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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 2023.

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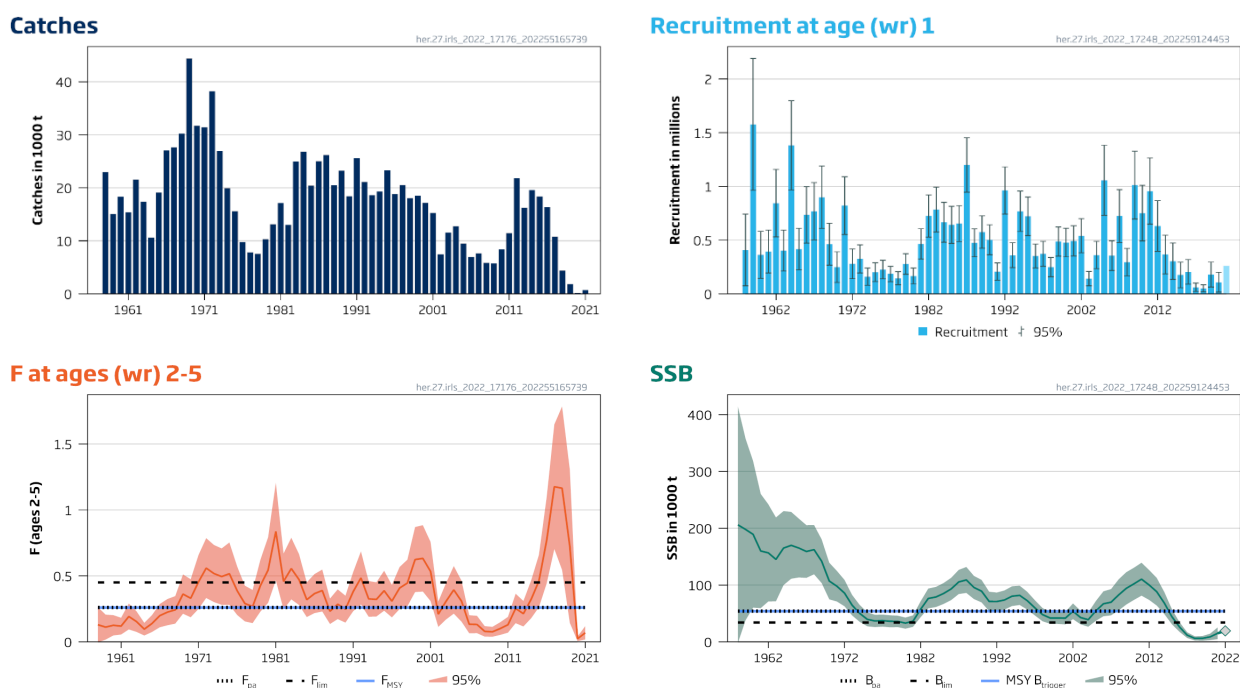
Figure 1   Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Summary of the stock assessment. The assumed recruitment is in a lighter shade, and the forecast spawning-stock biomass (SSB) value is indicated with a grey diamond. (WR is winter ring).

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
$F_{ages\ (wr)\ 2–5}$ (2022)	0.058	The F that corresponds to the monitoring TAC
$R_{age\ (wr)\ 1}$ (2022–2023)	197 044	Stock–recruitment relationship based on the SSB_{2020} from the assessment output; in thousands
SSB (2022)	19 349	Short-term forecast; in tonnes
Total catch (2022)	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 (2023)	F_{2-5} (2023)	SSB* (2023)	% SSB change**	SSB* (2024)#	% TAC change***	% advice change^
ICES advice basis							
MSY approach: zero catch	0	0	22746	17.6	25875	−100	
Other scenarios							
F_{MSY}	4475	0.26	20454	5.7	20049	415	-
$F_{MSY} \times SSB_{2022}/MSY\ B_{trigger}$	1725	0.093	21891	13.1	23546	98.5	-
F = 0	0	0	22746	17.6	25875	−100	-
F_{pa}	4475	0.26	20454	5.7	20049	415	-
F_{lim}	7150	0.45	18953	−2	16914	722.8	-
$SSB_{2023} = B_{lim}$^^	-	-	-	-	-	-	-
$SSB_{2023} = B_{pa}$^^	-	-	-	-	-	-	-
$SSB_{2023} = MSY\ B_{trigger}$^^	-	-	-	-	-	-	-
$F = F_{2022}$	1091	0.058	22209	14.8	24390	25.5	-
TAC = monitoring TAC	869	0.046	22319	15.3	24746	0	-

* For this autumn- and winter-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 2023 relative to the advised monitoring TAC in 2022 (869 tonnes).

^ Advice value for 2023 relative to the advice value for 2022 (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 2024 as in 2023.

There are no catch scenarios that will rebuild the stock above B_{lim} by 2024, 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.

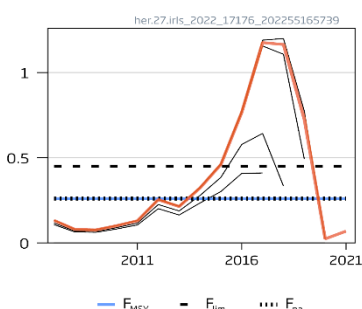| Advice basis	MSY approach
Management plan	ICES is not aware of any agreed precautionary management plan for herring in this area

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.
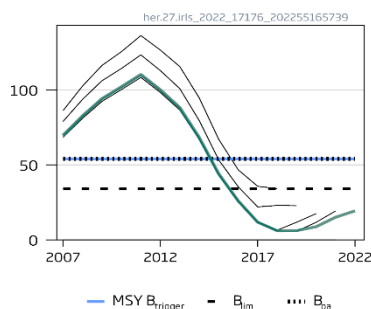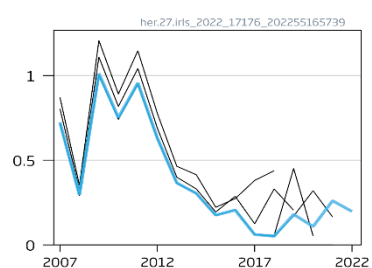
Figure 2   Herring in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k. Historical assessment results. Final-year recruitment and SSB estimates included. The reference points were revised in 2018 (following an interbenchmark), and only assessment results from the last four years should be compared to the reference points indicated.

Issues relevant for the advice

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 de Groot, 1979, 1996; ICES, 2003, 2015a). This is because a gravel substratum is an essential habitat for herring spawning. 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).

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 provides a 95% probability for SSB to be above B_{lim} (F_{P05} with advice rule [AR])	ICES (2018b)
Management Plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

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, 2022a)
Assessment type	Age-based analytical assessment (ASAP; ICES, 2022b) 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 interbenchmarked 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	ICES landings	Discards	ICES estimated catch
1988	TAC	13000	18000	16800	2400	19200
1989	TAC	20000	20000	19200	3500	22700
1990	TAC	15000	17500	17700	2500	20200
1991	TAC (TAC excluding discards)	15000 (12500)	21000	21700	1900	23600

Year^	ICES advice	Catch corresponding to advice	Agreed TAC	ICES landings	Discards	ICES estimated catch
1992	TAC	27000	21000	20900	2100	23000
1993	Precautionary TAC (including discards)	20000–24000	21000	19200	1900	21100
1994	Precautionary TAC (including discards)	20000–24000	21000	17400	1700	19100
1995	No specific advice		21000	18300	700	19000
1996	TAC	9800	16500–21000**	18800	3000	21800
1997	If required, precautionary TAC	< 25000	22000	18100	700	18800
1998	Catches below 25	< 25000	22000	20300	0	20300
1999	F = 0.4	19000	21000	18100	0	18100
2000	F < 0.3	20000	21000	18267	0	18267
2001	F < 0.34	17900	20000	17729	0	17729
2002	F < 0.35	11000	11000	10550	0	10550
2003	Substantially less than recent catches	-	13000	10875	0	10875
2004	60% of average catch 1997–2000	11000	13000	11065	0	11065
2005	60% of average catch 1997–2000	11000	13000	8452	0	8452
2006	Further reduction 60% average catch 2002–2004	6700	11000	8530	0	8530
2007	No fishing without rebuilding plan		9400	8268	0	8268
2008	No targeted fishing without rebuilding plan		7900	6853	0	6853
2009	No targeted fishing without rebuilding plan		5900	5760	0	5760
2010	F_{mgt} = 0.19	10150	10150	8406	0	8406
2011	See scenarios		13200	11503	0	11503
2012	MSY approach	< 26900	21100	21604	161	21765
2013	MSY approach	< 18500	17200	16067	118	16185
2014	MSY approach	< 35942	22300	18930	644	19574
2015	MSY approach	< 15140	15700*	17579	247	17826
2016	MSY approach	< 23164	15400*	16659	182	16841
2017	MSY approach	< 16145	14500*	11194	130	11324
2018	MSY approach	≤ 5445	10100*	4589	0	4589
2019	MSY approach	≤ 4742	4742	1841	0	1841
2020	MSY approach	0	869^^	132	0	132
2021	MSY approach	0	869^^	609	0	609
2022	MSY approach and precautionary considerations	0	869^^			
2023	MSY approach and precautionary considerations	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 2021/2022 as estimated by ICES. All weights are in tonnes.

Catch	Landings	Discards
745	Pelagic trawlers 100% 745	Negligible

Table 8   Herring in divisions 7.a South of 52°30′N, 7.g–h, and 7.j–k. ICES estimates of landings by country and ICES estimates of total annual unallocated/misreported, discards, and catch by assessment year. All weights are in tonnes.

Year	Denmark	France	Germany	Ireland	Netherlands	UK	Unallocated/misreported	Discards	Total
1988/1989	-	-	-	17000	-	-	-	3400	20400
1989/1990	-	+	-	15000	1900	-	2600	3600	23100
1990/1991	-	+	-	15000	1000	200	700	1700	18600
1991/1992	-	500	100	21400	1600	-	−100	2100	25600
1992/1993	-	-	-	18000	1300	-	−100	2000	21200
1993/1994	-	-	-	16600	1300	+	−1100	1800	18600
1994/1995	-	+	200	17400	1300	+	−1500	1900	19300
1995/1996	-	200	200	20000	100	+	−200	3000	23300
1996/1997	-	1000	-	17900	1000	-	−1800	750	18850
1997/1998	-	1300	-	19900	1400	-	−2100	-	20500
1998/1999	-	+	-	17700	1200	-	−700	-	18200
1999/2000	-		200	18300	1300	+	−1300	-	18500
2000/2001	-	573	228	16962	44	1	−617	-	17191
2001/2002	-	-	-	15236	-	-		-	15236
2002/2003	-	734	-	7465	257	-	−991	-	7465
2003/2004	-	800	-	11536	610	14	−1424	-	11536
2004/2005	-	801	41	12702	-	-	−801	-	12743
2005/2006	-	821	150	9494	799	-	−1770	-	9494
2006/2007	-	-	-	6944	518	5	−523	-	6944
2007/2008	-	379	248	7636	327	-	−954	-	7636
2008/2009	-	503	191	5872	150	-	−844	-	5872
2009/2010	-	364	135	5745	-	-	−499	-	5745
2010/2011	-	636	278	8370	325	-	−1239	n/a	8370
2011/2012	-	241	-	11470	7	-	−248	n/a	11470
2012/2013	-	3	230	16132	3135	-	2104	161	21765
2013/2014	-	-	450	14785	832	-		118	16185
2014/2015	-	244	578	17287	821	-		644	19574
2015/2016	-	-	477	16320	1304	+		254	18355
2016/2017	-	-	419	14585	1025	559	−451	182	16319
2017/2018	-	-	298	9627	648	64	-	130	10767
2018/2019	-	-	-	4227	436	-	−245	-	4418
2019/2020	-	-	-	1803	38	-	-	-	1841
2020/2021	1	-	-	132	+	-	-	-	133
2021/2022	-	-	-	745	-	-	-	-	745

+ 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	408556	742916	74204	206015	414368	0	22978	0.130	0.26	0
1959	1577690	2191396	964004	197957	358131	37789	15086	0.112	0.21	0.0168
1960	362961	581990	143930	189253	318267	60233	18283	0.126	0.20	0.048
1961	393717	592934	194506	159919	260499	59341	15372	0.119	0.183	0.056
1962	843980	1157913	530047	156601	242158	71042	21552	0.192	0.29	0.094
1963	402905	593224	212576	145174	219042	71298	17349	0.153	0.23	0.075
1964	1381900	1798028	965772	165103	230311	99889	10599	0.096	0.145	0.048
1965	416515	609615	223425	169927	228787	111073	19126	0.139	0.20	0.075
1966	735267	998655	471885	165194	217065	113315	27030	0.199	0.29	0.110
1967	768497	1035648	501352	159041	205484	112596	27658	0.23	0.32	0.126
1968	899711	1190064	609356	162296	205751	118849	30236	0.24	0.35	0.138
1969	461941	656468	267412	141929	180495	103365	44389	0.36	0.51	0.21
1970	248671	391417	105923	107098	139385	74815	31727	0.33	0.47	0.186

Year^	Recruitment at age (wr) 1	High	Low	SSB**	High	Low	Total catch^	F at ages (wr) 2–5	High	Low
1971	821309	1090281	552339	97962	124988	70936	31396	0.45	0.66	0.25
1972	279417	417622	141218	85877	109150	62604	38203	0.56	0.79	0.33
1973	325406	456671	194149	64565	82708	46422	26936	0.52	0.73	0.30
1974	160325	240937	79723	50062	64974	35148	19940	0.49	0.71	0.28
1975	202064	289678	114442	39631	51968	27294	15588	0.52	0.75	0.28
1976	226223	312599	139841	36804	47643	25965	9771	0.39	0.57	0.20
1977	184803	256273	113327	37415	48045	26785	7833	0.29	0.43	0.155
1978	145587	206656	84524	36168	46742	25594	7559	0.27	0.39	0.142
1979	278555	374323	182777	36022	46144	25900	10321	0.43	0.62	0.23
1980	166477	240942	92018	33006	42833	23179	13130	0.54	0.79	0.30
1981	464972	605982	323958	36517	46658	26376	17103	0.84	1.21	0.47
1982	724433	920802	528058	57440	71500	43380	13000	0.46	0.67	0.25
1983	784556	993182	575938	76388	93818	58958	24981	0.56	0.79	0.32
1984	666197	851616	480784	78994	96722	61266	26779	0.47	0.66	0.28
1985	642488	815309	469671	85081	103564	66598	20426	0.32	0.45	0.188
1986	654169	821436	486904	93073	112716	73430	25024	0.37	0.51	0.22
1987	1200230	1453961	946439	105472	126789	84151	26200	0.39	0.55	0.23
1988	475514	605932	345088	108978	131881	86079	20447	0.23	0.33	0.135
1989	575732	726301	425159	95704	116137	75271	23254	0.29	0.40	0.172
1990	503380	643048	363712	89224	109110	69338	18404	0.25	0.35	0.146
1991	207415	287852	126968	71049	88243	53855	25562	0.38	0.53	0.23
1992	962480	1182039	742921	70955	86887	55023	21127	0.48	0.69	0.28
1993	359813	475826	243794	73640	90500	56780	18618	0.33	0.46	0.190
1994	768796	957052	580548	80405	97815	62995	19300	0.32	0.45	0.192
1995	722078	901324	542836	81907	98932	64882	23305	0.39	0.54	0.24
1996	352309	463509	241111	72428	88163	56693	18816	0.31	0.43	0.185
1997	372858	489112	256608	59884	73358	46408	20496	0.41	0.57	0.25
1998	248780	338266	159294	47984	59675	36293	18041	0.45	0.62	0.27
1999	486666	622145	351195	41994	52244	31744	18485	0.62	0.87	0.38
2000	477218	610357	344083	42058	52569	31548	17191	0.63	0.88	0.38
2001	493295	634271	352309	41690	52703	30677	15269	0.53	0.76	0.31
2002	541125	699792	382448	53818	67673	39963	7465	0.21	0.31	0.113
2003	141584	209043	74117	42833	54876	30790	11536	0.31	0.44	0.169
2004	361343	488689	233991	39041	51556	26526	12743	0.39	0.57	0.21
2005	1057130	1384361	729839	54401	71860	36942	9494	0.31	0.46	0.153
2006	355901	494188	217612	67024	89012	45034	6944	0.133	0.20	0.065
2007	723893	970811	476969	69764	92931	46597	7636	0.132	0.198	0.066
2008	294385	423058	165722	82687	110119	55255	5872	0.079	0.120	0.039
2009	1011860	1327930	695870	94170	122710	65630	5745	0.076	0.114	0.038
2010	751592	1010271	492909	102117	130562	73678	8370	0.101	0.149	0.053
2011	956829	1265060	648600	110331	139318	81342	11470	0.130	0.190	0.070
2012	631242	868184	394296	100126	126514	73746	21820	0.25	0.37	0.141
2013	365882	546329	185431	88219	112611	63827	16247	0.21	0.31	0.116
2014	304081	473332	134828	68225	87622	48828	19574	0.32	0.47	0.179
2015	175780	295246	56314	44041	57385	30697	18355	0.46	0.66	0.26
2016	204642	319259	90021	26000	34530	17470	16318	0.77	1.09	0.44
2017	60833	99404	22262	11791	16914	6668	10767	1.18	1.65	0.70
2018	51314	84054	18574	6082	9788	2375	4418	1.16	1.78	0.55
2019	180019	296905	63135	6168	10309	2027	1841	0.73	1.31	0.143
2020	108106	200395	15825	8741	14453	3028	132	0.023	0.042	0.0053
2021	260375	627850	0	15084	25474	4694	745	0.069	0.120	0.0178
2022	197044***			19349*						

* From the short-term forecast.

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

*** Stock–recruitment relationship based on SSB_{2020} from the assessment output.

^ Assessment year (1 April–31 March).

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Download the stock assessment data and figures.

Recommended citation: ICES. 2022. 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, 2022. ICES Advice 2022, her.27.irls. https://doi.org/10.17895/ices.advice.19448003.