

ECOREGION Celtic Seas
STOCK Herring in Division VIIa North of 52° 30'N (Irish Sea)

Advice for 2013

ICES advises on the basis of MSY approach that landings in 2013 should be no more than 5100 t.

ICES advises that activities that impact on the seabed should not take place in spawning grounds unless they can be shown not to have a negative impact on spawning, larval production or stock dynamics.

Stock status

F (Fishing Mortality)			
	2009	2010	2011
MSY (F_{MSY})	✘	✔	✔ Appropriate
Precautionary approach (F_{pa}, F_{lim})	?	?	? Undefined
SSB (Spawning Stock Biomass)			
	2010	2011	2012
MSY ($B_{trigger}$)	✔	✔	✔ Above trigger
Precautionary approach (B_{pa}, B_{lim})	✔	✔	✔ Full reproductive capacity

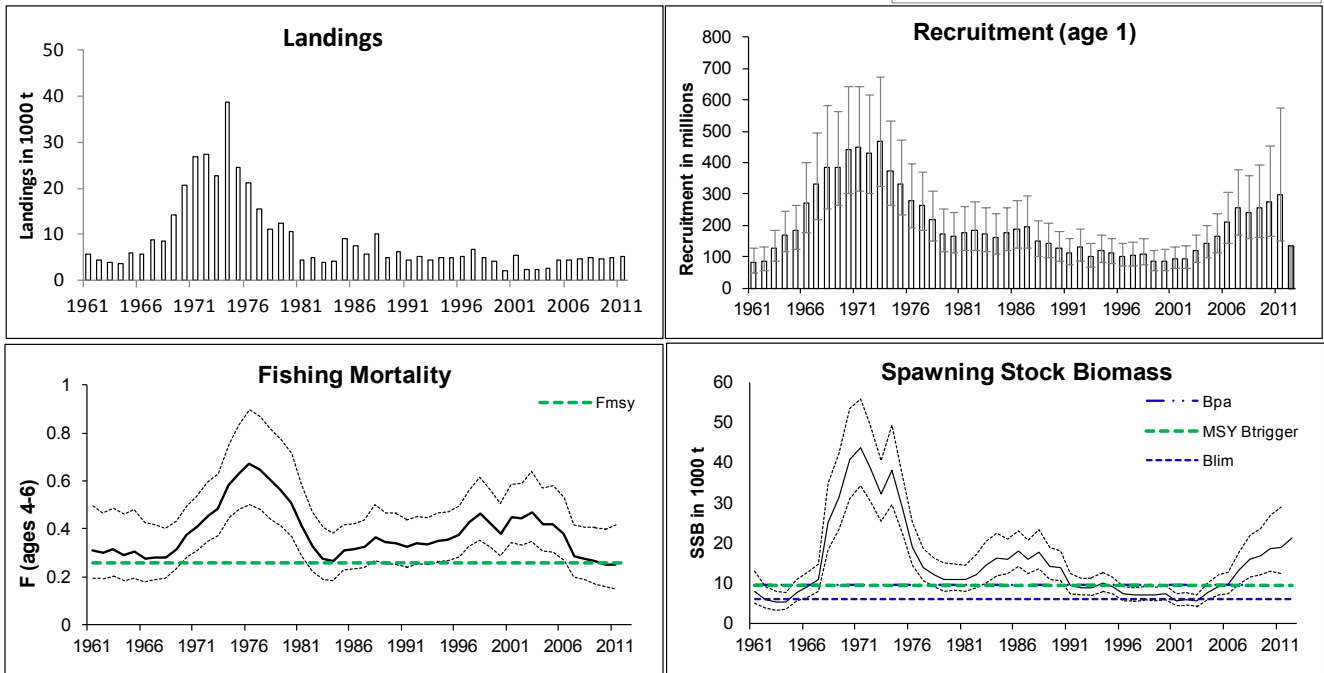
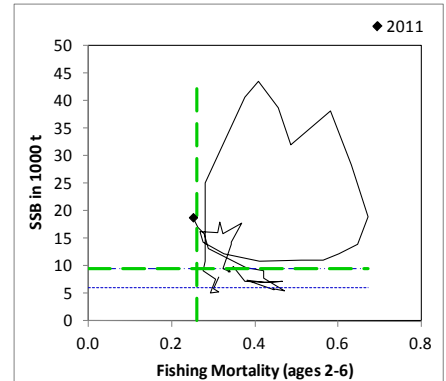


Figure 5.4.15.1 Herring in Division VIIa North of 52° 30'N (Irish Sea). Summary of stock assessment with observed landings. Estimates are shaded. Top right: F and SSB over the time series used in the assessment.

The spawning stock biomass has been above MSY $B_{trigger}$ since 2006. Fishing mortality has decreased since 2003 to the lowest in the time series and is now around F_{MSY} . Recruitment is increasing and estimated above the average of the the time series since 2006 (2004 year class).

Management plans

No specific management objectives are known to ICES. ICES recommends that a management plan for Division VIIa (North) should be developed.

Biology

Herring are an important prey species in the ecosystem and also one of the dominant planktivorous fish. This autumn spawning stock is considered a part of the Malin Shelf Stock Complex. A component of the VIIaN herring stock is known to mix seasonally with herring in Subarea VI, but the extent is unknown. Juvenile herring from the Celtic Sea herring stock are present in the Irish Sea. Spawning and nursery areas are sensitive and vulnerable to anthropogenic influences. Gravel extraction or disturbance in the close vicinity of any herring spawning will disturb that spawning activity and will reduce the available area for successful spawning.

Environmental influence on the stock

There are irregular cycles in the productivity of herring stocks (weights-at-age and recruitment). It is thought that the environment plays an important role (through transport, prey, and predation).

The fisheries

The fishery has not changed in recent years. UK pelagic trawlers takes the majority of catches during the 3rd and 4th quarters. A small local gillnet fishery continues to record landings on the traditional Mourne herring grounds during the 4th quarter. Herring fisheries tend to be clean with little bycatch of other fish. There are no observations of discarding or slippage in the Irish Sea fisheries that target herring. Discarding is not thought to be a feature of this fishery.

Catch distribution	Total catch (2011) 5.2 kt where 100 % landings (97% from pelagic trawlers and 3% gillnet)
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Effects of the fisheries on the ecosystem

The human consumption fisheries for herring are considered relatively clean, with little bycatch of other fish or cetaceans.

Quality considerations

The inter-annual variation in herring migration patterns affect the selectivity of both the fishery and acoustic survey. The assessment is done on a mixed stock (juveniles from the Celtic Sea), affecting the estimates of the younger ages. The acoustic survey are uncertain and the 2011 acoustic survey is considered an underestimate of abundance at older ages, having a mismatch with the migration pattern of the spawning stock biomass and affected by adverse weather conditions. Input data quality and sampling coverage is good for this stock.

Scientific basis

Assessment type	Analytical assessment (FLSAM)
Input data	Two survey indices (Northern Ireland Acoustic Surveys AC(VIIaN)), larvae survey NINEL); commercial catch-at-age data.
Discards and bycatch	Not considered relevant.
Indicators	Two survey indices (NIGFS-WIBTS-1Q, NIGFS-WIBTS-4Q).
Other information	Benchmarked in 2012 (WKPELA).
Working group report	HAWG

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Reference points

	Type	Value	Technical basis
MSY	MSY $B_{trigger}$	9500 t	Provisional based on B_{pa}
Approach	F_{MSY}	0.26	Based on stochastic simulations (ICES, 2012a)
Precautionary approach	B_{lim}	6000 t	Lowest observed SSB.
	B_{pa}	9500 t	$B_{pa} = B_{lim} * 1.58$
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

Unchanged since 2012

Outlook for 2013

Basis: $F(2012) = TAC\ constraint = 0.21$; $SSB(2013) = 22$; $R(2012) = 133\ mln$; $Landings(2012) = 5.2$.

Rationale	Landings (2013)	Basis	F (2013)	SSB (2014)	%SSB change ¹⁾	%TAC change ²⁾
MSY	5.1	F_{MSY}	0.26	18	-15%	8%
Zero catch	0	$F = 0$	0	23	2%	-100%
Other options	4.039	TAC-15% ($F_{2012} * 0.96$)	0.20	17	-11%	-15%
	4.752	Stable TAC ($F_{2012} * 1.15$)	0.24	16	-14%	0%
	5.465	TAC+15% ($F_{2012} * 1.34$)	0.28	15	-16%	+ 15%

Units: '000 tonnes.

¹⁾ SSB 2014 relative to SSB 2013.

²⁾ Human Consumption landings 2013 relative to TAC 2012.

MSY approach

Following the ICES MSY framework implies fishing mortality at $F_{MSY} = 0.26$, resulting in landings of less than 5100 t in 2013. This is expected to lead to an SSB of 18 000 t in 2014.

Precautionary approach

The SSB is well above B_{pa} and F_{pa} is undefined but current F is just below F_{MSY} . ICES does not advise to use B_{pa} as a target in 2013.

Additional considerations

The catches have been close to TAC levels and the main fishing effort has not varied considerably.

The acoustic survey estimates since 2007 suggest that SSB is at highest abundance within the 18 year time-series. The 2011 survey series was severely effected by adverse weather conditions and mismatched with the timing of the spawning stock biomass migration. Evidence from the commercial fishery and preliminary results from successive surveys indicate high abundance and catch rates on the main spawning grounds post survey. The 2011 survey is considered to be an underestimate of abundance of older ages (3+). 1-ringer+ biomass also remains high. Estimates from an enhanced acoustic survey series since 2007 indicate and confirm the significant increase in 1+ herring biomass. The acoustic survey provides estimates of numbers-at-age, however the 1 to 3-ringers in the area are a mixture of at least two adjacent stocks, (Celtic Sea and Division VIIa(N)). Splitting the current acoustic spawning stock biomass estimates according to season of origin, does not change the perception of a significant increase in Irish Sea "autumn" spawning biomass.

Actions which perturb or pollute herring spawning beds or increase turbidity after spawning are likely to have a negative effect on recruitment. Such activities include aggregate extraction, dumping of dredge spoil and the placement of certain structures on or over the seabed. Placement of structures on or over the seabed in spawning grounds should only be permitted if it can be shown that they do not disturb individual spawning beds or negatively impact spawning, larval production or stock dynamics.

Uncertainties in the assessment

The final assessment model is dominated by information from the catch, with the survey information having less influence on the model fit. The assessment model describes the data reasonably well and there is very little retrospective pattern in the assessment. The 2011 survey data are considered not to reflect the spawning stock biomass and age structure, which results in an underestimate of SSB and an overestimate of F in the model. The largest occurrence of mixed fish from different spawning season origins is in the age 1 data (recruitment age in the assessment). The assessment model does not appear to estimate recruitment well and should be considered as a smoothed estimate.

There is a seasonal closed area east of the Isle of Man since 1973. The fleet sometimes is able to fish spawning aggregations if they occur outside the closed area. The effect of this is that the age structure of the catches from year to year can vary widely.

Comparison with previous assessment and advice

Last year the assessment was based on trends only. This year an analytical assessment and short term forecast are presented for this stock. The advice for 2012 is based on MSY approach (F_{MSY}).

Sources

ICES. 2012a. Report of the Benchmark Workshop on Pelagic Stocks (WKPELA 2012), 13–17 February 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:47.

ICES. 2012b. Report of the Herring Assessment Working Group for the Area South of 62°N, 13–22 March 2012. ICES CM 2012/ACOM:06.

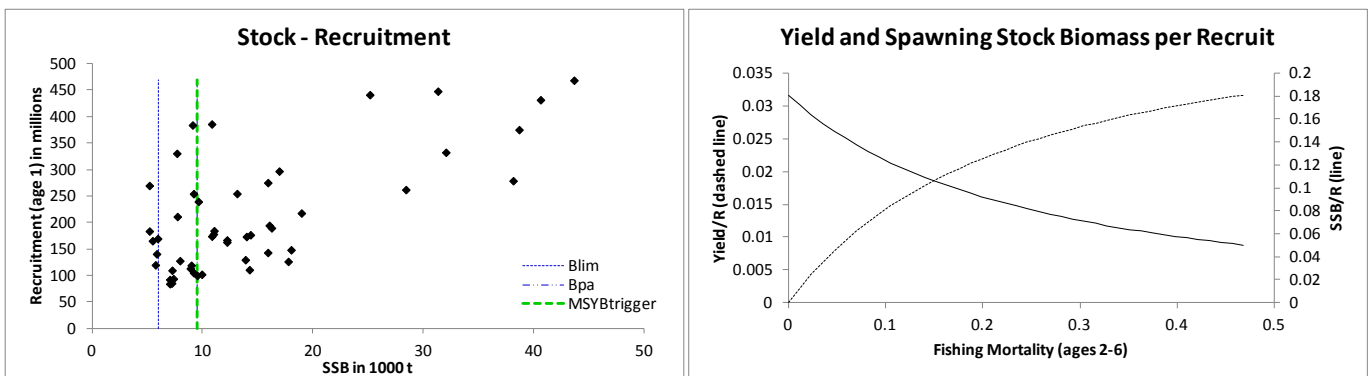


Figure 5.4.15.2 Herring in Division VIIa North of 52° 30'N (Irish Sea). Stock recruitment and yield per recruit analysis.

Table 5.4.15.1 Herring in Division VIIa North of 52° 30'N (Irish Sea). ICES advice, management, and catch.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	ICES Catch
1987	TAC	4.3	4.5	5.8
1988	TAC (Revised advice in 1988)	10.5 (5.6)	10.5	10.2
1989	TAC	5.5	6.0	5.0
1990	Precautionary TAC	5.7	7.0	6.3
1991	TAC	5.6	6.0	4.4
1992	TAC	6.6	7.0	5.3
1993	TAC	4.9–7.4	7.0	4.4
1994	Precautionary TAC	5.3	7.0	4.8
1995	Precautionary TAC	5.1	7.0	5.1
1996	If required, precautionary TAC	5.0	7.0	5.3
1997	No advice given	-	9.0	6.6
1998	<i>Status quo</i> F	6.5	9.0	4.9
1999	F=Proposed $F_{pa}=0.36$	4.9	6.6	4.1
2000	F=90% F(98)=0.31	3.9	5.4	2.0
2001	<i>Status quo</i> F= 0.26	5.1	6.9	5.5
2002	Average catch of 1996–2000	4.8	4.8	2.4
2003	2002 TAC	4.8	4.8	2.4
2004	Advice 2003 catch	4.8	4.8	2.5
2005	<i>Status quo</i> TAC	4.8	4.8	4.4
2006	<i>Status quo</i> TAC	4.8	4.8	4.4
2007	<i>Status quo</i> TAC	4.8	4.8	4.6
2008	<i>Recent catches</i>	4.4	4.8	4.9
2009	<i>Same advice as last year</i>	4.4	4.8	4.6
2010	Recent TAC	4.8	4.8	4.9
2011	No increase in catch	< 4.8	5.2	5.2
2012	No increase in catch	-	4.752	
2013	MSY approach	< 5.1		

Weights in '000 t.

Table 5.4.15.2 Herring in Division VIIa North of 52° 30'N (Irish Sea). ICES catch estimates in tonnes by country.

Country	Ireland	UK	Unallocated	Total
1987	1 200	3 290	1 333	5 823
1988	2 579	7 593	-	10 172
1989	1 430	3 532	-	4 962
1990	1 699	4 613	-	6 312
1991	80	4 318	-	4 398
1992	406	4 864	-	5 270
1993	0	4 408	-	4 408
1994	0	4 828	-	4 828
1995	0	5 076	-	5 076
1996	100	5 180	22	5 302
1997	0	6 651	-	6 651
1998	0	4 905	-	4 905
1999	0	4 127	-	4 127
2000	0	2 002	-	2 002
2001	862	4 599	-	5 461
2002	286	2 107	-	2 393
2003	0	2 399	-	2 399
2004	749	1 782	-	2 531
2005	1 153	3 234	-	4 387
2006	581	3 821	-	4 402
2007	0	4 629	-	4 629
2008	0	4 895	-	4 895
2009	0	4 594	-	4 594
2010	0	4 894	-	4 894
2011	0	5 202	-	5 202

Table 5.4.15.3

Herring in Division VIIa North of 52° 30'N (Irish Sea). Summary of the assessment. Low = lower limit and High = higher limit of 95% confidence interval. Landings are estimated by the assessment and differ from the observed catch statistics.

Year	Recruits Age 0 (Thousands)		Total biomass (tonnes)	Total biomass		Spawning biomass (tonnes)	Spawning biomass		Landings (tonnes)	Yield / SSB (ratio)	Mean F ages 4-6		
	Mean	Low High		Low High	Low High		Low High	Mean F			Low F	High F	
1961	81389	50886 130178	26108	19830 34374	7959	4925 12861	5413	0.680	0.312	0.195	0.499		
1962	85734	55728 131896	19904	15187 26087	5947	3831 9231	3951	0.664	0.300	0.193	0.467		
1963	127772	88451 184572	21091	16347 27212	5195	3371 8007	3612	0.695	0.314	0.203	0.485		
1964	169566	116506 246792	26849	20649 34912	5191	3504 7688	4141	0.798	0.292	0.186	0.460		
1965	183689	126708 266295	31320	24399 40203	7684	5471 10792	5512	0.717	0.307	0.196	0.479		
1966	269682	180247 403494	47005	35529 62187	9102	6525 12695	5839	0.642	0.275	0.178	0.425		
1967	330380	220003 496134	64731	48711 86020	10840	7947 14786	8230	0.759	0.280	0.189	0.415		
1968	383847	253214 581874	81471	61391 108119	25160	18183 34813	10137	0.403	0.280	0.196	0.401		
1969	385771	264128 563436	93433	73306 119087	31320	23265 42162	14561	0.465	0.317	0.232	0.434		
1970	441088	302939 642237	119491	94962 150357	40619	30867 53453	18807	0.463	0.375	0.282	0.498		
1971	447754	311436 643740	127516	102761 158235	43652	34160 55780	22948	0.526	0.407	0.310	0.535		
1972	431490	302302 615887	107045	87618 130778	38677	30310 49354	22561	0.583	0.455	0.348	0.594		
1973	468364	324439 676134	102334	83561 125325	32048	25345 40525	22880	0.714	0.486	0.375	0.631		
1974	375120	263831 533352	101316	82599 124275	38139	29521 49273	29057	0.762	0.582	0.447	0.757		
1975	332369	234042 472004	79063	64949 96244	28424	22225 36353	23249	0.818	0.633	0.481	0.832		
1976	278730	195164 398079	64731	52829 79316	18964	14349 25064	19376	1.022	0.672	0.502	0.899		
1977	261974	184516 371947	53263	43332 65470	13984	10490 18643	14988	1.072	0.647	0.481	0.870		
1978	217728	152681 310487	47193	38110 58441	12221	9168 16290	12642	1.034	0.602	0.444	0.817		
1979	173338	119058 252366	42277	33802 52878	10998	8053 15020	11945	1.086	0.564	0.410	0.776		
1980	166875	115505 241091	35102	28117 43821	11052	8237 14830	8749	0.792	0.510	0.366	0.712		
1981	178082	121392 261246	32306	25141 41513	10849	8083 14561	5508	0.508	0.412	0.290	0.585		
1982	184425	123080 276345	36425	27570 48123	12221	8797 16978	5097	0.417	0.326	0.225	0.473		
1983	174033	116606 259743	40579	30517 53958	14347	10121 20338	4922	0.343	0.275	0.187	0.407		
1984	162918	111075 238958	43827	33871 56709	16256	11771 22449	5324	0.327	0.267	0.186	0.384		
1985	176663	120720 258531	46864	37272 58924	16054	12351 20866	6507	0.405	0.310	0.229	0.419		
1986	189662	128291 280391	45844	36782 57139	18028	14105 23042	6990	0.388	0.315	0.234	0.424		
1987	194464	128044 295337	40579	32249 51060	15919	12259 20673	6220	0.391	0.323	0.239	0.437		
1988	148301	101345 217013	42362	33909 52922	17767	13538 23317	7111	0.400	0.367	0.270	0.499		
1989	143200	97796 209684	38330	30437 48270	14254	10791 18828	5676	0.398	0.344	0.252	0.468		
1990	126374	87046 183471	36571	29366 45543	13887	10647 18112	5784	0.416	0.343	0.252	0.466		
1991	110747	76065 161241	30364	24603 37473	9525	7308 12416	4874	0.512	0.324	0.239	0.438		
1992	129573	88829 189006	25413	20657 31262	8986	7121 11339	4163	0.463	0.340	0.255	0.454		
1993	99907	69257 144123	28912	23577 35453	8904	7001 11323	4717	0.530	0.335	0.251	0.448		
1994	119134	83137 170716	26134	21433 31867	9938	7876 12539	4433	0.446	0.348	0.261	0.465		
1995	113210	79931 160344	25413	20844 30982	9203	7282 11631	4807	0.522	0.355	0.267	0.473		
1996	102130	71726 145421	23063	19026 27957	7250	5701 9220	5001	0.690	0.375	0.284	0.497		
1997	104925	74016 148740	21361	17620 25895	7044	5525 8979	4880	0.693	0.429	0.327	0.563		
1998	109645	76211 157745	20482	16621 25239	7215	5754 9047	4032	0.559	0.465	0.351	0.617		
1999	84288	58320 121820	19807	16112 24350	7043	5469 9070	3753	0.533	0.424	0.321	0.561		
2000	85477	59075 123678	18182	14791 22351	7368	5758 9427	2973	0.403	0.380	0.286	0.505		
2001	92319	63941 133290	18130	14543 22600	5743	4442 7425	3483	0.606	0.447	0.340	0.588		
2002	93807	64107 137268	18710	14810 23637	5849	4521 7569	2796	0.478	0.444	0.334	0.590		
2003	119850	83387 172259	19518	15317 24871	5473	4252 7043	2434	0.445	0.471	0.347	0.640		
2004	140646	97953 201946	21727	17119 27574	7726	5873 10162	2713	0.351	0.421	0.309	0.572		
2005	165380	114688 238477	25336	19889 32275	9196	6993 12092	3604	0.392	0.421	0.305	0.582		
2006	211082	144849 307600	28624	22246 36831	9629	7323 12660	3790	0.394	0.379	0.270	0.532		
2007	254231	170360 379394	38369	29052 50673	13129	9767 17649	4243	0.323	0.288	0.200	0.415		
2008	239426	158815 360953	42447	32049 56217	15924	11619 21825	4974	0.312	0.277	0.189	0.405		
2009	254486	164903 392733	44267	32804 59737	16948	12101 23736	5051	0.298	0.264	0.171	0.406		
2010	275130	166702 454083	45661	32812 63541	18542	12854 26748	5066	0.273	0.252	0.160	0.398		
2011	296855	152957 576129	47005	31115 71009	18862	12273 28988	5437	0.288	0.251	0.151	0.416		
2012*	133430				21155								

* geometric mean recruitment 1995–2009 and SSB from assessment model