3.c.22	3	Poland	F - passive	0.0	No landings
2022	27.3.c.22	4	Poland	F - passive	0.0	No landings
2022	27.3.c.22	1	Sweden	F - active	0.0	No landings
2022	27.3.c.22	2	Sweden	F - active	0.0	No landings
2022	27.3.c.22	3	Sweden	F - active	0.0	No landings
2022	27.3.c.22	4	Sweden	F - active	0.0	No landings
2022	27.3.c.22	1	Sweden	F - passive	0.0	No landings
2022	27.3.c.22	2	Sweden	F - passive	0.0	No landings
2022	27.3.c.22	3	Sweden	F - passive	0.0	No landings
2022	27.3.c.22	4	Sweden	F - passive	0.0	No landings
2022	27.3.d.24	1	Denmark	F - active	0.0	No landings
2022	27.3.d.24	2	Denmark	F - active	0.1	2021 Denmark 27.3.d.24 fleetF - active Q1
2022	27.3.d.24	3	Denmark	F - active	0.0	2021 Germany 27.3.d.24 fleetF - active Q4
2022	27.3.d.24	4	Denmark	F - active	0.1	2021 Denmark 27.3.d.24 fleetF - active Q4
2022	27.3.d.24	1	Denmark	F - passive	0.0	No landings
2022	27.3.d.24	2	Denmark	F - passive	0.0	No landings
2022	27.3.d.24	3	Denmark	F - passive	0.0	2022 Germany 27.3.d.24 fleetF - passive Q4
2022	27.3.d.24	4	Denmark	F - passive	0.7	2022 Germany 27.3.d.24 fleetF - passive Q4
2022	27.3.d.24	1	Germany	F - active	21.8	2021 Denmark 27.3.d.24 fleetF - active Q1
2022	27.3.d.24	2	Germany	F - active	9.2	2021 Denmark 27.3.d.24 fleetF - active Q1
2022	27.3.d.24	3	Germany	F - active	0.0	No landings
2022	27.3.d.24	4	Germany	F - active	2.0	2021 Germany 27.3.d.24 fleetF - active Q4
2022	27.3.d.24	1	Germany	F - passive	133.7	Sampling
2022	27.3.d.24	2	Germany	F - passive	23.9	Sampling
2022	27.3.d.24	3	Germany	F - passive	3.4	2022 Germany 27.3.d.24 fleetF - passive Q4
2022	27.3.d.24	4	Germany	F - passive	16.4	Sampling
2022	27.3.d.24	1	Poland	F - active	0.0	No landings
2022	27.3.d.24	2	Poland	F - active	0.0	No landings
2022	27.3.d.24	3	Poland	F - active	1.8	2021 Germany 27.3.d.24 fleetF - active Q4
2022	27.3.d.24	4	Poland	F - active	87.6	2021 Germany 27.3.d.24 fleetF - active Q4
2022	27.3.d.24	1	Poland	F - passive	36.9	Sampling
2022	27.3.d.24	2	Poland	F - passive	24.5	Sampling
2022	27.3.d.24	3	Poland	F - passive	0.0	No landings
2022	27.3.d.24	4	Poland	F - passive	0.0	No landings
2022	27.3.d.24	1	Sweden	F - active	0.0	No landings
2022	27.3.d.24	2	Sweden	F - active	0.0	No landings
2022	27.3.d.24	3	Sweden	F - active	0.0	No landings
2022	27.3.d.24	4	Sweden	F - active	0.0	No landings
2022	27.3.d.24	1	Sweden	F - passive	1.2	2022 Germany 27.3.d.24 fleetF - passive Q2
2022	27.3.d.24	2	Sweden	F - passive	0.1	2022 Germany 27.3.d.24 fleetF - passive Q2
2022	27.3.d.24	3	Sweden	F - passive	0.0	No landings
2022	27.3.d.24	4	Sweden	F - passive	5.8	2022 Germany 27.3.d.24 fleetF - passive Q4

Table 3.2.3 WESTERN BALTIC HERRING. Both WBSS and NSAS. CANUM: Catch in numbers (mill), WECA: mean weight (g) and SOP (t) by age as W-ringers, area, fleet, and quarter in 2022

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.20	C	1	CANUM	-	-	1.96	-	-	-	-	-	-	**1.96**
2022	27.3.a.20	C	2	CANUM	-	-	0.25	-	-	-	-	-	-	**0.25**
2022	27.3.a.20	C	3	CANUM	-	0.01	0.28	0.19	0.19	0.09	0.07	0.03	0.04	**0.90**
2022	27.3.a.20	C	4	CANUM	-	0.01	0.20	0.14	0.14	0.07	0.05	0.02	0.03	**0.66**
2022	27.3.a.20	D	1	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	CANUM	0.56	1.63	0.13	-	-	-	-	-	-	**2.32**
2022	27.3.a.20	D	3	CANUM	0.09	0.26	0.02	-	-	-	-	-	-	**0.37**
2022	27.3.a.20	D	4	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	CANUM	-	0.04	1.47	0.18	0.03	0.00	-	-	-	**1.71**
2022	27.3.a.21	C	2	CANUM	-	0.01	0.26	0.03	0.00	0.00	-	-	-	**0.30**
2022	27.3.a.21	C	3	CANUM	-	0.00	0.02	0.02	0.02	0.01	0.01	0.00	0.00	**0.08**
2022	27.3.a.21	C	4	CANUM	-	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	**0.05**
2022	27.3.a.21	D	1	CANUM	-	0.00	0.10	0.01	0.00	0.00	-	-	-	**0.12**
2022	27.3.a.21	D	2	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	CANUM	0.58	1.69	0.13	-	-	-	-	-	-	**2.40**
2022	27.3.b.23	F	1	CANUM	-	0.00	0.02	0.03	0.07	0.06	0.04	0.01	0.01	**0.25**
2022	27.3.b.23	F	2	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	CANUM	-	0.00	0.01	0.01	0.02	0.02	0.01	0.00	0.00	**0.07**
2022	27.3.b.23	F	4	CANUM	-	0.00	0.08	0.14	0.28	0.26	0.15	0.06	0.04	**1.02**
2022	27.3.c.22	F	1	CANUM	-	-	-	0.00	0.00	0.01	0.02	0.02	0.02	**0.05**
2022	27.3.c.22	F	2	CANUM	-	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.01	**0.06**
2022	27.3.c.22	F	3	CANUM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2022	27.3.c.22	F	4	CANUM	0.00	0.00	0.01	0.02	0.01	0.01	0.01	0.00	0.00	**0.07**
2022	27.3.d.24	F	1	CANUM	-	0.04	0.08	0.30	0.23	0.27	0.24	0.24	0.19	**1.60**
2022	27.3.d.24	F	2	CANUM	-	0.02	0.04	0.18	0.13	0.11	0.07	0.05	0.04	**0.65**
2022	27.3.d.24	F	3	CANUM	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	**0.03**
2022	27.3.d.24	F	4	CANUM	0.00	0.01	0.12	0.24	0.19	0.13	0.08	0.05	0.02	**0.85**
2022	27.3.a.20	C	1	SOP	-	-	100.94	-	-	-	-	-	-	**100.94**
2022	27.3.a.20	C	2	SOP	-	-	13.00	-	-	-	-	-	-	**13.00**
2022	27.3.a.20	C	3	SOP	-	0.71	36.63	25.08	29.56	15.51	14.06	6.15	8.37	**136.06**
2022	27.3.a.20	C	4	SOP	-	0.35	26.70	18.36	21.64	11.35	10.28	4.49	6.14	**99.32**
2022	27.3.a.20	D	1	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	SOP	14.65	85.46	11.50	-	-	-	-	-	-	**111.62**
2022	27.3.a.20	D	3	SOP	2.31	13.49	1.82	-	-	-	-	-	-	**17.62**
2022	27.3.a.20	D	4	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	SOP	-	0.87	75.43	12.86	3.03	0.31	-	-	-	**92.50**
2022	27.3.a.21	C	2	SOP	-	0.15	13.28	2.26	0.53	0.05	-	-	-	**16.28**
2022	27.3.a.21	C	3	SOP	-	0.14	3.08	2.08	2.44	1.29	1.17	0.51	0.69	**11.39**
2022	27.3.a.21	C	4	SOP	-	0.31	1.78	1.09	1.27	0.69	0.64	0.28	0.34	**6.40**
2022	27.3.a.21	D	1	SOP	-	0.06	5.35	0.91	0.22	0.02	-	-	-	**6.57**

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.21	D	2	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	SOP	15.16	88.42	11.90	-	-	-	-	-	-	**115.48**
2022	27.3.b.23	F	1	SOP	-	0.05	2.88	5.63	11.91	12.17	7.56	2.77	2.12	**45.10**
2022	27.3.b.23	F	2	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	SOP	-	0.01	0.80	1.56	3.31	3.38	2.10	0.77	0.59	**12.53**
2022	27.3.b.23	F	4	SOP	-	0.21	11.96	23.42	49.53	50.59	31.41	11.51	8.83	**187.46**
2022	27.3.c.22	F	1	SOP	-	-	-	0.07	0.22	1.00	2.51	2.65	2.76	**9.21**
2022	27.3.c.22	F	2	SOP	-	0.00	0.03	0.72	0.64	1.29	2.26	1.14	1.17	**7.27**
2022	27.3.c.22	F	3	SOP	0.00	0.01	0.04	0.09	0.06	0.07	0.04	0.01	0.02	**0.33**
2022	27.3.c.22	F	4	SOP	0.00	0.12	0.76	1.67	1.06	1.30	0.81	0.19	0.49	**6.40**
2022	27.3.d.24	F	1	SOP	-	0.68	4.33	18.68	19.57	31.93	39.00	43.14	36.32	**193.66**
2022	27.3.d.24	F	2	SOP	-	0.29	1.93	11.15	10.26	9.79	9.78	7.88	6.68	**57.76**
2022	27.3.d.24	F	3	SOP	0.00	0.01	0.24	0.78	0.94	1.63	0.78	0.49	0.35	**5.22**
2022	27.3.d.24	F	4	SOP	0.07	0.50	9.91	25.92	26.88	21.64	13.63	9.56	4.55	**112.66**
2022	27.3.a.20	C	1	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	2	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	3	WECA	-	59.30	131.35	133.02	158.52	170.43	193.09	197.52	204.53	**150.90**
2022	27.3.a.20	C	4	WECA	-	61.69	131.46	133.01	158.51	170.41	193.02	197.36	204.58	**151.39**
2022	27.3.a.20	D	1	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**48.06**
2022	27.3.a.20	D	3	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**48.06**
2022	27.3.a.20	D	4	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**54.04**
2022	27.3.a.21	C	2	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**54.04**
2022	27.3.a.21	C	3	WECA	-	56.60	130.87	133.09	158.59	170.52	193.36	198.23	204.31	**148.88**
2022	27.3.a.21	C	4	WECA	-	55.17	128.43	133.49	158.98	171.02	194.91	202.24	202.96	**138.95**
2022	27.3.a.21	D	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**54.04**
2022	27.3.a.21	D	2	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**48.06**
2022	27.3.b.23	F	1	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.b.23	F	2	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.b.23	F	4	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.c.22	F	1	WECA	-	-	-	152.29	145.43	161.22	163.20	170.16	179.87	**169.08**
2022	27.3.c.22	F	2	WECA	-	16.17	61.11	68.50	104.96	115.29	127.23	146.05	157.91	**118.21**
2022	27.3.c.22	F	3	WECA	20.10	60.63	74.25	88.63	98.87	105.55	106.08	143.78	103.75	**94.57**
2022	27.3.c.22	F	4	WECA	20.10	61.36	73.76	87.58	96.03	104.13	103.77	138.39	102.62	**93.06**
2022	27.3.d.24	F	1	WECA	-	16.17	51.82	62.41	86.71	116.23	159.27	180.37	186.72	**120.75**
2022	27.3.d.24	F	2	WECA	-	16.17	51.39	61.10	78.65	85.88	131.31	156.98	163.95	**89.17**
2022	27.3.d.24	F	3	WECA	20.10	38.38	89.00	122.70	153.31	186.65	188.20	198.22	204.43	**160.37**
2022	27.3.d.24	F	4	WECA	20.04	38.40	84.06	109.66	139.09	166.75	177.32	187.32	195.92	**133.32**

Table 3.2.4 WESTERN BALTIC HERRING. Proportion of North Sea autumn spawners (NSAS) and Western Baltic spring spawners (WBSS) in Skagerrak (27.3.a.20) and Kattegat (27.3.a.21) by age as W-ringers and quarter. n: number of individuals sampled for stock. The samples can come from both commercial and scientific survey sampling schemes.

year	area	quarter	type	0	1	2	3	4	5	6	7	8+
2022	27.3.a.20	1	n	0	38	106	18	7	11	4	0	1
2022	27.3.a.20	1	NSAS	-	-	0.9038	-	-	-	-	-	-
2022	27.3.a.20	1	WBSS	-	-	0.0962	-	-	-	-	-	-
2022	27.3.a.20	2	n	0	17	122	16	10	8	8	2	1
2022	27.3.a.20	2	NSAS	0.9672	0.9925	0.9638	-	-	-	-	-	-
2022	27.3.a.20	2	WBSS	0.0328	0.0075	0.0362	-	-	-	-	-	-
2022	27.3.a.20	3	n	91	198	221	102	89	56	27	9	12
2022	27.3.a.20	3	NSAS	0.8740	0.9229	0.7130	0.4987	0.3976	0.3840	0.4186	0.4664	0.4892
2022	27.3.a.20	3	WBSS	0.1260	0.0771	0.2870	0.5013	0.6024	0.6160	0.5814	0.5336	0.5108
2022	27.3.a.20	4	n	0	0	0	0	0	0	0	0	0
2022	27.3.a.20	4	NSAS	-	0.9229	0.7130	0.4987	0.3976	0.3840	0.4186	0.4664	0.4892
2022	27.3.a.20	4	WBSS	-	0.0771	0.2870	0.5013	0.6024	0.6160	0.5814	0.5336	0.5108
2022	27.3.a.21	1	n	0	63	19	14	4	0	0	0	0
2022	27.3.a.21	1	NSAS	-	0.8794	0.6472	0.2105	0.0379	0.0103	-	-	-
2022	27.3.a.21	1	WBSS	-	0.1206	0.3528	0.7895	0.9621	0.9897	-	-	-
2022	27.3.a.21	2	n	0	0	0	0	0	0	0	0	0
2022	27.3.a.21	2	NSAS	-	0.9788	0.8386	0.6162	0.5316	0.6043	-	-	-
2022	27.3.a.21	2	WBSS	-	0.0212	0.1614	0.3838	0.4684	0.3957	-	-	-
2022	27.3.a.21	3	n	144	303	127	52	14	10	13	4	2
2022	27.3.a.21	3	NSAS	-	0.8069	0.3266	0.2132	0.2832	0.4493	0.5641	0.4609	0.1132
2022	27.3.a.21	3	WBSS	-	0.1931	0.6734	0.7868	0.7168	0.5507	0.4359	0.5391	0.8868
2022	27.3.a.21	4	n	0	0	0	0	0	0	0	0	0
2022	27.3.a.21	4	NSAS	0.9448	0.8069	0.3266	0.2132	0.2832	0.4493	0.5641	0.4609	0.1132
2022	27.3.a.21	4	WBSS	0.0552	0.1931	0.6734	0.7868	0.7168	0.5507	0.4359	0.5391	0.8868

Table 3.2.5 WESTERN BALTIC HERRING. NSAS in Skagerrak (27.3.a.20) and Kattegat (27.3.a.21). CANUM: Catch in numbers (mill), WECA: mean weight (g) and SOP (t) by age as W-ringers, area, fleet, and quarter in 2022

year	area	fleet	quarter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.20	C	1	CANUM	-	-	1.77	-	-	-	-	-	-	**1.77**
2022	27.3.a.20	C	2	CANUM	-	-	0.24	-	-	-	-	-	-	**0.24**
2022	27.3.a.20	C	3	CANUM	-	0.01	0.20	0.09	0.07	0.03	0.03	0.01	0.02	**0.48**
2022	27.3.a.20	C	4	CANUM	-	0.01	0.14	0.07	0.05	0.03	0.02	0.01	0.01	**0.35**
2022	27.3.a.20	D	1	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	CANUM	0.55	1.62	0.12	-	-	-	-	-	-	**2.29**
2022	27.3.a.20	D	3	CANUM	0.08	0.24	0.01	-	-	-	-	-	-	**0.33**
2022	27.3.a.20	D	4	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	CANUM	-	0.03	0.95	0.04	0.00	0.00	-	-	-	**1.02**
2022	27.3.a.21	C	2	CANUM	-	0.01	0.22	0.02	0.00	0.00	-	-	-	**0.25**
2022	27.3.a.21	C	3	CANUM	-	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.03**
2022	27.3.a.21	C	4	CANUM	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**
2022	27.3.a.21	D	1	CANUM	-	0.00	0.07	0.00	0.00	0.00	-	-	-	**0.07**
2022	27.3.a.21	D	2	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	CANUM	0.55	1.36	0.04	-	-	-	-	-	-	**1.96**
2022	27.3.a.20	C	1	SOP	-	-	91.24	-	-	-	-	-	-	**91.24**

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.20	C	2	SOP	-	-	12.53	-	-	-	-	-	-	**12.53**
2022	27.3.a.20	C	3	SOP	-	0.65	26.12	12.51	11.75	5.96	5.89	2.87	4.09	**69.83**
2022	27.3.a.20	C	4	SOP	-	0.33	19.04	9.16	8.61	4.36	4.30	2.09	3.00	**50.88**
2022	27.3.a.20	D	1	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	SOP	14.17	84.82	11.09	-	-	-	-	-	-	**110.08**
2022	27.3.a.20	D	3	SOP	2.02	12.45	1.29	-	-	-	-	-	-	**15.77**
2022	27.3.a.20	D	4	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	SOP	-	0.77	48.82	2.71	0.11	0.00	-	-	-	**52.42**
2022	27.3.a.21	C	2	SOP	-	0.15	11.13	1.40	0.28	0.03	-	-	-	**13.00**
2022	27.3.a.21	C	3	SOP	-	0.11	1.01	0.44	0.69	0.58	0.66	0.24	0.08	**3.80**
2022	27.3.a.21	C	4	SOP	-	0.25	0.58	0.23	0.36	0.31	0.36	0.13	0.04	**2.26**
2022	27.3.a.21	D	1	SOP	-	0.05	3.46	0.19	0.01	0.00	-	-	-	**3.72**
2022	27.3.a.21	D	2	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	SOP	14.32	71.34	3.89	-	-	-	-	-	-	**89.55**
2022	27.3.a.20	C	1	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	2	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	3	WECA	-	59.30	131.35	133.02	158.52	170.43	193.09	197.52	204.53	**146.10**
2022	27.3.a.20	C	4	WECA	-	61.69	131.46	133.01	158.51	170.41	193.02	197.36	204.58	**146.90**
2022	27.3.a.20	D	1	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**48.13**
2022	27.3.a.20	D	3	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**47.81**
2022	27.3.a.20	D	4	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**51.31**
2022	27.3.a.21	C	2	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**53.01**
2022	27.3.a.21	C	3	WECA	-	56.60	130.87	133.09	158.59	170.52	193.36	198.23	204.31	**147.90**
2022	27.3.a.21	C	4	WECA	-	55.17	128.43	133.49	158.98	171.02	194.91	202.24	202.96	**128.54**
2022	27.3.a.21	D	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**51.31**
2022	27.3.a.21	D	2	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**45.76**

Table 3.2.6 WESTERN BALTIC HERRING. WBSS. CANUM: Catch in numbers (mill), WECA: mean weight (g) and SOP (t) by age as W-ringers, area, fleet, and quarter in 2022

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.20	C	1	CANUM	-	-	0.19	-	-	-	-	-	-	**0.19**
2022	27.3.a.20	C	2	CANUM	-	-	0.01	-	-	-	-	-	-	**0.01**
2022	27.3.a.20	C	3	CANUM	-	0.00	0.08	0.09	0.11	0.06	0.04	0.02	0.02	**0.42**
2022	27.3.a.20	C	4	CANUM	-	0.00	0.06	0.07	0.08	0.04	0.03	0.01	0.02	**0.31**
2022	27.3.a.20	D	1	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	CANUM	0.02	0.01	0.00	-	-	-	-	-	-	**0.04**
2022	27.3.a.20	D	3	CANUM	0.01	0.02	0.01	-	-	-	-	-	-	**0.04**
2022	27.3.a.20	D	4	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	CANUM	-	0.00	0.52	0.14	0.03	0.00	-	-	-	**0.69**
2022	27.3.a.21	C	2	CANUM	-	0.00	0.04	0.01	0.00	0.00	-	-	-	**0.06**
2022	27.3.a.21	C	3	CANUM	-	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	**0.05**
2022	27.3.a.21	C	4	CANUM	-	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	**0.03**
2022	27.3.a.21	D	1	CANUM	-	0.00	0.04	0.01	0.00	0.00	-	-	-	**0.05**
2022	27.3.a.21	D	2	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	CANUM	0.03	0.33	0.09	-	-	-	-	-	-	**0.45**
2022	27.3.b.23	F	1	CANUM	-	0.00	0.02	0.03	0.07	0.06	0.04	0.01	0.01	**0.25**
2022	27.3.b.23	F	2	CANUM	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	CANUM	-	0.00	0.01	0.01	0.02	0.02	0.01	0.00	0.00	**0.07**
2022	27.3.b.23	F	4	CANUM	-	0.00	0.08	0.14	0.28	0.26	0.15	0.06	0.04	**1.02**
2022	27.3.c.22	F	1	CANUM	-	-	-	0.00	0.00	0.01	0.02	0.02	0.02	**0.05**
2022	27.3.c.22	F	2	CANUM	-	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.01	**0.06**
2022	27.3.c.22	F	3	CANUM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2022	27.3.c.22	F	4	CANUM	0.00	0.00	0.01	0.02	0.01	0.01	0.01	0.00	0.00	**0.07**
2022	27.3.d.24	F	1	CANUM	-	0.04	0.08	0.30	0.23	0.27	0.24	0.24	0.19	**1.60**
2022	27.3.d.24	F	2	CANUM	-	0.02	0.04	0.18	0.13	0.11	0.07	0.05	0.04	**0.65**
2022	27.3.d.24	F	3	CANUM	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	**0.03**
2022	27.3.d.24	F	4	CANUM	0.00	0.01	0.12	0.24	0.19	0.13	0.08	0.05	0.02	**0.85**
2022	27.4.a.e	A	1	CANUM	-	-	2.54	0.35	0.34	-	-	-	-	**3.22**
2022	27.4.a.e	A	2	CANUM	-	0.00	3.29	5.96	6.09	4.72	3.98	2.51	3.00	**29.54**
2022	27.4.a.e	A	3	CANUM	-	0.10	0.42	0.39	0.74	0.41	0.47	-	0.25	**2.78**
2022	27.4.a.e	A	4	CANUM	-	-	-	-	0.04	-	0.02	-	-	**0.06**
2022	27.3.a.20	C	1	SOP	-	-	9.71	-	-	-	-	-	-	**9.71**
2022	27.3.a.20	C	2	SOP	-	-	0.47	-	-	-	-	-	-	**0.47**
2022	27.3.a.20	C	3	SOP	-	0.05	10.51	12.57	17.81	9.56	8.18	3.28	4.27	**66.23**

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.20	C	4	SOP	-	0.03	7.66	9.20	13.04	6.99	5.98	2.40	3.13	**48.43**
2022	27.3.a.20	D	1	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	SOP	0.48	0.64	0.42	-	-	-	-	-	-	**1.54**
2022	27.3.a.20	D	3	SOP	0.29	1.04	0.52	-	-	-	-	-	-	**1.85**
2022	27.3.a.20	D	4	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	C	1	SOP	-	0.11	26.61	10.16	2.92	0.30	-	-	-	**40.09**
2022	27.3.a.21	C	2	SOP	-	0.00	2.14	0.87	0.25	0.02	-	-	-	**3.29**
2022	27.3.a.21	C	3	SOP	-	0.03	2.08	1.63	1.75	0.71	0.51	0.28	0.61	**7.59**
2022	27.3.a.21	C	4	SOP	-	0.06	1.20	0.86	0.91	0.38	0.28	0.15	0.30	**4.14**
2022	27.3.a.21	D	1	SOP	-	0.01	1.89	0.72	0.21	0.02	-	-	-	**2.85**
2022	27.3.a.21	D	2	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	SOP	0.84	17.08	8.01	-	-	-	-	-	-	**25.93**
2022	27.3.b.23	F	1	SOP	-	0.05	2.88	5.63	11.91	12.17	7.56	2.77	2.12	**45.10**
2022	27.3.b.23	F	2	SOP	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	SOP	-	0.01	0.80	1.56	3.31	3.38	2.10	0.77	0.59	**12.53**
2022	27.3.b.23	F	4	SOP	-	0.21	11.96	23.42	49.53	50.59	31.41	11.51	8.83	**187.46**
2022	27.3.c.22	F	1	SOP	-	-	-	0.07	0.22	1.00	2.51	2.65	2.76	**9.21**
2022	27.3.c.22	F	2	SOP	-	0.00	0.03	0.72	0.64	1.29	2.26	1.14	1.17	**7.27**
2022	27.3.c.22	F	3	SOP	0.00	0.01	0.04	0.09	0.06	0.07	0.04	0.01	0.02	**0.33**
2022	27.3.c.22	F	4	SOP	0.00	0.12	0.76	1.67	1.06	1.30	0.81	0.19	0.49	**6.40**
2022	27.3.d.24	F	1	SOP	-	0.68	4.33	18.68	19.57	31.93	39.00	43.14	36.32	**193.66**
2022	27.3.d.24	F	2	SOP	-	0.29	1.93	11.15	10.26	9.79	9.78	7.88	6.68	**57.76**
2022	27.3.d.24	F	3	SOP	0.00	0.01	0.24	0.78	0.94	1.63	0.78	0.49	0.35	**5.22**
2022	27.3.d.24	F	4	SOP	0.07	0.50	9.91	25.92	26.88	21.64	13.63	9.56	4.55	**112.66**
2022	27.4.a.e	A	1	SOP	-	-	207.91	36.92	39.34	-	-	-	-	**284.18**
2022	27.4.a.e	A	2	SOP	-	0.21	417.97	774.80	858.21	797.68	692.06	481.84	603.24	**4626.00**
2022	27.4.a.e	A	3	SOP	-	6.71	61.49	67.65	125.60	76.56	86.94	-	55.78	**480.74**
2022	27.4.a.e	A	4	SOP	-	-	-	-	5.90	-	4.74	-	-	**10.63**
2022	27.3.a.20	C	1	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	2	WECA	-	-	51.61	-	-	-	-	-	-	**51.61**
2022	27.3.a.20	C	3	WECA	-	59.30	131.35	133.02	158.52	170.43	193.09	197.52	204.53	**156.31**
2022	27.3.a.20	C	4	WECA	-	61.69	131.46	133.01	158.51	170.41	193.02	197.36	204.58	**156.41**
2022	27.3.a.20	D	1	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.20	D	2	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**43.56**
2022	27.3.a.20	D	3	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**50.37**
2022	27.3.a.20	D	4	WECA	-	-	-	-	-	-	-	-	-	**-**

year	area	fleet	quar-ter	type	0	1	2	3	4	5	6	7	8+	Total
2022	27.3.a.21	C	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**58.08**
2022	27.3.a.21	C	2	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**58.53**
2022	27.3.a.21	C	3	WECA	-	56.60	130.87	133.09	158.59	170.52	193.36	198.23	204.31	**149.38**
2022	27.3.a.21	C	4	WECA	-	55.17	128.43	133.49	158.98	171.02	194.91	202.24	202.96	**145.39**
2022	27.3.a.21	D	1	WECA	-	22.80	51.40	73.40	112.90	81.10	-	-	-	**58.08**
2022	27.3.a.21	D	2	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	3	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.a.21	D	4	WECA	25.94	52.37	91.63	-	-	-	-	-	-	**58.16**
2022	27.3.b.23	F	1	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.b.23	F	2	WECA	-	-	-	-	-	-	-	-	-	**-**
2022	27.3.b.23	F	3	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.b.23	F	4	WECA	-	140.82	153.78	161.60	178.38	191.71	203.86	203.93	206.67	**183.97**
2022	27.3.c.22	F	1	WECA	-	-	-	152.29	145.43	161.22	163.20	170.16	179.87	**169.08**
2022	27.3.c.22	F	2	WECA	-	16.17	61.11	68.50	104.96	115.29	127.23	146.05	157.91	**118.21**
2022	27.3.c.22	F	3	WECA	20.10	60.63	74.25	88.63	98.87	105.55	106.08	143.78	103.75	**94.57**
2022	27.3.c.22	F	4	WECA	20.10	61.36	73.76	87.58	96.03	104.13	103.77	138.39	102.62	**93.06**
2022	27.3.d.24	F	1	WECA	-	16.17	51.82	62.41	86.71	116.23	159.27	180.37	186.72	**120.75**
2022	27.3.d.24	F	2	WECA	-	16.17	51.39	61.10	78.65	85.88	131.31	156.98	163.95	**89.17**
2022	27.3.d.24	F	3	WECA	20.10	38.38	89.00	122.70	153.31	186.65	188.20	198.22	204.43	**160.37**
2022	27.3.d.24	F	4	WECA	20.04	38.40	84.06	109.66	139.09	166.75	177.32	187.32	195.92	**133.32**
2022	27.4.a.e	A	1	WECA	-	-	82.00	105.00	117.00	-	-	-	-	**88.16**
2022	27.4.a.e	A	2	WECA	-	63.00	127.00	130.00	141.00	169.00	174.00	192.00	201.31	**156.58**
2022	27.4.a.e	A	3	WECA	-	69.00	147.00	172.00	169.00	186.00	186.00	-	225.45	**173.02**
2022	27.4.a.e	A	4	WECA	-	-	-	-	160.00	-	248.00	-	-	**190.05**

Table 3.2.7 WESTERN BALTIC HERRING. WBSS. CANUM: Catch in numbers (mill), WECA: mean weight (g) and SOP (t) by age as W-ringers in 1993-2022

year	area	type	0	1	2	3	4	5	6	7	8+	Total
1993	27.3.a & 27.4.a.e	CANUM	161.25	371.50	315.82	219.05	94.08	59.43	40.97	21.71	8.22	**1292.03**
1993	27.3.b & 27.3.c & 27.3.d.24	CANUM	44.85	159.21	180.13	196.06	166.87	151.07	61.80	42.21	16.31	**1018.51**
1994	27.3.a & 27.4.a.e	CANUM	60.62	153.11	261.14	221.64	130.97	77.30	44.40	14.39	8.62	**972.19**
1994	27.3.b & 27.3.c & 27.3.d.24	CANUM	202.58	96.29	103.84	161.01	136.06	90.84	74.02	35.11	24.47	**924.22**
1995	27.3.a & 27.4.a.e	CANUM	50.31	302.51	204.19	97.93	90.86	30.55	21.28	12.01	7.24	**816.86**
1995	27.3.b & 27.3.c & 27.3.d.24	CANUM	490.99	1358.18	233.95	128.88	104.01	53.57	38.82	20.87	13.22	**2442.49**
1996	27.3.a & 27.4.a.e	CANUM	166.23	228.05	317.74	75.60	40.41	30.63	12.58	6.73	5.63	**883.60**
1996	27.3.b & 27.3.c & 27.3.d.24	CANUM	4.91	410.82	82.84	124.08	103.75	99.46	52.69	23.98	19.48	**922.02**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
1997	27.3.a & 27.4.a.e	CANUM	25.97	73.43	158.71	180.06	30.15	14.15	4.77	1.75	2.31	**491.31**
1997	27.3.b & 27.3.c & 27.3.d.24	CANUM	350.83	595.19	130.62	96.86	45.13	28.96	35.15	19.46	21.83	**1324.02**
1998	27.3.a & 27.4.a.e	CANUM	36.26	175.14	315.15	94.53	54.72	11.19	8.72	2.19	2.09	**699.98**
1998	27.3.b & 27.3.c & 27.3.d.24	CANUM	513.51	447.93	115.75	88.33	91.97	34.13	15.04	13.21	12.02	**1331.90**
1999	27.3.a & 27.4.a.e	CANUM	41.34	190.29	155.67	122.26	43.16	22.21	4.42	3.02	2.40	**584.77**
1999	27.3.b & 27.3.c & 27.3.d.24	CANUM	528.26	425.84	178.67	123.95	47.10	33.71	11.07	6.46	3.68	**1358.73**
2000	27.3.a & 27.4.a.e	CANUM	114.83	318.22	302.10	99.88	50.85	18.76	8.21	1.35	1.40	**915.60**
2000	27.3.b & 27.3.c & 27.3.d.24	CANUM	37.75	616.32	194.30	86.73	77.78	52.96	30.06	12.43	9.29	**1117.62**
2001	27.3.a & 27.4.a.e	CANUM	121.68	36.63	208.10	111.08	32.06	19.67	9.84	4.17	2.42	**545.65**
2001	27.3.b & 27.3.c & 27.3.d.24	CANUM	634.60	486.53	280.71	146.76	76.04	48.71	29.25	14.14	4.27	**1721.02**
2002	27.3.a & 27.4.a.e	CANUM	69.63	577.69	168.26	134.60	53.09	12.05	7.48	2.43	2.02	**1027.26**
2002	27.3.b & 27.3.c & 27.3.d.24	CANUM	80.64	81.44	113.58	186.71	119.19	45.11	31.05	11.41	6.31	**675.44**
2003	27.3.a & 27.4.a.e	CANUM	52.11	63.02	182.52	63.99	62.23	20.31	5.87	3.84	1.62	**455.52**
2003	27.3.b & 27.3.c & 27.3.d.24	CANUM	1.37	63.86	82.33	95.80	125.06	82.18	22.86	13.10	7.01	**493.56**
2004	27.3.a & 27.4.a.e	CANUM	25.67	209.34	96.02	93.98	18.24	16.84	4.51	1.51	0.59	**466.71**
2004	27.3.b & 27.3.c & 27.3.d.24	CANUM	217.88	248.41	101.79	70.79	74.97	74.40	44.45	13.36	10.42	**856.48**
2005	27.3.a & 27.4.a.e	CANUM	95.32	96.87	203.33	75.35	46.93	9.33	11.50	3.46	1.41	**543.51**
2005	27.3.b & 27.3.c & 27.3.d.24	CANUM	11.59	207.56	115.89	102.48	83.46	51.30	54.19	27.77	11.21	**665.46**
2006	27.3.a & 27.4.a.e	CANUM	7.30	104.15	115.60	114.22	48.92	55.75	11.09	10.31	5.15	**472.49**
2006	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.65	44.76	72.07	119.00	101.73	43.00	31.36	22.11	12.16	**446.84**
2007	27.3.a & 27.4.a.e	CANUM	1.63	103.86	90.88	36.91	30.81	12.78	9.45	6.24	2.68	**295.22**
2007	27.3.b & 27.3.c & 27.3.d.24	CANUM	18.96	668.54	158.33	169.66	112.79	65.14	24.63	5.91	1.78	**1225.74**
2008	27.3.a & 27.4.a.e	CANUM	4.90	101.76	71.07	38.92	13.48	15.13	7.73	4.50	1.30	**258.80**
2008	27.3.b & 27.3.c & 27.3.d.24	CANUM	18.96	668.54	158.33	169.66	112.79	65.14	24.63	5.91	1.78	**1225.74**
2009	27.3.a & 27.4.a.e	CANUM	14.80	149.60	132.29	45.85	24.44	10.88	7.80	7.68	5.28	**398.63**
2009	27.3.b & 27.3.c & 27.3.d.24	CANUM	5.93	31.48	110.72	55.48	45.50	37.21	31.95	13.23	7.24	**338.74**
2010	27.3.a & 27.4.a.e	CANUM	9.11	48.57	106.09	45.22	20.77	8.59	5.91	7.24	5.88	**257.38**
2010	27.3.b & 27.3.c & 27.3.d.24	CANUM	3.29	26.49	31.31	39.31	28.45	22.42	13.89	7.96	7.51	**180.63**
2011	27.3.a & 27.4.a.e	CANUM	6.17	83.06	29.87	20.96	13.39	5.99	2.98	1.02	1.12	**164.56**
2011	27.3.b & 27.3.c & 27.3.d.24	CANUM	5.64	15.46	16.41	17.83	35.93	21.64	19.65	11.21	8.21	**151.99**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
2012	27.3.a & 27.4.a.e	CANUM	1.52	30.54	94.31	20.71	9.51	7.09	4.21	2.23	8.56	**178.68**
2012	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.48	46.31	36.50	43.76	37.81	28.35	13.96	9.01	8.44	**224.62**
2013	27.3.a & 27.4.a.e	CANUM	-	12.03	51.73	71.36	11.26	4.35	1.40	0.48	1.02	**153.62**
2013	27.3.b & 27.3.c & 27.3.d.24	CANUM	1.03	60.58	37.10	43.31	55.92	28.72	25.32	11.50	10.99	**274.46**
2014	27.3.a & 27.4.a.e	CANUM	25.32	31.53	22.38	24.24	44.58	7.60	4.55	2.33	2.90	**165.42**
2014	27.3.b & 27.3.c & 27.3.d.24	CANUM	5.84	35.27	37.73	42.12	37.50	19.02	11.20	6.54	6.19	**201.41**
2015	27.3.a & 27.4.a.e	CANUM	3.31	57.75	59.94	20.98	14.10	14.59	4.85	2.68	3.90	**182.10**
2015	27.3.b & 27.3.c & 27.3.d.24	CANUM	26.67	46.24	72.78	38.51	48.44	29.85	14.86	7.86	9.12	**294.32**
2016	27.3.a & 27.4.a.e	CANUM	23.88	27.18	161.73	43.03	13.33	12.10	13.25	3.60	6.55	**304.65**
2016	27.3.b & 27.3.c & 27.3.d.24	CANUM	20.01	22.34	37.25	93.86	45.68	30.54	17.42	10.46	8.26	**285.82**
2017	27.3.a & 27.4.a.e	CANUM	1.43	48.42	42.18	42.82	34.17	10.25	10.88	7.35	2.90	**200.41**
2017	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.07	9.41	32.84	38.54	78.33	38.50	26.94	13.46	10.17	**248.26**
2018	27.3.a & 27.4.a.e	CANUM	0.29	20.47	179.14	17.62	15.19	22.30	6.84	3.90	3.13	**268.88**
2018	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.37	48.38	18.46	34.64	23.06	51.27	16.26	8.84	4.51	**205.79**
2019	27.3.a & 27.4.a.e	CANUM	5.31	38.23	59.24	21.05	8.22	9.74	11.10	2.98	2.64	**158.51**
2019	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.27	6.88	20.67	15.56	13.30	10.33	15.87	6.03	3.52	**92.44**
2020	27.3.a & 27.4.a.e	CANUM	10.78	36.61	54.90	23.35	17.13	7.78	13.62	8.35	5.67	**178.18**
2020	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.03	1.69	2.49	4.58	4.67	6.71	4.15	5.33	1.58	**31.22**
2021	27.3.a & 27.4.a.e	CANUM	1.48	2.20	63.75	17.33	15.57	9.41	5.79	2.69	4.06	**122.29**
2021	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.04	0.59	1.77	3.19	2.53	1.50	1.33	0.93	0.92	**12.81**
2022	27.3.a & 27.4.a.e	CANUM	0.06	0.47	7.30	7.05	7.44	5.24	4.54	2.54	3.28	**37.93**
2022	27.3.b & 27.3.c & 27.3.d.24	CANUM	0.00	0.08	0.35	0.95	0.94	0.90	0.64	0.44	0.34	**4.65**
1993	27.3.a & 27.4.a.e	SOP	2434.91	9611.56	25695.54	27935.64	14120.14	10166.57	8026.96	4540.63	1966.03	**104497.98**
1993	27.3.b & 27.3.c & 27.3.d.24	SOP	728.16	3895.79	8015.32	14420.93	15700.81	18492.58	9233.18	7111.29	2913.86	**80511.93**
1994	27.3.a & 27.4.a.e	SOP	1224.56	6524.31	24766.99	27206.25	19686.09	13043.26	8642.46	3021.51	1897.96	**106013.39**
1994	27.3.b & 27.3.c & 27.3.d.24	SOP	2613.28	2712.82	5627.67	12296.13	12926.14	10689.44	9887.47	5416.74	4255.09	**66424.79**
1995	27.3.a & 27.4.a.e	SOP	901.66	12551.14	19969.61	13517.04	14822.87	6065.33	4404.12	2746.64	1695.68	**76674.09**
1995	27.3.b & 27.3.c & 27.3.d.24	SOP	4567.55	22198.52	10012.98	8802.55	9242.52	6717.94	5836.94	4034.62	2743.17	**74156.79**
1996	27.3.a & 27.4.a.e	SOP	1747.94	6296.43	28617.71	10196.93	6664.61	5714.08	2567.57	1402.34	1241.02	**64448.62**
1996	27.3.b & 27.3.c & 27.3.d.24	SOP	59.46	9410.34	3790.35	9176.81	9559.06	11565.13	6366.55	3333.98	3555.17	**56816.85**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
1997	27.3.a & 27.4.a.e	SOP	497.94	3648.03	12175.61	22912.70	4655.67	2488.87	879.10	336.83	480.33	**48075.08**
1997	27.3.b & 27.3.c & 27.3.d.24	SOP	10664.28	14726.68	7629.60	9782.77	5447.57	4495.70	6373.70	3835.46	4557.05	**67512.81**
1998	27.3.a & 27.4.a.e	SOP	1008.50	8979.66	22541.57	10286.89	7804.06	1921.99	1694.74	402.61	481.46	**55121.49**
1998	27.3.b & 27.3.c & 27.3.d.24	SOP	6831.86	11784.54	6046.07	6943.75	9474.35	4274.81	2255.97	2142.02	2157.56	**51910.94**
1999	27.3.a & 27.4.a.e	SOP	476.52	9697.90	13011.90	14047.56	5231.70	3225.44	748.67	373.38	366.22	**47179.29**
1999	27.3.b & 27.3.c & 27.3.d.24	SOP	5860.25	11455.16	8998.16	10115.52	5276.56	5001.96	1675.65	1084.60	592.39	**50060.25**
2000	27.3.a & 27.4.a.e	SOP	2600.55	10145.19	20357.05	10755.90	7131.34	3188.81	1287.93	249.46	293.63	**56009.87**
2000	27.3.b & 27.3.c & 27.3.d.24	SOP	623.62	13687.78	8309.07	6974.41	9606.20	7053.69	4310.81	1931.33	1406.79	**53903.71**
2001	27.3.a & 27.4.a.e	SOP	1095.59	1875.17	15863.43	12092.68	4657.21	3370.83	1852.00	780.09	492.37	**42079.37**
2001	27.3.b & 27.3.c & 27.3.d.24	SOP	8198.11	10845.78	13128.16	10128.55	7110.63	7345.74	4245.14	2068.45	653.26	**63723.84**
2002	27.3.a & 27.4.a.e	SOP	708.74	11795.44	13161.97	15848.04	7632.35	2045.85	1435.18	481.39	434.97	**53543.92**
2002	27.3.b & 27.3.c & 27.3.d.24	SOP	873.98	2221.32	6561.21	15246.91	12965.46	5958.22	5794.80	2029.69	995.11	**52646.70**
2003	27.3.a & 27.4.a.e	SOP	677.85	2355.21	13956.34	7211.41	8222.76	2859.91	892.23	643.30	256.11	**37075.13**
2003	27.3.b & 27.3.c & 27.3.d.24	SOP	30.80	1644.48	3816.60	7217.62	11902.70	9627.35	2878.73	2057.67	1139.04	**40314.98**
2004	27.3.a & 27.4.a.e	SOP	694.94	9047.40	7868.58	11004.82	2652.45	2651.17	769.31	278.96	110.63	**35078.25**
2004	27.3.b & 27.3.c & 27.3.d.24	SOP	810.64	3560.14	4829.01	5500.15	7224.46	9336.75	6686.03	2215.45	1573.88	**41736.50**
2005	27.3.a & 27.4.a.e	SOP	1341.03	5318.72	17414.88	9163.28	6960.95	1518.52	2027.61	617.71	282.14	**44644.85**
2005	27.3.b & 27.3.c & 27.3.d.24	SOP	157.26	2943.82	5595.72	7513.20	7456.75	5928.01	7782.71	4439.22	1908.12	**43724.81**
2006	27.3.a & 27.4.a.e	SOP	121.25	3846.70	9584.17	12906.53	6971.55	9765.29	2199.10	2159.24	1133.90	**48687.73**
2006	27.3.b & 27.3.c & 27.3.d.24	SOP	13.80	1520.98	4084.76	9991.37	10393.89	5388.28	4513.86	3887.99	2066.24	**41861.19**
2007	27.3.a & 27.4.a.e	SOP	40.92	6815.63	7723.10	4269.33	4265.11	2035.14	1802.16	1113.94	567.07	**28632.40**
2007	27.3.b & 27.3.c & 27.3.d.24	SOP	225.20	18564.43	9073.47	12713.07	11988.06	7903.51	3466.99	961.09	330.68	**65226.50**
2008	27.3.a & 27.4.a.e	SOP	94.08	7280.71	6471.59	4456.26	1916.81	2590.50	1401.67	899.93	256.26	**25367.80**
2008	27.3.b & 27.3.c & 27.3.d.24	SOP	308.89	33104.93	10325.89	14953.38	12465.51	8677.35	3456.01	925.59	307.00	**84524.54**
2009	27.3.a & 27.4.a.e	SOP	198.86	7783.27	11946.08	5436.40	4093.60	1974.15	1668.64	1757.36	1371.35	**36229.71**
2009	27.3.b & 27.3.c & 27.3.d.24	SOP	62.50	889.91	5320.36	5020.17	5629.96	5403.84	5123.78	2264.46	1317.23	**31032.20**
2010	27.3.a & 27.4.a.e	SOP	74.92	2878.22	8990.76	5870.44	3444.74	1685.52	1311.02	1696.32	1512.86	**27464.80**
2010	27.3.b & 27.3.c & 27.3.d.24	SOP	40.13	587.84	1633.42	3421.88	3409.42	3470.59	2370.19	1526.80	1456.84	**17917.11**
2011	27.3.a & 27.4.a.e	SOP	51.84	2796.70	2659.53	2522.41	1877.76	1019.75	554.48	221.56	237.44	**11941.47**
2011	27.3.b & 27.3.c & 27.3.d.24	SOP	70.24	354.90	903.73	1392.34	4066.39	2955.12	2899.87	1807.71	1380.02	**15830.32**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
2012	27.3.a & 27.4.a.e	SOP	14.16	1434.28	7179.64	2779.88	1570.23	1290.26	858.19	495.08	1931.43	**17553.16**
2012	27.3.b & 27.3.c & 27.3.d.24	SOP	8.67	734.99	2008.00	4176.64	4351.34	4262.55	2340.68	1598.25	1613.51	**21094.64**
2013	27.3.a & 27.4.a.e	SOP	-	715.86	4872.03	9408.78	1829.78	848.33	290.16	117.96	242.34	**18325.24**
2013	27.3.b & 27.3.c & 27.3.d.24	SOP	14.08	1075.75	2005.51	3757.67	7237.17	3930.39	3678.24	1829.39	1975.48	**25503.69**
2014	27.3.a & 27.4.a.e	SOP	235.80	1647.16	2203.35	3331.52	7942.09	1513.29	964.34	523.91	658.87	**19020.33**
2014	27.3.b & 27.3.c & 27.3.d.24	SOP	96.11	1058.94	2226.96	3466.04	4577.57	3013.91	1746.33	1066.42	1085.68	**18337.95**
2015	27.3.a & 27.4.a.e	SOP	52.94	1838.42	4066.94	2418.05	2150.04	2520.89	938.61	531.95	829.76	**15347.59**
2015	27.3.b & 27.3.c & 27.3.d.24	SOP	190.21	736.65	3670.80	3053.25	5211.20	4318.47	2535.06	1065.74	1362.20	**22143.57**
2016	27.3.a & 27.4.a.e	SOP	170.21	1090.64	10312.47	5425.51	2141.77	2118.68	2660.61	765.08	1539.43	**26224.40**
2016	27.3.b & 27.3.c & 27.3.d.24	SOP	206.30	761.56	1924.56	7937.46	4340.07	3955.54	2793.91	1757.05	1396.74	**25073.19**
2017	27.3.a & 27.4.a.e	SOP	43.52	2136.90	2585.40	4847.99	4844.08	1668.42	1863.33	1344.92	492.58	**19827.13**
2017	27.3.b & 27.3.c & 27.3.d.24	SOP	1.30	322.47	1895.29	3191.57	9235.11	4752.94	3706.40	1985.92	1421.77	**26512.76**
2018	27.3.a & 27.4.a.e	SOP	2.97	1139.59	9901.98	1926.62	2345.95	4007.33	1333.55	760.67	647.02	**22065.66**
2018	27.3.b & 27.3.c & 27.3.d.24	SOP	5.85	700.74	955.67	3021.46	2500.97	7315.11	2331.65	1394.26	766.47	**18992.17**
2019	27.3.a & 27.4.a.e	SOP	106.18	2018.98	5035.94	2502.42	1137.80	1618.61	2034.84	577.20	557.41	**15589.37**
2019	27.3.b & 27.3.c & 27.3.d.24	SOP	4.51	211.26	1176.85	1303.11	1644.24	1442.18	2628.03	834.62	586.15	**9830.96**
2020	27.3.a & 27.4.a.e	SOP	146.33	1723.30	3680.94	3093.83	2753.00	1406.15	2536.16	1663.22	1160.40	**18163.34**
2020	27.3.b & 27.3.c & 27.3.d.24	SOP	0.57	64.80	171.86	399.61	520.01	976.02	646.85	916.51	270.10	**3966.32**
2021	27.3.a & 27.4.a.e	SOP	16.01	132.43	4138.44	1855.90	2436.11	1597.39	1081.93	524.80	796.42	**12579.44**
2021	27.3.b & 27.3.c & 27.3.d.24	SOP	0.81	13.62	127.90	332.27	350.75	219.89	228.42	163.33	163.53	**1600.53**
2022	27.3.a & 27.4.a.e	SOP	1.61	25.96	758.58	915.39	1065.94	892.22	798.68	487.94	667.35	**5613.66**
2022	27.3.b & 27.3.c & 27.3.d.24	SOP	0.08	1.87	32.88	89.69	124.38	134.81	109.87	80.11	63.90	**637.60**
1993	27.3.a & 27.4.a.e	WECA	15.10	25.87	81.36	127.53	150.09	171.08	195.93	209.13	239.04	**80.88**
1993	27.3.b & 27.3.c & 27.3.d.24	WECA	16.24	24.47	44.50	73.55	94.09	122.41	149.40	168.47	178.65	**79.05**
1994	27.3.a & 27.4.a.e	WECA	20.20	42.61	94.84	122.75	150.31	168.73	194.67	209.92	220.24	**109.05**
1994	27.3.b & 27.3.c & 27.3.d.24	WECA	12.90	28.17	54.20	76.37	95.00	117.67	133.58	154.28	173.89	**71.87**
1995	27.3.a & 27.4.a.e	WECA	17.92	41.49	97.80	138.03	163.14	198.51	206.99	228.79	234.35	**93.86**
1995	27.3.b & 27.3.c & 27.3.d.24	WECA	9.30	16.34	42.80	68.30	88.86	125.41	150.37	193.30	207.45	**30.36**
1996	27.3.a & 27.4.a.e	WECA	10.52	27.61	90.07	134.89	164.94	186.57	204.05	208.47	220.25	**72.94**
1996	27.3.b & 27.3.c & 27.3.d.24	WECA	12.10	22.91	45.75	73.96	92.14	116.28	120.83	139.04	182.54	**61.62**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
1997	27.3.a & 27.4.a.e	WECA	19.18	49.68	76.71	127.25	154.39	175.83	184.37	192.04	208.02	**97.85**
1997	27.3.b & 27.3.c & 27.3.d.24	WECA	30.40	24.74	58.41	101.00	120.71	155.22	181.34	197.13	208.80	**50.99**
1998	27.3.a & 27.4.a.e	WECA	27.81	51.27	71.53	108.82	142.63	171.74	194.44	184.16	230.00	**78.75**
1998	27.3.b & 27.3.c & 27.3.d.24	WECA	13.30	26.31	52.23	78.61	103.02	125.25	149.97	162.10	179.52	**38.97**
1999	27.3.a & 27.4.a.e	WECA	11.53	50.96	83.59	114.90	121.21	145.24	169.57	123.84	152.32	**80.68**
1999	27.3.b & 27.3.c & 27.3.d.24	WECA	11.09	26.90	50.36	81.61	112.04	148.38	151.43	167.81	160.98	**36.84**
2000	27.3.a & 27.4.a.e	WECA	22.65	31.88	67.39	107.68	140.25	169.95	156.95	184.97	210.10	**61.17**
2000	27.3.b & 27.3.c & 27.3.d.24	WECA	16.52	22.21	42.76	80.41	123.51	133.18	143.42	155.40	151.41	**48.23**
2001	27.3.a & 27.4.a.e	WECA	9.00	51.20	76.23	108.87	145.27	171.37	188.21	187.25	203.34	**77.12**
2001	27.3.b & 27.3.c & 27.3.d.24	WECA	12.92	22.29	46.77	69.01	93.51	150.82	145.12	146.27	153.14	**37.03**
2002	27.3.a & 27.4.a.e	WECA	10.18	20.42	78.22	117.74	143.76	169.78	191.89	198.25	215.45	**52.12**
2002	27.3.b & 27.3.c & 27.3.d.24	WECA	10.84	27.28	57.77	81.66	108.78	132.08	186.61	177.82	157.70	**77.94**
2003	27.3.a & 27.4.a.e	WECA	13.01	37.37	76.46	112.69	132.13	140.84	151.90	167.36	158.21	**81.39**
2003	27.3.b & 27.3.c & 27.3.d.24	WECA	22.41	25.75	46.36	75.34	95.18	117.15	125.94	157.10	162.59	**81.68**
2004	27.3.a & 27.4.a.e	WECA	27.07	43.22	81.94	117.10	145.41	157.41	170.71	184.38	187.07	**75.16**
2004	27.3.b & 27.3.c & 27.3.d.24	WECA	3.72	14.33	47.44	77.70	96.36	125.49	150.42	165.78	151.01	**48.73**
2005	27.3.a & 27.4.a.e	WECA	14.07	54.91	85.65	121.61	148.32	162.67	176.31	178.31	200.61	**82.14**
2005	27.3.b & 27.3.c & 27.3.d.24	WECA	13.57	14.18	48.28	73.31	89.34	115.55	143.61	159.87	170.16	**65.71**
2006	27.3.a & 27.4.a.e	WECA	16.62	36.94	82.91	113.00	142.50	175.17	198.21	209.46	219.96	**103.04**
2006	27.3.b & 27.3.c & 27.3.d.24	WECA	21.24	33.98	56.68	83.96	102.17	125.30	143.92	175.85	169.96	**93.68**
2007	27.3.a & 27.4.a.e	WECA	25.17	65.63	84.98	115.67	138.44	159.24	190.77	178.55	211.88	**96.99**
2007	27.3.b & 27.3.c & 27.3.d.24	WECA	11.88	27.77	57.31	74.93	106.28	121.34	140.75	162.69	185.52	**53.21**
2008	27.3.a & 27.4.a.e	WECA	19.19	71.54	91.06	114.48	142.21	171.24	181.39	200.04	196.43	**98.02**
2008	27.3.b & 27.3.c & 27.3.d.24	WECA	16.29	49.52	65.22	88.14	110.52	133.22	140.31	156.68	172.24	**68.96**
2009	27.3.a & 27.4.a.e	WECA	13.44	52.03	90.30	118.57	167.49	181.45	213.89	228.91	259.49	**90.89**
2009	27.3.b & 27.3.c & 27.3.d.24	WECA	10.53	28.27	48.05	90.49	123.75	145.22	160.38	171.16	181.84	**91.61**
2010	27.3.a & 27.4.a.e	WECA	8.23	59.26	84.75	129.82	165.86	196.16	221.83	234.34	257.16	**106.71**
2010	27.3.b & 27.3.c & 27.3.d.24	WECA	12.22	22.19	52.16	87.06	119.82	154.80	170.59	191.86	194.10	**99.19**
2011	27.3.a & 27.4.a.e	WECA	8.40	33.67	89.04	120.37	140.24	170.21	185.92	216.34	211.85	**72.57**
2011	27.3.b & 27.3.c & 27.3.d.24	WECA	12.45	22.96	55.06	78.08	113.16	136.56	147.58	161.24	168.00	**104.15**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
2012	27.3.a & 27.4.a.e	WECA	9.31	46.96	76.13	134.24	165.08	181.96	204.08	222.01	225.61	**98.24**
2012	27.3.b & 27.3.c & 27.3.d.24	WECA	18.12	15.87	55.02	95.44	115.08	150.34	167.62	177.42	191.18	**93.91**
2013	27.3.a & 27.4.a.e	WECA	-	59.50	94.18	131.84	162.56	194.96	207.80	247.92	238.12	**119.29**
2013	27.3.b & 27.3.c & 27.3.d.24	WECA	13.69	17.76	54.06	86.76	129.42	136.87	145.26	159.10	179.80	**92.92**
2014	27.3.a & 27.4.a.e	WECA	9.31	52.25	98.47	137.42	178.17	199.21	211.71	225.10	227.05	**114.98**
2014	27.3.b & 27.3.c & 27.3.d.24	WECA	16.46	30.02	59.02	82.29	122.07	158.43	155.98	163.02	175.51	**91.05**
2015	27.3.a & 27.4.a.e	WECA	16.00	31.83	67.85	115.24	152.44	172.83	193.40	198.66	212.90	**84.28**
2015	27.3.b & 27.3.c & 27.3.d.24	WECA	7.13	15.93	50.44	79.29	107.58	144.69	170.59	135.65	149.36	**75.24**
2016	27.3.a & 27.4.a.e	WECA	7.13	40.13	63.76	126.09	160.66	175.09	200.82	212.82	235.02	**86.08**
2016	27.3.b & 27.3.c & 27.3.d.24	WECA	10.31	34.09	51.67	84.56	95.01	129.54	160.36	168.06	169.17	**87.73**
2017	27.3.a & 27.4.a.e	WECA	30.50	44.13	61.29	113.21	141.77	162.84	171.23	182.87	169.95	**98.93**
2017	27.3.b & 27.3.c & 27.3.d.24	WECA	18.12	34.25	57.71	82.81	117.90	123.46	137.60	147.50	139.80	**106.79**
2018	27.3.a & 27.4.a.e	WECA	10.31	55.68	55.28	109.34	154.45	179.69	194.97	194.95	206.43	**82.07**
2018	27.3.b & 27.3.c & 27.3.d.24	WECA	15.90	14.48	51.77	87.24	108.43	142.67	143.41	157.66	170.05	**92.29**
2019	27.3.a & 27.4.a.e	WECA	20.01	52.81	85.01	118.91	138.37	166.10	183.29	193.95	211.38	**98.35**
2019	27.3.b & 27.3.c & 27.3.d.24	WECA	16.69	30.70	56.94	83.72	123.62	139.58	165.62	138.32	166.67	**106.35**
2020	27.3.a & 27.4.a.e	WECA	13.58	47.08	67.05	132.51	160.71	180.81	186.14	199.26	204.83	**101.94**
2020	27.3.b & 27.3.c & 27.3.d.24	WECA	18.46	38.34	69.11	87.25	111.28	145.53	155.94	172.08	171.04	**127.04**
2021	27.3.a & 27.4.a.e	WECA	10.80	60.24	64.91	107.10	156.43	169.78	186.75	194.86	196.11	**102.87**
2021	27.3.b & 27.3.c & 27.3.d.24	WECA	19.10	23.02	72.19	104.11	138.56	146.52	171.64	176.35	177.14	**124.95**
2022	27.3.a & 27.4.a.e	WECA	25.94	55.62	103.92	129.89	143.19	170.29	175.87	192.07	203.16	**148.02**
2022	27.3.b & 27.3.c & 27.3.d.24	WECA	20.04	24.42	92.68	94.90	132.63	149.31	170.85	181.45	185.81	**137.13**

Table 3.2.8 WESTERN BALTIC HERRING. NSAS. CANUM: Catch in numbers (mill), WECA: mean weight (g) and SOP (t) by age as W-ringers in 1993-2022

year	area	type	0	1	2	3	4	5	6	7	8+	Total
1993	27.3.a	CANUM	2795.45	2032.52	237.62	26.51	7.68	3.64	2.71	2.16	0.66	**5108.95**
1994	27.3.a	CANUM	481.61	1086.54	201.41	26.91	6.01	2.90	1.55	0.38	0.17	**1807.48**
1995	27.3.a	CANUM	1144.54	1189.25	161.51	13.31	3.46	1.10	0.62	0.36	0.27	**2514.43**
1996	27.3.a	CANUM	516.09	961.10	161.37	16.99	3.42	1.65	0.67	0.35	0.28	**1661.92**
1997	27.3.a	CANUM	67.64	305.28	131.70	21.24	1.66	0.79	0.21	0.09	0.13	**528.75**
1998	27.3.a	CANUM	51.34	745.14	161.51	26.63	19.25	3.04	3.08	1.18	0.48	**1011.65**
1999	27.3.a	CANUM	598.78	303.03	148.62	47.21	13.40	6.23	1.23	0.48	0.46	**1119.42**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
2000	27.3.a	CANUM	235.33	984.26	115.97	21.86	22.88	7.54	3.27	0.60	0.07	**1391.78**
2001	27.3.a	CANUM	807.75	563.64	150.03	17.16	1.36	0.29	0.50	0.04	0.03	**1540.80**
2002	27.3.a	CANUM	478.50	362.57	56.69	5.63	0.74	0.16	0.12	0.05	0.02	**904.47**
2003	27.3.a	CANUM	21.58	444.99	182.31	13.04	16.21	1.79	1.12	1.23	0.18	**682.44**
2004	27.3.a	CANUM	88.42	70.87	179.94	20.72	6.04	9.75	1.83	1.96	0.87	**380.39**
2005	27.3.a	CANUM	96.44	307.46	159.17	16.17	5.36	2.38	2.27	0.48	0.16	**589.88**
2006	27.3.a	CANUM	35.09	150.13	50.18	10.20	3.26	3.34	0.56	0.38	0.18	**253.31**
2007	27.3.a	CANUM	67.65	189.31	76.90	2.07	0.45	1.44	0.26	0.63	0.02	**338.72**
2008	27.3.a	CANUM	85.66	86.60	72.00	1.88	0.25	0.15	0.06	0.33	0.07	**246.99**
2009	27.3.a	CANUM	116.75	77.52	7.03	0.35	0.22	-	-	-	0.10	**201.98**
2010	27.3.a	CANUM	48.60	197.00	43.30	0.30	0.10	0.10	-	0.10	-	**289.50**
2011	27.3.a	CANUM	203.80	35.43	61.46	3.22	0.28	0.17	0.12	0.09	0.02	**304.58**
2012	27.3.a	CANUM	145.83	174.74	43.05	1.85	1.14	0.19	0.20	0.11	0.03	**367.14**
2013	27.3.a	CANUM	0.90	86.19	85.82	2.39	0.36	0.28	-	-	-	**175.93**
2014	27.3.a	CANUM	284.74	61.13	80.21	5.90	0.54	0.50	0.17	0.03	0.06	**433.28**
2015	27.3.a	CANUM	30.71	169.58	97.57	6.96	1.25	4.89	1.11	1.20	0.35	**313.63**
2016	27.3.a	CANUM	133.30	23.33	47.56	5.95	0.53	0.30	0.22	0.03	0.06	**211.30**
2017	27.3.a	CANUM	0.15	75.99	34.43	6.91	2.97	1.20	0.07	0.05	0.03	**121.80**
2018	27.3.a	CANUM	14.51	19.17	28.49	1.13	1.79	1.04	0.18	0.12	0.09	**66.52**
2019	27.3.a	CANUM	23.72	101.32	19.84	4.56	0.10	0.13	0.07	0.01	0.00	**149.75**
2020	27.3.a	CANUM	79.43	26.58	44.16	5.27	2.18	0.30	0.61	0.80	0.00	**159.33**
2021	27.3.a	CANUM	6.91	15.69	36.34	2.79	1.51	0.79	0.46	0.15	0.14	**64.78**
2022	27.3.a	CANUM	1.18	3.29	3.78	0.23	0.14	0.07	0.06	0.03	0.04	**8.79**
1993	27.3.a	SOP	34903.11	58106.61	18939.29	3749.22	1016.25	850.14	646.94	389.84	133.08	**118734.49**
1994	27.3.a	SOP	7722.84	46630.15	16789.90	2979.53	830.85	459.57	286.84	74.94	36.82	**75811.44**
1995	27.3.a	SOP	12836.74	46555.17	14266.53	1939.87	572.98	224.93	132.55	85.96	65.49	**76680.21**
1996	27.3.a	SOP	5696.90	22448.28	12946.67	2151.39	564.81	307.10	144.65	76.73	66.36	**44402.89**
1997	27.3.a	SOP	1304.36	14571.21	9025.33	2643.29	285.19	145.85	40.18	16.33	24.85	**28056.57**
1998	27.3.a	SOP	1408.88	41993.78	12895.90	3137.24	3136.38	546.61	607.87	211.01	107.72	**64045.37**
1999	27.3.a	SOP	6255.48	15297.03	13037.30	5368.64	1840.84	974.42	230.49	90.23	91.69	**43186.13**
2000	27.3.a	SOP	5004.98	28011.84	8825.12	2377.46	3730.67	1436.04	600.96	114.18	13.39	**50114.64**
2001	27.3.a	SOP	7029.00	27848.95	11299.75	1856.44	177.45	42.57	109.07	7.89	5.24	**48376.36**
2002	27.3.a	SOP	5858.67	13790.27	5705.23	684.17	105.57	26.00	21.40	8.46	5.32	**26205.10**
2003	27.3.a	SOP	441.56	14992.46	12218.68	1605.67	2435.66	292.78	213.07	264.41	33.39	**32497.68**
2004	27.3.a	SOP	1993.35	3920.77	12638.28	2498.27	850.51	1479.09	312.27	366.55	154.49	**24213.59**
2005	27.3.a	SOP	1595.05	15527.28	11303.61	1711.89	828.18	412.21	419.59	95.15	33.57	**31926.51**
2006	27.3.a	SOP	503.45	8034.66	3974.80	1199.64	456.33	620.45	107.43	81.46	37.07	**15015.30**
2007	27.3.a	SOP	1807.38	11857.46	5464.09	224.04	55.37	218.75	48.01	110.46	2.86	**19788.42**

year	area	type	0	1	2	3	4	5	6	7	8+	Total
2008	27.3.a	SOP	1385.63	4986.26	6222.26	204.96	34.78	24.68	9.89	67.26	12.91	**12948.64**
2009	27.3.a	SOP	1095.33	4634.68	710.24	28.57	45.73	-	-	-	27.55	**6542.09**
2010	27.3.a	SOP	364.50	9968.20	3325.44	36.69	14.93	19.13	-	21.63	-	**13750.52**
2011	27.3.a	SOP	1524.02	1243.86	5136.69	364.38	37.18	32.79	22.66	21.96	4.71	**8388.25**
2012	27.3.a	SOP	1792.18	6937.44	2873.20	229.20	192.92	33.05	39.04	24.43	6.34	**12127.79**
2013	27.3.a	SOP	30.26	6497.88	6405.35	320.40	56.94	55.94	-	-	-	**13366.78**
2014	27.3.a	SOP	2556.85	3482.13	5904.69	640.69	88.40	95.08	36.29	5.80	12.66	**12822.58**
2015	27.3.a	SOP	484.77	5039.71	6635.56	924.60	196.92	879.97	217.75	237.52	75.04	**14691.84**
2016	27.3.a	SOP	899.04	873.19	2806.67	733.03	79.27	47.04	46.14	7.21	14.85	**5506.43**
2017	27.3.a	SOP	4.57	3689.57	2327.96	708.64	411.51	207.80	12.33	8.38	4.60	**7375.38**
2018	27.3.a	SOP	145.80	933.08	1637.53	115.71	278.95	187.12	34.79	22.05	17.28	**3372.31**
2019	27.3.a	SOP	276.56	4154.39	1230.43	385.12	11.62	15.00	11.03	1.93	0.43	**6086.51**
2020	27.3.a	SOP	1071.90	969.96	2901.59	729.82	367.16	52.94	121.73	172.67	0.07	**6387.85**
2021	27.3.a	SOP	74.63	741.51	2584.86	322.94	240.54	137.03	88.61	30.83	25.09	**4246.05**
2022	27.3.a	SOP	30.52	170.93	230.19	26.64	21.82	11.24	11.21	5.33	7.21	**515.07**
1993	27.3.a	WECA	12.49	28.59	79.70	141.41	132.32	233.37	238.53	180.61	203.09	**23.24**
1994	27.3.a	WECA	16.04	42.92	83.36	110.72	138.31	158.58	184.61	199.05	213.90	**41.94**
1995	27.3.a	WECA	11.22	39.15	88.33	145.70	165.54	204.53	212.20	236.38	244.27	**30.50**
1996	27.3.a	WECA	11.04	23.36	80.23	126.64	165.02	186.50	216.05	216.29	239.11	**26.72**
1997	27.3.a	WECA	19.28	47.73	68.53	124.44	171.49	184.72	188.68	188.66	192.37	**53.06**
1998	27.3.a	WECA	27.44	56.36	79.85	117.80	162.93	179.71	197.21	178.94	226.27	**63.31**
1999	27.3.a	WECA	10.45	50.48	87.73	113.72	137.40	156.47	188.10	187.35	198.80	**38.58**
2000	27.3.a	WECA	21.27	28.46	76.10	108.77	163.08	190.33	183.91	189.41	200.18	**36.01**
2001	27.3.a	WECA	8.70	49.41	75.31	108.21	130.09	147.09	219.10	175.76	198.05	**31.40**
2002	27.3.a	WECA	12.24	38.04	100.64	121.55	142.65	160.88	178.71	177.37	218.58	**28.97**
2003	27.3.a	WECA	20.47	33.69	67.02	123.16	150.28	163.48	190.17	214.62	186.83	**47.62**
2004	27.3.a	WECA	22.54	55.32	70.24	120.60	140.87	151.72	170.58	186.55	178.46	**63.65**
2005	27.3.a	WECA	16.54	50.50	71.01	105.86	154.64	173.46	184.53	200.23	208.91	**54.12**
2006	27.3.a	WECA	14.35	53.52	79.22	117.63	140.16	185.51	190.40	215.63	206.91	**59.28**
2007	27.3.a	WECA	26.72	62.64	71.06	108.14	124.38	151.73	183.74	174.65	153.77	**58.42**
2008	27.3.a	WECA	16.18	57.58	86.42	109.14	138.75	167.67	175.37	203.06	197.69	**52.43**
2009	27.3.a	WECA	9.38	59.79	101.00	81.30	206.35	0.00	0.00	0.00	268.53	**32.39**
2010	27.3.a	WECA	7.50	50.60	76.80	122.30	149.30	191.30	221.50	216.30	204.50	**47.50**
2011	27.3.a	WECA	7.48	35.11	83.57	113.32	133.86	191.47	193.17	234.32	248.25	**27.54**
2012	27.3.a	WECA	12.29	39.70	66.75	123.69	169.16	174.56	199.39	219.78	215.93	**33.03**
2013	27.3.a	WECA	33.66	75.39	74.64	133.88	160.14	200.37	-	-	-	**75.98**
2014	27.3.a	WECA	8.98	56.96	73.62	108.56	162.38	190.94	209.02	221.12	227.82	**29.59**
2015	27.3.a	WECA	15.79	29.72	68.01	132.87	157.09	179.85	195.87	197.22	214.93	**46.84**
2016	27.3.a	WECA	6.74	37.42	59.01	123.13	149.08	156.65	207.97	209.50	234.59	**26.06**
2017	27.3.a	WECA	30.81	48.55	67.62	102.48	138.67	172.88	170.96	184.78	161.99	**60.55**
2018	27.3.a	WECA	10.05	48.67	57.48	102.82	155.48	179.69	189.49	186.69	202.12	**50.70**
2019	27.3.a	WECA	11.66	41.00	62.01	84.37	116.20	118.10	164.56	202.20	158.50	**40.64**
2020	27.3.a	WECA	13.49	36.49	65.71	138.58	168.38	174.62	199.24	216.74	137.84	**40.09**
2021	27.3.a	WECA	10.80	47.26	71.13	115.75	159.30	173.46	192.63	205.52	185.88	**65.55**
2022	27.3.a	WECA	25.94	52.03	60.93	117.62	157.34	169.84	193.14	197.60	204.54	**58.59**

Table 3.3.1 Western Baltic spring spawning herring. German acoustic survey (GERAS) on the Spring Spawning Herring in Subdivisions 21 (Southern Kattegat, 41G0–42G2) – 24 in autumn 1993–2022 (September/October).

								*	**			***	***	***	***
Year	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
W-rings/Numbers in millions															
0	5,474.540	5,107.780	1,833.130	2,859.220	2,490.090	5,993.820	1,008.910	2,477.972	4,102.595	3,776.780	2,554.680	3,055.595	4,159.311	2,588.922	2,150.306
1	415.730	1,675.340	1,439.460	1,955.400	801.350	1,338.710	1,429.880	1,125.716	837.557	1,238.480	968.860	750.199	940.892	558.851	392.737
2	883.810	328.610	590.010	738.180	678.530	287.240	453.980	1,226.932	421.396	222.530	592.360	590.756	226.959	260.402	165.347
3	559.720	357.960	434.090	394.530	394.070	232.510	328.960	844.088	575.358	217.270	346.230	295.659	279.618	117.412	166.301
4	443.730	353.850	295.170	162.430	236.830	155.950	201.590	366.841	341.120	260.350	163.150	142.778	212.201	76.782	102.018
5	189.420	253.510	305.550	118.910	100.190	51.940	78.930	131.430	63.678	96.960	143.320	78.541	139.813	43.919	82.174
6	60.400	126.760	119.260	99.290	50.980	8.130	38.610	85.690	24.520	38.040	79.030	79.018	97.261	12.144	29.727
7	23.510	46.430	46.980	33.280	23.640	1.470	5.920	19.471	9.690	8.580	22.600	25.564	66.937	9.262	11.443
8+	2.330	27.240	18.910	47.850	9.330	2.100	4.190	9.683	13.380	9.890	11.770	15.013	27.789	8.839	9.262
Total	8,053.190	8,277.480	5,082.560	6,409.090	4,785.010	8,071.870	3,550.970	6,287.823	6,389.293	5,868.880	4,882.000	5,033.123	6,150.781	3,676.532	3,109.314

3+ group	1,279.110	1,165.750	1,219.960	856.290	815.040	452.100	658.200	1,457.203	1,027.746	631.090	766.100	636.573	823.619	268.357	400.924
W-rings/Biomass ('000 tonnnes)															
0	66.889	58.540	16.564	28.497	23.760	71.814	13.784	31.163	38.209	33.928	23.074	32.794	42.958	25.202	23.699
1	14.466	58.620	46.643	76.396	39.899	51.117	57.530	48.177	34.165	44.791	35.885	29.790	38.230	22.782	17.602
2	40.972	20.939	29.127	43.461	50.085	22.016	28.431	75.879	29.957	16.089	34.542	46.478	18.013	20.202	10.446
3	40.749	30.091	31.035	35.942	35.280	27.484	27.740	77.137	56.769	22.008	27.726	31.876	31.946	11.366	15.297
4	43.038	40.104	21.174	22.291	28.049	16.664	24.065	37.936	40.360	34.167	18.364	20.414	31.253	9.679	11.077
5	24.198	27.268	37.141	16.743	11.430	6.768	9.259	18.458	9.029	14.561	17.348	12.772	24.876	6.724	11.584
6	12.313	14.915	16.056	13.998	6.157	0.867	5.620	13.267	3.497	5.715	12.225	13.820	17.959	2.001	4.823
7	5.294	9.269	6.101	5.333	3.716	0.350	1.210	3.866	1.075	1.343	3.413	5.111	13.431	1.703	1.756
8+	0.627	6.570	2.930	10.636	2.170	0.458	0.757	2.101	1.908	1.615	1.991	3.447	6.344	1.798	1.303
Total	248.545	266.316	206.771	253.297	200.547	197.537	168.395	307.984	214.967	174.218	174.568	196.503	225.010	101.456	97.588
3+ group	126.218	128.217	114.438	104.943	86.802	52.590	68.651	152.765	112.637	79.410	81.067	87.441	125.809	33.270	45.840
W-rings/Mean weight (g)															
0	12.2	11.5	9.0	10.0	9.5	12.0	13.7	12.6	9.3	9.0	9.0	10.7	10.3	9.7	11.0
1	34.8	35.0	32.4	39.1	49.8	38.2	40.2	42.8	40.8	36.2	37.0	39.7	40.6	40.8	44.8
2	46.4	63.7	49.4	58.9	73.8	76.6	62.6	61.8	71.1	72.3	58.3	78.7	79.4	77.6	63.2
3	72.8	84.1	71.5	91.1	89.5	118.2	84.3	91.4	98.7	101.3	80.1	107.8	114.2	96.8	92.0
4	97.0	113.3	71.7	137.2	118.4	106.9	119.4	103.4	118.3	131.2	112.6	143.0	147.3	126.1	108.6
5	127.7	107.6	121.6	140.8	114.1	130.3	117.3	140.4	141.8	150.2	121.0	162.6	177.9	153.1	141.0
6	203.9	117.7	134.6	141.0	120.8	106.6	145.5	154.8	142.6	150.2	154.7	174.9	184.6	164.8	162.2
7	225.2	199.6	129.9	160.2	157.2	237.9	204.5	198.6	110.9	156.6	151.0	199.9	200.6	183.8	153.5
8+	269.1	241.2	154.9	222.3	232.6	217.9	180.7	217.0	142.6	163.3	169.2	229.6	228.3	203.4	140.7
Total	30.9	32.2	40.7	39.5	41.9	24.5	47.4	49.0	33.6	29.7	35.8	39.0	36.6	27.6	31.4

small revision in 2015

small revision in 2017 (<0.5 %)

*incl. mean for Sub-division 23, which was not covered by RV SOLEA

**incl. mean for Sub-division 21, which was not covered by RV SOLEA

small revision in 2018

***** excl. Central Baltic Herring in SD 24 (SD 23) based on SF (Gröhsler et al. 2013)**

****** excl. Central Baltic Herring in SD 22, SD 24 (SD 23) based on SF & excl. mature herring in SD 23 (stages>=6)**

******* excl. Central Baltic Herring in SD 22, SD 24 (SD 23) based on SF**

& excl. Central Baltic Herring in SDs 21-24 based on SF

&& excl. Central Baltic Herring in SDs 21 and SD 24 (SD 23) based on SF

&&&excl. Central Baltic Herring in SDs 21-22 and SD 24 (SD 23) based on SF

&&&&excl. Central Baltic Herring in SD 24 based on SF and large herring accumulation in in rectangle 41G2/SD 23

Table 3.3.2 Western Baltic spring spawning herring. Acoustic surveys (HERAS) on the Western Baltic Spring Spawning Herring in the North Sea/Division 3.a in 1991–2022 (July).

Year	1991	* 1992	* 1993	* 1994	* 1995	* 1996	1997	1998	** 1999	2000	2001	2002	2003	2004	2005	2006
W-rings/Numbers in millions																
0		3,853	372	964												
1		277	103	5	2,199	1,091	128	138	1,367	1,509	66	3,346	1,833	1,669	2,687	2,081
2	1,864	2,092	2,768	413	1,887	1,005	715	1,682	1,143	1,891	641	1,577	1,110	930	1,342	2,217
3	1,927	1,799	1,274	935	1,022	247	787	901	523	674	452	1,393	395	726	464	1,780
4	866	1,593	598	501	1,270	141	166	282	135	364	153	524	323	307	201	490
5	350	556	434	239	255	119	67	111	28	186	96	88	103	184	103	180
6	88	197	154	186	174	37	69	51	3	56	38	40	25	72	84	27
7	72	122	63	62	39	20	80	31	2	7	23	18	12	22	37	10
8+	10	20	13	34	21	13	77	53	1	10	12	17	5	18	21	0.1
Total	5,177	10,509	5,779	3,339	6,867	2,673	2,088	3,248	3,201	4,696	1,481	7,002	3,807	3,926	4,939	6,786
3+ group	5,177	4,287	2,536	1,957	2,781	577	1,245	1,428	691	1,295	774	2,079	864	1,328	910	2,487
W-rings/Biomass ('000 tonnes)																
0		34.3	1	8.7												
1		26.8	7	0.4	77.4	52.9	4.7	7.1	74.8	61.4	3.5	137.2	79.0	63.9	105.9	112.6
2	177.1	169.0	139	33.2	108.9	87.0	52.2	136.1	101.6	138.1	55.8	107.2	91.5	75.6	100.1	160.5
3	219.7	206.3	112	114.7	102.6	27.6	81.0	84.8	59.5	68.8	51.2	126.9	41.4	89.4	46.6	158.6
4	116.0	204.7	69	76.7	145.5	17.9	21.5	35.2	14.7	45.3	21.5	55.9	41.7	41.5	28.9	56.3
5	51.1	83.3	65	41.8	33.9	17.8	9.8	13.1	3.4	25.1	17.9	12.8	13.9	29.3	16.5	23.7
6	19.0	36.6	26	38.1	27.4	5.8	9.8	6.9	0.5	10.0	6.9	7.4	4.2	11.7	14.9	4.1
7	13.0	24.4	16	13.1	6.7	3.3	14.9	4.8	0.3	1.4	4.7	3.5	2.0	4.1	7.5	1.6
8+	2.0	5.0	2	7.8	3.8	2.7	13.6	9.0	0.1	1.3	2.7	3.1	0.9	3.2	4.9	0.0
Total	597.9	756.1	436.5	325.8	506.2	215.1	207.5	297.0	254.9	351.4	164.2	454.0	274.5	318.8	325.3	517.5
3+ group	420.9	560.3	291.0	292.3	319.9	75.2	150.6	153.7	78.5	151.9	104.9	209.6	104.0	179.3	119.3	244.4
W-rings/Mean weight (g)																
0		8.9	4.0	9.0												
1		96.8	66.3	80.0	35.2	48.5	36.9	51.9	54.7	40.7	54.0	41.0	43.1	38.3	39.4	54.1
2	95.0	80.8	50.1	80.3	57.7	86.6	73.0	80.9	88.9	73.1	87.0	68.0	82.5	81.3	74.6	72.4
3	114.0	114.7	87.9	122.7	100.4	111.9	103.0	94.1	113.8	102.2	113.2	91.1	104.9	123.2	100.5	89.1
4	134.0	128.5	116.2	153.0	114.6	126.8	129.6	124.7	109.1	124.4	140.5	106.6	128.8	135.2	143.7	114.8
5	146.0	149.8	149.9	175.1	132.9	149.4	145.0	118.7	120.0	135.4	185.2	145.8	134.2	159.4	160.9	131.6
6	216.0	185.7	169.6	205.0	157.2	157.3	143.1	135.8	179.9	179.2	182.6	186.5	165.4	162.9	177.7	153.2
7	181.0	199.7	256.9	212.0	172.9	166.8	185.6	156.4	179.9	208.8	206.3	198.7	167.2	191.6	202.3	169.2
8+	200.0	252.0	164.2	230.3	183.1	212.9	178.0	168.0	181.7	135.2	226.9	183.4	170.3	178.0	229.2	178.0
Total	115.6	123.9	75.8	100.2	73.7	80.5	99.4	91.4	78.5	74.8	110.9	64.8	72.1	81.2	65.9	76.3

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
W-rings/Numbers in millions																
0		112				1		314	2	203	1		2	9	0	0
1	3,918	5,852	565	999	2,980	1,018	49	513	1,949	425	696	106	418	815	26	45
2	3,621	1,160	398	511	473	1,081	627	415	1,244	255	424	224	591	274	245	246
3	933	843	205	254	259	236	525	176	446	381	661	271	315	225	275	129
4	499	333	161	115	163	87	53	248	224	99	401	175	109	180	203	124
5	154	274	82	65	70	76	30	28	171	40	94	169	67	74	52	100
6	34	176	86	24	53	33	12	37	82	40	53	50	52	77	49	58
7	26	45	39	28	22	14	8	26	89	12	52	35	19	64	22	36
8+	14	44	65	34	46	60	15	42	115	28	92	44	13	46	39	37
Total	**9,199**	**8,839**	**1,601**	**2,030**	**4,066**	**2,606**	**1,319**	**1,799**	**4,322**	**1,483**	**2,474**	**1,074**	**1,586**	**1,764**	**911**	**775**
3+ group	**1,660**	**1,715**	**638**	**520**	**613**	**506**	**643**	**557**	**1,127**	**600**	**1,353**	**744**	**575**	**666**	**640**	**484**
W-rings/Biomass ('000 tonnes)																
0						0.0		1.0	0.03	1.0	0.0		0.0	0.0	0.0	0.0
1	193.2	284.4	26.8	53.0	90.0	44.0	3.0	26.0	61.5	16.0	31.0	4.0	15.0	35.0	1.0	2.0
2	273.4	100.9	48.8	34.0	47.0	87.0	51.0	48.0	106.2	20.0	41.0	19.0	49.0	23.0	21.0	28.0
3	90.9	101.8	30.6	28.0	31.0	26.0	59.0	21.0	54.7	51.0	101.0	28.0	32.0	29.0	30.0	17.0
4	59.6	47.1	29.4	17.0	25.0	12.0	7.0	43.0	33.8	15.0	63.0	25.0	15.0	26.0	23.0	17.0
5	18.5	45.3	17.5	11.0	12.0	13.0	4.0	6.0	30.3	7.0	16.0	28.0	12.0	13.0	9.0	16.0
6	4.6	30.9	21.4	5.0	10.0	6.0	2.0	8.0	16.7	8.0	10.0	9.0	9.0	13.0	8.0	11.0
7	2.6	9.4	10.6	6.0	5.0	3.0	1.0	6.0	17.7	3.0	11.0	7.0	3.0	13.0	5.0	7.0
8+	1.9	8.7	19.8	8.0	10.0	14.0	3.0	11.0	25.2	6.0	20.0	10.0	3.0	9.0	8.0	9.0
Total	644.7	628.5	204.9	162.0	230.0	205.0	130.0	169.0	346.0	126.0	293.0	130.0	138.0	161.0	105.0	107.0
3+ group	178.2	243.2	129.3	75.0	93.0	74.0	76.0	95.0	178.3	90.0	221.0	107.0	74.0	103.0	83.0	77.0
W-rings/Mean weight (g)																
0		6.3				3.0		4.3	14.2	4.0	23.0		4.0	4.6		
1	49.3	48.6	47.5	52.7	30.2	42.9	58.1	51.6	31.5	37.0	45.0	42.0	35.8	43.2	54.4	40.2
2	75.5	87.0	122.7	65.8	98.8	80.4	80.8	114.9	85.4	79.0	97.1	82.9	82.7	85.2	86.9	115.6
3	97.4	120.8	149.1	111.4	121.2	110.6	111.7	122.4	122.7	134.0	153.4	104.6	102.1	127.0	107.4	132.6
4	119.5	141.4	182.9	150.9	150.6	142.9	128.5	175.0	150.9	151.0	157.3	145.4	139.6	145.2	112.5	137.2
5	120.0	165.5	213.3	175.6	168.7	170.8	138.3	210.6	177.1	173.0	173.4	164.9	170.8	178.5	168.8	163.1
6	136.6	175.6	248.3	198.0	190.8	182.0	157.2	220.2	202.3	194.0	182.0	172.6	178.6	171.9	169.1	183.2
7	101.5	208.5	272.1	215.9	211.0	194.0	155.5	213.3	198.9	214.0	202.7	187.3	187.5	201.0	212.0	198.5
8+	138.3	196.7	304.7	234.8	228.5	228.6	198.5	244.1	218.9	215.0	221.2	236.4	221.8	198.7	209.0	230.2
Total	70.1	71.1	128.0	79.8	56.6	78.5	97.9	94.6	80.1	50.0	118.8	121.3	87.2	91.7	115.2	115.2

* revised in 1997

**the survey only covered the Skagerrak area by Norway. Additional estimates for the Kattegat area were added (see ICES 2000/ACFM:10, Table 3.5.8)

Table 3.3.3. Western Baltic spring-spawning herring.

N20 Larval Abundance Index.

Estimation of 0-Group herring reaching 20 mm in length in Greifswalder Bodden and adjacent waters (March/April to June).

Year	N20 (millions)
1992	660
1993	4542
1994	15158
1995	9327
1996	24540
1997	5290
1998	18782
1999	22342
2000	3404
2001	5670
2002	12452
2003	4775
2004	6818
2005	5118
2006	4173
2007	1986
2008	1903
2009	7989
2010	8004
2011	4493
2012	1340
2013	3588
2014	681
2015	3001
2016	482
2017	1247
2018	1563
2019	1317
2020	239
2021	2751
2022	6603

TABLE 3.6.1.a - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet A
Catch in number (CANUM, thousands)

	0	1	2	3	4	5	6	7	8
2000	0	0	8161	9752	10223	5660	2466	605	778
2001	0	454	11344	10224	6123	7151	2664	1556	410
2002	0	0	7589	14825	10583	3349	2877	969	620
2003	0	0	30	3130	5992	3502	1167	1305	605
2004	0	0	15140	27898	3520	4110	1002	456	146
2005	0	0	6569	17434	12680	2573	3787	1084	714
2006	0	129	3514	8783	13962	22370	5102	5258	3055
2007	0	0	74	2627	1253	596	806	377	613
2008	0	0	70	87	167	77	81	182	35
2009	0	0	1017	2075	3375	1423	1733	4471	3144
2010	0	26	32	518	985	389	518	270	1018
2011	0	0	63	442	400	235	69	109	298
2012	0	0	16	214	359	0	1432	0	7395
2013	0	0	53	409	172	494	312	67	645
2014	0	34	2451	3369	5406	802	2116	1045	1573
2015	0	20	95	868	1404	3872	1837	1446	2170
2016	0	20	1209	4109	1033	1137	1182	689	1210
2017	0	2.858	46.79	2368	1013	245.2	90.16	108.3	136.3
2018	0	28.6	329.8	900.6	2277	4270	1744	860.9	623.1
2019	0	7599	6239	4857	2750	7257	9687	2650	2583
2020	0	1812	3204	5845	7536	1219	10720	5325	4587
2021	0	393.8	1096	2794	7339	4469	1887	1100	2250
2022	0	100.5	6245	6705	7203	5132	4464	2510	3244

TABLE 3.6.1.b - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet C
Catch in number (CANUM, thousands)

	0	1	2	3	4	5	6	7	8
2000	59181	209579	294752	99060	55666	20361	7311	978	772
2001	2924	22479	184831	97597	25224	12059	5979	1672	882
2002	1207	108742	133960	118066	40768	8532	4442	1459	1345
2003	4704	27998	155177	57513	54639	16425	4427	2786	1051
2004	6559	78442	56286	42645	9927	7987	2586	671	290
2005	5318	62322	175515	53573	30534	6613	7336	2142	692
2006	2105	41760	91008	86554	29334	26306	4849	4390	1833
2007	230	90083	79527	31939	26596	11189	7371	5701	1931
2008	824	92818	60484	34255	12424	14454	7281	4175	1121
2009	442	91310	119936	41373	20153	9000	5845	3043	1921
2010	230	41741	96890	42943	17084	7087	4177	2768	2739
2011	89	41858	28489	19924	12990	5756	2913	915	822
2012	0	15350	81497	20357	9152	7091	2774	2230	1166
2013	0	6260	40605	68642	10640	3858	1085	409	372
2014	49	23096	16886	18895	39169	6795	2439	1283	1329
2015	115	17357	47337	19590	12579	10401	3016	1232	1727
2016	0	13761	146136	38528	12298	10290	12066	2906	5340
2017	1427	47128	36117	40438	33155	10000	10792	7246	2762
2018	2.36	18967	176762	16634	12912	18031	5096	3041	2511
2019	5231	29648	52720	16127	5473	2488	1414	326	54.23
2020	10315	32689	49813	16558	9210	6368	2864	3022	1071
2021	1482	1370	62429	14535	8234	4939	3907	1594	1811
2022	0	7.689	920.1	332.6	239.4	107.5	77.36	30.89	40.7

TABLE 3.6.1.c - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet D
Catch in number (CANUM, thousands)

	0	1	2	3	4	5	6	7	8
2000	58480	109337	13888	5033	555	156	87	18	10
2001	118759	13695	11926	3256	711	460	1197	938	1130
2002	68427	468952	26715	1707	1742	169	160	0	53
2003	47410	35021	27318	4810	3741	1543	665	263	158
2004	19111	130900	24598	23435	4794	4746	918	387	156
2005	90002	35287	21250	4344	3718	149	377	238	0
2006	1551	47777	17551	14152	3926	5720	652	428	234
2007	1395	13772	11277	2346	2960	997	1270	161	133
2008	4079	8946	10511	4583	888	598	366	141	148
2009	14358	58292	11338	2404	913	457	224	164	219
2010	8879	6826	8183	202	310	83	0	0	0
2011	6080	41200	1317	590	0	0	0	0	0
2012	1521	15193	12792	138	0	0	0	0	0
2013	0	5770	11071	2313	444	0	0	0	0
2014	25267	8397	3039	1979	0	0	0	0	0
2015	3195	40377	12506	526	121	313	0	0	0
2016	23879	13397	14390	391	0	674	0	0	0
2017	0	1294	6017	18.3	0	0	0	0	0
2018	285.3	1471	2047	85.05	0	0	0	0	0
2019	75.4	985.6	279.9	61.46	0	0	0	0	0
2020	462.8	2107	1881	944.4	384.9	190.1	40.66	0	6.787
2021	0	434.9	226.5	0	0	0	0	0	0
2022	62.04	358.5	134.4	9.819	1.833	0.2657	0	0	0

TABLE 3.6.1.d - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet F
Catch in number (CANUM, thousands)

	0	1	2	3	4	5	6	7	8
2000	37749	616321	194300	86731	77777	52964	30056	12428	9291
2001	634631	498179	283245	147601	75897	47807	28743	13928	4188
2002	80637	81436	113576	186714	119192	45110	31053	11414	6310
2003	1374	63857	82330	95798	125060	82178	22858	13098	7006
2004	217885	248412	101789	70788	74972	74400	44450	13363	10422
2005	11586	207562	115890	102482	83461	51304	54195	27767	11214
2006	650	44762	72070	118995	101731	43005	31364	22110	12157
2007	9095	68189	93857	106993	96054	52215	20752	15017	12082
2008	4707	73668	68438	98131	75655	70738	37572	13260	18475
2009	5934	31481	110715	55478	45495	37211	31948	13230	7244
2010	3285	26490	31314	39307	28455	22420	13894	7958	7505
2011	5643	15458	16413	17831	35934	21639	19649	11212	8214
2012	479	46311	36497	43760	37810	28353	13964	9008	8440
2013	1029	60576	37098	43312	55919	28716	25322	11498	10987
2014	5840	35272	37735	42119	37499	19023	11196	6541	6186
2015	26670	46242	72781	38506	48439	29846	14860	7857	9120
2016	20012	22342	37247	93863	45681	30535	17423	10455	8256
2017	51.79	9435	32839	38541	78328	38496	26936	13463	10170
2018	367.8	48383	18459	34635	23065	51273	16259	8843	4507
2019	270.3	6881	20667	15565	13301	10333	15868	6034	3517
2020	30.67	1690	2487	4580	4673	6707	4148	5326	1579
2021	42.55	591.9	1772	3192	2531	1501	1331	926.2	923.2
2022	3.743	76.78	354.8	945.1	937.8	902.9	643.1	441.5	343.9

TABLE 3.6.2.a - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet A
Weight at age as W-ringers in the catch (WECA, kg)

	0	1	2	3	4	5	6	7	8
2000	0.0000	0.0000	0.1407	0.1652	0.1839	0.2070	0.2024	0.2176	0.2663
2001	0.0000	0.0790	0.1275	0.1514	0.1784	0.1884	0.1982	0.2208	0.2666
2002	0.0000	0.0000	0.1431	0.1542	0.1652	0.1864	0.1976	0.2075	0.2235
2003	0.0000	0.0000	0.1014	0.1356	0.1414	0.1632	0.1752	0.1846	0.1923
2004	0.0000	0.0000	0.1206	0.1328	0.1639	0.1659	0.1748	0.1843	0.2079
2005	0.0000	0.0000	0.1071	0.1539	0.1676	0.1793	0.1887	0.1864	0.2084
2006	0.0000	0.0247	0.1246	0.1488	0.1641	0.1752	0.2140	0.2243	0.2367
2007	0.0000	0.0000	0.1566	0.1482	0.1565	0.1850	0.1858	0.1993	0.2248
2008	0.0000	0.0000	0.1418	0.1647	0.1657	0.1680	0.1922	0.1994	0.2158
2009	0.0000	0.0000	0.1381	0.1701	0.2111	0.2110	0.2481	0.2484	0.2845
2010	0.0000	0.0678	0.1323	0.1573	0.2003	0.2056	0.2109	0.2190	0.2352
2011	0.0000	0.0000	0.1497	0.1670	0.1828	0.2078	0.2130	0.2106	0.2188
2012	0.0000	0.0000	0.1396	0.1846	0.2053	0.0000	0.2131	0.0000	0.2264
2013	0.0000	0.0000	0.1350	0.1542	0.2143	0.1956	0.2206	0.2433	0.2530
2014	0.0000	0.1037	0.1478	0.1595	0.1666	0.1957	0.1997	0.2116	0.2215
2015	0.0000	0.1147	0.1367	0.1436	0.1625	0.1809	0.2028	0.2040	0.2161
2016	0.0000	0.1218	0.1213	0.1537	0.1742	0.1819	0.2099	0.2198	0.2247
2017	0.0000	0.1013	0.1231	0.1460	0.1660	0.1801	0.2001	0.1973	0.2109
2018	0.0000	0.0964	0.1275	0.1626	0.1827	0.1974	0.2134	0.2236	0.2387
2019	0.0000	0.0722	0.1309	0.1582	0.1599	0.1792	0.1873	0.1959	0.2124
2020	0.0000	0.1050	0.1275	0.1457	0.1597	0.1698	0.1829	0.1934	0.2072
2021	0.0000	0.1193	0.1380	0.1493	0.1596	0.1677	0.1738	0.1810	0.1965
2022	0.0000	0.0688	0.1101	0.1312	0.1429	0.1704	0.1756	0.1920	0.2031

TABLE 3.6.2.b - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet C
Weight at age as W-ringers in the catch (WECA, kg)

	0	1	2	3	4	5	6	7	8
2000	0.0216	0.0402	0.0685	0.1072	0.1390	0.1600	0.1463	0.1767	0.1554
2001	0.0244	0.0644	0.0744	0.1049	0.1377	0.1623	0.1906	0.1682	0.1987
2002	0.0095	0.0453	0.0856	0.1129	0.1382	0.1633	0.1887	0.1921	0.2132
2003	0.0130	0.0554	0.0808	0.1136	0.1327	0.1407	0.1553	0.1652	0.1473
2004	0.0237	0.0569	0.0736	0.1133	0.1392	0.1546	0.1677	0.1870	0.1774
2005	0.0230	0.0667	0.0863	0.1121	0.1413	0.1565	0.1711	0.1748	0.1926
2006	0.0262	0.0560	0.0842	0.1103	0.1343	0.1744	0.1816	0.1922	0.1962
2007	0.0472	0.0708	0.0881	0.1142	0.1379	0.1587	0.1912	0.1775	0.2078
2008	0.0362	0.0740	0.0925	0.1149	0.1421	0.1712	0.1809	0.1999	0.1967
2009	0.0227	0.0740	0.0902	0.1153	0.1605	0.1772	0.2039	0.2015	0.2247
2010	0.0279	0.0663	0.0880	0.1280	0.1592	0.1942	0.2109	0.2117	0.2257
2011	0.0215	0.0509	0.0910	0.1208	0.1389	0.1687	0.1853	0.2170	0.2093
2012	0.0000	0.0662	0.0818	0.1340	0.1635	0.1820	0.1994	0.2220	0.2206
2013	0.0000	0.0937	0.0994	0.1324	0.1628	0.1949	0.2041	0.2487	0.2123
2014	0.0141	0.0633	0.1046	0.1411	0.1798	0.1996	0.2221	0.2361	0.2336
2015	0.0175	0.0409	0.0747	0.1145	0.1500	0.1706	0.1877	0.1924	0.2089
2016	0.0000	0.0563	0.0659	0.1236	0.1595	0.1807	0.1999	0.2112	0.2374
2017	0.0305	0.0449	0.0673	0.1113	0.1410	0.1624	0.1710	0.1827	0.1679
2018	0.0216	0.0570	0.0553	0.1068	0.1495	0.1755	0.1887	0.1868	0.1984
2019	0.0201	0.0487	0.0798	0.1073	0.1275	0.1277	0.1556	0.1784	0.1616
2020	0.0138	0.0435	0.0620	0.1289	0.1634	0.1848	0.1994	0.2095	0.1949
2021	0.0108	0.0480	0.0636	0.0990	0.1536	0.1717	0.1930	0.2044	0.1957
2022	0.0000	0.0361	0.0656	0.1061	0.1532	0.1671	0.1931	0.1976	0.2045

TABLE 3.6.2.c - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet D
Weight at age as W-ringers in the catch (WECA, kg)

	0	1	2	3	4	5	6	7	8
2000	0.0236	0.0161	0.0658	0.1304	0.1549	0.1669	0.1937	0.0804	0.1499
2001	0.0086	0.0287	0.0564	0.0940	0.1276	0.1440	0.1540	0.1655	0.1840
2002	0.0102	0.0146	0.0230	0.1363	0.1427	0.1700	0.1797	0.0000	0.1790
2003	0.0130	0.0229	0.0516	0.0951	0.1184	0.1101	0.1043	0.1469	0.1469
2004	0.0282	0.0350	0.0772	0.1053	0.1448	0.1548	0.1746	0.1800	0.1855
2005	0.0135	0.0340	0.0738	0.1093	0.1402	0.1490	0.1531	0.1727	0.0000
2006	0.0142	0.0245	0.0721	0.1123	0.1368	0.1824	0.1961	0.2195	0.2047
2007	0.0215	0.0316	0.0624	0.0997	0.1355	0.1502	0.1915	0.1682	0.2107
2008	0.0158	0.0465	0.0826	0.1101	0.1396	0.1717	0.1884	0.2042	0.1896
2009	0.0132	0.0176	0.0871	0.1296	0.1607	0.1728	0.2103	0.2068	0.2058
2010	0.0077	0.0166	0.0399	0.0940	0.0410	0.1110	0.0000	0.0000	0.0000
2011	0.0082	0.0162	0.0448	0.0711	0.0000	0.0000	0.0000	0.0000	0.0000
2012	0.0093	0.0275	0.0398	0.0852	0.0000	0.0000	0.0000	0.0000	0.0000
2013	0.0000	0.0224	0.0748	0.1114	0.1378	0.0000	0.0000	0.0000	0.0000
2014	0.0093	0.0216	0.0244	0.0643	0.0000	0.0000	0.0000	0.0000	0.0000
2015	0.0159	0.0279	0.0415	0.0971	0.2840	0.1470	0.0000	0.0000	0.0000
2016	0.0071	0.0234	0.0375	0.0805	0.0000	0.0780	0.0000	0.0000	0.0000
2017	0.0000	0.0150	0.0250	0.0750	0.0000	0.0000	0.0000	0.0000	0.0000
2018	0.0102	0.0385	0.0427	0.0480	0.0000	0.0000	0.0000	0.0000	0.0000
2019	0.0120	0.0279	0.0397	0.0645	0.0000	0.0000	0.0000	0.0000	0.0000
2020	0.0095	0.0531	0.0979	0.1147	0.1164	0.1168	0.1158	0.0000	0.1300
2021	0.0000	0.0453	0.0673	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2022	0.0259	0.0523	0.0806	0.0734	0.1129	0.0811	0.0000	0.0000	0.0000

TABLE 3.6.2.d - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet - Fleet F
Weight at age as W-ringers in the catch (WECA, kg)

	0	1	2	3	4	5	6	7	8
2000	0.0165	0.0222	0.0428	0.0804	0.1235	0.1332	0.1434	0.1554	0.1514
2001	0.0129	0.0221	0.0467	0.0689	0.0933	0.1504	0.1445	0.1455	0.1522
2002	0.0108	0.0273	0.0578	0.0817	0.1088	0.1321	0.1866	0.1778	0.1577
2003	0.0224	0.0257	0.0464	0.0753	0.0952	0.1172	0.1259	0.1571	0.1626
2004	0.0037	0.0143	0.0474	0.0777	0.0964	0.1255	0.1504	0.1658	0.1510
2005	0.0136	0.0142	0.0483	0.0733	0.0893	0.1156	0.1436	0.1599	0.1702
2006	0.0212	0.0340	0.0567	0.0840	0.1022	0.1253	0.1439	0.1758	0.1700
2007	0.0119	0.0278	0.0573	0.0749	0.1063	0.1213	0.1407	0.1627	0.1855
2008	0.0163	0.0369	0.0649	0.0877	0.1103	0.1332	0.1406	0.1583	0.1747
2009	0.0105	0.0283	0.0481	0.0905	0.1238	0.1452	0.1604	0.1712	0.1818
2010	0.0122	0.0222	0.0522	0.0871	0.1198	0.1548	0.1706	0.1919	0.1941
2011	0.0124	0.0230	0.0551	0.0781	0.1132	0.1366	0.1476	0.1612	0.1680
2012	0.0181	0.0159	0.0550	0.0954	0.1151	0.1503	0.1676	0.1774	0.1912
2013	0.0137	0.0178	0.0541	0.0868	0.1294	0.1369	0.1453	0.1591	0.1798
2014	0.0165	0.0300	0.0590	0.0823	0.1221	0.1584	0.1560	0.1630	0.1755
2015	0.0071	0.0159	0.0504	0.0793	0.1076	0.1447	0.1706	0.1356	0.1494
2016	0.0103	0.0341	0.0517	0.0846	0.0950	0.1295	0.1604	0.1681	0.1692
2017	0.0220	0.0342	0.0577	0.0828	0.1179	0.1235	0.1376	0.1475	0.1398
2018	0.0159	0.0145	0.0518	0.0872	0.1084	0.1427	0.1434	0.1577	0.1701
2019	0.0167	0.0307	0.0569	0.0837	0.1236	0.1396	0.1656	0.1383	0.1667
2020	0.0185	0.0383	0.0691	0.0873	0.1113	0.1455	0.1559	0.1721	0.1710
2021	0.0191	0.0230	0.0722	0.1041	0.1386	0.1465	0.1716	0.1763	0.1771
2022	0.0200	0.0244	0.0927	0.0949	0.1326	0.1493	0.1709	0.1814	0.1858

TABLE 3.6.3 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Weight at age as W-ringers in the stock (WEST, kg)

	0	1	2	3	4	5	6	7	8
1991	0.0001	0.0308	0.0528	0.0787	0.1041	0.1245	0.1449	0.1594	0.1640
1992	0.0001	0.0203	0.0451	0.0818	0.1075	0.1313	0.1593	0.1710	0.1869
1993	0.0001	0.0156	0.0402	0.0967	0.1079	0.1409	0.1672	0.1827	0.1891
1994	0.0001	0.0186	0.0529	0.0836	0.1077	0.1392	0.1566	0.1768	0.2028
1995	0.0001	0.0131	0.0459	0.0708	0.1327	0.1674	0.1892	0.2097	0.2338
1996	0.0001	0.0181	0.0546	0.0905	0.1170	0.1197	0.1538	0.1467	0.1280
1997	0.0001	0.0131	0.0515	0.1063	0.1333	0.1662	0.1943	0.2090	0.2264
1998	0.0001	0.0221	0.0558	0.0829	0.1128	0.1338	0.1678	0.1683	0.1843
1999	0.0001	0.0211	0.0567	0.0871	0.1081	0.1480	0.1601	0.1439	0.1504
2000	0.0001	0.0140	0.0431	0.0837	0.1250	0.1436	0.1629	0.1650	0.1831
2001	0.0001	0.0169	0.0509	0.0783	0.1159	0.1690	0.1763	0.1681	0.1805
2002	0.0001	0.0164	0.0637	0.0905	0.1239	0.1736	0.1983	0.1980	0.2036
2003	0.0001	0.0144	0.0445	0.0793	0.1051	0.1268	0.1506	0.1729	0.1847
2004	0.0001	0.0131	0.0456	0.0811	0.1092	0.1440	0.1628	0.1932	0.2076
2005	0.0001	0.0126	0.0514	0.0800	0.1066	0.1322	0.1573	0.1677	0.1820
2006	0.0001	0.0185	0.0621	0.0953	0.1174	0.1659	0.1710	0.1858	0.1871
2007	0.0001	0.0150	0.0550	0.0800	0.1140	0.1430	0.1710	0.1750	0.1880
2008	0.0001	0.0180	0.0680	0.0860	0.1100	0.1390	0.1430	0.1410	0.1580
2009	0.0001	0.0230	0.0520	0.0900	0.1300	0.1560	0.1740	0.1850	0.1990
2010	0.0001	0.0140	0.0626	0.0974	0.1283	0.1618	0.1813	0.2023	0.2045
2011	0.0001	0.0090	0.0580	0.0950	0.1260	0.1560	0.1730	0.1850	0.1920
2012	0.0001	0.0120	0.0500	0.0920	0.1140	0.1580	0.1780	0.1910	0.2010
2013	0.0001	0.0140	0.0560	0.0950	0.1290	0.1430	0.1610	0.1790	0.1990
2014	0.0001	0.0160	0.0520	0.0810	0.1300	0.1650	0.1740	0.1900	0.2050
2015	0.0001	0.0150	0.0490	0.0880	0.1160	0.1570	0.1800	0.1690	0.1940
2016	0.0001	0.0138	0.0415	0.0811	0.1057	0.1366	0.1735	0.1824	0.1903
2017	0.0001	0.0177	0.0479	0.0815	0.1181	0.1324	0.1558	0.1731	0.1751
2018	0.0001	0.0125	0.0491	0.0828	0.1091	0.1432	0.1544	0.1696	0.1853

	0	1	2	3	4	5	6	7	8
2019	0.0001	0.0256	0.0568	0.0771	0.1190	0.1481	0.1705	0.1778	0.1910
2020	0.0001	0.0238	0.0484	0.0781	0.1039	0.1465	0.1644	0.1686	0.1809
2021	0.0001	0.0192	0.0544	0.0745	0.1170	0.1293	0.1773	0.1814	0.1781
2022	0.0001	0.0178	0.0749	0.0865	0.1127	0.1304	0.1650	0.1810	0.1872

TABLE 3.6.4 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Natural mortality (NATMOR)

	0	1	2	3	4	5	6	7	8
1991	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1992	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1993	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1994	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1995	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1996	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1997	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1998	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1999	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2000	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2001	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2002	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2003	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2004	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2005	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2006	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2007	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2008	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2009	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2010	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2011	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2012	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2

	0	1	2	3	4	5	6	7	8
2013	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2014	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2015	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2016	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2017	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2018	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2019	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2020	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2021	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2022	0.3	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2

TABLE 3.6.5 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Proportion mature (MATPROP)

	0	1	2	3	4	5	6	7	8
1991	0	0	0.2	0.75	0.9	1	1	1	1
1992	0	0	0.2	0.75	0.9	1	1	1	1
1993	0	0	0.2	0.75	0.9	1	1	1	1
1994	0	0	0.2	0.75	0.9	1	1	1	1
1995	0	0	0.2	0.75	0.9	1	1	1	1
1996	0	0	0.2	0.75	0.9	1	1	1	1
1997	0	0	0.2	0.75	0.9	1	1	1	1
1998	0	0	0.2	0.75	0.9	1	1	1	1
1999	0	0	0.2	0.75	0.9	1	1	1	1
2000	0	0	0.2	0.75	0.9	1	1	1	1
2001	0	0	0.2	0.75	0.9	1	1	1	1
2002	0	0	0.2	0.75	0.9	1	1	1	1
2003	0	0	0.2	0.75	0.9	1	1	1	1
2004	0	0	0.2	0.75	0.9	1	1	1	1
2005	0	0	0.2	0.75	0.9	1	1	1	1
2006	0	0	0.2	0.75	0.9	1	1	1	1

	0	1	2	3	4	5	6	7	8
2007	0	0	0.2	0.75	0.9	1	1	1	1
2008	0	0	0.2	0.75	0.9	1	1	1	1
2009	0	0	0.2	0.75	0.9	1	1	1	1
2010	0	0	0.2	0.75	0.9	1	1	1	1
2011	0	0	0.2	0.75	0.9	1	1	1	1
2012	0	0	0.2	0.75	0.9	1	1	1	1
2013	0	0	0.2	0.75	0.9	1	1	1	1
2014	0	0	0.2	0.75	0.9	1	1	1	1
2015	0	0	0.2	0.75	0.9	1	1	1	1
2016	0	0	0.2	0.75	0.9	1	1	1	1
2017	0	0	0.2	0.75	0.9	1	1	1	1
2018	0	0	0.2	0.75	0.9	1	1	1	1
2019	0	0	0.2	0.75	0.9	1	1	1	1
2020	0	0	0.2	0.75	0.9	1	1	1	1
2021	0	0	0.2	0.75	0.9	1	1	1	1
2022	0	0	0.2	0.75	0.9	1	1	1	1

TABLE 3.6.6 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Fraction of harvest before spawning (FPROP)

	0	1	2	3	4	5	6	7	8
1991	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1992	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1993	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1994	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1995	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1996	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1997	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1998	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1999	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2000	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

	0	1	2	3	4	5	6	7	8
2001	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2002	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2003	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2004	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2005	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2006	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2007	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2008	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2010	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2011	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2012	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2013	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2014	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2015	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2016	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2017	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2018	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2019	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2020	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2021	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2022	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

TABLE 3.6.7 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Fraction of natural mortality before spawning (MPROP)

	0	1	2	3	4	5	6	7	8
1991	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

	0	1	2	3	4	5	6	7	8
1992	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1993	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1994	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1995	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1996	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1997	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1998	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1999	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2000	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2001	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2002	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2003	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2004	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2005	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2006	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2007	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2008	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2009	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2010	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2011	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2012	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2013	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2014	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2015	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2016	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2017	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2018	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2019	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2020	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

	0	1	2	3	4	5	6	7	8
2021	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2022	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

TABLE 3.6.8.a - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Survey indices: HERAS (number in thousands)

	3	4	5	6
1991	1927000	866000	350000	88000
1992	1799000	1593000	556000	197000
1993	1274000	598000	434000	154000
1994	935000	501000	239000	186000
1995	1022000	1270000	255000	174000
1996	247000	141000	119000	37000
1997	787000	166000	67000	69000
1998	901000	282000	111000	51000
1999	NA	NA	NA	NA
2000	673600	363900	185700	55600
2001	452300	153100	96400	37600
2002	1392800	524300	87500	39500
2003	394600	323400	103400	25200
2004	726000	306900	183700	72100
2005	463500	201300	102500	83600
2006	1780400	490000	180400	27000
2007	933000	499000	154000	34000
2008	843000	333000	274000	176000
2009	205000	161000	82000	86000
2010	254000	115000	65000	24000
2011	259000	163000	70000	53000
2012	236000	87000	76000	33000
2013	525000	53000	30000	12000
2014	176000	248000	28000	37000

	3	4	5	6
2015	446000	224000	171000	82000
2016	381000	99000	40000	40000
2017	661000	401000	94000	53000
2018	271000	175000	169000	50000
2019	315000	109000	67000	52000
2020	225000	180000	74000	77000
2021	275000	203000	52000	49000
2022	129000	124000	100000	58000

TABLE 3.6.8.b - WESTERN BALTIC SPRING SPAWNING HERRING, continued
Multi fleet
Survey indices: GerAS (number in thousands)

	1	2	3	4
1994	415730	883810	559720	443730
1995	1675340	328610	357960	353850
1996	1439460	590010	434090	295170
1997	1955400	738180	394530	162430
1998	801350	678530	394070	236830
1999	1338710	287240	232510	155950
2000	1429880	453980	328960	201590
2001	NA	NA	NA	NA
2002	837549	421393	575356	341119
2003	1238480	222530	217270	260350
2004	968860	592360	346230	163150
2005	750199	590756	295659	142778
2006	940892	226959	279618	212201
2007	558851	260402	117412	76782
2008	392737	165347	166301	102018
2009	270959	95866	43553	17761
2010	534633	305540	214539	107364
2011	1206762	360354	210455	115984

	1	2	3	4
2012	755034	294242	193974	124548
2013	893837	456204	307567	262908
2014	769320	242590	279650	332660
2015	440738	509769	221344	129795
2016	493366	155417	196061	60953
2017	463940	145360	123230	137500
2018	428530	89280	41160	20240
2019	247870	122948	47727	24244
2020	185814	82236	66046	21600
2021	158368	144638	49942	22420
2022	118050	75870	39610	18400

TABLE 3.6.8.c - WESTERN BALTIC SPRING SPAWNING HERRING, continued
Multi fleet
Survey indices: N20 (number in thousands)

	0
1992	1060000
1993	3044000
1994	12515000
1995	7930000
1996	21012000
1997	4872000
1998	16743000
1999	20364000
2000	3026000
2001	4845000
2002	11324000
2003	5507000
2004	5640000
2005	3887000
2006	3774000

	0
2007	1829000
2008	1622000
2009	6464000
2010	7037000
2011	4444000
2012	1140000
2013	3021000
2014	539000
2015	2478000
2016	442000
2017	1247000
2018	1563000
2019	1317000
2020	239000
2021	2751000
2022	6603000

TABLE 3.6.8.d - WESTERN BALTIC SPRING SPAWNING HERRING, continued
Multi fleet
Survey indices: IBTS Q1 + BITS Q1 (number in thousands)

	1	2	3
2002	1012698	57144	11439
2003	679132	131493	3395
2004	289327	72938	12960
2005	178201	113465	7044

2006	143497	32836	6406
2007	237369	36605	3262
2008	162723	32322	3946
2009	533986	38010	1120
2010	301646	78811	9377
2011	159743	68881	12912
2012	267873	74418	3626
2013	170436	73289	13112
2014	150560	21317	2742
2015	260080	61794	2046
2016	190864	92649	5407
2017	465661	71591	11029
2018	106439	67129	2736
2019	417826	39068	5625
2020	326622	79385	5288
2021	325379	127912	6423
2022	182473	75620	7168

TABLE 3.6.8.e - WESTERN BALTIC SPRING SPAWNING HERRING, continued
Multi fleet
Survey indices: IBTS Q3 + BITS Q4 (number in thousands)

	2	**3**
2002	3416	1487
2003	7071	1519
2004	3530	1270
2005	3573	634

2006	2805	1162
2007	3932	688.8
2008	2377	1241
2009	3346	621.1
2010	4349	1260
2011	2817	705.1
2012	5435	806.5
2013	4832	1468
2014	1242	1442
2015	9964	1402
2016	8592	2125
2017	5824	1723
2018	6675	1165
2019	9767	3318
2020	8749	2299
2021	9096	1780
2022	2314	1214

TABLE 3.6.9 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
SAM software version

Model version: [0.5.4 , 0.5.4 , 0.5.4]

Model SHA: [3c872568b9d7 , 3c872568b9d7 , 3c872568b9d7]

TABLE 3.6.10 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
SAM configuration settings

Configuration saved: Tue Feb 13 12:34:28 2018

```
#
# Where a matrix is specified, rows correspond to fleets and columns to ages.
# Same number indicates same parameter used
# Numbers (integers) starts from zero and must be consecutive
#
$minAge
# The minimum age class in the assessment
 0

$maxAge
# The maximum age class in the assessment
 8

$maxAgePlusGroup
# Is last age group considered a plus group (1 yes, or 0 no).
 1

$keyLogFsta
# Coupling of the fishing mortality states (normally only first row is used).
 -1  0  1  2  3  4  5  6  6
  7  8  9 10 11 12 13 14 14
 15 16 17 18 19 20 21 22 22
 23 24 25 26 27 28 29 30 30
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1

$corFlag
# Correlation of fishing mortality across ages (0 independent, 1 compound symmetry, or 2
AR(1)
 0 2 2 2

$keyLogFpar
# Coupling of the survey catchability parameters (normally first row is not used, as that is
covered by fishing mortality).
-1          -1          -1          -1          -1          -1          -1
            -1          -1
-1          -1          -1          -1          -1          -1          -1
            -1          -1
-1          -1          -1          -1          -1          -1          -1
            -1          -1
-1          -1          -1          -1          -1          -1          -1
            -1          -1
-1          -1          -1          0           1           2           3
            -1          -1
-1          4           5           6           7           -1          -1
            -1          -1
 8          -1          -1          -1          -1          -1          -1
            -1          -1
-1          9           10          11          -1          -1          -1
            -1          -1
```

```
-1          -1          12          13          -1          -1          -1
                -1          -1
-1          -1          -1          -1          -1          -1          -1
                -1          -1
```

$keyQpow
Density dependent catchability power parameters (if any).

```
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
```

$keyVarF
Coupling of process variance parameters for log(F)-process (normally only first row is used)

```
 -1  0  0  0  0  0  0  0  0
  1  1  1  1  1  1  1  1  1
  2  2  2  2  2  2  2  2  2
  3  3  3  3  3  3  3  3  3
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
 -1 -1 -1 -1 -1 -1 -1 -1 -1
```

$keyVarLogN
Coupling of process variance parameters for log(N)-process

```
 0 1 1 1 1 1 1 1 1
```

$keyVarObs
Coupling of the variance parameters for the observations.

```
            -1          0           1           1           1           1
            1           1           1
             2          3           4           4           4           4
            4           4           4
             5          6           6           6           6           6
            6           6           6
             7          8           8           8           8           8
            8           8           8
            -1          -1          -1          9           9           9
            9           -1          -1
            -1          10          10          10          10          -1
            -1          -1          -1
             11         -1          -1          -1          -1          -1
            -1          -1          -1
```

```
-1          12          12          12          -1          -1
-1          -1          -1
-1          -1          13          13          -1          -1
-1          -1          -1
-1          -1          -1          -1          -1          -1
-1          -1          -1
```

$obsCorStruct
Covariance structure for each fleet ("ID" independent, "AR" AR(1), or "US" for unstructured). | Possible values are: "ID" "AR" "US"
"ID" "AR" "ID" "AR" "AR" "AR" "ID" "AR" "US" "NA"

$keyCorObs
Coupling of correlation parameters can only be specified if the AR(1) structure is chosen above.
NA's indicate where correlation parameters can be specified (-1 where they cannot).
#0-1 1-2 2-3 3-4 4-5 5-6 6-7 7-8
NA NA NA NA NA NA NA NA
3 3 3 3 4 4 4 4
NA NA NA NA NA NA NA NA
3 3 3 3 4 4 4 4
-1 -1 -1 0 0 1 -1 -1
-1 2 1 0 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1
-1 2 1 -1 -1 -1 -1 -1
-1 -1 NA -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1

$stockRecruitmentModelCode
Stock recruitment code (0 for plain random walk, 1 for Ricker, and 2 for Beverton-Holt).
0

$noScaledYears
Number of years where catch scaling is applied.
0

$keyScaledYears
A vector of the years where catch scaling is applied.

$keyParScaledYA
A matrix specifying the couplings of scale parameters (nrow = no scaled years, ncols = no ages).

$fbarRange
lowest and highest age included in Fbar
3 6

$keyBiomassTreat
To be defined only if a biomass survey is used (0 SSB index, 1 catch index, and 2 FSB index).
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1

$obsLikelihoodFlag
Option for observational likelihood | Possible values are: "LN" "ALN"
"LN" "LN" "LN" "LN" "LN" "LN" "LN" "LN" "LN" "LN"

$fixVarToWeight
If weight attribute is supplied for observations this option sets the treatment (0 relative weight, 1 fix variance to weight).
0

TABLE 3.6.11 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Stock summary - Estimated recruitment (1000), spawning stock biomass (SSB) (tons), average fishing mortality and total stock biomass (TSB) (tons).

Year	R(age 0)	Low	High	SSB	Low	High	Fbar(3-6)	Low	High	TSB	Low	High
1991	5116963	3971062	6593528	294773	240510	361280	0.422	0.302	0.590	591253	498894	700711
1992	3684550	2929011	4634981	304636	248867	372902	0.510	0.386	0.673	524980	442517	622810
1993	3078506	2396940	3953874	287341	235433	350693	0.582	0.440	0.769	457006	383148	545100
1994	4479773	3505922	5724135	227748	186895	277532	0.603	0.461	0.790	375889	316051	447057

Year	R(age 0)	Low	High	SSB	Low	High	Fbar(3-6)	Low	High	TSB	Low	High
1995	4110015	3260314	5181165	195407	159074	240038	0.596	0.444	0.799	316364	265035	377633
1996	4171325	3326114	5231316	134244	110260	163444	0.668	0.508	0.878	277990	236393	326906
1997	3527199	2762275	4503943	146775	121087	177913	0.634	0.481	0.837	277244	235011	327068
1998	4744073	3747772	6005230	119220	99355	143057	0.626	0.473	0.829	264982	226547	309939
1999	5018116	4011841	6276791	120005	100006	144003	0.507	0.383	0.671	271356	232689	316450
2000	3086006	2460397	3870691	125841	104976	150854	0.589	0.460	0.754	263828	225949	308058
2001	2764627	2227871	3430703	136767	115236	162319	0.610	0.476	0.783	280857	241020	327278
2002	2740867	2217827	3387256	160622	135519	190376	0.500	0.387	0.647	288864	247633	336959
2003	2971033	2389890	3693490	129048	108627	153308	0.446	0.344	0.579	222004	191124	257874
2004	2088989	1683176	2592645	134457	113177	159739	0.464	0.358	0.601	228238	196581	264993
2005	1780760	1441341	2200108	126104	106721	149007	0.528	0.412	0.677	220173	189455	255872
2006	1361488	1099249	1686286	137834	116489	163090	0.476	0.370	0.614	233249	200441	271427
2007	1451383	1166312	1806132	112660	94616	134144	0.529	0.411	0.680	181938	155613	212715
2008	1180250	944293	1475167	91780	77241	109057	0.575	0.450	0.733	159665	137057	186003
2009	1109111	892922	1377642	82061	69293	97181	0.542	0.420	0.699	143240	123181	166566
2010	1444975	1167671	1788134	74567	63284	87861	0.432	0.329	0.568	124213	106794	144473
2011	1335731	1086848	1641608	68146	57744	80422	0.291	0.217	0.389	111275	95942	129059
2012	1198209	969739	1480507	72629	61598	85635	0.377	0.286	0.497	124011	107092	143602
2013	1765082	1343427	2319080	80901	68627	95371	0.399	0.303	0.525	136923	118062	158798
2014	1233676	971998	1565800	84593	71265	100414	0.320	0.242	0.424	143429	123716	166282
2015	998672	785133	1270290	88247	74449	104601	0.407	0.309	0.537	150321	129082	175056
2016	893169	689301	1157332	85406	71847	101523	0.522	0.401	0.679	133590	113623	157066
2017	915592	699274	1198826	74730	62341	89581	0.561	0.430	0.731	118867	100253	140937
2018	813788	598428	1106650	59805	48982	73019	0.572	0.429	0.763	95426	79074	115158
2019	830255	584427	1179485	51376	40213	65638	0.279	0.196	0.399	93027	74067	116841
2020	612037	403824	927607	53628	40296	71370	0.187	0.114	0.308	92039	70375	120373
2021	454304	267107	772694	62343	44764	86824	0.111	0.063	0.195	97293	70982	133356
2022	537470	268327	1076573	75548	52770	108157	0.050	0.022	0.114	109946	77649	155677

TABLE 3.6.12.a - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated fishing mortality - Sum all fleets

Year Age	0	1	2	3	4	5	6	7	8
1991	0.027	0.203	0.313	0.349	0.400	0.444	0.495	0.537	0.537
1992	0.027	0.222	0.349	0.402	0.476	0.540	0.621	0.688	0.688
1993	0.034	0.261	0.375	0.446	0.541	0.618	0.723	0.805	0.805
1994	0.041	0.286	0.413	0.470	0.564	0.634	0.745	0.826	0.826
1995	0.065	0.360	0.457	0.484	0.557	0.619	0.723	0.793	0.793
1996	0.047	0.321	0.431	0.504	0.618	0.710	0.840	0.932	0.932
1997	0.048	0.307	0.396	0.468	0.580	0.674	0.815	0.939	0.939
1998	0.050	0.316	0.426	0.476	0.574	0.664	0.792	0.940	0.940
1999	0.034	0.235	0.395	0.411	0.467	0.531	0.619	0.740	0.740
2000	0.028	0.238	0.441	0.463	0.541	0.619	0.731	0.876	0.876
2001	0.032	0.248	0.415	0.455	0.557	0.646	0.784	0.924	0.924
2002	0.025	0.199	0.382	0.391	0.457	0.524	0.628	0.740	0.740
2003	0.023	0.182	0.336	0.346	0.407	0.467	0.563	0.667	0.667
2004	0.024	0.187	0.284	0.330	0.422	0.493	0.611	0.729	0.729
2005	0.016	0.171	0.328	0.381	0.488	0.557	0.687	0.819	0.819
2006	0.015	0.170	0.364	0.376	0.446	0.494	0.590	0.695	0.695
2007	0.013	0.160	0.360	0.401	0.497	0.555	0.662	0.761	0.761
2008	0.013	0.166	0.380	0.427	0.538	0.609	0.725	0.817	0.817
2009	0.014	0.186	0.425	0.422	0.505	0.566	0.675	0.755	0.755
2010	0.007	0.123	0.355	0.347	0.406	0.445	0.531	0.594	0.594
2011	0.004	0.075	0.206	0.217	0.271	0.303	0.372	0.420	0.420
2012	0.005	0.087	0.226	0.264	0.351	0.400	0.493	0.552	0.552
2013	0.005	0.091	0.222	0.269	0.369	0.427	0.530	0.599	0.599
2014	0.004	0.074	0.198	0.226	0.295	0.341	0.421	0.487	0.487
2015	0.006	0.102	0.242	0.275	0.368	0.441	0.545	0.659	0.659
2016	0.006	0.120	0.376	0.387	0.467	0.554	0.678	0.842	0.842
2017	0.004	0.109	0.395	0.415	0.491	0.596	0.741	0.954	0.954

Year Age	0	1	2	3	4	5	6	7	8
2018	0.004	0.106	0.386	0.413	0.495	0.612	0.768	1.043	1.043
2019	0.002	0.046	0.166	0.190	0.238	0.297	0.393	0.592	0.592
2020	0.001	0.049	0.192	0.164	0.176	0.176	0.234	0.362	0.362
2021	0.001	0.022	0.098	0.092	0.112	0.103	0.138	0.239	0.239
2022	0.000	0.003	0.013	0.027	0.054	0.046	0.073	0.164	0.164

TABLE 3.6.12.b - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated fishing mortality - Fleet A

Year Age	0	1	2	3	4	5	6	7	8
1991	0.000	0.000	0.004	0.021	0.016	0.019	0.017	0.017	0.017
1992	0.000	0.000	0.004	0.020	0.016	0.018	0.018	0.018	0.018
1993	0.000	0.000	0.004	0.020	0.017	0.018	0.019	0.020	0.020
1994	0.000	0.000	0.004	0.020	0.018	0.018	0.021	0.021	0.021
1995	0.000	0.000	0.004	0.020	0.018	0.019	0.022	0.023	0.023
1996	0.000	0.000	0.004	0.020	0.019	0.020	0.024	0.026	0.026
1997	0.000	0.000	0.004	0.020	0.019	0.021	0.024	0.032	0.032
1998	0.000	0.000	0.004	0.019	0.019	0.024	0.024	0.040	0.040
1999	0.000	0.000	0.004	0.020	0.020	0.027	0.025	0.046	0.046
2000	0.000	0.000	0.004	0.019	0.022	0.029	0.030	0.049	0.049
2001	0.000	0.000	0.004	0.017	0.023	0.030	0.033	0.049	0.049
2002	0.000	0.000	0.003	0.016	0.021	0.028	0.031	0.048	0.048
2003	0.000	0.000	0.002	0.015	0.019	0.023	0.027	0.043	0.043
2004	0.000	0.000	0.002	0.016	0.018	0.021	0.024	0.036	0.036
2005	0.000	0.000	0.002	0.014	0.018	0.018	0.024	0.039	0.039
2006	0.000	0.000	0.001	0.010	0.015	0.016	0.022	0.042	0.042
2007	0.000	0.000	0.001	0.007	0.010	0.009	0.017	0.028	0.028
2008	0.000	0.000	0.001	0.004	0.007	0.006	0.013	0.022	0.022
2009	0.000	0.000	0.001	0.004	0.008	0.006	0.014	0.031	0.031
2010	0.000	0.000	0.000	0.003	0.007	0.004	0.013	0.024	0.024
2011	0.000	0.000	0.000	0.003	0.006	0.003	0.012	0.017	0.017

Year Age	0	1	2	3	4	5	6	7	8
2012	0.000	0.000	0.000	0.003	0.006	0.002	0.016	0.015	0.015
2013	0.000	0.000	0.000	0.003	0.006	0.004	0.018	0.019	0.019
2014	0.000	0.000	0.001	0.005	0.008	0.007	0.023	0.032	0.032
2015	0.000	0.000	0.001	0.006	0.009	0.010	0.026	0.043	0.043
2016	0.000	0.000	0.001	0.008	0.010	0.012	0.026	0.048	0.048
2017	0.000	0.000	0.001	0.010	0.012	0.013	0.025	0.054	0.054
2018	0.000	0.000	0.002	0.011	0.019	0.020	0.036	0.098	0.098
2019	0.000	0.000	0.004	0.015	0.026	0.027	0.053	0.142	0.142
2020	0.000	0.000	0.005	0.018	0.038	0.028	0.066	0.160	0.160
2021	0.000	0.000	0.005	0.019	0.045	0.033	0.061	0.148	0.148
2022	0.000	0.000	0.007	0.021	0.046	0.036	0.060	0.147	0.147

TABLE 3.6.12.c - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated fishing mortality - Fleet C

Year Age	0	1	2	3	4	5	6	7	8
1991	0.001	0.029	0.132	0.095	0.076	0.068	0.066	0.066	0.066
1992	0.001	0.030	0.135	0.098	0.078	0.070	0.068	0.068	0.068
1993	0.001	0.027	0.122	0.088	0.071	0.063	0.061	0.061	0.061
1994	0.001	0.034	0.154	0.111	0.089	0.079	0.077	0.077	0.077
1995	0.001	0.041	0.185	0.134	0.108	0.096	0.093	0.093	0.093
1996	0.001	0.029	0.134	0.097	0.078	0.069	0.067	0.067	0.067
1997	0.000	0.025	0.112	0.081	0.065	0.058	0.056	0.056	0.056
1998	0.001	0.033	0.151	0.109	0.087	0.078	0.075	0.076	0.076
1999	0.001	0.044	0.201	0.145	0.116	0.103	0.100	0.101	0.101
2000	0.001	0.050	0.229	0.166	0.133	0.118	0.115	0.115	0.115
2001	0.001	0.040	0.184	0.133	0.107	0.095	0.092	0.092	0.092
2002	0.001	0.048	0.218	0.158	0.127	0.112	0.109	0.110	0.110
2003	0.001	0.040	0.182	0.131	0.105	0.094	0.091	0.091	0.091
2004	0.000	0.020	0.092	0.066	0.053	0.047	0.046	0.046	0.046
2005	0.001	0.031	0.141	0.102	0.082	0.073	0.071	0.071	0.071

Year Age	0	1	2	3	4	5	6	7	8
2006	0.001	0.042	0.194	0.140	0.112	0.100	0.097	0.098	0.098
2007	0.001	0.038	0.176	0.127	0.102	0.091	0.088	0.089	0.089
2008	0.001	0.040	0.182	0.131	0.105	0.094	0.091	0.092	0.092
2009	0.001	0.052	0.239	0.172	0.138	0.123	0.120	0.121	0.121
2010	0.001	0.054	0.248	0.178	0.143	0.128	0.124	0.126	0.126
2011	0.001	0.029	0.134	0.096	0.077	0.069	0.067	0.068	0.068
2012	0.001	0.027	0.123	0.089	0.071	0.064	0.062	0.063	0.063
2013	0.000	0.022	0.101	0.073	0.059	0.052	0.051	0.052	0.052
2014	0.000	0.024	0.110	0.079	0.064	0.057	0.055	0.056	0.056
2015	0.000	0.025	0.116	0.083	0.067	0.060	0.059	0.059	0.059
2016	0.001	0.056	0.258	0.185	0.149	0.134	0.131	0.132	0.132
2017	0.001	0.064	0.295	0.212	0.170	0.152	0.149	0.151	0.151
2018	0.001	0.062	0.285	0.205	0.165	0.147	0.144	0.146	0.146
2019	0.000	0.025	0.117	0.084	0.067	0.060	0.059	0.059	0.059
2020	0.001	0.036	0.166	0.119	0.096	0.086	0.084	0.085	0.085
2021	0.000	0.019	0.087	0.062	0.050	0.045	0.044	0.044	0.044
2022	0.000	0.001	0.004	0.003	0.002	0.002	0.002	0.002	0.002

TABLE 3.6.12.d - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated fishing mortality - Fleet D

Year Age	0	1	2	3	4	5	6	7	8
1991	0.015	0.043	0.016	0.008	0.004	0.003	0.004	0.004	0.004
1992	0.012	0.033	0.013	0.007	0.003	0.003	0.004	0.003	0.003
1993	0.017	0.047	0.017	0.009	0.004	0.003	0.004	0.004	0.004
1994	0.024	0.066	0.024	0.011	0.006	0.004	0.006	0.005	0.005
1995	0.049	0.141	0.048	0.021	0.010	0.007	0.009	0.007	0.007
1996	0.028	0.075	0.025	0.011	0.005	0.004	0.005	0.005	0.005
1997	0.029	0.076	0.025	0.011	0.005	0.004	0.005	0.004	0.004
1998	0.033	0.087	0.029	0.012	0.005	0.004	0.005	0.005	0.005
1999	0.021	0.054	0.019	0.008	0.004	0.003	0.004	0.003	0.003

Year Age	0	1	2	3	4	5	6	7	8
2000	0.014	0.035	0.013	0.005	0.002	0.002	0.003	0.003	0.003
2001	0.018	0.051	0.021	0.009	0.005	0.005	0.009	0.010	0.010
2002	0.016	0.050	0.020	0.007	0.004	0.003	0.004	0.003	0.003
2003	0.016	0.059	0.032	0.015	0.009	0.008	0.009	0.008	0.008
2004	0.016	0.068	0.044	0.023	0.014	0.012	0.012	0.009	0.009
2005	0.007	0.034	0.023	0.011	0.006	0.004	0.004	0.003	0.003
2006	0.008	0.050	0.043	0.022	0.012	0.012	0.011	0.009	0.009
2007	0.005	0.031	0.029	0.014	0.007	0.008	0.007	0.007	0.007
2008	0.005	0.033	0.032	0.013	0.005	0.006	0.005	0.005	0.005
2009	0.008	0.061	0.051	0.015	0.004	0.004	0.003	0.003	0.003
2010	0.002	0.020	0.014	0.003	0.000	0.000	0.000	0.000	0.000
2011	0.001	0.012	0.007	0.001	0.000	0.000	0.000	0.000	0.000
2012	0.001	0.011	0.008	0.001	0.000	0.000	0.000	0.000	0.000
2013	0.001	0.015	0.015	0.002	0.000	0.000	0.000	0.000	0.000
2014	0.001	0.013	0.012	0.001	0.000	0.000	0.000	0.000	0.000
2015	0.002	0.031	0.028	0.003	0.000	0.000	0.000	0.000	0.000
2016	0.001	0.019	0.019	0.001	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000
2018	0.000	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000
2019	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000
2020	0.000	0.008	0.010	0.001	0.000	0.000	0.000	0.000	0.000
2021	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
2022	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000

TABLE 3.6.12.e - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated fishing mortality - Fleet F

Year Age	0	1	2	3	4	5	6	7	8
1991	0.011	0.131	0.161	0.225	0.303	0.354	0.408	0.451	0.451
1992	0.014	0.159	0.197	0.278	0.378	0.449	0.532	0.599	0.599
1993	0.016	0.187	0.232	0.329	0.449	0.533	0.638	0.720	0.720

Year Age	0	1	2	3	4	5	6	7	8
1994	0.016	0.187	0.231	0.328	0.451	0.533	0.642	0.723	0.723
1995	0.015	0.178	0.219	0.309	0.422	0.498	0.599	0.670	0.670
1996	0.019	0.217	0.267	0.376	0.516	0.616	0.744	0.835	0.835
1997	0.018	0.207	0.255	0.357	0.491	0.592	0.730	0.846	0.846
1998	0.017	0.196	0.242	0.336	0.462	0.559	0.687	0.820	0.820
1999	0.012	0.137	0.171	0.239	0.328	0.398	0.489	0.590	0.590
2000	0.013	0.153	0.194	0.274	0.383	0.470	0.584	0.709	0.709
2001	0.013	0.157	0.206	0.296	0.422	0.517	0.650	0.774	0.774
2002	0.008	0.101	0.141	0.210	0.306	0.382	0.484	0.580	0.580
2003	0.007	0.083	0.120	0.185	0.274	0.342	0.436	0.525	0.525
2004	0.008	0.098	0.145	0.225	0.336	0.413	0.529	0.638	0.638
2005	0.008	0.105	0.162	0.255	0.382	0.461	0.589	0.706	0.706
2006	0.006	0.078	0.127	0.205	0.307	0.365	0.460	0.546	0.546
2007	0.007	0.090	0.154	0.253	0.378	0.447	0.550	0.637	0.637
2008	0.007	0.093	0.166	0.278	0.420	0.503	0.617	0.698	0.698
2009	0.006	0.073	0.135	0.231	0.355	0.433	0.538	0.600	0.600
2010	0.004	0.049	0.093	0.163	0.255	0.313	0.393	0.444	0.444
2011	0.003	0.033	0.065	0.117	0.187	0.231	0.292	0.335	0.335
2012	0.004	0.048	0.094	0.171	0.273	0.334	0.416	0.475	0.475
2013	0.004	0.053	0.105	0.190	0.304	0.371	0.461	0.528	0.528
2014	0.003	0.037	0.076	0.141	0.223	0.277	0.342	0.399	0.399
2015	0.003	0.046	0.097	0.183	0.292	0.371	0.461	0.556	0.556
2016	0.003	0.044	0.099	0.193	0.308	0.409	0.521	0.661	0.661
2017	0.003	0.041	0.096	0.193	0.308	0.430	0.566	0.749	0.749
2018	0.003	0.041	0.096	0.197	0.311	0.445	0.588	0.800	0.800
2019	0.001	0.018	0.043	0.091	0.144	0.209	0.282	0.390	0.390
2020	0.000	0.005	0.012	0.026	0.042	0.062	0.084	0.118	0.118
2021	0.000	0.002	0.005	0.011	0.017	0.025	0.034	0.047	0.047
2022	0.000	0.001	0.002	0.003	0.005	0.008	0.011	0.015	0.015

TABLE 3.6.13 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Estimated stock numbers (1000) at age

Year Age	0	1	2	3	4	5	6	7	8
1991	5116963	4122924	2246492	1868970	912099	551866	162679	48647	17493
1992	3684550	3724986	2032424	1347850	1077384	497917	288437	81767	31957
1993	3078506	2657326	1836150	1163842	743742	546329	236380	126922	46855
1994	4479773	2171413	1239962	1050432	601950	359298	239713	93775	63492
1995	4110015	3221895	993598	662571	551260	273342	158147	92522	56203
1996	4171325	2841926	1369150	517817	331744	257352	120258	62936	55096
1997	3527199	2955983	1244119	737268	256595	145205	102040	42433	38452
1998	4744073	2459235	1318275	685884	380052	117813	61070	36282	25960
1999	5018116	3356038	1077173	700956	349774	176488	49391	22925	19619
2000	3086006	3637957	1614152	590018	377595	180650	85003	21850	16616
2001	2764627	2202123	1743758	862519	300315	179843	79037	33849	13092
2002	2740867	1974032	1022498	948433	458460	138978	77669	29013	15395
2003	2971033	1968178	982551	565762	524811	240177	66788	34017	17334
2004	2088989	2177660	995187	578229	327846	284020	123565	31205	21495
2005	1780760	1497932	1106839	619893	338542	176259	141501	55206	20779
2006	1361488	1300362	754532	656535	353852	168236	84023	57724	27522
2007	1451383	984515	669130	427801	366123	188429	81583	39370	34440
2008	1180250	1072280	502311	383468	233639	181462	89964	34276	28415
2009	1109111	861040	558253	280755	202720	112933	79724	36040	22702
2010	1444975	800250	434020	298258	151820	100911	52814	32389	22848
2011	1335731	1070880	424331	248103	172111	82789	53375	25609	24742
2012	1198209	983916	612334	281654	162145	107306	50089	30176	27047
2013	1765082	873794	540704	408364	176521	93621	58346	25229	26989
2014	1233676	1334182	473332	352391	258359	98528	50171	28116	23835
2015	998672	909022	774443	317014	229196	153120	57946	26829	26546
2016	893169	732268	495210	510106	197613	129228	78419	27582	22860
2017	915592	656006	393307	272324	292050	102253	60963	31911	17870
2018	813788	681086	357534	217378	142182	151180	46864	23624	15462

Year Age	0	1	2	3	4	5	6	7	8
2019	830255	600180	367595	197654	119111	70626	67455	18126	11053
2020	612037	619775	347061	250692	130665	78773	42827	37534	13201
2021	454304	454322	362378	233320	172339	88793	54311	27633	28795
2022	537470	330972	272534	265572	173991	125009	66370	38486	36122

TABLE 3.6.14.a - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Predicted catch in numbers - Sum fleets

	0	1	2	3	4	5	6	7	8
1991	117613.57	629969.45	596163.16	545280.90	294832.05	193779.95	62205.55	19820.79	7127.31
1992	84795.35	615213.07	594869.30	443922.98	402347.01	204229.49	131488.04	40161.95	15696.70
1993	90740.19	511044.05	572439.81	416773.48	305868.90	247192.37	119875.94	69285.83	25577.68
1994	156769.86	459472.93	424659.96	397034.50	258992.32	167719.50	125783.18	52749.46	35714.80
1995	228109.28	852944.82	376703.06	260176.44	238086.02	126871.60	82379.03	51347.59	31191.09
1996	167109.59	666951.07	484646.20	205942.14	152041.55	129633.55	68143.48	38167.63	33413.14
1997	143431.09	664482.66	406660.45	273918.41	111073.62	69965.70	56235.63	25755.87	23339.33
1998	204231.14	571305.11	464243.59	261624.03	165771.81	57008.50	33442.25	22490.92	16092.30
1999	145152.65	593473.18	354570.30	238424.54	131273.83	73239.40	23036.31	12342.68	10562.76
2000	73414.03	648601.87	584747.28	223238.74	160717.67	85157.81	45226.54	13331.29	10137.61
2001	75759.89	408244.77	600265.02	318813.05	129498.21	86722.58	43870.79	21201.70	8200.47
2002	59215.24	298599.94	325361.15	308907.03	169643.91	57415.29	36935.29	15722.43	8343.03
2003	59933.17	273634.13	279704.79	165156.83	175408.71	89687.65	28998.11	16940.80	8632.65
2004	43531.50	308771.20	242917.43	159884.30	110186.77	108012.92	55430.11	16013.03	11029.92
2005	25172.59	194089.04	307511.70	195006.35	129392.60	74316.54	69929.25	31124.30	11714.96
2006	18116.59	168933.49	231779.35	207051.29	127801.03	65823.60	37813.80	29715.00	14167.67
2007	15772.42	120365.69	202675.85	141341.83	142963.89	79744.93	39586.16	21268.44	18605.18
2008	12865.91	135918.92	160270.11	133567.09	96952.25	82232.33	46438.35	19368.91	16056.89
2009	13479.26	122194.42	197264.82	97920.38	81194.00	49078.13	39735.85	19716.83	12419.94
2010	8994.76	75908.06	127238.25	86610.02	50517.38	36102.15	21899.94	14786.27	10430.58
2011	5049.91	61987.70	75321.38	46376.07	39269.86	20799.65	16055.17	8567.59	8277.74
2012	5305.10	66057.66	119232.23	62916.10	46293.64	34018.42	18992.54	12480.88	11186.68

	0	1	2	3	4	5	6	7	8
2013	8213.92	61190.26	103721.00	92366.05	52266.16	31134.22	23251.94	11049.37	11820.42
2014	4428.24	76778.21	81479.19	68217.15	63345.13	27246.84	16749.36	10631.05	9012.12
2015	5009.31	71508.01	162187.32	73752.86	68286.16	52753.55	23871.38	12907.56	12771.42
2016	4243.82	67712.98	153473.66	163859.57	74438.69	55610.16	39683.36	16508.17	13681.55
2017	3487.59	54971.80	125744.92	93133.04	115405.81	47005.34	33167.77	21022.79	11772.38
2018	3023.23	55697.53	112204.96	74149.37	56686.32	71099.40	26279.58	16858.30	11033.76
2019	1349.80	21321.03	52840.98	32731.76	24361.27	17590.38	21720.04	8473.95	5167.39
2020	771.50	23814.37	56522.42	35690.40	20148.68	12170.53	8732.17	11595.27	4078.29
2021	215.84	7732.63	30928.00	18969.00	17078.70	8120.66	6643.02	5690.44	5929.88
2022	49.02	668.47	3240.43	6430.57	8353.62	5096.17	4265.81	5378.99	5048.48

TABLE 3.6.14.b - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Predicted catch in numbers - Fleet A

	0	1	2	3	4	5	6	7	8
1991	0.00	9.96	8627.26	34513.20	13425.49	9496.65	2491.33	724.96	260.69
1992	0.00	9.00	7821.97	24266.65	15830.02	8259.16	4670.04	1338.60	523.17
1993	0.00	6.42	6971.57	21388.46	11246.44	8960.04	4078.81	2243.33	828.15
1994	0.00	5.25	4706.45	18568.36	9796.10	5860.09	4454.39	1778.70	1204.29
1995	0.00	7.79	3750.65	11896.85	9096.05	4648.74	3162.07	1882.30	1143.40
1996	0.00	6.87	5107.33	9205.47	5539.44	4712.42	2542.61	1455.59	1274.27
1997	0.00	7.14	4618.34	13001.34	4310.71	2747.95	2220.89	1220.69	1106.16
1998	0.00	5.94	4928.90	11729.74	6610.96	2481.97	1306.04	1295.38	926.85
1999	0.00	8.11	4027.25	12306.41	6234.40	4212.77	1126.23	934.66	799.87
2000	0.00	8.79	5980.37	9945.89	7582.75	4728.72	2245.73	944.78	718.44
2001	0.00	6.08	5897.37	13211.06	6109.31	4789.35	2318.45	1459.99	564.70
2002	0.00	4.68	2743.55	14026.67	8608.40	3432.74	2157.68	1233.76	654.69
2003	0.00	4.40	1696.94	7806.51	9071.87	5039.09	1632.26	1306.93	665.98
2004	0.00	5.03	2133.05	8392.56	5386.33	5318.26	2658.92	992.30	683.50
2005	0.00	3.95	2071.01	7549.34	5506.04	2911.91	3065.69	1909.91	718.88
2006	0.00	4.25	990.47	5848.09	4633.44	2475.66	1636.05	2176.73	1037.83

	0	1	2	3	4	5	6	7	8
2007	0.00	3.18	481.81	2520.47	3247.31	1552.70	1225.56	989.73	865.80
2008	0.00	3.68	265.11	1430.32	1564.44	965.77	1013.59	677.57	561.70
2009	0.00	3.39	262.37	1028.45	1441.05	562.51	1006.05	992.10	624.94
2010	0.00	3.90	139.69	925.54	948.11	387.62	618.11	700.89	494.42
2011	0.00	5.69	116.72	698.67	913.10	238.19	580.26	395.48	382.10
2012	0.00	6.36	157.12	761.07	820.23	226.27	711.00	402.23	360.52
2013	0.00	7.73	187.36	1283.11	949.56	350.37	937.32	441.04	471.82
2014	0.00	18.40	269.38	1541.26	1901.06	598.43	1036.08	796.91	675.55
2015	0.00	18.74	489.12	1655.11	1882.57	1390.04	1323.78	1031.67	1020.79
2016	0.00	22.40	450.96	3478.93	1832.89	1358.95	1857.76	1183.29	980.68
2017	0.00	29.88	423.02	2374.67	3277.22	1225.38	1383.26	1532.73	858.30
2018	0.00	53.62	639.36	2239.64	2420.06	2660.59	1504.43	2006.75	1313.42
2019	0.00	84.79	1184.43	2755.11	2794.34	1706.46	3142.15	2179.01	1328.75
2020	0.00	117.26	1490.68	4074.31	4444.44	1976.76	2463.97	5034.23	1770.64
2021	0.00	96.32	1790.59	3954.93	6808.16	2629.39	2905.49	3462.90	3608.61
2022	0.00	71.75	1673.83	4886.50	7118.58	3964.59	3498.02	4790.44	4496.09

TABLE 3.6.14.c - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Predicted catch in numbers - Fleet C

	0	1	2	3	4	5	6	7	8
1991	2506.98	92137.45	251461.88	153787.49	60836.93	32844.11	9406.68	2820.01	1014.04
1992	1853.21	85430.03	233178.19	113722.96	73704.10	30397.83	17111.26	4863.33	1900.76
1993	1396.72	55045.07	191205.15	88978.44	46062.35	30183.43	12690.07	6831.89	2522.07
1994	2562.55	56536.26	160391.00	100154.66	46591.11	24829.90	16101.08	6315.23	4275.82
1995	2839.44	101001.28	152925.67	75465.69	51070.12	22629.70	12728.06	7465.61	4534.99
1996	2087.49	64855.95	156331.26	43465.75	22572.46	15624.41	7095.31	3723.18	3259.39
1997	1471.99	56377.77	119710.25	51993.70	14644.63	7389.28	5045.69	2104.07	1906.66
1998	2663.79	62871.44	167597.11	64216.72	28866.96	7987.66	4024.07	2397.45	1715.38
1999	3748.45	113592.24	178012.81	85841.09	34858.19	15722.29	4277.43	1990.84	1703.74
2000	2637.09	140470.72	301118.85	81854.64	42711.91	18281.03	8364.42	2156.01	1639.51

	0	1	2	3	4	5	6	7	8
2001	1893.34	68452.04	266302.41	97379.73	27564.69	14749.60	6302.96	2708.19	1047.48
2002	2228.51	72614.41	182473.72	125641.02	49481.21	13418.27	7293.89	2735.30	1451.47
2003	2013.87	60575.27	148689.27	63249.60	47687.35	19505.49	5274.97	2699.31	1375.51
2004	716.45	34212.11	79491.75	33718.37	15445.28	11931.54	5045.41	1281.10	882.43
2005	934.75	35853.13	132274.97	54415.50	24091.17	11206.17	8749.72	3434.12	1292.58
2006	981.35	42527.68	120857.47	77757.17	34096.39	14520.32	7056.38	4880.47	2326.94
2007	950.00	29294.99	98174.12	46298.22	32205.96	14845.97	6258.30	3042.48	2661.50
2008	798.80	32976.68	76024.52	42835.59	21224.76	14775.12	7134.90	2739.42	2270.99
2009	982.95	34490.44	107837.79	40311.51	23764.39	11887.97	8180.44	3726.69	2347.50
2010	1327.89	33213.89	86627.10	44293.97	18423.02	11001.44	5614.77	3470.31	2448.04
2011	662.48	24255.56	48220.98	20674.25	11635.17	5014.07	3150.68	1523.72	1472.17
2012	547.86	20566.23	64499.02	21721.57	10140.69	6013.64	2736.76	1662.33	1489.96
2013	663.97	15058.34	47364.45	26111.02	9141.85	4343.27	2639.75	1150.94	1231.25
2014	501.49	24827.29	44654.17	24285.71	14436.34	4936.34	2454.20	1387.23	1175.98
2015	428.86	17858.26	76985.58	23028.03	13506.54	8100.45	2996.91	1400.02	1385.25
2016	852.30	31530.52	102448.22	78470.36	24887.41	14677.72	8725.17	3096.21	2566.06
2017	997.65	32138.77	91390.10	47248.19	41568.81	13140.01	7679.66	4056.82	2271.75
2018	857.41	32293.04	80716.70	36573.32	19609.18	18816.75	5716.80	2908.08	1903.34
2019	358.22	11841.91	36746.51	14403.02	7035.29	3745.53	3502.11	949.53	579.02
2020	375.00	17281.37	48161.39	25517.83	10816.82	5863.75	3122.86	2760.91	971.07
2021	145.67	6679.92	27321.30	12768.14	7630.89	3527.39	2113.59	1084.73	1130.38
2022	8.38	238.35	1038.50	726.28	382.91	246.20	128.04	74.90	70.30

TABLE 3.6.14.d - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Predicted catch in numbers - Fleet D

	0	1	2	3	4	5	6	7	8
1991	64614.27	138230.52	33146.74	14044.34	3419.57	1531.43	621.49	156.61	56.32
1992	38917.82	96707.28	23711.50	8079.50	3285.05	1149.26	943.10	230.21	89.98
1993	46116.08	96091.81	28571.11	9061.41	2884.96	1576.58	957.75	437.74	161.60
1994	91722.45	109836.32	26478.56	10719.81	2998.16	1301.46	1203.73	394.97	267.42

	0	1	2	3	4	5	6	7	8
1995	170748.23	335552.45	41925.59	12479.72	4765.80	1638.35	1261.32	595.95	362.01
1996	98054.84	161838.43	31066.43	5305.47	1619.18	915.04	593.88	262.62	229.91
1997	88242.12	169831.65	27876.73	7153.41	1169.49	483.85	475.42	170.28	154.30
1998	133626.91	161863.26	34105.24	7225.63	1835.96	412.52	295.10	152.43	109.06
1999	91172.08	139799.25	18442.46	4884.53	1131.68	426.37	168.65	70.36	60.21
2000	36646.65	99788.79	18529.35	2734.55	832.33	306.50	209.89	50.07	38.07
2001	42704.64	86314.71	32465.60	7016.45	1473.74	854.97	655.21	292.21	113.02
2002	37237.19	76300.02	18286.28	6042.76	1517.71	356.18	249.01	74.41	39.49
2003	40504.94	89258.82	28115.72	7396.29	4154.86	1672.83	559.76	232.96	118.71
2004	28533.24	113772.05	39011.15	11777.29	4033.73	3022.09	1330.27	259.80	178.95
2005	11343.67	39707.64	22722.95	5955.82	1737.23	712.91	495.91	139.97	52.68
2006	9951.72	49756.34	28483.46	12942.81	3953.60	1891.91	821.91	459.16	218.92
2007	6022.01	23936.72	17240.36	5360.40	2384.29	1356.03	542.51	244.89	214.22
2008	4783.97	27806.12	14197.71	4444.71	1073.28	902.21	383.12	163.84	135.83
2009	7180.26	40067.15	24995.91	3795.91	745.91	399.02	199.96	112.44	70.83
2010	3053.55	12675.87	5631.79	717.71	54.28	25.82	6.93	5.37	3.79
2011	1478.85	9948.54	2845.20	214.47	11.67	3.82	1.43	1.09	1.05
2012	1037.97	8766.16	4611.25	232.67	8.01	3.58	0.97	1.02	0.91
2013	1618.78	10535.26	7400.99	695.63	17.32	5.96	1.80	1.30	1.39
2014	1021.37	13487.82	5000.08	387.31	13.94	4.74	1.11	1.06	0.90
2015	1712.08	21531.48	19610.09	762.06	32.33	26.22	3.54	2.39	2.36
2016	925.33	11064.29	8359.80	645.74	14.66	16.22	4.06	2.28	1.89
2017	161.13	1822.83	1342.70	65.56	4.63	3.01	1.18	1.27	0.71
2018	132.50	1771.50	1146.60	54.62	2.70	4.98	1.24	1.31	0.86
2019	93.62	1101.26	821.38	42.12	2.63	2.73	2.27	1.18	0.72
2020	215.37	4077.07	3102.11	259.89	20.82	21.29	9.50	11.88	4.18
2021	17.09	283.09	231.51	12.96	1.59	1.47	1.01	0.96	1.00
2022	21.16	207.39	155.35	11.90	1.20	1.35	0.87	1.00	0.94

TABLE 3.6.14.e - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Predicted catch in numbers - Fleet F

	0	1	2	3	4	5	6	7	8
1991	50492.32	399591.52	302927.28	342935.87	217150.06	149907.76	49686.05	16119.21	5796.26
1992	44024.32	433066.76	330157.64	297853.87	309527.84	164423.24	108763.64	33729.81	13182.79
1993	43227.39	359900.75	345691.98	297345.17	245675.15	206472.32	102149.31	59772.87	22065.86
1994	62484.86	293095.10	233083.95	267591.67	199606.95	135728.05	104023.98	44260.56	29967.27
1995	54521.61	416383.30	178101.15	160334.18	173154.05	97954.81	65227.58	41403.73	25150.69
1996	66967.26	440249.82	292141.18	147965.45	122310.47	108381.68	57911.68	32726.24	28649.57
1997	53716.98	438266.10	254455.13	201769.96	90948.79	59344.62	48493.63	22260.83	20172.21
1998	67940.44	346564.47	257612.34	178451.94	128457.93	46126.35	27817.04	18645.66	13341.01
1999	50232.12	340073.58	154087.78	135392.51	89049.56	52877.97	17464.00	9346.82	7998.94
2000	34130.29	408333.57	259118.71	128703.66	109590.68	61841.56	34406.50	10180.43	7741.59
2001	31161.91	253471.94	295599.64	201205.81	94350.47	66328.66	34594.17	16741.31	6475.27
2002	19749.54	149680.83	121857.60	163196.58	110036.59	40208.10	27234.71	11678.96	6197.38
2003	17414.36	123795.64	101202.86	86704.43	114494.63	63470.24	21531.12	12701.60	6472.45
2004	14281.81	160782.01	122281.48	105996.08	85321.43	87741.03	46395.51	13479.83	9285.04
2005	12894.17	118524.32	150442.77	127085.69	98058.16	59485.55	57617.93	25640.30	9650.82
2006	7183.52	76645.22	81447.95	110503.22	85117.60	46935.71	28299.46	22198.64	10583.98
2007	8800.41	67130.80	86779.56	87162.74	105126.33	61990.23	31559.79	16991.34	14863.66
2008	7283.14	75132.44	69782.77	84856.47	73089.77	65589.23	37906.74	15788.08	13088.37
2009	5316.05	47633.44	64168.75	52784.51	55242.65	36228.63	30349.40	14885.60	9376.67
2010	4613.32	30014.40	34839.67	40672.80	31091.97	24687.27	15660.13	10609.70	7484.33
2011	2908.58	27777.91	24138.48	24788.68	26709.92	15543.57	12322.80	6647.30	6422.42
2012	3719.27	36718.91	49964.84	40200.79	35324.71	27774.93	15543.81	10415.30	9335.29
2013	5931.17	35588.93	48768.20	64276.29	42157.43	26434.62	19673.07	9456.09	10115.96
2014	2905.38	38444.70	31555.56	42002.87	46993.79	21707.33	13257.97	8445.85	7159.69
2015	2868.37	32099.53	65102.53	48307.66	52864.72	43236.84	19547.15	10473.48	10363.02
2016	2466.19	25095.77	42214.68	81264.54	47703.73	39557.27	29096.37	12226.39	10132.92
2017	2328.81	20980.32	32589.10	43444.62	70555.15	32636.94	24103.67	15431.97	8641.62
2018	2033.32	21579.37	29702.30	35281.79	34654.38	49617.08	19057.11	11942.16	7816.14

	0	1	2	3	4	5	6	7	8
2019	897.96	8293.07	14088.66	15531.51	14529.01	12135.66	15073.51	5344.23	3258.90
2020	181.13	2338.67	3768.24	5838.37	4866.60	4308.73	3135.84	3788.25	1332.40
2021	53.08	673.30	1584.60	2232.97	2638.06	1962.41	1622.93	1141.85	1189.89
2022	19.48	150.98	372.75	805.89	850.93	884.03	638.88	512.65	481.15

TABLE 3.9.1 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Input table for short term predictions

2022						
wr	N	M	Mat	PM	PF	SWt
0	537470	0.3	0.00	0.25	0.1	0.0001
1		0.5	0.00	0.25	0.1	0.0178
2		0.2	0.20	0.25	0.1	0.0749
3		0.2	0.75	0.25	0.1	0.0865
4		0.2	0.90	0.25	0.1	0.1127
5		0.2	1.00	0.25	0.1	0.1304
6		0.2	1.00	0.25	0.1	0.1650
7		0.2	1.00	0.25	0.1	0.1810
8+		0.2	1.00	0.25	0.1	0.1872

2023						
wr	N	M	Mat	PM	PF	SWt
0	725195	0.3	0.00	0.25	0.1	0.0001
1		0.5	0.00	0.25	0.1	0.0198
2		0.2	0.20	0.25	0.1	0.0567
3		0.2	0.75	0.25	0.1	0.0798
4		0.2	0.90	0.25	0.1	0.1123
5		0.2	1.00	0.25	0.1	0.1395
6		0.2	1.00	0.25	0.1	0.1663
7		0.2	1.00	0.25	0.1	0.1757
8+		0.2	1.00	0.25	0.1	0.1845

2024						
wr	N	M	Mat	PM	PF	SWt
0	725195	0.3	0.00	0.25	0.1	0.0001
1		0.5	0.00	0.25	0.1	0.0198
2		0.2	0.20	0.25	0.1	0.0567

3	0.2	0.75	0.25	0.1	0.0798
4	0.2	0.90	0.25	0.1	0.1123
5	0.2	1.00	0.25	0.1	0.1395
6	0.2	1.00	0.25	0.1	0.1663
7	0.2	1.00	0.25	0.1	0.1757
8+	0.2	1.00	0.25	0.1	0.1845

Input units are thousands and kg

M =	Natural mortality
MAT =	Maturity ogive
PF =	Proportion of F before spawning
PM =	Proportion of M before spawning
SWt =	Weight in stock (kg)

N_{2022} wr 0-8+:	Populations numbers from the assessment
$N_{2023/2024}$ wr 0:	Average of wr 0 for the years 2017-2021
Natural Mortality (M):	Constant
Weight in the Stock 2023-2024 (SWt):	Average for 2018-2022

TABLE 3.9.2 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. MSY approach (zero catch, F=0)

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.000	0.000	0.000
fbar:low	0.050	0.044	0.000	0.000	0.000
fbar:high	0.050	0.044	0.000	0.000	0.000
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92726	103649	115511
ssb:low	75548	85431	92726	103649	115511
ssb:high	75548	85431	92726	103649	115511
catch:Estimate	5898	6663	0	0	0
catch:low	5898	6663	0	0	0
catch:high	5898	6663	0	0	0

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	0	0	0
Fleet C	301	439	0	0	0
Fleet D	25	154	0	0	0
Fleet F	630	788	0	0	0

TABLE 3.9.3 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. MAP 2018: F=FMSY(0.31)*SSBy-1/MSYBtrigger

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.177	0.186	0.166
fbar:low	0.050	0.044	0.177	0.186	0.166
fbar:high	0.050	0.044	0.177	0.186	0.166
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	90148	80228	74422
ssb:low	75548	85431	90148	80228	74422
ssb:high	75548	85431	90148	80228	74422
catch:Estimate	5898	6663	27346	26182	22426
catch:low	5898	6663	27346	26182	22426
catch:high	5898	6663	27346	26182	22426

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	21630	20463	17555
Fleet C	301	439	1707	1749	1559
Fleet D	25	154	764	896	803
Fleet F	630	788	3245	3073	2510

TABLE 3.9.4 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. MAP 2018: F=FMSYlower(0.216)*SSBy-1/MSYBtrigger

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.123	0.131	0.124
fbar:low	0.050	0.044	0.123	0.131	0.124
fbar:high	0.050	0.044	0.123	0.131	0.124
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	90919	86404	83816
ssb:low	75548	85431	90919	86404	83816
ssb:high	75548	85431	90919	86404	83816
catch:Estimate	5898	6663	19958	20839	19932
catch:low	5898	6663	19958	20839	19932
catch:high	5898	6663	19958	20839	19932

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	15835	16448	15821
Fleet C	301	439	1223	1317	1276
Fleet D	25	154	536	638	610
Fleet F	630	788	2363	2435	2225

TABLE 3.9.6 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=Fpa=0.41

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.410	0.410	0.410
fbar:low	0.050	0.044	0.410	0.410	0.410
fbar:high	0.050	0.044	0.410	0.410	0.410
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	86889	59887	48447
ssb:low	75548	85431	86889	59887	48447
ssb:high	75548	85431	86889	59887	48447
catch:Estimate	5898	6663	52915	36646	30142
catch:low	5898	6663	52915	36646	30142
catch:high	5898	6663	52915	36646	30142

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	41324	27452	22121
Fleet C	301	439	3541	2994	2810
Fleet D	25	154	1720	1870	1872
Fleet F	630	788	6330	4331	3338

TABLE 3.9.7 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=Flim=0.45

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.450	0.450	0.450
fbar:low	0.050	0.044	0.450	0.450	0.450
fbar:high	0.050	0.044	0.450	0.450	0.450
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	86347	57171	45396
ssb:low	75548	85431	86347	57171	45396
ssb:high	75548	85431	86347	57171	45396
catch:Estimate	5898	6663	56452	37572	30407
catch:low	5898	6663	56452	37572	30407
catch:high	5898	6663	56452	37572	30407

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	43996	27940	22072
Fleet C	301	439	3818	3161	2949
Fleet D	25	154	1878	2033	2036
Fleet F	630	788	6760	4437	3351

TABLE 3.9.8 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=F2023=0.044

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.044	0.044	0.044
fbar:low	0.050	0.044	0.044	0.044	0.044
fbar:high	0.050	0.044	0.044	0.044	0.044
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92074	96985	102699
ssb:low	75548	85431	92074	96985	102699
ssb:high	75548	85431	92074	96985	102699
catch:Estimate	5898	6663	7669	8582	9589
catch:low	5898	6663	7669	8582	9589
catch:high	5898	6663	7669	8582	9589

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	6114	6873	7776
Fleet C	301	439	457	496	531
Fleet D	25	154	194	219	221
Fleet F	630	788	905	994	1062

TABLE 3.9.9 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. Catch for bycatch fleets only

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.028	0.024	0.021
fbar:low	0.050	0.044	0.028	0.024	0.021
fbar:high	0.050	0.044	0.028	0.024	0.021
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92275	99119	107337
ssb:low	75548	85431	92275	99119	107337
ssb:high	75548	85431	92275	99119	107337
catch:Estimate	5898	6663	5436	5436	5436
catch:low	5898	6663	5436	5436	5436
catch:high	5898	6663	5436	5436	5436

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	5282	5282	5282
Fleet C	301	439	0	0	0
Fleet D	25	154	154	154	154
Fleet F	630	788	0	0	0

TABLE 3.9.10 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.000	0.000	0.000
fbar:low	0.050	0.044	0.000	0.000	0.000
fbar:high	0.050	0.044	0.000	0.000	0.000
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92726	103649	115511
ssb:low	75548	85431	92726	103649	115511
ssb:high	75548	85431	92726	103649	115511
catch:Estimate	5898	6663	0	0	0
catch:low	5898	6663	0	0	0
catch:high	5898	6663	0	0	0

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	0	0	0
Fleet C	301	439	0	0	0
Fleet D	25	154	0	0	0
Fleet F	630	788	0	0	0

TABLE 3.9.11 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0.01

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.010	0.010	0.010
fbar:low	0.050	0.044	0.010	0.010	0.010
fbar:high	0.050	0.044	0.010	0.010	0.010
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92577	102077	112390
ssb:low	75548	85431	92577	102077	112390
ssb:high	75548	85431	92577	102077	112390
catch:Estimate	5898	6663	1800	2134	2506
catch:low	5898	6663	1800	2134	2506
catch:high	5898	6663	1800	2134	2506

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	1438	1719	2049
Fleet C	301	439	106	119	130
Fleet D	25	154	44	50	51
Fleet F	630	788	212	246	276

TABLE 3.9.12 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0.025

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.025	0.025	0.025
fbar:low	0.050	0.044	0.025	0.025	0.025
fbar:high	0.050	0.044	0.025	0.025	0.025
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92355	99783	107946
ssb:low	75548	85431	92355	99783	107946
ssb:high	75548	85431	92355	99783	107946
catch:Estimate	5898	6663	4436	5125	5884
catch:low	5898	6663	4436	5125	5884
catch:high	5898	6663	4436	5125	5884

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	3541	4118	4794
Fleet C	301	439	262	290	314
Fleet D	25	154	110	125	126
Fleet F	630	788	523	592	650

TABLE 3.9.13 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0.05

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.050	0.050	0.050
fbar:low	0.050	0.044	0.050	0.050	0.050
fbar:high	0.050	0.044	0.050	0.050	0.050
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	91986	96126	101124
ssb:low	75548	85431	91986	96126	101124
ssb:high	75548	85431	91986	96126	101124
catch:Estimate	5898	6663	8667	9603	10641
catch:low	5898	6663	8667	9603	10641
catch:high	5898	6663	8667	9603	10641

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	6907	7682	8616
Fleet C	301	439	517	559	596
Fleet D	25	154	220	249	250
Fleet F	630	788	1023	1113	1179

TABLE 3.9.14 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0.1

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.100	0.100	0.100
fbar:low	0.050	0.044	0.100	0.100	0.100
fbar:high	0.050	0.044	0.100	0.100	0.100
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	91254	89386	89360
ssb:low	75548	85431	91254	89386	89360
ssb:high	75548	85431	91254	89386	89360
catch:Estimate	5898	6663	16559	16944	17612
catch:low	5898	6663	16559	16944	17612
catch:high	5898	6663	16559	16944	17612

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	13157	13436	14079
Fleet C	301	439	1007	1042	1078
Fleet D	25	154	437	491	494
Fleet F	630	788	1958	1975	1962

TABLE 3.9.15 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. F=0.15

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.150	0.150	0.150
fbar:low	0.050	0.044	0.150	0.150	0.150
fbar:high	0.050	0.044	0.150	0.150	0.150
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	90529	83326	79630
ssb:low	75548	85431	90529	83326	79630
ssb:high	75548	85431	90529	83326	79630
catch:Estimate	5898	6663	23768	22576	22207
catch:low	5898	6663	23768	22576	22207
catch:high	5898	6663	23768	22576	22207

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	18829	17741	17516
Fleet C	301	439	1470	1463	1477
Fleet D	25	154	651	727	731
Fleet F	630	788	2818	2644	2483

TABLE 3.9.17 - WESTERN BALTIC SPRING SPAWNING HERRING
Multi fleet
Forecast table. Constant 2023 TAC

	2022	2023	2024	2025	2026
fbar:Estimate	0.050	0.044	0.038	0.034	0.030
fbar:low	0.050	0.044	0.038	0.034	0.030
fbar:high	0.050	0.044	0.038	0.034	0.030
rec:Estimate	537470	725195	725195	725195	725195
rec:low	537470	725195	725195	725195	725195
rec:high	537470	725195	725195	725195	725195
ssb:Estimate	75548	85431	92162	97926	105128
ssb:low	75548	85431	92162	97926	105128
ssb:high	75548	85431	92162	97926	105128
catch:Estimate	5898	6663	6663	6663	6663
catch:low	5898	6663	6663	6663	6663
catch:high	5898	6663	6663	6663	6663

Per fleet	2022	2023	2024	2025	2026
Fleet A	4942	5282	5282	5282	5282
Fleet C	301	439	439	439	439
Fleet D	25	154	154	154	154
Fleet F	630	788	788	788	788

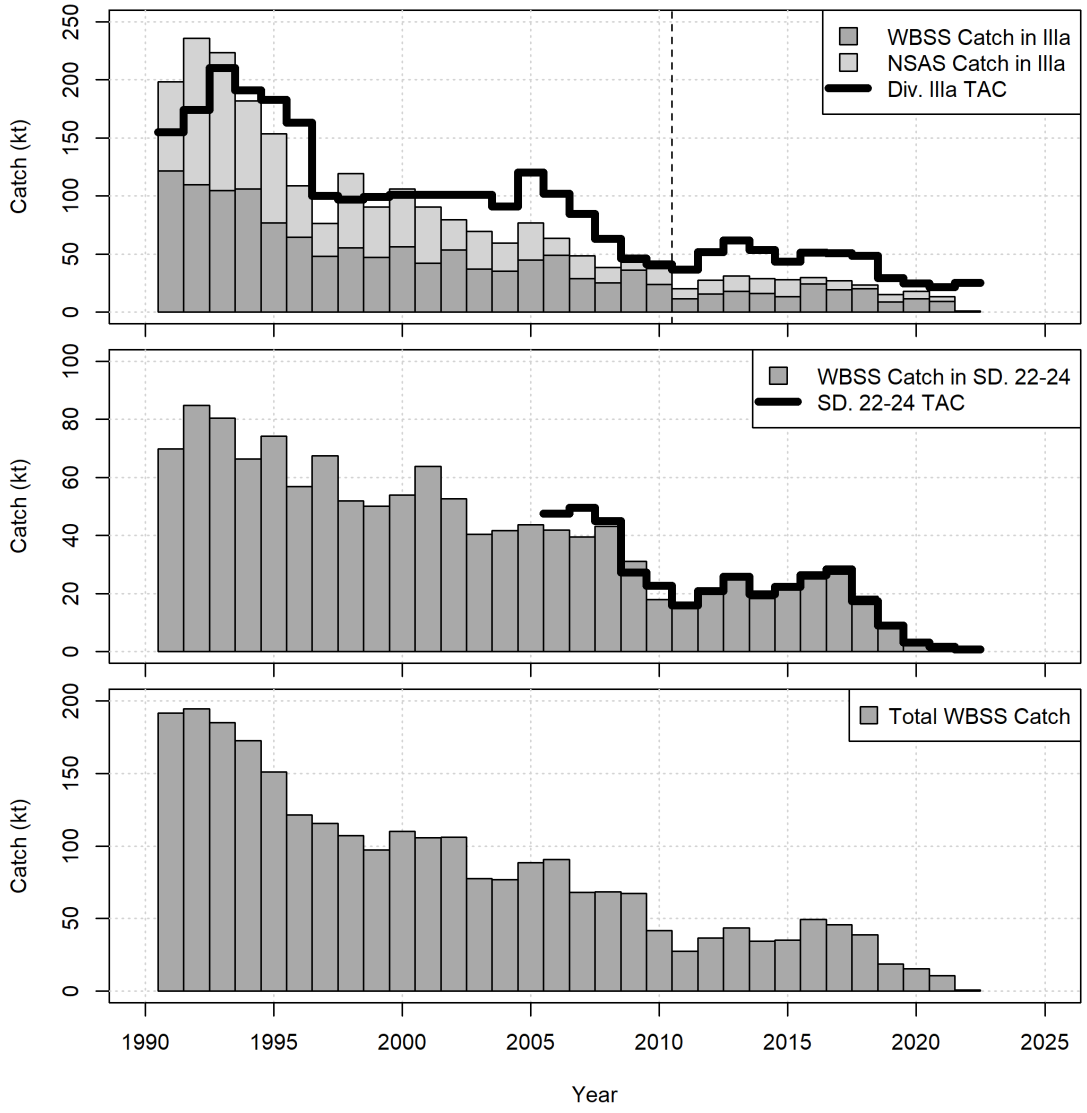


Figure 3.1.1 Western Baltic Spring Spawning Herring. CATCH and TACs (1000 t) by area. Note, the TAC for IIIa excludes the by-catch TAC, while the CATCH includes the by-catch

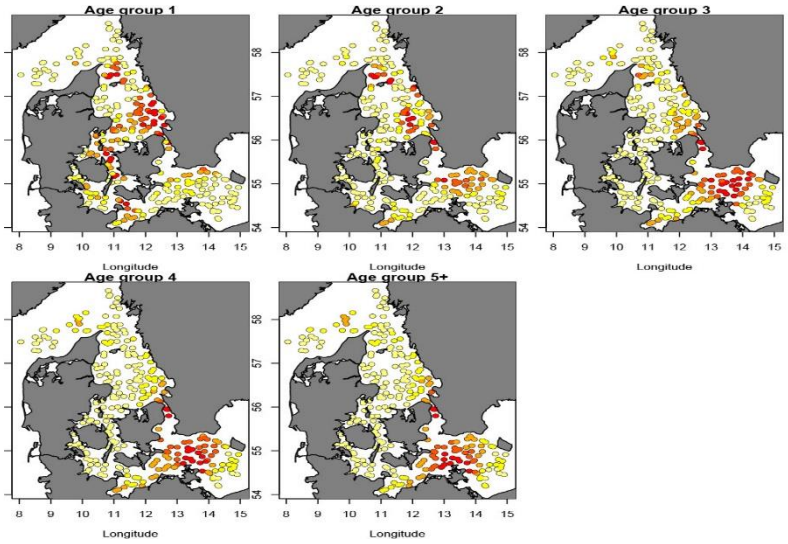


Figure 3.3.1 WESTERN BALTIC SPRING SPAWNING HERRING. Map showing distribution of hauls and the density of fish per age in the IBTS+BITS-Q1 survey.

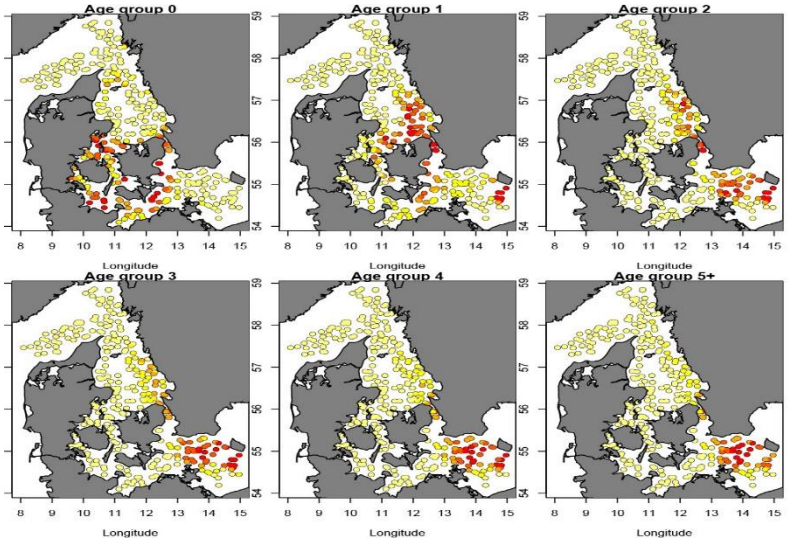


Figure 3.3.2 WESTERN BALTIC SPRING SPAWNING HERRING. Map showing distribution of hauls and the density of fish per age in the IBTS+BITS-Q3.4 survey.

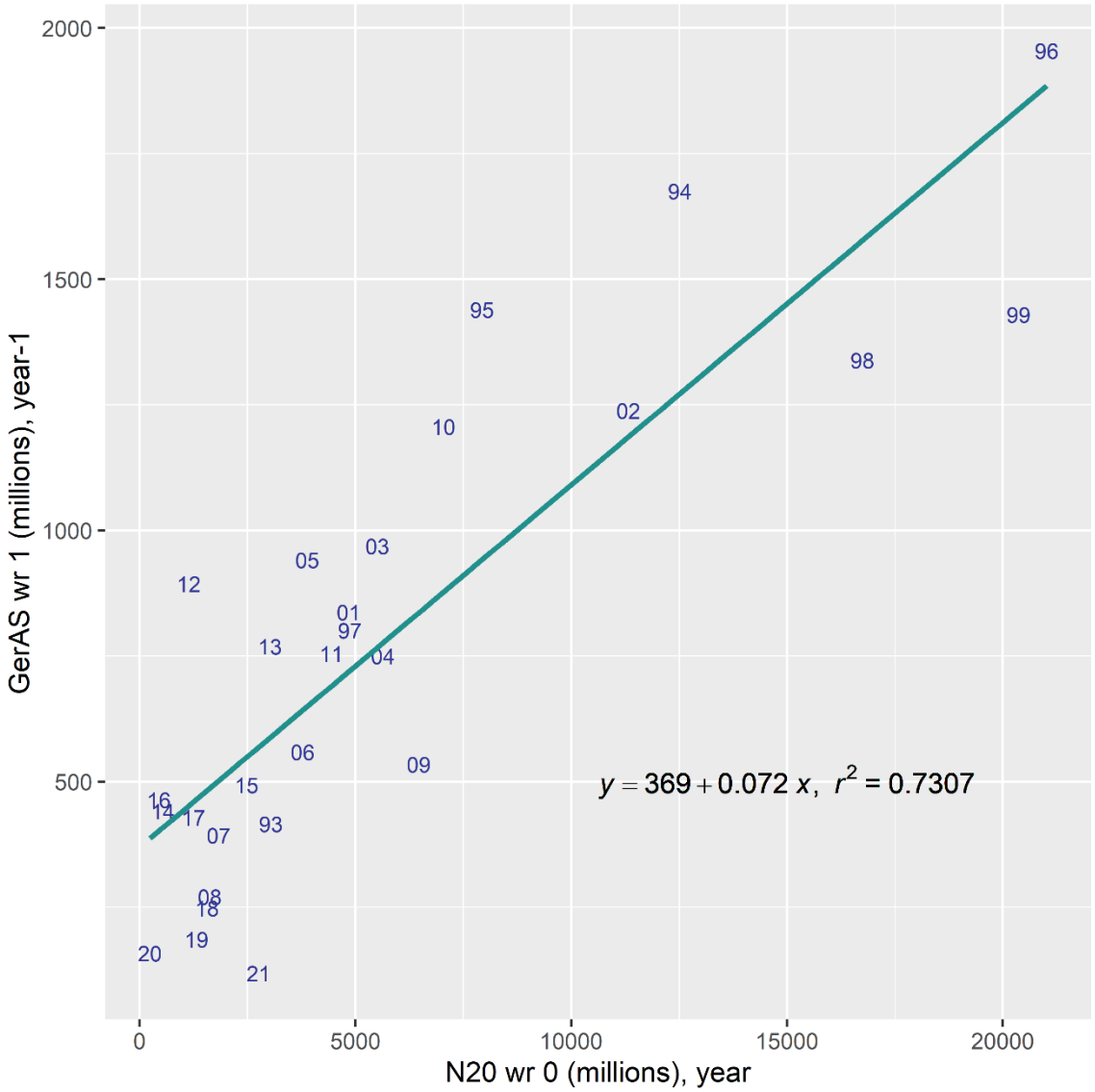


Figure 3.5.1 WESTERN BALTIC SPRING SPAWNING HERRING. Correlation of 1 wr herring from GERAS with the N20 larvae index. Note the year lag between surveys. Labels show the year of the N20.

Figure 3.6.1.1 WESTERN BALTIC SPRING SPAWNING HERRING. Weight (kg) at age as W-ringers (wr) in the catch (WECA).

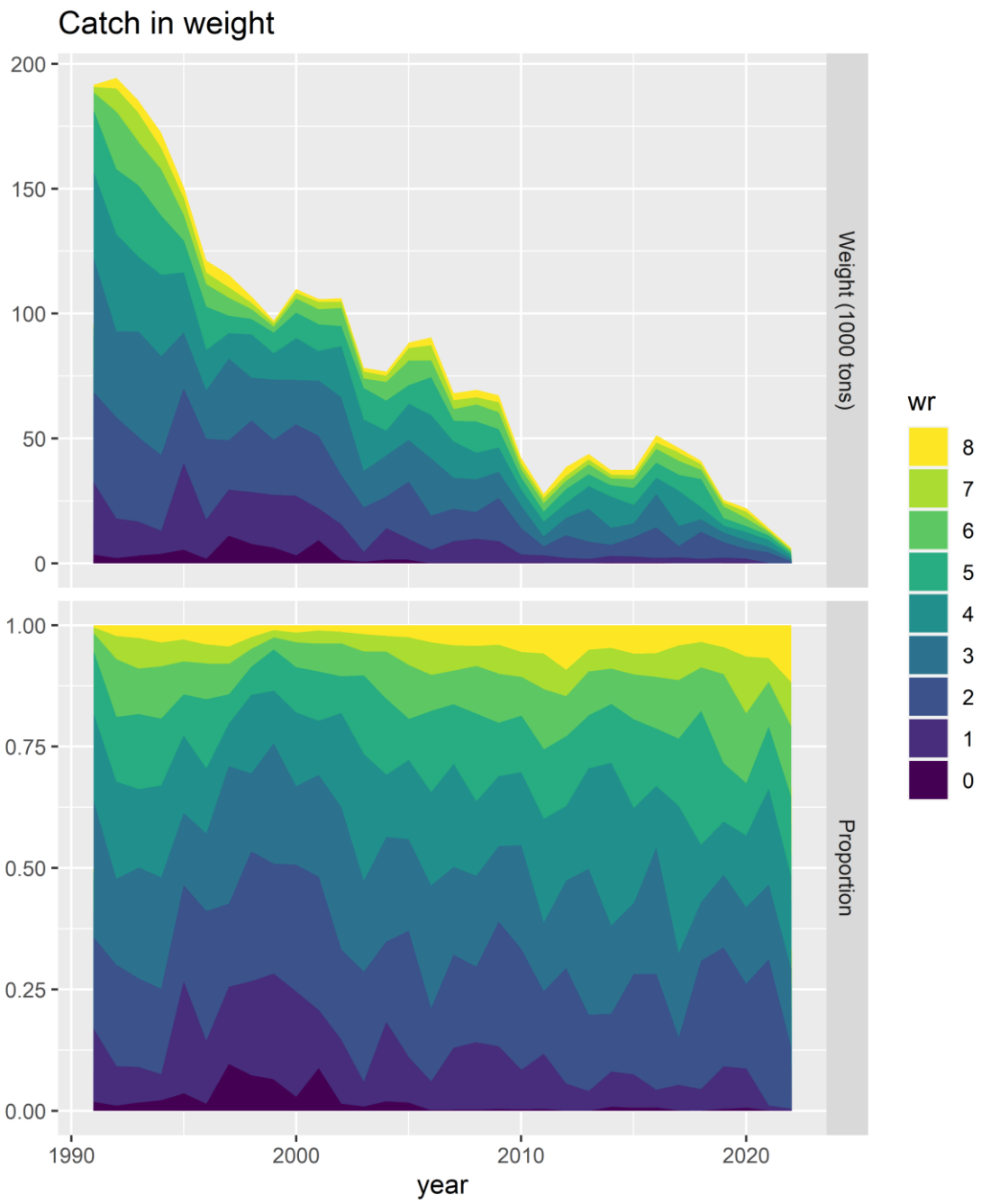


Figure 3.6.1.2 WESTERN BALTIC SPRING SPAWNING HERRING. Catch in weight. Upper panel: Catch in weight (1000 tons) at age as W-ringers (wr). Lower panel: Proportion (by weight) of a given age as W-ringers (wr) in the catch.

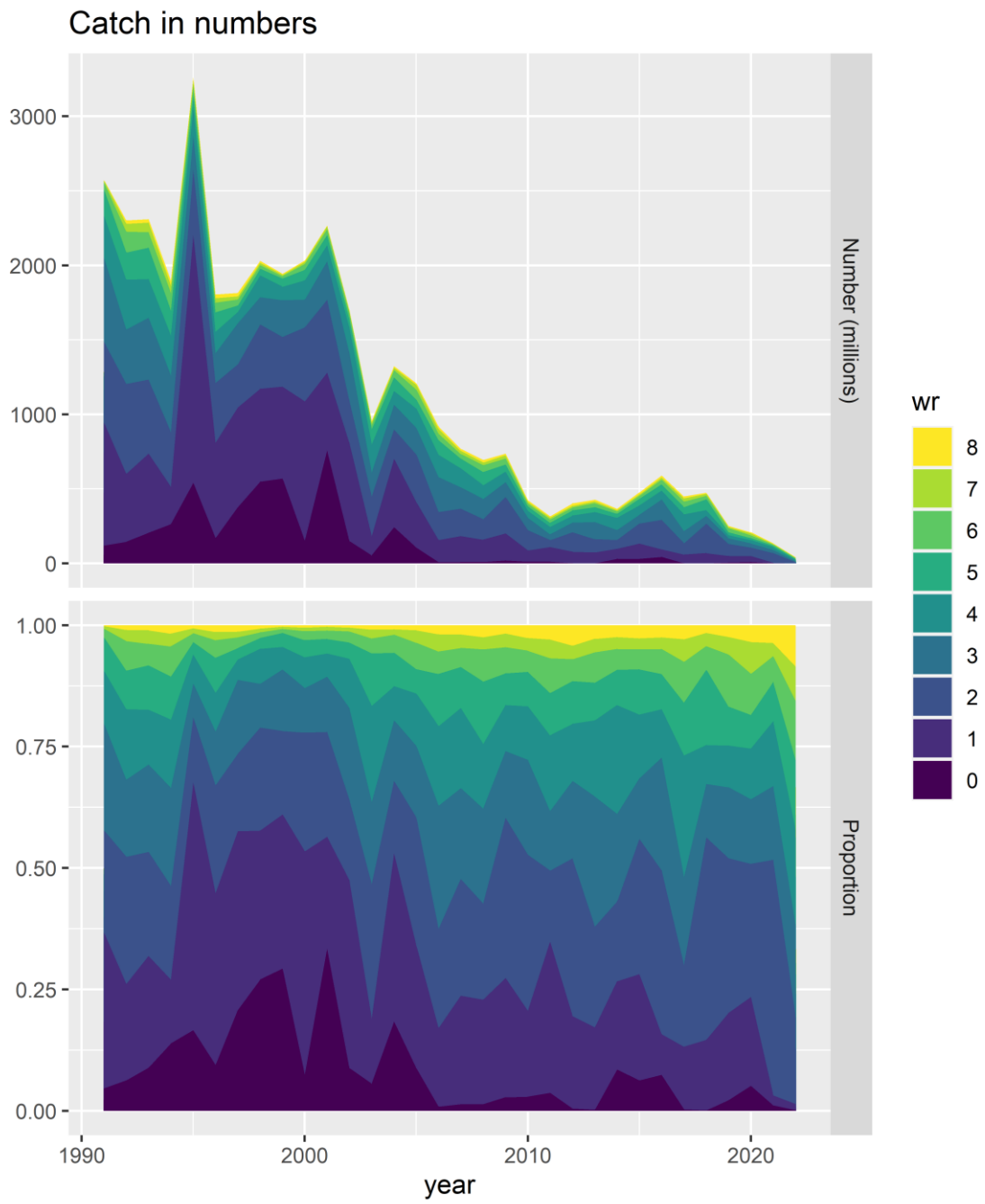


Figure 3.6.1.3 WESTERN BALTIC SPRING SPAWNING HERRING. Catch in Numbers. Upper panel: Catch in numbers (millions) at age as W-ringers (wr). Lower panel: Proportion (by number) of a given age as W-ringers (wr) in the catch.

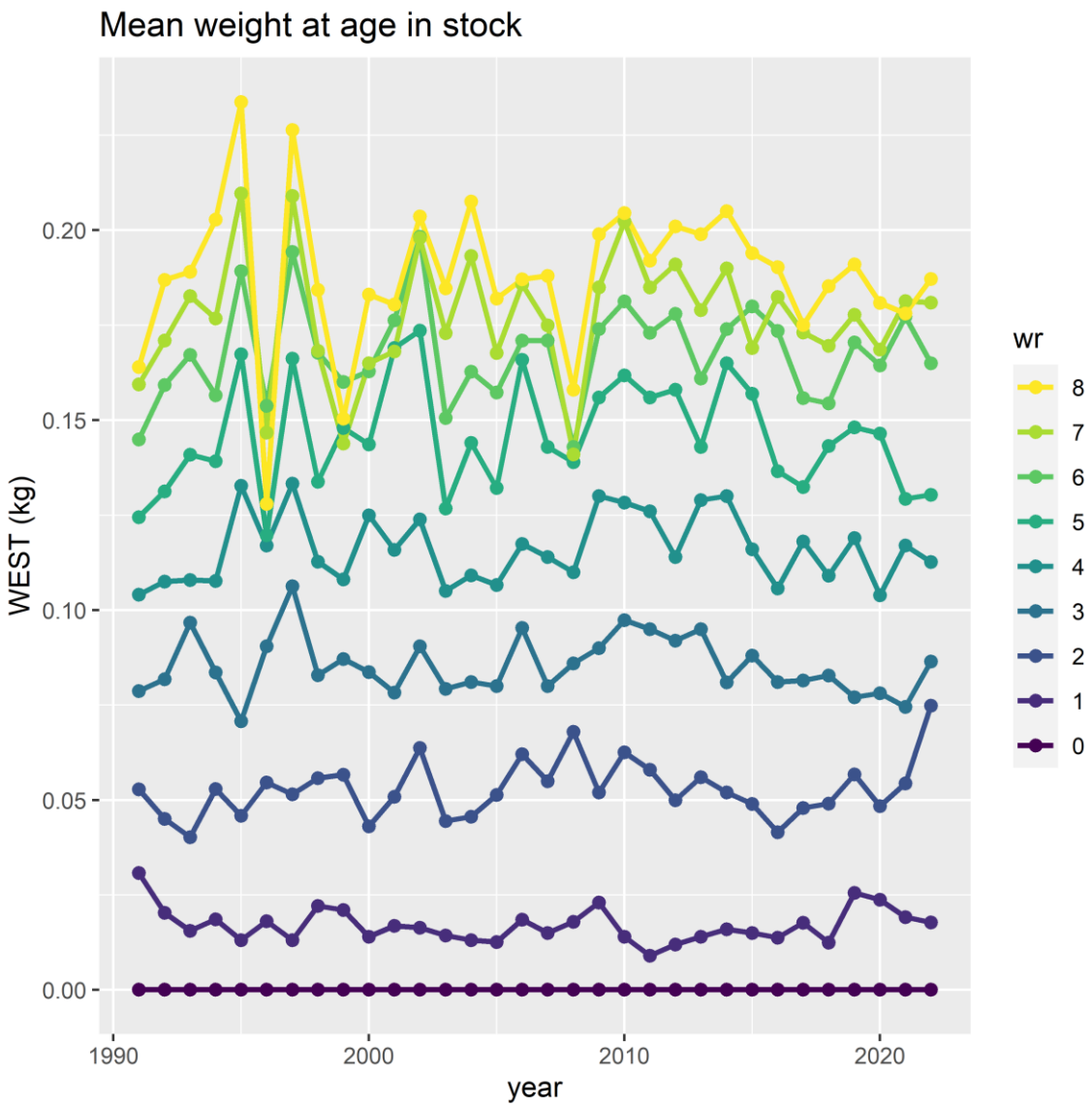


Figure 3.6.1.4 WESTERN BALTIC SPRING SPAWNING HERRING. Weight (kg) at age as W-ringers (wr) in the stock (WEST), coming from the catch Q1 WECA.

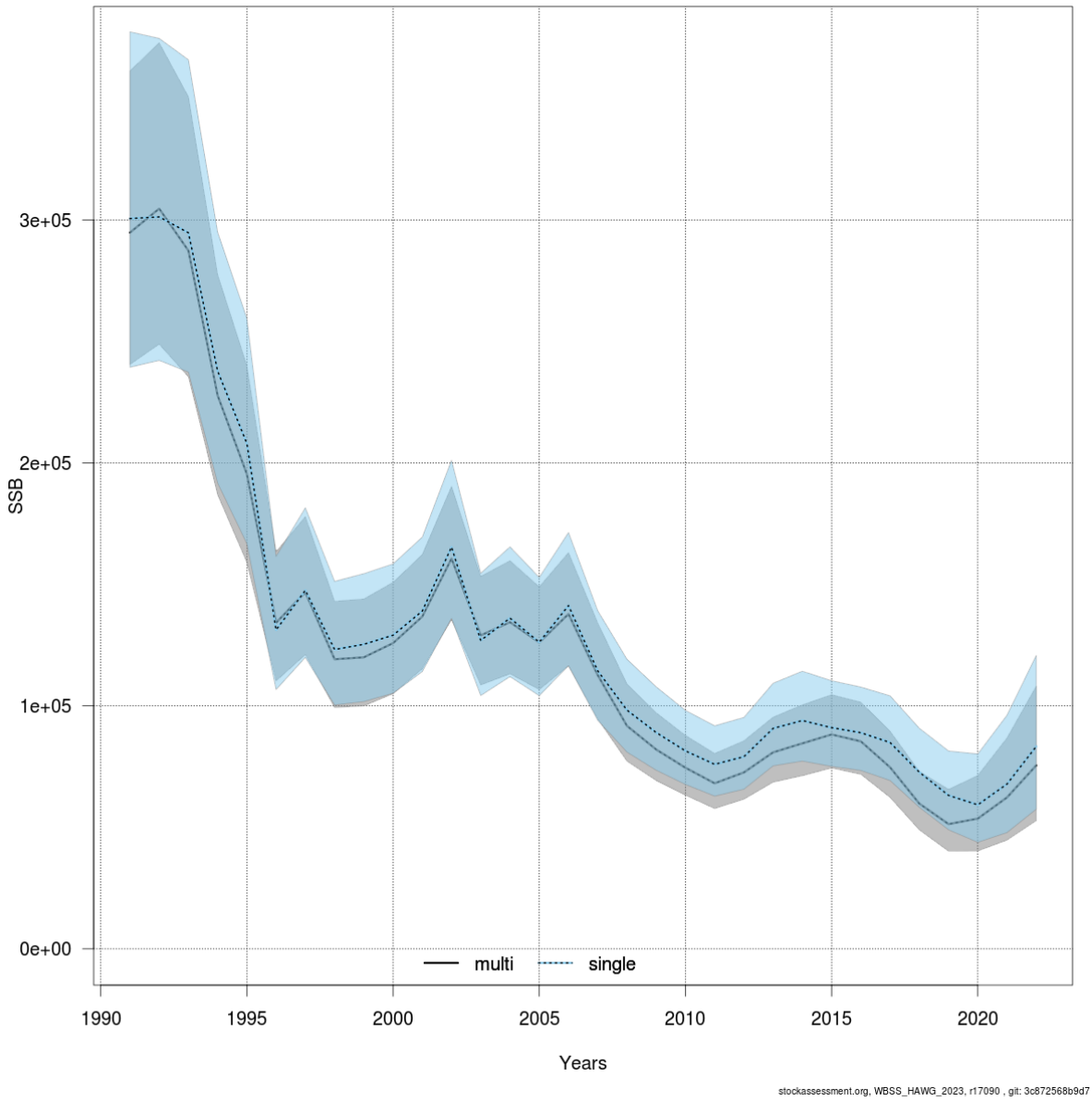


Figure 3.6.4.1 WESTERN BALTIC SPRING SPAWNING HERRING. Stock summary plot. Spawning stock biomass (SSB). Estimates from the WBSS multi fleet (multi) and the WBSS single fleet (single) assessment runs and point wise 95% confidence intervals are shown by line and shaded area.

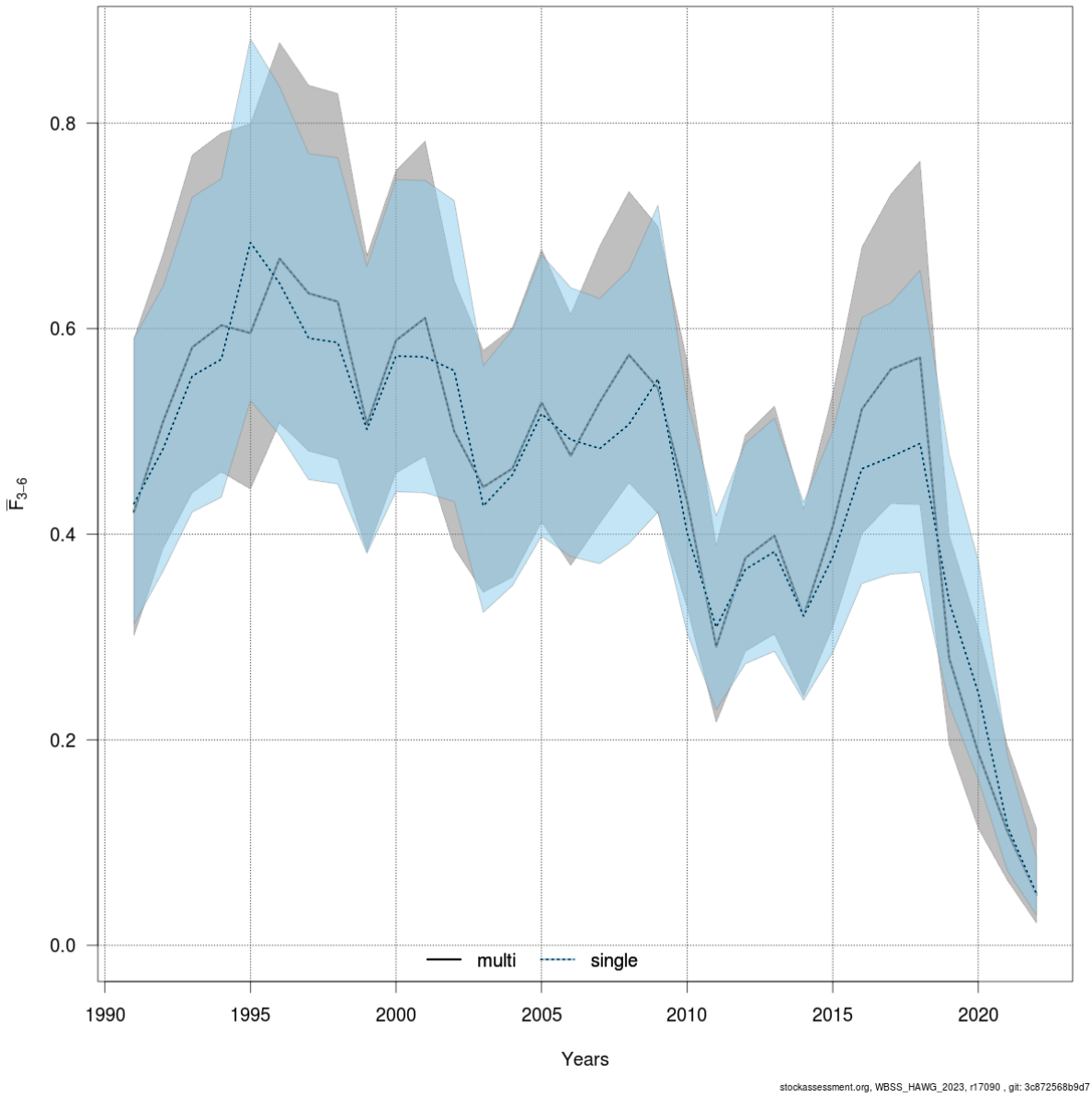


Figure 3.6.4.2 WESTERN BALTIC SPRING SPAWNING HERRING. Stock summary plot. Average fishing mortality (F) for the shown age range. Estimates from the WBSS multi fleet (multi) and the WBSS single fleet (single) assessment runs and point wise 95% confidence intervals are shown by line and shaded area.

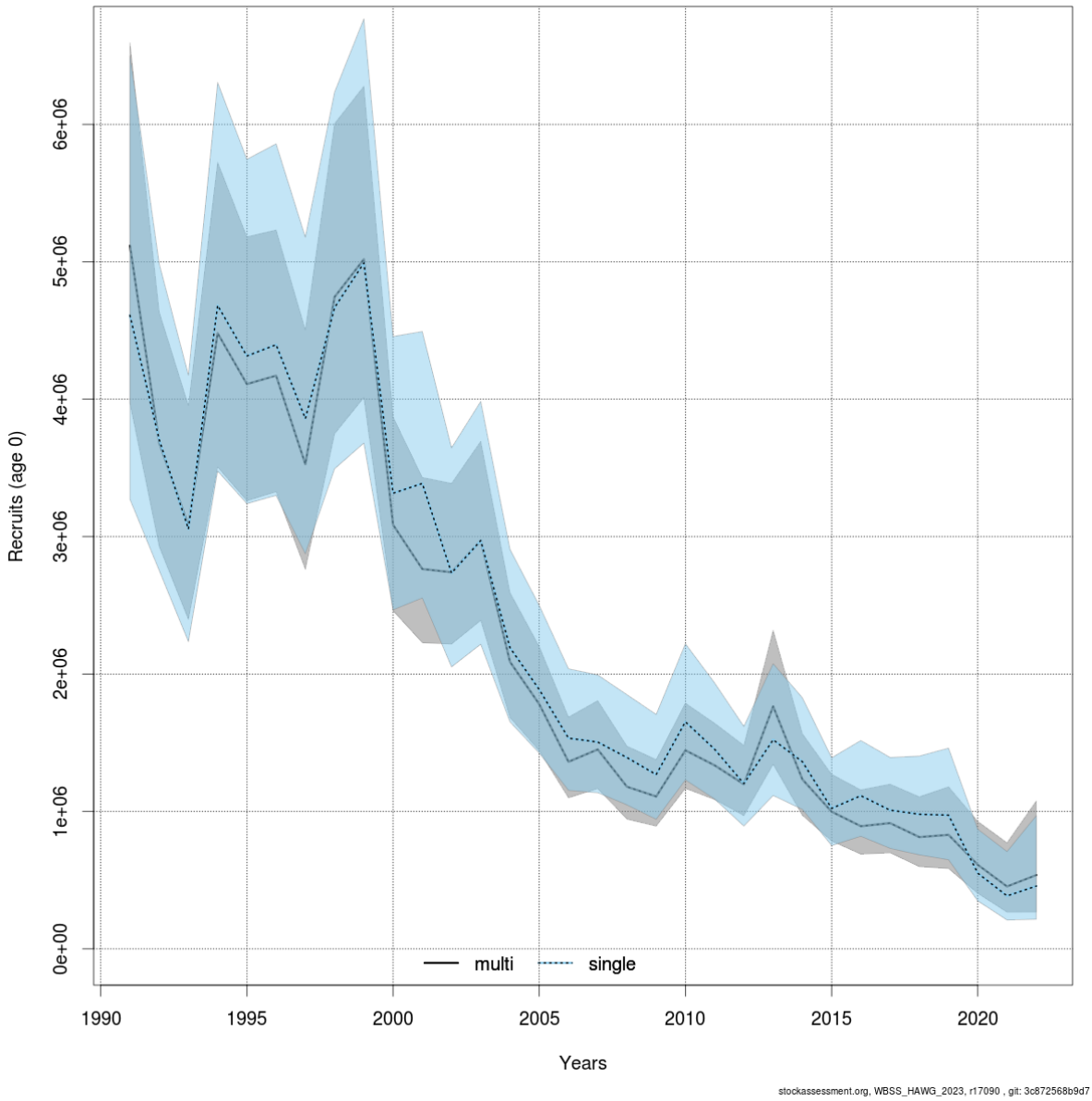


Figure 3.6.4.3 WESTERN BALTIC SPRING SPAWNING HERRING. Stock summary plot. Yearly recruitment (age 0 equal 0 W-ringers). Estimates from the WBSS multi fleet (multi) and the WBSS single fleet (single) assessment runs and point wise 95% confidence intervals are shown by line and shaded area.

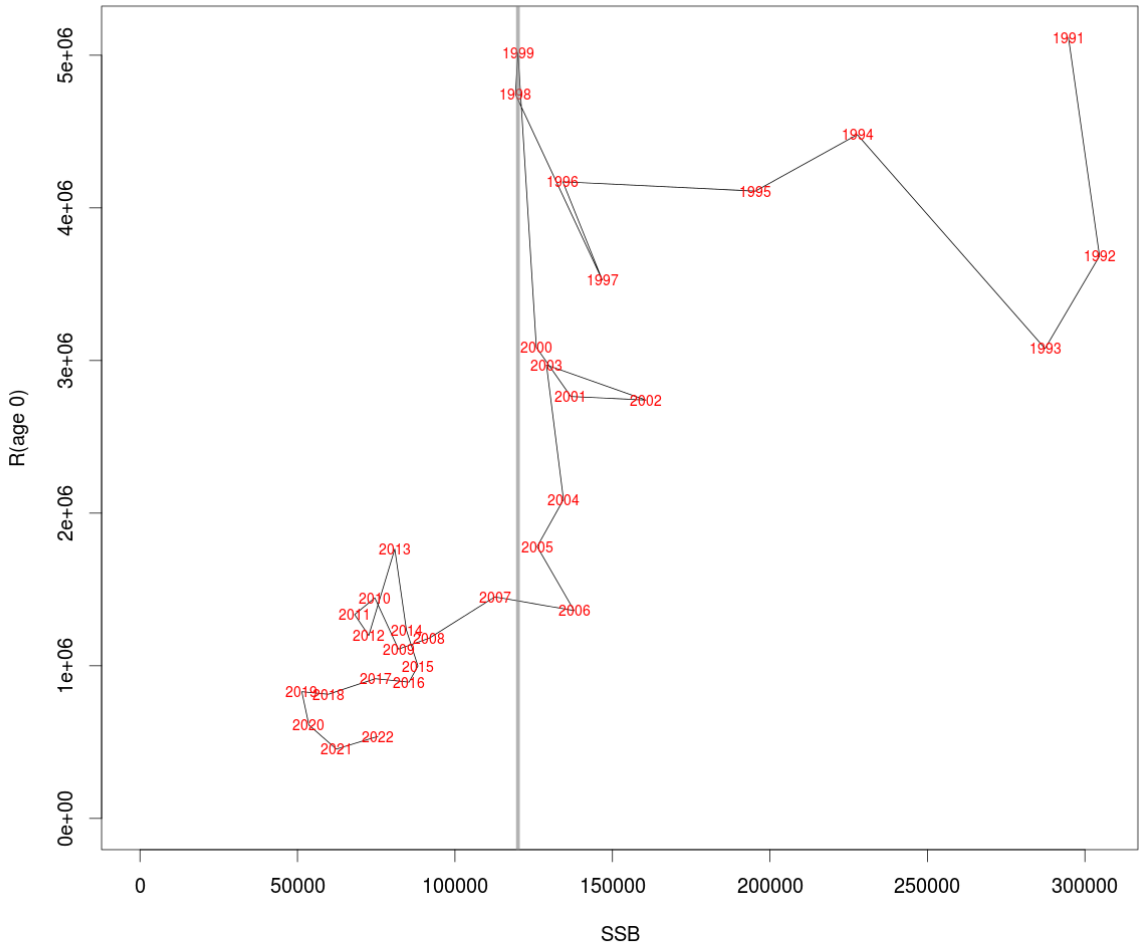


Figure 3.6.4.4 WESTERN BALTIC SPRING SPAWNING HERRING. Recruitment at age 0-wr (in thousands) is plotted against spawning stock biomass (tonnes) as estimated by the assessment.

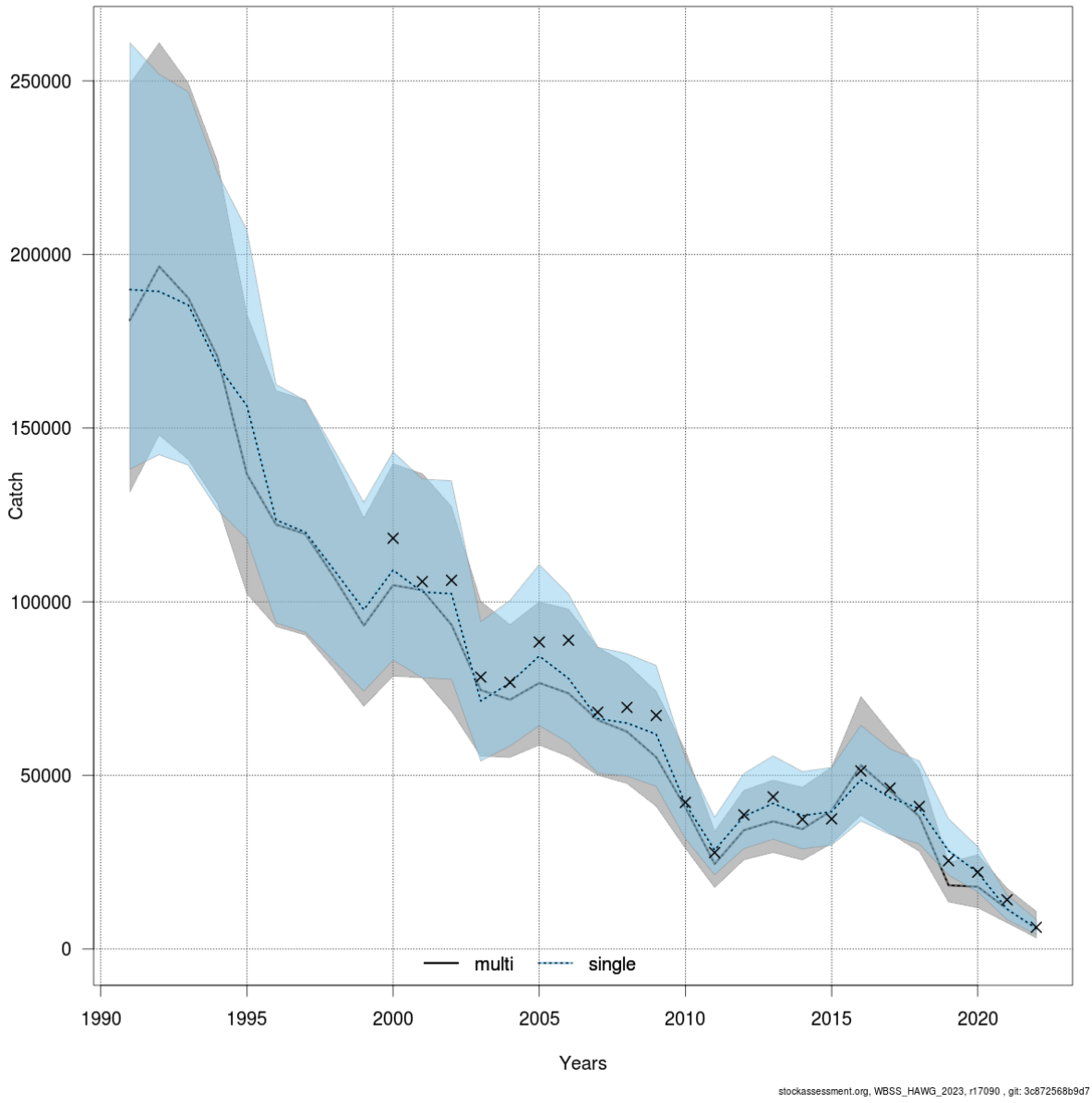


Figure 3.6.4.5 WESTERN BALTIC SPRING SPAWNING HERRING. Total catch in weight (tons). Prediction from the WBSS multi fleet (multi) and the WBSS single fleet (single) assessment runs and point wise 95% confidence intervals are shown by line and shaded area. The yearly observed total catch weight (crosses) are calculated sum of catch per fleet.

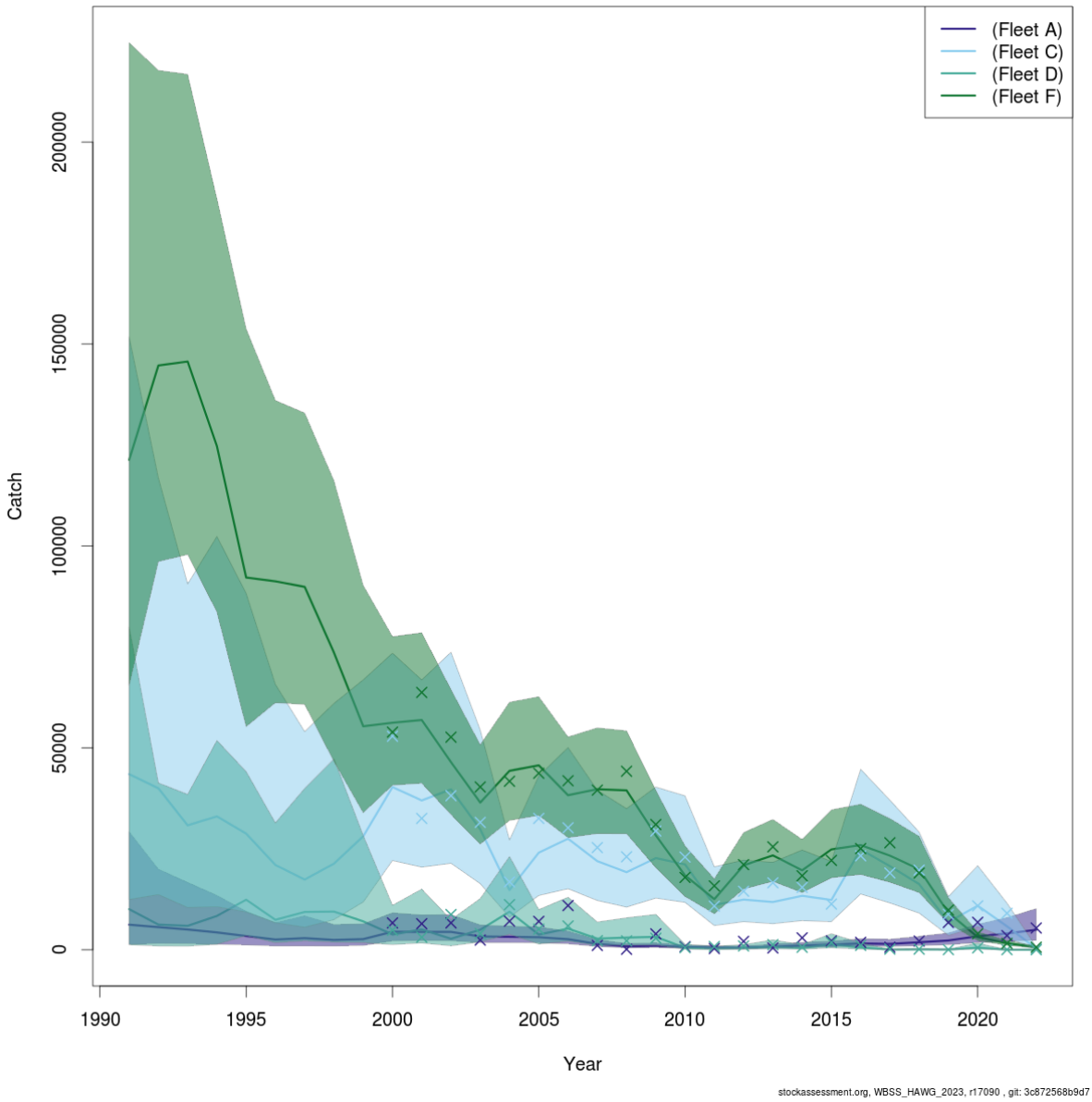


Figure 3.6.4.6 WESTERN BALTIC SPRING SPAWNING HERRING. Total catch in weight (tons) by fleet. Prediction from the WBSS multi fleet assessment run and point wise 95% confidence intervals are shown by line and shaded area. The plot also shows the observed total catch weight per fleet (crosses)

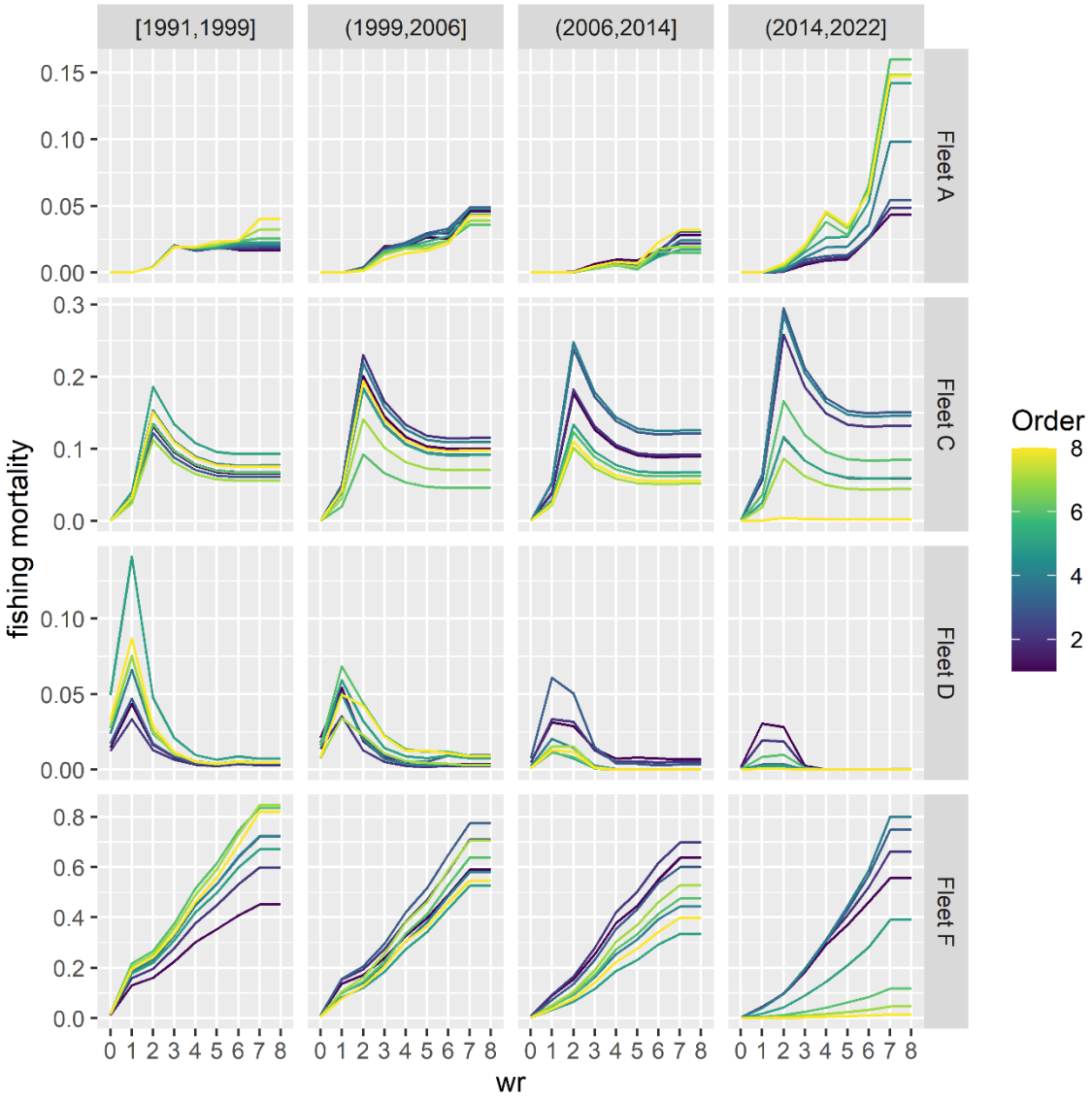


Figure 3.6.4.7 WESTERN BALTIC SPRING SPAWNING HERRING. Estimated partial fishing mortalities at age as W-ringers (wr) per fleet and year. Order: 1 equal 1st year in the respective time span.

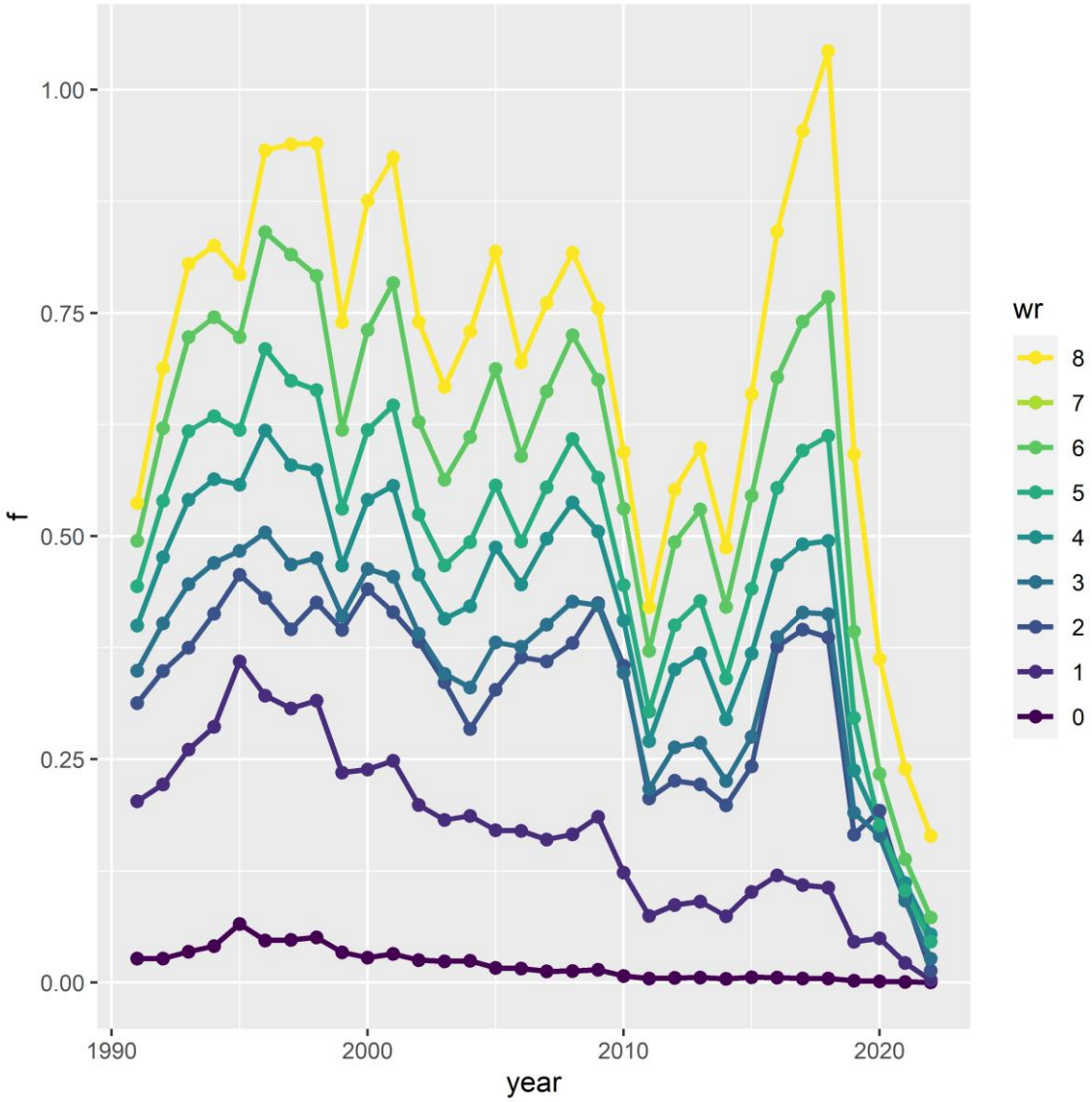


Figure 3.6.4.8 Western Baltic Spring Spawning Herring. Time-series of estimated fishing mortality-at-age as W-ringers (wr)

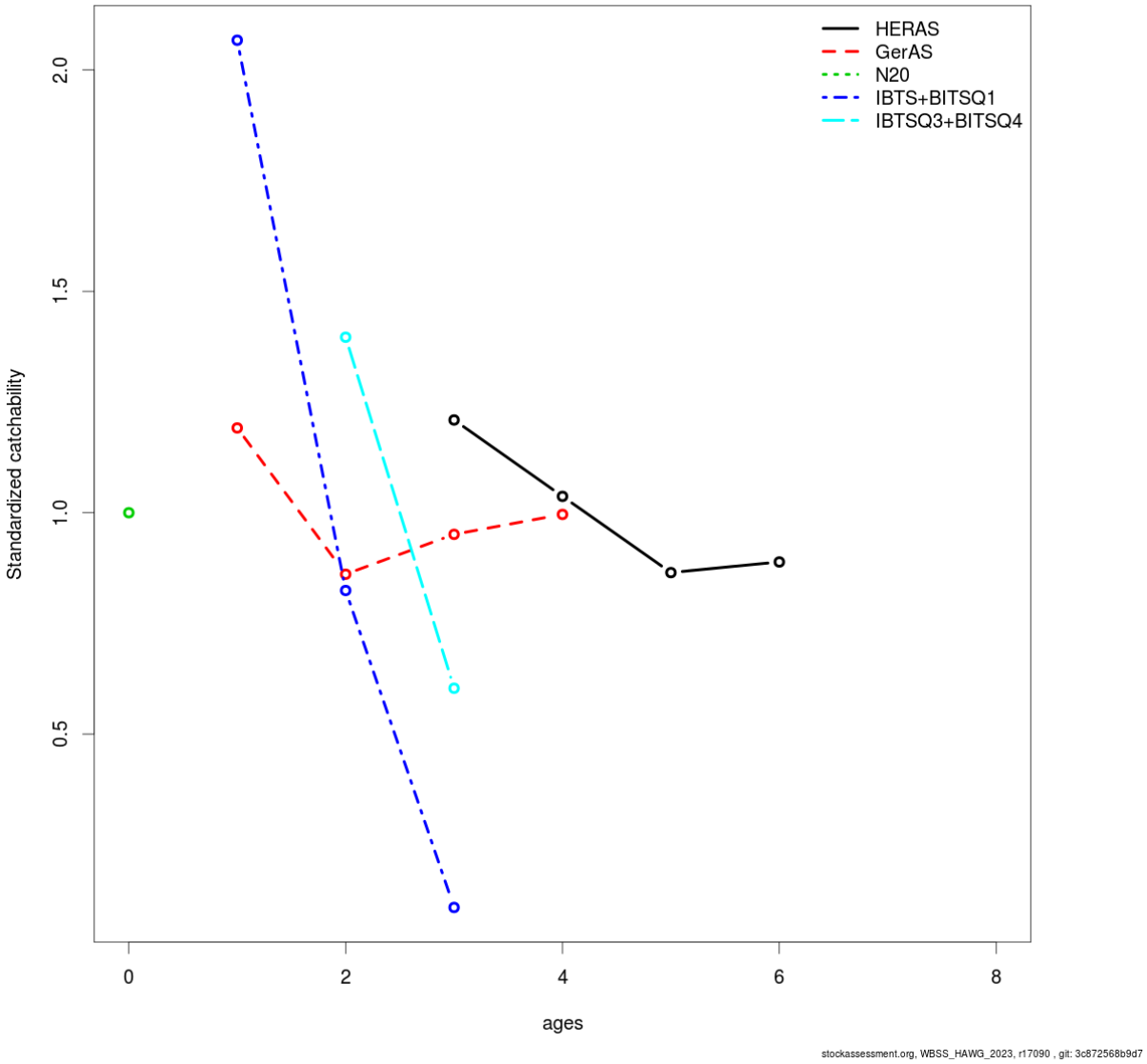


Figure 3.6.4.9 Western Baltic Spring Spawning Herring. Estimated survey catchabilities. N20 only covers age 0 and therefore no line

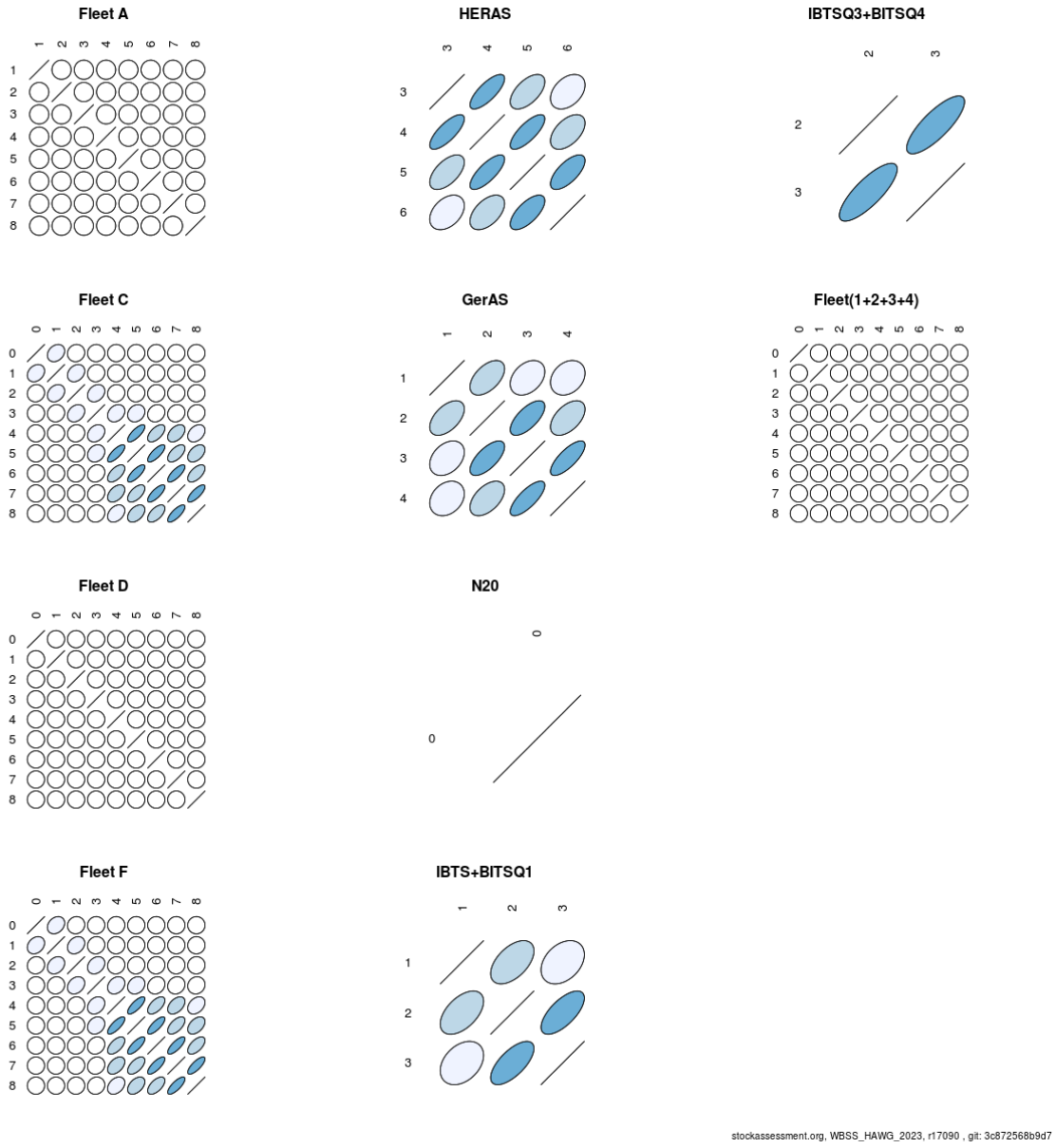


Figure 3.6.4.10 WESTERN BALTIC SPRING SPAWNING HERRING. Estimates correlations between age groups for each fleet.

Figure 3.6.4.11 WESTERN BALTIC SPRING SPAWNING HERRING. Estimated age distribution in the stock. Colours represent a cohort

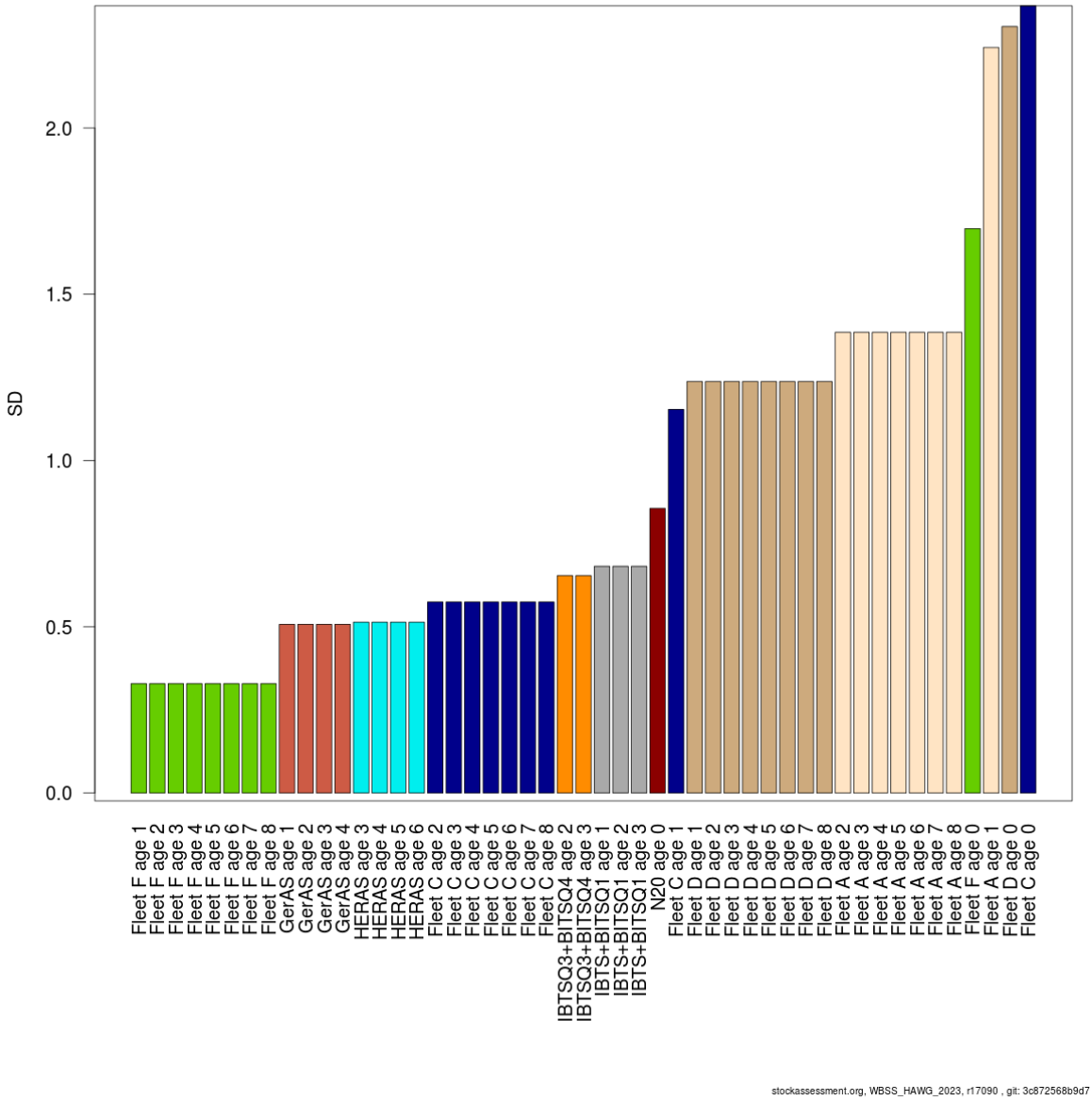


Figure 3.6.4.12 WESTERN BALTIC SPRING SPAWNING HERRING. Estimated observation variance in the WBSS multi fleet assessment run.

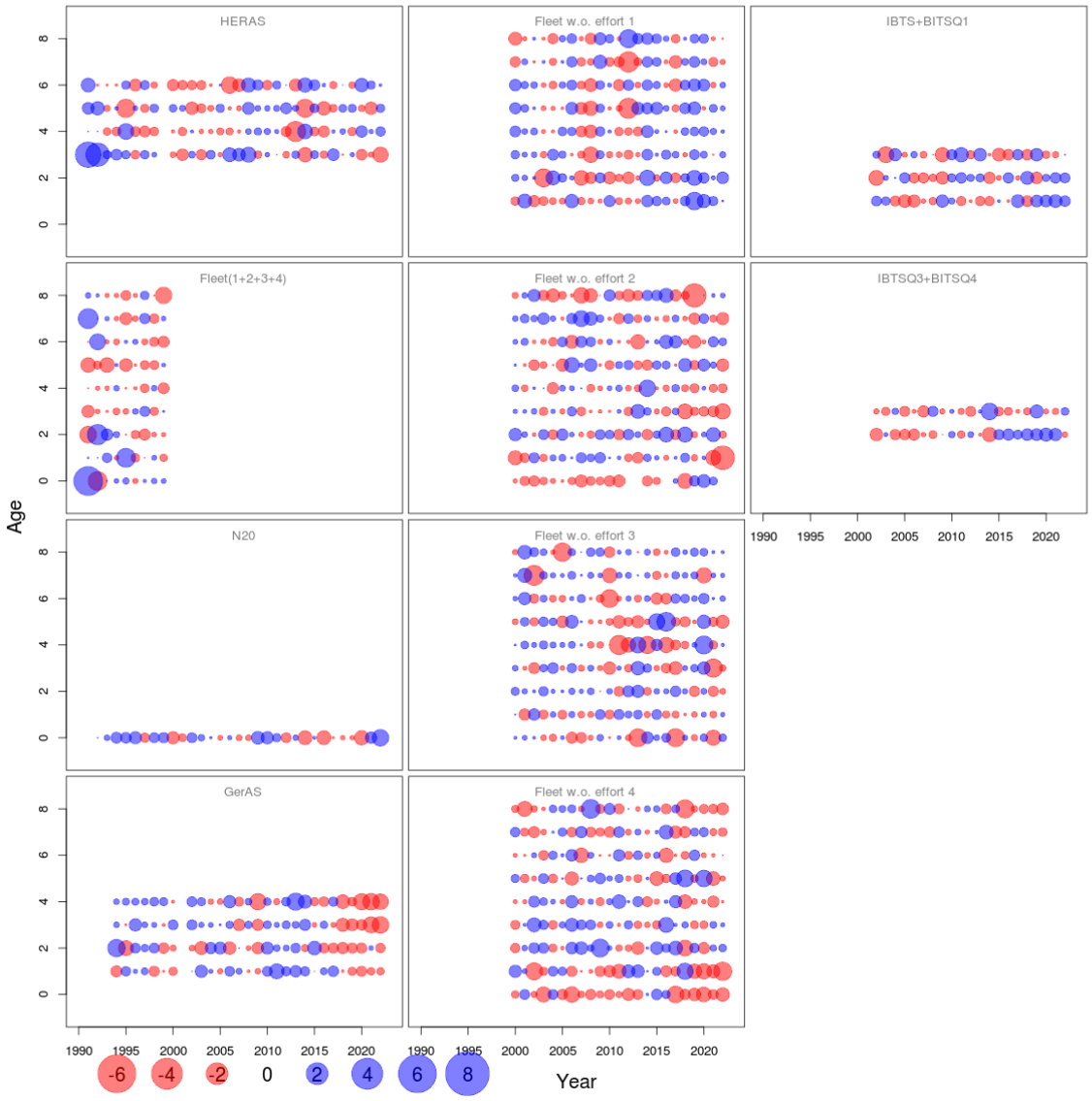


Figure 3.6.4.13 WESTERN BALTIC SPRING SPAWNING HERRING. BUBBLE PLOT. Standardized one-observation-ahead residuals from multi fleet run.

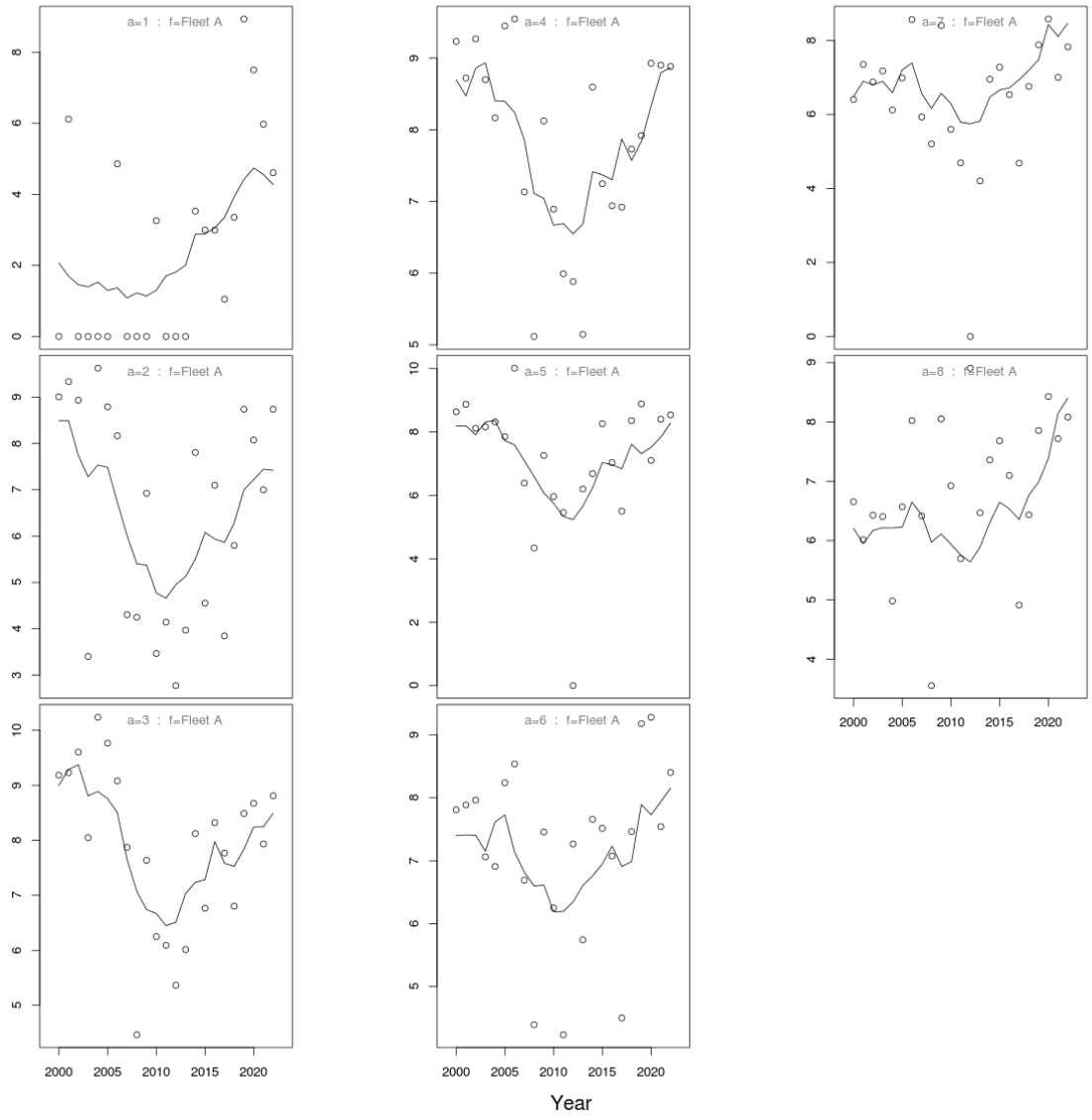


Figure 3.6.4.14 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of commercial catches fit per fleet. Fleet A. Plot of predicted (line) and observed (points) catches (log scale) per W-ringers (a) and year.

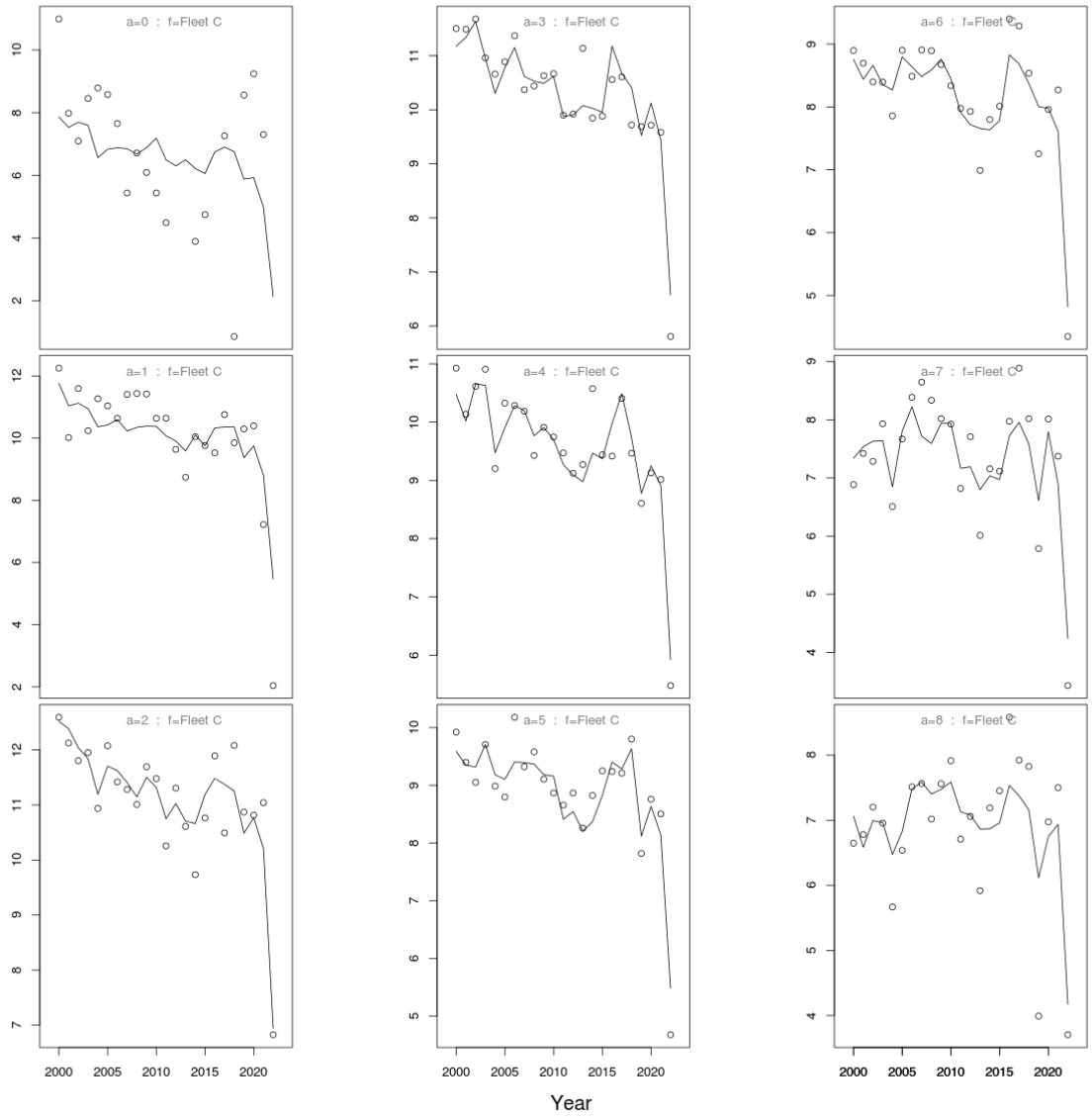


Figure 3.6.4.15 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of commercial catches fit per fleet. Fleet C. Plot of predicted (line) and observed (points) catches (log scale) per W-ringers (a) and year.

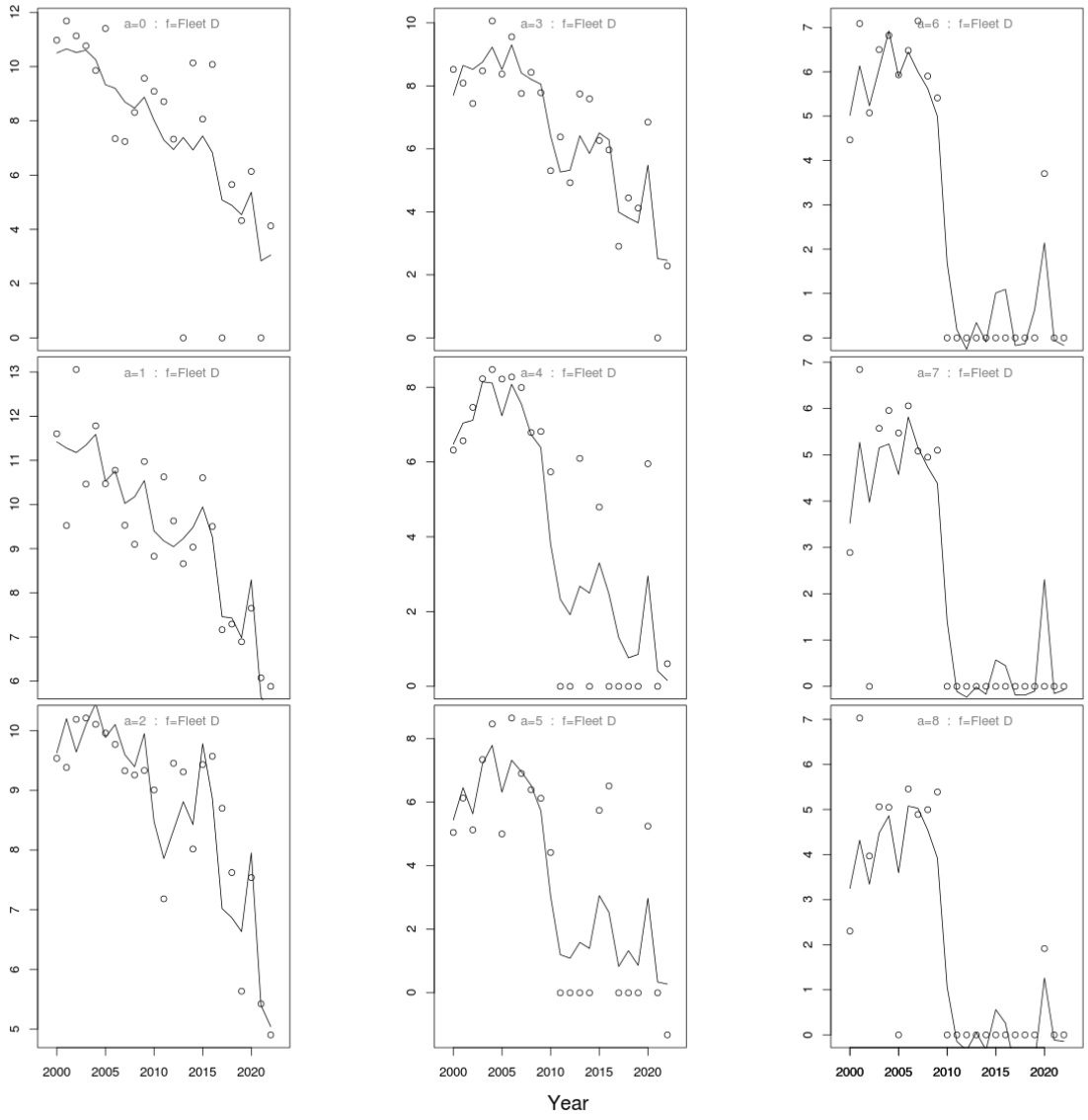


Figure 3.6.4.16 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of commercial catches fit per fleet. Fleet D. Plot of predicted (line) and observed (points) catches (log scale) per W-ringers (a) and year.

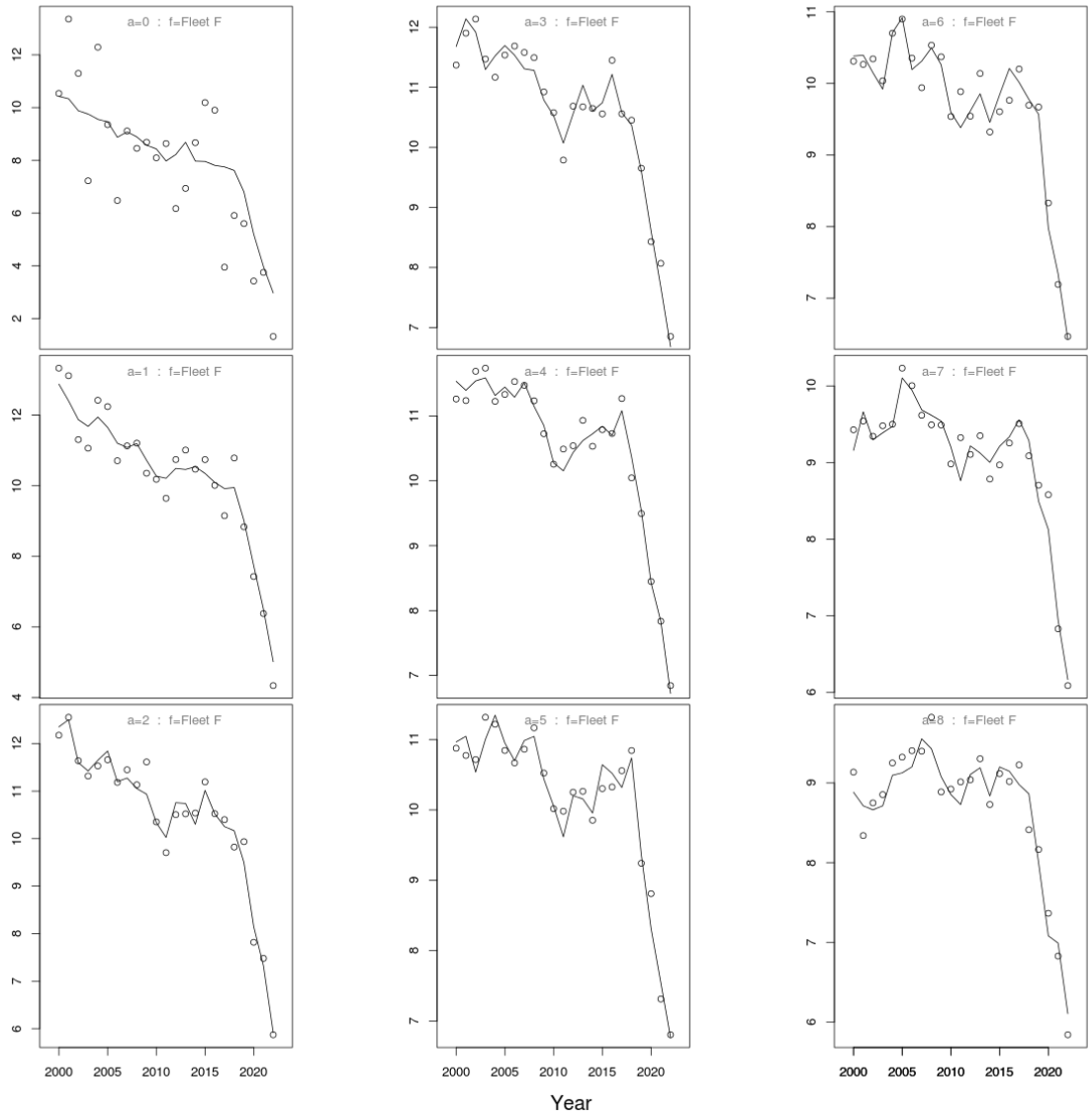


Figure 3.6.4.17 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of commercial catches fit per fleet. Fleet F. Plot of predicted (line) and observed (points) catches (log scale) per W-ringers (a) and year.

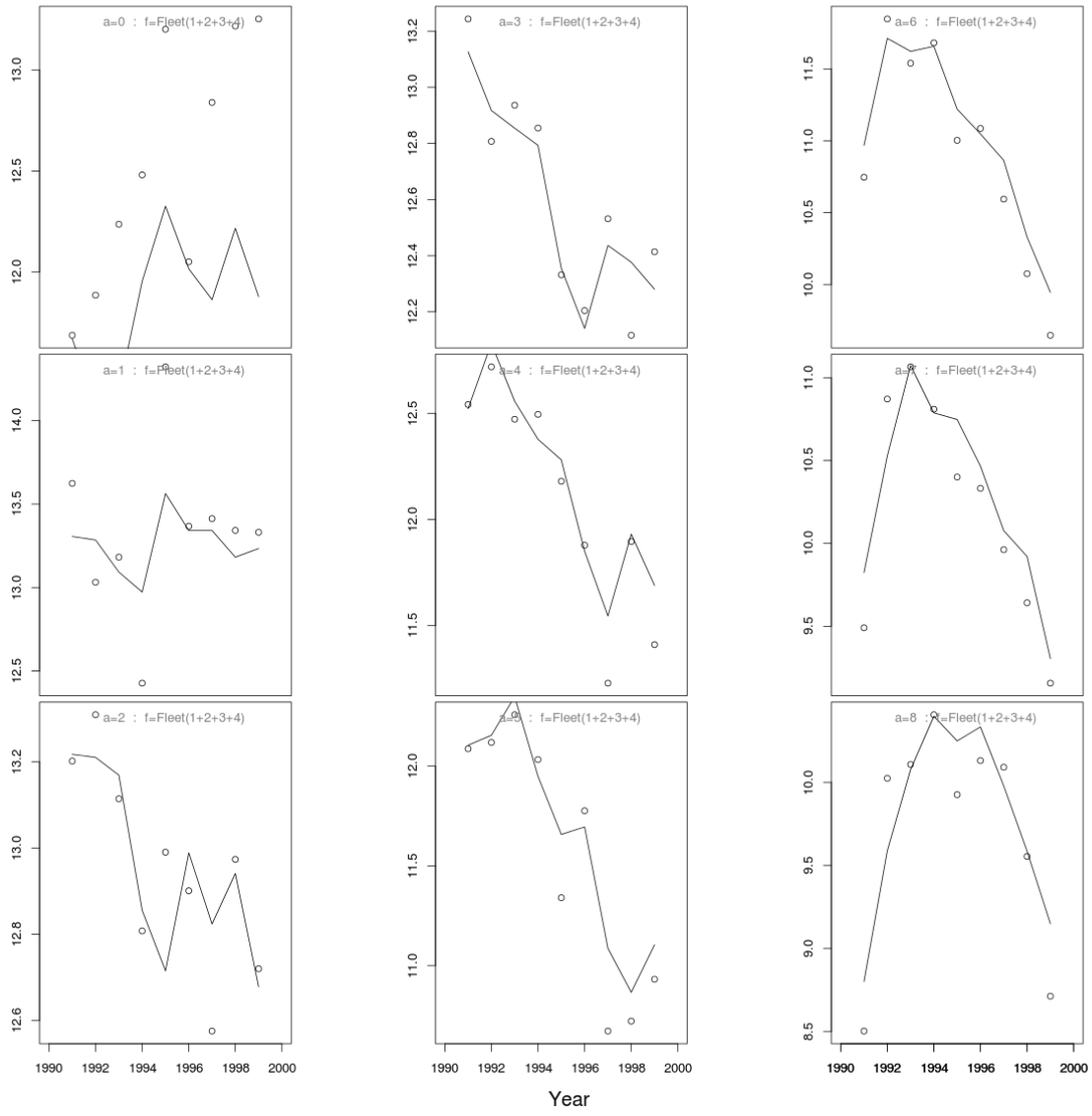


Figure 3.6.4.18 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of commercial catches fit. Sum of fleets. Plot of predicted (line) and observed (points) catches (log scale) per W-ringers (a) and year.

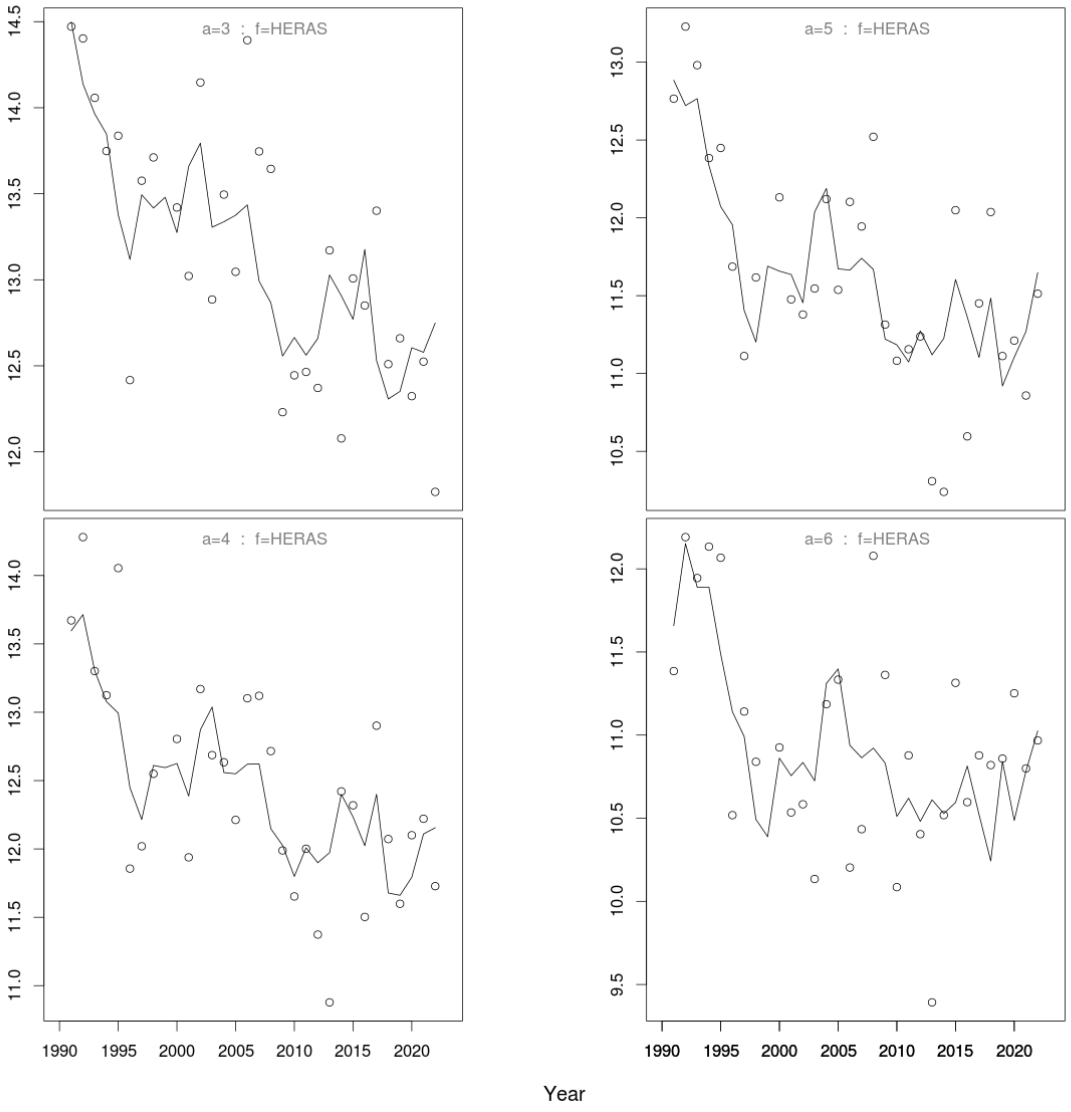


Figure 3.6.4.19 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of the HERAS index. Plot of predicted (line) and observed (points) index (log scale) per W-ringers (a) and year.

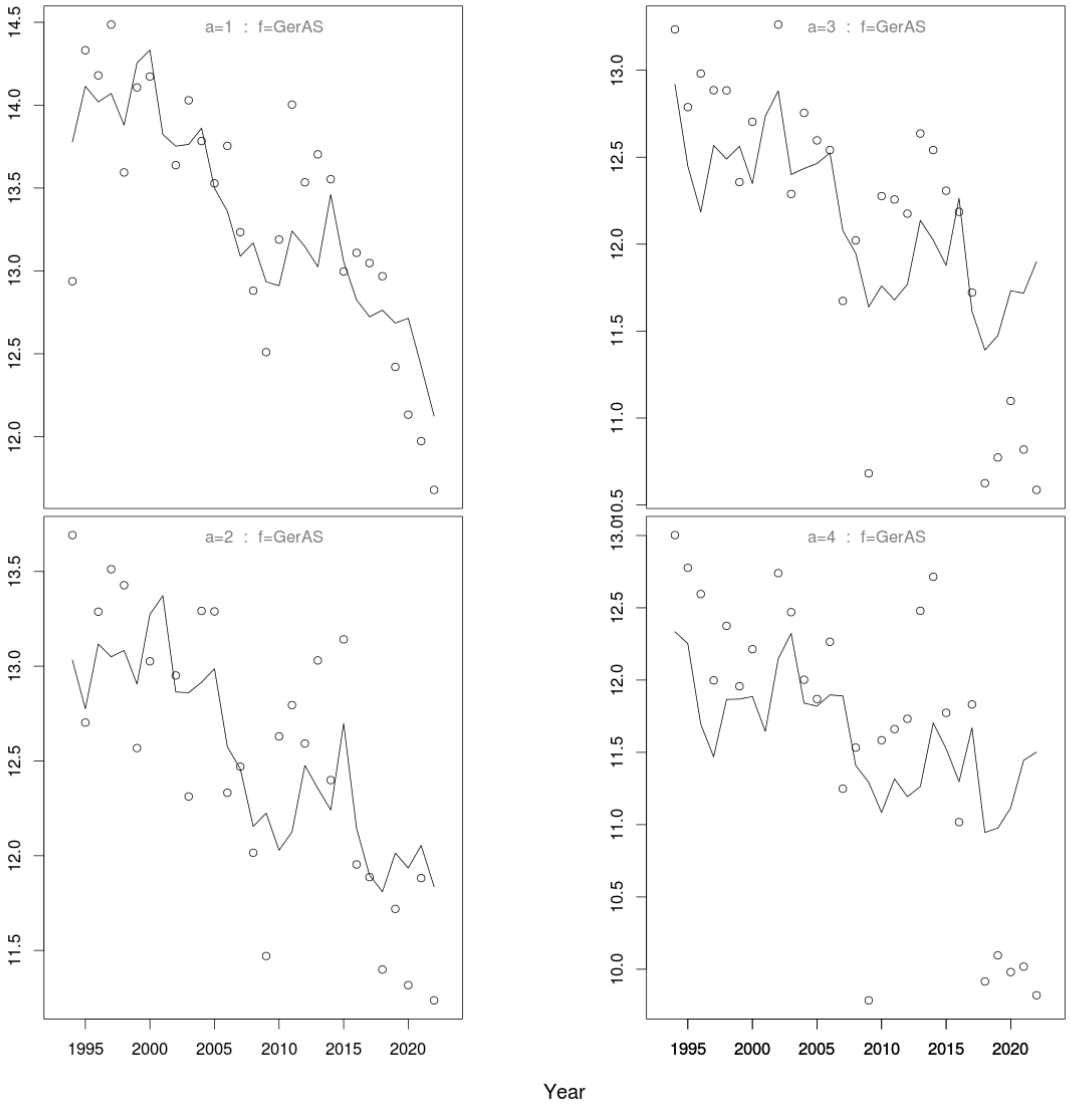


Figure 3.6.4.20 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of the GerAs index. Plot of predicted (line) and observed (points) index (log scale) per W-ringers (a) and year.

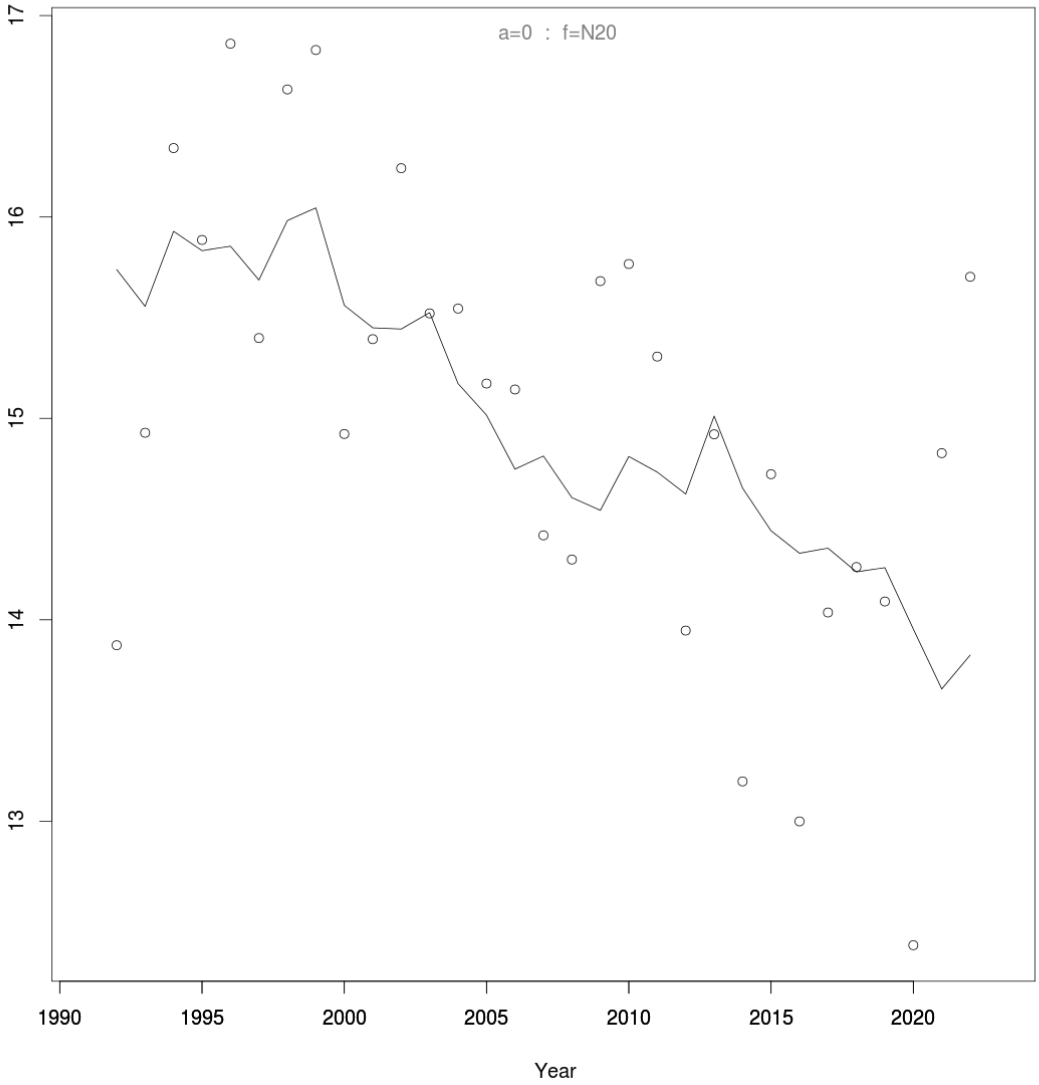


Figure 3.6.4.21 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of the N20 index. Plot of predicted (line) and observed (points) index (log scale) per W-ringers (a) and year.

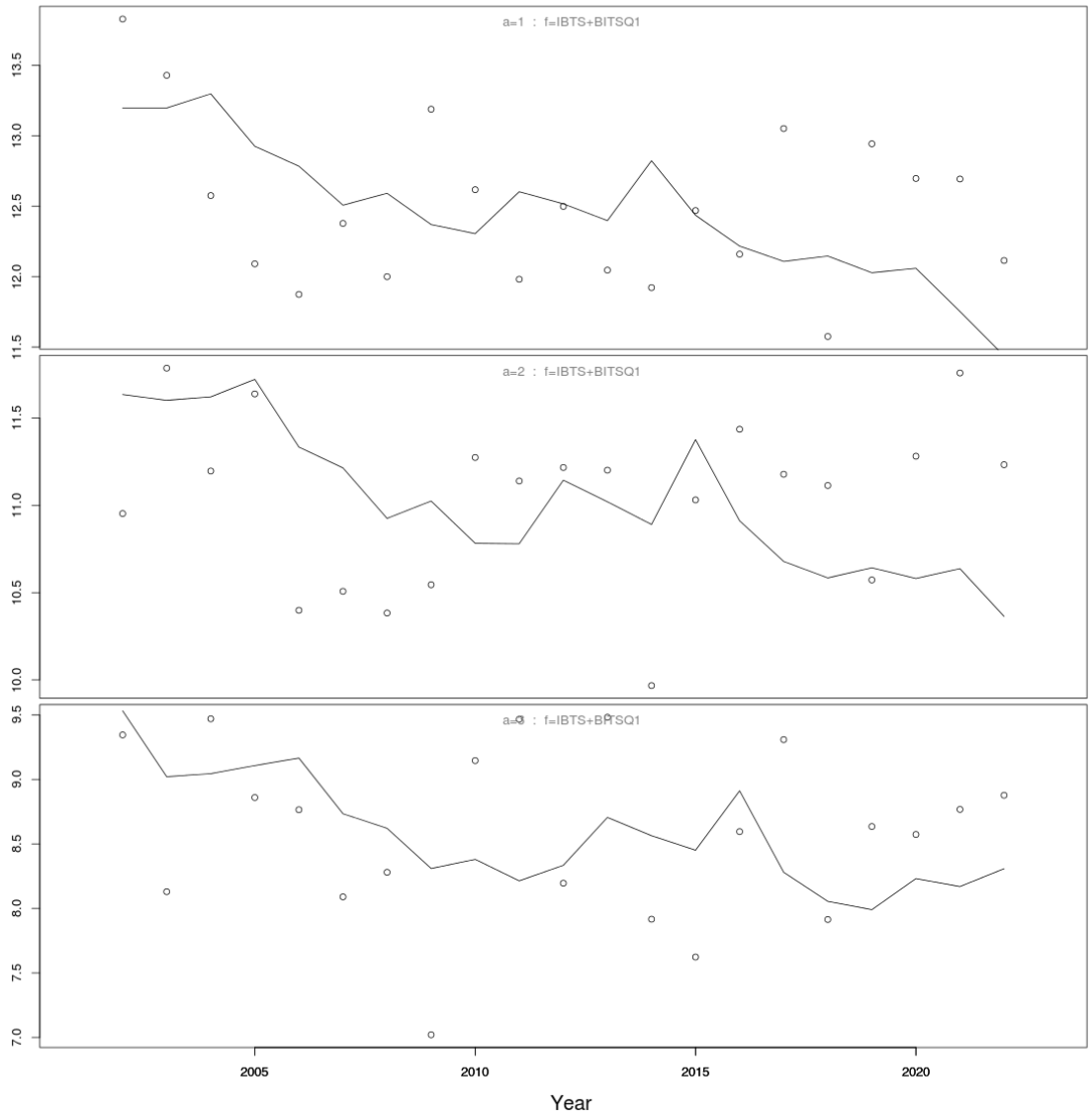


Figure 3.6.4.22 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of the IBTS+BITS-Q1 index. Plot of predicted (line) and observed (points) index (log scale) per W-ringers (a) and year.

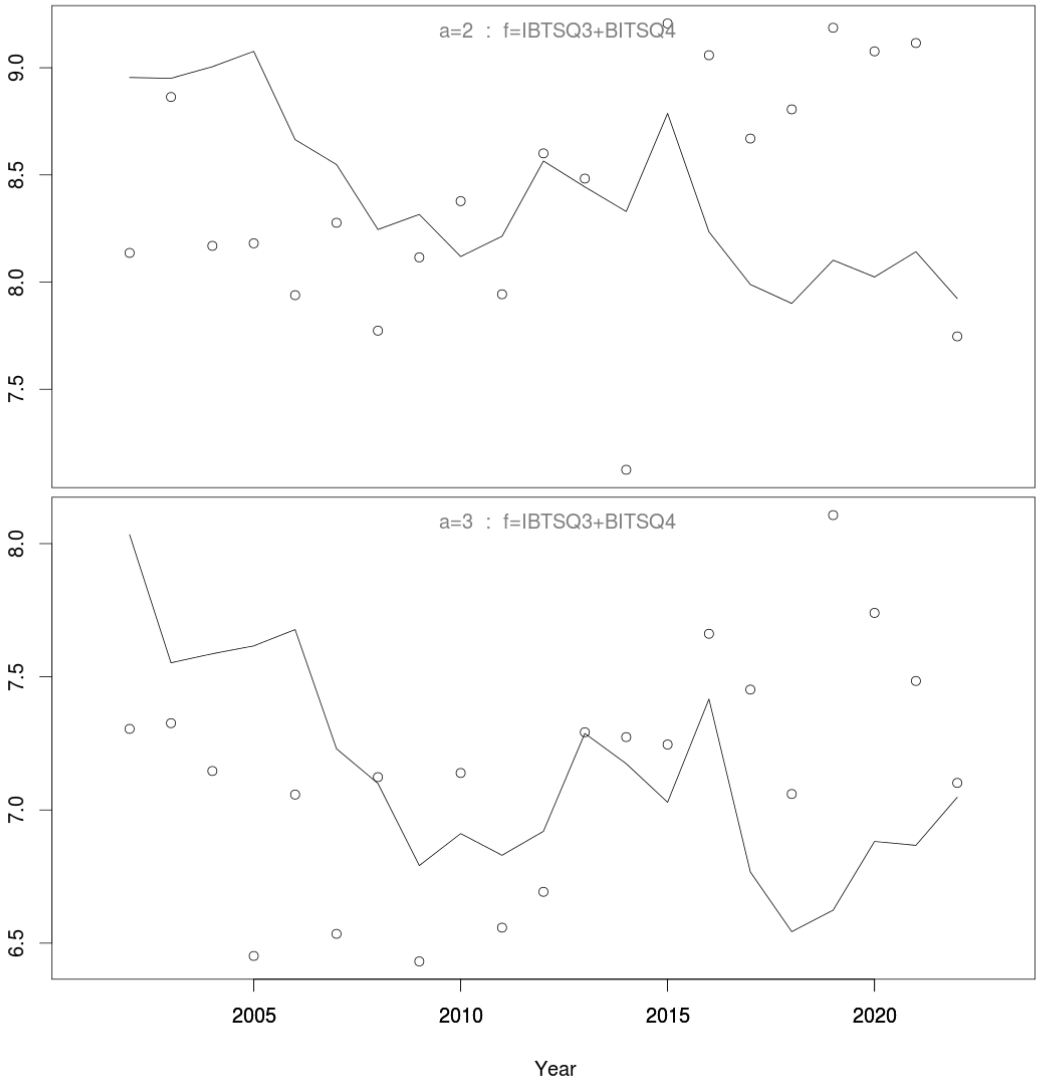


Figure 3.6.4.23 WESTERN BALTIC SPRING SPAWNING HERRING. Diagnostics of the IBTS+BITS-Q3.4 index. Plot of predicted (line) and observed (points) index (log scale) per W-ringers (a) and year.

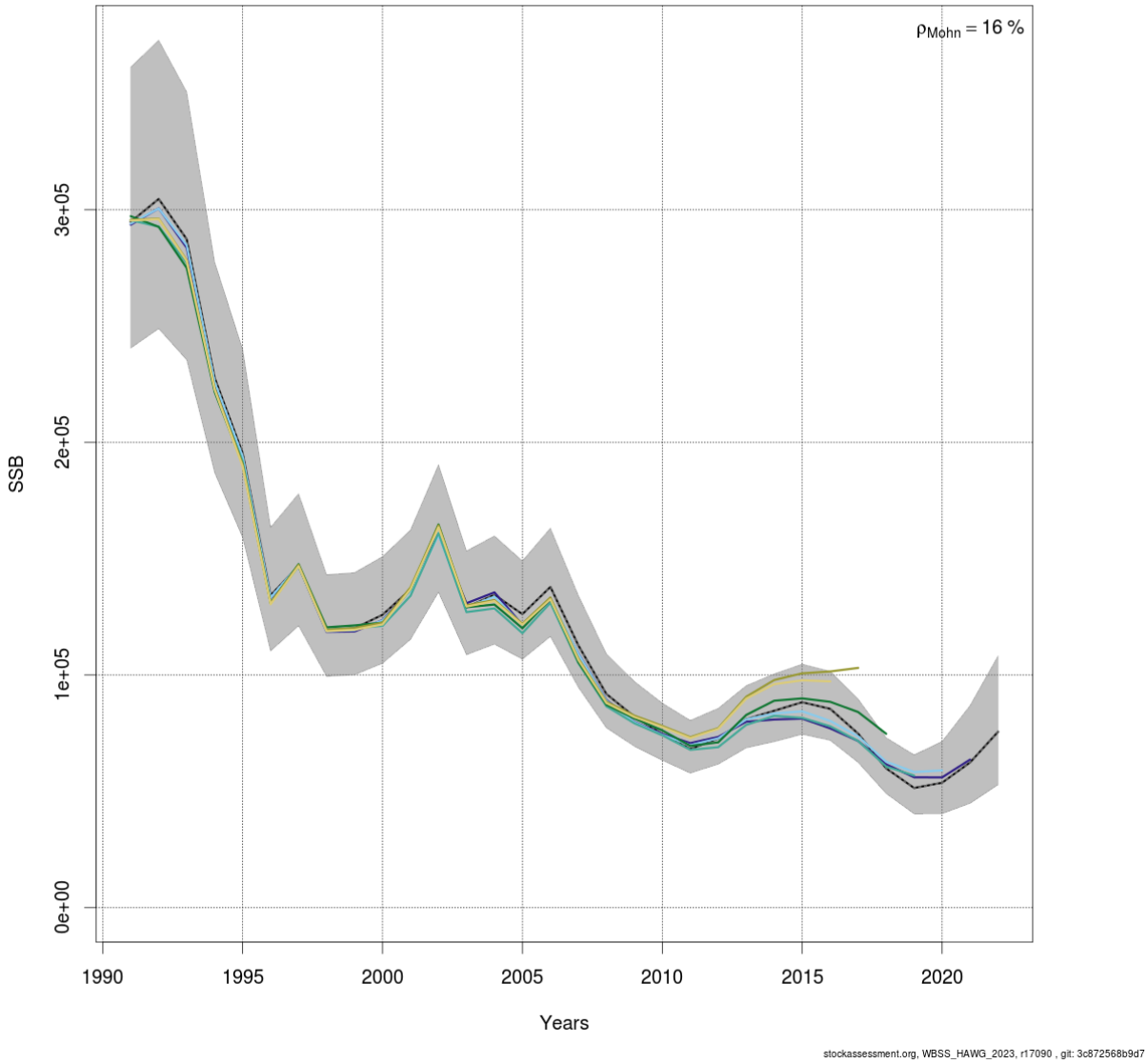


Figure 3.6.4.24 WESTERN BALTIC SPRING SPAWNING HERRING. Analytical retrospective pattern over 5 years from multi fleet run. Spawning stock biomass.

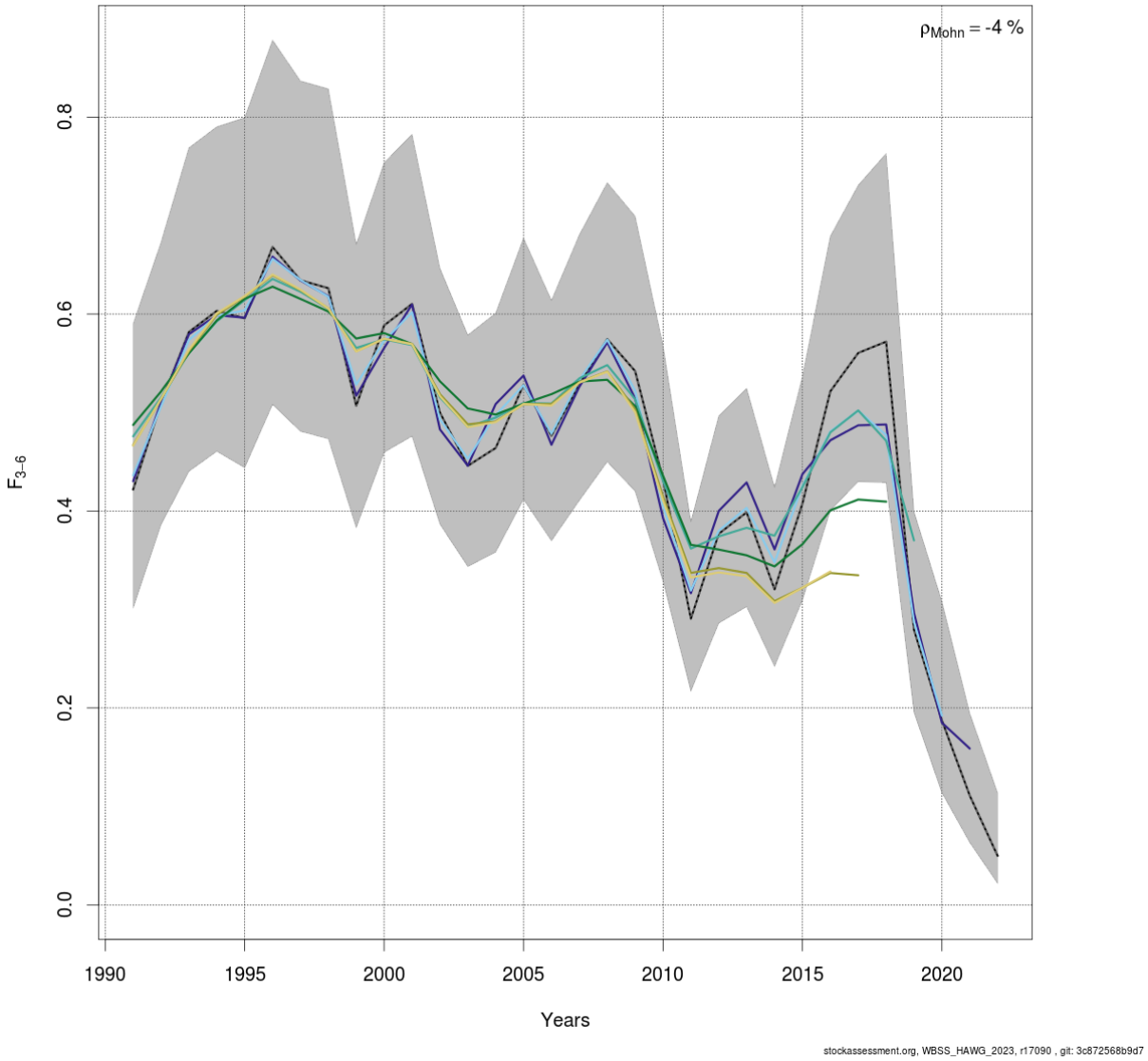


Figure 3.6.4.25 WESTERN BALTIC SPRING SPAWNING HERRING. Analytical retrospective pattern over 5 years from multi fleet run. Average fishing mortality for the shown age range.

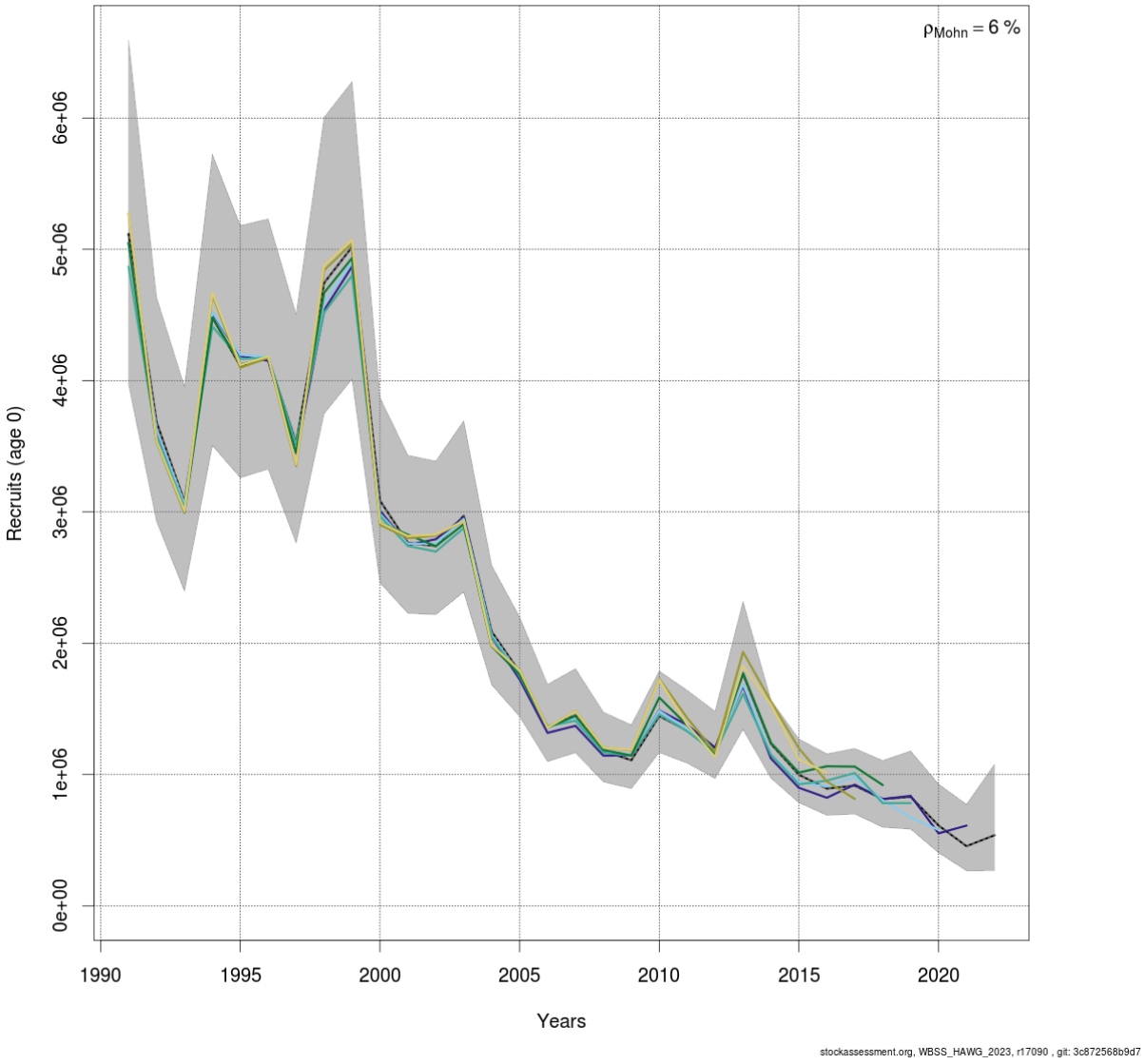


Figure 3.6.4.26 WESTERN BALTIC SPRING SPAWNING HERRING. Analytical retrospective pattern over 5 years from multi fleet run. Recruitment.

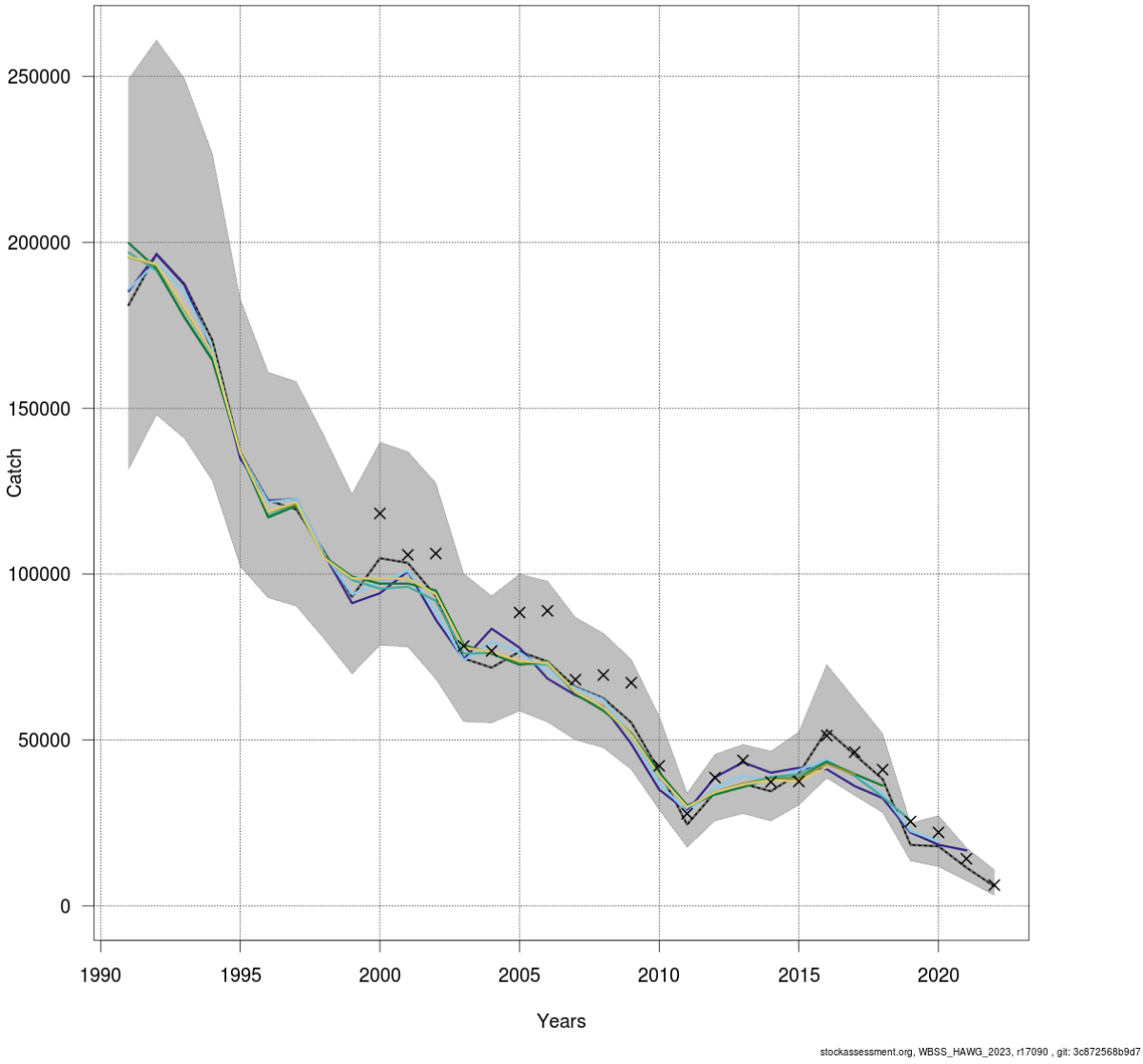


Figure 3.6.4.27 WESTERN BALTIC SPRING SPAWNING HERRING. Analytical retrospective pattern over 5 years from multi fleet run. Catch.

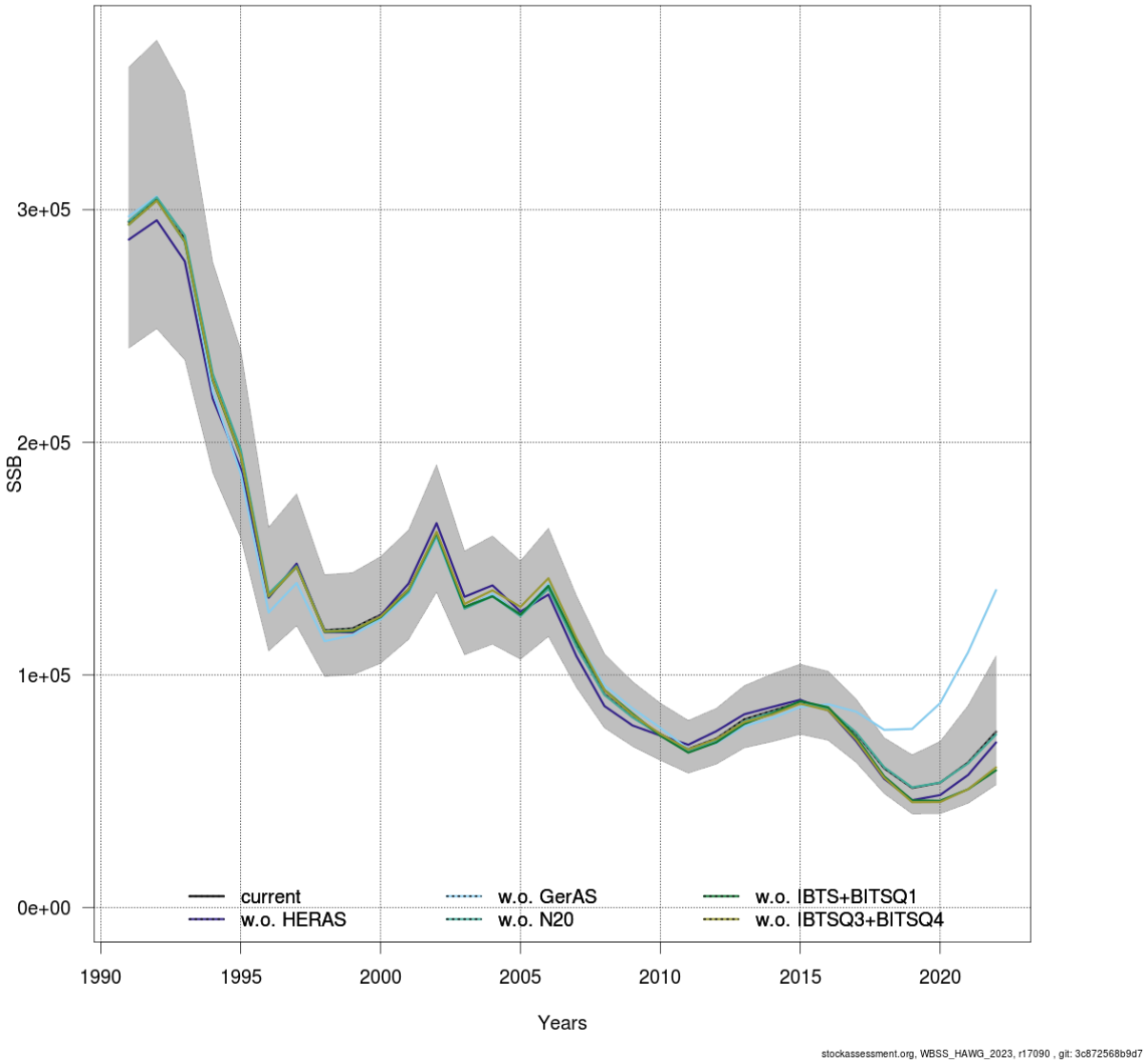


Figure 3.6.4.28 WESTERN BALTIC SPRING SPAWNING HERRING. Leave-one out from multi fleet run. Spawning stock biomass.

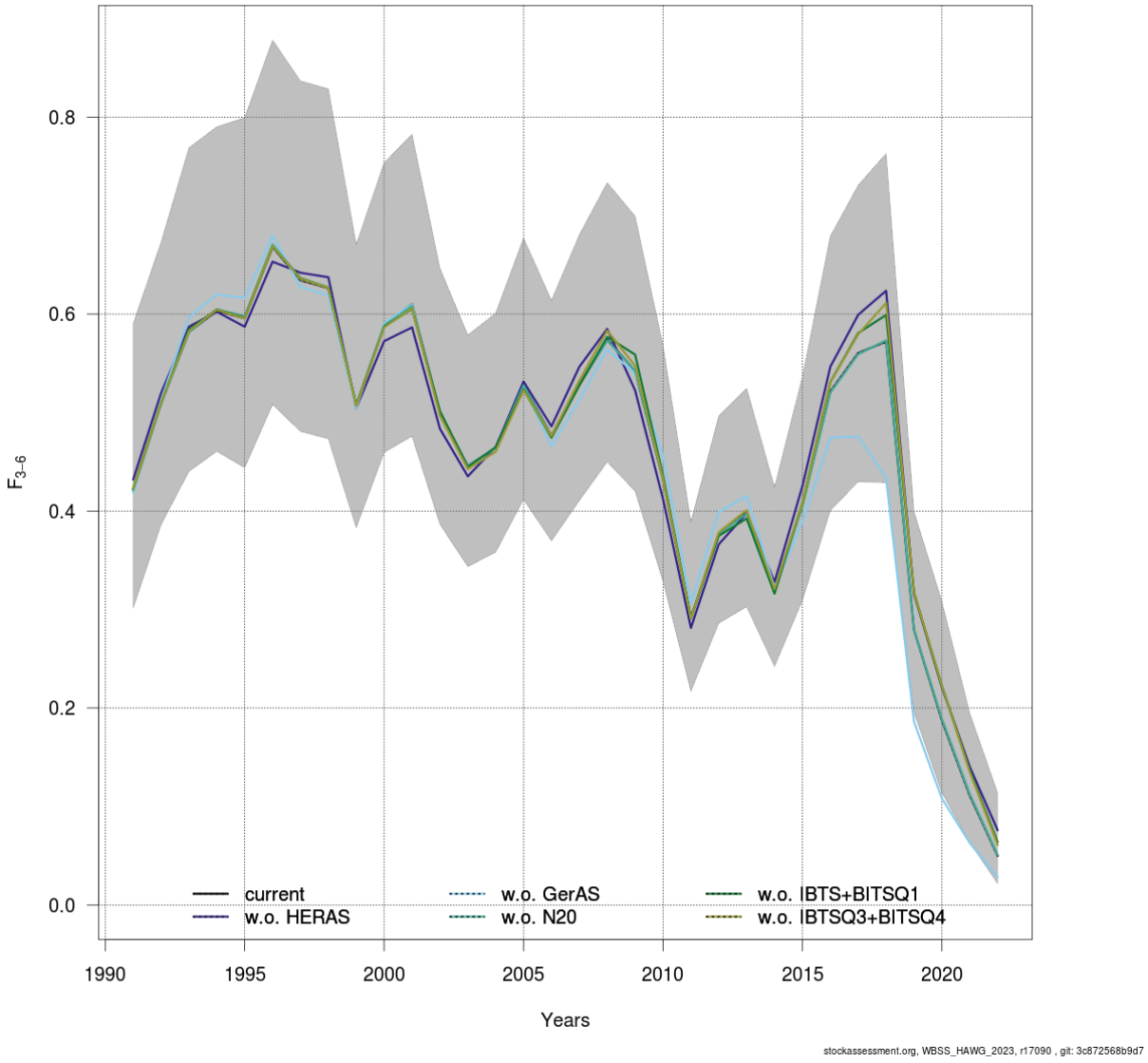


Figure 3.6.4.29 WESTERN BALTIC SPRING SPAWNING HERRING. Leave-one out from multi fleet run. Average fishing mortality for the shown age range.

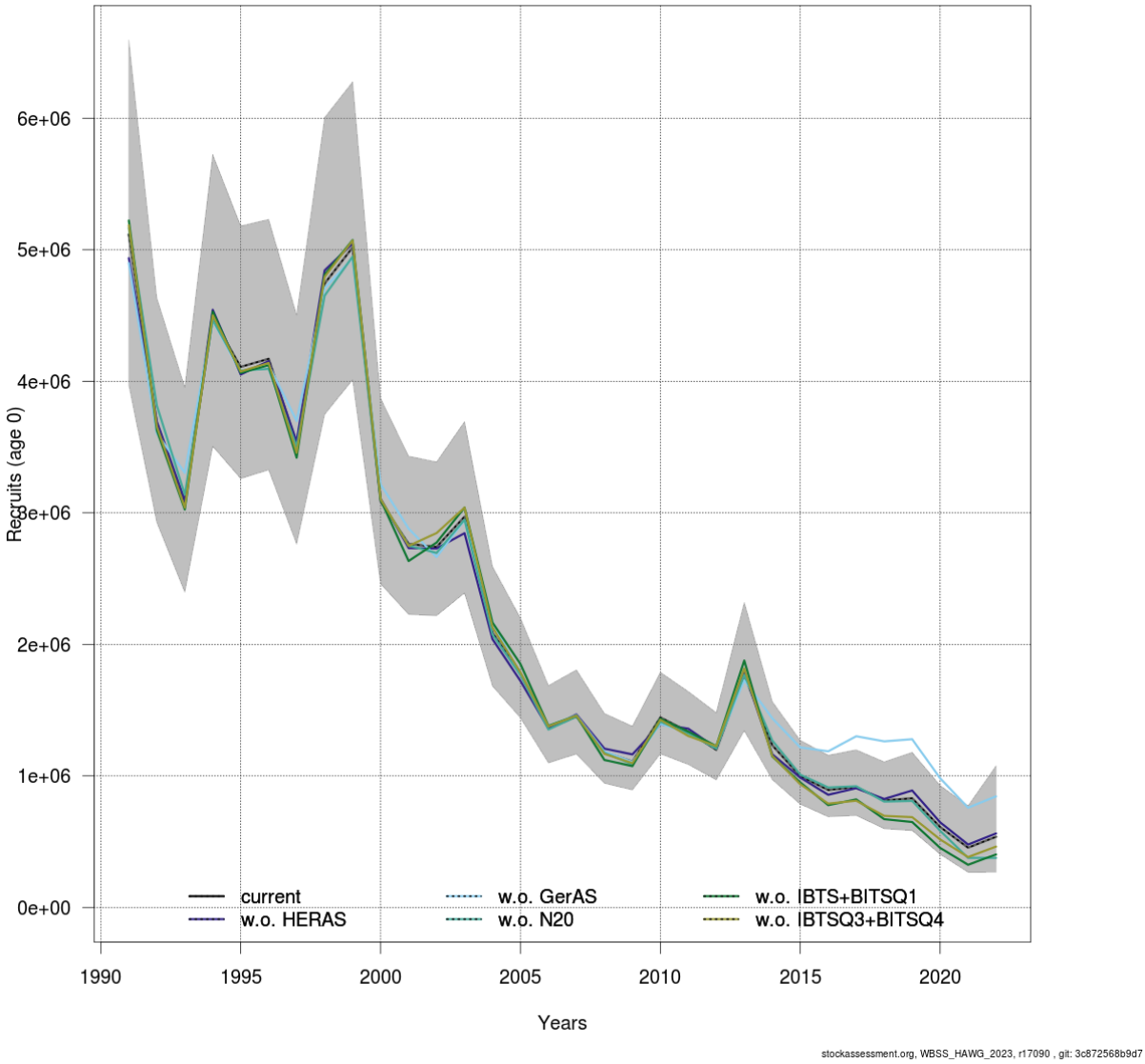


Figure 3.6.4.30 WESTERN BALTIC SPRING SPAWNING HERRING. Leave-one out from multi fleet run. Recruitment.

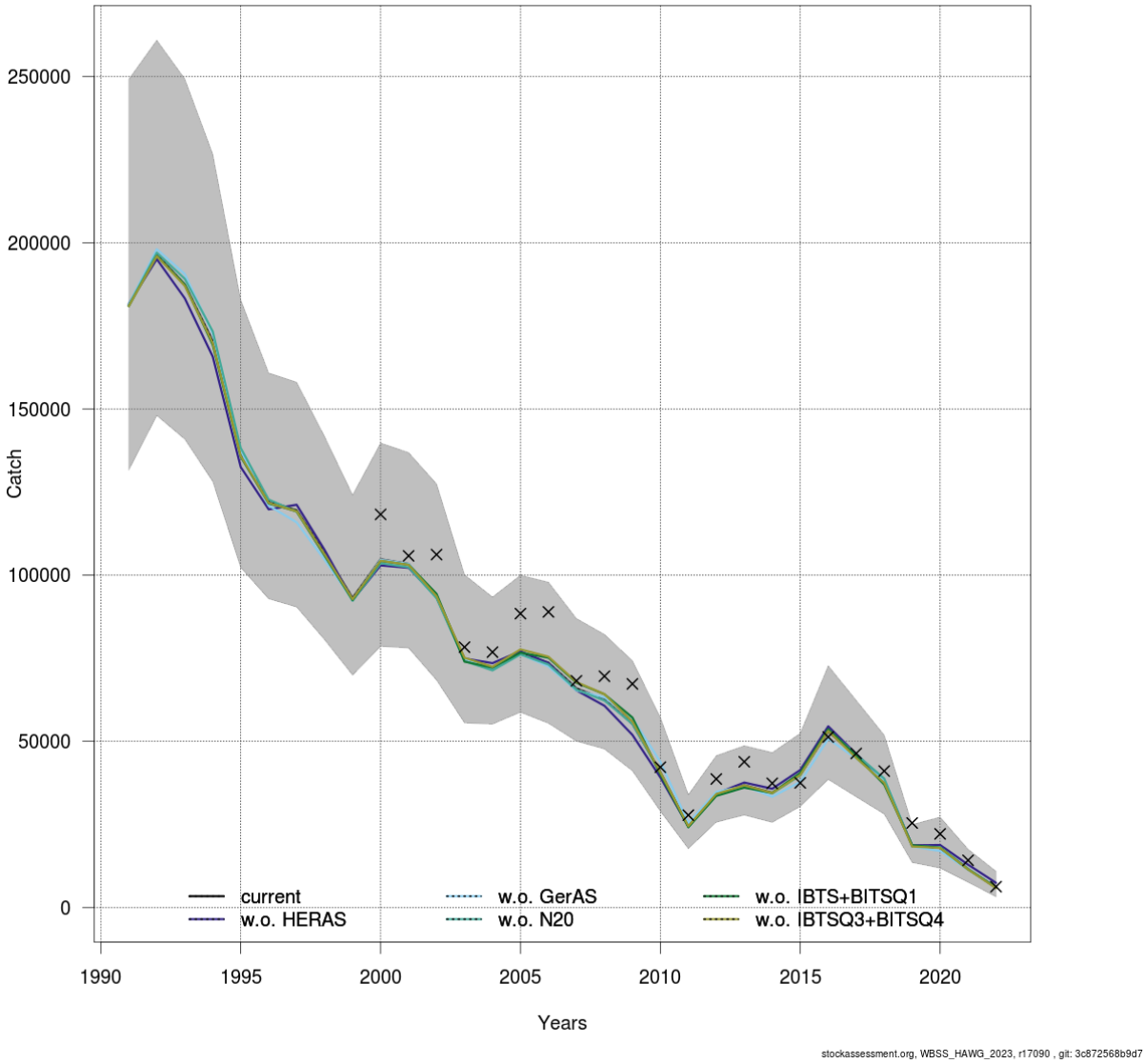


Figure 3.6.4.31 WESTERN BALTIC SPRING SPAWNING HERRING. Leave-one out from multi fleet run. Catch.