

# 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 FMSY, and spawning-stock size is below MSY Btrigger, Bpa, and Blim.

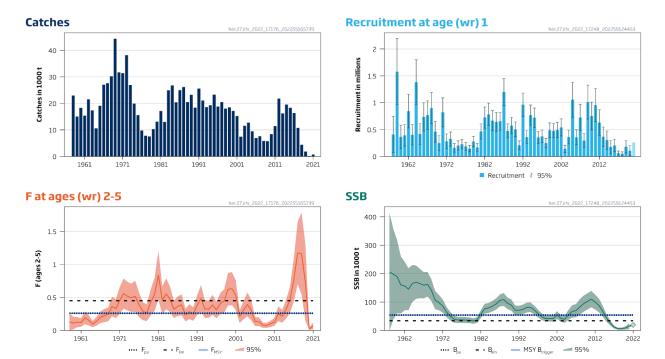


Figure 1 Herring in divisions 7.a South of 52°30′N, 7.g–h, and 7.j–k. Summary of the stock assessment. The assumed recruitment is in a lighter shade, and the forecast spawning-stock biomass (SSB) value is indicated with a grey diamond. (WR is winter ring).

#### **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
Fages (wr) 2-5 (2022)	0.058	The F that corresponds to the monitoring TAC
R <sub>age (wr) 1</sub> (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 <sub>2-5</sub> (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 <sub>MSY</sub>	4475	0.26	20454	5.7	20049	415	-
F <sub>MSY</sub> × SSB <sub>2022</sub> /MSY B <sub>trigger</sub>	1725	0.093	21891	13.1	23546	98.5	-
F = 0	0	0	22746	17.6	25875	-100	-
F <sub>pa</sub>	4475	0.26	20454	5.7	20049	415	-
F <sub>lim</sub>	7150	0.45	18953	-2	16914	722.8	-
SSB <sub>2023</sub> = B <sub>lim</sub> ^^	-	=	-	ı	ı	-	-
$SSB_{2023} = B_{pa}^{\Lambda}$	-	-	-	1	ı	-	-
SSB <sub>2023</sub> = MSY B <sub>trigger</sub> ^^	-	-	-	-	ı	-	-
$F = F_{2022}$	1091	0.058	22209	14.8	24390	25.5	-
TAC = monitoring TAC	869	0.046	22319	15.3	24746	0	-

<sup>\*</sup> 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).

There are no catch scenarios that will rebuild the stock above B<sub>lim</sub> by 2024, and the ICES advice for zero catch is the same as last year.

#### Basis of the advice

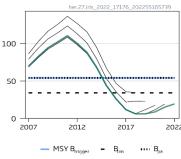
**Table 3** Herring in divisions 7.a South of 52°30′N, 7.g–h, and 7.j–k. The basis of the advice.

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

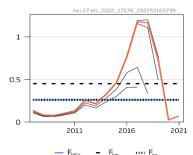
## Quality of the assessment

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

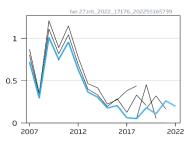




F at ages (wr) 2-5



Rec at age (wr) 1(Millions)



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.

ICES Advice 2022

<sup>\*\*</sup> SSB 2023 relative to SSB 2022.

<sup>\*\*\*</sup> Total catch in 2023 relative to the advised monitoring TAC in 2022 (869 tonnes).

<sup>^</sup> Advice value for 2023 relative to the advice value for 2022 (0 tonnes).

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

<sup>#</sup> Assuming the same catch scenario in 2024 as in 2023.

#### 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.

	weights are in			
Framework	Reference point	Value	Technical basis	Source
	MSY B <sub>trigger</sub>	54000	B <sub>pa</sub>	ICES (2018b)
MSY approach	F <sub>MSY</sub>	0.26	Stochastic simulations using a segmented regression stock- recruitment relationship from 1970–2014	ICES (2018b)
	B <sub>lim</sub>	34000	B <sub>loss</sub> = the lowest observed SSB (1980)	ICES (2018b)
Precautionary approach	B <sub>pa</sub>	54000	$B_{pa}$ = $B_{lim}$ × exp(1.645 × $\sigma_B$ ), with $\sigma_B$ = 0.29 from assessment uncertainty in the terminal year	ICES (2018b)
арргоасп	F <sub>lim</sub>	0.45	Equilibrium F maintaining SSB > B <sub>lim</sub> with 50% probability	ICES (2018b)
	F <sub>pa</sub>	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	$SSB_{mgt}$	Not defined		
Plan	F <sub>mgt</sub>	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.

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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.

		Catch				ICES
Year^	ICES advice	corresponding to	Agreed TAC	ICES landings	Discards	estimated
		advice				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^ Incention         Incention         Agreed TAC advice         ICES landings and catch         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         18900           1998         Catches below 25         <25000         22000         2300         0         2030         18100         700         18100         100         18100         0         18100         100         18100         17729         0         18267         0         18267         0         18267         0         18267         0         18267         0         18267         0         18267			Catch	_			ICES
TAC	Year^	ICES advice		Agreed TAC	ICES landings	Discards	
1992   TAC   27000   21000   20900   2100   23000   23000   2900   2900   2100   23000   29		1020 041100		7.6.000 17.0	.010 .000	2.000.00	
1993   discards   20000-24000   21000   19200   1900   21100   1990   1990   1990   1990   1990   1990   1990   1990   1990   1995   No specific advice   21000   18300   700   19000   1996   TAC   9800   16500-21000**   18800   3000   21800   1997   If required, preautionary TAC   < 25000   22000   23000   23000   23000   1999   F = 0.4   199000   21000   21000   18100   0   18100   20000   F < 0.3   20000   20000   21000   18267   0   18267   2001   F < 0.34   17900   20000   17729   0   17729   2002   F < 0.35   11000   11000   10550   0   10550   2003	1992	TAC		21000	20900	2100	
1994   discards    20000-24000   21000   17400   1700   19100   1995   No specific advice   21000   16500-21000**   18800   3000   21800   1996   TAC   9800   16500-21000**   18800   3000   21800   1997   If required, precautionary TAC   < 25000   22000   22000   23000   0   28000   1998   Catches below 25   < 25000   22000   22000   23000   0   23000   1999   F = 0.4   19000   21000   18100   0   18100   0   18100   20000   F < 0.3   20000   21000   18267   0   18267   0   18267   2001   F < 0.34   17900   20000   17729   0   17729   0   17729   2002   F < 0.35   11000   11000   10550   0   10555   2003   Substantially less than recent catches   - 13000   10875   0   10875   2004   60% of average catch 1997-2000   11000   13000   18452   0   8452   2006   60% of average catch 1997-2000   11000   13000   8452   0   8452   2006   2002   2004   60% of average catch 1997-2000   11000   13000   8530   0   8530   2007   No fishing without rebuilding plan   9400   8268   0   8268   2008   No targeted fishing without rebuilding plan   9400   8268   0   8268   2008   Republishing plan   8500   11503   0   11503   2011   See scenarios   13200   11503   0   11503   2011   See scenarios   13200   11503   0   11503   2011   See scenarios   13200   11503   0   11503   2014   MSY approach   < 26900   21100   21604   161   21765   2013   MSY approach   < 25900   23164   15700*   17579   247   17826   2016   MSY approach   < 25900   23164   15400*   1194   130   11324   2015   MSY approach   < 25140   15700*   17579   247   17826   2016   MSY approach   < 25445   10100*   4589   0   4589   2019   MSY approach   < 25445   10100*   4589   0   4589   2019   MSY approach   < 25445   10100*   4589   0   4589   2019   MSY approach   < 25445   10100*   4589   0   4589   2019   MSY approach   < 25450   2020   MSY approach   0   869^A   2020   MSY approach   0   869^A   2020	1002	Precautionary TAC (including	20000 24000	24000	10200	1000	24400
1994   discards	1993	discards)	20000-24000	21000	19200	1900	21100
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   23000   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   22000   17729   0   17729     2002   F < 0.35   11000   11000   10550   0   10550     2003   Substantially less than recent catches   - 13000   10875   0   10875     2005   60% of average catch 1997-2000   11000   13000   1065   0   11065     2005   60% of average catch 1997-2000   11000   13000   1065   0   11065     2006   Further reduction 60% average catch 6700   11000   8530   0   8530     2007   No fishing without rebuilding plan   9400   8268   0   8268     2008   No targeted fishing without rebuilding plan   9400   8268   0   8268     2008   No targeted fishing without rebuilding plan   9400   8268   0   8268     2009   No targeted fishing without rebuilding plan   9400   8268   0   8268     2010   F <sub>mgt</sub> = 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   285942   22300   18930   644   19574     2015   MSY approach   23164   15400*   17579   247   17826     2016   MSY approach   23164   15400*   1194   130   11324     2018   MSY approach   24762   4742   8441   0   8481     2019   MSY approach   24762   4742   8441   0   8481     2020   MSY approach   24762   4742   8441   0   8491     2020   MSY approach   24762   4742   8441   0   8491     2021   MSY approach   24762   4742   8441   0   8491     2022   MSY approach   24762   4742   8441   0   8491     2023   MSY approach   24762   4742   8441   0   8491     2024   MSY approach   24762   4742   8441   0   8491     2025   MSY approach   24762   4742   8494   0   8496     2026   MSY approach   24763   4742   4742   8441   0   84	100/		20000-24000	21000	17/100	1700	19100
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 7000 18267 0 18267			20000-24000				
1997	-						
1998		-		16500-21000**		3000	
1999         F = 0.4         19000         21000         18100         0         18100           2000         F < 0.3	1997	If required, precautionary TAC	< 25000	22000	18100	700	18800
2000   F < 0.3   2000   21000   18267   0   18267   2001   F < 0.34   17900   20000   177729   0   177729   2002   F < 0.35   2003   11000   11000   10550   0   10550   2003   20030   2003		Catches below 25				0	
2001         F < 0.34	1999	F = 0.4	19000	21000	18100	0	18100
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   2004   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	2000	F < 0.3	20000	21000	18267	0	18267
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 <sub>mgt</sub> = 0.19         10150         10150         8406         0         8406           2011         See scenarios         13200         11503         0         11503           2012         MSY approach         < 26900	2001	F < 0.34	17900	20000	17729	0	17729
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 <sub>mgt</sub> = 0.19         10150         10150         8406         0         8406           2011         See scenarios         13200         11503         0         11503           2012         MSY approach         < 26900	2002	F < 0.35	11000	11000	10550	0	10550
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         Fingt = 0.19         10150         10150         8406         0         8406           2011         Fingt = 0.19         10150         10150         8406         0         8406           2011         Might = 0.19         10150         10150         8406         0         8406           2011         Might = 0.19         10150         10150         8406         0         8406           2011         Might = 0.19         10150         10150         10150         8406 <t< td=""><td>2003</td><td>Substantially less than recent catches</td><td>-</td><td>13000</td><td>10875</td><td>0</td><td>10875</td></t<>	2003	Substantially less than recent catches	-	13000	10875	0	10875
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         Fingt = 0.19         10150         10150         8406         0         8406           2011         See scenarios         13200         11503         0         11503           2012         MSY approach         < 26900	2004		11000	13000	11065	0	11065
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   7000   700	2005	-	11000	13000	8452	0	8452
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 <sub>mgt</sub> = 0.19         10150         10150         8406         0         8406           2011         See scenarios         13200         11503         0         11503           2012         MSY approach         < 26900	2006	Further reduction 60% average catch	6700	11000	8530	0	8530
2008         rebuilding plan         7900         6853         0         6853           2009         No targeted fishing without rebuilding plan         5900         5760         0         5760           2010         Fmgt = 0.19         10150         10150         8406         0         8406           2011         See scenarios         13200         11503         0         11503           2012         MSY approach         < 26900	2007			9400	8268	0	8268
Tebuilding plan   September	2000	No targeted fishing without		7000	6053		6053
2009     rebuilding plan     5900     5760     0     5760       2010     Fmgt = 0.19     10150     10150     8406     0     8406       2011     See scenarios     13200     11503     0     11503       2012     MSY approach     < 26900	2008	rebuilding plan		7900	6853	0	6853
rebuilding plan         2010       Fmgt = 0.19       10150       10150       8406       0       8406         2011       See scenarios       13200       11503       0       11503         2012       MSY approach       < 26900	2009			5000	5760	0	5760
2011       See scenarios       13200       11503       0       11503         2012       MSY approach       < 26900	2003	rebuilding plan		3900	3700	U	3700
2012       MSY approach       < 26900	2010	$F_{mgt} = 0.19$	10150	10150	8406	0	8406
2013       MSY approach       < 18500	2011	See scenarios		13200	11503	0	11503
2014       MSY approach       <35942	2012	MSY approach	< 26900	21100	21604		21765
2015       MSY approach       < 15140	2013	MSY approach	< 18500	17200	16067	118	16185
2016       MSY approach       < 23164	2014	MSY approach	< 35942	22300	18930	644	19574
2017       MSY approach       < 16145	2015	MSY approach	< 15140	15700*	17579	247	17826
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 and precautionary considerations       0       869^^       609       0       609         2022       MSY approach and precautionary considerations       0       869^^       0       0         3023       MSY approach and precautionary       0       0       0       0       0	2016	MSY approach	< 23164	15400*	16659	182	16841
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^^       869^^       0         3023       MSY approach and precautionary       0       0       0       0       0	2017	MSY approach	< 16145	14500*	11194	130	11324
2020     MSY approach     0     869^^     132     0     132       2021     MSY approach     0     869^^     609     0     609       2022     MSY approach and precautionary considerations     0     869^^     869^^       2023     MSY approach and precautionary     0	2018	MSY approach	≤ 5445	10100*	4589	0	4589
2020     MSY approach     0     869^^     132     0     132       2021     MSY approach     0     869^^     609     0     609       2022     MSY approach and precautionary considerations     0     869^^     869^^       2023     MSY approach and precautionary     0	2019	• • • • • • • • • • • • • • • • • • • •		4742		0	
2021 MSY approach  2022 MSY approach and precautionary considerations  MSY approach and precautionary  0 869^^  0 869^^  0 869^^	2020		0	869^^	132	0	132
2022 MSY approach and precautionary considerations 0 869^^			0	869^^	609	0	609
considerations  MSY approach and precautionary		• • • • • • • • • • • • • • • • • • • •					
MSY approach and precautionary	2022		0	869^^			
1 7073 1	2022						
	2023		0				

<sup>\*</sup> Initial TAC before carry-over of unused quota from previous year.

## 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%	Negligible
	745	

<sup>\*\*</sup> Revised in 1996 after the ACFM May meeting.

<sup>^</sup> By calendar year.

<sup>^^</sup> Monitoring TAC.

**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.

total allilual ullallocateu/filisieporteu, discarus, anu cati									
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	ı	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

<sup>+</sup> 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.

recruitment is in thousands. Then and Low Telef to 55% confidence intervals.										
٧٥٥٣٨	Recruitment	High	Love	SSB**	High	Low	Total	F at ages	Hiah	Loui
Year^	at age (wr) 1	High	Low	33B	High	Low	catch^	(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

1971   1972   1974   1972   1975   1976   1975   1976   1975   1976   1975   1976   1977   1976   1977	Year^	Recruitment at age (wr) 1	High	Low	SSB**	High	Low	Total catch^	F at ages (wr) 2–5	High	Low
1972   279417   417622   141218   85877   109150   62604   38203   0.56   0.79   0.3     1974   160325   240937   79723   50062   64974   35148   19940   0.49   0.71   0.28     1975   202064   289678   114442   36455   36512   51968   27294   15588   0.52   0.75   0.20     1976   240224   312599   139841   36804   47643   25965   9771   0.39   0.57   0.20     1977   184803   256273   113327   37415   48045   26785   7833   0.29   0.43   0.15     1978   145887   206656   84524   36168   46742   25954   7559   0.27   0.39   0.142     1979   278555   374323   182777   36022   46144   25900   10321   0.43   0.62   0.23     1980   166477   240942   292018   33006   42833   23219   13130   0.54   0.79   0.30     1981   464972   605982   323958   36517   46658   26376   17103   0.84   1.21   0.47     1982   724333   92002   528098   57400   71500   43800   13000   0.46   0.67   0.25     1983   784556   993182   575938   76388   93818   58958   24981   0.56   0.67   0.25     1984   666197   851616   480784   96722   61266   62779   0.47   0.66   0.67     1987   1700230   143961   946493   105472   126788   84151   25020   0.39   0.55   0.23     1988   654169   821436   486904   99073   112716   73430   25024   0.32   0.45   0.18     1989   575322   726301   42519   95704   116137   75271   23254   0.29   0.40   0.172     1990   503380   643048   363712   88924   109110   69338   18404   0.25   0.33   0.145     1991   207415   287852   126968   71049   88243   53855   25562   0.38   0.55   0.23     1993   359813   475826   243794   73640   59950   56780   18618   0.33   0.46   0.192     1999   503880   643048   363712   88924   109110   69338   18404   0.25   0.35   0.45     1991   207415   287852   126968   71049   88243   53855   25562   0.38   0.53   0.23     1993   359813   475826   243794   73640   0.9500   56780   18618   0.33   0.46   0.192     1999   503880   643048   363712   88924   109110   69338   18404   0.25   0.25   0.35     1999   503880   643648   363612   71049   88243   53855   55562   0.38   0.53	1971		1090281	552339	97962	124988	70936		` '	0.66	0.25
1973   325406   456671   194149   64565   82708   46422   26936   0.52   0.73   0.30     1974   160325   240937   79723   50026   64974   35148   19940   0.49   0.77   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   256973   113327   37415   48065   6785   7833   0.29   0.43   0.155     1978   145587   206656   84524   36168   46742   25594   7559   0.27   0.39   0.142     1979   278555   374323   18277   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   332398   35517   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   78949   96722   61266   26779   0.47   0.66   0.28     1985   642488   813309   469671   85081   103564   66598   20426   0.32   0.45   0.188     1986   654169   821436   486904   93073   112716   73430   25024   0.32   0.45   0.188     1986   654169   6505912   3453861   94639   105472   126789   84151   26200   0.39   0.55   0.23     1988   475514   6059312   345388   103878   131881   86079   20447   0.23   0.33   0.15     1989   575732   726301   425159   95704   116137   75271   23254   0.29   0.40   0.172     1990   503380   643048   363712   89224   109110   69338   18160   0.25   0.35   0.16     1991   207415   287852   126668   71049   88243   53855   535502   0.38   0.35   0.26     1993   352309   463509   241111   72428   88163   56693   18166   0.31   0.43   0.45   0.19     1994   768796   957052   580548   80405   97815   62995   19300   0.32   0.45   0.35     1997   372888   489112   256668   71049   88243   53653   18166   0.31   0.43   0.45     1999   366666   666666   666666   666666   666666	-		417622								
1974	1973	325406	456671	194149	64565	82708	46422	26936		0.73	0.30
1975   202064   289678   114442   39631   51968   27294   15588   0.52   0.75   0.28			240937	79723	50062	64974	35148			0.71	0.28
1976   226223   312599   139841   36804   47643   25965   9771   0.39   0.57   0.20     1977   184803   256273   113327   37415   48045   25785   7833   0.29   0.43   0.155     1978   145587   206656   84524   36168   46742   25594   77559   0.27   0.39   0.142     1979   278555   374323   182777   36022   46144   25900   10321   0.43   0.62   0.23     1980   166477   240942   29018   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   774433   290800   252805   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   78594   96722   61266   26779   0.47   0.66   0.28     1985   642488   8815309   469671   85081   103564   66598   20426   0.32   0.45   0.18     1986   654169   821436   486904   93073   112716   73430   25024   0.37   0.51   0.22     1988   475514   605912   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   83224   109110   69338   18404   0.25   0.35   0.146     1991   207415   287852   126668   71049   88243   53855   25562   0.38   0.53   0.24     1993   359813   475826   243794   73640   90500   56780   18618   0.33   0.44   0.190     1994   768796   652145   53159   59704   176137   75271   23254   0.29   0.40   0.172     1995   722078   901324   542836   81907   98932   64882   23305   0.39   0.54   0.24     1996   352309   463509   241111   74428   84668   26953   18618   0.33   0.44   0.190     1994   768796   657052   580048   80045   97815   56693   18816   0.31   0.43   0.65     1998   248780   338266   159294   47984   59675   36293   18041   0.45   0.66   0.28     1999   36388   46388   475826   243794   47984   59675   36293   18041   0.45   0.66   0.26     1999   248606   13808   24868   24868   24868   24868   24868   2486			289678				27294			0.75	
1977									0.39	0.57	
1978									0.29	0.43	0.155
1979	1978									0.39	
1980											
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   41694   59675   36293   18041   0.45   0.62   0.27     1999   486666   622145   351195   41694   59675   36293   18041   0.45   0.62   0.27     1999   54866   622145   504083   42088   52569   31548   17191   0.63   0.88   0.38     2000   477218   610357   346083   42058   52569   31548   17191   0.63   0.88   0.38     2000   43713   63828   43828   43829   43828   43828   43828   43828											
1982   724433   92802   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   0.18     1986   6654169   821436   486904   93073   112716   773430   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   503880   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   0.190     1995   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     1999   486666   622145   351195   41994   52244   31744   18485   0.62   0.87   0.38     2000   477218   610357   344063   42058   52569   31548   17191   0.63   0.88   0.33     2000   561125   699792   382448   53818   67673   39963   7465   0.21   0.31   0.113     2003   141584   209043   74117   42833   54876   36942   9494   0.31   0.46   0.15     2004   361343   488689   233991   39041   51556   26556   12743   0.39   0.57   0.21     2005   1057130   1384361   729839   54401   71860   36942   9494   0.31   0.46   0.15     2006   355901   494188   217612   67024   88912   45634   6944   0.133   0.20   0.06     2007   73589   79081   476969   69764   92931   465697   7636   0.010										1.21	
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   7726301   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   74291   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   0.33   0.34   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     2003   141584   209043   74117   42833   54876   30790   11536   0.31   0.46   0.153     2004   541125   699792   382448   53818   67673   39963   7465   0.21   0.31   0.113     2003   141584   209043   74117   42833   54876   30790   11536   0.31   0.46   0.153     2006   355901   494188   217612   67024   89012   45034   6944   0.13   0.46   0.153     2006   355901   494188   217612   67024   89012   45034   6944   0.1											
1984   666197											
1985											
1986											
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   880548   80405   97815   62995   19300   0.32   0.45   0.190   1995   732078   901324   542836   81907   89392   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   0.33   0.36   0.57   0.21   0.20   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   0.131   0.44   0.159   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   0.26   0.206											
1988											
1989											
1990											
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											
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   0.62   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   0.053   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   12611   63827   16247   0.21   0.31   0.116   2014   304081   473332   134828   68225   87622   48828   19574   0.32   0.47   0.179   2015   175780											
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   15136   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   47696   69764   92931   46597   7636   0.132   0.198   0.066     2008   294385   423058   165722   82687   11019   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   8819   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											
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											
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   33963   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   0.055     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   0.441     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   0.79     2015   175780   295246   56314   40414   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   1076											
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         38248         53818         67673         39963         7465         0.21         0.31         0.113           2003         141584         209043         74117         42833         54876											
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         51560 <td></td>											
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 </td <td></td>											
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 </td <td></td>											
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<											
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         1101											
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         0.065           2008         294385         423058         165722         82687         110119         55255         5872         0.079         0.120         0.039           2009         1011860         1327930         695870         94170 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>											
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											
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											
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 </td <td></td>											
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 </td <td></td>											
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<											
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 <td>2006</td> <td>355901</td> <td></td> <td>217612</td> <td>67024</td> <td>89012</td> <td></td> <td>6944</td> <td>0.133</td> <td>0.20</td> <td>0.065</td>	2006	355901		217612	67024	89012		6944	0.133	0.20	0.065
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	2007		970811			92931			-		0.066
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         <										0.120	
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 <td></td> <td>0.038</td>											0.038
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		751592	1010271	492909				8370	0.101	0.149	0.053
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         3	2011				110331					0.190	0.070
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 <td>2012</td> <td>631242</td> <td>868184</td> <td>394296</td> <td>100126</td> <td>126514</td> <td>73746</td> <td>21820</td> <td>0.25</td> <td>0.37</td> <td>0.141</td>	2012	631242	868184	394296	100126	126514	73746	21820	0.25	0.37	0.141
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	2013	365882	546329	185431	88219	112611	63827	16247	0.21	0.31	0.116
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	2014	304081	473332	134828	68225		48828	19574	0.32	0.47	0.179
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	2015	175780	295246	56314	44041	57385	30697	18355	0.46	0.66	0.26
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	2016	204642	319259	90021	26000	34530	17470	16318	0.77	1.09	0.44
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	2017	60833	99404	22262	11791	16914	6668	10767	1.18	1.65	0.70
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	2018	51314	84054	18574	6082	9788	2375	4418	1.16	1.78	0.55
2021 260375 627850 0 15084 25474 4694 745 0.069 0.120 0.0178	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
2022 197044*** 19349*	2021		627850	0	15084	25474	4694	745	0.069	0.120	0.0178
	2022	197044***			19349*						

<sup>\*</sup> From the short-term forecast.

<sup>\*\*</sup> SSB estimated at spawning time (1 October).

<sup>\*\*\*</sup> Stock–recruitment relationship based on SSB<sub>2020</sub> from the assessment output.

<sup>^</sup> Assessment year (1 April–31 March).

#### 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.

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%20Doccuments/2003/G/G0403.PDF.

ICES. 2015a. 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. <a href="https://doi.org/10.17895/ices.pub.5430">https://doi.org/10.17895/ices.pub.5430</a>.

ICES. 2015b. Report of the Benchmark Workshop on West of Scotland Herring (WKWEST), 2–6 February, Dublin, Ireland. ICES CM 2015\ACOM:34. 299 pp. <a href="https://doi.org/10.17895/ices.pub.5429">https://doi.org/10.17895/ices.pub.5429</a>.

ICES. 2018a. EU request for ICES to evaluate the long-term management plan for Celtic Sea herring. *In* Report of ICES Advisory Committee, 2018. ICES Advice 2018, sr.2018.03. 7 pp. https://doi.org/ 10.17895/ices.pub.4140.

ICES. 2018b. Report of the Benchmark Workshop on Pelagic Stocks (WKPELA 2018), 12–16 February 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:32. 313 pp. https://doi.org/10.17895/ices.pub.5432.

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

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.

Pelagic AC. 2011. Long-term management plan for herring in the Celtic Sea and Division VIIJ, as agreed by the Pelagic Regional Advisory Council. Accessed 26 June 2019 at:

www.pelagic-ac.org/media/pdf/LTMP%20Celtic%20Sea%20and%20South%20of%20Ireland%20herring.pdf.

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*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.