

Herring (*Clupea harengus*) in divisions 6.a and 7.b–c (West of Scotland, West of Ireland)

ICES advice on fishing opportunities

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

Stock development over time

The information presented here represents two stocks (herring in Division 6.a(N), and herring in divisions 6.a(S) and 7.b–c) assessed as one.

Both spawning-stock biomass (SSB) and Recruitment (R) have been declining since around 2000 and are at their lowest level in the time series. Fishing mortality (F) has reduced since 2016 when catches have been limited to a monitoring TAC.

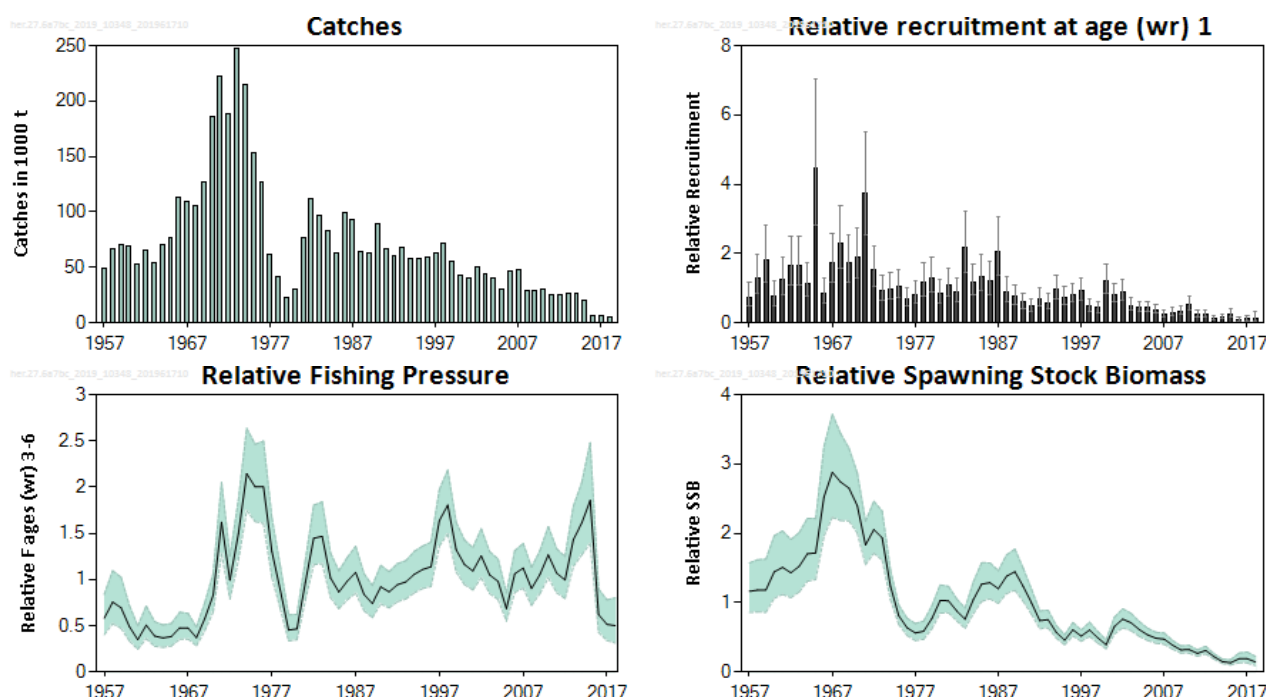


Figure 1 Herring in divisions 6.a and 7.b–c. Summary of the stock assessment. Relative R, F, and SSB from the stock assessment (relative to mean over assessment period). The shaded areas on the F and SSB plots represent 95% confidence intervals.

Stock and exploitation status

ICES cannot assess the stock and exploitation status relative to MSY and PA reference points, because those reference points are undefined.

Table 1 Herring in divisions 6.a and 7.b–c. State of the stock and fishery relative to reference points.

Table 2 Harvest in divisions 5a and 7b, as a share of the stock and fishery relative to reference points.

		Fishing pressure			Stock size					
		2016	2017	2018	2016	2017	2018			
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	$MSY\ B_{trigger}$?	?	?	Undefined
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	B_{pa}, B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	—	Not applicable
Qualitative evaluation	-				Stable	-				Below possible reference points

Catch scenarios

The ICES framework for category 3 stocks was applied (ICES, 2012). Given that SSB is currently assessed to be close to the lowest level in the time series and is likely to remain so in 2020, and that it is below possible reference points, the advice is for zero catch for 2020.

Basis of the advice

Table 2 Herring in divisions 6.a and 7.b–c. The basis of the advice.

Advice basis	Precautionary approach
Management plan	ICES is not aware of an agreed precautionary management plan for herring in this area. A proposed rebuilding plan has not been evaluated by ICES.

Quality of the assessment

An interbenchmark was carried out on this stock in 2019 due to the strong retrospective bias in the 2018 assessment (ICES, 2019a). The IBTS survey estimates were revised, the acoustic surveys combined into a single index, and catch data were reconfigured to account for fleet-specific differences. The updated assessment model still, however, has a strong retrospective bias.

The interbenchmark points to continued concerns with the quality of the combined assessment, and how well it is able to represent the dynamics of the separate stocks and fisheries in 6.a(N) and 6.a(S) and 7.b–c. The assessment still suffers from a lack of information on younger-aged fish. Given unresolved issues with the assessment it is used as indicative of trends only.

The updated assessment shows a different trajectory of the stock, with SSB and recruitment revised downwards and at very low levels. However, the perception of the current state of the stock is unchanged compared to previous assessments. The fishing mortality has been revised upward, with a decrease evident since the introduction of the monitoring TAC.

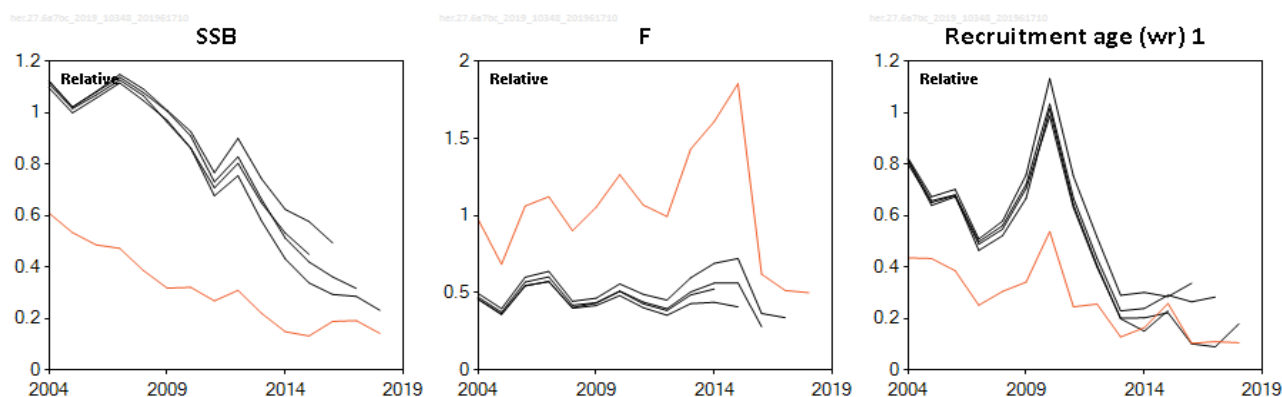


Figure 2 Herring in divisions 6.a and 7.b–c. Historical assessment results. The stock was inter-benchmarked in 2019.

Issues relevant for the advice

In April 2016, ICES issued advice for a scientific monitoring fishery that could be obtained through a catch of 4840 tonnes for herring in this area, at the request of the European Commission (ICES, 2016a). The EC established a monitoring TAC of 5800 tonnes in 2016, which has been maintained since then.

A rebuilding plan, which contains provisions for a monitoring TAC while the combined stocks remain below B_{lim} (based on previous assessments), was evaluated by ICES (ICES, 2017). A key aim of the plan is to provide sampling opportunities; this includes sampling for assessment input catch-at-age information as well as sample collection for stock discrimination

research, whilst ensuring that the stock can be rebuilt. However, the plan was found not to be precautionary. A revised version of the rebuilding plan was submitted to ICES by the European Commission in 2018 but has not been evaluated.

ICES considers it important to develop a stock recovery plan for herring in divisions 6.a and 7.b–c, but the continued uncertainty in the quality of the assessment and stock mixing need to be resolved in order to enable the evaluation of a rebuilding plan.

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 these combined stocks (ICES, 2003, 2015b).

There has been an increase in marine anthropogenic activity, especially in the area of marine renewable energy. Construction and development of, for example, wind farms results in disturbance to the seabed. Any activities that have a negative impact on the spawning habitat of herring, such as the extraction of marine aggregates (e.g. gravel and sand) and construction in the vicinity of spawning grounds, require consideration (see for example, Groot, 1979, 1996; ICES 2003, 2015b). This is because a gravel substratum is an essential habitat for herring spawning.

Reference points

No reference points are defined for these combined stocks.

Basis of the assessment

Table 3 Herring in divisions 6.a and 7.b–c. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2018)
Assessment type	Age-based assessment indicative of trends (FLSAM; ICES 2019b).
Input data	Commercial catches, (weights, ages, and length frequencies from catch sampling); combined West of Scotland and Malin Shelf Herring Acoustic Survey data (WoS + MSHAS 1991–2018), Scottish west coast IBTS surveys Q1 (1994–2018) and Q4 (1996–2018).
Discards and bycatch	Not included, considered negligible.
Indicators	None
Other information	Benchmarked in WKWEST (ICES, 2015a), updated with corrected natural mortalities by ICES (2015c). Inter-benchmarked in 2019 (ICES 2019a). These combined stocks are autumn / winter spawners. Age is given in winter rings (wr), so for example: a 2-year-old fish is termed “1-winter ring”.
Working group	Herring Assessment Working Group for the Area South of 62°N (HAWG)

Information from stakeholders

The industry, in conjunction with the PelAC, initiated a major genetic research programme in 2016 that aimed to elucidate existing information on stock mixing in divisions 6.a and 7.b–c. Preliminary analyses from the study indicated that the 6.a(N) and 6.a(S) / 7.b–c herring stocks represent two genetically-distinct populations. In 2018 University College Dublin, the Irish Marine Institute, and Marine Scotland Science began a three-year project to develop this programme further. This project is now well advanced in terms of this separation analyses.

The industry-initiated acoustic survey which commenced in 2016 was continued in 2017 and 2018, and will take place again in 2019. This will provide a minimum estimate of spawning-stock size, and provide genetic and morphometric samples of the two separate spawning populations.

The PelAC sent a revised draft rebuilding plan for herring in 6.a and 7.b–c in March 2018 to the Commission, which was submitted to ICES for evaluation. ICES has not evaluated this rebuilding plan.

History of the advice, catch, and management

Table 4 Herring in divisions 6.a and 7.b–c. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC in Div. 5.b., 6.b, and 6.a (N)	Agreed TAC in Div. 6.a (S), 7.bc	Discards	ICES estimated catches
2015 *	Prior to the advice for 2016, ICES advised separately for herring in Division 6.a North and herring in Division 6.a South and 7.b,c. See ICES (2014a and 2014b) for the history of ICES advice on these individual stocks	-	22690		0	19885
2016	MSY approach	0	4170	1630	0	6937 ^
2017	MSY approach	0	4170	1630	0	6428
2018	MSY approach	0	4170	1630	0	5558
2019	MSY approach	0	4170	1630		
2020	Precautionary approach	0				

* See Table 5.3.12.1 in ICES (2014a) and Table 5.3.13.1 in ICES (2014b) for the full histories of ICES advice, management, landings, and catches.

^ Including catches from the carried-over 2015 TAC.

History of the catch and landings

Table 5 Herring in divisions 6.a and 7.b–c. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)	Landings		Discards
5558 tonnes	Pelagic trawl 100%	Ringnets (negligible)	Negligible
	5558 tonnes		

Table 6 Herring in Divisions 6.a and 7.b–c. History of commercial catch and landings; both the official and ICES estimated values are presented for each country. All weights are in tonnes.

Country	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Faroe Islands	0	0	274	0	0	0	0	0	0	0	800	400	228	1810
France	119	818	5087	3672	2297	3093	1903	463	870	760	1855	1370	625	613
Germany	5890	4693	7938	3744	7836	8873	8253	6752	4615	3944	3810	2935	1046	2691
Ireland	33985	35836	30493	28998	33521	26275	36399	24240	15005	15589	17311	16502	12844	16231
Netherlands	8900	8632	10683	9015	11196	13273	10983	9112	5881	6622	4978	3609	8296	5132
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway	2389	7447	30676	4840	6223	4962	5317	2695	0	0	0	0	0	0
UK	32730	32802	4237	42685	46639	44273	42302	36446	22816	21862	20604	16947	17706	17494
Total landings	84013	90228	80914	92954	107712	100749	105157	79708	49187	48777	49358	41763	40745	43971
Discards *	300	250	700	0	0	112	90	0	0	0	0	0	123	772
Total catch	84313	90478	81614	92954	107712	100861	105247	79708	49187	48777	49358	41763	40868	44743
Corrected for 6.a South/7.b–c unallocated/ area misreported	88913	96728	87864	94054	114612	101561	116447	87624	57635	50167	53231	45344	43681	47623
Corrected for 6.a North unallocated	83428	92975	88564	89513	96859	93546	104699	79469	57635	50444	59475	48164	47171	47623
Corrected for 6.a North area misreported	60835	68578	58330	57367	58605	63780	72253	55846	43008	40007	50740	44583	40286	30360
ICES estimate	60835	68578	58330	57367	58605	63780	72253	55846	43008	40007	50740	44583	40286	30360
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Denmark	0	0	0	0	0	0	0	0	0	0	23	0	39	
Faroe Islands	570	484	927	1544	70	0	0	0	360	0	0	0	0	
France	701	703	564	1049	511	504	244	586	589	0	0	0	7	
Germany	3152	1749	2526	27	3583	3518	1829	4025	3354	3292	1028	0	17	
Ireland	19192	17791	13340	10468	10241	8203	7178	4584	5565	1872	1740	1717	1054	
Netherlands	7361	8065	4133	5675	3600	1684	3523	1815	1641	956	372	835	1000	
Lithuania	0	0	0	0	0	0	0	0	770	0	0	0	0	
Norway	0	0	0	0	0	0	0	0	0	1	0	0	4	
UK	18290	17618	13963	11076	12018	11696	12249	15906	16769	15265	3254	3356	2911	
Total landings	49266	46410	35453	29839	30023	25605	25023	26916	29048	21386	6417	5908	5032	
Discards *	163	0	0	0	95	0	0	30	0	0	0			
Total catch	49429	46410	35453	29839	30118	25605	25023	26946	29048	21386	6417	5908	5032	
Corrected for 6.a South / 7.b–c unallocated/ area misreported	54135	51552	38556	31774	32846	28277	27803	29414	31211	22386	7388	6428	5558	
Corrected for 6.a North unallocated	54135	51552	38556	31774	32846	28277	27803	29414	31211	22386	7388	6428	5558	
Corrected for 6.a North area misreported	47251	47433	29394	28976	30118	24678	25023	26946	27123	19880	6938	6428	5558	
ICES estimate	47251	47433	29394	28976	30118	24678	25023	26946	27123	19880	6938	6428	5558	

* Unraised discards.

Table 7 Herring in Divisions 6.a and 7.b–c. The Division 6.a North component of the stock. History of commercial catch and landings; both the official and ICES estimated values are presented for each country. All weights are in tonnes.

Country	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Faroe Islands	0	0	274	0	0	0	0	0	0	0	800	400	228	1810
France	119	818	5087	3672	2297	3093	1903	463	870	760	1340	1370	625	613
Germany	5640	4693	7938	3733	7836	8873	8253	6752	4615	3944	3810	2935	1046	2691
Ireland	7985	8236	6093	3548	9721	1875	11199	7915	4841	4311	4239	3581	1894	2880
Netherlands	8000	6132	8183	7808	9396	9873	8483	7244	4647	4534	4612	3609	8232	5132
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway	2389	7447	30676	4840	6223	4962	5317	2695	0	0	0	0	0	0
UK	32730	32602	-4287	42661	46639	44273	42302	36446	22816	21862	20604	16947	17706	17494
Unallocated	-5485	-3753	700	-4541	-17753	-8015	-11748	-8155	0	277	6244	2820	3490	0
Discards *	200	0	0	0	0	62	90	0	0	0	0	0	123	772
Total	51578	56175	54664	61271	64359	64995	65799	61514	37789	35688	41649	31622	33344	31392
Area misreported	-22593	-24397	-30234	-32146	-38254	-29766	-32446	-23623	-14627	-10437	-8735	-3581	-6885	-17263
ICES estimate	28985	31778	24430	29575	26105	35233	33353	29736	23162	25251	32914	28081	26459	14129
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Denmark	0	0	0	0	0	0	0	0	0	0	23	0	39	
Faroe Islands	570	484	927	1544	70	0	0	0	360	0	0	0	0	
France	701	703	564	1049	511	504	244	586	589	0	0	0	7	
Germany	3152	1749	2526	27	3583	3518	1829	4025	3354	3292	1028	0	17	
Ireland	4352	5129	3103	1935	2728	3956	3451	3124	2632	1799	569	10	84	
Netherlands	7008	8052	4133	5675	3600	1684	3523	1775	1641	956	300	835	1000	
Lithuania	0	0	0	0	0	0	0	0	770	0	0	0	0	
Norway	0	0	0	0	0	0	0	0	0	1	0	0	4	
UK	18284	17618	13963	11076	12018	11696	12249	15906	16769	15260	3254	3356	2911	
Unallocated	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards *	163	0	0	0	95	0	0	30	0	0	0	0	0	
Total	34230	33735	25216	21306	22510	21358	21296	25446	26115	21307	5174	4201	4063	
Area misreported	-6884	-4119	-9162	-2798	-2728	-3599	-2780	-2468	-4088	-2506	-450			
ICES estimate	27346	29616	16054	18508	19877	17759	18516	22978	22027	18801	4724	4201	4063	

* Unraised discards.

Table 8 Herring in divisions 6.a and 7.b–c. The divisions 6.a South / 7.b–c component of the stock. History of commercial catch and landings; both the official and ICES estimated values are presented for each country. All weights are in tonnes.

Country	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
France	0	0	0	0	0	0	0	0	0	0	515	0	0	0
Germany	250	0	0	11	0	0	0	0	0	0	0	0	0	0
Ireland	26000	27600	24400	25450	23800	24400	25200	16325	10164	11278	13072	12921	10950	13351
Netherlands	900	2500	2500	1207	1800	3400	2500	1868	1234	2088	366	0	64	0
UK (Northern Ireland)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK (England & Wales)	0	0	50	24	0	0	0	0	0	0	0	0	0	0
UK Scotland	0	200	0	0	0	0	0	0	0	0	0	0	0	0
Total landings	27150	30300	26950	26692	25600	27800	27700	18193	11398	13366	13953	12921	11014	13351
Unallocated / area misreported	4600	6250	6250	1100	6900	700	11200	7916	8448	1390	3873	3581	2813	2880
Discards *	100	250	700	0	0	50	0	0	0	0	0	0	0	0
ICES estimated catch	31850	36800	33900	27792	32500	28550	38900	26109	19846	14756	17826	16502	13827	16231
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
France	0	0	0	0	0	0	0	0	0	0	0	0	0	
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ireland	14840	12662	10237	8533	7513	4247	3727	1460	2933	73	1171	1707	970	
Netherlands	353	13	0	0	0	0	0	40	0	0	72	0	0	
UK (Northern Ireland)	0	0	0	0	0	0	0	0	0	0	0	0	0	
UK (England & Wales)	0	0	0	0	0	0	0	0	0	0	0	0	0	
UK Scotland	6	0	0	0	0	0	0	0	0	5	0	0	0	
Total landings	15199	12675	10237	8533	7513	4247	3791	1500	2933	78	1243	1707	970	
Unallocated / area misreported	4706	5142	3103	1935	2728	2672	2780	2468	2163	1000	971	520	525	
Discards *	0	0	0	0	0	0	0	0	0	0	0	0	0	
ICES estimate	19193	17791	13340	10468	10241	6919	6571	3968	5096	1078	2214	2227	1495	

* Unraised discards.

Summary of the assessment

Table 9 Herring in divisions 6.a and 7.b–c. Assessment summary. Weights are in tonnes. Age is in winter-rings (wr). Highs and lows are 95% confidence intervals. All values are relative to the time-series average except catch.

Year	Recruitment at age (wr) 1	High	Low	SSB	High	Low	Catches	F at ages (wr) 3–6	High	Low
1957	0.74	1.16	0.47	1.16	1.57	0.86	49000	0.58	0.84	0.40
1958	1.28	1.98	0.83	1.18	1.62	0.86	66000	0.76	1.09	0.52
1959	1.82	2.8	1.18	1.18	1.63	0.86	70000	0.70	1.02	0.47
1960	0.78	1.22	0.50	1.44	1.96	1.06	69000	0.49	0.72	0.34
1961	1.25	1.91	0.82	1.51	2.0	1.12	53000	0.35	0.50	0.24
1962	1.65	2.5	1.08	1.43	1.91	1.07	66000	0.51	0.71	0.36
1963	1.64	2.5	1.09	1.52	2.0	1.15	54000	0.39	0.54	0.28
1964	1.14	1.73	0.75	1.70	2.2	1.31	70000	0.37	0.51	0.27
1965	4.5	7.0	2.8	1.71	2.2	1.33	77000	0.38	0.52	0.28
1966	0.85	1.29	0.56	2.5	3.3	1.96	113000	0.48	0.65	0.35
1967	1.73	2.6	1.17	2.9	3.7	2.2	109000	0.47	0.63	0.36
1968	2.3	3.4	1.57	2.7	3.4	2.2	105000	0.37	0.48	0.28
1969	1.74	2.5	1.19	2.7	3.2	2.2	127000	0.58	0.75	0.45
1970	1.88	2.7	1.30	2.4	2.9	2.0	186000	0.83	1.06	0.65
1971	3.7	5.5	2.5	1.83	2.2	1.54	220000	1.62	2.0	1.28
1972	1.52	2.2	1.05	2.1	2.5	1.71	188000	0.99	1.25	0.79
1973	0.93	1.36	0.64	1.94	2.3	1.61	250000	1.49	1.85	1.20
1974	0.99	1.44	0.68	1.24	1.47	1.04	210000	2.1	2.6	1.75
1975	1.05	1.53	0.71	0.81	0.96	0.69	153000	2.0	2.5	1.63
1976	0.69	1.01	0.47	0.64	0.78	0.53	126000	2.0	2.5	1.61
1977	0.83	1.22	0.56	0.56	0.70	0.45	62000	1.30	1.67	1.02
1978	1.16	1.72	0.79	0.59	0.73	0.47	42000	0.89	1.15	0.69
1979	1.30	1.91	0.88	0.77	0.95	0.62	23000	0.45	0.62	0.33
1980	0.85	1.24	0.58	1.03	1.25	0.85	30000	0.47	0.62	0.35
1981	1.09	1.59	0.75	1.03	1.23	0.85	76000	0.97	1.20	0.78
1982	0.89	1.30	0.61	0.88	1.05	0.74	112000	1.45	1.80	1.16
1983	2.2	3.2	1.46	0.76	0.92	0.63	97000	1.47	1.84	1.17
1984	1.16	1.70	0.79	1.04	1.30	0.84	83000	1.02	1.29	0.81
1985	1.35	1.97	0.92	1.27	1.57	1.02	62000	0.86	1.09	0.68
1986	1.20	1.76	0.82	1.29	1.57	1.05	100000	0.98	1.24	0.78
1987	2.0	3.0	1.37	1.20	1.46	0.99	93000	1.08	1.36	0.85
1988	0.91	1.34	0.61	1.38	1.69	1.13	65000	0.84	1.06	0.66
1989	0.75	1.09	0.52	1.45	1.77	1.18	63000	0.74	0.93	0.59
1990	0.59	0.85	0.41	1.23	1.50	1.02	89000	0.92	1.15	0.74
1991	0.48	0.69	0.33	1.00	1.19	0.83	66000	0.87	1.08	0.69
1992	0.70	1.01	0.49	0.74	0.88	0.62	61000	0.94	1.17	0.76
1993	0.59	0.83	0.41	0.75	0.89	0.64	69000	0.97	1.20	0.79
1994	0.96	1.36	0.68	0.57	0.67	0.49	58000	1.06	1.30	0.86
1995	0.74	1.03	0.53	0.46	0.54	0.39	57000	1.11	1.36	0.90
1996	0.81	1.13	0.59	0.61	0.71	0.52	59000	1.14	1.40	0.92
1997	0.92	1.29	0.66	0.52	0.60	0.44	62000	1.64	1.97	1.36
1998	0.48	0.67	0.34	0.60	0.72	0.51	72000	1.80	2.2	1.49
1999	0.43	0.60	0.30	0.49	0.58	0.42	56000	1.32	1.62	1.08
2000	1.19	1.67	0.85	0.39	0.46	0.33	43000	1.16	1.43	0.94
2001	0.82	1.14	0.59	0.66	0.79	0.55	40000	1.09	1.35	0.89
2002	0.89	1.24	0.63	0.76	0.91	0.64	51000	1.25	1.55	1.02
2003	0.50	0.71	0.36	0.71	0.85	0.60	45000	1.05	1.30	0.85
2004	0.44	0.61	0.31	0.61	0.73	0.51	40000	0.98	1.22	0.78

Year	Recruitment at age (wr) 1	High	Low	SSB	High	Low	Catches	F at ages (wr) 3–6	High	Low
2005	0.43	0.61	0.31	0.53	0.63	0.45	30000	0.69	0.86	0.55
2006	0.39	0.54	0.28	0.49	0.57	0.41	47000	1.06	1.31	0.86
2007	0.25	0.35	0.180	0.47	0.56	0.40	47000	1.12	1.39	0.91
2008	0.31	0.43	0.22	0.39	0.46	0.33	29000	0.90	1.13	0.72
2009	0.34	0.49	0.24	0.32	0.37	0.27	29000	1.05	1.31	0.85
2010	0.54	0.76	0.38	0.32	0.38	0.27	30000	1.27	1.57	1.02
2011	0.25	0.35	0.173	0.27	0.32	0.23	25000	1.07	1.33	0.86
2012	0.26	0.37	0.177	0.31	0.37	0.26	25000	0.99	1.25	0.79
2013	0.128	0.187	0.088	0.22	0.26	0.184	27000	1.43	1.79	1.14
2014	0.164	0.25	0.108	0.149	0.183	0.121	27000	1.61	2.0	1.27
2015	0.26	0.42	0.159	0.132	0.175	0.099	19900	1.86	2.5	1.39
2016	0.104	0.176	0.061	0.188	0.27	0.131	6900	0.62	0.90	0.43
2017	0.110	0.20	0.060	0.192	0.29	0.128	6400	0.51	0.78	0.34
2018	0.106	0.34	0.033	0.142	0.22	0.090	5600	0.50	0.80	0.31

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Recommended citation: ICES. 2019. Herring (*Clupea harengus*) in divisions 6.a and 7.b-c (West of Scotland, West of Ireland). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, her.27.6a7bc <https://doi.org/10.17895/ices.advice.4717>