Herring (*Clupea harengus*) in subareas 1, 2, and 5, and in divisions 4.a and 14.a, Norwegian spring-spawning herring (the Northeast Atlantic and the Arctic Ocean)

ICES advice on fishing opportunities

ICES advises that when the long-term management strategy agreed by the European Union, the Faroe Islands, Iceland, Norway, and the Russian Federation is applied, catches in 2021 should be no more than 651 033 tonnes.

Note: This advice sheet is abbreviated due to the COVID-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

Stock development over time

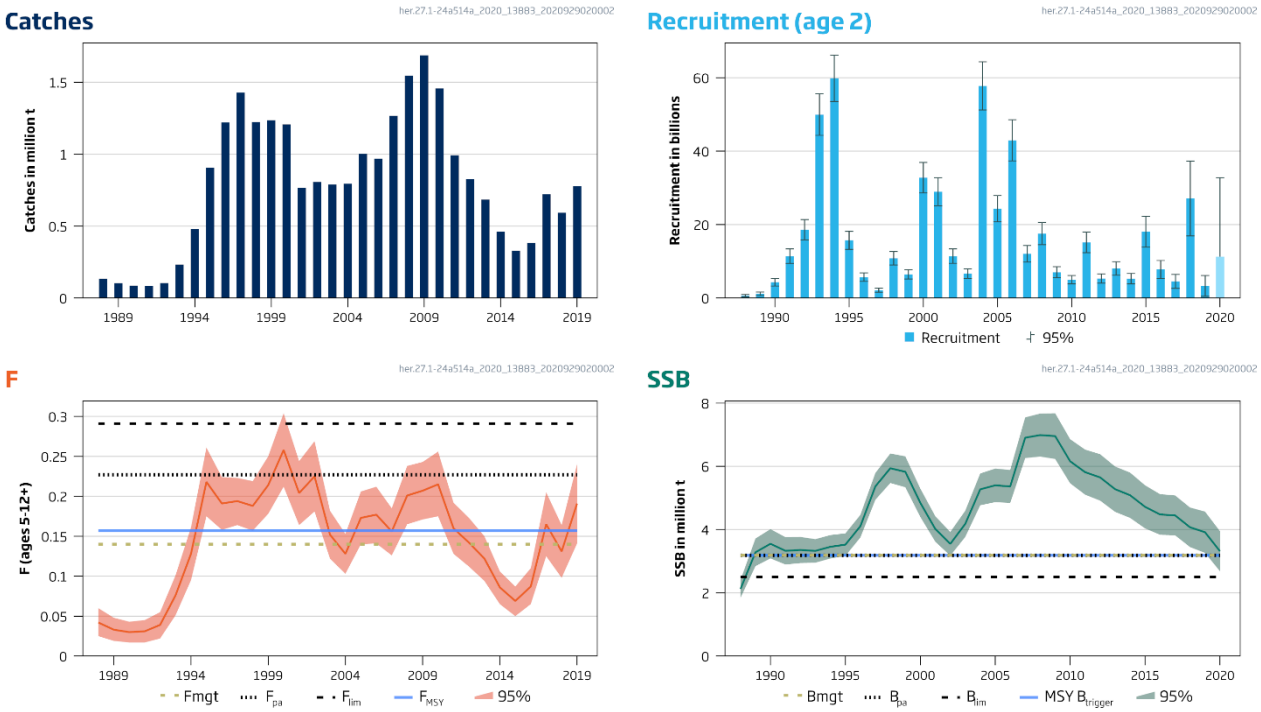

Figure 1 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Summary of the stock assessment. The assumed recruitment value for 2020 is shaded in a paler colour. F is the fishing mortality weighted by population numbers, and SSB is the spawning-stock biomass. Plots show the relevant confidence intervals.

Stock and exploitation status

Table 1 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). State of the stock and the fishery relative to reference points.

		Fishing pressure				Stock size			
		2017	2018	2019		2018	2019	2020	
Maximum sustainable yield	F_{MSY}	✗	✓	✗	Above	MSY $B_{trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{mgt}	✗	✓	✗	Above	B_{mgt}	✓	✓	✓ Above

Catch scenarios

Table 2 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). The basis for the catch scenarios.

Variable	Value	Notes
$F_{ages\ 5–12+}$ (2020)	0.187	Based on ICES assumed catches in 2020
SSB (2021)	3 504 683 tonnes	From the assessment model
$R_{age\ 2}$ (2020)	11.255 billion	Median stochastic recruitment based on the years 1988–2019
$R_{age\ 2}$ (2021)	11.255 billion	Median stochastic recruitment based on the years 1988–2019
Catch (2020)	693 915 tonnes	Sum of the declared national quotas

Table 3 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2021)	F (2021)	SSB (2022)	% SSB change *	% Catch change **	% Advice change ***
ICES advice basis						
Agreed management strategy ^	651033	0.14	3683236	5	−6	24
Other scenarios						
MSY approach: F_{MSY}	722964	0.157	3623608	3	4	38
F = 0	0	0	4225988	21	−100	−100
F_{pa}	1004581	0.227	3390898	−3	45	91
F_{lim}	1242950	0.291	3194919	−9	79	136
SSB (2022) = B_{lim}	2099298	0.568	2500000	−29	203	299
SSB (2022) = B_{pa} = MSY $B_{trigger}$	1256299	0.295	3184000	−9	81	139
F = F_{2020}	846569	0.187	3521321	0.5	22	64

* SSB 2022 relative to SSB 2021.
** Catch in 2021 relative to ICES estimated catch in 2020 (693 915 tonnes).
*** Advice value 2021 relative to advice value 2020 (525 594 tonnes).
^ According to the harvest control rule in the management strategy F (2021) = F_{mgt} = 0.14, since the SSB is forecasted to be above $B_{trigger}$ on 1 January 2021.

The advice for 2021 is 24% higher than that for 2020 due to an upward revision in the 2016 year class, which contributes more to the catches in 2021.

Quality of the assessment

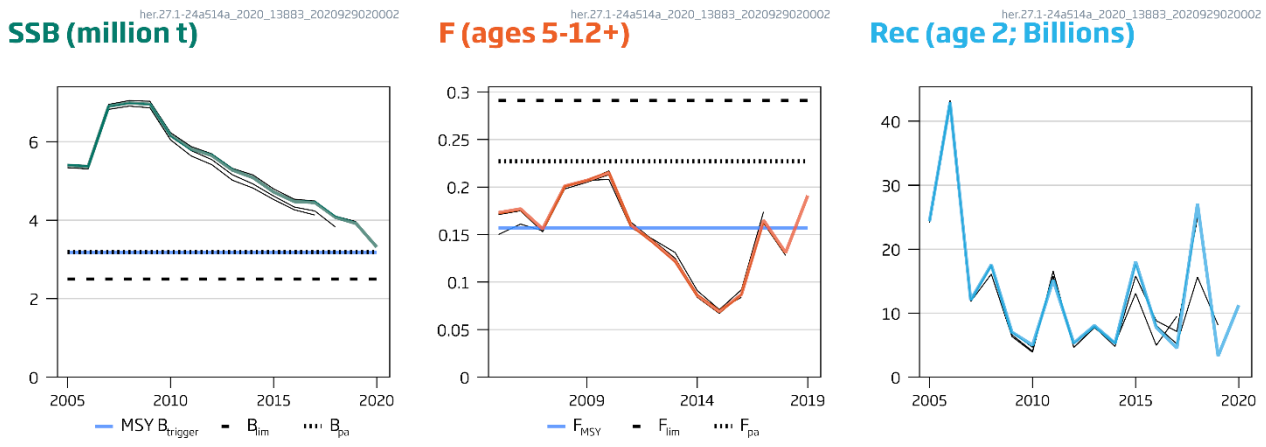

Figure 2 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Historical assessment results.

History of the advice, catch, and management

Table 4 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). ICES advice and landings. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Sum of agreed quotas	ICES catch
1987	TAC	150000	115000	127306
1988	TAC	120000–150000	120000	135301
1989	TAC	100000	100000	103830
1990	TAC	80000	80000	86411
1991	No fishing from a biological point of view	0	76000	84683
1992	No fishing from a biological point of view	0	98000	104448
1993	No increase in F	119000	200000	232457
1994	Gradual increase in F towards $F_{0.1}$; TAC suggested	334000	450000	479228
1995	No increase in F	513000	900000 *	905501
1996	Keep SSB above 2.5 million tonnes	-	1425000 *	1220283
1997	Keep SSB above 2.5 million tonnes	-	1500000	1426507
1998	Do not exceed the harvest control rule	-	1300000	1223131
1999	Do not exceed the harvest control rule	1263000	1300000	1235433
2000	Do not exceed the harvest control rule	≤ 1500000	1250000	1207201
2001	Do not exceed the harvest control rule	753000	850000	766136
2002	Do not exceed the harvest control rule	853000	850000	807795
2003	Do not exceed the harvest control rule	710000	711000 *	789510
2004	Do not exceed the harvest control rule	825000	825000 *	794066
2005	Do not exceed the harvest control rule	890000	1000000 *	1003243
2006	Do not exceed the harvest control rule	732000	967000 *	968958
2007	Do not exceed the harvest control rule	1280000	1280000	1266993
2008	Do not exceed the harvest control rule	1518000	1518000	1545656
2009	Do not exceed the harvest control rule	1643000	1643000	1687371
2010	Do not exceed the harvest control rule	1483000	1483000	1457015
2011	See scenarios in the 2010 advice	988000–1170000	988000	992997
2012	Follow the management plan	833000	833000	826000
2013	Follow the management plan	619000	692000 *	684743
2014	Follow the management plan	418487	436893 *	461306
2015	Follow the management plan	283013	328206 *	328740
2016	Follow the management plan	≤ 316876	376612 *	383174
2017	Follow the management plan	≤ 437364 **	805142 *	721566
2018	Follow the management plan	≤ 384197	546448 *	592899
2019	Follow the management strategy, F_{mgt} = 0.14 and B_{mgt} = 3.184 million t	≤ 588562	773750 *	777165
2020	Follow the management strategy, F_{mgt} = 0.14 and B_{mgt} = 3.184 million tonnes	≤ 525594	693915 *	
2021	Follow the management strategy, F_{mgt} = 0.14 and B_{mgt} = 3.184 million tonnes	≤ 651033		

* There was no agreement on the TAC; the number is the sum of autonomous quotas from the individual parties.
** Value corrected in October 2017 (previously 646 075 tonnes).

Table 5 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Catches inside and outside the NEAFC Regulatory Area (RA), as estimated by ICES, as well as total landings. Weights are in tonnes.

Year	Inside the NEAFC RA	Outside the NEAFC RA	Total catches	Percentage inside the NEAFC RA
2019	281092	496073	777165	36

Summary of the assessment

Table 6 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Assessment summary. All weights are in tonnes and recruitment in thousands.

Year	Recruitment (age 2)			SSB			Total catch	F (ages 5–12+)		
	Low	Value	High	Low	Value	High		Low	Value	High
1988	342000	660000	977000	1840000	2122000	2404000	135301	0.025	0.042	0.060
1989	687000	1171000	1654000	2844000	3281000	3717000	103830	0.0190	0.033	0.048
1990	3259000	4307000	5356000	3088000	3551000	4014000	86411	0.0170	0.030	0.043
1991	9429000	11401000	13374000	2895000	3328000	3760000	84683	0.0170	0.031	0.045
1992	15830000	18620000	21410000	2941000	3354000	3767000	104448	0.022	0.039	0.055
1993	44310000	49953000	55595000	2954000	3326000	3697000	232457	0.051	0.076	0.101
1994	53523000	59830000	66137000	3086000	3456000	3826000	479228	0.095	0.128	0.161
1995	13277000	15722000	18168000	3169000	3524000	3879000	905501	0.175	0.22	0.26
1996	4546000	5704000	6863000	3750000	4107000	4464000	1220283	0.158	0.191	0.22
1997	1578000	2156000	2733000	4941000	5365000	5789000	1426507	0.164	0.194	0.22
1998	8993000	10836000	12679000	5473000	5939000	6405000	1223131	0.157	0.188	0.22
1999	5187000	6446000	7705000	5339000	5827000	6316000	1235433	0.178	0.21	0.25
2000	28648000	32789000	36929000	4400000	4848000	5297000	1207201	0.21	0.26	0.30
2001	25151000	28974000	32798000	3617000	4020000	4423000	766136	0.164	0.20	0.24
2002	9433000	11399000	13364000	3174000	3548000	3923000	807795	0.181	0.23	0.27
2003	5348000	6675000	8002000	3766000	4180000	4595000	789510	0.122	0.152	0.182
2004	51213000	57781000	64349000	4769000	5272000	5774000	794066	0.103	0.128	0.153
2005	20785000	24348000	27911000	4868000	5399000	5929000	1003243	0.140	0.173	0.21
2006	37336000	42944000	48551000	4842000	5364000	5886000	968958	0.141	0.177	0.21
2007	9808000	12059000	14310000	6261000	6904000	7547000	1266993	0.126	0.156	0.185
2008	14540000	17566000	20592000	6308000	6988000	7668000	1545656	0.165	0.20	0.24
2009	5547000	7036000	8524000	6233000	6956000	7679000	1687373	0.171	0.21	0.24
2010	3867000	5004000	6141000	5463000	6160000	6858000	1457014	0.175	0.22	0.26
2011	12375000	15176000	17977000	5103000	5815000	6528000	992998	0.128	0.160	0.192
2012	4076000	5323000	6570000	4916000	5650000	6384000	825999	0.112	0.142	0.173
2013	6231000	8062000	9894000	4560000	5277000	5994000	684743	0.094	0.122	0.150
2014	3879000	5299000	6719000	4370000	5086000	5802000	461306	0.065	0.086	0.106
2015	13841000	18059000	22277000	4038000	4719000	5400000	328740	0.050	0.069	0.087
2016	5303000	7769000	10236000	3835000	4477000	5119000	383174	0.065	0.087	0.110
2017	2617000	4537000	6457000	3820000	4450000	5081000	721566	0.125	0.165	0.21
2018	16906000	27096000	37286000	3447000	4072000	4697000	592899	0.098	0.131	0.164
2019	479000	3305000	6131000	3263000	3916000	4569000	777165	0.141	0.191	0.24
2020	0	11255000	32781000	2682000	3315000	3948000				

Sources and references

ICES. 2020. Working Group on Widely Distributed Stocks (WGWIDE). ICES Scientific Reports. 2:82. 1019 pp. http://doi.org/10.17895/ices.pub.7475

Recommended citation: ICES. 2020. Herring (*Clupea harengus)* in subareas 1, 2, and 5, and in divisions 4.a and 14.a, Norwegian spring-spawning herring (the Northeast Atlantic and the Arctic Ocean). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, her.27.1-24a514a. https://doi.org/10.17895/ices.advice.5876.

Annex 1

ICES Advice on fishing opportunities, catch, and effort
Northeast Atlantic and Arctic Ocean ecoregions
Published 1 October 2019

Herring (*Clupea harengus*) in subareas 1, 2, and 5, and in divisions 4.a and 14.a, Norwegian spring-spawning herring (the Northeast Atlantic and the Arctic Ocean)

ICES advice on fishing opportunities

ICES advises that when the long-term management strategy agreed by the European Union, the Faroe Islands, Iceland, Norway, and the Russian Federation is applied, catches in 2020 should be no more than 525 594 tonnes.

Stock development over time

Fishing mortality has increased since 2015, but is estimated to be below F_{MSY} in 2018. The spawning stock biomass (SSB) has been declining since 2008, but is estimated to be above MSY $B_{trigger}$ in 2019. Recruitment is estimated to be average or low since 2007 (2005 year-class).

Figure 1 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Summary of the stock assessment. Confidence intervals (95%) are included in the recruitment, fishing mortality, and spawning-stock biomass plots. F_W is the fishing mortality weighted by the population numbers.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY}, F_{MGT}, F_{pa}, and F_{lim}; spawning-stock size is above MSY $B_{trigger}$, B_{MGT}, B_{pa}, and B_{lim}.

Table 1 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Status of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2016	2017	2018		2017	2018	2019	
Maximum sustainable yield	F_{MSY}	✓	✗	✓	Below	MSY $B_{trigger}$	✓	✓	✓	Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	✓	✗	✓	Below	B_{MGT}	✓	✓	✓	Above

Catch scenarios for 2020

Table 2 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). The basis for the catch scenarios.

Variable	Value	Notes
$F_{ages\ 5–12+}$ (2019)	0.186	Based on ICES estimated catches in 2019
SSB (2020)	3 652 236 t	From the assessment model
$R_{age\ 2}$ (2019)	8.111 billion	From the assessment model
$R_{age\ 2}$ (2020)	11.428 billion	Median stochastic recruitment based on the years 1988–2019
Catch (2019)	773 750 t	Sum of declared unilateral quotas

Table 3 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2020)	F_w * (2020)	SSB (2021)	% SSB change **	% Catch change ***	% Advice change ****
ICES advice basis						
Agreed management strategy ^	525594	0.14	3660436	0	−32	−11
Other scenarios						
MSY approach: F_{MSY}	584722	0.157	3610543	−1	−24	−1
F = 0	0	0	4105988	12	−100	−100
F_{pa}	818333	0.227	3413922	−7	6	39
F_{lim}	1018785	0.291	3245902	−11	32	73
SSB (2021) = B_{lim}	1920272	0.638	2500000	−32	148	226
SSB (2021) = B_{pa} = MSY $B_{trigger}$	1002679	0.316	3184000	−13	41	86
F = F_{2019}	683925	0.186	3526947	−3	−12	16

* F_w = Fishing mortality weighted by population numbers (ages 5–12+).
** SSB 2021 relative to SSB 2020.
*** Catch in 2020 relative to estimated catch in 2019 (773 750 t).
**** Advice value 2020 relative to advice value 2019 (588 562 t).
^ According to the harvest control rule in the management strategy F(2019) = F_{mgt} = 0.14, since the SSB is forecast to be above $B_{trigger}$ on 1 January 2020.

Catch advice for 2020 is 11% lower than that for 2019. This is due to a decline in the stock.

Basis of the advice

Table 4 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). The basis of the advice.

Advice basis	Management strategy
Management strategy	A long-term management strategy was agreed by the European Union, the Faroe Islands, Iceland, Norway, and Russian Federation in 2018 (Anon, 2018). ICES has evaluated the long-term management strategy and found it to be precautionary (ICES, 2018a).

Quality of the assessment

There is an upward revision of SSB for later years in this year's assessment, but the revision is within the confidence limits of the model. There is a downward revision of the 2016 year class in this years' assessment. The uncertainty around the estimate of recent year classes is, however, generally high.

Figure 2 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Historical assessment results. The 2016 assessment is not included in these plots as it has been found to be erroneous. F_W is the fishing mortality weighted by the population numbers. F_W for 2018 is the mean for ages 5–12+. In 2017, mean F_W used ages 5–11; prior to the 2017 assessment ages 5–14 were used. Recruitment estimates from assessments conducted before 2016 are not shown as they refer to age 0 instead of age 2.

Issues relevant for the advice

The advice is based on the target fishing mortality in the long-term management strategy agreed by the European Union, the Faroe Islands, Iceland, Norway, and the Russian Federation; it does not take into account the deviations from the plan as evident from the sum of declared unilateral quotas.

Reference points

Table 5 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Reference points, values, and their technical basis. F values corresponded to fishing mortality weighted by the population numbers, for ages 5–12+.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	3.184 million t	B_{pa}	ICES (2018b, 2018c)
	F_{MSY}	0.157	Stochastic simulations with Beverton–Holt, segmented regression, and Ricker stock–recruitment relationships.	ICES (2018a)
Precautionary approach	B_{lim}	2.5 million t	MBAL (accepted in 1998).	ICES (2018b, 2018c)
	B_{pa}	3.184 million t	Based on B_{lim} and assessment uncertainties. $B_{lim} \times \exp(1.645 \times \sigma)$, with $\sigma = 0.147$.	ICES (2018b, 2018c)
	F_{lim}	0.291	Equilibrium scenarios with stochastic recruitment: F value corresponding to 50% probability of (SSB < B_{lim}).	ICES (2018a)
	F_{pa}	0.227	Based on F_{lim} and assessment uncertainties. F_{lim} $\exp(-1.645 \times \sigma)$, with $\sigma = 0.152$.	ICES (2018a)
EU–Faroes–Iceland–Norway–Russian Federation long-term management strategy	SSB_{mgt_lower}	2.5 million t	Precautionary HCR evaluated by MSE.	ICES (2018a)
	SSB_{mgt}	3.184 million t		
	F_{mgt_lower}	0.05		
	F_{mgt}	0.14		

Basis of the assessment

Table 6 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018c)
Assessment type	Statistical assessment model (XSAM; ICES, 2019) that uses catches in the model and in the forecast and also includes error structures in catches and abundance indices.
Input data	Assessment period 1988–2018: Commercial catches-at-age (stock weight-at-age from surveys and, since 2009, from catch sampling). Three survey indices: Norwegian acoustic survey on spawning grounds in February/March (NASF, 1994–2005, 2015–2019); International Ecosystem Survey in the Nordic Seas (IESNS) covering the adult stock in the Nordic seas (1996–2019), and the juvenile stock in the Barents Sea (1991–2019). Maturity ogive variable by year-class strength. Natural mortalities are fixed values from historical analysis (age 2 = 0.9; ages greater than 2 = 0.15).
Discards and bycatch	Not included, considered negligible.
Indicators	None.
Other information	This stock was benchmarked in 2016 (ICES, 2016). A re-evaluation of reference points and the current management plan took place in 2018 (ICES, 2018b, 2018a).
Working group	Working Group on Widely Distributed Stocks (WGWIDE)

Information from stakeholders

The EU fleet (Dutch) that accounted for 0.7% of the catches last year reported that the herring came later out of the Icelandic zone and that individual size/weight was reported to be on average 400 g, with the first lots of herring going eastward being even bigger (500 g). The herring was easy to locate and catch, from the Iceland–Faroe Ridge to the NEAFC regulatory area.

History of the advice, catch, and management

Table 7 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). ICES advice and landings. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Sum of agreed quotas	ICES catch
1987	TAC	150000	115000	127306
1988	TAC	120000–150000	1[illegible]000	135301
1989	TAC	100000	10[illegible]000	103830
1990	TAC	80000	80000	86411
1991	No fishing from a biological point of view	0	[illegible]000	84683
1992	No fishing from a biological point of view	0	980[illegible]	104448
1993	No increase in F	119000	[illegible]000	232457
1994	Gradual increase in F towards $F_{0.1}$; TAC suggested	334000	450000	479228
1995	No increase in F	513000	[illegible]0000 *	905501
1996	Keep SSB above 2.5 million t	-	425000 *	1220283
1997	Keep SSB above 2.5 million t	-	1500000	1426507
1998	Do not exceed the harvest control rule	-	1300000	1223131
1999	Do not exceed the harvest control rule	12[illegible]000	1300000	1235433
2000	Do not exceed the harvest control rule	≤ [illegible]0000	1250000	1207201
2001	Do not exceed the harvest control rule	753[illegible]00	850000	766136
2002	Do not exceed the harvest control rule	853000	850000	807795
2003	Do not exceed the harvest control rule	710000	711000 *	789510
2004	Do not exceed the harvest control rule	825000	825000 *	794066
2005	Do not exceed the harvest control rule	890000	1000000 *	1003243
2006	Do not exceed the harvest control rule	732000	967000 *	968958
2007	Do not exceed the harvest control rule	1280000	1280000	1266993
2008	Do not exceed the harvest control rule	1518000	1518000	1545656
2009	Do not exceed the harvest control rule	1643000	1643000	1687371
2010	Do not exceed the harvest control rule	1483000	1483000	1457015
2011	See scenarios	988000–1170000	988000	992997
2012	Follow the management plan	833000	833000	826000
2013	Follow the management plan	619000	692000 *	684743
2014	Follow the management plan	418487	436893 *	461306
2015	Follow the management plan	283013	328206 *	328740
2016	Follow the management plan	≤ 316876	376612 *	383174
2017	Follow the management plan	≤ 437364 **	805142 *	721566
2018	Follow the management plan	≤ 384197	546448 *	592899
2019	Follow the management strategy, F_{mgt} = [illegible].14 and B_{mgt} = 3.184 million t	≤ 588562	773750 *	
2020	Follow the management strategy, F_{mgt} = [illegible].14 and B_{mgt} = 3.184 million t	≤ 525594		

* There was no agreement on the TAC; the number is the sum of autonomous quotas from the individual Parties.
** Value corrected in October 2017 (previously 646 075 t).

History of the catch and landings

Table 8 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Catch distribution by fleet in 2018 as estimated by ICES.

Catch	Landings		Discards
592 899 t	51% purse seine	49% pelagic trawl	Discarding is considered to be negligible, but some slippage is known to occur.
	592 899 t		

Table 9 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). History of commercial landings; ICES estimated values are presented for each country participating in the fishery. All weights are in tonnes.

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Ireland	Netherlands	Greenland	UK (Scotland) *	Germany	France	Poland	Sweden	Total
1986	199256	26000	-	-	-	-	-	-	-	-	-	-	-	225256
1987	108417	18889	-	-	-	-	-	-	-	-	-	-	-	127306
1988	115076	20225	-	-	-	-	-	-	-	-	-	-	-	135301
1989	88707	15123	-	-	-	-	-	-	-	-	-	-	-	103830
1990	74604	11807	-	-	-	-	-	-	-	-	-	-	-	86411
1991	73683	11000	-	-	-	-	-	-	-	-	-	-	-	84683
1992	91111	13337	-	-	-	-	-	-	-	-	-	-	-	104448
1993	199771	32645	-	-	-	-	-	-	-	-	-	-	-	232457
1994	380771	74400	-	2911	21146	-	-	-	-	-	-	-	-	479228
1995	529838	101987	30577	57084	174109	-	7969	2500	88	5	-	-	-	905501
1996	699161	119290	60681	52788	164957	19541	19664	-	46131	11978	-	-	22424	1220283
1997	860963	168900	44292	59987	220154	11179	8694	-	2514	6190	1500	-	19499	1426507
1998	743925	124049	35519	68136	197789	2437	12827	-	15971	7003	605	-	14863	1223131
1999	740640	157328	37010	55527	203381	2412	5871	-	19207	-	-	-	14057	1235433
2000	713500	163261	34968	68625	186035	8939	-	-	1[illegible]96	3298	-	-	14749	1207201
2001	495036	109054	24038	34170	77693	6070	6439	-	[illegible]2230	1588	-	-	9818	766136
2002	487233	113763	18998	32302	127197	1699	9392	-	3482	3017	-	1226	9486	807795
2003	477573	122846	14144	27943	117910	1400	8674	-	9214	3371	-	-	6431	789510
2004	477076	115876	23111	42771	102787	11	1[illegible]69	-	1869	4810	400	-	7986	794066
2005	580804	132099	28368	65071	156467	-	21517	-	-	17676	0	561	680	1003243
2006	567237	120836	18449	63137	157474	4393	1625	-	12523	9958	80	-	2946	968958
2007	779089	162434	22911	64251	173621	6411	29764	4897	13244	6038	0	4333	0	1266993
2008	961603	193119	31128	74261	217602	7903	28[illegible]55	3810	19737	8338	0	0	0	1545656
2009	1016675	210105	32320	85098	265479	[illegible]0014	24021	3730	25477	14452	0	0	0	1687371
2010	871113	199472	26792	80281	205864	8061	26695	3453	24151	11133	0	0	0	1457015
2011	572641	144428	26740	53271	151[illegible]4	[illegible]327	8348	3426	14045	13296	0	0	0	992997
2012	491005	118595	21754	36190	1209[illegible]6	4[illegible]13	6237	1490	12310	11945	0	0	705	826000
2013	359458	78521	17160	105038	[illegible]0729	3815	5626	11788	8342	4244	0	0	23	684743
2014	263253	60292	12513	38529	58[illegible]8	706	9175	13108	4233	669	0	0	0	461306
2015	176321	45853	9105	3303[illegible]	4[illegible]625	1400	5255	12434	55	2660	0	0	0	328740
2016	197501	50455	10384	447[illegible]	50[illegible]18	2048	3519	17508	4031	2582	0	0	0	383174
2017	389383	91118	19037	98170	[illegible]0400	3495	6679	12569	4358	5201	0	1	1155	721566
2018	332028	64185	17052	82062	83[illegible]93	2428	4290	2465	2582	1989	0	0	425	592899

* Includes Northern Ireland since 200[illegible].

Summary of the assessment

Table 10 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Assessment summary. All weights in tonnes and recruitment in thousands.

Year	Recruitment(age 2)			SSB			Total	F (ages 5–12+)		
	Low	Value	High	Low	Value	High		Low	Value	High
1988	342000	648000	954000	1819000	2122000	2424000	135301	0.023	0.04	0.061
1989	691000	1171000	1651000	2812000	3281000	3750000	103830	0.0180	0.033	0.049
1990	3232000	4311000	5389000	3054000	3550000	4046000	86411	0.0160	0.031	0.045
1991	9278000	11347000	13415000	2861000	3324000	3788000	84683	0.0170	0.031	0.046
1992	15603000	18561000	21519000	2910000	3352000	3794000	104648	0.022	0.038	0.055
1993	43769000	49849000	55929000	2925000	3323000	3720000	232467	0.049	0.076	0.103
1994	53041000	59854000	66667000	3056000	3452000	3847000	479328	0.091	0.126	0.160
1995	13111000	15663000	18216000	3145000	3524000	3904000	905591	0.170	0.22	0.26
1996	4530000	5726000	6922000	3726000	4109000	4493000	1220223	0.154	0.189	0.22
1997	1592000	2182000	2771000	4914000	5373000	5833000	1426500	0.161	0.194	0.23
1998	8872000	10787000	12701000	5435000	5941000	6448000	1223131	0.156	0.190	0.22
1999	5126000	6420000	7715000	5288000	5816000	6345000	1235433	0.174	0.21	0.25
2000	28595000	33024000	37454000	4358000	4842000	5326000	1207201	0.21	0.26	0.31
2001	24960000	29019000	33078000	3584000	4018000	4453000	766136	0.160	0.20	0.25
2002	9423000	11483000	13542000	3148000	3552000	3955000	807795	0.178	0.23	0.27
2003	5289000	6659000	8029000	3743000	4192000	4640000	789510	0.119	0.151	0.183
2004	50958000	58091000	65225000	4748000	5292000	5836000	794066	0.101	0.127	0.154
2005	20694000	24506000	28317000	4853000	5425000	5997000	1003243	0.136	0.171	0.21
2006	37152000	43239000	49327000	4831000	5396000	5961000	968958	0.137	0.175	0.21
2007	9698000	12056000	14414000	6250000	6952000	7654000	1266993	0.122	0.153	0.184
2008	14307000	17519000	20732000	6303000	7050000	7796000	1545656	0.159	0.198	0.24
2009	5477000	7027000	8576000	6231000	7030000	7829000	1687373	0.166	0.21	0.24
2010	3527000	4663000	5799000	5458000	6231000	7009000	1457014	0.169	0.21	0.26
2011	12570000	15793000	19015000	5077000	5878000	6680000	992998	0.124	0.159	0.194
2012	3882000	5255000	6627000	4866000	5692000	6518000	825999	0.108	0.141	0.173
2013	5948000	8010000	10073000	4516000	5322000	6129000	684743	0.091	0.121	0.150
2014	3716000	5362000	7008000	4346000	5154000	5963000	461306	0.062	0.084	0.105
2015	12745000	17625000	22504000	4020000	4798000	5569000	328740	0.048	0.067	0.087
2016	4975000	8039000	11102000	3808000	4535000	5262000	383174	0.062	0.087	0.111
2017	2454000	5185000	7916000	3775000	4490000	5205000	721566	0.119	0.162	0.21
2018	6182000	15643000	25104000	3389000	4103000	4818000	592899	0.092	0.128	0.163
2019	0	8111000	19137000	3212000	3965000	4717000				

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Recommended citation: ICES. 2019. Herring (*Clupea harengus*) in subareas 1, 2, and 5, and in divisions 4.a and 14.a, Norwegian spring-spawning herring (the Northeast Atlantic and Arctic Ocean). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, her.27.1-24a514a. https://doi.org/10.17895/ices.advice.4882.