HERRING ASSESSMENT WORKING GROUP FOR THE AREA SOUTH OF 62° N (HAWG)

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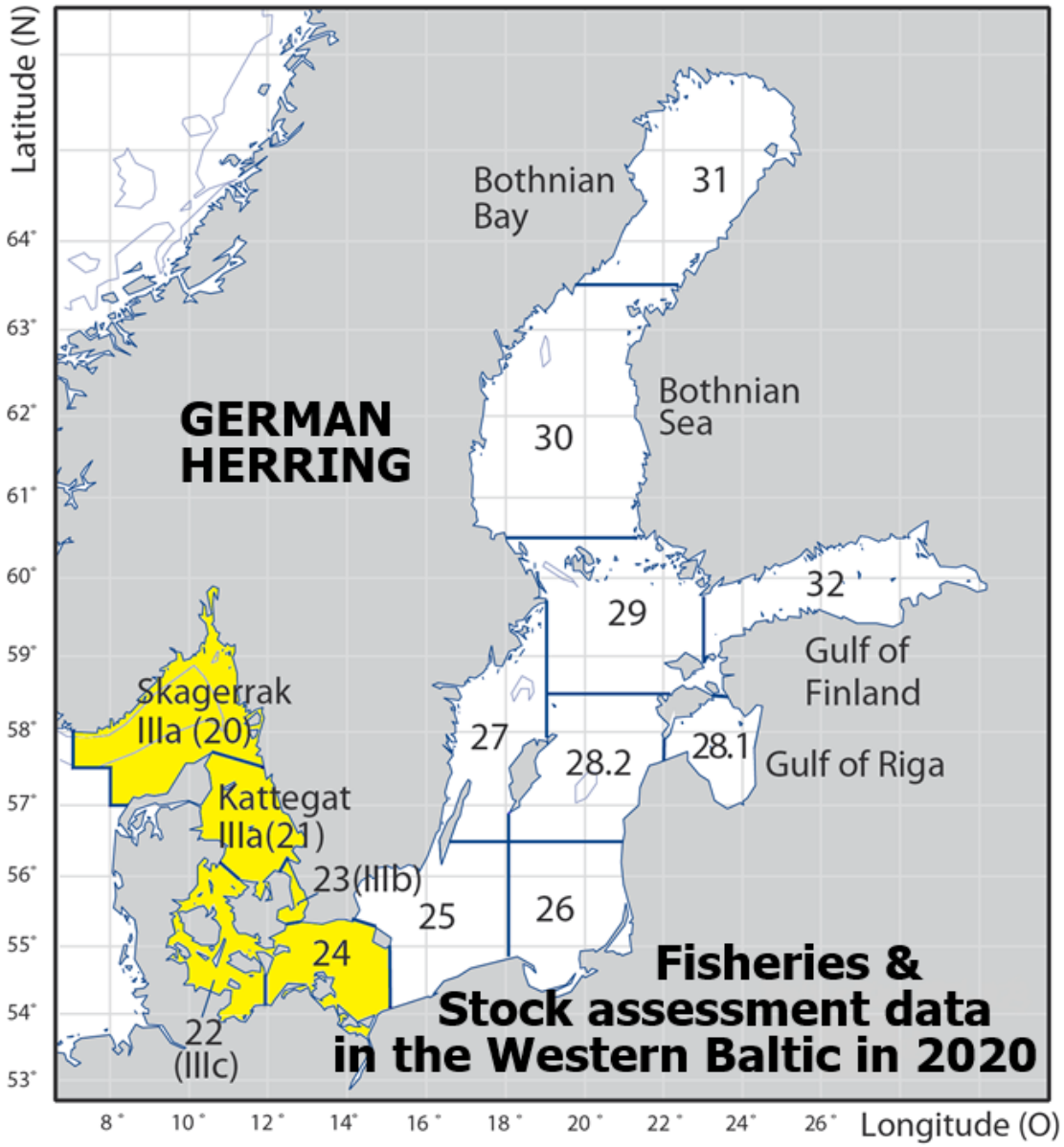
Annex 4: List of Working Documents

Working documents HAWG 2021	
WD 01	Pastoors, M and Rolf, N. Utilizing the full time series of herring catch by rectangle.
WD 02	Polte, P and Gröhsler, T. 2020 Western Baltic spring spawning herring recruitment monitored by the Rügen Herring Larvae Survey
WD 03	Gröhsler, T. German herring Fisheries and stock assessment data in the Western Baltic in 2020.
WD 04	HAWG 2021. IBPNSAS2021 – Interbenchmark Protocol on North Sea Autumn Spawning Herring 2021
WD 05	Pastoors, M. and Quirijns, F.A. PFA Self sampling report for North Sea herring Fisheries, 2015-2020

Working Document 03 **Herring Assessment WG for the area South of 62° North (HAWG)/WBSSH**
16 - 24 March 2021



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1 German herring fisheries in 2020

1.1 Fisheries

In 2020 the total German herring landings from the Western Baltic Sea in Subdivisions (SD) 22 and 24 amounted to 2,069 t, which represents a decrease of 63 % compared to the landings in 2019 (5,571 t). The lower landings in 2020 were caused by a decrease of the corresponding TAC/quota (German quota for SDs 22 and 24 in 2020: 1,738 t + quota-transfer of 451 t). The German quota in 2020 was used by 95 % (2019: 97 %, 2018: 94 %). The fishing activities in one of the main fishing areas, the Greifswald Bay (SD 24), started already in mid-Januray. The main German fishery stopped their activities at the end of April.

As in previous years some herring was also caught in the Skagerrak/Kattegat area (Division IIIa):

Year	Landings (t)
2005	751
2006	556
2007	454
2008	352 + 1,214 misreported from area SD 23
2009	887
2010	146
2011	54
2012	629
2013	195 (= 46 % of GER quota (>32 mm) of 421 t
2014	84 (= 27 % of GER quota (>32 mm) of 310 t
2015	128 (= 44 % of GER quota (>32 mm) of 289 t
2016	125 (= 37 % of GER quota (>32 mm) of 339 t
2017	85 (= 25 % of GER quota (> 32 mm) of 339 t*
2018	206 (= 43 % of GER quota (>32 mm) of 358 t*
2019	121 (= 61 % of GER quota (>32 mm) of 358 t*
2020	155 (= 93 % of GER quota (>32 mm) of 166 t*

*Including a quota transfer of +1 t in 2017/2019/2020 and +34 t in 2018..

The landings (t by quarter and Sub-Division including information about the fraction of landings in foreign ports (**given as minus values**)) are shown in the table below:

Quarter	Skag./Katteg. (t)	Subdiv. 22 (t)	Subdiv. 24 (t)	TOTAL (t)	TOTAL (%)
I		6.457 -0.004	1,521.042	**1,527.499** **-0.004**	**68.7** **0.000**
II		2.723	43.645	**46.368**	**2.1**
III		0.215	0.440	**0.655**	**0.0**
IV	155.117 -69.068	4.745	489.518	**649.380** **-69.068**	**29.2** **-3.106**
TOTAL	**155.117** **-69.068**	**14.140** **-0.004**	**2,054.645** **0.000**	**2,223.902** **-69.072**	**100.0** **-3.106**

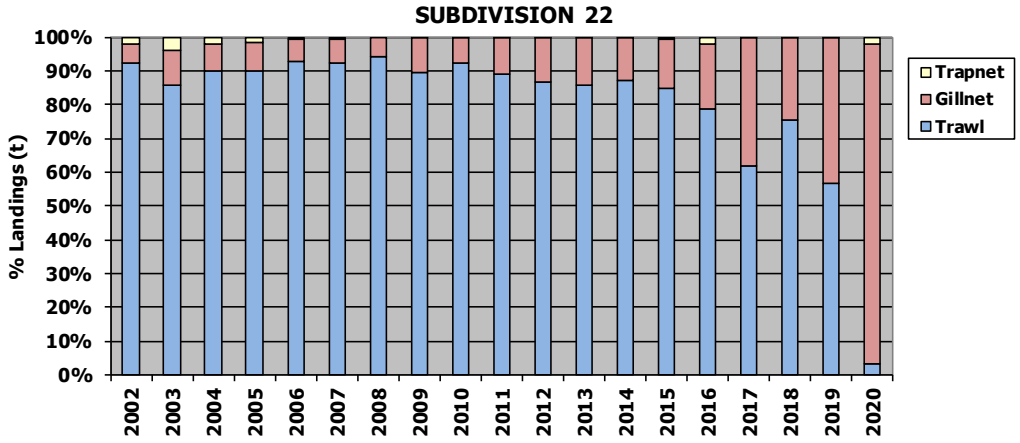
Source: Federal Centre for Agriculture and Food (BLE). Since 2008 the obligation to report via logbooks changed to vessels >8 m (until 2007 for vessels >10 m)

Landings = **Total landings**
-Landings = **Fraction landed abroad**

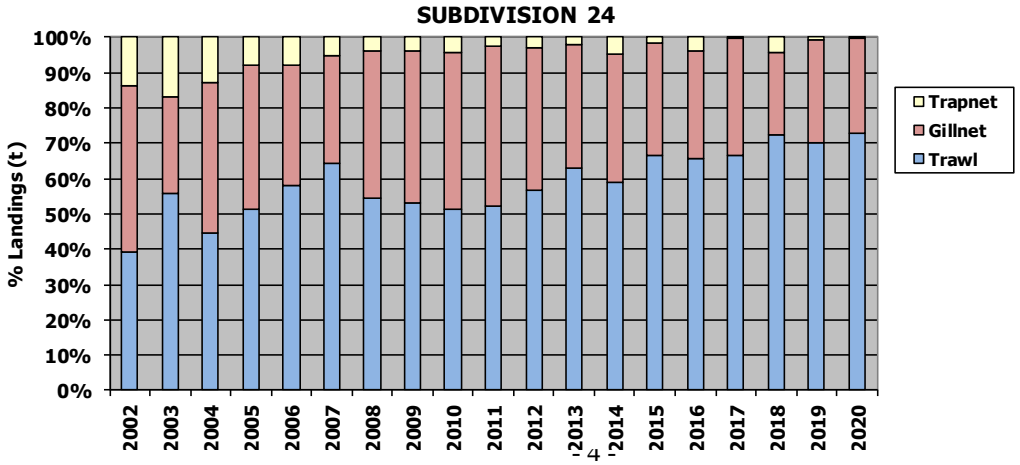
Just as in former years the main fishing season was during the first and second quarter. About 71 % of the herring in 2020 in SDs 20-24 was caught between January and April (2019: 79 %; 2018: 88 %, 2017: 86 %, 2016 : 84 %). As in last years, the main fishing area was located in Subdivision 24 (2020: 92 %; 2016-2019: 97 %). The overall fishing pattern during the last years was rather stable in the Baltic area of Subdivisions 22 and 24. Until 2000, the dominant part of herring was caught in the passive fishery by gillnets and trapnets around the Island of

Rügen. Since 2001, the activities in the trawl fishery have increased. They reached in 2020 of 72 % (2019: 70 %; 2018: 72 %, 2017: 67 %). The trawl fishery was mostly carried out in Subdivision 24 (2020: 99.97 %; 2018-2019: 99 %, 2016-2017: 98 %). The change in fishing pattern since 2001 was caused by the perspective of a new fish processing factory on the Island of Rügen, which finally started the production in autumn 2003. This factory intends to process 50,000 t fish annually. The figure below shows the share of the different gear types in the German herring fishery for the years 2003-2020 in Subdivisions 22 and 24.

SD 22 (t)	Trawl	Gillnet	Trapnet	Total	SD 22 (%)	Trawl	Gillnet	Trapnet
2002	3,871.716	253.710	78.838	4,204.264	2002	92.1%	6.0%	1.9%
2003	3,147.054	382.678	150.007	3,679.739	2003	85.5%	10.4%	4.1%
2004	2,282.844	196.963	55.674	2,535.481	2004	90.0%	7.8%	2.2%
2005	1,700.627	162.795	29.312	1,892.734	2005	89.9%	8.6%	1.5%
2006	2,977.731	215.366	14.372	3,207.469	2006	92.8%	6.7%	0.4%
2007	1,922.914	139.321	16.395	2,078.630	2007	92.5%	6.7%	0.8%
2008	2,086.175	124.471	0.000	2,210.646	2008	94.4%	5.6%	0.0%
2009	1,436.082	171.106	0.910	1,608.098	2009	89.3%	10.6%	0.1%
2010	1,565.826	125.609	3.381	1,694.816	2010	92.4%	7.4%	0.2%
2011	1,040.724	124.015	3.073	1,167.812	2011	89.1%	10.6%	0.3%
2012	729.236	109.950	3.315	842.501	2012	86.6%	13.1%	0.4%
2013	610.485	99.970	2.708	713.163	2013	85.6%	14.0%	0.4%
2014	572.074	80.422	2.660	655.156	2014	87.3%	12.3%	0.4%
2015	404.439	70.548	2.382	477.369	2015	84.7%	14.8%	0.5%
2016	193.125	48.061	4.593	245.779	2016	78.6%	19.6%	1.9%
2017	190.689	117.481	0.004	308.174	2017	61.9%	38.1%	0.0%
2018	103.078	32.903	0.341	136.322	2018	75.6%	24.1%	0.3%
2019	30.506	23.052	0.131	53.689	2019	56.8%	42.9%	0.2%
2020	0.468	13.350	0.322	14.140	2020	3.3%	94.4%	2.3%



SD 24 (t)	Trawl	Gillnet	Trapnet	Total	SD 24 (%)	Trawl	Gillnet	Trapnet
2002	7,155.192	8,529.682	2,480.824	18,165.698	2002	39.4%	47.0%	13.7%
2003	8,425.517	4,162.634	2,508.141	15,096.292	2003	55.8%	27.6%	16.6%
2004	6,912.896	6,599.784	1,960.868	15,473.548	2004	44.7%	42.7%	12.7%
2005	9,863.481	7,761.212	1,522.218	19,146.911	2005	51.5%	40.5%	8.0%
2006	11,393.038	6,744.164	1,525.095	19,662.297	2006	57.9%	34.3%	7.8%
2007	14,449.006	6,937.814	1,117.411	22,504.231	2007	64.2%	30.8%	5.0%
2008	11,196.706	8,636.140	789.005	20,621.851	2008	54.3%	41.9%	3.8%
2009	7,617.179	6,232.206	523.088	14,372.473	2009	53.0%	43.4%	3.6%
2010	5,415.716	4,679.209	448.801	10,543.726	2010	51.4%	44.4%	4.3%
2011	3,654.547	3,177.875	186.600	7,019.022	2011	52.1%	45.3%	2.7%
2012	5,865.995	4,142.744	318.993	10,327.732	2012	56.8%	40.1%	3.1%
2013	8,742.420	4,833.203	301.719	13,877.342	2013	63.0%	34.8%	2.2%
2014	5,656.314	3,482.558	447.064	9,585.936	2014	59.0%	36.3%	4.7%
2015	8,517.972	4,112.581	181.151	12,811.704	2015	66.5%	32.1%	1.4%
2016	9,301.364	4,314.489	564.965	14,180.818	2016	65.6%	30.4%	4.0%
2017	9,585.798	4,781.359	19.100	14,386.257	2017	66.6%	33.2%	0.1%
2018	8,082.664	2,630.414	454.833	11,167.911	2018	72.4%	23.6%	4.1%
2019	3,882.004	1,592.857	41.981	5,516.842	2019	70.4%	28.9%	0.8%
2020	1,495.625	558.631	0.389	2,054.645	2020	72.8%	27.2%	0.0%



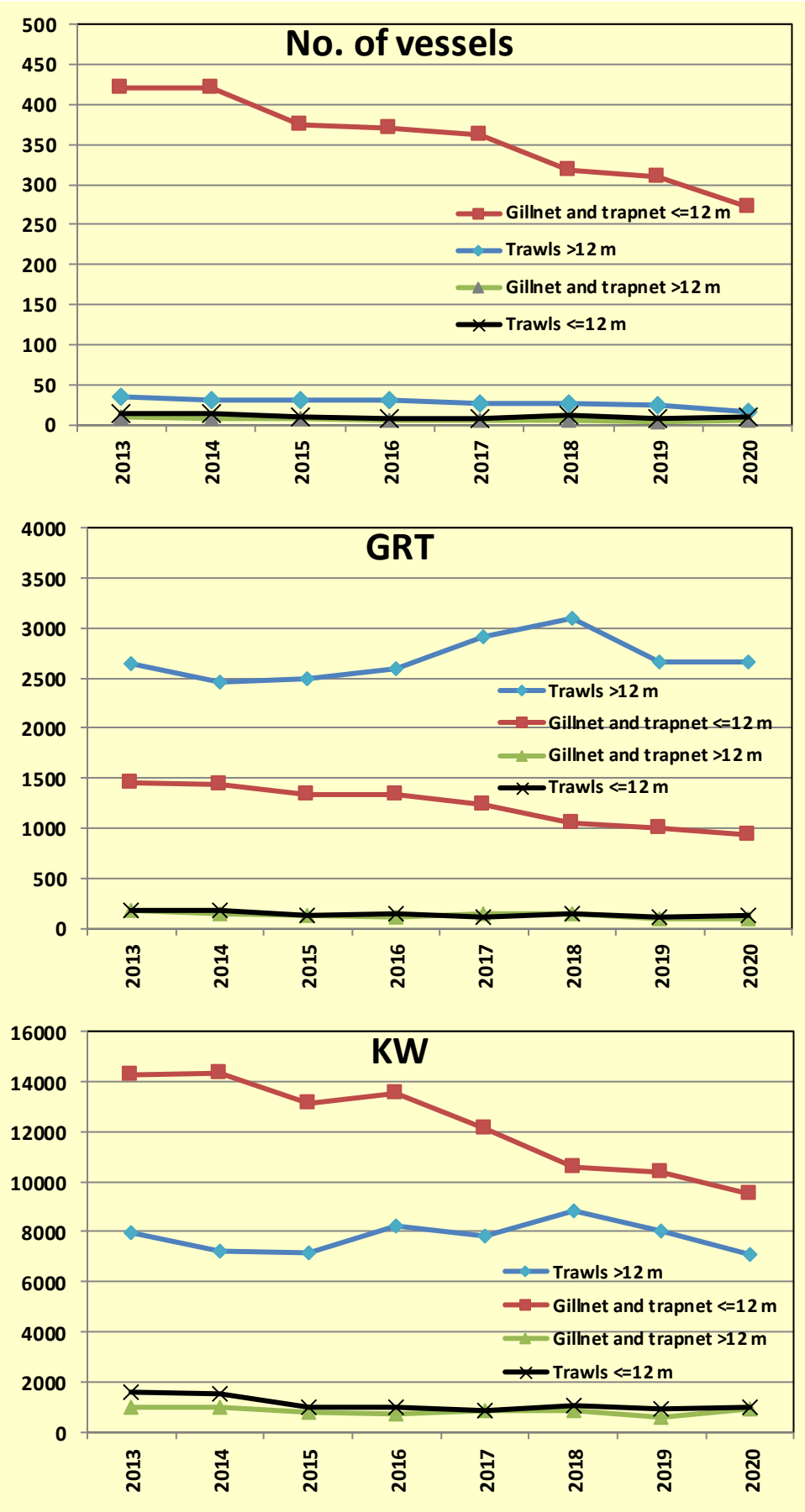
1.2 Fishing fleet

The German fishing fleet in the Baltic Sea consists of two parts where all catches for herring are taken in a directed fishery:

- coastal fleet with undecked vessels (rowing/motor boats <=10 m, engine power <=100 HP)
- cutter fleet with decked vessels and total lengths between 12 m and 30 m.

In the years from 2013 until 2020 the following types of fishing vessels carried out the herring fishery in the Baltic (only referring to vessels, which are contributing to the overall total landings per year with more than 20 %):

	Type of gear	Vessel length (m)	No. of vessels	GRT	kW
2013	Fixed gears (gillnet and trapnet)	<=12	421	1,459	14,289
		>12	9	186	1,005
	Trawls	<=12	14	173	1,557
		>12	35	2,638	7,960
	TOTAL		**479**	**4,456**	**24,811**
2014	Fixed gears (gillnet and trapnet)	<=12	421	1,443	14,351
		>12	8	149	970
	Trawls	<=12	13	170	1,502
		>12	31	2,469	7,205
	TOTAL		**473**	**4,231**	**24,028**
2015	Fixed gears (gillnet and trapnet)	<=12	375	1,341	13,163
		>12	7	133	802
	Trawls	<=12	9	122	991
		>12	31	2,503	7,148
	TOTAL		**422**	**4,099**	**22,104**
2016	Fixed gears (gillnet and trapnet)	<=12	371	1,341	13,532
		>12	5	103	699
	Trawls	<=12	8	137	997
		>12	30	2,599	8,205
	TOTAL		**414**	**4,180**	**23,433**
2017	Fixed gears (gillnet and trapnet)	<=12	362	1,237	12,158
		>12	6	148	874
	Trawls	<=12	8	113	872
		>12	27	2,910	7,816
	TOTAL		**403**	**2,910**	**21,720**
2018	Fixed gears (gillnet and trapnet)	<=12	319	1,049	10,572
		>12	6	148	874
	Trawls	<=12	11	143	1,080
		>12	26	3,093	8,815
	TOTAL		**362**	**4,433**	**21,341**
2019	Fixed gears (gillnet and trapnet)	<=12	309	1,008	10,374
		>12	4	100	598
	Trawls	<=12	8	114	897
		>12	25	2,655	8,025
	TOTAL		**346**	**3,877**	**19,894**
2020	Fixed gears (gillnet and trapnet)	<=12	271	939	9,524
		>12	6	100	920
	Trawls	<=12	10	128	983
		>12	16	2,668	7,077
	TOTAL		**303**	**3,835**	**18,504**


No. of vessels
500
450
400
350
300
250
200
150
100
50
0
Gillnet and trapnet <=12 m
Trawls >12 m
Gillnet and trapnet >12 m
Trawls <=12 m
2013
2014
2015
2016
2017
2018
2019
2020
GRT
4000
3500
3000
2500
2000
1500
1000
500
0
Trawls >12 m
Gillnet and trapnet <=12 m
Gillnet and trapnet >12 m
Trawls <=12 m
2013
2014
2015
2016
2017
2018
2019
2020
KW
16000
14000
12000
10000
8000
6000
4000
2000
0
Trawls >12 m
Gillnet and trapnet <=12 m
Gillnet and trapnet >12 m
Trawls <=12 m
2013
2014
2015
2016
2017
2018
2019
2020

1.3 Species composition of landings

The catch composition from gillnet and trapnet consists of nearly 100 % of herring.

The results from the species composition of German trawl catches, which were sampled in **Subdivision 24** of quarter 1 and 4 in 2020, are given below:

SD 24/Quarter I		Weight (kg)					Weight (%)			
	Sample No.	Herring	Sprat	Cod	Other	Total	Herring	Sprat	Cod	Other
January	1	58.0	0.0	0.0	0.0	58.1	99.9	0.1	0.0	0.0
	2									
	3									
	Mean	58.0	0.0	0.0	0.0	58.1	99.9	0.1	0.0	0.0
February	1	46.3	0.4	0.0	0.0	46.7	99.2	0.8	0.0	0.0
	2	59.7	0.0	0.0	0.0	59.7	99.9	0.1	0.0	0.0
	3									
	Mean	53.0	0.2	0.0	0.0	53.2	99.6	0.4	0.0	0.0
March	1									
	2	53.4	0.0	0.0	0.0	53.4	100.0	0.0	0.0	0.0
	3									
	Mean									
Q I	Mean	55.5	0.1	0.0	0.0	55.6	99.8	0.2	0.0	0.0

SD 24/Quarter IV		Weight (kg)					Weight (%)			
	Sample No.	Herring	Sprat	Cod	Other	Total	Herring	Sprat	Cod	Other
Octob.	1									
	2									
	3									
	Mean									
Novemb.	1	44.1	0.3	0.0	0.0	44.5	99.3	0.7	0.0	0.0
	2									
	3									
	Mean	44.1	0.3	0.0	0.0	44.5	99.3	0.7	0.0	0.0
Decemb.	1	42.3	0.6	0.0	0.3	43.3	97.7	1.5	0.0	0.8
	2	54.1	0.0	0.1	0.0	54.1	99.9	0.0	0.1	0.0
	3									
	Mean	48.2	0.3	0.0	0.2	48.7	98.8	0.7	0.1	0.4
Q IV	Mean	46.2	0.3	0.0	0.1	46.6	99.1	0.7	0.0	0.2

The officially reported total trawl landings of herring in Subdivison 24 (see 2.1) in combination with the detected mean species composition in the samples (see above) results in the following differences:

Subdiv.	Quarter	Trawl landings (t)	Mean Contribution of Herring (%)	Total Herring corrected (t)	Difference (t)
24	I	**1,027.217**	99.8	1,025.163	-2.054
	IV	**467.578**	99.1	463.370	-4.208

The officially reported trawl landings in Subdivision 24 (see 2.1) and the referring assessment input data (see 2.2 and 2.3) were as in last years not corrected since the results would only result in overall small changes of the official statistics (total trawl landings in Subdivision 22 and 24 of 1496 t – 6 t: -0.4 % difference).

1.4 Logbook registered discards/BMS landings

No BMS landings (new catch categories since 2015) of herring have been reported in the German herring fisheries in 2020 (no BMS landing have been reported since 2015). A total amount of logbook registered discards (new catch categories since 2015) of 32.437 t were recorded by the German fisherman (as predation by seals?) in the gillnet/trapnet fisheries in SDs 22/24 in 2020 (2019/SD 22/24 gillnet/trapnet fisheries: 21.882 t; 2018/SD 24/gillnet fisheries: 14.510 t). Neither discards nor logbook registered discards have been reported before 2018.

		Trapnet			Gillnet			Total		
		27.3.c.22	27.3.d.24	Total	27.3.c.22	27.3.d.24	Total	27.3.c.22	27.3.d.24	Total
Month	1	0.000	0.000	0.000	0.000	2.120	2.120	0.000	2.120	2.120
	2	0.000	0.000	0.000	0.005	7.615	7.620	0.005	7.615	7.620
	3	0.000	0.000	0.000	0.000	17.960	17.960	0.000	17.960	17.960
	4	0.000	0.000	0.000	0.000	2.947	2.947	0.000	2.947	2.947
	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	9	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.150	0.150
	10	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.150	0.150
	11	0.000	0.035	0.035	0.000	0.900	0.900	0.000	0.935	0.935
	12	0.000	0.000	0.000	0.000	0.555	0.555	0.000	0.555	0.555
Quarter	1	0.000	0.000	0.000	0.005	27.695	27.700	0.005	27.695	27.700
	2	0.000	0.000	0.000	0.000	2.947	2.947	0.000	2.947	2.947
	3	0.000	0.150	0.150	0.000	0.000	0.000	0.000	0.150	0.150
	4	0.000	0.185	0.185	0.000	1.455	1.455	0.000	1.640	1.640
Total		0.000	0.335	0.335	0.005	32.097	32.102	0.005	32.432	32.437

1.5 Central Baltic herring

In the western Baltic, the distribution areas of two stocks, the Western Baltic Spring Spawning herring (WBSSH) and the Central Baltic herring (CBH) overlap. German autumn acoustic survey (GERAS) results indicated in the recent years that in SD 24, which is part of the WBSSH management area, a considerable fraction of CBH is present and correspondingly erroneously allocated to WBSSH stock indices (ICES, 2013). Accordingly, a stock separation function (SF) based on growth parameters in 2005 to 2010 has been developed to quantify the proportion of CBH and WBSSH in the area (Gröhsler et al., 2013, Gröhsler et al., 2016). The estimates of the growth parameters based on baseline samples of WBSSH and CBH support the applicability of SF in 2011-2018 and 2020 (no update for 2019, due CBH occurring in baseline samples in SD 21 and SD 23, Oeberst et al., 2013, WD Oeberst et al., 2014, WD Oeberst et al., 2015; WD Oeberst et al., 2016; WD Oeberst et al., 2017; WD Gröhsler, T. and Schaber, M., 2018, WD Gröhsler, T. and Schaber, M., 2019, WD Gröhsler, T. and Schaber, M., 2021). SF (slightly modified by commercial samples) was employed in the years 2005-2016 to identify the fraction of Central Baltic Herring in German commercial herring landings from SD 22 and 24 (WD Gröhsler et al., 2013; ICES, 2018). These results and further results of the years 2017-2019 showed a rather low share of CBH in landings from all métiers but indicated that the actual degree of mixing might be underrepresented in commercial landings as German commercial fisheries target pre-spawning and spawning aggregations of WBSSH.

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2 Stock assessment data in 2020

2.1 Landings (tons) and sampling effort

The sampling in SDs 22-24 was carried out as usual without constraints caused by COVID-19. It was possible to sample 98 % of the landings in SDs 22/24 in 2020.

Gear	Quarter	SKAGERRAK (DIVISION IIIaN/SD 20)				KATTEGAT (DIVISION IIIaS/SD21)			
		Landings (tons)	No. samples	No. measured	No. aged	Landings (tons)	No. samples	No. measured	No. aged
TRAWL	Q 1	no landings	-	-	-	no landings	-	-	-
	Q 2	no landings	-	-	-	no landings	-	-	-
	Q 3	no landings	-	-	-	no landings	-	-	-
	Q 4	155.117	-	-	-	no landings	-	-	-
	Total	155.117	0	0	0	0.000	0	0	0
GILLNET	Q 1	no landings	-	-	-	no landings	-	-	-
	Q 2	no landings	-	-	-	no landings	-	-	-
	Q 3	no landings	-	-	-	no landings	-	-	-
	Q 4	no landings	-	-	-	no landings	-	-	-
	Total	0.000	0	0	0	0.000	0	0	0
TRAPNET	Q 1	no landings	-	-	-	no landings	-	-	-
	Q 2	no landings	-	-	-	no landings	-	-	-
	Q 3	no landings	-	-	-	no landings	-	-	-
	Q 4	no landings	-	-	-	no landings	-	-	-
	Total	0.000	0	0	0	0.000	0	0	0
TOTAL	Q 1	**0.000**	**0**	**0**	**0**	**0.000**	**0**	**0**	**0**
	Q 2	**0.000**	**0**	**0**	**0**	**0.000**	**0**	**0**	**0**
	Q 3	**0.000**	**0**	**0**	**0**	**0.000**	**0**	**0**	**0**
	Q 4	**155.117**	**0**	**0**	**0**	**0.000**	**0**	**0**	**0**
	Total	**155.117**	**0**	**0**	**0**	**0.000**	**0**	**0**	**0**

Gear	Quarter	SUBDIVISION 22				SUBDIVISION 24			
		Landings (tons)	No. samples	No. measured	No. aged	Landings (tons)	No. samples	No. measured	No. aged
TRAWL	Q 1	0.131	0	0	0	1,027.217	7	2,958	746
	Q 2	0.302	0	0	0	0.830	0	0	0
	Q 3	0.000	-	-	-	0.000	-	-	-
	Q 4	0.035	0	0	0	467.578	3	1,132	353
	Total	0.468	0	0	0	1,495.625	10	4,090	1,099
GILLNET	Q 1	6.326	3	1,135	186	493.775	9	3,152	475
	Q 2	2.420	0	0	0	42.529	2	741	92
	Q 3	0.154	0	0	0	0.428	0	0	0
	Q 4	4.450	0	0	0	21.899	0	0	0
	Total	13.350	3	1,135	186	558.631	11	3,893	567
TRAPNET	Q 1*	**0.000**	**-**	**-**	**-**	0.050	**1**	**378**	**106**
	Q 2	0.001	1	864	84	0.286	0	0	0
	Q 3	0.061	0	0	0	0.012	2	389	123
	Q 4	0.260	0	0	0	0.041	0	0	0
	Total	0.322	1	864	84	0.389	3	767	229
TOTAL	Q 1	**6.457**	**3**	**1,135**	**186**	**1,521.042**	**17**	**6,488**	**1,327**
	Q 2	**2.723**	**1**	**864**	**84**	**43.645**	**2**	**741**	**92**
	Q 3	**0.215**	**0**	**0**	**0**	**0.440**	**2**	**389**	**123**
	Q 4	**4.745**	**0**	**0**	**0**	**489.518**	**3**	**1,132**	**353**
	Total	**14.140**	**4**	**1,999**	**270**	**2,054.645**	**24**	**8,750**	**1,895**

*Sampled data of trapnet SD 22 Q1 (without landings!) finally used for trapnet SD 24 Q1

Gear	Quarter	TOTAL (DIV. IIIa & SUBDIV. 22+24)			
		Landings (tons)	No. samples	No. measured	No. aged
TRAWL	Q 1	1,027.348	7	2,958	746
	Q 2	1.132	0	0	0
	Q 3	no landings	0	0	0
	Q 4	622.730	3	1,132	353
	Total	1,651.210	10	4,090	1,099
GILLNET	Q 1	500.101	12	4,287	661
	Q 2	44.949	2	741	92
	Q 3	0.582	0	0	0
	Q 4	26.349	0	0	0
	Total	571.981	14	5,028	753
TRAPNET	Q 1	0.050	1	378	106
	Q 2	0.287	1	864	84
	Q 3	0.073	2	389	123
	Q 4	0.301	0	0	0
	Total	0.711	4	1,631	313
TOTAL	Q 1	1,527.499	20	7,623	1,513
	Q 2	46.368	3	1,605	176
	Q 3	0.655	2	389	123
	Q 4	649.380	3	1,132	353
	Total	2,223.902	28	10,749	2,165

2.2 Catch in numbers (millions)

		SUBDIVISION 20				SUBDIVISION 22				SUBDIVISION 24				SUBDIVISIONS 22+24			
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TRAWL	0								0.0000				0.020				0.020
	1					0.0000	0.0000		0.0000	0.011	0.000		0.243	0.011	0.000		0.243
	2					0.0000	0.0001		0.0001	0.188	0.000		0.711	0.188	0.000		0.711
	3					0.0002	0.0004		0.0001	1.445	0.001		0.765	1.445	0.002		0.765
	4					0.0002	0.0003		0.0000	1.180	0.001		0.537	1.180	0.001		0.537
	5					0.0003	0.0006		0.0001	2.190	0.002		0.710	2.190	0.002		0.710
	6					0.0001	0.0002		0.0000	0.844	0.001		0.329	0.844	0.001		0.329
	7					0.0002	0.0005		0.0000	1.604	0.001		0.365	1.604	0.002		0.365
	8+					0.0000	0.0001		0.0000	0.387	0.000		0.086	0.387	0.000		0.087
	Sum					0.0010	0.0023		0.0003	7.848	0.006		3.766	7.849	0.009		3.766
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GILLNET	0																
	1																
	2																
	3					0.000				0.006				0.006			
	4					0.002	0.000	0.000	0.001	0.057	0.007	0.000	0.004	0.059	0.007	0.000	0.004
	5					0.005	0.002	0.000	0.003	0.712	0.029	0.000	0.015	0.717	0.030	0.000	0.018
	6					0.006	0.003	0.000	0.006	0.584	0.053	0.001	0.027	0.591	0.056	0.001	0.033
	7					0.014	0.007	0.000	0.013	1.011	0.124	0.001	0.064	1.025	0.131	0.002	0.077
	8+					0.009	0.002	0.000	0.004	0.428	0.041	0.000	0.021	0.437	0.043	0.001	0.025
	Sum					0.037	0.014	0.001	0.027	2.799	0.253	0.003	0.131	2.835	0.268	0.003	0.157
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	*Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TRAPNET	0																
	1							0.000	0.0000			0.00000	0.0000			0.0000	0.0000
	2						0.00000	0.000	0.0001	0.0000	0.000	0.00000	0.0000	0.0000	0.0001	0.0000	0.0001
	3						0.00001	0.000	0.0001	0.0001	0.001	0.00000	0.0000	0.0001	0.0007	0.0000	0.0001
	4						0.00001	0.000	0.0001	0.0001	0.000	0.00001	0.0000	0.0001	0.0003	0.0000	0.0001
	5							0.000	0.0005	0.0002	0.001	0.00002	0.0001	0.0002	0.0011	0.0001	0.0006
	6							0.000	0.0004	0.0000	0.000	0.00002	0.0001	0.0000	0.0003	0.0001	0.0005
	7							0.000	0.0003	0.0000	0.000	0.00002	0.0001	0.0000	0.0000	0.0001	0.0004
	8+							0.000	0.0001	0.0000	0.000	0.00000	0.0000	0.0000	0.0002	0.0000	0.0001
	Sum						0.000	0.000	0.0015	0.0005	0.003	0.00007	0.0002	0.0005	0.0027	0.0004	0.0018
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TOTAL	0								0.000				0.020				0.020
	1					0.000	0.000	0.0000	0.0000	0.011	0.000	0.0000	0.243	0.011	0.000	0.0000	0.243
	2					0.000	0.000	0.0000	0.0001	0.188	0.000	0.0000	0.711	0.188	0.000	0.0000	0.711
	3					0.001	0.000	0.0000	0.0001	1.451	0.002	0.0000	0.765	1.451	0.002	0.0000	0.765
	4					0.002	0.001	0.0001	0.0009	1.237	0.008	0.0001	0.540	1.239	0.009	0.0001	0.541
	5					0.006	0.002	0.0002	0.0035	2.902	0.031	0.0003	0.725	2.907	0.034	0.0005	0.728
	6					0.006	0.003	0.0003	0.0060	1.428	0.054	0.0006	0.356	1.434	0.057	0.0008	0.362
	7					0.014	0.008	0.0005	0.0133	2.615	0.125	0.0013	0.429	2.630	0.133	0.0018	0.442
	8+					0.009	0.002	0.0002	0.0044	0.815	0.041	0.0004	0.108	0.824	0.044	0.0006	0.112
	Sum					0.038	0.017	0.0013	0.0283	10.647	0.262	0.0026	3.897	10.685	0.279	0.0039	3.925

*Sampled data of trapnet SD 22 Q1 (without landings!) finally used for trapnet SD 24 Q1

REPLACEMENT OF MISSING SAMPLES:

SUBDIVISION 22					SUBDIVISION 24				
Missing		Replacement by			Missing		Replacement by		
Gear	Quart.	Area	Gear	Quart.	Gear	Quart.	Area	Gear	Quart.
Trawl	1, 2	24	Trawl	1	Trawl	2	24	Trawl	1
Trawl	4	24	Trawl	4	Gillnet	3, 4	24	Gillnet	2
Gillnet	2, 3, 4	24	Gillnet	2	Trapnet	2	24 (22)	Trapnet	1
Trapnet	3, 4	24	Trapnet	3	Trapnet	4	24	Trapnet	3

2.3 Mean weight (grammes) in the catch

		SUBDIVISION 20				SUBDIVISION 22				SUBDIVISION 24				SUBDIVISIONS 22+24			
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TRAWL	0								19.9				19.9				19.9
	1					17.1	17.1		45.6	17.1	17.1		45.6	17.1	17.1		45.6
	2					57.5	57.5		78.3	57.5	57.5		78.3	57.5	57.5		78.3
	3					85.1	85.1		111.1	85.1	85.1		111.1	85.1	85.1		111.1
	4					101.7	101.7		126.2	101.7	101.7		126.2	101.7	101.7		126.2
	5					139.4	139.4		160.6	139.4	139.4		160.6	139.4	139.4		160.6
	6					156.0	156.0		159.8	156.0	156.0		159.8	156.0	156.0		159.8
	7					168.5	168.5		178.4	168.5	168.5		178.4	168.5	168.5		178.4
	8+					171.4	171.4		185.7	171.4	171.4		185.7	171.4	171.4		185.7
	Sum					130.9	130.9		124.2	130.9	130.9		124.2	130.9	130.9		124.2
GILLNET	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	0																
	1																
	2																
	3					136.6				115.5				116.6			
	4					148.4	163.2	163.2	163.2	156.9	163.2	163.2	163.2	156.7	163.2	163.2	163.2
	5					156.6	158.0	158.0	158.0	169.0	158.0	158.0	158.0	168.9	158.0	158.0	158.0
	6					168.0	168.3	168.3	168.3	175.4	168.3	168.3	168.3	175.3	168.3	168.3	168.3
	7					174.2	167.7	167.7	167.7	180.7	167.7	167.7	167.7	180.6	167.7	167.7	167.7
	8+					184.7	174.8	174.8	174.8	183.7	174.8	174.8	174.8	183.7	174.8	174.8	174.8
	Sum					171.6	167.8	167.8	167.8	176.4	167.8	167.8	167.8	176.4	167.8	167.8	167.8
TRAPNET	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	*Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	0																
	1							65.8	65.8			65.8	65.8			65.8	65.8
	2						51.0	92.2	92.2	58.3	58.3	92.2	92.2	58.3	57.9	92.2	92.2
	3						64.9	70.5	70.5	72.9	72.9	70.5	70.5	72.9	72.9	70.5	70.5
	4						75.9	119.0	119.0	95.7	95.7	119.0	119.0	95.7	95.4	119.0	119.0
	5							177.8	177.8	122.4	122.4	177.8	177.8	122.4	122.4	177.8	177.8
	6							179.3	179.3	138.4	138.4	179.3	179.3	138.4	138.4	179.3	179.3
	7							194.6	194.6	156.8	156.8	194.6	194.6	156.8	156.8	194.6	194.6
	8+							196.6	196.6	162.5	162.5	196.6	196.6	162.5	162.5	196.6	196.6
	Sum						65.6	168.7	168.7	108.2	108.2	168.7	168.7	108.2	108.0	168.7	168.7
TOTAL	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	0								19.9				19.9				19.9
	1					17.1	17.1	65.8	56.6	17.1	17.1	65.8	45.6	17.1	17.1	65.8	45.6
	2					57.5	57.1	92.2	86.0	57.5	57.8	92.2	78.3	57.5	57.6	92.2	78.3
	3					118.6	84.8	70.5	89.5	85.2	80.5	70.5	111.1	85.2	81.3	70.5	111.1
	4					144.6	134.2	141.1	156.1	104.2	153.3	160.2	126.5	104.3	151.8	152.6	126.5
	5					155.7	152.7	168.5	160.9	146.6	155.8	159.5	160.5	146.6	155.6	163.3	160.5
	6					167.8	167.4	171.9	169.0	163.9	168.0	168.7	160.4	163.9	168.0	169.8	160.6
	7					174.1	167.8	171.6	168.4	173.2	167.7	168.0	176.8	173.2	167.7	169.1	176.6
	8+					184.6	174.6	176.8	175.1	177.9	174.7	175.0	183.5	177.9	174.7	175.5	183.2
	Sum					170.5	162.6	168.0	167.4	142.9	166.3	167.8	125.6	143.0	166.1	167.9	125.9

*Sampled data of trapnet SD 22 Q1 (without landings!) finally used for trapnet SD 24 Q1

REPLACEMENT OF MISSING SAMPLES:

SUBDIVISION 22					SUBDIVISION 24				
Missing		Replacement by			Missing		Replacement by		
Gear	Quart.	Area	Gear	Quart.	Gear	Quart.	Area	Gear	Quart.
Trawl	1, 2	24	Trawl	1	Trawl	2	24	Trawl	1
Trawl	4	24	Trawl	4	Gillnet	3, 4	24	Gillnet	2
Gillnet	2, 3, 4	24	Gillnet	2	Trapnet	2	24 (22)	Trapnet	1
Trapnet	3, 4	24	Trapnet	3	Trapnet	4	24	Trapnet	3

2.4 Mean length (cm) in the catch

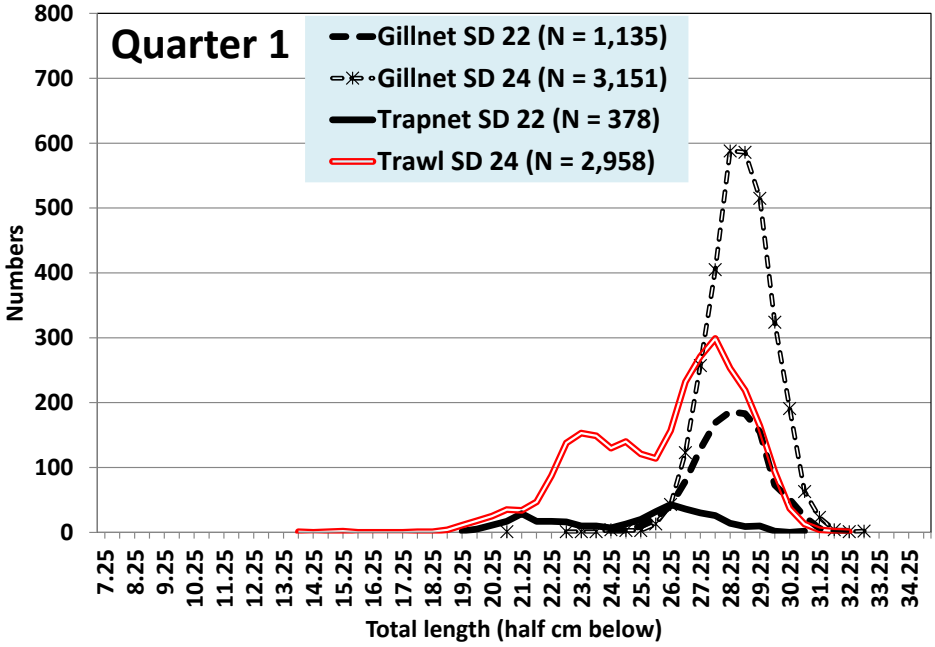
		SUBDIVISION 20				SUBDIVISION 22				SUBDIVISION 24				SUBDIVISIONS 22+24			
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TRAWL	0								14.7				14.7				14.7
	1					14.8	14.8		19.6	14.8	14.8		19.6	14.8	14.8		19.6
	2					20.5	20.5		22.7	20.5	20.5		22.7	20.5	20.5		22.7
	3					23.2	23.2		24.8	23.2	23.2		24.8	23.2	23.2		24.8
	4					24.4	24.4		25.7	24.4	24.4		25.7	24.4	24.4		25.7
	5					26.8	26.8		27.7	26.8	26.8		27.7	26.8	26.8		27.7
	6					27.7	27.7		27.6	27.7	27.7		27.6	27.7	27.7		27.6
	7					28.5	28.5		28.7	28.5	28.5		28.7	28.5	28.5		28.7
	8+					28.6	28.6		29.2	28.6	28.6		29.2	28.6	28.6		29.2
	Sum					26.1	26.1		25.4	26.1	26.1		25.4	26.1	26.1		25.4
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GILLNET	0																
	1																
	2																
	3					26.0				25.1				25.1			
	4					26.7	27.6	27.6	27.6	27.2	27.6	27.6	27.6	27.2	27.6	27.6	27.6
	5					27.3	27.3	27.3	27.3	28.0	27.3	27.3	27.3	28.0	27.3	27.3	27.3
	6					28.0	28.0	28.0	28.0	28.5	28.0	28.0	28.0	28.5	28.0	28.0	28.0
	7					28.4	28.0	28.0	28.0	29.0	28.0	28.0	28.0	28.9	28.0	28.0	28.0
	8+					29.2	28.5	28.5	28.5	29.2	28.5	28.5	28.5	29.2	28.5	28.5	28.5
	Sum					28.3	28.0	28.0	28.0	28.6	28.0	28.0	28.0	28.6	28.0	28.0	28.0
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	*Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TRAPNET	0																
	1							19.1	19.1			19.1	19.1			19.1	19.1
	2						19.5	24.2	24.2	20.0	20.0	24.2	24.2	20.0	20.0	24.2	24.2
	3						21.2	21.6	21.6	21.8	21.8	21.6	21.6	21.8	21.8	21.6	21.6
	4						22.5	24.2	24.2	24.1	24.1	24.2	24.2	24.1	24.0	24.2	24.2
	5							27.9	27.9	26.4	26.4	27.9	27.9	26.4	26.4	27.9	27.9
	6							28.2	28.2	27.5	27.5	28.2	28.2	27.5	27.5	28.2	28.2
	7							28.8	28.8	28.9	28.9	28.8	28.8	28.9	28.9	28.8	28.8
	8+							27.1	27.1	28.8	28.8	27.1	27.1	28.8	28.8	27.1	27.1
	Sum						21.3	27.3	27.3	25.0	25.0	27.3	27.3	25.0	24.9	27.3	27.3
	W-rings	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TOTAL	0								14.7				14.7				14.7
	1					14.8	14.8	19.1	19.3	14.8	14.8	19.1	19.6	14.8	14.8	19.1	19.6
	2					20.5	20.4	24.2	23.5	20.5	20.3	24.2	22.7	20.5	20.4	24.2	22.7
	3					25.0	23.1	21.6	23.1	23.2	22.6	21.6	24.8	23.2	22.7	21.6	24.8
	4					26.6	26.1	25.9	27.1	24.6	27.1	27.4	25.7	24.6	27.0	26.8	25.7
	5					27.2	27.1	27.6	27.4	27.1	27.2	27.3	27.7	27.1	27.2	27.5	27.7
	6					28.0	28.0	28.1	28.0	28.0	28.0	28.0	27.6	28.0	28.0	28.0	27.6
	7					28.4	28.0	28.1	28.0	28.6	28.0	28.0	28.6	28.6	28.0	28.0	28.6
	8+					29.2	28.5	28.3	28.5	28.9	28.5	28.5	29.0	28.9	28.5	28.4	29.0
	Sum					28.2	27.7	27.8	27.9	26.8	27.9	28.0	25.5	26.8	27.9	27.9	25.5

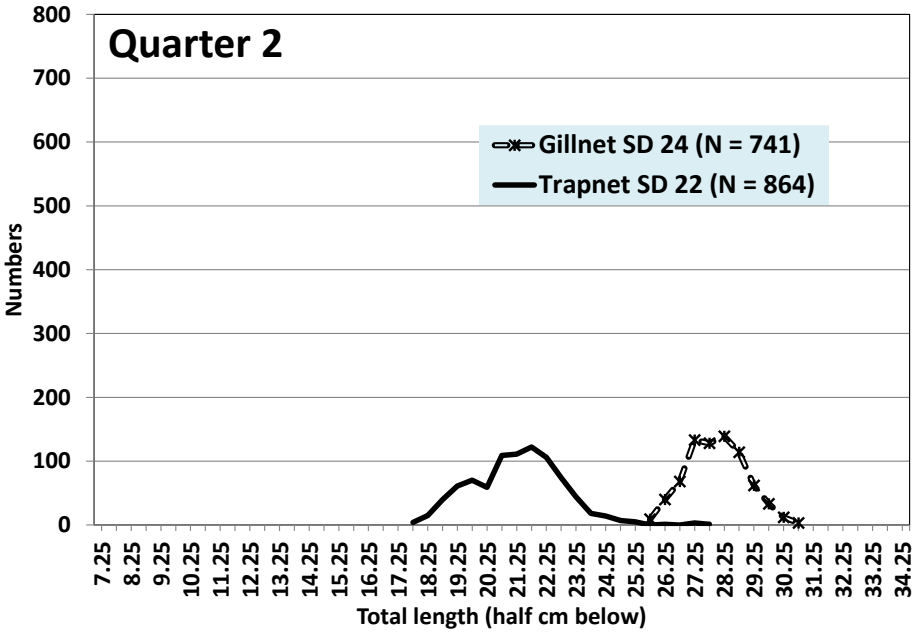
*Sampled data of trapnet SD 22 Q1 (without landings!) finally used for trapnet SD 24 Q1

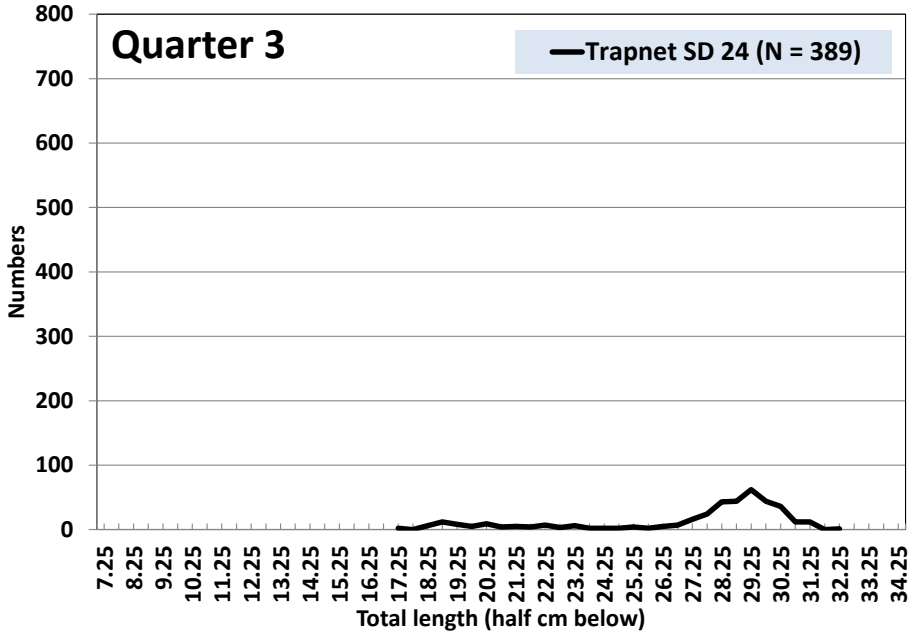
REPLACEMENT OF MISSING SAMPLES:

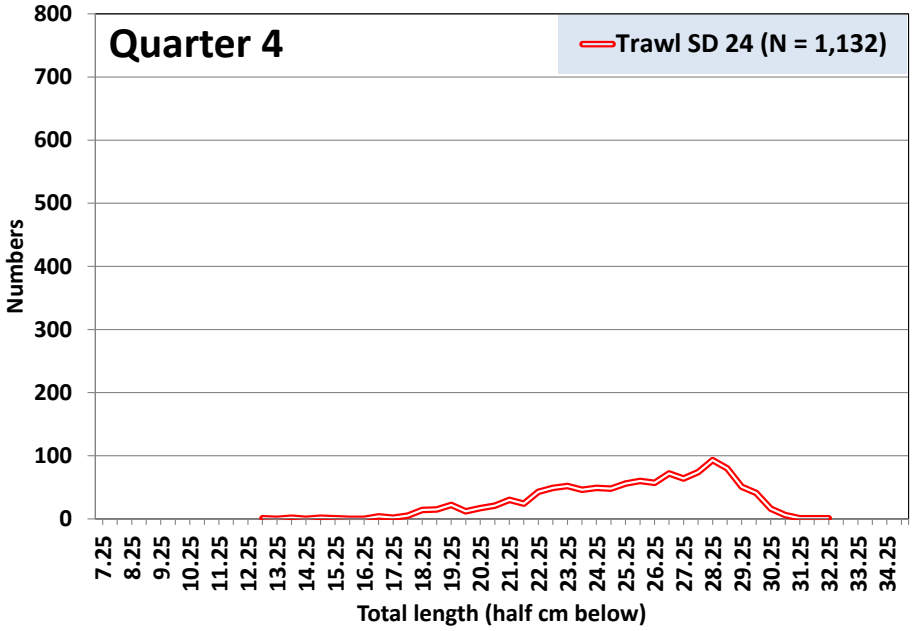
SUBDIVISION 22					SUBDIVISION 24				
Missing		Replacement by			Missing		Replacement by		
Gear	Quart.	Area	Gear	Quart.	Gear	Quart.	Area	Gear	Quart.
Trawl	1, 2	24	Trawl	1	Trawl	2	24	Trawl	1
Trawl	4	24	Trawl	4	Gillnet	3, 4	24	Gillnet	2
Gillnet	2, 3, 4	24	Gillnet	2	Trapnet	2	24 (22)	Trapnet	1
Trapnet	3, 4	24	Trapnet	3	Trapnet	4	24	Trapnet	3

2.5 Sampled length distributions by Subdivision, quarter and type of gear








Quarter 4
Trawl SD 24 (N = 1,132)
Numbers
800
700
600
500
400
300
200
100
0
7.25
8.25
9.25
10.25
11.25
12.25
13.25
14.25
15.25
16.25
17.25
18.25
19.25
20.25
21.25
22.25
23.25
24.25
25.25
26.25
27.25
28.25
29.25
30.25
31.25
32.25
33.25
34.25
Total length (half cm below)