

## Herring (*Clupea harengus*) in Division 7.a North of 52°30'N (Irish Sea)

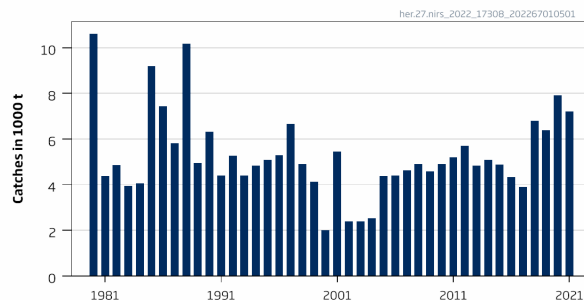
### ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 7309 tonnes.

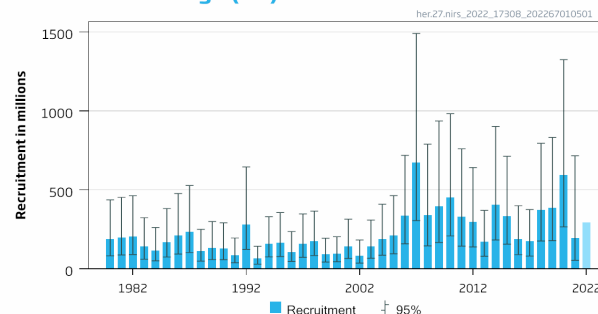
### Stock development over time

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

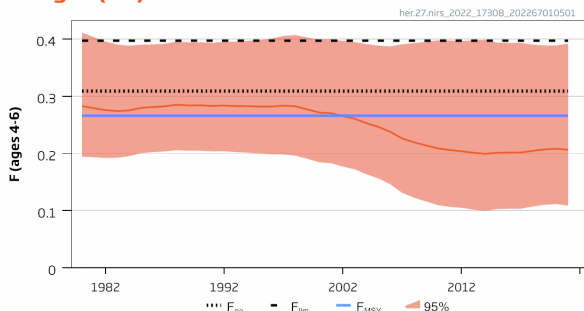
#### Catches



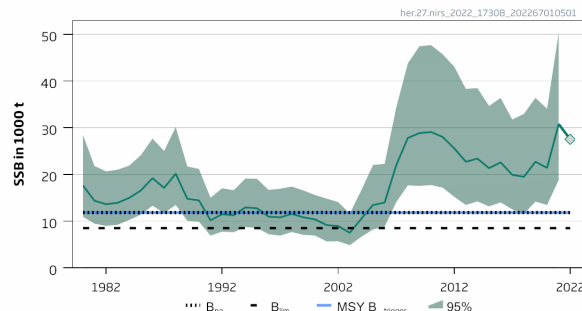
#### Recruitment at age (wr) 1



#### F at ages (wr) 4-6



#### SSB



**Figure 1** Herring in Division 7.a North of 52°30'N. Summary of the stock assessment. The assumed final-year recruitment value is in a lighter shade, and the predicted SSB is shown with a grey diamond. (WR is winter ring).

### Catch scenarios

**Table 1** Herring in Division 7.a North of 52°30'N. Basis for the catch scenarios. Assumptions made for the interim year and the forecast.

Variable	Value	Notes
$F_{ages(wr)4-6}(2022)$	0.284	F based on the assumed catch for 2022
SSB (2022)*	24 716	Short-term forecast; in tonnes
$R_{age(wr)1}(2022-2023)$	294 667	Geometric mean over 2010–2019; in thousands
Total catch (2022)	8455	TAC in 2022; in tonnes

\* For autumn-spawning stocks, the SSB is determined at spawning time and is influenced by fisheries between 1 January and spawning (set for September).

**Table 2** Herring in Division 7.a North of 52°30'N. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	$F_{4-6}$ (2023)	SSB* (2023)	SSB*, ^ (2024)	% SSB change**	% advice change^^
ICES advice basis						
MSY approach: $F_{MSY}$	7309	0.266	23076	22204	-7	-14
Other scenarios						
$F = 0$	0	0.000	28552	32681	16	-100
$F_{pa}$	10359	0.397	20797	18480	-16	23
$F_{lim}$	8346	0.309	22301	20895	-10	-1
$F = F_{sq}$	7748	0.284	22748	21952	-8	-8
SSB (2023) = $B_{lim}$	27238	1.567	8500	11655	-66	222
SSB (2023) = $B_{pa}$	22529	1.124	11831	14294	-52	166
SSB (2023) = MSY $B_{trigger}$	22529	1.124	11831	14294	-52	166

\* For autumn-spawning stocks, the SSB is determined at spawning time and is influenced by fisheries between 1 January and spawning (set for September).

\*\* SSB 2023 relative to SSB 2022.

^ Assuming same catch scenario in 2024 as in 2023.

^^ Advice value for 2023 relative to the advice/TAC value for 2022 (8455 tonnes).

The decrease in catch advice for 2023 is the result of a reduction in the estimated stock size at the start of the TAC year .

### Basis of the advice

**Table 3** Herring in Division 7.a North of 52°30'N. The basis of the advice.

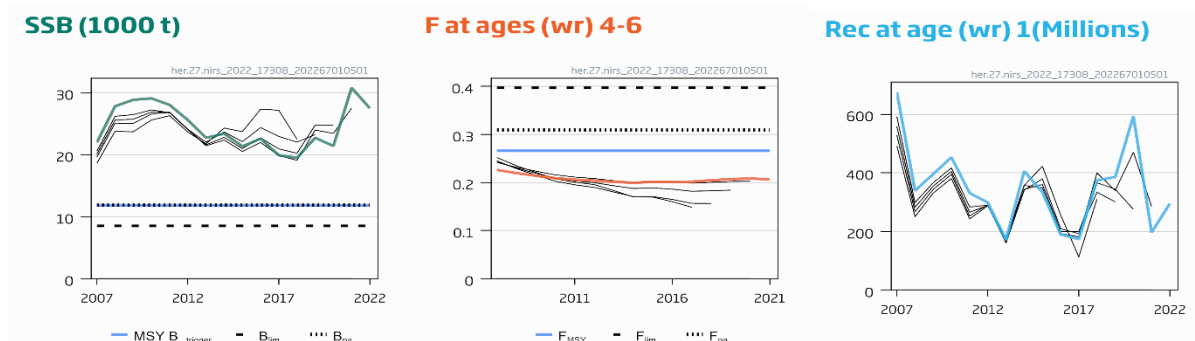
Advice basis	MSY approach
Management plan	ICES is not aware of any agreed precautionary management plan for herring in this area

### Quality of the assessment

The herring assessment for Division 7.a North of 52°30'N is performed on a mixed stock (including juveniles from the Celtic Sea), which affects the estimates of the younger ages. Both the catches and acoustic survey indices contain an unknown amount of fish from other stocks. Due to the presence of herring from other stocks, the assessment may overestimate the Irish Sea stock. There is interannual variation in the proportion of juvenile Celtic Sea herring present in the Irish Sea, as well as variation in the distribution patterns.

The interannual variation in herring migration patterns affects the quality of the assessment. The timing of the acoustic survey is occasionally mismatched with the assumed migration pattern of the spawning stock into the Irish Sea from the Malin Shelf.

While the trend in fishing mortality is estimated to be stable, a historical comparison of the current assessment with previous assessments shows annual upward revision of fishing mortality and wide confidence intervals. The assessed historic SSB appears to be sensitive to addition of a new year of data resulting in revision during the recent time period.



**Figure 2** Herring in Division 7.a North of 52°30'N. Historical assessment results. Final-year recruitment estimates and forecast SSB are included.

## 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, 2015). 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, 2015).

It is known that juvenile Celtic Sea herring mix with the Irish Sea stock, and the consequence of this needs to be further evaluated for management and advice. This stock should be considered as part of a metapopulation.

## Reference points

**Table 4** Herring in Division 7.a North of 52°30'N. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	11831	MSY $B_{trigger} = B_{pa}$	ICES (2017a)
	$F_{MSY}$	0.266	Based on simulation using a combined stock–recruitment relationship (EqSim)	ICES (2017a)
Precautionary approach	$B_{lim}$	8500	Lowest SSB producing above-average recruitment	ICES (2017a)
	$B_{pa}$	11831	$B_{pa} = B_{lim} \times \exp(1.645 \times \sigma)$ , with $\sigma = 0.201$ , based on the estimated CV from the terminal assessment year	ICES (2017a)
	$F_{lim}$	0.397	Equilibrium F maintaining SSB > $B_{lim}$ with 50% probability	ICES (2017a)
	$F_{pa}$	0.309	The F that provides a 95% probability for SSB to be above $B_{lim}$ ( $F_{P05}$ with advice rule)	ICES (2017a, 2021)
Management plan	SSB <sub>mgt</sub>	Not defined		
	$F_{mgt}$	Not defined		

## Basis of the assessment

**Table 5** Herring in Division 7.a North of 52°30'N. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Age-based analytical assessment (FLSAM; ICES, 2022b) that uses catches in the model and in the forecast
Input data	Two survey indices (Northern Ireland Acoustic Surveys: AC [Division 7.a North; A2002] and SSB acoustic survey included as an absolute index [A4705]); commercial catch-at-age data and annual maturity ogives; annual stock weights from AC (Division 7.a North)
Discards and bycatch	Discarding is considered to be negligible
Indicators	None
Other information	Benchmarked in WKIRISH3 and HAWG (ICES, 2017a, 2017b). 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 Division 7.a North of 52°30'N. ICES advice, ICES estimates of catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	ICES estimated catch
1987	TAC	4300	4500	5823
1988	TAC (Revised advice in 1988)	10500 (5600)	10500	10172
1989	TAC	5500	6000	4962
1990	Precautionary TAC	5700	7000	6312
1991	TAC	5600	6000	4398
1992	TAC	6600	7000	5270
1993	TAC	4900–7400	7000	4408
1994	Precautionary TAC	5300	7000	4828
1995	Precautionary TAC	5100	7000	5076
1996	If required, precautionary TAC	5000	7000	5302

Year	ICES advice	Catch corresponding to advice	Agreed TAC	ICES estimated catch
1997	No advice given	-	9000	6651
1998	<i>Status quo</i> F	6500	9000	4905
1999	F = proposed $F_{pa} = 0.36$	4900	6600	4127
2000	F = 90% F (98) = 0.31	3900	5400	2002
2001	<i>Status quo</i> F = 0.26	5100	6900	5461
2002	Average catch of 1996–2000	4800	4800	2393
2003	2002 TAC	4800	4800	2399
2004	Advice 2003 catch	4800	4800	2531
2005	<i>Status quo</i> TAC	4800	4800	4387
2006	<i>Status quo</i> TAC	4800	4800	4402
2007	<i>Status quo</i> TAC	4800	4800	4629
2008	Recent catches	4400	4800	4895
2009	Same advice as last year	4400	4800	4594
2010	Recent TAC	4800	4800	4894
2011	No increase in catch	< 4800	5200	5202
2012	No increase in catch	-	5280	5693
2013	MSY approach	< 5100	4993	4828
2014	MSY approach	< 5251	5251	5208
2015	MSY approach	< 4854	4854	4891
2016	MSY approach	≤ 4575	4575	4327
2017	MSY approach	≤ 4127	4127	3896
2018	MSY approach	≤ 7016	7016	6804
2019	MSY approach	≤ 6896	6896	6377
2020	MSY approach	≤ 8064	8064	7927
2021	MSY approach	≤ 7341	7341	7208
2022	MSY approach	≤ 8455	8455	
2023	MSY approach	≤ 7309		

### History of the catch and landings

**Table 7** Herring in Division 7.a North of 52°30'N. Catch by fleet in 2021 as estimated by ICES. All weights are in tonnes.

Table 1. Landings in Division 14 North (01-02-03 North Catch 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100) in 2021 as estimated 2, 10207 t. Weights are in tonnes.			
Catch	Landings		Discards
7208	Pelagic trawlers > 99%	Other gears < 1%	Negligible
	7208		

**Table 8** Herring in Division 7.a North of 52°30'N. History of landings; ICES estimated values presented for each country. All weights are in tonnes.

Year	Country		Total
	Ireland	UK	
1987	1200	3290	5823
1988	2579	7593	10172
1989	1430	3532	4962
1990	1699	4613	6312
1991	80	4318	4398
1992	406	4864	5270
1993	0	4408	4408
1994	0	4828	4828
1995	0	5076	5076
1996	100	5180	5324
1997	0	6651	6651
1998	0	4905	4905
1999	0	4127	4127
2000	0	2002	2002
2001	862	4599	5461
2002	286	2107	2393

Year	Country		Total
	Ireland	UK	
2003	0	2399	2399
2004	749	1782	2531
2005	1153	3234	4387
2006	581	3821	4402
2007	0	4629	4629
2008	0	4895	4895
2009	0	4594	4594
2010	0	4894	4894
2011	0	5202	5202
2012	18	5675	5693
2013	0	4828	4828
2014	119	5089	5208
2015	0	4868	4891
2016	82	4245	4327
2017	200	3696	3896
2018	1299	5504	6804
2019	1317	5061	6378
2020	1957	5969	7927
2021	753	6455	7208

### Summary of the assessment

**Table 9** Herring in Division 7.a North of 52°30'N. Assessment summary. Weights are in tonnes, recruitment in thousands. 'High' and 'Low' refer to 95% confidence intervals.

Year	Recruitment			Spawning-stock biomass			Catches	Fishing mortality		
	Age (wr) 1	High	Low	SSB*	High	Low		F (ages 4–6)	High	Low
1980	189662	436733	82366	17659	28517	10935	10613	0.28	0.41	0.194
1981	198988	452664	87474	14364	21821	9456	4377	0.28	0.40	0.193
1982	204434	463433	90182	13623	20672	8977	4855	0.28	0.40	0.192
1983	140505	323991	60933	13929	21033	9224	3933	0.27	0.39	0.192
1984	115382	261498	50910	14995	21904	10266	4066	0.28	0.39	0.195
1985	169058	381696	74878	16574	24150	11375	9187	0.28	0.39	0.20
1986	211293	476865	93621	19199	27689	13312	7440	0.28	0.39	0.20
1987	233281	528455	102980	17123	25033	11713	5823	0.28	0.39	0.20
1988	110968	250066	49243	20149	30167	13458	10172	0.29	0.40	0.21
1989	132455	299999	58481	14778	21729	10051	4949	0.28	0.39	0.20
1990	129832	291705	57786	14459	21178	9872	6312	0.28	0.39	0.20
1991	86422	195298	38243	10182	15035	6896	4398	0.28	0.39	0.20
1992	281813	645238	123084	11490	17041	7747	5270	0.28	0.40	0.20
1993	65121	143310	29591	11261	16631	7625	4409	0.28	0.40	0.20
1994	158261	330497	75784	12940	19129	8754	4828	0.28	0.40	0.20
1995	166708	356758	77900	12769	19079	8546	5076	0.28	0.40	0.200
1996	105240	236623	46806	10969	16700	7204	5301	0.28	0.40	0.199
1997	159213	347558	72934	10813	16945	6900	6651	0.28	0.41	0.198
1998	175255	365650	84000	11545	17406	7658	4905	0.28	0.41	0.196
1999	91675	193861	43352	10825	16581	7067	4127	0.28	0.40	0.191
2000	95416	203604	44715	10389	15610	6914	2002	0.27	0.40	0.185
2001	143487	314724	65418	9165	14842	5660	5461	0.27	0.40	0.183
2002	81552	182292	36484	8945	14085	5680	2393	0.27	0.40	0.177
2003	143631	308991	66765	7512	11651	4844	2399	0.26	0.39	0.172
2004	187775	409563	86091	10534	16670	6657	2531	0.25	0.39	0.163
2005	210449	464029	95444	13448	22041	8205	4387	0.25	0.39	0.156
2006	337729	718438	158763	13986	22267	8784	4402	0.24	0.39	0.146
2007	674684	1490620	305376	21954	34314	14046	4629	0.23	0.39	0.131
2008	339083	789204	145688	27806	43796	17654	4895	0.22	0.39	0.123

Year	Recruitment			Spawning-stock biomass			Catches	Fishing mortality		
	Age (wr) 1	High	Low	SSB*	High	Low		F (ages 4–6)	High	Low
2009	395537	936542	167050	28854	47450	17546	4594	0.21	0.40	0.116
2010	452707	982607	208571	29086	47699	17736	4894	0.21	0.40	0.110
2011	330711	760287	143853	28029	45747	17173	5202	0.21	0.40	0.107
2012	298343	641231	138809	25591	43094	15197	5693	0.20	0.40	0.105
2013	171957	370531	79802	22720	38336	13465	4828	0.20	0.40	0.102
2014	405550	902050	182330	23389	38478	14217	5083	0.199	0.40	0.100
2015	333367	713146	155836	21354	34679	13149	4891	0.20	0.39	0.103
2016	189473	399847	89784	22584	36390	14016	4327	0.20	0.39	0.103
2017	174033	375365	80688	19922	31761	12497	3896	0.20	0.39	0.103
2018	373996	795291	175876	19489	32965	11522	6804	0.20	0.39	0.107
2019	385386	832201	178469	22720	36414	14176	6377	0.21	0.39	0.110
2020	593030	1324780	265466	21401	34088	13436	7927	0.21	0.39	0.111
2021	196418	716188	53869	30792	50397	18813	7208	0.21	0.39	0.109
2022	294667**			24716***						

\*For autumn-spawning stocks, the SSB is determined at spawning time and is influenced by fisheries between 1 January and spawning (September).

\*\* Geometric mean recruitment 2010–2019 and SSB from assessment model.

\*\*\* From the short-term forecast.

## Sources and references

de Groot, S. J. 1979. The potential environmental impact of marine gravel extraction in the North Sea. *Ocean Management*, 5: 233–249. [https://doi.org/10.1016/0302-184X\(79\)90003-9](https://doi.org/10.1016/0302-184X(79)90003-9).

de Groot, S. J. 1996. The physical impact of marine aggregate extraction in the North Sea. *ICES Journal of Marine Science*, 53: 1051–1053. <https://doi.org/10.1006/jmsc.1996.0131>.

ICES. 2003. Report of the Working Group on Fish Ecology (WGFE), 3–7 March 2003, ICES Headquarters, Copenhagen, Denmark. ICES CM 2003/G:04. 113 pp. <http://www.ices.dk/sites/pub/CM%20Documents/2003/G/G0403.PDF>.

ICES. 2015. Second Interim Report of the Working Group on Maritime Systems (WGMARS), 2–5 December 2014, ICES HQ, Copenhagen, Denmark. ICES CM 2014/SSGSUE:08. 35 pp. <https://doi.org/10.17895/ices.pub.5430>.

ICES. 2017a. Benchmark Workshop on the Irish Sea Ecosystem (WKIRISH3), 30 January–3 February 2017, Galway, Ireland. ICES CM 2017/BSG:01. 165 pp. <https://doi.org/10.17895/ices.pub.5433>.

ICES. 2017b. Report of the Herring Assessment Working Group for the Area South of 62°N (HAWG), 16–22 March 2017, ICES Headquarters, Copenhagen, Denmark. ICES CM 2017/ACOM:07. 856 pp. <https://doi.org/10.17895/ices.pub.5434>.

ICES. 2021. Advice on fishing opportunities. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, Section 1.1.1. <https://doi.org/10.17895/ices.advice.7720>.

ICES. 2022a. Advice on fishing opportunities. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, Section 1.1.1. <https://doi.org/10.17895/ices.advice.19928060>.

ICES. 2022b. Herring Assessment Working Group for the Area South of 62° N (HAWG). ICES Scientific Reports. 4:16. <http://doi.org/10.17895/ices.pub.10072>.

[Download the stock assessment data and figures.](#)

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