

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

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2017 should be no more than 16 145 tonnes.

ICES advises, under precautionary considerations, that activities that have an 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.

Stock development over time

The spawning-stock biomass (SSB) is above the MSY B_{trigger} , and it has been decreasing in recent years. The fishing mortality (F) is below F_{MSY} . Recruitment (R) has declined recently.

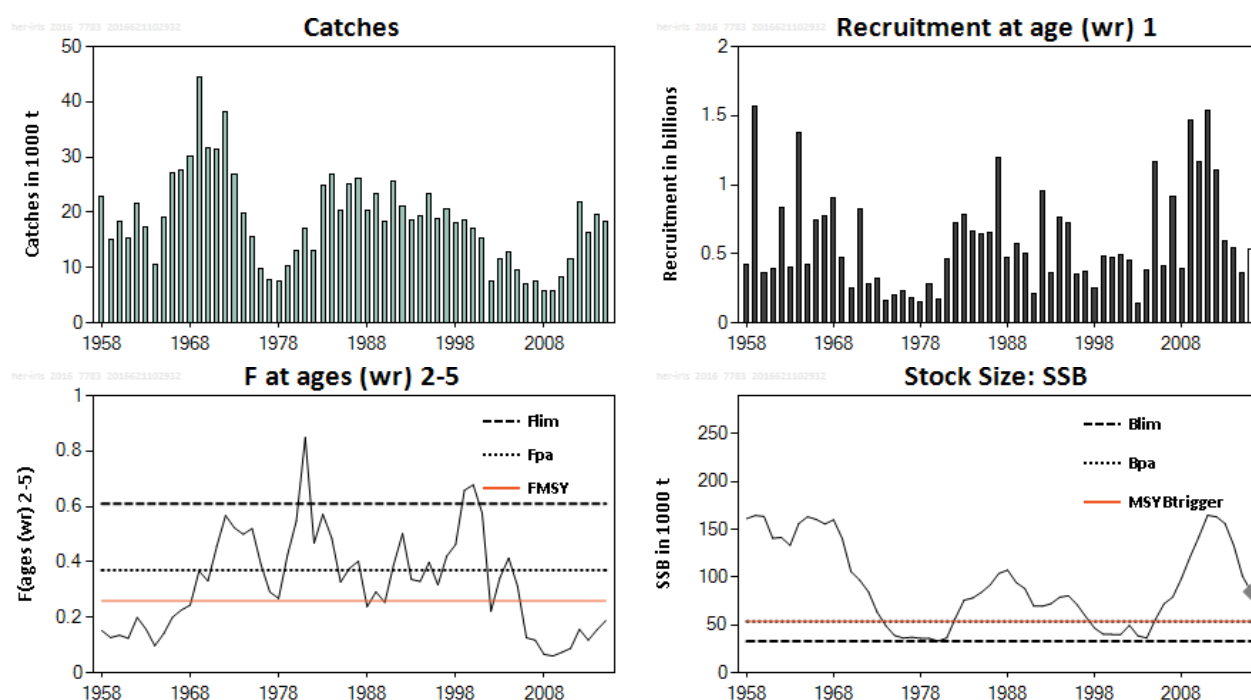


Figure 5.3.32.1 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. ICES estimated catch, recruitment, fishing mortality and spawning-stock biomass from the summary of the stock assessment. Recruitment estimates are not shaded, and the estimated SSB value is designated by a grey diamond.

Stock and exploitation status

Table 5.3.32.1 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		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	F_{MSY}	✓	✓	✓ Appropriate	$MSY B_{\text{trigger}}$	✓	✓ Above trigger
Precautionary approach	F_{pa} , F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa} , B_{lim}	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	-	-	- Not applicable	SSB_{MGT}	-	- Not applicable

Catch options

Table 5.3.32.2 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. The basis for the catch options.

Variable	Value	Source	Notes
F ages (wr) 2–5 (2016)	0.24	ICES (2016a)	F corresponding to the estimated total catch for 2016
R age (wr) 1 (2016/2017)	537 900 thousands	ICES (2016a)	Stock–recruitment relationship based on SSB ₂₀₁₄ from the assessment output
SSB (2016)	84 923 t	ICES (2016a)	
Total catch (2016)	18 590 t	ICES (2016a)	Including TAC, carry-over of national quotas, and an estimated proportion of discards.

Table 5.3.32.3 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. The catch options. All weights are in tonnes.

Rationale	Catch (2017)	Basis	F (2017)	SSB (2017) *	% SSB change **	% TAC change ***
MSY approach	16145	F _{MSY}	0.26	74417	–12	4.8
Precautionary approach	21933	F _{PA}	0.37	70947	–16	+42
Zero catch	0	Zero catch	0	83468	–2	–100
Other options	14467	F _{mgt} in management strategy proposed by Pelagic AC	0.23	75399	–11	–6
	13126	TAC – 15%	0.21	76176	–10	–15
	15442	TAC 2016	0.25	74829	–12	0.30
	17758	TAC + 15%	0.29	73463	–14	15
	14955	F ₂₀₁₆	0.24	75114	–12	–3
	32796	F _{lim}	0.61	64041	–25	113
	47030	SSB ₂₀₁₇ = B _{pa} = MSY B _{trigger}	1.02	54000	–36	205
	71095	SSB ₂₀₁₇ = B _{lim}	2.36	33000	–61	362

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

** SSB 2017 relative to SSB 2016.

*** Catch 2017 relative to TAC 2016 (15.4 kt).

Basis of the advice

Table 5.3.32.4 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 evaluated by ICES and found to be precautionary (ICES, 2012; 2015a). ICES is requested by the EC to provide advice based on the MSY approach and to include the management strategy as a catch option.

Quality of the assessment

The 2014 and 2015 acoustic survey estimates were not used in the assessment based on the recommendation of ICES WGIPS (ICES, 2015b, 2016b) as the survey did not cover the entire stock because of the timing of the migration patterns. This leads to a decrease in the precision and accuracy of the estimates in recent years.

In some years, because of the mis-match between the timings of the survey and the migration, survey data was not considered in the assessment. In both 2014 and 2015 survey data have been excluded for this reason and this increases the uncertainty in the assessment.

Estimates of recruitment are more uncertain and this may be related to the lack of a fisheries-independent recruitment estimator.

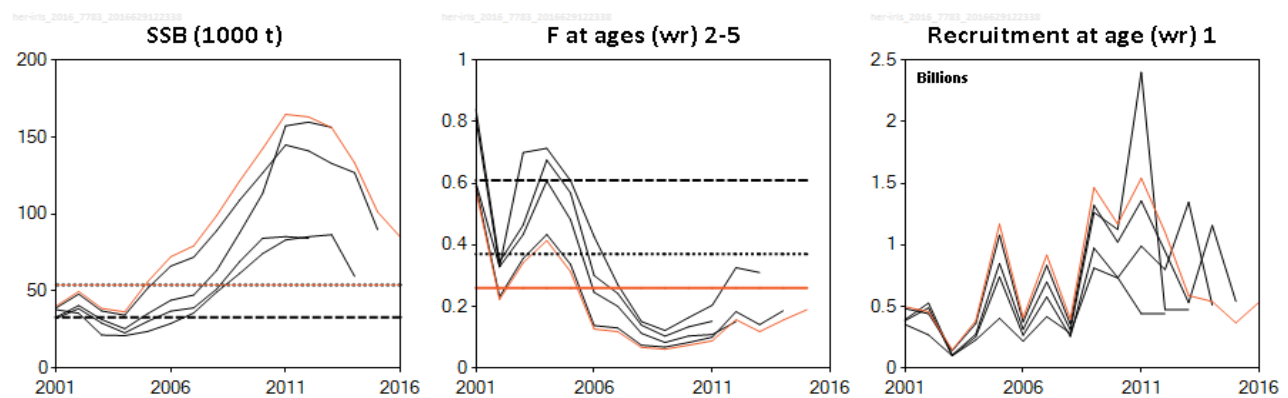


Figure 5.3.32.2 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. Historical assessment results (final-year recruitment estimates included). The stock was benchmarked (ICES, 2015c) after the 2014 assessment.

Issues relevant for the advice

The catch forecast for 2017 assumes that the quota and carry-over from 2015 is fully utilized in 2016.

In 2015 no inter-species quota transfer was used (ICES, 2016a) and it was therefore not considered in the advice.

There has been an increase in marine anthropogenic activity. Any activities that have a negative impact on the spawning habitat of herring, such as dumping of dredge spoil, 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, 2015d). This is because a gravel substratum is an essential habitat for herring spawning.

Evaluations conducted in 2015 by ICES (ICES, 2015a, 2015c) show that the management strategy is precautionary. The TAC has been set in accordance with the management strategy since 2013. However, ICES is requested by the EC to provide advice based on the MSY approach and to include the management strategy as a catch option.

Reference points

Table 5.3.32.5 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	54000 t	B_{pa}	ICES (2015a)
	F_{MSY}	0.26	Simulations using segmented regression stock recruit relationship	ICES (2015a)
Precautionary approach	B_{lim}	33000 t	B_{loss}	ICES (2015a)
	B_{pa}	54000 t	$B_{pa} = B_{lim} \times \exp(1.645 \times \sigma_B)$, with $\sigma_B = 0.30$ from assessment uncertainty (capped) in the terminal year.	ICES (2015c, 2016a)
	F_{lim}	0.61	Equilibrium F maintaining SSB > B_{lim} with 50% probability	ICES (2016a)
	F_{pa}	0.37	$F_{pa} = F_{lim} \times \exp(-1.645 \times \sigma_F)$, where $\sigma_F = 0.30$ from assessment uncertainty (capped) in the terminal year.	ICES (2015c, 2016a)
Management plan agreed by Pelagic AC in 2011	SSB _{MGT}	61000 t		ICES (2012)
	F_{MGT}	0.23		ICES (2012)

Basis of the assessment

Table 5.3.32.6 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. The basis of the assessment.

ICES stock data category	1 (ICES, 2016c)
Assessment type	Age-based analytical assessment (ASAP; ICES, 2016a) 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 2014 and 2015); annual weights in the stock; fixed maturity ogive; natural mortality assumed constant.
Discards and bycatch	Included in the assessment (raised to total catch)
Indicators	None
Other information	Benchmarked in WKWEST (ICES, 2015c), updated with corrected natural mortalities by ICES (2015a). 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, 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 considers the survey estimates in 2014 and 2015 to be unrealistically low and therefore considers their exclusion from the assessment to be appropriate.

History of advice, catch and management

Table 5.3.32.7 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. History of ICES advice, the agreed TAC, official landings, and ICES estimates of discards and catch. All weights are in thousand tonnes.

Year	ICES advice	Predicted catch corresponding to advice	Agreed TAC	Official landings	Discards	ICES estimated catch*
1987	Precautionary TAC	18	18	18	4.2	27.3
1988	TAC	13	18	17	2.4	19.2
1989	TAC	20	20	18	3.5	22.7
1990	TAC	15	17.5	17	2.5	20.2
1991	TAC (TAC excluding discards)	15 (12.5)	21	21	1.9	23.6
1992	TAC	27	21	19	2.1	23.0
1993	Precautionary TAC (including discards)	20–24	21	20	1.9	21.1
1994	Precautionary TAC (including discards)	20–24	21	19	1.7	19.1
1995	No specific advice		21	18	0.7	19.1
1996	TAC	9.8	16.5–21**	21	3	21.8
1997	If required, precautionary TAC	< 25	22	20.7	0.7	18.8
1998	Catches below 25	< 25	22	20.5	0	20.3
1999	F = 0.4	19	21	19.4	0	18.1
2000	F < 0.3	20	21	18.8	0	18.3
2001	F < 0.34	17.9	20	19	0	17.7
2002	F < 0.35	11	11	11.5	0	10.6
2003	Substantially less than recent catches	-	13	12	0	10.9
2004	60% of average catch 1997–2000	11	13	12		11.1
2005	60% of average catch 1997–2000	11	13	10		8.5
2006	Further reduction 60% avg. catch 2002–2004	6.7	11	9		8.5
2007	No fishing without rebuilding plan		9.4	9.6		8.3
2008	No targeted fishing without rebuilding plan		7.9	7.8		6.9
2009	No targeted fishing without rebuilding plan		5.9	6.2	***	5.8
2010	F _{mgt} = 0.19	10.15	10.15	9.6	***	8.4
2011	See scenarios		13.2	11.7	***	11.5
2012	MSY approach	< 26.9	21.1	21.6	+	21.6

Year	ICES advice	Predicted catch corresponding to advice	Agreed TAC	Official landings	Discards	ICES estimated catch*
2013	MSY approach	< 18.5	17.2	16.2	+	16.2
2014	MSY approach	< 35.942	22.3	18.8	0.6	19.6
2015	MSY approach	< 15.140	15.7	17.6	0.2	17.8
2016	MSY approach	≤ 23.164**	15.4			
2017	MSY approach	≤ 16.145				

* By calendar year.

** Revised in 1996 after the ACFM May meeting.

*** Increased risk of discarding.

+ Values of less than 0.5 tonnes.

++ Version 2: See also the ICES advice provided 15 September 2015 in response to a EU request

([http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special Requests/EU her-irls update.pdf](http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special%20Requests/EU%20her-irls%20update.pdf)).

History of catch and landings

Table 5.3.32.8 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings		Discards
17825 t	100 % pelagic trawlers	Driftnets (negligible)	247 t
	17578 t		

Table 5.3.32.9 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. History of commercial landings (in tonnes) as estimated by ICES by calendar (TAC) year for each country participating in the fishery. These values may not correspond to the official statistics in all cases and cannot be used for management purposes.

Year	France	Germany	Ireland	Netherlands	U.K.	Unallocated	Discards**	Total
1988			16800				2400	19200
1989	+		16000	1900		1300	3500	22700
1990	+		15800	1000	200	700	2500	20200
1991	+	100	19400	1600		600	1900	23600
1992	500		18000	100	+	2300	2100	23000
1993			19000	1300	+	-1100	1900	21100
1994	+	200	17400	1300	+	-1500	1700	19100
1995	200	200	18000	100	+	-200	700	19000
1996	1000	0	18600	1000		-1800	3000	21800
1997	1300	0	18000	1400		-2600	700	18800
1998	+		19300	1200		-200	na	20300
1999		200	17900	1300	+	-1300	na	18100
2000	573	228	18038	44	1	-617	na	18267
2001	1359	219	17729			-1578	na	17729
2002	734		10550	257		-991	na	10550
2003	800		10875	692	14	-1506	na	10875
2004	801	41	11024			-801	na	11065
2005	821	150	8452	799		-1770	na	8452
2006			8530	518	5	-523	na	8530
2007	581	248	8268	463	63	-1355	na	8268
2008	503	191	6853	291		-985	na	6853
2009	364	135	5760			-499	na	5760
2010	636	278	8406	325		-1239	na	8406
2011	241		11503	7		-248	na	11503
2012	3	230	16132	3135		2104	161	21765
2013		450	14785	832			118	16185
2014	244	578	17287	821			644	19574
2015		477	15798	1304	+		247	17825

* The "+" designates catch of less than 0.5 tonnes.

** na = not available.

Table 5.3.32.10 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. History of commercial landings and discards (in tonnes) by assessment year (1 April–31 March) as estimated by ICES for each country participating in the fishery. These values may not correspond to the official statistics in all cases and cannot be used for management purposes.

Year	France**	Germany	Ireland	Netherlands	U.K.**	Unallocated	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	18800
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	na	8370
2011/2012	241		11470	7		–248	na	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

* Added in 2014 after report of 1% discarding.

** The “+” designates catch of less than 0.5 tonnes.

*** na = not available.

Summary of the assessment

Table 5.3.32.11 Herring in divisions 7.a South of 52°30' N, 7.g–h, and 7.j–k. Assessment summary. Weights are in tonnes and recruitments (at age (wr) 1) are in thousands.

Year^	Recruitment at age (wr) 1 (thousands)	SSB** (tonnes)	Catch (tonnes)	Fishing mortality at ages (wr) 2–5
1957/1958	423324	161321	22978	0.15
1958/1959	1565270	164667	15086	0.13
1959/1960	364697	163603	18283	0.14
1960/1961	392024	140800	15372	0.12
1961/1962	837547	141655	21552	0.20
1962/1963	405668	133436	17349	0.16
1963/1964	1379970	156257	10599	0.10
1964/1965	421470	163268	19126	0.14
1965/1966	741379	160551	27030	0.20
1966/1967	775032	155737	27658	0.23
1967/1968	907348	160114	30236	0.24
1968/1969	469420	140420	44389	0.37
1969/1970	254953	105983	31727	0.33
1970/1971	824165	96964	31396	0.46
1971/1972	282498	84869	38203	0.57
1972/1973	327070	63621	26936	0.52
1973/1974	163084	49396	19940	0.50
1974/1975	204147	39142	15588	0.52
1975/1976	227419	36450	9771	0.39
1976/1977	186588	37231	7833	0.29
1977/1978	148132	36167	7559	0.27
1978/1979	282208	36198	10321	0.43
1979/1980	168544	33225	13130	0.55
1980/1981	465723	36513	17103	0.85
1981/1982	724061	57322	13000	0.47
1982/1983	783387	75989	24981	0.57
1983/1984	664825	78359	26779	0.49
1984/1985	640118	84294	20426	0.33
1985/1986	650690	92031	25024	0.38
1986/1987	1193310	104063	26200	0.40
1987/1988	475132	107515	20447	0.24
1988/1989	574803	94444	23254	0.29
1989/1990	503581	88070	18404	0.25
1990/1991	208741	69943	25562	0.39
1991/1992	958670	69723	21127	0.50
1992/1993	360045	72377	18618	0.34
1993/1994	766900	79191	19300	0.33
1994/1995	719177	80664	23305	0.40
1995/1996	352675	71252	18816	0.32
1996/1997	371770	58737	20496	0.42
1997/1998	248567	46804	18041	0.46
1998/1999	478120	40524	18485	0.66
1999/2000	468872	40231	17191	0.68
2000/2001	497692	40036	15269	0.58
2001/2002	457861	49749	7465	0.22
2002/2003	146665	38746	11536	0.34
2003/2004	383169	36467	12743	0.41
2004/2005	1169010	56092	9494	0.31
2005/2006	408108	72288	6944	0.13

Year [^]	Recruitment	SSB ^{**}	Catch	Fishing mortality
	at age (wr) 1 (thousands)	(tonnes)	(tonnes)	at ages (wr) 2–5
2006/2007	917257	79355	7636	0.12
2007/2008	395932	99065	5872	0.07
2008/2009	1465500	121558	5745	0.06
2009/2010	1169110	142470	8370	0.07
2010/2011	1541530	164809	11470	0.09
2011/2012	1104530	163226	21820	0.16
2012/2013	588701	156272	16247	0.12
2013/2014	539982	133362	19574	0.16
2014/2015	366128	101382	18355	0.19
2015/2016	537900 ^{***}	84923 [*]		

* Geometric mean (1958–2015).

** The SSB is estimated at spawning time (set at 1st of October).

*** Stock–recruit relationship based on SSB₂₀₁₄ from the assessment output.

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

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