

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 and precautionary considerations are applied, there should be zero catch in 2022.

Stock development over time

Fishing pressure on the stock is below F_{MSY} and spawning-stock size is below MSY $B_{trigger}$, B_{pa} , and B_{lim} .

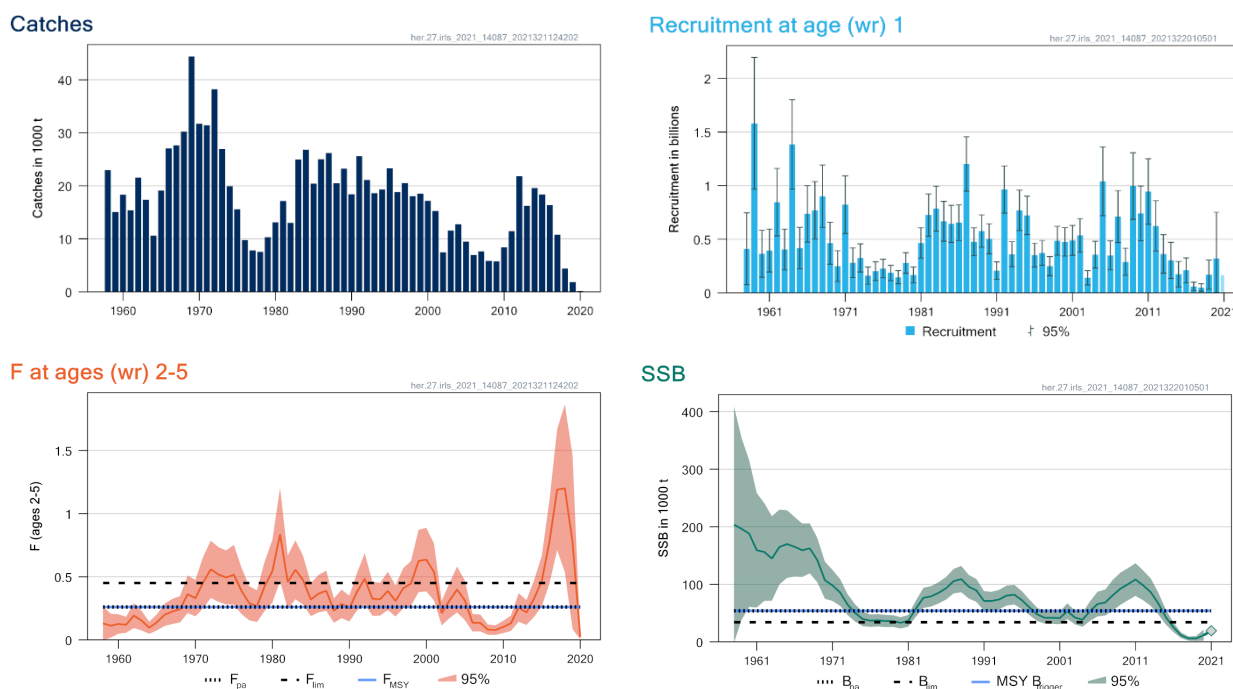


Figure 1 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Summary of the stock assessment. The assumed recruitment is in a lighter shade and the forecast spawning-stock biomass (SSB) value is indicated with a grey diamond.

Catch scenarios

Table 1 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
$F_{ages(wr) 2-5}$ (2021)	0.062	The F that corresponds to the monitoring TAC
$R_{age(wr) 1}$ (2021-2022)	164 568	Stock–recruitment relationship based on the SSB_{2019} from the assessment output; in thousands
SSB (2021)	19 278	Fishing at $F = 0.062$; in tonnes
Total catch (2021)	869	Monitoring TAC; in tonnes

Table 2 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 (2022)	F ₂₋₅ (2022)	SSB* (2022)	% SSB change**	SSB* (2023)#	% TAC change***	% advice change^
ICES advice basis							
MSY approach: zero catch	0	0	21902	10.4	24171	-100	-
Other scenarios							
F _{MSY}	4214	0.26	19639	-5.8	18507	385	-
F _{MSY} × SSB ₂₀₂₁ /MSY B _{trigger}	1620	0.093	21061	4	21909	86	-
F = 0	0	0	21902	10.4	24171	-100	-
F _{pa}	4214	0.26	19639	-5.8	18507	385	-
F _{lim}	6724	0.45	18159	-14.7	15483	674	-
SSB ₂₀₂₂ = B _{lim} ^^	-	-	-	-	-	-	-
SSB ₂₀₂₂ = B _{pa} ^^	-	-	-	-	-	-	-
SSB ₂₀₂₂ = MSY B _{trigger} ^^	-	-	-	-	-	-	-
F = F ₂₀₂₁	1090	0.062	21340	6.7	22637	25	-
TAC = monitoring TAC	869	0.049	21455	7.1	22982	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 2023 relative to SSB 2022.

*** Total catch in 2022 relative to the advised monitoring TAC in 2021 (869 tonnes).

^ Advice value for 2022 relative to the advice value for 2021 (0 tonnes).

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

Assuming the same catch scenario in 2023 as in 2022.

There are no catch scenarios that will rebuild the stock above B_{lim} by 2023, and the ICES advice for zero catch is the same as last year.

Basis of the advice

Table 3 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 Advisory Council in 2011 (PelAC, 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).

Quality of the assessment

SSB is consistently overestimated and fishing mortality is consistently underestimated. However, this bias does not impact the outcome of the advice.

The catch in 2020 was considerably lower than the monitoring TAC, but this appears to have been due to a lack of concentrations of herring rather than impacts of the COVID-19 pandemic.

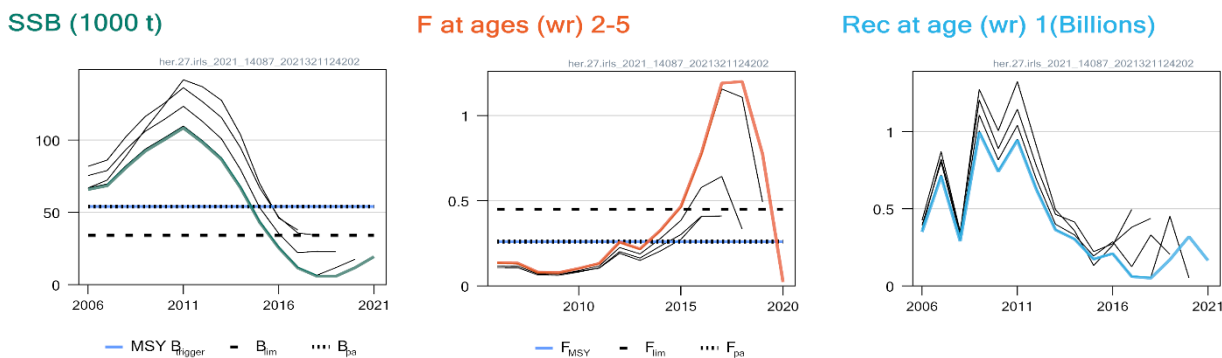


Figure 2 Herring in divisions 7.a South of 52°30'N, 7.g-h, and 7.j-k. Historical assessment results. Final-year recruitment and SSB estimates included. The assessment was benchmarked in 2015 and inter-benchmarked in 2018.

Issues relevant for the advice

Activities that have a negative impact on the spawning 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, 2003, 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 such as wind turbines 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.

Recruitment estimates are uncertain because of a lack of recruitment indices. It is known that juvenile Celtic Sea herring mix with the Irish Sea stock but the level of mixing is unknown. The consequence of this needs to be further evaluated for management and advice.

Reference points

Table 4 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	B_{pa}	ICES (2018b)
	F_{MSY}	0.26	Stochastic simulations using a segmented regression stock-recruitment relationship from 1970–2014	ICES (2018b)
Precautionary approach	B_{lim}	34000	B_{loss} = the lowest observed SSB (1980)	ICES (2018b)
	B_{pa}	54000	$B_{pa} = B_{lim} \times \exp(1.645 \times \sigma_B)$, with $\sigma_B = 0.29$ from assessment uncertainty in the terminal year	ICES (2018b)
	F_{lim}	0.45	Equilibrium F maintaining SSB > B_{lim} with 50% probability	ICES (2018b)
	F_{pa}	0.26	The F that leads to SSB $\geq B_{lim}$ with 95% probability	ICES (2018b, (2021))

Basis of the assessment

Table 5 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, 2021a)
Assessment type	Age-based analytical assessment (ASAP; ICES, 2021b) 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 [A4057], 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)

History of the advice, catch, and management

Table 6 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

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES estimated catch [^]
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 ^{^^}	132	132	0	132
2021	MSY approach	0	869 ^{^^}				
2022	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.

History of the catch and landings

Table 7 Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Catch distribution by fleet in 2020 as estimated by ICES. All weights are in tonnes.

Catch (2020)	Landings	Discards
132	Pelagic trawlers 100%	Negligible
	132	

Table 8 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
2019			1803	38		1841
2020			132	+		132

+ Designates catch of less than 0.5 tonnes.

Summary of the assessment

Table 9 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	410779	746293	75267	203775	409149	0	22978	0.131	0.26	0
1959	1580370	2194997	965803	196418	354496	38344	15086	0.112	0.21	0.0171
1960	364196	583798	144602	188191	315721	60659	18283	0.126	0.20	0.048
1961	394746	594454	195046	159220	258812	59628	15372	0.119	0.183	0.056
1962	845346	1159930	530770	156166	241093	71247	21552	0.192	0.29	0.094
1963	403789	594484	213096	144911	218373	71447	17349	0.153	0.23	0.075
1964	1383720	1800455	966945	165008	230000	100020	10599	0.096	0.144	0.048
1965	417477	610920	224040	169945	228691	111189	19126	0.139	0.20	0.075
1966	736461	1000217	472703	165303	217150	113450	27030	0.198	0.29	0.110
1967	769688	1037171	502209	159195	205650	112730	27658	0.22	0.32	0.125
1968	900913	1191578	610242	162483	205974	118986	30236	0.24	0.35	0.138
1969	462667	657408	267932	142099	180716	103484	44389	0.36	0.51	0.21
1970	249296	392258	106342	107237	139576	74904	31727	0.33	0.47	0.186
1971	821736	1090809	552671	98066	125139	70993	31396	0.45	0.66	0.25
1972	279864	418173	141547	85942	109250	62634	38203	0.56	0.79	0.33
1973	325791	457147	194433	64609	82781	46437	26936	0.52	0.73	0.30
1974	160634	241335	79925	50103	65041	35165	19940	0.49	0.71	0.28
1975	202410	290142	114678	39673	52034	27312	15588	0.52	0.75	0.28
1976	226633	313150	140110	36855	47720	25990	9771	0.39	0.57	0.20
1977	185181	256787	113573	37481	48140	26822	7833	0.29	0.43	0.155
1978	145900	207077	84723	36245	46849	25641	7559	0.27	0.39	0.142
1979	278995	374915	183085	36102	46253	25951	10321	0.42	0.62	0.23
1980	166827	241414	92246	33083	42939	23227	13130	0.54	0.79	0.29
1981	465534	606711	324349	36588	46757	26419	17103	0.84	1.21	0.47
1982	725162	921728	528592	57523	71611	43435	13000	0.46	0.67	0.25
1983	785160	993959	576361	76477	93938	59016	24981	0.56	0.79	0.32
1984	666802	852381	481219	79075	96832	61316	26779	0.47	0.66	0.28
1985	643131	816122	470138	85166	103681	66651	20426	0.32	0.45	0.188
1986	654874	822328	487412	93167	112845	73489	25024	0.37	0.51	0.22
1987	1201270	1455336	947264	105573	126928	84212	26200	0.39	0.55	0.23
1988	476003	606554	345446	109082	132022	86138	20447	0.23	0.33	0.135
1989	576335	727068	425612	95798	116268	75328	23254	0.29	0.40	0.172
1990	503907	643721	364099	89314	109235	69393	18404	0.25	0.35	0.146
1991	207728	288266	127194	71122	88348	53896	25562	0.38	0.53	0.23
1992	963301	1183016	743584	71017	86976	55058	21127	0.48	0.69	0.28
1993	360216	476338	244102	73702	90586	56818	18618	0.33	0.46	0.190
1994	769446	957831	581069	80474	97905	63043	19300	0.32	0.45	0.192
1995	722547	901874	543226	81967	99007	64927	23305	0.39	0.54	0.24
1996	352563	463814	241306	72473	88218	56728	18816	0.31	0.43	0.185

Year [^]	Recruitment at age (wr) 1	High	Low	SSB ^{**}	High	Low	Total catch [^]	F at ages (wr) 2–5	High	Low
1997	372999	489261	256739	59909	73388	46430	20496	0.41	0.57	0.25
1998	248744	338183	159297	47983	59672	36294	18041	0.45	0.62	0.27
1999	485934	621103	350757	41944	52174	31714	18485	0.63	0.87	0.38
2000	474998	607312	342688	41909	52361	31457	17191	0.64	0.89	0.38
2001	489171	628630	349710	41401	52305	30497	15269	0.54	0.76	0.31
2002	535959	692701	379219	53318	66994	39642	7465	0.21	0.31	0.114
2003	140532	207333	73727	42362	54225	30499	11536	0.31	0.45	0.172
2004	356132	481243	231017	38491	50774	26206	12743	0.40	0.58	0.22
2005	1039870	1360517	719283	53466	70551	36381	9494	0.31	0.47	0.156
2006	349711	485330	214090	65778	87287	44269	6944	0.136	0.21	0.066
2007	710921	953137	468703	68378	91040	45716	7636	0.134	0.20	0.067
2008	289372	415782	162958	80993	107837	54149	5872	0.081	0.122	0.040
2009	996276	1307469	685091	92307	120270	64344	5745	0.078	0.116	0.039
2010	741184	996372	485988	100208	128126	72294	8370	0.103	0.152	0.054
2011	945168	1249774	640566	108341	136831	79849	11470	0.132	0.193	0.071
2012	624414	858944	389876	98303	124249	72357	21820	0.26	0.37	0.144
2013	363192	542212	184168	86567	110567	62567	16247	0.22	0.31	0.118
2014	303332	472017	134643	66930	86011	47849	19574	0.33	0.47	0.182
2015	173758	292593	54927	43140	56260	30020	18355	0.47	0.67	0.27
2016	209358	326321	92399	25480	33834	17126	16318	0.78	1.11	0.45
2017	59869	98836	20902	11527	16529	6525	10767	1.19	1.67	0.71
2018	49856	84889	14823	5843	9543	2142	4418	1.20	1.86	0.53
2019	169991	306531	33449	5790	10138	1443	1841	0.77	1.46	0.085
2020	320017	751514	0	11680	21360	2000	132	0.023	0.042	0.0033
2021	164568***			19278*						

* From the short-term forecast.

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

*** Stock–recruitment relationship based on SSB₂₀₁₉ from the assessment output.

[^] Assessment year (1 April–31 March).

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Recommended citation: ICES. 2021. 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). *In* Report of the ICES Advisory Committee, 2021, her.27.irls. <https://doi.org/10.17895/ices.advice.7773>.