

Herring (*Clupea harengus*) in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k (Irish Sea, Celtic Sea, and southwest of Ireland)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, there should be zero catch in 2021.

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

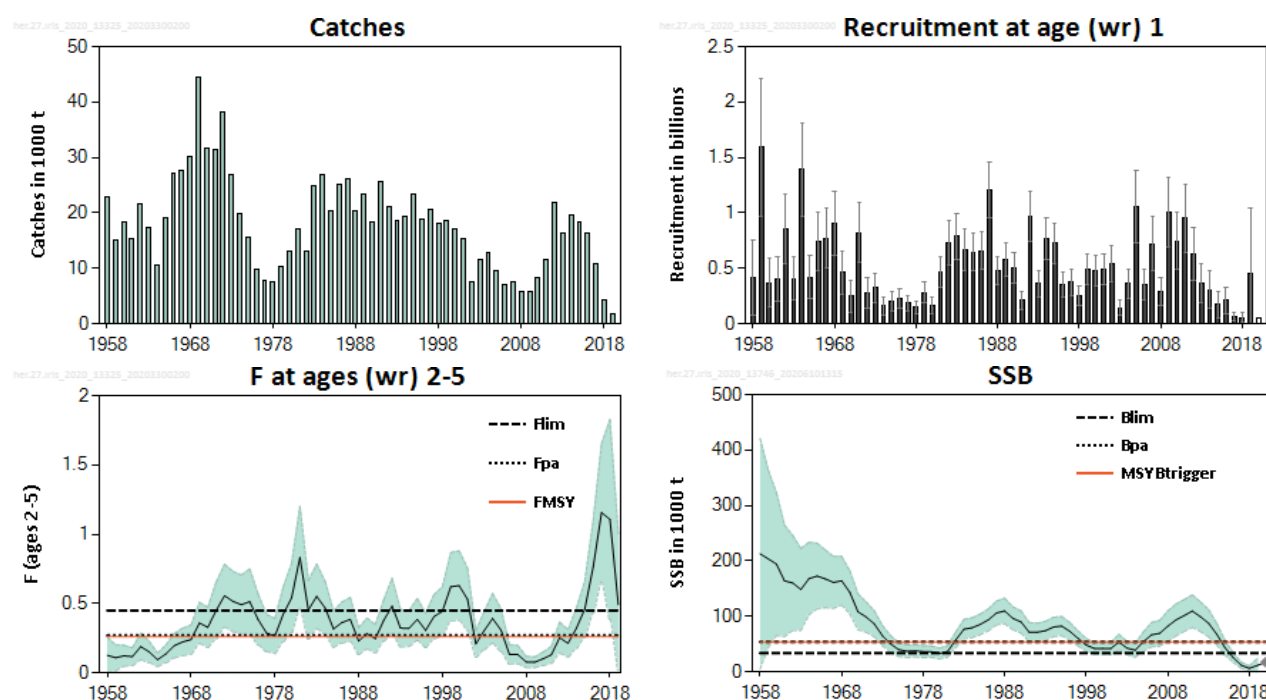


Figure 1 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Summary of the stock assessment. The assumed recruitment (R) is unshaded and the forecast spawning-stock biomass (SSB) value is indicated with a grey diamond. The shaded areas on the fishing mortality (F) and SSB plots represent 95% confidence intervals.

Stock and exploitation status

Table 1 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. 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	✗	✗	✗ Below trigger
Precautionary approach	F_{pa} , F_{lim}	✗	✗	✗ Harvested unsustainably	B_{pa} , B_{lim}	✗	✗	✗ Reduced reproductive capacity
Management plan	F_{MGT}	—	—	— Not applicable	B_{MGT}	—	—	— Not applicable

Catch scenarios

Table 2 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{\text{ages (wr) 2-5 (2020)}}$	0.066	The F that corresponds to the monitoring TAC.
$R_{\text{age (wr) 1 (2020-2021)}}$	52 405	Stock–recruitment relationship based on the SSB_{2018} from the assessment output; in thousands.
$SSB (2020)$	17 485	Fishing at $F = 0.066$; in tonnes.
Total catch (2020)	869	Monitoring TAC; in tonnes.

Table 3 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2021)	F_{2-5} (2021)	SSB^* (2021)	% SSB change **	SSB^* (2022) #	% TAC change ***	% advice change ^
ICES advice basis							
MSY approach: zero catch	0	0	16063	–8	15426	–100	–
Other scenarios							
F_{MSY}	3504	0.26	14199	–19	11055	303	–
$F_{MSY} \times SSB_{2020} / MSY B_{\text{trigger}}$	1232	0.08	15432	–12	13819	42	–
$F = 0$	0	0	16063	–8	15426	–100	–
F_{pa}	3622	0.27	14132	–19	10919	317	–
F_{lim}	5566	0.45	12987	–26	8786	541	–
$SSB_{2021} = B_{lim}^{^^}$	–	–	–	–	–	–	–
$SSB_{2021} = B_{pa}^{^^}$	–	–	–	–	–	–	–
$SSB_{2021} = MSY B_{\text{trigger}}^{^^}$	–	–	–	–	–	–	–
$F = F_{2020}$	978	0.066	15564	–11	14144	13	–
TAC = Monitoring TAC	869	0.059	15620	–11	14240	0	–

* For this autumn-spawning stock, the SSB is determined at spawning time and is influenced by fisheries between 1 April and spawning (October).

** SSB 2021 relative to SSB 2020.

*** Total catch in 2021 relative to the TAC in 2020 (869 tonnes).

^ Advice value for 2021 relative to the advice value for 2020 (0 tonnes).

^^ These catch scenarios are left blank because the stated SSB cannot be achieved, even with $F = 0$.

Assuming same catch scenario in 2022 as in 2021.

Quality of the assessment

The assessment is considered highly uncertain. SSB is consistently overestimated and fishing mortality is consistently underestimated. However, the uncertainty of the assessment does not impact the outcome of the advice.

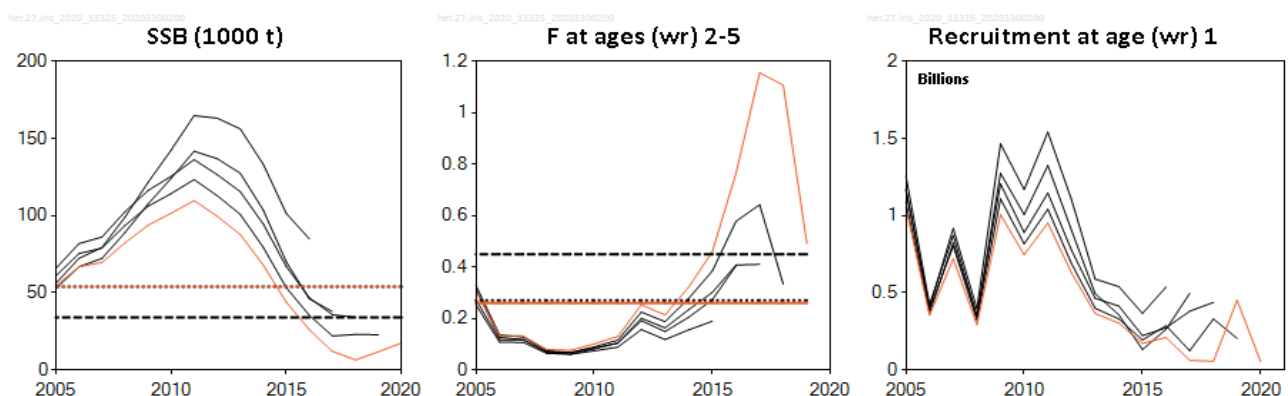


Figure 2 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Historical assessment results. Final-year recruitment and SSB estimates included. The assessment was benchmarked in 2015 and inter-benchmarked in 2018.

History of the advice, catch, and management

Table 4 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. ICES advice, official landings, and ICES estimated catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES estimated catch ^
1987	Precautionary TAC	18000	18000		18000	4200	27300
1988	TAC	13000	18000	16800	16800	2400	19200
1989	TAC	20000	20000	17900	19200	3500	22700
1990	TAC	15000	17500	17000	17700	2500	20200
1991	TAC (TAC excluding discards)	15000 (12500)	21000	21100	21700	1900	23600
1992	TAC	27000	21000	18600	20900	2100	23000
1993	Precautionary TAC (including discards)	20000–24000	21000	20300	19200	1900	21100
1994	Precautionary TAC (including discards)	20000–24000	21000	18900	17400	1700	19100
1995	No specific advice		21000	18500	18300	700	19000
1996	TAC	9800	16500–21000 **	20600	18800	3000	21800
1997	If required, precautionary TAC	< 25000	22000	20700	18100	700	18800
1998	Catches below 25	< 25000	22000	20500	20300	0	20300
1999	F = 0.4	19000	21000	19400	18100	0	18100
2000	F < 0.3	20000	21000	18884	18267	0	18267
2001	F < 0.34	17900	20000	19307	17729	0	17729
2002	F < 0.35	11000	11000	11541	10550	0	10550
2003	Substantially less than recent catches	-	13000	12381	10875	0	10875
2004	60% of average catch 1997–2000	11000	13000	11866	11065	0	11065
2005	60% of average catch 1997–2000	11000	13000	10222	8452	0	8452
2006	Further reduction 60% average catch 2002–2004	6700	11000	9053	8530	0	8530
2007	No fishing without rebuilding plan		9400	9623	8268	0	8268
2008	No targeted fishing without rebuilding plan		7900	7838	6853	0	6853
2009	No targeted fishing without rebuilding plan		5900	6259	5760	0	5760
2010	F _{mgt} = 0.19	10150	10150	9645	8406	0	8406
2011	See scenarios		13200	11751	11503	0	11503
2012	MSY approach	< 26900	21100	19500	21604	161	21765
2013	MSY approach	< 18500	17200	16067	16067	118	16185
2014	MSY approach	< 35942	22300	18930	18930	644	19574
2015	MSY approach	< 15140	15700 *	17579	17579	247	17826
2016	MSY approach	< 23164	15400 *	16587	16136	182	16318
2017	MSY approach	< 16145	14500 *	10637	10637	130	10767
2018	MSY approach	≤ 5445	10100 *	4834	4589	0	4589
2019	MSY approach	≤ 4742	4742	1841	1841	0	1841
2020	MSY approach	0	869 ^^				
2021	MSY approach	0					

* Initial TAC before carry-over of unused quota from previous year.

** Revised in 1996 after the ACFM May meeting.

^ By calendar year.

^^ Monitoring TAC.

Summary of the assessment

Table 5 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Assessment summary. All weights are in tonnes and recruitment is in thousands. High and low refer to 95% confidence intervals.

Year ^	Recruitment at age (wr) 1	High	Low	SSB **	High	Low	Total catch ^	F at ages (wr) 2–5	High	Low
1958	416389	756176	76604	212881	420895	4865	22978	0.127	0.258	0.003
1959	1594650	2216451	972949	203797	363726	43874	15086	0.11	0.202	0.017
1960	368441	590469	146411	194358	323226	65494	18283	0.123	0.199	0.048
1961	399134	600892	197368	164157	264635	63685	15372	0.118	0.18	0.055
1962	853511	1170834	536186	160451	245986	74914	21552	0.19	0.286	0.093
1963	407405	599692	215108	148618	222557	74683	17349	0.151	0.228	0.074
1964	1392530	1812077	972923	168268	233628	2912	10599	0.095	0.143	0.047
1965	419978	614512	225448	172804	231874	13726	19126	0.138	0.201	0.074
1966	739764	1004772	474748	167733	219888	15572	27030	0.197	0.285	0.109
1967	772745	1041358	504122	161269	208026	14514	27658	0.223	0.322	0.124
1968	903981	1195765	612195	164268	208047	20493	30236	0.241	0.345	0.137
1969	464186	659557	268823	143568	182441	4699	44389	0.36	0.509	0.211
1970	250351	393759	106941	108429	140986	75874	31727	0.329	0.473	0.185
1971	823299	1093035	553565	99043	126295	71791	31396	0.451	0.655	0.247
1972	280943	419692	142188	86732	110189	63275	38203	0.557	0.783	0.33
1973	326911	458732	195088	65242	83550	46934	26936	0.516	0.733	0.3
1974	161218	242188	80252	50604	65675	35533	19940	0.492	0.706	0.279
1975	203101	291126	115074	40093	52581	27605	15588	0.514	0.75	0.277
1976	227445	314286	140594	37219	48198	26240	9771	0.385	0.568	0.201
1977	185840	257717	113963	37807	48566	27048	7833	0.288	0.423	0.153
1978	146362	207734	84987	36540	47240	25840	7559	0.266	0.391	0.141
1979	279745	375953	183528	36355	46591	26119	10321	0.423	0.619	0.227
1980	167492	242342	92638	33306	43240	23372	13130	0.541	0.789	0.293
1981	467127	608842	325418	36829	47076	26582	17103	0.832	1.201	0.463
1982	728109	925423	530797	57842	72010	43674	13000	0.454	0.665	0.244
1983	788475	998043	578917	76920	94468	59372	24981	0.552	0.784	0.319
1984	669958	856266	483654	79578	97418	61738	26779	0.468	0.66	0.277
1985	646179	819850	472510	85739	104328	67150	20426	0.317	0.448	0.186
1986	658128	826261	489999	93825	113576	74074	25024	0.363	0.51	0.216
1987	1207080	1462037	952163	106334	127759	84901	26200	0.386	0.544	0.228
1988	478279	609371	347189	109884	132894	86866	20447	0.23	0.326	0.134
1989	579069	730400	427740	96523	117060	75986	23254	0.284	0.396	0.171
1990	506130	646478	365782	90006	109994	70018	18404	0.246	0.348	0.145
1991	208702	289577	127823	71730	89019	54441	25562	0.379	0.527	0.231
1992	967209	1187788	746632	71592	87612	55572	21127	0.482	0.682	0.281
1993	361611	478156	245064	74274	91229	57319	18618	0.323	0.458	0.189
1994	772174	961222	583118	81042	98549	63533	19300	0.32	0.449	0.191
1995	725049	905011	545089	82505	99625	65385	23305	0.385	0.537	0.234
1996	353773	465396	242144	72951	88775	57127	18816	0.307	0.43	0.184
1997	374420	491116	257724	60327	73880	46774	20496	0.406	0.566	0.247
1998	249788	339601	159979	48357	60116	36598	18041	0.444	0.62	0.267
1999	488919	624977	352863	42320	52624	32016	18485	0.622	0.868	0.375
2000	478526	612137	344923	42348	52905	31791	17191	0.63	0.88	0.379
2001	493225	634328	352132	41902	52950	30854	15269	0.531	0.755	0.308
2002	539997	698501	381499	53935	67813	40057	7465	0.209	0.305	0.113
2003	142293	210041	74539	42922	54979	30865	11536	0.306	0.443	0.169
2004	360298	487481	233120	39128	51650	26606	12743	0.392	0.572	0.213
2005	1054640	1382508	726692	54395	71868	36922	9494	0.308	0.463	0.153
2006	354347	492505	216195	66923	88944	44902	6944	0.133	0.202	0.065
2007	720272	967681	472859	69590	92808	46372	7636	0.132	0.198	0.066
2008	292507	420851	164169	82391	109905	54877	5872	0.08	0.12	0.039
2009	1006110	1323071	689129	93745	122433	65055	5745	0.077	0.114	0.039
2010	746881	1005482	488278	101575	130225	72935	8370	0.101	0.149	0.053

Year ^	Recruitment at age (wr) 1	High	Low	SSB **	High	Low	Total catch ^	F at ages (wr) 2–5	High	Low
2011	952159	1260684	643636	109720	138967	80473	11470	0.13	0.19	0.07
2012	628844	865863	391817	99597	126275	72919	21820	0.253	0.366	0.141
2013	365501	545798	185202	87806	112510	63102	16247	0.214	0.312	0.116
2014	303675	472675	134665	67969	87659	48279	19574	0.322	0.467	0.178
2015	172583	290929	54231	43886	57474	30298	18355	0.46	0.66	0.259
2016	209482	327337	91623	26045	34824	17266	16318	0.765	1.097	0.432
2017	61806	103140	20472	12034	17535	6533	10767	1.156	1.654	0.658
2018	56039	101645	10431	6463	10953	1972	4418	1.107	1.827	0.388
2019	451705	1043679	0	11751	24700	0	1841	0.492	1.004	0.02
2020	52405 ***			17485 *						

* From the short-term forecast.

** SSB estimated at spawning time (1 October).

*** Stock–recruitment relationship based on SSB₂₀₁₈ from the assessment output.

^ Assessment year (1 April–31 March).

Sources and references

ICES. 2019. EU request for advice on a monitoring TAC for herring in ICES divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. In Report of the ICES Advisory Committee, 2019. ICES Advice 2019, sr.2019.20, <https://doi.org/10.17895/ices.advice.5614>.

ICES. 2020. Herring Assessment Working Group for the Area South of 62°N (HAWG). ICES Scientific Reports, 2:60. 1054 pp. <http://doi.org/10.17895/ices.pub.6105>.

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Annex 1

ICES Advice on fishing opportunities, catch, and effort
Celtic Seas ecoregion
Published 28 June 2019

Herring (*Clupea harengus*) in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k (Irish Sea, Celtic Sea, and southwest of Ireland)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, there should be zero catch in 2020.

Stock development over time

The spawning-stock biomass (SSB) has been decreasing significantly since 2011 and has been below B_{lim} since 2017. The fishing mortality (F) has increased since 2008 and has been above F_{lim} in 2016 and 2017. It decreased in 2018; it remains above F_{MSY} . Recruitment has been below average since 2013.

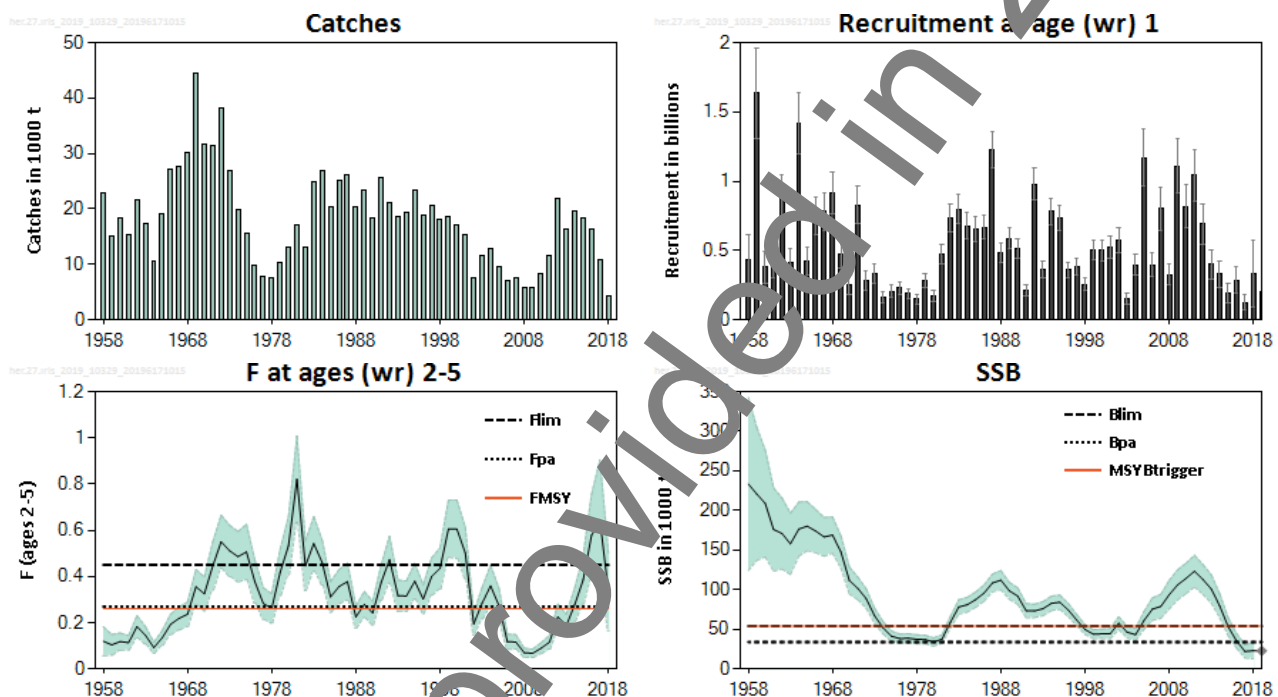


Figure 1 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Summary of the stock assessment. The assumed recruitment is unshaded and the forecast SSB value is designated by a grey diamond. The shaded areas on the F and SSB plots represent 95% confidence intervals.

Stock and exploitation status

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

Table 1 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size		
		2016	2017	2018		2017	2018	2019
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	$MSY B_{trigger}$	✗	✗
Precautionary approach	F_{pa}, F_{lim}	✗	✗	○	Increased risk	B_{pa}, B_{lim}	✗	✗
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—
								Below trigger
								Reduced reproductive capacity
								Not applicable

Catch scenarios

Table 2 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages(wr)2-5}$ (2019)	0.34	F corresponding to the assumed total catch for 2019
$R_{age(wr)1}$ (2019–2020)	204 340	Stock-recruitment relationship based on the SSB_{2017} from the assessment output (in thousands)
SSB (2019)	22 787	Tonnes; Calculated in the short term forecast based on the assumptions for the intermediate year
Total catch (2019)	5320	Tonnes; TAC adjusted for estimated uptake, carry over of national quota

Table 3 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2020)	F_{2-5} (2020)	SSB^* (2020)	% SSB change **	SSB^* (2019)	% TAC change ***	% Advice change ^
ICES advice basis							
MSY approach: zero catch	0	0	24248	6.4	27628	–100	–100
Other scenarios							
F_{MSY}	4258	0.26	22018	–3.4	19871	–10.2	–10.2
$F_{MSY} \times SSB_{2019} / MSY B_{trigger}$	1919	0.11	23271		21352	–59.5	–59.5
$F = 0$	0	0	24248	6.4	27628	–100	–100
F_{pa}	4404	0.27	21953	–3.7	19779	–7.1	–7.1
F_{lim}	6823	0.45	20533	–9.8	18263	43.9	43.9
$SSB_{2020} = B_{lim}^{^^}$							
$SSB_{2020} = B_{pa}^{^^}$							
$SSB_{2020} = MSY B_{trigger}^{^^}$							
$F = F_{2019}$	5334	0.34	21413	–6	19194	12.5	12.5

* For this autumn-spawning stock, the SSB is determined at spawning time and is influenced by fisheries between 1 April and spawning (October).

** SSB 2020 relative to SSB 2019.

*** Total catch in 2020 relative to TAC in 2019 (4742 tonnes).

^ Advice value for 2020 relative to the advice value for 2019 (4742 tonnes).

^^ These catch scenarios are left blank because the stated SSB can not be achieved, even with $F = 0$.

There are no catch scenarios that will rebuild the stock above B_{lim} by 2021, therefore ICES advises zero catch.

Basis of the advice

Table 4 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. The basis of the advice.

Advice basis	MSY Approach
Management plan	The long-term management strategy for Celtic Sea herring that was proposed by the Pelagic AC in 2011 (Pelagic AC, 2011) was re-evaluated by ICES in 2018. ICES advises that the harvest control rule is no longer consistent with the precautionary approach. The management strategy results in a greater than 5% probability of the stock falling below B_{lim} in several years throughout the 20-year simulated period (ICES, 2018a). A rebuilding plan is currently being developed for this stock.

Quality of the assessment

The survey time-series used in the assessment includes data from 2002–2018 (excluding 2004 and 2017). The 2017 acoustic survey estimates was not used in the assessment (ICES, 2018b) because the survey collected only one biological sample, which was not considered representative. Herring have been observed close to the bottom since 2014, and are considered to be less reliably estimated by the acoustic survey. Uncertainty is thus added to the assessment.

The 2018 assessment revises the SSB downwards and the mean F upwards. This revision is most likely the result of the lack of the 2017 survey index, and because of the 2018 abundance estimate from the acoustic survey being the lowest in the time series.

Recruitment estimates are uncertain, due to a lack of recruitment indices. In the Irish Sea, mixing occurs between Celtic Sea and Irish Sea fish, but the level of mixing is unknown.

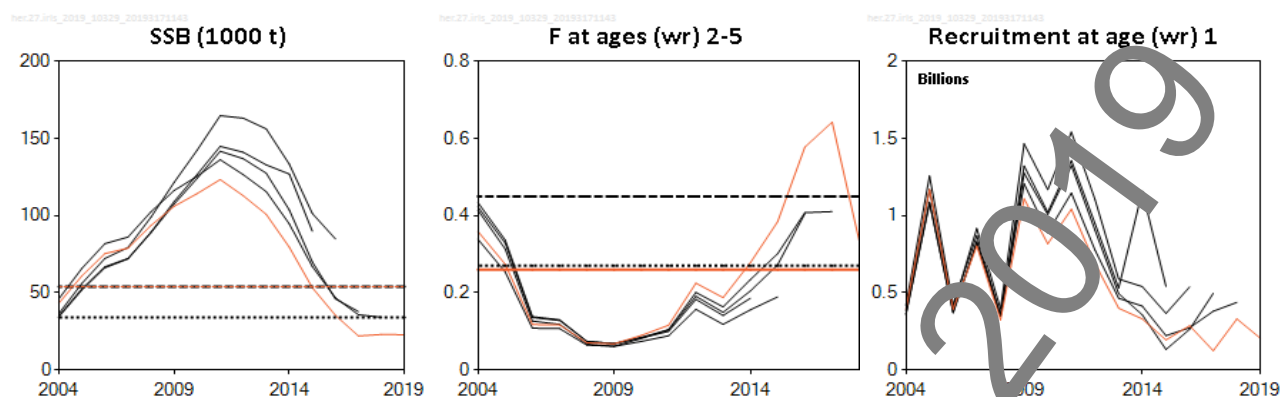


Figure 2 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Historical assessment results. Final year recruitment and SSB estimates included. The assessment was benchmarked in 2015 and later-benchmarked in 2018.

Issues relevant for the advice

Activities that have a negative impact on the spawning habitat of herring should not occur, unless the effects of these activities have been assessed and shown not to be detrimental to the productivity of the stock (ICES, 2013, 2015a).

There has been an increase in marine anthropogenic activity. Activities that have a negative impact on the spawning habitat of herring, such as the dumping of dredge spoil, the extraction of marine aggregates (e.g. gravel and sand), and the erection of structures in the vicinity of spawning grounds, are a cause for concern (see for example Groot, 1979, 1996; ICES, 2003, 2015a). This is because a gravel substratum is an essential habitat for herring spawning.

Reference points

Table 5 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	54000	Stochastic simulations using a segmented regression stock–recruitment relationship from 1970–2014.	ICES (2018b)
	F_{MSY}	0.25		ICES (2018b)
Precautionary approach	B_{lim}	34000	B_{loss} = the lowest observed SSB (1980).	ICES (2018b)
	B_{pa}	4000	$B_{pa} = B_{lim} \times \exp(1.645 \times \sigma_B)$, with $\sigma_B = 0.29$ from assessment uncertainty in the terminal year.	ICES (2018b)
	F_{lim}	0.75	Equilibrium F maintaining $SSB > B_{lim}$ with 50% probability.	ICES (2018b)
	F_{pa}	0.27	$F_{pa} = F_{lim} \times \exp(-1.645 \times \sigma_F)$, where $\sigma_F = 0.30$ from assessment uncertainty (capped) in the terminal year.	ICES (2018b)

Basis of the assessment

Table 6 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018c)
Assessment type	Age-based analytical assessment (ASAP; ICES, 2019) that uses catches in the model and in the forecast.
Input data	Commercial catches (weights, ages, and length frequencies from catch sampling); Acoustic survey index (CSHAS) (excluding 2017); annual weights in the stock; fixed maturity ogive; natural mortality assumed constant.
Discards and bycatch	Included in the assessment.
Indicators	None
Other information	Benchmarked in WKWEST (ICES, 2015b) and inter-benchmarked in 2018 (ICES, 2018b). Assessed on a seasonal basis, 1 April–31 March, to allow for the inclusion of the spawning cycle in the assessment period. This is an autumn-/winter-spawning stock. Age is given in winter rings (wr), so for example: a 2-year-old fish is termed “1-winter ring” as fish do not lay down a ring in their first winter.
Working group	Herring Assessment Working Group for the Area South of 62°N (HAWG)

Information from stakeholders

The PelAC has been actively pursuing a rebuilding plan for Celtic Sea herring in light of the results of the inter-benchmark and most recent assessment. In order to support future stock assessments, the PelAC is seeking advice on the relevant timeframe for any fishery, the geographical areas where each fleet should operate, and a level of catches that would not impair the recovery of the stock but would be sufficient to allow collection of fisheries-dependent data.

History of the advice, catch, and management

Table 7 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. ICES advice, official landings, and ICES estimated catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES estimated catch ^
1987	Precautionary TAC	18000	18000		18000	4200	27300
1988	TAC	13000	18000	16800	16800	2400	19200
1989	TAC	20000	20000	17900	19200	3500	22700
1990	TAC	15000	17500	17000	17700	2500	20200
1991	TAC (TAC excluding discards)	15000 (12500)	21000	21100	21700	1900	23600
1992	TAC	17000	21000	18600	20900	2100	23000
1993	Precautionary TAC (including discards)	20000–24000	21000	20300	19200	1900	21100
1994	Precautionary TAC (including discards)	20000–24000	21000	18900	17400	1700	19100
1995	No specific advice		21000	18500	18300	700	19000
1996	TAC	9800	16500–21000 **	20600	18800	3000	21800
1997	If required, precautionary TAC	< 25000	22000	20700	18100	700	18800
1998	Catches below 25	< 25000	22000	20500	20300	0	20300
1999	F = 0.4	19000	21000	19400	18100	0	18100
2000	F < 0.3	20000	21000	18884	18267	0	18267
2001	F < 0.34	17900	20000	19307	17729	0	17729
2002	F < 0.3	11000	11000	11541	10550	0	10550
2003	Substantially less than recent catches	-	13000	12381	10875	0	10875
2004	60% of average catch 1997–2000	11000	13000	11866	11065	0	11065
2005	70% of average catch 1997–2000	11000	13000	10222	8452	0	8452
2006	Further reduction 60% avg. catch 2002–2004	6700	11000	9053	8530	0	8530
2007	No fishing without rebuilding plan		9400	9623	8268	0	8268

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES estimated catch ^
2008	No targeted fishing without rebuilding plan		7900	7838	6853	0	6853
2009	No targeted fishing without rebuilding plan		5900	6259	5760	0	5760
2010	$F_{\text{mgt}} = 0.19$	10150	10150	9645	8406	0	8406
2011	See scenarios		13200	11751	11503	0	11503
2012	MSY approach	< 26900	21100	19500	21604	165	21765
2013	MSY approach	< 18500	17200	16067	16067	118	16185
2014	MSY approach	< 35942	22300	18930	18930	644	19574
2015	MSY approach	< 15140	15700 *	17579	17579	247	17826
2016	MSY approach	< 23164	15400 *	16587	16136	182	16318
2017	MSY approach	< 16145	14500 *	10637	10637	130	10767
2018	MSY approach	≤ 5445	10100 *	4834	4834	0	4589
2019	MSY approach	≤ 4742	4742				
2020	MSY approach	0					

* Initial TAC before carry-over of unused quota from previous year.

** Revised in 1996 after the ACFM May meeting.

^ By calendar year.

History of the catch and landings

Table 8 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Catch distribution by fleet in 2018 as estimated by ICES. All weights are in tonnes.

Catch (2018)	Landings		Discards
4589	Pelagic trawlers 100%	Driftnets (negligible)	Negligible
	4589		

Table 9 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. History of official landings by country; . All weights are in tonnes.

Year	France	Germany	Ireland	Netherlands	U.K.	Total
1988			16800			16800
1989	+		16000	1900		17900
1990	+		15800	1000	200	17000
1991	+	100	19400	1600		21100
1992	500		18000	100	+	18600
1993			19000	1300	+	20300
1994	+	200	17400	1300	+	18900
1995	200	200	18000	100	+	18500
1996	1000	0	18600	1000		20600
1997	1300	0	18000	1400		20700
1998			19300	1200		20500
1999		200	17900	1300	+	19400
2000	573	228	18038	44	1	18884
2001	1359	219	17729			19307
2002	734		10550	257		11541
2003	800		10875	692	14	12381
2004	801	41	11024			11866
2005	821	150	8452	799		10222
2006			8530	518	5	9053
2007	581	248	8268	463	63	9623
2008	503	191	6853	291		7838
2009	364	135	5760			6259
2010	636	278	8406	325		9645

Year	France	Germany	Ireland	Netherlands	U.K.	Total
2011	241		11503	7		11751
2012	3	230	16132	3135		19500
2013		450	14785	832		16067
2014	244	578	17287	821		18930
2015		477	15798	1304		17579
2016		419	14584	1025	559	16587
2017		298	9627	648	64	10637
2018			4398	436		4834

* Added in 2014 after report of 1% discarding.

+ Designates catch of less than 0.5 tonnes.

Summary of the assessment

Table 10 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Assessment summary. All weights are in tonnes and recruitment is in thousands. High and Low refers to 95% confidence intervals.

Year ^	Recruitment at age (wr) 1	High	Low	SSB **	High	Low	Total Catch^	F at ages (wr) 2–5	High	Low
1958	432921	612710	253130	233325	342550	121110	22978	0.120	0.182	0.057
1959	1635380	1963250	1307550	220788	304665	136915	15086	0.104	0.149	0.060
1960	380345	497240	263460	208855	276378	141342	18283	0.118	0.155	0.082
1961	411312	517410	305210	175958	228534	123386	15372	0.113	0.144	0.083
1962	876079	1042450	709710	170916	215622	120318	21552	0.183	0.23	0.135
1963	417379	517860	316900	157804	196431	119139	17349	0.146	0.183	0.108
1964	1416300	1634710	1197890	176475	210655	142349	10599	0.092	0.115	0.068
1965	426955	527790	326110	180087	210937	149243	19126	0.134	0.166	0.103
1966	749003	886030	611970	174004	201007	146743	27030	0.193	0.24	0.149
1967	781200	919870	642530	166671	190114	142226	27658	0.22	0.27	0.169
1968	912571	1063020	762120	168961	191807	146093	30236	0.24	0.29	0.184
1969	468508	569090	367930	147455	160754	127166	44389	0.36	0.43	0.28
1970	253287	327092	179488	111093	128592	94588	31727	0.33	0.40	0.25
1971	827508	966020	689000	101630	115869	87411	31396	0.45	0.55	0.34
1972	283975	355408	212552	88825	101063	76591	38203	0.55	0.67	0.44
1973	330198	398160	262240	105939	76522	57356	26936	0.51	0.62	0.40
1974	162981	204696	121264	51069	59881	44057	19940	0.49	0.59	0.38
1975	205075	250421	159019	12249	47830	34668	15588	0.51	0.63	0.39
1976	229833	274648	185002	38230	44019	32441	9771	0.38	0.47	0.29
1977	187854	224950	150750	38727	44382	33072	7833	0.28	0.35	0.22
1978	147816	179446	116154	37387	43001	31773	7559	0.26	0.33	0.198
1979	281942	331470	200010	37090	42449	31731	10321	0.42	0.52	0.32
1980	169396	207988	130000	33959	39152	28766	13130	0.53	0.66	0.41
1981	471852	549800	398718	37537	42894	32180	17103	0.82	1.01	0.63
1982	736210	880000	634390	58759	66124	51394	13000	0.45	0.55	0.34
1983	797560	903000	689430	78168	87283	69053	24981	0.54	0.66	0.43
1984	678457	770659	582261	80971	90239	71703	26779	0.46	0.56	0.36
1985	634705	740445	564975	87319	96973	77665	20426	0.31	0.38	0.25
1986	667240	754187	580293	95648	105906	85388	25024	0.36	0.43	0.28
1987	1223010	1355010	1091390	108449	119588	97312	26200	0.38	0.46	0.30
1988	1046005	552385	416855	112106	124069	100151	20447	0.22	0.27	0.177
1989	586679	664898	508462	98534	109209	87859	23254	0.28	0.34	0.22
1990	502524	585018	440022	91935	102325	81545	18404	0.24	0.29	0.191
1991	211557	253358	169762	73439	82441	64437	25562	0.37	0.45	0.30
1992	978544	1092610	864470	73225	81582	64869	21127	0.47	0.57	0.37
1993	365941	426133	305747	75914	84758	67070	18618	0.32	0.38	0.25
1994	780801	878486	683114	82712	91847	73577	19300	0.32	0.38	0.25
1995	733569	826644	640496	84144	93088	75200	23305	0.38	0.46	0.30
1996	358158	415861	300459	74460	82738	66182	18816	0.30	0.36	0.24
1997	379927	440430	319430	61708	68825	54591	20496	0.40	0.48	0.32
1998	254369	301109	207631	49665	55873	43457	18041	0.44	0.52	0.35

Year ^	Recruitment at age (wr) 1	High	Low	SSB **	High	Low	Total Catch^	F at ages (wr) 2–5	High	Low
1999	502744	574929	430551	43794	49322	38266	18485	0.61	0.73	0.48
2000	498757	571909	425611	44349	50189	38509	17191	0.60	0.73	0.48
2001	520736	600360	441120	44550	50891	38209	15269	0.50	0.61	0.39
2002	571806	661912	481708	57700	65859	49541	7465	0.195	0.24	0.148
2003	152742	190856	114624	46422	53632	39212	11536	0.28	0.35	0.22
2004	393483	469458	317502	43225	50950	35500	12743	0.36	0.45	0.27
2005	1169160	1376230	962170	60953	72121	49785	9494	0.27	0.35	0.200
2006	393857	478152	309568	75416	89604	61226	6944	0.118	0.150	0.085
2007	803252	958390	648110	78923	94029	63817	763	0.117	0.148	0.085
2008	324154	400926	247374	93644	111624	75664	5872	0.070	0.089	0.051
2009	1108940	1306530	911270	106082	125084	87076	9775	0.068	0.086	0.049
2010	817497	974210	660790	114286	133481	95099	8370	0.090	0.113	0.066
2011	1041780	1231010	852590	123378	143359	103401	11470	0.116	0.145	0.086
2012	689412	832230	546590	112915	131682	94138	21820	0.22	0.28	0.169
2013	399890	505020	294760	100858	118721	82999	16247	0.187	0.24	0.139
2014	330244	427344	233136	79531	94526	64536	19574	0.28	0.35	0.21
2015	194060	265017	123103	53288	64618	41958	18355	0.38	0.49	0.28
2016	286552	385393	187707	35398	44708	26083	16318	0.58	0.76	0.40
2017	124377	181574	67186	21999	30211	13787	10767	0.64	0.90	0.38
2018	330242	569120	91360	22977	33251	12703	4418	0.33	0.50	0.166
2019	204340 ***			22787 *						

* From the short-term forecast

** SSB estimated at spawning time (1st October).

*** Stock-recruit relationship based on SSB₂₀₁₇ from the assessment output.

^ Assessment year (1 April–31 March).

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