

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

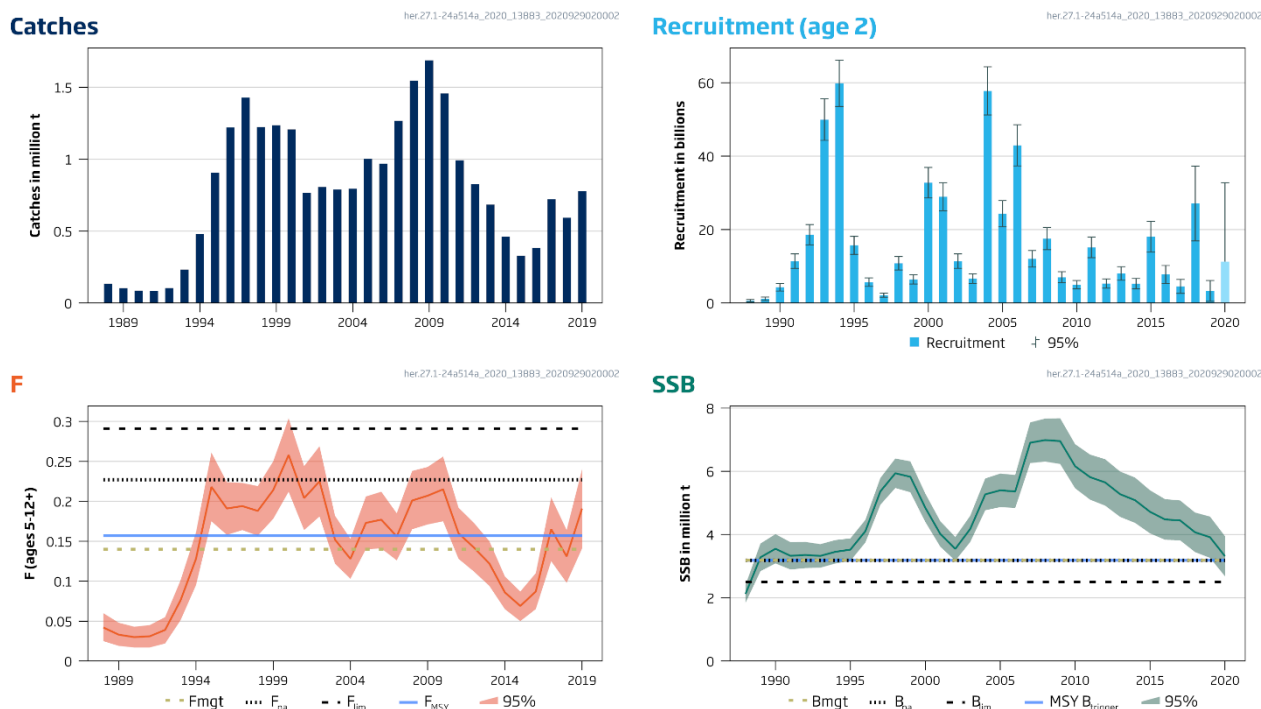


Figure 1 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Summary of the stock assessment. The assumed recruitment value for 2020 is shaded in a paler colour. F is the fishing mortality weighted by population numbers, and SSB is the spawning-stock biomass.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

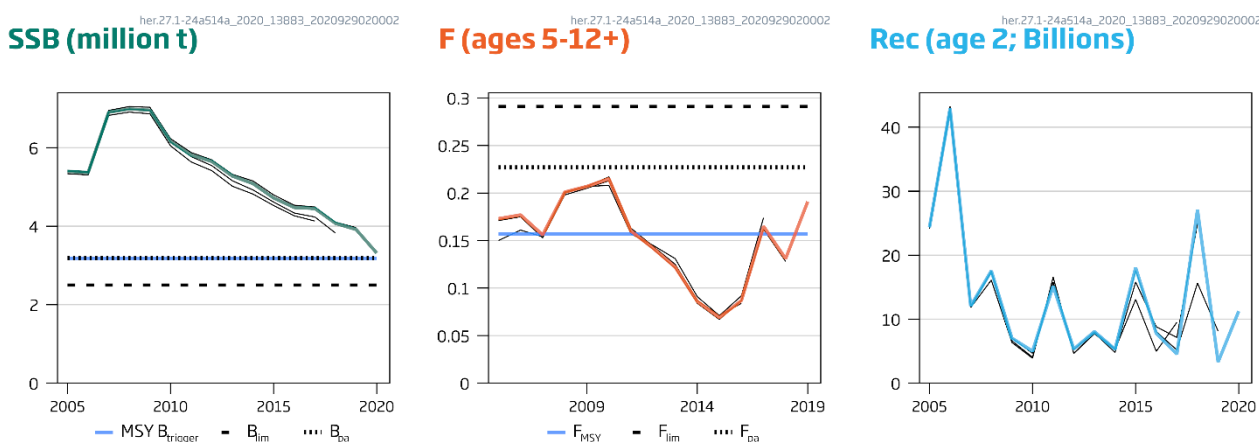


Figure 2 Herring in subareas 1, 2, and 5, and in divisions 4.a and 14.a (Norwegian spring-spawning herring). Historical assessment results.

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>

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