

ECOREGION North Sea and Baltic
STOCK Herring in Division IIIa and Subdivisions 22–24 (Western Baltic spring spawners)

Advice for 2011

Management Objective (s)	Catches in 2011
Transition to an MSY approach with caution at low stock size	26 500 t to 53 600 t for transition to the MSY framework by 2011 to 2015, respectively. Additional conservation measure: catches of WBSS herring in the North Sea should not be allowed to increase
Cautiously avoid impaired recruitment (Precautionary Approach)	n/a
Cautiously avoid impaired recruitment and achieve other objective(s) of a management plan (e.g., catch stability)	n/a

Stock status

Fishing mortality	2007	2008	2009
F_{MSY}	above	above	above
F_{PA}/F_{lim}	undefined	undefined	undefined
Spawning Stock Biomass (SSB)	2007	2008	2009
MSY Btrigger	above	above	below
B_{PA}/B_{lim}	undefined	undefined	undefined

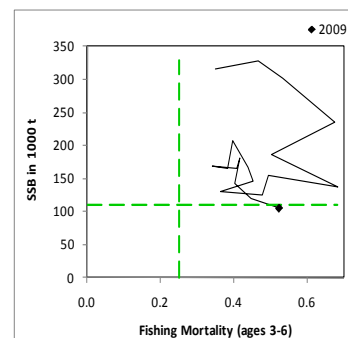


Figure 6.4.15.1 Herring in Division IIIa and Subdivisions 22–24 (Western Baltic spring spawners). Summary of stock assessment (weights in '000 tonnes, estimates are shown in grey). Top right: SSB and F over the years.

SSB has been decreasing in recent years and is expected to further decline in 2010 due to an increased fishing mortality, poor recruitment (2004–2008) and a change in fishing pattern in 2009.

Management plans

No specific management objectives are known to ICES.

In light of the EU policy paper on fisheries management (17 May 2010, [COM\(2010\) 241](#)) this stock is classified under category 3. The resulting TAC would be 43.6 kt. ICES has not evaluated this harvest control rule.

Biology

Herring in Division IIIa and Subdivisions 22–24 (WBSS) migrate from the Western Baltic into more saline waters of Division IIIa and the eastern parts of Division IVa in search of food in summer. In these areas they mix with North Sea Autumn spawning (NSAS) herring. Herring is considered to have a major impact on other fish stocks as prey and predator and is itself prey for seabirds and marine mammals.

Environmental influence on the stock

Reasons for the reduction of recruitment in 2004–2008 (reduced egg or larval survival) in Western Baltic herring are currently unknown. There are no indications of systematic changes in growth or age at maturity, and candidate key stages for reduced recruitment are probably the egg or the larval stage. Further investigation of the causes of the poor recruitment will require targeted research projects.

The fisheries

Misreporting by Danish vessels in Division IIIa is assumed to have stopped from 2009 due to new national regulations.

Area where WBSS are being caught	Fleet	Fishery	WBSS catch	NSAS catch
Division IIIa	C	Directed herring fisheries with purse-seiners and trawlers.	29 426 t	5 056 t
	D	Bycatches of herring caught in the small-mesh fisheries.	2 863 t	1 486 t
SD 22-24	F	All herring fisheries in Subdivisions 22–24.	31 032 t	0 t
Division IVa East	A	Directed herring fisheries with purse-seiners and trawlers.	3 941 t	-

Quality considerations

The main causes for uncertainty are: a lack of a firm basis to predict the fraction of NSAS in the catches in the Kattegat and Skagerrak, the proportions of the two stocks as well as the distribution of the fishery are variable between years. ICES uses a geometric mean recruitment from 2004–2008 (weaker year classes) for the short-term prediction. Insufficient sampling makes 2009 split of NSAS and WBSS uncertain in the transfer area in Division IVa East.

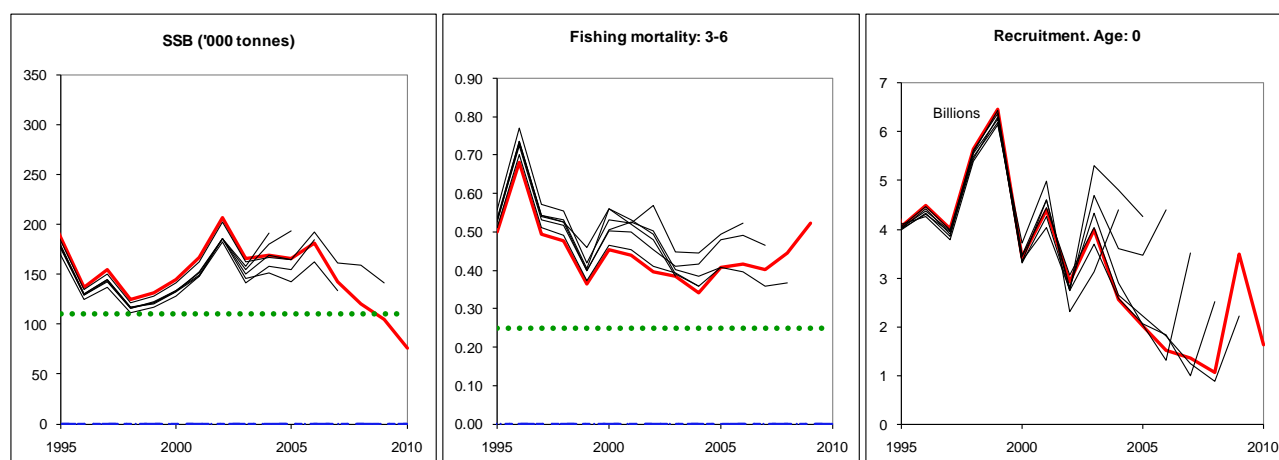


Figure 6.4.15.2 Herring in Division IIIa and Subdivisions 22–24 (Western Baltic spring spawners). Historical assessment results (final year recruitment as a 5 year GM included).

Scientific basis

Assessment type

Age based analytical assessment (FLICA)

Input data

2 acoustic and 1 larval survey indices (HERAS, GerAS (BIAS), N20)

Catch statistics + Corrections for area misreporting

Discards and by-catch

Discards not included in the assessment and considered low

Indicators

Otolith microstructure and morphometric methods to calculate NSAS proportion in catches

Other information

The last benchmark took place in 2008

Working group report

[HAWG](#)

6.4.15

Supporting Information June, revised September 2010

ECOREGION North Sea and Baltic
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Reference points

	Type	Value	Technical basis
MSY approach	MSY B_{trigger}	110 000 t	Provisional value, based on management plan development and the lowest observed SSB in the 2008 assessment
	F_{MSY}	0.25	Management plan evaluations (WKHMP report ICES 2008/ACOM:27)
Precautionary approach	B_{lim}	-	Not defined
	B_{pa}	-	Not defined
	F_{lim}	-	Not defined
	F_{pa}	-	Not defined

Unchanged since 2010

Since this stock has always been fished at fishing mortality rates considerably higher than F_{MSY} , the provisional B_{MSY} -trigger of 110,000 t (based on the lowest SSB in the assessment conducted in 2008) is likely to underestimate the true lower limit of SSB when the stock is fished at F_{MSY} .

Yield and spawning biomass per Recruit F-reference points (2010):

	Fish Mort Ages 3-6	Yield/R	SSB/R
Average last 3 years	0.46	0.03	0.04
F_{max}^*	-	-	-
$F_{0.1}$	0.22	0.03	0.09

* F_{max} is not well defined.

Outlook for 2011

Explanation on fleet coding:

Area	Fleet	Description
North Sea	A	Directed herring fisheries with purse-seiners and trawlers. Bycatches in industrial fisheries by Norway are included.
	B	Bycatches of herring taken under EU regulations.
Division IIIa	C	Directed herring fisheries with purse-seiners and trawlers.
	D	Bycatches of herring caught in the small-mesh fisheries.
Subdivisions 22-24	F	All herring fisheries in Subdivisions 22–24.

Basis (for Western Baltic spring spawning herring, WBSS): $F_{(2010)} = 0.43$ [catch constraint]; $R_{10-12} = GM(2004-2008) = 1627$ million; $SSB_{(2010)} = 76.2$ kt; catch $(2010) = 57.3$ kt^{a)}.

Catches are for all herring in Division IIIa and Subdivisions 22–24, see further in Section 6.4.16 on North Sea Autumn Spawning herring (NSAS).

Rationale	Catch options and results for WBSS herring only: Division IIIa, Subdivisions 22-24 and Division IVaE ¹⁾								Catch options for WBSS and NSAS herring in: Division IIIa and Subdivisions 22-24 ¹⁾						
	Catch 2011	Basis	F 2011	22-24	IIIa		IVaE	SSB 2011 ³⁾	SSB 2012 ³⁾	% SSB change ⁴⁾	22-24	IIIa		% TAC change ⁵⁾	
				Fleet F	Fleet C	Fleet D	Fleet A ²⁾					Catch 2011	Fleet F		Fleet C
MSY framework	26.5	$F_{MSY} * 0.69$	0.17	9.2	11.4	2.0	3.9	76.0	113.7	50%	25.6	9.2	13.3	3.0	-60%
MSY transition	53.6	Transition	0.38	20.2	25.0	4.4	3.9	74.5	92.8	25%	56.2	20.2	29.3	6.7	-11%
EU policy paper	43.6	$F_{(2010)} * 0.7$	0.30	16.1	20.0	3.5	3.9	75.1	100.4	34%	44.9	16.1	23.4	5.3	-29%
Zero catch	0.0	$F = 0.0$	0.00	0.0	0.0	0.0	0.0	77.3	134.8	74%	0.0	0.0	0.0	0.0	-100%
<i>Status quo</i>	37.2	$F_{(2010)} * 0.58$ $= F_{MSY}$	0.25	13.5	16.8	3.0	3.9	75.4	105.4	40%	37.7	13.5	19.7	4.5	-40%
	39.5	$F_{(2010)} * 0.62$	0.27	14.5	17.9	3.2	3.9	75.3	103.5	37%	40.3	14.5	21.0	4.8	-36%
	43.0	$TAC * 0.7$	0.29	15.9	19.7	3.5	3.9	75.0	100.9	34%	44.2	15.9	23.1	5.3	-30%
	51.3	$TAC * 0.85$	0.36	19.3	23.9	4.2	3.9	74.6	94.5	27%	53.7	19.3	28.0	6.4	-15%
	59.3	$F_{(2010)}$	0.43	22.5	27.9	4.9	3.9	74.2	88.6	19%	62.7	22.5	32.7	7.5	-1%
	59.7	$TAC_{(2010)}$	0.43	22.7	28.1	4.9	3.9	74.1	88.2	19%	63.2	22.7	33.0	7.5	0%

Weights in '000 t

^{a)} assuming a utilisation in 2010 of the WBSS part of the TAC/bycatch ceiling of 100% (F-fleet), $33\ 855 - 0.2 * 4\ 515 = 97\%$ (C-fleet with 20% of Norwegian TAC transferred to North Sea catches) and $4\ 349 / 8\ 373 = 52\%$ (D-fleet) .

¹⁾ Ratio of herring catches between different fleets and areas in 2011 is based on the 2010 area TACs, the ratio between the different herring stocks in IIIa is based on the 2009 catch proportions. The later proportions cannot be predicted and may therefore deviate significantly from the assumed ratio.

²⁾ As in 2009 a catch of 3.9 kt of WBSS herring taken in the transfer area in Division IVa East is assumed. The amount of this catch cannot be predicted since it is dependent on the geographical distribution of the stock components in Division IVa East.

³⁾ For spring spawning stocks, the SSB is determined at spawning time and is influenced by fisheries between 1st January and spawning time.

⁴⁾ SSB (2012) relative to SSB (2011).

⁵⁾ Catches (2011) relative to TAC 2010 (SD 22-24 + IIIa – 20% Norwegian quota transfer + IIIa bycatch ceiling = $22.7\text{kt} + 33.0\text{kt} + 7.5\text{kt} = 63.2\text{kt}$).

To derive the total herring catch for Division IIIa (right hand side of the table), predicted catches of NSAS (as advised in section 6.4.16) have to be added to the advised maximum catches of WBSS in the area. The total catch by fleet is only compatible with the advice for WBSS if the values given for NSAS are treated as maximum catches. Thus the resulting catch options were also used as constraints for catch options for the NSAS herring (Section 6.4.16). Note that the right hand side of the table is for illustrative purposes only and is not part of the ICES advice; the ratio of TACs between areas is not fixed and there are several options for TACs compatible with the removal of WBSS advised by ICES.

MSY approach

Following the ICES MSY framework implies fishing mortality to be reduced to 0.17 (31% lower than F_{MSY} because SSB_{2011} is 31% below $B_{trigger}$), resulting in landings of 26 500 t in 2011. This is expected to lead to an SSB of 113 700 t in 2012. The estimation of SSB in 2011 is dependent on the advised F_{MSY} for 2011 and both have thus been estimated iteratively.

For a transition to the ICES MSY framework by 2015, the fishing mortality in 2011 is $(0.8 * F_{(2010)} + 0.2 * (F_{MSY} * 0.69))$ [where 0.69 is the ratio of the 2011 biomass to MSY $B_{trigger}$] = 0.38. This results in a catch of 53 600 t in 2011, which will give an SSB of 92 800 t in 2012.

Since 2006 (when SSB was 182 000 t), SSB has continuously declined and reached a record-low of 76 000 t in 2010. Recruitment has also markedly declined, and all recent year classes are the lowest on record (except for the average 2009 cohort). Fishing mortality has been increasing since 2005 and F in 2009 was among the highest in the time series (and more than twice the F_{MSY} proxy of 0.25). Clearly, the stock is now outside of safe biological limits, and there is concern that the stock is now in a state where there is a high probability of continued recruitment failure. Therefore, the catch emanating from a transition to the MSY framework by 2015 may not be adequate to rectify this situation. Considering the stock is outside safe biological limits and high uncertainty about future recruitment, a more rapid transition to the MSY framework may be necessary. ICES highlights catch options transition periods ranging from 1-5 years (2011 to 2015, respectively).

In addition, in this case there are mixed stock concerns and therefore an additional conservation measure is required. To conserve mature adults, catches of WBSS herring in the North Sea should not be allowed to increase.

Policy paper

In light of the EU policy paper on fisheries management (17 May 2010, [COM\(2010\) 241](#)) this stock is classified under category 3 because although the state of the stock cannot be evaluated in the absence of precautionary reference points the stock is at record low SSB in 2010 and being fished considerably above F_{MSY} . The policy paper in this instance implies a 30% reduction of $F_{(2010)}$ since the resulting TAC change is lower than 30%. This leads to $F_{(2010)} * 0.7 = 0.30$ which results in catches of 43 600 t in 2011 and an SSB of 100 400 t in 2012.

Additional considerations

Recruitment of Western Baltic herring has been reduced by 15-35% annually from 2004 to 2008. The estimated strength of the 2009 year class is about average for the total time series 1991-2009. With a failure to reduce F in recent years, the poor year classes now have an increasingly negative influence on SSB. Increases in F in 2008 and 2009 further decreased SSB to record low levels. At these low levels, there is no information on likely recruitment patterns.

In 2009, a Danish regulation and control initiative was adopted that prohibits catches in the North Sea and the Skagerrak during the same fishing trip has efficiently stopped misreporting by the Danish C-fleet. Before 2009, considerable amounts of NSAS herring were taken in IVa West and misreported as catches from Division IIIa (in recent years about 30% of the C-fleet quota). For the assessment these catches were removed from the WBSS catches and transferred into the catch of NSAS herring thus reducing the total take out of WBSS herring so that catches were normally less than the WBSS TAC. Regulations allowing transfer of Norwegian quotas from Division IIIa to the North Sea were earlier introduced as an incentive to decrease misreporting for the Norwegian part of the fishery. Except for a small amount (20% of the Norwegian quota) the total TAC of the C-fleet is now taken within Division IIIa. Further fishing for herring in the transfer area in IVa East is estimated to take a relatively high amount of WBSS.

The quota for the C fleet and the bycatch quota for the D fleet (see above) are set for the NSAS and the WBSS stocks together. Since the WBSS is in a much poorer state than the NSAS the implication for the catch of WBSS must primarily be taken into account when setting quotas for the fleets that exploit these stocks.

The TAC for fleet F was exceeded by 14% in 2009 due to the transfer of quota not used in 2008 to 2009 (EU 649/2009). As this transfer of quota can only be taken once, a TAC overshoot is not expected in 2010.

Information from the fishing industry

VMS data confirm that area misreporting from the North Sea to the Skagerrak is no longer an issue for the Danish part of the C-fleet.

Comparison with previous assessment and advice

The update assessment this year shows an increase of 22% of the estimated fishing mortality in 2008 and a 25% decrease for the SSB in 2008. This falls within the wide, but unbiased retrospective in the assessment.

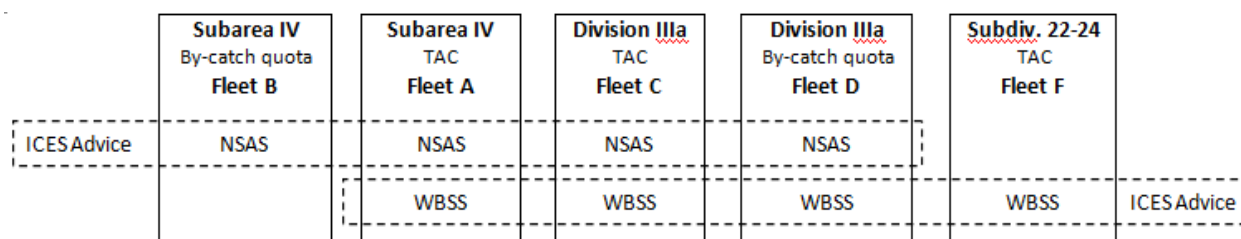
In 2009 ICES advised an immediate reduction in F to candidate for $F_{MSY} = 0.25$. In the light of the continuing reduction of recruitment, the basis for the advice did not change.

Last year's advice was based on the anticipated MSY principle ($F_{MSY}=0.25$). This year's advice is based on the transition scheme towards the ICES MSY framework (F_{MSY} , with estimated SSB in 2011 being below the candidate trigger of 110 kt)

Assessment and management area

Catch options for the whole stock of WBSS are partitioned into catches by area. In the mixing area in Division IIIa, catches of WBSS herring in Division IIIa also imply catches of North Sea Autumn-Spawning (NSAS) herring which constitute part of the total catch in that area.

ICES advises on catch options by fleet for the entire distribution of the two herring stocks separately, however the stocks are managed by areas covering the geographical distribution of the stocks (see the following text diagram).



The calculation of the intermediate year (2010) catch and the catch options for 2011 are based on the 2009 patterns of

1. the proportion of the two stocks in catches of the different fleets and
2. the fraction of the TACs set for each fleet plus a constant catch of WBSS taken by the A-fleet in IVaE.

Short-term predictions are based on an expected catch in 2010 of 57 323 t of Western Baltic spring spawning stock, including a constant catch of WBSS in IVaE. To make catch options by fleet 2011 it is assumed that each fleet will take its full share of the total TAC and that TACs are set proportional to the TACs for 2010 after a subtraction of 20% of the Norwegian quota that is transferred to the A-fleet (as NSAS). The proportions of WBSS in the 2009 catches were 0.85 in the C-fleet, 0.66 in the D-fleet and 1.00 in the F-fleet. Additionally it is assumed that a constant catch of 3 900 t of WBSS will be caught by the A-fleet in Division IVa East in 2010 and 2011.

These catches of WBSS herring are taken in the North Sea under the North Sea TAC in the transfer area in IVa East during Q2 and 3 summer feeding period. It is likely that the 2011 TAC for NSAS will increase, therefore a larger proportion of WBSS may be taken outside the management areas. To conserve mature adults, catches of WBSS herring in the North Sea should not be allowed to increase.

Sources

- ICES. 2010. Report of the Herring Assessment Working Group for the Area South of 62°N, 15–23 March 2010 ICES CM 2010/ACOM:06.
- ICES. 2008. Report of the Workshop on Herring Management Plans (WKHMP) 4 - 8 February, ICES Headquarters Copenhagen. ICES 2008/ACOM:27

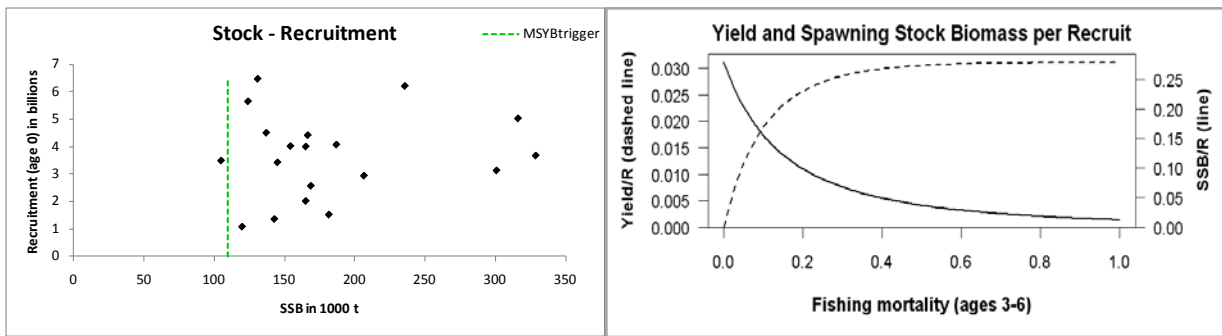


Figure 6.4.15.3 Herring in Division IIIa and Subdivisions 22–24 (Western Baltic spring spawners). Stock recruitment and Yield and SSB per Recruit plot.

Table 6.4.15.1 Herring in Division IIIa and Subdivisions 22–24 (Western Baltic spring spawners). Single stock exploitation boundaries (advice), management and catches.

Year	ICES Advice	Pred. catch corresp. to advice	Agreed TAC IIIa ²	ICES catch of Stock			
				22–24	IIIa	IV	Total
1987	Reduction in F	224	218	102	59	14	175
1988	No increase in F	196	218	99	129	23	251
1989	TAC	174	218	95	71	20	186
1990	TAC	131	185	78	118	8	204
1991	TAC	180	155	70	112	10	192
1992	TAC	180	174	85	101	9	195
1993	Increased yield from reduction in F; reduction in juvenile catches	188	210	81	95	10	186
1994	TAC	130–180	191	66	92	14	172
1995	If required, TAC not exceeding recent catches	168–192	183	74	80	10	164
1996	If required, TAC not exceeding recent catches	164–171	163	58	71	1	130
1997	IIIa: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	66–85 ¹	100	68	55	1	124
1998	Should be managed in accordance with North Sea autumn spawners	-	97	51	53	8	112
1999	IIIa: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	-	99	50	43	5	98
2000	IIIa: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~60 for Subdivs. 22–24	101	54	57	7	118
2001	IIIa: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~50 for Subdivs. 22–24	101	64	42	6	112
2002	IIIa: managed together with autumn spawners 22–24: if required, TAC not exceeding recent catches	~50 for Subdivs. 22–24	101	53	47	7	107
2003	Reduce F	<80	101	40	36	2	78
2004	Separate management regime for this stock Reduce F	<92	91	42	24	7	77
2005	Separate management regime for this stock <i>Status quo</i> F	95	120	44	38	7	89
2006	Separate management regime for this stock <i>Status quo</i> F	95	102 ³ /47.5*	42	36	11	89
2007	Separate management regime for this stock <i>Status quo</i> F	99	69 ³ /49.5*	40	28	1	68
2008	Separate management regime for this stock Reduce F by 20% towards F _{0.1}	71	51.7 ³ /45*	43	25	0	68
2009	Separate management regime for this stock Reduce F to F = 0.25	< 32.8	37.7 ³ /27.2*	31	32	4	67
2010	Separate management regime for this stock Reduce F to F = 0.25	< 39.8	33.9 ³ /22.7*				
2011	MSY transition in 1-5 years and no increase in catches of WBSS herring in the North Sea	26.5 – 53.6					

Weights in '000 t.

¹Catch in Subdivisions 22–24.

²Including mixed clupeoid TAC and bycatch ceiling in small-mesh fishery.

³ Human consumption in Division IIIa, not including industrial bycatch or mixed clupeoids, but including North Sea Autumn Spawner catch in fleet C.

* separate TAC for SD 22–24.

Table 6.4.15.2 Herring in Subdivisions 22–24 and Division IIIa (spring and autumn spawners). Landings ('000 t).

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998 ²
Skagerrak											
Denmark	144.4	47.4	62.3	58.7	64.7	87.8	44.9	43.7	28.7	14.3	10.3
Faroe Islands											
Germany											
Norway	5.7	1.6	5.6	8.1	13.9	24.2	17.7	16.7	9.4	8.8	8.0
Sweden	57.2	47.9	56.5	54.7	88.0	56.4	66.4	48.5	32.7	32.9	46.9
Total	207.3	96.9	124.4	121.5	166.6	168.4	129.0	108.9	70.8	56.0	65.2
Kattegat											
Denmark	76.2	57.1	32.2	29.7	33.5	28.7	23.6	16.9	17.2	8.8	23.7
Sweden	49.7	37.9	45.2	36.7	26.4	16.7	15.4	30.8	27.0	18.0	29.9
Total	125.9	95.0	77.4	66.4	59.9	45.4	39.0	47.7	44.2	26.8	53.6
Sub. Div. 22+24											
Denmark	33.1	21.7	13.6	25.2	26.9	38.0	39.5	36.8	34.4	30.5	30.1
Germany	54.7	56.4	45.5	15.8	15.6	11.1	11.4	13.4	7.3	12.8	9.0
Poland	6.6	8.5	9.7	5.6	15.5	11.8	6.3	7.3	6.0	6.9	6.5
Sweden	4.6	6.3	8.1	19.3	22.3	16.2	7.4	15.8	9.0	14.5	4.3
Total	99.0	92.9	76.9	65.9	80.3	77.1	64.6	73.3	56.7	64.7	49.9
Sub. Div. 23											
Denmark	0.1	1.5	1.1	1.7	2.9	3.3	1.5	0.9	0.7	2.2	0.4
Sweden	0.1	0.1	0.1	2.3	1.7	0.7	0.3	0.2	0.3	0.1	0.3
Total	0.2	1.6	1.2	4.0	4.6	4.0	1.8	1.1	1.0	2.3	0.7
Grand Total											
	432.4	286.4	279.9	257.8	311.4	294.9	234.4	231.0	172.7	149.8	169.4

Year	1999 ²	2000	2001 ⁵	2002 ⁴	2003	2004	2005	2006 ^{1,3}	2007	2008 ¹	2009
Skagerrak											
Denmark	10.1	16.0	16.2	26.0	15.5	11.8	14.8	5.2	3.6	3.9	12.7
Faroe Islands							0.4			0.0	0.6
Germany					0.7	0.5	0.8	0.6	0.5	1.6	0.3
Norway	7.4	9.7							3.5	4.0	3.3
Sweden	36.4	45.8	30.8	26.4	25.8	21.8	32.5	26.0	19.4	16.5	12.9
Total	53.9	71.5	47.0	52.3	42.0	34.1	48.5	31.8	26.9	26.0	29.7
Kattegat											
Denmark	17.9	18.9	18.8	18.6	16.0	7.6	11.1	8.6	9.2	7.0	4.9
Sweden	14.6	17.3	16.2	7.2	10.2	9.6	10.0	10.8	11.2	5.2	3.6
Germany											0.6
Total	32.5	36.2	35.0	25.9	26.2	17.2	21.1	19.4	20.3	12.2	9.1
Sub. Div. 22+24											
Denmark	32.5	32.6	28.3	13.1	6.1	7.3	5.3	1.4	2.8	3.1	2.1
Germany	9.8	9.3	11.4	22.4	18.8	18.5	21.0	22.9	24.6	22.8	16.0
Poland	5.3	6.6	9.3	-	4.4	5.5	6.3	5.5	2.9	5.5	5.2
Sweden	2.6	4.8	13.9	10.7	9.4	9.9	9.2	9.6	7.2	7.0	4.1
Total	50.2	53.3	62.9	46.2	38.7	41.2	41.8	39.4	37.6	37.5	27.4
Sub. Div. 23											
Denmark	0.5	0.9	0.6	4.6	2.3	0.1	1.8	1.8	2.9	5.3	2.8
Sweden	0.1	0.1	0.2	-	0.2	0.3	0.4	0.7		0.3	0.8
Total	0.6	1.0	0.8	4.6	2.6	0.4	2.2	2.5	2.9	5.7	3.6
Grand Total											
	137.2	162.0	145.7	128.9	109.5	92.8	113.6	93.0	87.7	81.3	69.9

¹ Preliminary data.

² Revised data for 1998 and 1999

Bold= German revised data for 2008 (in HAWG 2010)

³ 2000 tonnes of Danish landings are missing, see text section 3.1.2

⁴ The Danish national management regime for herring and sprat fishery in Subdivision 22 was changed in 2002

⁵ The total landings in Skagerrak have been updated for 1995-2001 due to Norwegian misreportings into Skagerrak.

Table 6.4.15.3 Herring in Subdivisions 22–24 and Division IIIa (spring spawners). Summary of the assessment.

Year	Recruitment Age 0 thousands	SSB at spawning time tonnes	Landings tonnes	Mean F Ages 3-6
1991	5020627	316347	191573	0.349
1992	3667701	328906	194411	0.466
1993	3124936	301059	185010	0.533
1994	6202502	235874	172438	0.674
1995	4065845	187212	150831	0.501
1996	4498746	137360	121266	0.682
1997	4011730	154531	115588	0.494
1998	5642872	124364	107032	0.476
1999	6463434	131238	97240	0.363
2000	3418683	145314	109914	0.453
2001	4409766	166868	105803	0.439
2002	2933490	206794	106191	0.397
2003	3995251	165417	78309	0.384
2004	2564193	169052	76815	0.340
2005	2012424	165396	88406	0.407
2006	1515946	181856	90549	0.415
2007	1354566	143097	68997	0.402
2008	1076630	120154	68484	0.446
2009	3484636	105234	67262	0.523
2010*	1627212	75921		
Average	3554559	178100	115585	0.460

* Recruitment is GM (2004–2008). SSB is predicted.