

## Herring (*Clupea harengus*) in subdivisions 20–24, spring spawners (Skagerrak, Kattegat, and western Baltic)

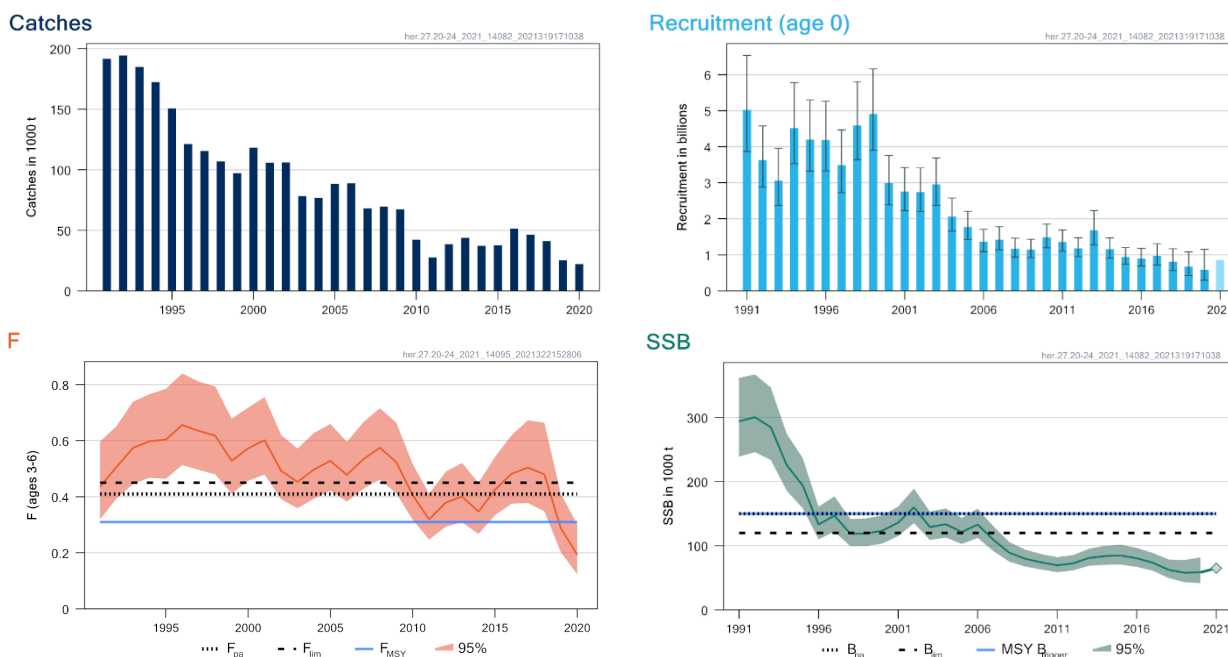
### ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, there should be zero catch in 2022.

This advice applies to the catch of western Baltic spring-spawning herring (WBSS) in subdivisions 20–24 and the eastern part of Subarea 4.

### Stock development over time

Fishing pressure on the stock is below  $F_{MSY}$ ,  $F_{pa}$ , and  $F_{lim}$ ; spawning-stock size is below MSY  $B_{trigger}$ ,  $B_{pa}$ , and  $B_{lim}$ .



**Figure 1** Herring in subdivisions 20–24, spring spawners. Commercial catches, recruitment, fishing mortality (F), and spawning-stock biomass (SSB) from the summary of the stock assessment; 95% confidence intervals are shown for SSB, F, and recruitment. The 2021 recruitment bar shaded in a lighter colour is the average value of 2015–2019, and the grey diamond in the SSB plot is a predicted number for 2021.

### Catch scenarios

ICES MSY approach stipulates that F is reduced proportionally to SSB when the spawning-stock size falls below MSY  $B_{trigger}$ . When SSB is below  $B_{lim}$ , measures should be taken so that it can be brought above  $B_{lim}$  in the short term. All catch scenarios, including zero catch, result in SSB remaining below  $B_{lim}$  in 2023, therefore zero catch is advised for 2022.

**Table 1** Herring in subdivisions 20–24, spring spawners. The basis for the catch scenarios. All weights are in tonnes and recruitment (R) is in thousands.

Variable	Value	Notes
F <sub>ages 3–6</sub> (2021)	0.174	Based on catch in 2021
SSB (2021)	65 046	Based on catch in 2021
R <sub>age 0</sub> (2021 and 2022)	859 579	Average 2015-2019
Total catch (2021)	19 088	-See Table 8 for fleet descriptions. A-fleet: 5 241 t (average catch 2018–2020) - C-fleet: 12 076 t including an assumed 50% transfer (given by the Norwegian fishing industry) of the Norwegian catch and 3 000 t of EU catch (max allowed EU catches in Norwegian waters) transferred to the North Sea and 70.36% (average split 2018–2020) of WBSS in the catch  - D-fleet: 196 t assuming 8.2% utilization of the TAC (average utilization 2018–2020) and 35.83% of WBSS in the catch (average split 2018–2020) - F-fleet: 1 575 t (TAC)

**Table 2** Herring in subdivisions 20–24, spring spawners. Annual catch scenarios. All weights are in tonnes. All scenarios, except the catch for bycatch fleets only, assume the F-fleet catches 50% of the total WBSS herring catch.

Basis	Total catch (2022)	F <sub>3–6</sub> (2022)	SSB* (2022)	SSB* (2023)	% SSB change **	% advice change ***
ICES advice basis						
MSY approach: zero catch	0	0	68 903	83 794	22	0
Other scenarios						
EU Baltic Sea multiannual plan (MAP) <sup>^</sup> : $F = F_{MSY} \times \frac{SSB_{2021}}{MSY B_{trigger}}$	12 499	0.134	67 797	71 788	6	
MAP <sup>^</sup> : $F = F_{MSY lower} \times \frac{SSB_{2021}}{MSY B_{trigger}}$	8 922	0.094	68 130	75 182	10	
MAP <sup>^</sup> : $F = F_{MSY upper} \times \frac{SSB_{2021}}{MSY B_{trigger}}$	15 017	0.164	67 554	69 420	3	
$F = F_{MSY}$	26 098	0.310	66 384	59 264	-11	
$F = F_{pa}$	32 716	0.410	65 595	53 327	-19	
$F = F_{lim}$	35 167	0.450	65 283	51 161	-22	
SSB (2023) = B <sub>lim</sub> <sup>^^</sup>						
SSB (2023) = B <sub>pa</sub> <sup>^^</sup>						
SSB (2023) = MSY B <sub>trigger</sub> <sup>^^</sup>						
$F = F_{2021}$	15 811	0.174	67 476	68 733	2	
Catch for bycatch fleets only <sup>^^^</sup>	5 437	0.036	68 464	79 423	16	

\* 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 (2023) relative to SSB (2022).

\*\*\* The advised catch in 2021 was 0 tonnes.

<sup>^</sup> Because SSB<sub>2021</sub> is below MSY B<sub>trigger</sub>, the F<sub>MSY</sub>, F<sub>MSY lower</sub>, and F<sub>MSY upper</sub> values in the MAP are adjusted by the SSB<sub>2021</sub>/MSY B<sub>trigger</sub> ratio.

<sup>^^</sup> B<sub>lim</sub> and B<sub>pa</sub> cannot be achieved in 2023, even with zero catch advice.

<sup>^^^</sup> Only the A-fleet that targets North Sea autumn-spawning (NSAS) herring and the D-fleet that targets sprat are allowed to fish, assuming the same catch as in the intermediate year 2021 (C- and F-fleets have zero catch).

**Table 3** Herring in subdivisions 20–24, spring spawners. Medium-term catch scenarios. Different low F scenarios are provided, where  $F_{2023} = F_{2022}$ . All weights are in tonnes. All scenarios, except the constant catch 2021–2023 \*\*, assume the F-fleet catches 50% of the total WBSS herring catch.

Basis	Total catch (2022)	Total catch (2023)	$F_{3-6}$ (2022)	SSB* (2022)	SSB* (2023)	SSB* (2024)	% SSB change (2022–2023)	% SSB change (2023–2024)
Medium-term catch scenarios								
F = 0	0	0	0	68 903	83 794	102 194	22	22
F = 0.05	4 889	5 952	0.050	68 489	79 076	92 308	15	17
F = 0.1	9 489	10 945	0.100	68 078	74 685	83 653	10	12
F = 0.15	13 821	15 131	0.150	67 670	70 596	76 048	4	8
Constant catch 2021–2023 **	19 088	19 088	0.169	67 529	68 201	71 588	1	5

\* 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' 2021 catches (as defined in Table 2) are kept constant for 2022–2023.

The stock is estimated to be below  $B_{lim}$ . There are no catch scenarios that will rebuild the stock above  $B_{lim}$  by 2024. ICES continues to advise zero catch.

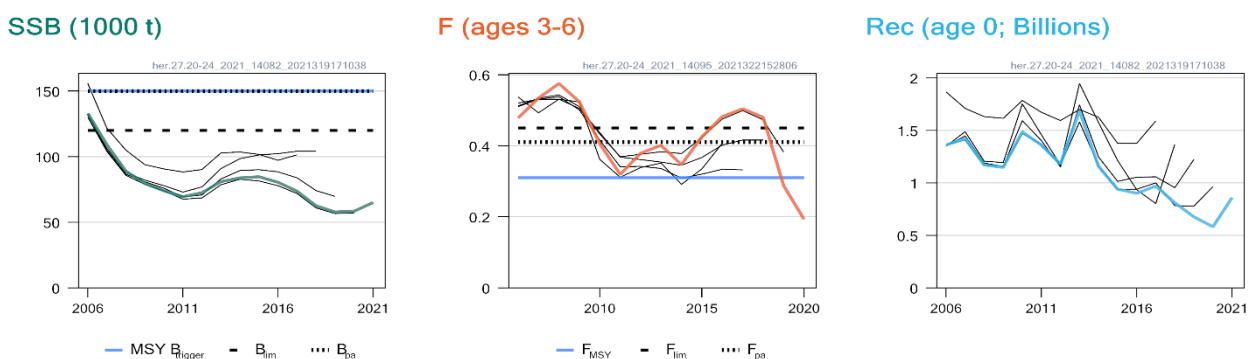
### Basis of the advice

**Table 4** Herring in subdivisions 20–24, spring spawners. The basis of the advice.

Advice basis	MSY approach
Management plan	An EU Baltic Sea multiannual plan (MAP; EU, 2016) was established in 2016 and updated in 2019 (MAP; EU, 2019). It applies to herring in subdivisions 22–24, which is part of the distribution area of the WBSS stock. This plan is not adopted by Norway and thus not used as basis of the advice for this shared stock.

### Quality of the assessment

The 2021 assessment gives consistent estimates of SSB compared to the 2020 assessment. There is downward revision of both F and recruitment estimates in 2019. This stock was benchmarked in 2018, which led to a change in perception for the entire time-series.



**Figure 2** Herring in subdivisions 20–24, spring spawners. Historical assessment results (final-year recruitment included for each line, corresponding to the recruitment assumption in the intermediate year); coloured lines represent the most recent assessment (2021) following the benchmark in 2018. Final-year recruitment assumption and SSB prediction are included.

### Issues relevant for the advice

This stock is caught across three different management units, and recovery will be impaired if catches of this stock are not minimized in all units. It is estimated that around 27% of the 2021 total catches from the stock are taken in Division 4.a. For the other two areas, catch shares in 2021 are estimated to be around 64% for subdivisions 20–21 and 8% for subdivisions 22–24.

The stock projections are particularly uncertain this year. Possible changes may occur in 2021–2022 to both fishing grounds and subsequent exploitation patterns in the North Sea herring fisheries as a consequence of the Brexit agreements. Given the mixing of the WBSS and North Sea autumn-spawning (NSAS) herring throughout part of the North Sea, and the large differences in the size and quotas of the two stocks, changes in the distribution of the fisheries may result in increased catches of WBSS, for which zero catch advice is issued.

For a number of years, the Pelagic Advisory Council (PelAC) has provided an estimate on the expected transfer of herring catches from Division 3.a to the North Sea to be assumed during the intermediate year. This information is highly uncertain for this year and is estimated to be limited to 3000 t (16% of EU quotas compared to approx. 50% used in recent years; Anon, 2021). The reduced transfer of catches into the North Sea increases the catches in 3.a and therefore of western Baltic Spring Spawning herring.

### Reference points

**Table 5** Herring in subdivisions 20–24, spring spawners. Reference points, values, and their technical basis. Weights in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	150 000	$B_{pa}$ equal to the upper 95% confidence limit of $B_{lim}$	ICES (2018)
	$F_{MSY}$	0.31	Stochastic simulations (EqSim) with Beverton-Holt, Ricker, and segmented regression stock–recruitment curve from the full time-series (1991–2016)	ICES (2018)
Precautionary approach	$B_{lim}$	120 000	Chosen as the mean of the two lowest SSB (1998, 1999) values with above average recruitment	ICES (2018)
	$B_{pa}$	150 000	Upper 95% confidence limit of $B_{lim}$ with $\sigma \approx 0.136$ , using the CV from the final-year SSB estimate in the assessment	ICES (2018)
	$F_{lim}$	0.45	$F_{P50\%}$ leading to 50% probability of $SSB > B_{lim}$ under stochastic simulations with Beverton-Holt, Ricker, and segmented stock–recruitment from the full time-series (1991–2016)	ICES (2018)
	$F_{pa}$	0.41	The F that leads to $SSB \geq B_{lim}$ with 95% probability.	ICES (2018)
Management plan (2018)*	MAP (2018) MSY $B_{trigger}$	150 000	$B_{pa}$ equal to the upper 95% confidence limit of $B_{lim}$	ICES (2018)
	MAP (2018) $B_{lim}$	120 000	Chosen as the mean of the two lowest SSB (1998, 1999) values with above average recruitment	ICES (2018)
	MAP (2018) $F_{MSY}$	0.31	Stochastic simulations (EqSim) with Beverton-Holt, Ricker, and segmented regression stock–recruitment curve from the full time-series (1991–2016)	ICES (2018)
	MAP (2018) target range $F_{lower}$	0.216–0.310	Consistent with the ranges, resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2018)
	MAP (2018) target range $F_{upper}$	0.310–0.379	Consistent with the ranges, resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2018)

\*Revised Baltic MAP (EU 2016, 2019) which refers to most recent reference points (ICES, 2018).

## Basis of the assessment

**Table 6** Herring in subdivisions 20–24, spring spawners. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2021a)
Assessment type	Age-based analytical assessment, multi-fleet SAM (ICES, 2021b) that uses catches by fleet in the model and in the forecast
Input data	Two acoustic, two trawl, and indices from one larval survey (HERAS A5092, GerAS [BIAS] A1588, IBTS/BITS Q1 [G1022/G2916], IBTS/BITS Q3–4 [G2829/G8863], and N20 I2308 I7165); catch statistics and corrections for historical area misreporting; otolith microstructure and morphometric methods to calculate the proportion of NSAS in the catches
Discards and bycatch	Discarding is considered to be negligible. The amount of slippage in Division 3.a is unknown.
Indicators	None
Other information	Last benchmarked in 2018 (ICES, 2018)
Working group	Herring Assessment Working Group for the Area South of 62°N (HAWG)

## History of the advice, catch, and management

**Table 7** Herring in subdivisions 20–24, spring spawners. ICES advice, TACs, and ICES estimated catch. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC Division 3.a ***	Agreed TAC subdivisions 22–24	ICES estimated catch ^			
					Subdiv. 22–24	Division 3.a	Subarea 4	Total
1987	Reduction in F	224000	218000		102000	59000	14000	175000
1988	No increase in F	196000	218000		99000	129000	23000	251000
1989	TAC	174000	218000		95000	71000	20000	186000
1990	TAC	131000	185000		78000	118000	8000	204000
1991	TAC	180000	155000		70000	112000	10000	192000
1992	TAC	180000	174000		85000	101000	9000	195000
1993	Increased yield from reduction in F; reduction in juvenile catches	188000	210000		81000	95000	10000	186000
1994	TAC	130000–180000	191000		66000	92000	14000	172000
1995	If required, TAC not exceeding recent catches	168000–192000	183000		74000	80000	10000	164000
1996	If required, TAC not exceeding recent catches	164000–171000	163000		58000	71000	1000	130000
1997	3.a: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	66000–85000*	100000		68000	55000	1000	124000
1998	Should be managed in accordance with NSAS	-	97000		51000	53000	8000	112000
1999	3.a: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	-	99000		50000	43000	5000	98000
2000	3.a: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~60000 for SDs 22–24	101000		54000	57000	7000	118000
2001	3.a: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~50000 for SDs 22–24	101000		64000	42000	6000	112000
2002	3.a: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~50000 for SDs 22–24	101000		53000	47000	7000	107000

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC Division 3.a ***	Agreed TAC subdivisions 22–24	ICES estimated catch ^			
					Subdiv. 22–24	Division 3.a	Subarea 4	Total
2003	Reduce F	< 80000	101000		40000	36000	2000	78000
2004	Separate management regime; reduce F	< 92000	91000		42000	28000	7000	77000
2005	Separate management regime; <i>status quo</i> F	95000	120000		44000	38000	7000	89000
2006	Separate management regime; <i>status quo</i> F	95000	102000	47500	42000	36000	11000	89000
2007	Separate management regime; <i>status quo</i> F	99000	69000	49500	40000	28000	1000	69000
2008	Separate management regime; reduce F 20% towards $F_{0.1}$	71000	51700	45000	44000	25000	0	69000
2009	Separate management regime. Reduce F to $F = 0.25$	< 32800	37700	27200	31000	32000	4000	67000
2010	Separate management regime; reduce F to $F = 0.25$	< 39800	33900	22700	18000	24000	1000	42000
2011	MSY transition in 1–5 years and no increase in catches of WBSS herring in the North Sea	26500–53600	30000	15800	16000	12000	300	28000
2012	$F_{MSY} = 0.25$ and no increase in catches of WBSS herring in the North Sea	< 42700	45000	20900	21000	15000	2000	39000
2013	$F_{MSY} = 0.25$ and no optional transfer of catch scenarios to the North Sea	< 51900	55000	25800	26000	17000	500	44000
2014	Transition to MSY approach	< 41602	46800	19800	18000	16000	3000	37000
2015	MSY approach ( $F_{MSY} = 0.28$ )**	< 44439	43600	22200	22000	13000	2000	37000
2016	MSY approach ( $F_{MSY} = 0.32$ )	< 52547	51048	26274	25000	24000	2000	51000
2017	MSY approach ( $F_{MSY} = 0.32$ )	< 56802	50740	28401	26513	19195	632	46340
2018	MSY approach ( $F = 0.295$ )	< 34618	48427	17309	18992	19902	2164	41058
2019	MSY approach	0	29326	9001	9831	8832	6757	25420
2020	MSY approach	0	24528	3150	3966	11361	6802	22130
2021	MSY approach	0	21604	1575				
2022	MSY approach	0						

\* Catch in subdivisions 22–24.

\*\* Advice for 2015 was for wanted catch.

\*\*\* Including mixed clupeid TAC and a bycatch ceiling in the small-meshed fisheries until 2005 and for 2007. For 2006, and from 2008, human consumption only, not including industrial bycatch or mixed clupeids but including North Sea autumn-spawners catch in fleet C, with an optional 50% transfer from Division 3.a to Subarea 4 since 2011.

^ WBSS only.

## History of the catch and landings

**Table 8** Herring in subdivisions 20–24, spring spawners. Catch distribution, by stock and by fleet, of WBSS and NSAS herring in 2020 as estimated by ICES.

WBSS catch area	Fleet	Fisheries	WBSS 2020 catch (t)	NSAS 2020 catch (t)
Division 3.a	C	Directed herring fisheries with purse-seiners and trawlers	10 880	5985
	D	Bycatches of herring caught in the small-meshed fisheries	481	433
Subdivisions 22–24	F	All herring fisheries in subdivisions 22–24.	3966	0
Subarea 4	A	Directed herring fisheries with purse-seiners and trawlers	6802	-
Total area	C,D,F,A	All	22 130	6 418

**Table 9** Herring in subdivisions 20–24, spring spawners. Catch distribution of WBSS in 2020 as estimated by ICES.

Total catch (2020)	Landings		Discards
22 130 tonnes	79.9% directed fishery	20.1% bycatch*	Negligible
	22 130 tonnes		

\* By the A and D fleets

**Table 12** Herring in subdivisions 20–24. History of commercial catch by area and country as estimated by ICES for all herring stocks caught within the management area for subdivisions 20–24. Values prior to 2002 are rounded. Weights are in tonnes.

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<b>Skagerrak</b>														
Denmark	47400	62300	58700	64700	87800	44900	43700	28700	14300	10300	10100	16000	16200	25968
Norway	1600	5600	8100	13900	24200	17700	16700	9400	8800	8000	7400	9700	0	0
Sweden	47900	56500	54700	88000	56400	66400	48500	32700	32900	46900	36400	45800	30800	26354
Total	96900	124400	121500	166600	168400	129000	108900	70800	56000	65200	53900	71500	47000	52322
<b>Kattegat</b>														
Denmark	57100	32200	29700	33500	28700	23600	16900	17200	8800	23700	17900	18900	18800	18609
Sweden	37900	45200	36700	26400	16700	15400	30800	27000	18000	29900	14600	17300	16200	7246
Total	95000	77400	66400	59900	45400	39000	47700	44200	26800	53600	32500	36200	35000	25855
<b>Subdivisions 22 and 24</b>														
Denmark	21700	13600	25200	26900	38000	39500	36800	34400	30500	30100	32500	32600	28300	13066
Germany	56400	45500	15800	15600	11100	11400	13400	7300	12800	9000	9800	9300	11400	22400
Poland	8500	9700	5600	15500	11800	6300	7300	6000	6900	6500	5300	6600	9300	0
Sweden	6300	8100	19300	22300	16200	7400	15800	9000	14500	4300	2600	4800	13900	10717
Total	92900	76900	65900	80300	77100	64600	73300	56700	64700	49900	50200	53300	62900	46184
<b>Subdivision 23</b>														
Denmark	1500	1100	1700	2900	3300	1500	900	700	2200	400	500	900	600	4572
Sweden	100	100	2300	1700	700	300	200	300	100	300	100	100	200	0
Total	1600	1200	4000	4600	4000	1800	1100	1000	2300	700	600	1000	800	4572
Grand total	286400	279900	257800	311400	294900	234400	231000	172700	149800	169400	137200	162000	145700	128932
<b>Year</b>														
	2003	2004	2005	2006**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Skagerrak</b>														
Denmark	15477	11782	14768	5156	3595	3867	12720	5309	3577	3244	4886	6449	4137	3554
Faroe Islands	0	0	440	0	0	0	552	447	0	0	0	0	480	318
Netherlands	725	484	751	600	454	1566	255	145	54	629	194	84	128	125
Germany	0	0	0	0	0	0	0	395	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	30	0
Norway	0	0	0	0	3466	4024	3295	3281	116	446	3019	2048	2475	3924
Sweden	25830	21806	32545	26000	19422	16501	12869	17445	9458	16210	16677	12594	12857	13321
Total	42032	34073	48504	31756	26937	25958	29691	27023	13205	20530	24776	21175	20107	21242
<b>Kattegat</b>														
Denmark	15952	7563	11109	8617	9181	7020	4896	7567	5155	6326	3877	4266	3976	2448
Sweden	10236	9626	9986	10800	11153	5213	3612	2693	1661	800	2586	3412	3752	6206
Germany	0	0	0	0	0	0	631	0	0	0	0	0	0	0
Total	26188	17189	21095	19417	20334	12234	9140	10260	6800	7126	6464	7678	7728	8653
<b>Subdivisions 22 and 24</b>														
Denmark	6143	7305	5311	1405	2839	3073	2146	762	3089	4105	5060	4283	4487	5714
Germany	18776	18493	21040	22870	24583	22823	15981	12239	8187	11170	14591	10241	13289	14427
Poland	4398	5512	6292	5504	2945	5535	5232	1799	1803	2394	3110	2381	2648	2918
Sweden	9379	9865	9171	9604	7220	7024	4050	2034	2179	2706	2067	1078	1497	1659
Total	38696	41175	41814	39383	37587	38456	27409	16833	15258	20400	24800	17983	21922	24718
<b>Subdivision 23</b>														
Denmark	2315	94	1779	1827	2871	5324	2817	1***	26	38	44	47	30	26
Sweden	243	317	384	652	0	327	807	934	544	681	632	319	192	332
Total	2558	411	2163	2479	2871	5651	3623	1000	600	700	700	366	222	359
Grand total	109473	92848	113576	93035	87729	82298	69863	55200	35863	48755	56740	47202	49978	54972



Year	2017	2018	2019	2020*
<b>Skagerrak</b>				
Denmark	2699	858	593	3189
Faroe Islands	400	149		
Netherlands			121	155
Germany	85	205		
Lithuania				
Norway	3337	3411	2472	2119
Sweden	11936	11332	8509	9073
Total	18458	15956	11695	14537
<b>Kattegat</b>				
Denmark	912	1258	1499	672
Sweden	7426	6044	1725	2570
Germany				
Total	8338	7302	3224	3242
<b>Subdivisions 22 and 24</b>				
Denmark	5586	4487	2041	586
Finland		1		
Germany	14694	11304	5571	2069
Poland	3330	1773	1130	596
Sweden	2287	943	729	233
Total	25898	18507	9470	3484
<b>Subdivision 23</b>				
Denmark	260	69	9	1
Sweden	356	416	351	481
Total	616	485	360	482
Grand total	53309	42250	24750	21745

\* Preliminary data.

\*\* 2000 t of Danish catches are missing (ICES, 2007).

\*\*\* 3103 t officially reported catches (ICES, 2011).

**Summary of the assessment**

**Table 11** Herring in subdivisions 20–24, spring spawners. Assessment summary. Weights are in tonnes. High and low refer to the 95% confidence intervals.

Year	Recruitment			Spawning-stock biomass			Catches	Fishing mortality		
	Recruitment (age 0, wr 0)	High	Low	SSB*	High	Low		F (ages 3–6)	High	Low
	thousands			tonnes			tonnes			
1991	5022943	6531238	3862967	294077	361896	238967	191573	0.44	0.60	0.32
1992	3630255	4574690	2880796	300530	367206	245962	194408	0.51	0.65	0.39
1993	3060821	3954675	2369000	284750	346799	233802	185010	0.57	0.74	0.45
1994	4514044	5777413	3526940	225900	274666	185793	172439	0.60	0.77	0.47
1995	4196456	5299361	3323087	193972	237118	158677	150820	0.60	0.79	0.46
1996	4185013	5263477	3327521	133192	160884	110267	121260	0.66	0.84	0.51
1997	3489204	4466663	2725647	147001	177132	121995	115585	0.64	0.81	0.50
1998	4590581	5802791	3631603	118707	141973	99253	107033	0.62	0.79	0.48
1999	4901369	6158050	3901140	119183	142657	99572	97234	0.53	0.68	0.41
2000	2993894	3757179	2385673	123386	147287	103364	118277	0.57	0.72	0.46
2001	2757400	3421131	2222439	136051	160994	114973	105803	0.60	0.76	0.48
2002	2740576	3410681	2202127	159982	189145	135316	106189	0.49	0.62	0.39
2003	2956361	3686924	2370559	129160	153209	108886	78310	0.45	0.57	0.36
2004	2064667	2576004	1654831	133609	158235	112816	76814	0.50	0.63	0.39
2005	1769476	2204110	1420549	121380	143394	102745	88404	0.53	0.66	0.42
2006	1361515	1706499	1086272	133027	157821	112128	88931	0.48	0.60	0.38
2007	1421277	1779384	1135240	109135	130132	91526	68180	0.53	0.67	0.43
2008	1169516	1460655	936407	89005	105604	75015	69576	0.57	0.72	0.46
2009	1148604	1430684	922140	79609	93885	67504	67261	0.52	0.67	0.41
2010	1487230	1852970	1193680	74031	87026	62977	42214	0.41	0.52	0.32
2011	1359643	1688048	1095129	69532	82242	58786	27771	0.32	0.41	0.25
2012	1179901	1471377	946166	72538	85482	61555	38648	0.38	0.49	0.29
2013	1685120	2226013	1275657	80985	95348	68786	43829	0.40	0.52	0.31
2014	1156414	1470288	909546	83868	99980	70353	37358	0.35	0.45	0.27
2015	940624	1199933	737352	84718	101573	70660	37491	0.43	0.54	0.33
2016	900718	1178135	688624	80484	96701	66987	51298	0.48	0.62	0.38
2017	969757	1309003	718431	73684	88832	61120	46340	0.50	0.67	0.38
2018	810280	1168633	561813	62561	78634	49773	41058	0.48	0.66	0.35
2019	676518	1080977	423391	57841	77703	43056	25420	0.29	0.41	0.20
2020	582158	1148633	295053	58434	81834	41725	22130	0.19	0.30	0.12
2021	859579**			65046***						

\* SSB at spawning time (April).

\*\* Recruitment is the average of 2015–2019.

\*\*\* SSB is predicted.

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