

6.4.16 Herring in Subarea IV and Divisions IIIa and VIId (North Sea autumn spawners)

State of the stock

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long-term yield	Fishing mortality in relation to agreed target	Comment
Increased risk	Harvested sustainably	Overfished	Above target	

Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as being at risk of having reduced reproductive capacity and harvested sustainably. The SSB in autumn 2008 was estimated at 1.0 million t, and is expected to remain below B_{pa} (1.3 million t) in 2009. F_{2-6} in 2008 was estimated at 0.24, above the management target F_{2-6} (for this state of the stock = 0.14). The year classes since 2002 are estimated to be among the weakest since the late 1970s.

Management objectives

In November 2008 EU-Norway have agreed on an adjusted management plan (see annex) taking account of recent poor recruitment. ICES has evaluated this management plan (WKHMP ICES CM 2008 ACOM:27) and concluded that the plan is consistent with the precautionary approach.

Reference points

	Type	Value	Technical basis
Precautionary approach	B_{lim}	800 000 t	< 0.8 million t; poor recruitment has been experienced
	B_{pa}	1.3 million t	B trigger in the previous harvest control rule
	F_{lim}	not defined	
	F_{pa}	$F_{0-1} = 0.12$ $F_{2-6} = 0.25$	Target F_s in the previous harvest control rule
Targets	F_{mt}	$F_{0-1} = 0.05$ $F_{2-6} = 0.25$	If SSB > 1.5 million tonnes, B trigger (based on simulations)
		$F_{0-1} = 0.05$ $F_{2-6} = 0.25 - (0.15 * (1500000 - SSB) / 700000)$	If SSB between 0.8 and 1.5 million tonnes (based on simulations)
		$F_{0-1} = 0.04$ $F_{2-6} = 0.10$	If SSB < 0.8 million t (based on simulations)

Precautionary reference points unchanged since 1999, target reference points since 2009.

Yield and spawning biomass per Recruit F-reference points (2009):

	Fishing Mort Ages 2-6	Yield/R	SSB/R
average last 3 years	0.31	0.018	0.05
F_{max}	0.47	0.013	0.024
$F_{0,1}$	0.13	0.011	0.075
$F_{35\%SPR}$	0.16	0.012	0.065

HCR evaluation has shown that candidates for reference points which are consistent with high long-term yields and a low risk of depleting the productive potential of the stock are around the target values in the management plan.

Single-stock exploitation boundaries

ICES advises on the basis of the agreed EU-Norway management plan. Following the agreed management plan implies catches of 164 300 t for fleet A and 10 400 t for fleet B in 2010 in the North Sea.

Short-term implications

Catch forecasts are presented below for different scenarios of sharing the catch amongst fleets, producing the total fishing mortality given in the table headings. The forecasts are based on an assumption of the fisheries in 2009, taking

the TAC with an overshoot by the A-fleet of 13% corresponding to the overshoot seen in the last three years, and by-catches following the agreed management plan.

The seven scenarios presented below are based on an interpretation of the harvest control rule or other options and show the range of options for differing overall exploitation rates. The distribution of catches among the fleets is only illustrative, and other options with similar overall exploitation rates are possible:

- a) No fishing;
- b) Catches that are estimated lead to $SSB > B_{pa}$ in 2011;
- c) A 15% decrease in A fleet in TAC between 2009 and 2010;
- d) The EU-Norway management plan with larger catches of approximately 40% for the C and D fleet
- e) The EU-Norway management plan;
- f) A roll over TAC from 2009 to 2010 of 171 kt for the A fleet;
- g) A 15% increase in A fleet in TAC between 2009 and 2010;

Since the current management plan only stipulates overall fishing mortalities for juveniles and adults, making fleet-wise predictions for four fleets that are more or less independent provides different options for 2010. The consequence of other combinations of catch options can be explored on request.

Outlook assuming a TAC constraint for fleet A in 2009

Basis: Intermediate year (2009) with catch constraint

R_{09} (ICA)=32832 million; R_{10-11} =GM(YC 2001-2007)=21465 million

F fleet A	F fleet B	F fleet C	F fleet D	F₀₋₁	F₂₋₆	Catch fleet A	Catch fleet B	Catch Fleet C	Catch fleet D	SSB 2009
0.184	0.021	0.006	0.004	0.04	0.189	194.2	7.4	6.5	2.7	971

Scenarios for prediction year (2010)

	F-VALUES BY FLEET AND TOTAL						CATCHES BY FLEET				RESULTS			
	F Fleet A	F fleet B	F fleet C	F fleet D	F₀₋₁	F₂₋₆	Catch fleet A	Catch fleet B	Catch fleet C	Catch fleet D	SSB 2010¹⁾	SSB 2011	%SSB change²⁾	%TAC change fleet A³⁾
a	0	0	0	0	0	0	0	0	0	0	1133	1497	+32%	-100%
b	0.094	0.022	0.003	0.004	0.033	0.097	110.2	7.0	5.0	2.5	1063	1300	+22%	-36%
c	0.126	0.033	0.005	0.006	0.049	0.131	145.4	10.4	7.4	3.7	1040	1238	+19%	-15%
d	0.144	0.028	0.007	0.008	0.050	0.149	162.6	9.0	10.5	5.3	1027	1206	+17%	-5%
e	0.144	0.033	0.005	0.006	0.050	0.148	164.3	10.4	7.4	3.7	1027	1209	+18%	-4%
f	0.150	0.033	0.005	0.006	0.050	0.155	171.0	10.4	7.4	3.7	1023	1198	+17%	0%
g	0.174	0.033	0.005	0.006	0.051	0.179	196.7	10.4	7.4	3.7	1007	1160	+15%	+15%

Weights in '000 t.

Shaded areas are considered not in accordance with the precautionary approach.

All numbers apply to North Sea autumn-spawning herring only.

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

²⁾ SSB 2011 relative to SSB 2010.

³⁾ Calculated landings 2010 relative to TAC 2009.

Fleet definitions:

Fleet A: Directed herring fisheries with purse-seiners and trawlers (32 mm minimum mesh size) in the North Sea. Bycatches in the Norwegian industrial fisheries are included.

Fleet B: Herring taken as bycatch in the small-mesh fisheries in the North Sea under EU regulations (mesh size less than 32 mm).

Fleet C: Directed herring fisheries in Skagerrak and Kattegat with purse-seiners and trawlers (32 mm minimum mesh size).

Fleet D: Bycatches of herring caught in the small-mesh fisheries (mesh size less than 32 mm) in Skagerrak and Kattegat.

Management considerations

A reduction in fishing mortality to close to the target fishing mortality is expected to be achieved in 2009 (Figure 6.4.16.1). The SSB is expected to increase slightly both in 2010 and further in 2011, indicating that the current management has the potential to reverse the decline in the stock and stabilize it above the present level. The 2008 year class is estimated to be within the range of recent low recruitments. ICES assumes that the recruitment will remain at the low level. Delay in implementing substantial reductions in catch by not following the management plan has resulted in the SSB being at greater risk of being below B_{lim} and lower catches (Figure 6.4.16.3).

Landings of herring taken in the North Sea but reported from other areas such as Divisions IIa and IIIa and from Division VIaN have increased in 2008 compared to 2007. The total amount of catch in excess of the TAC in the human consumption fishery has increased as a proportion of the TAC to 17% (35 000 t).

Management of the autumn-spawning herring must be considered together with the Western Baltic Spring-Spawning herring. The options selected for the C- and D-fleets are compatible with the advised exploitation of Western Baltic Spring Spawners assuming a catch for 2010 of 39800 tonnes (see Section 6.4.7) and are 7.4 and 3.7 thousand tonnes of North Sea autumn spawning herring for C and D fleets respectively.

Downs herring

The sub-TAC for Divisions IVc and VIId was established for the conservation of the spawning aggregation of Downs herring. The Downs herring has returned to its pre-collapsed state and is now again a major component of the stock. It is probable that exploitation of Downs herring has been relatively high. In the absence of data to the contrary ICES proposes that a share of 11% of the total North Sea TAC (average share 1989–2002) would still be appropriate for Downs herring.

Management plan evaluations

The new management plan has been evaluated and the plan is consistent with the precautionary approach.

Impact of fisheries on the ecosystems

Herring is considered to have a major impact on most other fish stocks as prey and predator and is itself prey for seabirds and sea mammals. Herring spawning and nursery areas, being near the coasts, are particularly sensitive and vulnerable to anthropogenic influences. The most serious of these is the increasing extraction of marine sand and gravel and the development of wind farms on existing and historic spawning beds.

The human consumption fisheries for herring are considered relatively clean, with little bycatch of other fish and almost no disturbance to the seabed. The limited evidence from observer programmes suggest that discarding of herring is not wide-spread. Juvenile herring are bycaught in the industrial fisheries..

Factors affecting the fisheries and the stock

Regulations and their effects

In EU waters, slippage and high grading of herring is now prohibited in the North Sea herring fishery (EC Council Reg No 43/2009) as long as the fish are above minimum landing size and quota is available. The consequences of new regulation are unknown but thought have little impact on the catch estimates. In the Norwegian purse seine fisheries, slipping is permitted under conditions where the fish is assumed to be viable (likely to survive). This rule is currently under revision. High grading and discarding is not permitted.

Changes in fishing technology and fishing patterns.

There have been no major changes to fishing technology and fishing patterns of the fleets that target North Sea herring.

Impacts of the environment on the fish stock

North Sea herring has recently produced six poor year classes in a row, which has never been observed before at this SSB. Indications suggest that the 2008 year class is slightly higher but still lies within the bounds of the recent series of poor year classes. The survival of the larvae has been poor (Payne et al., 2009). The specific reasons for this are not known. The trends in herring recruitment are similar to the warming of the water on the spawning grounds and changes in the hydrography. These changes may be linked to the AMO (Atlantic Multidecadal Oscillation), and they are also associated with changes in the zooplankton community. Further investigation of the causes of the poor recruitment will require targeted research projects. Scientific basis

Data and methods

The stock assessment and projections used data from the landings and from four survey time-series of North Sea herring. Each of these surveys targets a different life stage of the herring. The landings and catch-at-age data is collated from Subarea IV and Divisions VIIId and IIIa. Some national catch estimates were corrected for unallocated and misreported catch.

Denmark and Norway provided information on bycatches of herring in the industrial fishery. These are the main countries conducting these fisheries.

Information from the fishing industry

Representatives from the pelagic industry after the ICES expert group express concern that for the last 2-3 years the fishermen's observations of the abundance of juvenile herring in the Eastern, Central and Southern part of the North Sea were higher than anticipated given the results of the assessment. The working group has found underestimation of the 2007 year-class and corrected for this in the current assessment, however, other year classes are still estimated at the same low level.

Uncertainties in assessment and forecast

ICES carried out a benchmark assessment of the North Sea autumn-spawning herring stock in 2006, checking the appropriate use of the survey indices and catch. The present assessment is an update of the benchmark assessment. Surveys show slightly divergent signals. The occurrence of misreported and unallocated catches leads to uncertainties in the assessment. The overall assessment gives a consistent basis for advice (figure 6.4.16.4).

There is no evidence that discarding of herring is a major problem at present for the estimation of population dynamics or conservation of North Sea herring.

Comparison with previous assessment and advice

The assessment is consistent with the assessment of 2008. The new assessment has revised the size of the 2007 year class but it is still estimated as poor and comparable with the other recent year classes.

The basis advice is different from last year. Last year ICES advised to implement a new management plan, this year it advises to follow the new management plan.

Source of information

Report of the Herring Assessment Working Group for the Area South of 62°N, 17–25 March 2009. ICES CM 2009/ACOM:03).

Report of the Workshop on Herring Management Plans (WKHMP). ICES CM 2008/ACOM:27.

Payne MR, Hatfield EMC, Dickey-Collas, M, Falkenhaus, T, Gallego, A, Gröger, J., Licandro, P, Llope, M, Munk, P, Röckmann, C, Schmidt, JO & Nash, RDM (2009). Recruitment in a changing environment: the 2000s North Sea herring recruitment failure. ICES J Mar Sci. 66: 272-277

Table 6.4.16.1 Herring caught in the North Sea (Subarea IV and Division VIIId). Single stock exploitation boundaries (advice), management and catch/landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC ¹	Bycatch ceiling Fleet B	ICES Lndgs. ⁴ IV, VIIId	ICES Catch ⁵ IV, VIIId	ICES Catch Autumn spawners IIIa, IV, VIIId
1987	TAC	610	600		625	625	792
1988	TAC	515	530		710	710	888
1989	TAC	514	514		669	717	787
1990	TAC	403	415		523	578	646
1991	TAC	423	420		537	588	657
1992	TAC	406	430		518	572	716
1993	No increase in yield at $F > 0.3$	340 ¹	430		495	540	671
1994	No increase in yield at $F > 0.3$	346 ¹	440		463	498	571
1995	Long-term gains expected at lower F	429 ¹	440		510	516	579
1996	50% reduction of agreed TAC ²	156 ¹	156 ³	44	207	233	275
1997	$F = 0.2$	159 ¹	159	24	175	238	264
1998	$F(\text{adult}) = 0.2, F(\text{juv}) < 0.1$	254 ¹	254	22	268	338	392
1999	$F(\text{adult}) = 0.2, F(\text{juv}) < 0.1$	265 ¹	265	30	290	333	363
2000	$F(\text{adult}) = 0.2, F(\text{juv}) < 0.1$	265 ¹	265	36	284	346	388
2001	$F(\text{adult}) = 0.2, F(\text{juv}) < 0.1$	See scenarios	265	36	296	323	363
2002	$F(\text{adult}) = 0.2, F(\text{juv}) < 0.1$	See scenarios	265	36	304	353	372
2003	$F(\text{adult}) = 0.25, F(\text{juv}) = 0.12$	See scenarios	400	52	414	450	480
2004	$F(\text{adult}) = 0.25, F(\text{juv}) = 0.1$	See scenarios	460	38	484	550	567
2005	$F(\text{adult}) = 0.25, F(\text{juv}) = 0.1$	See scenarios	535	50	568	639	664
2006	$F(\text{adult}) = 0.25, F(\text{juv}) = 0.12$	See scenarios	455	43	490	511	515
2007	Bring SSB above B_{pa} by 2008	See scenarios	341	32	361	388	407
2008	$F(\text{adult}) = 0.17, F(\text{juv}) = 0.08$ (MP)	See scenarios	201	19	228	245	258
2009	Adopt one of the new proposed HCRs	See scenarios	171	16			
2010	$F(\text{adult}) = 0.15, F(\text{juv}) = 0.05$ (MP)	See scenarios					

Weights in '000 t.

¹Catch in directed fishery in IV and VIIId.

²Revision of advice given in 1995.

³Revised in June 1996, down from 263.

⁴Landings are provided by the working group and do not in all cases correspond to official statistics.

⁵ICES catch includes unallocated and misreported landings, discards, and slipping.

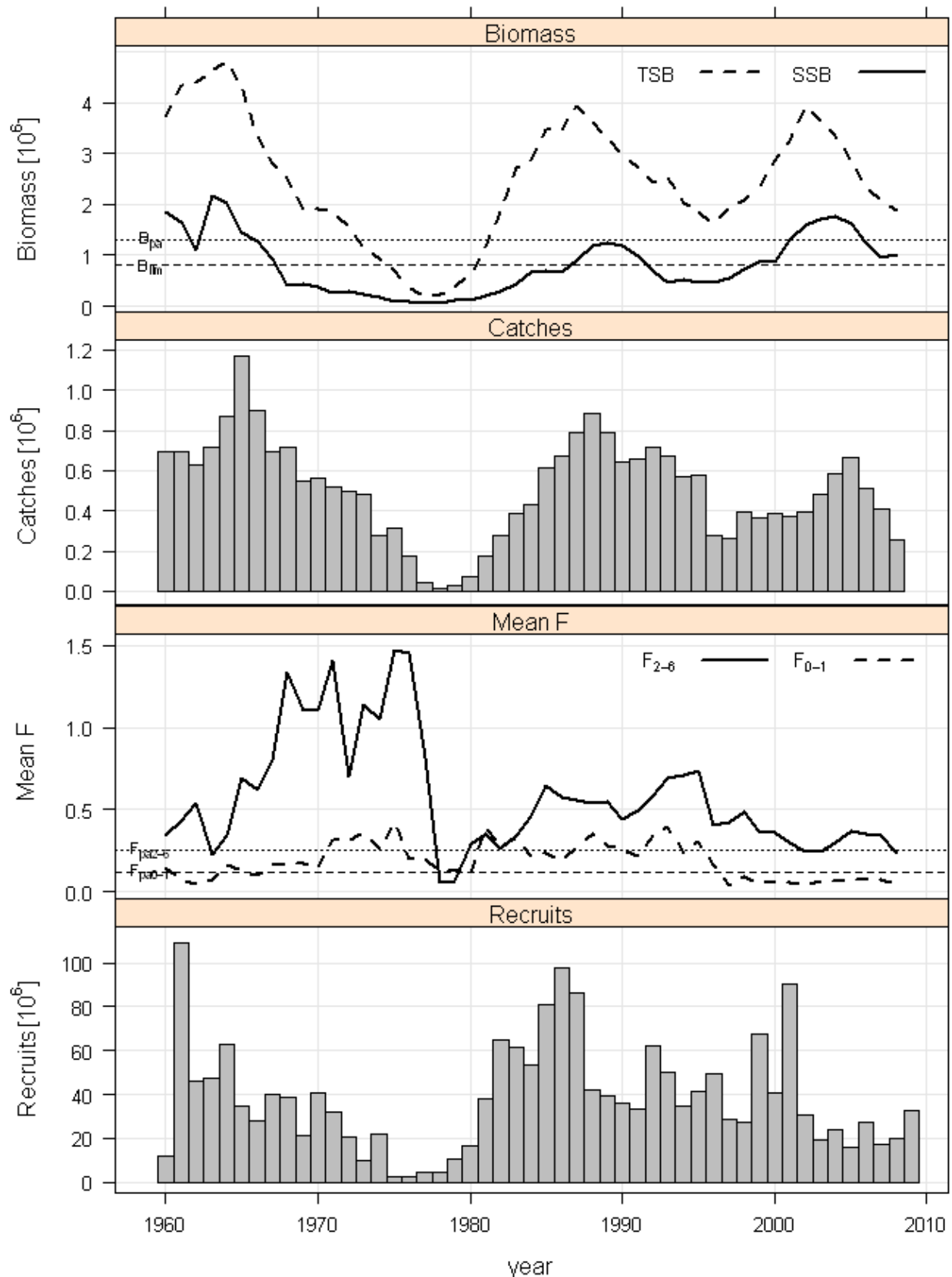


Figure 6.4.16.1 Herring in Subarea IV, Divisions VIIId & IIIa (autumn spawners), stock summary. Fishing mortality is expressed as averages over ages 2–6 (dots) and 0–1 (line). B_{pa} ($B_{trigger}$ in the previous Harvest control rule) and B_{lim} , $F_{pa\ 2-6}$ and $F_{pa\ 0-1}$ are shown. Recruitment is expressed as one year olds (0 winter ring).

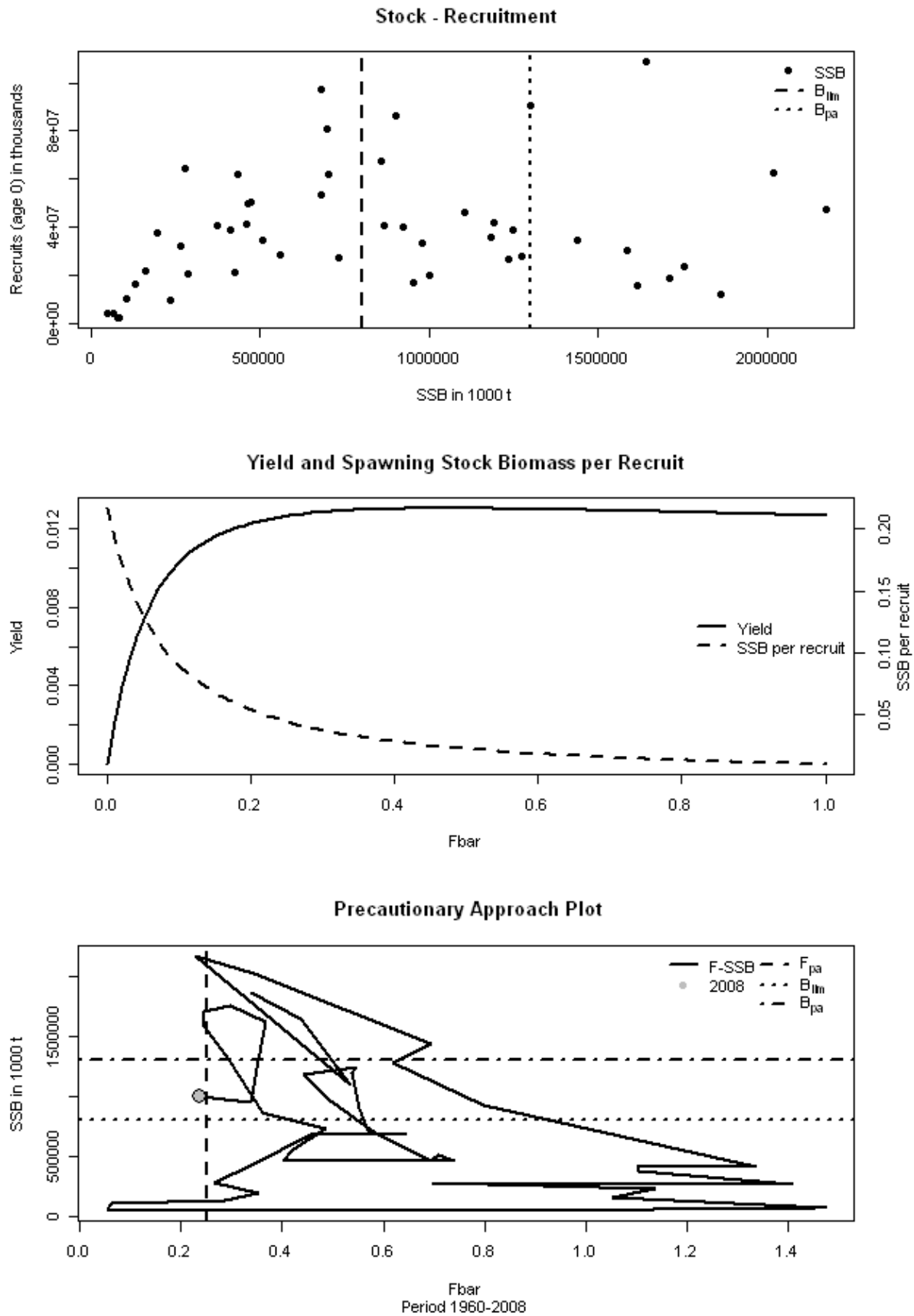


Figure 6.4.16.2 Herring in Subarea IV, Divisions VIIId & IIIa (autumn spawners). Stock and recruitment, yield, and precautionary approach.

Management plan North Sea Herring

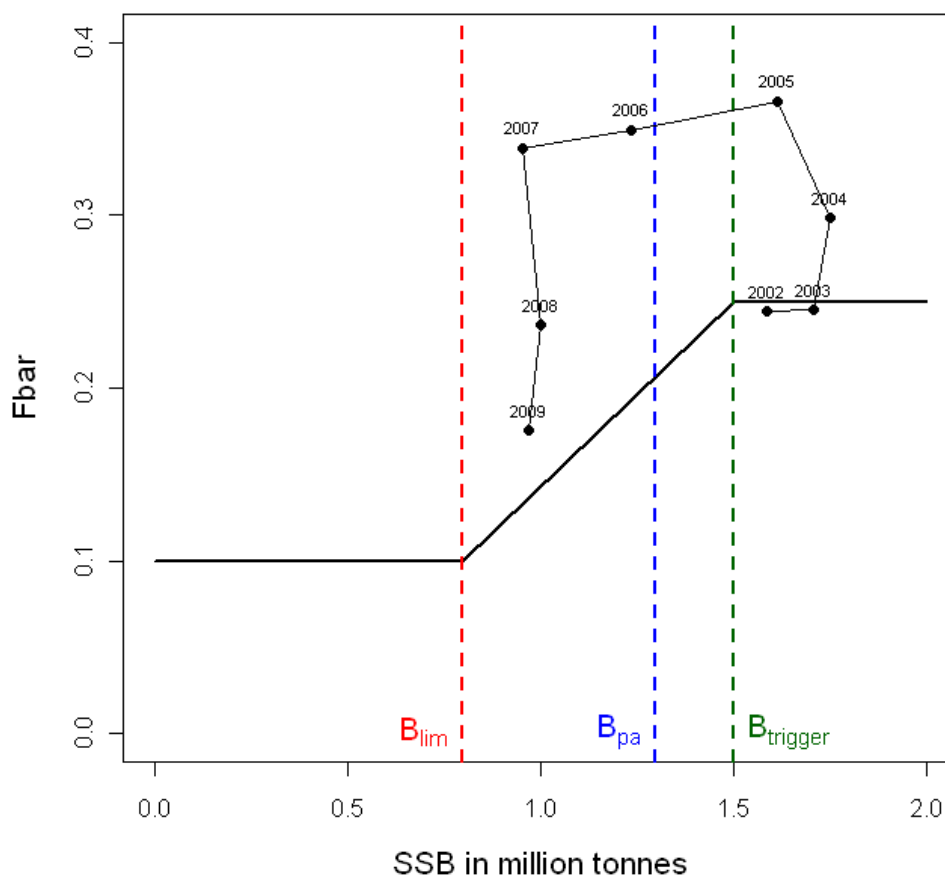


Figure 6.4.16.3 North Sea herring. Agreed management plan for adult fishery (A-fleet, ages 2-6) including trigger biomass points (B_{lim} and $B_{trigger}$) and B_{pa} . Black dots represent realised estimated fishing mortalities from 2002 until 2008. Fishing mortality in 2009 is estimated based on the agreed TACS for the A-fleet from the short term prediction.

Herring in Subarea IV and Divisions IIIa and VIId (North Sea autumn spawners)

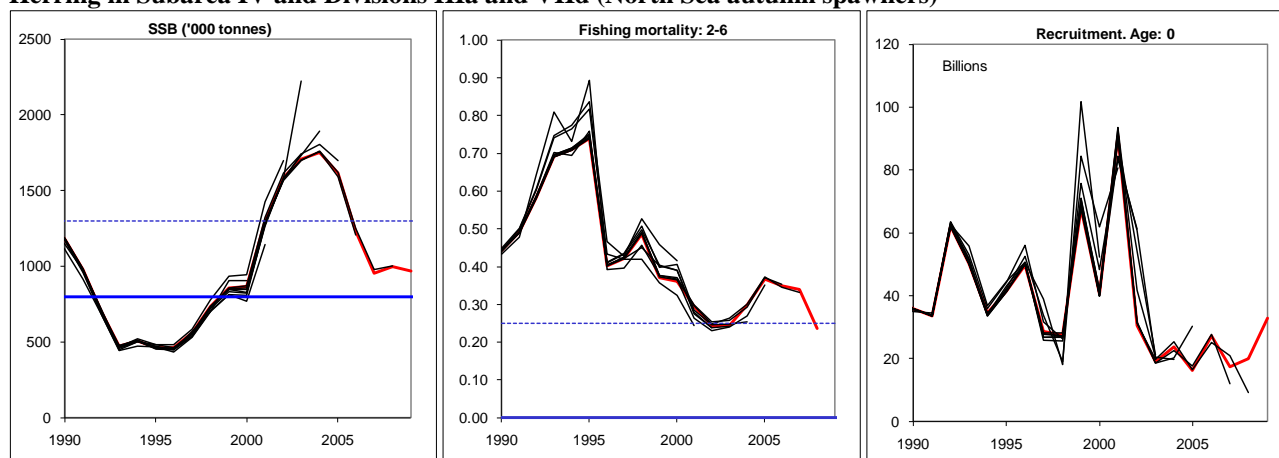


Figure 6.4.16.4 North Sea herring. Comparison of current assessment with previous assessments.

Table 6.4.16.2

Herring caught in the North Sea (Subarea IV and Division VIIId). Catch in tonnes by country, 1999–2008. These figures do not in all cases correspond to the official statistics and cannot be used for legal purposes.

Country	1999	2000	2001	2002	2003
Belgium	2	-	-	23	5
Denmark ⁶	61268	64123	67096	70825	78606
Faroe Islands	1977	915	1082	1413	627
France	26962	20952	24880	25422	31544
Germany	26764	26687	29779	27213	43953
Netherlands	54467	54341	51293	55257	81108
Norway ¹	74071	72072	75886	74974	112481
Poland	-	-	-	-	-
Sweden	3241	3046	3695	3418	4781
USSR/Russia	-	-	-	-	-
UK (England)	11434	11179	14582	13757	18639
UK (Scotland)	29911	30033	26719	30926	40292
UK (N.Ireland)	-	996	1018	944	2010
Unallocated landings	43327 ⁵	61673 ⁵	27362 ⁵	31552 ⁵	31875 ⁵
Total landings	333424	346017	323392	335724	445921
Discards	-	-	-	17093	4125
Total catch	333424	346017	323392	352817	450046
Estimates of the parts of the catches which have been allocated to spring spawning stocks					
IIIa type (WBSS)	4732	6649	6449	6652	2821
Thames estuary ²	88	76	107	60	84
Others ³	-	378	1097	0	308
Norw. Spring Spawners ⁴	32106	25678	7108	4069	979

Country	2004	2005	2006	2007	2008
Belgium	8	6	3	1	-
Denmark ⁶	99037	128380	102322	84697	62864
Faroe Islands	402	738	1785	2891	2014
France	34521	38829	49475	24909	30347
Germany	41858	46555	40414	14893	8095
Netherlands	96162	81531	76315	66393	23122
Norway ¹	137638	156802	135361	100050	59321
Poland	-	458	-	-	-
Sweden	5692	13464	10529	15448	13840
Russia	-	99	-	-	-
UK (England)	20855	25311	22198	15993	11717
UK (Scotland)	45331	73227	48428	35115	16021
UK (N.Ireland)	2656	2912	3531	638	331
Unallocated landings	48898 ⁵	57788	18764	26641	17151
Total landings	533058	626101	509125	387669	244823
Discards	17059	12824	1492	93	224
Total catch	550117	638925	510617	387762	245047
Estimates of the parts of the catches which have been allocated to spring spawning stocks					
IIIa type (WBSS)	7079	7039	10954	1070	124
Thames estuary ²	62	74	65	2	7
Others ³	0	0	0	0	0
Norw. Spring Spawners ⁴	452	417	626	685	2721

¹ Catches of Norwegian spring spawners removed (taken under a separate TAC).

² Landings from the Thames estuary area are included in the North Sea catch figure for UK (England).

³ Caught in the whole North Sea, partly included in the catch figure for The Netherlands

⁴ These catches (including some local fjord-type Spring Spawners) are taken by Norway under a separate quota south of 62°N and are not included in the Norwegian North Sea catch figure for this area.

⁵ may include misreported catch from VIaN and discards

⁶ Including any bycatches in the industrial fishery

Table 6.4.16.3

Herring caught in the North Sea. Catch in tonnes in Division IVa West. These figures do not in all cases correspond to the official statistics and cannot be used for legal purposes.

Country	1999	2000	2001	2002	2003
Denmark ¹	15359	25530	17770	26422	48358
Faroe Islands	1977	205	192	-	95
France	6369	3210	8164	10522	11237
Germany	11206	5811	17753	15189	25796
Netherlands	21552	15117	17503 ³	18289	25045
Norway	31395	33164	11653	10836	34443
Sweden	859	1479	-	-	-
Poland	-	-	1418	2397	2647
Russia	-	-	-	-	-
UK (England)	7999	8859	12283	10142	12030
UK (Scotland)	28537	29055	25105	30014	39970
UK (N. Ireland)	-	996	1018	944	2010
Unallocated landings	25469 ²	44334 ²	24725 ²	14201 ²	14115 ²
Misreporting from VIa North					
Total Landings	150722	167760	137584	138956	215746
Discards				17093	4125
Total catch	150722	167760	137584	156049	219871

Country	2004	2005	2006	2007	2008
	48128	80990	60462	45948	28426
Faroe Islands	-		580	1118	2
France	10941	13474	18453	8570	13068
Germany	17559	22278	18605	4985	498
Netherlands	43876	36619	39209	42622	11634
Norway	36119	66232	38363	40279	40304
Poland	-	458	-	-	-
Sweden	2178	8261	4957	7658	7025
Russia	-	99	-	-	-
UK (England)	13480	15523	12031	11833	8355
UK (Scotland)	43490	71941	47368	35115	14727
UK (N. Ireland)	2656	2912	3531	638	331
Unallocated landings	28631 ²	39324 ²	10981 ²	22215	14952
Misreporting from VIa North					
Total Landings	247058	358111	253048	220981	139322
Discards	15794	10861	1492	93	194
Total catch	262852	368972	254540	221074	139516

¹ Including any by-catches in the industrial fishery

² May include misreported catch from VIaN and discards

³ Including 1057 t of local spring spawners

Table 6.4.16.4 Herring caught in the North Sea. Catch in tonnes in Division IVa East. These figures do not in all cases correspond to the official statistics and cannot be used for legal purposes.

Country	1999	2000	2001	2002	2003
Denmark 1	18259	11300	18466	17846	7401
Faroe Islands	-	710	890	1365	359
France	115	-	-	-	-
Germany	-	29	-	81	54
Netherlands	-	38	-	-	-
Norway 2	39977	38655	56904	63482	62306
Sweden	772	1177	517	568	1529
Unallocated landings	-	338	0	3959	998
Total landings	59123	52247	76777	89303	83640
Discards	-	-	-	-	-
Total catch	59123	52247	76777	89303	83640
Norw. Spring Spawners 4	32106	25678	7108	4069	979

Country	2004	2005	2006	2007	2008
Denmark 1	16278	5761	8614	2646	1587
Faroe Islands	-	738	975	577	400
France	-	-	-	-	-
Germany	888	-	34	-	-
Netherlands	-	-	-	263	-
Norway 2	100443	89925	90065	54424	17474
UK (Scotland)	-	-	83	-	-
Sweden	1720	3510	2857	640	-
Unallocated landings	0	0	0	-96 3	0
Total landings	119329	99934	102628	58454	19461
Discards	-	-	-	-	-
Total catch	119329	99934	102628	58454	19461
Norw. Spring Spawners 4	452	417	626	685	2721

¹ Including any by-catches in the industrial fishery

² Catches of Norwegian spring spawning herring removed (taken under a separate TAC)

³ Negative unallocated catches due to misreporting into other areas

⁴ These catches (including some fjord-type spring spawners) are taken by Norway under a separate quota south of 62°N and are not included in the Norwegian North Sea catch figure for this area

Table 6.4.16.5 Herring caught in the North Sea. Catch in tonnes in Division IVb. These figures do not in all cases correspond to the official statistics and cannot be used for legal purposes.

Country	1999	2000	2001	2002	2003
Belgium	1	-	-	-	-
Denmark ¹	26211	26825	30277	26387	22574
Faroe Islands	-	-	-	48	173
France	7634	10863	7796	4214	7918
Germany	13529	18818	8340	7577	12116
Netherlands	22343	26839	24160	13154	19115
Norway	2699	253	7329	656	15732
Sweden	1610	390	1760	453	605
UK (England)	1641	669	814	317	2632
UK (Scotland)	1374	978	1614	289	322
Unallocated landings ³	-3794 ⁴	-9820 ⁴	-22885 ⁴	4052	-2401
Total landings	73248	75815	59205	57147	78786
Discards ²					
Total catch	73248	75815	59205	57147	78786

Country	2004	2005	2006	2007	2008
Belgium	-	-	-	-	-
Denmark ¹	33857	41423	32277	35990	32230
Faroe Islands	402	-	200	1196	1612
France	10592	10205	17385	8421	9687
Germany	13823	14381	14222	2205	2415
Netherlands	23649	10038	13363	8550	904
Norway	1076	645	6933	5347	1543
Sweden	1794	1694	2715	7150	6815
UK (England)	2864	3869	4924	577	833
UK (Scotland)	1841	1286	977	-	1293
Unallocated landings ³	8300	10233	2364	-203	-904
Total landings	98198	93774	95360	69233	56428
Discards ²	1265	1963			30
Total catch	99463	95737	95360	69233	56458

¹ Including any by-catches in the industrial fishery

² Discards partly included in unallocated landings

³ Negative unallocated catches due to misreporting from other areas

⁴ May include discards. Negative unallocated due to misreporting into other areas

Table 6.4.16.6 Herring caught in the North Sea. Catch in tonnes in Divisions IVc and VIId. These figures do not in all cases correspond to the official statistics and cannot be used for legal purposes.

Country	1999	2000	2001	2002	2003
Belgium	1	1	-	23	5
Denmark	1439	468	583	170	273
France	12844	6879	8750	10686	12389
Germany	2029	2029	3686	4366	5987
Netherlands	10572	12348	9630	23814	36948
UK (England)	1794	1651	1485	3298	3977
UK (Scotland)	-	-	-	623	-
Unallocated landings	21652 ³	26822 ³	25522 ³	5336	8170
Total landings	50331	50198	49656	50318	67749
Discards ²				-	-
Total catch	50331	50198	49656	50318	67749
Coastal spring spawners included above ¹	88	76	147 ⁴	60	84

Country	2004	2005	2006	2007	2008
Belgium	8	6	3	1	-
Denmark	774	206	969	113	621
Faroe Islands	-	-	30	-	-
France	12988	15150	13637	7918	7592
Germany	9588	9896	7553	7703	5182
Netherlands	28637	34874	23743	14958	10584
UK (England)	4511	5919	5243	3583	2529
UK (Scotland)	-	-	-	-	1
Unallocated landings	11967	8231	5419	4725	3103
Total landings	68473	74282	56597	39001	29612
Discards ²	-	-	-	-	-
Total catch	68473	74282	56597	39001	29612
Coastal spring spawners included above ¹	62	74	65	2	7

¹ Landings from the Thames estuary area are included in the North Sea catch figure for UK (England)

² Discards partly included in unallocated landings

³ May include misreported catch and discards

⁴ Thames/Blackwater herring landings: 107 t, others included in the catch figure for The Netherlands

Table 6.4.16.7 (“The Wonderful table”). HERRING in Subarea IV, Division VIIId and Division IIIa. Figures in thousand tonnes.

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sub-Area IV and Division VIIId: TAC (IV and VIIId)																		
Recommended Divisions IVa, b	352	290 ⁵	296 ⁵	389 ⁸	156	159	254	265	265	- 15	- 15	- 15	- 15	- 15	- 15	- 15	- 15	- 15
Recommended Divisions IVc, VIIId	54	50	50	50	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11	- 11
Expected catch of spring spawners	10	8																
Agreed Divisions IVa,b ¹	380	380	390	390	263;131 ¹⁰	134	229	240	240	240	223	340.5	393.9	460.7	404.7	303.5	174.6	147.4
Agreed Div. IVc, VIIId	50	50	50	50	50; 25 ¹⁰	25	25	25	25	25	42.7	59.5	66.1	74.3	50.0	37.5	26.7	23.6
Bycatch ceiling in the small mesh fishery						24	22	30	36	36	36	52.0	38.0	50.0	42.5	31.9	18.8	16.0
CATCH (IV and VIIId)																		
National landings Divisions IVa,b ²	481	463	421	465	183	149	245	261	261	272	261	354.5	427.7	502.3	439.2	326.8	201.2	
Unallocated landings Divisions IVa,b	14	-1	6	-15	-5	36	44	22	35	2	24	23.7	36.9	49.6	13.3	21.9	14.0	
Discard/slipping Divisions IVa,b ³	3	1	1	-	-	-	-	-	-	-	17	4.1	17.1	12.8	1.5	0.1	0.2	
Total catch Divisions IVa,b ⁴	498	463	428	450	178	185	289	283	296	273	303	382.3	481.6	564.6	454.0	348.8	215.4	
National landings Divisions IVc, VIIId ³	37	32	42	45	24	26	23	29	23	24	43	59.5	56.5	66.1	51.2	34.3	26.5	
Unallocated landings Divisions IVc, VIIId	35	43	30	22	31	27	27	22	27	26	7	8.2	12.0	8.2	5.4	4.7	3.1	
Discard/slipping Divisions IVc, VIIId ³	2	2	2	-	-	-	-	-	-	-	0	-	-	-	-	-	-	
Total catch Divisions IVc, VIIId	74	77	74	67	55	53	49	50	50	50	50	67.7	68.5	74.3	56.6	39.0	29.6	
Total catch IV and VIIId as used by ICES⁴	572	540	498	516	233	238	338	333	346	323	353	450.0	550.1	638.9	510.6	387.8	245.0	
CATCH BY FLEET/STOCK (IV and VIIId)⁷																		
North Sea autumn spawners directed fisheries (Fleet A)	441	438	447	439	195	225	316	313	322	296	323	434.9	529.5	610.0	487.1	379.6	236.3	
North Sea autumn spawners industrial (Fleet B)	124	101	38	67	38	13	14	15	18	20	22	12.3	13.6	21.8	11.9	7.1	8.6	
North Sea autumn spawners in IV and VIIId total	564	539	485	506	233	237	330	329	339	317	346	447.2	543.0	631.9	499.0	386.7	244.9	
Baltic-IIIa-type spring spawners in IV	8	9	13	10	1	1	8	5	7	6	7	2.8	7.1	7.0	11.0	1.1	0.1	
Coastal-type spring spawners	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	1.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	
Norw. Spring Spawners caught under a separate quota in IV ¹⁴	5	9	6	10	30	55	29	32	26	7	4	1.0	0.5	0.4	0.6	0.7	2.7	
Division IIIa: TAC (IIIa)																		
Predicted catch of autumn spawners	153	102	77	98	48	35	58	43	53	- 15	- 15	- 15	- 15	- 15	- 15	- 15	- 15	- 15
Recommended spring spawners	90	93-113	- 6	- 9	- 9	- 12	- 12	- 12	- 12	- 12	- 12	- 12	- 15	- 15	- 15	- 15	- 15	- 15
Recommended mixed clupeoids	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agreed herring TAC	124	165	148	140	120	80	80	80	80	80	80	80.0	70.0	96.0	81.6	69.4	51.7	37.7
Agreed mixed clupeoid TAC	50	45	43	43	43													
Bycatch ceiling in the small mesh fishery						20	17	19	21	21	21	21.0	21.0	24.2	20.5	15.4	11.5	8.4
CATCH (IIIa)																		
National landings	227	214	168	157	115	83	120	86	108	90	79	76.0	61.1	90.8	88.9	47.3	38.2	
Catch as used by ICES	227	214	168	140	105	74	108	79	99	82	73	68.1	52.7	69.6	51.2	47.4	38.2	
CATCH BY FLEET/STOCK (IIIa)⁷																		
Autumn spawners human consumption (Fleet C)	47	44	42	38	24	21	59	28	36	34	17	24.1	13.4	22.9	11.6	16.4	9.2	
Autumn spawners mixed clupeoid (Fleet D) ¹³	23	25	12	6	9	4	6	8	13	12	9	8.4	10.8	9.0	3.4	3.4	3.7	
Autumn spawners other industrial landings (Fleet E)	82	63	32	29	8	2												
Autumn spawners in IIIa total	152	132	86	73	43	27	61	34	49	46	26	32.5	24.2	31.9	15.0	19.8	12.9	
Spring spawners human consumption (Fleet C)	53	68	59	44	58	43	40	40	45	33	38	31.6	16.8	32.5	30.2	25.3	23.0	
Spring spawners mixed clupeoid (Fleet D) ¹³	2	1	1	2	4	3	3	3	5	3	9	4.0	11.2	5.1	5.9	2.3	2.2	
Spring spawners other industrial landings (Fleet E)	20	12	24	21	2	1												
Spring spawners in IIIa total	75	81	84	67	64	47	43	43	50	36	47	35.6	28.0	37.6	36.1	27.6	25.2	
North Sea autumn spawners Total as used by ICES	716	671	571	579	275	264	392	363	388	363	372	479.7	567.2	663.8	514.6	406.5	257.9	

¹ IVa,b and EC zone of IIa. ² Provided by Working Group members. ³ Incomplete, only some countries providing discard information. ⁴ Includes spring spawners not included in assessment. ⁵ Based on F=0.3 in directed fishery only; TAC advised for IVc, VIIId subtracted. ⁶ 130-180 for spring spawners in all areas. ⁷ Based on sum-of-products (number x mean weight at age). ⁸ Status quo F catch for fleet A. ⁹ The catch should not exceed recent catch levels. ¹⁰ During the middle of 1996 revised to 50% of its original agreed TAC. ¹¹ Included in IVa,b. ¹² Managed in accordance with autumn spawners. ¹³ Fleet D and E are merged from 1999 onwards. ¹⁴ These catches (including local fjord-type Spring Spawners) are taken by Norway under a separate quota south of 62°N and are not included in the Norwegian North Sea catch figure for this area. ¹⁵ See catch option tables for different fleets.

Table 6.4.16.8 Herring in Subarea IV, Divisions IIIa and VIIId (autumn spawners). Summary of the assessment.

Year	Recruitment Age 0* (thousands)	TSB (tonnes)	SSB (tonnes)	Fbar (2-6 wr)	Fbar (0-1 wr)	Landings (tonnes)
1960	12087837	3723796	1861453	0.339	0.141	696200
1961	1.09E+08	4343827	1643371	0.436	0.074	696700
1962	46275907	4385355	1103051	0.536	0.047	627800
1963	47657598	4611329	2172543	0.227	0.069	716000
1964	62784953	4783461	2018320	0.344	0.161	871200
1965	34894783	4332831	1438153	0.694	0.127	1168800
1966	27858148	3310426	1274731	0.62	0.103	895500
1967	40255855	2816512	921824	0.798	0.162	695500
1968	38698462	2520863	412347	1.336	0.168	717800
1969	21581503	1905376	424149	1.105	0.169	546700
1970	41072449	1921915	374690	1.106	0.152	563100
1971	32306362	1849388	266027	1.408	0.318	520100
1972	20858534	1549403	288267	0.697	0.318	497500
1973	10102036	1155880	233324	1.135	0.36	484000
1974	21688511	911745	161930	1.053	0.263	275100
1975	2814491	679921.7	81542	1.473	0.423	312800
1976	2720374	358115	77673	1.451	0.199	174800
1977	4326038	209911.7	47180	0.815	0.198	46000
1978	4594665	224320.4	64421	0.054	0.123	11000
1979	10600186	381521.6	106648	0.065	0.125	25100
1980	16716729	629858.8	130506	0.285	0.12	70764
1981	37860685	1158012	195088	0.353	0.384	174879
1982	64740217	1842378	277945	0.264	0.28	275079
1983	61794951	2717821	431973	0.338	0.326	387202
1984	53439842	2863511	678583	0.456	0.216	428631
1985	80893853	3460696	698559	0.644	0.234	613780
1986	97583821	3470897	678431	0.573	0.189	671488
1987	86180225	3934292	899264	0.553	0.267	792058
1988	42262187	3618637	1192606	0.539	0.353	887686
1989	39173461	3307320	1247533	0.547	0.281	787899
1990	35871987	2973566	1182522	0.443	0.256	645229
1991	33634923	2712273	978026	0.491	0.213	658008
1992	62138096	2433999	701221	0.584	0.342	716799
1993	50250988	2515706	470816	0.692	0.399	671397
1994	34500565	2022344	508453	0.709	0.236	568234
1995	41602863	1841589	460948	0.739	0.308	579371
1996	49747245	1623068	462153	0.402	0.165	275098
1997	28730419	1946579	560344	0.421	0.035	264313
1998	27373602	2066499	733708	0.486	0.088	391628
1999	67697220	2331906	857946	0.37	0.043	363163
2000	40678164	2858801	865448	0.362	0.062	388157
2001	90678376	3236723	1301315	0.294	0.051	374065
2002	30444152	3933140	1587054	0.244	0.04	394709
2003	19069558	3647278	1708980	0.245	0.063	482281
2004	23729100	3343288	1752878	0.298	0.062	587698
2005	16141706	2862232	1615686	0.366	0.075	663813
2006	27136239	2340941	1233800	0.349	0.072	514597
2007	17358063	2085122	952774	0.339	0.07	406482
2008	20044858	1868927	999336	0.236	0.049	257870
2009	32832169		971000**			

* Age 1 (0 winterrings (wr))

** Predicted value

Annex 6.4.16 Agreed Management Plan for North Sea herring

According to the EU–Norway agreement (November 2008):

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 800,000 tonnes (Blim).
2. Where the SSB is estimated to be above 1.5 million tonnes the Parties agree to set quotas for the directed fishery and for bycatches in other fisheries, reflecting a fishing mortality rate of no more than 0.25 for 2 ringers and older and no more than 0.05 for 0 - 1 ringers.
3. Where the SSB is estimated to be below 1.5 million tonnes but above 800,000 tonnes, the Parties agree to set quotas for the direct fishery and for bycatches in other fisheries, reflecting a fishing mortality rate on 2 ringers and older equal to:

0.25-(0.15(1,500,000-SSB)/700,000) for 2 ringers and older,
and no more than 0.05 for 0 - 1 ringers*

4. Where the SSB is estimated to be below 800,000 tonnes the Parties agree to set quotas for the directed fishery and for bycatches in other fisheries, reflecting a fishing mortality rate of less than 0.1 for 2 ringers and older and of less than 0.04 for 0-1 ringers.
5. Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15 % from the TAC of the preceding year the parties shall fix a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.
6. Notwithstanding paragraph 5 the Parties may, where considered appropriate, reduce the TAC by more than 15 % compared to the TAC of the preceding year.
7. Bycatches of herring may only be landed in ports where adequate sampling schemes to effectively monitor the landings have been set up. All catches landed shall be deducted from the respective quotas set, and the fisheries shall be stopped immediately in the event that the quotas are exhausted.
8. The allocation of the TAC for the directed fishery for herring shall be 29 % to Norway and 71 % to the Community. The bycatch quota for herring shall be allocated to the Community.
9. A review of this arrangement shall take place no later than 31 December 2011.
10. This arrangement enters into force on 1 January 2009.