

8.3.13 Herring (*Clupea harengus*) in Subdivision 31 (Bothnian Bay)

ICES stock advice

ICES advises that when the precautionary approach is applied, catches in 2017 should be no more than 6442 tonnes.

Stock development over time

An exploratory assessment shows that the spawning-stock biomass (SSB) has increased since 2008. The fishing mortality (F) has had an overall increasing trend since 2010. Recruitment since 2010 has been above average, except for 2013.

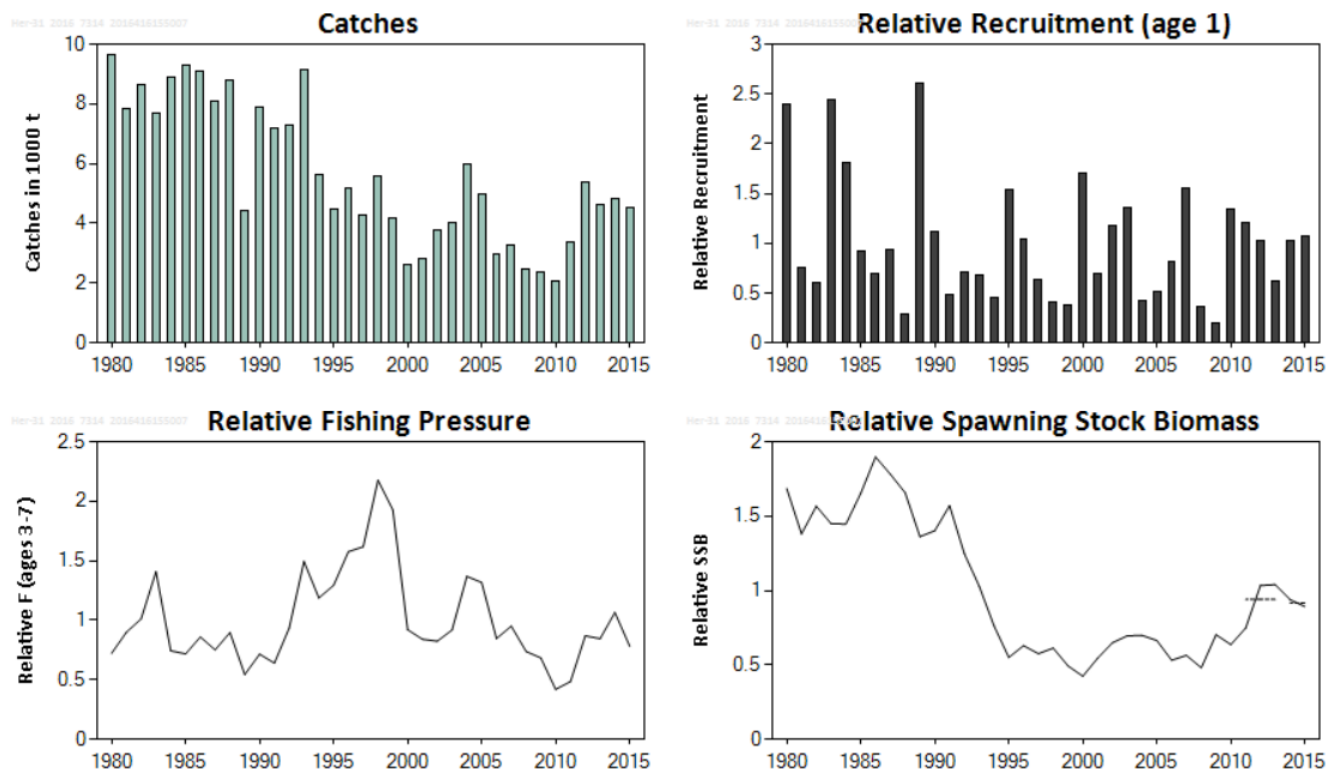


Figure 8.3.13.1 Herring in Subdivision 31. Summary of the exploratory stock assessment (catch weights in thousand tonnes). Recruitment, fishing mortality, and SSB are relative in relation to the average of the time-series. Bottom right panel: relative SSB, regarded as an indicator of the recent development of the stock. The dashed lines in the SSB plot indicate the average values of the respective years.

Stock and exploitation status

Table 8.3.13.1 Herring in Subdivision 31. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2013	2014	2015		2013	2014	2015	
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	MSY	?	?	?
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	$B_{trigger}$?	?	?
Management plan	F_{MGT}	-	-	-	Not applicable	B_{pa}, B_{lim}	?	?	?
Qualitative evaluation	-	→	↗	↘	Decreasing	SSB_{MGT}	-	-	-
							→	↘	→
									Stable

Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012). The SSB trend from the exploratory stock assessment is used as the index of stock development. The advice is based on a comparison of the two latest index values (index A) with the three preceding values (index B), multiplied by the recent advised catch.

The index is estimated to have decreased by less than 20% and thus the uncertainty cap was not applied when calculating the catch advice. The stock status relative to candidate reference points is unknown. Considering that the fishing effort has been decreasing since the 1980s and is considered to be low (Figure 8.3.13.2), no additional precautionary buffer was applied.

Table 8.3.13.2 Herring in Subdivision 31. For stocks in ICES data categories 3–6, one catch option is provided.

Index A (2014, 2015)		0.92
Index B (2011, 2012, 2013)		0.94
Index ratio (A/B)		0.97
Uncertainty cap	Not applied	-
Recent advised catch for 2016		6641 t
Precautionary buffer	Not applied	-
Catch advice*		6442 t

*(Recent advised catch) × (index ratio).

Basis of the advice

Table 8.3.13.3 Herring in Subdivision 31. The basis of the advice.

Advice basis	Precautionary approach.
Management plan	There is a proposed EU management plan for the Baltic Sea. The plan has not been formally implemented.

Quality of the assessment

The advice is based on an exploratory assessment as an indicator of SSB. The uncertainty of this index is not available.

The methods applied to derive quantitative advice for stocks without an analytical assessment are expected to evolve as they are further developed and validated.

There is uncertainty about the stock structure of herring in subdivisions 30 and 31.

Issues relevant for the advice

The herring stocks in subdivisions 30 and 31 are currently assessed separately, but they are managed by a common TAC. Adding up the catch advice for the two stocks in 2017 results in a total herring catch of 134 556 t + 6 442 t = 140 998 t in subdivisions 30 and 31 in 2017.

A combined TAC may pose a risk and not adequately protect the smaller stock. However, the recent development of both stocks and the low fishing effort currently in Subdivision 31 suggest a low risk of overexploitation of the smaller stock.

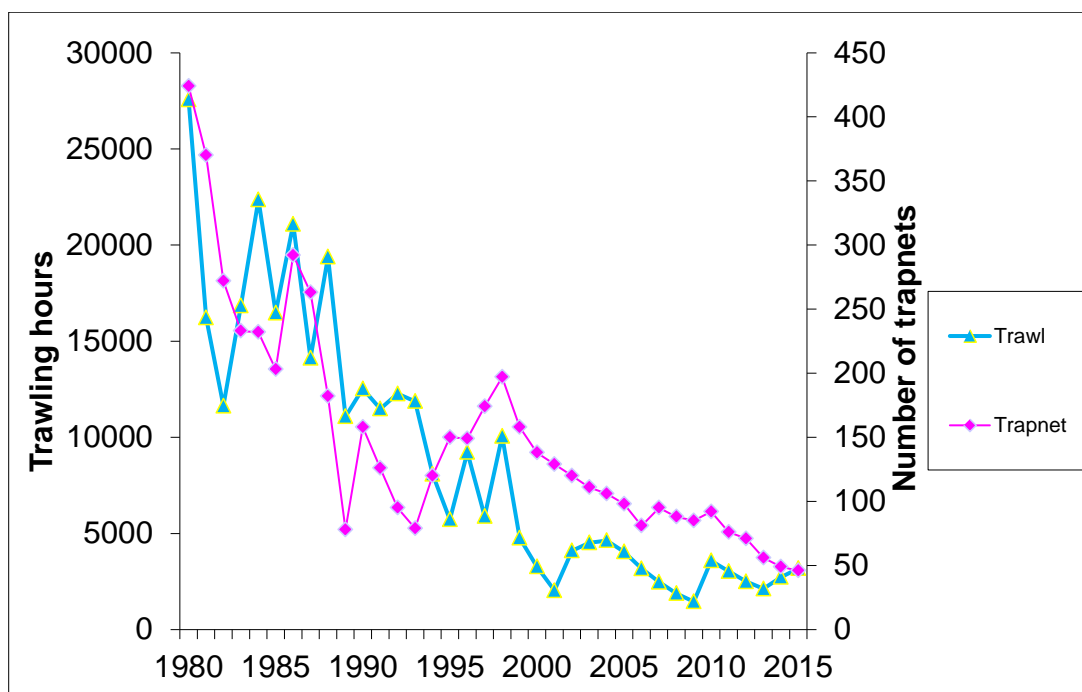


Figure 8.3.13.2 Herring in Subdivision 31. Effort by fishery (i.e. trawl and trapnet), regarded as representative for the variation of fishing pressure over time.

Reference points

No reference points are defined for this stock.

Basis of the assessment

Table 8.3.13.4 Herring in Subdivision 31. The basis of the assessment.

ICES stock data category	3.2.0 (ICES, 2016a)
Assessment type	Exploratory age-based assessment (XSA; ICES, 2016b).
Input data	Commercial fleet indices (trawl fleet and trapnet); commercial catches (international landings, age and length frequencies from catch sampling); annual maturity data (commercial catch, from quarters 1 and 2 in the year before spawning).
Discards and bycatch	Not included, assumed negligible.
Indicators	None
Other information	A benchmark is scheduled for the two herring stocks (subdivisions 30 and 31) in 2017.
Working group	Baltic Fisheries Assessment Working Group (WGBFAS)

Information from stakeholders

There is no available information.

History of advice, catch and management

Table 8.3.13.5 Herring in Subdivision 31. History of ICES advice, the agreed TAC, and ICES estimates of catch. Weights in thousand tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987		9.0		8.1
1988		13.0		8.8
1989		7.0		4.4
1990		9.0		7.8
1991	TAC for eastern part of SD, allowance for western part	9+	84.0	6.8
1992	<i>Status quo</i> F	8.0	84.0	6.5
1993	Increase in yield by increasing F	-	90.0	9.2
1994	Increase in yield by increasing F	-	90.0	5.8
1995	Increase in yield by increasing F	18.4	110.0	4.7
1996	Increase in yield by increasing F	18.4	110.0	5.2
1997	Increase in yield by increasing F	-	110.0	4.3
1998	Increase in yield by increasing F	-	110.0	5.6
1999	Increase in yield by increasing F	-	94.0	4.2
2000	Increase in yield by increasing F	-	85.0	2.5
2001	Exploitation rate should not be increased	-	72.0	2.8
2002	Exploitation rate should be decreased	-	64.0	3.8
2003	No increase in catches	3.0	60.0	4.0
2004	No increase in catches	3.0	61.2	6.0
2005	No increase in catches	3.5	64.0	5.0
2006	Less than average catches (2002–2004)	4.6	91.6	3.0
2007	Less than average catches (2002–2005)	4.7	82.8	3.2
2008	No increase in catch	< 3.0	87.0	2.5
2009	Same advice as last year	< 3.0	82.7	2.4
2010	Same advice as last year	< 3.0	103.3	2.1
2011	No basis for advice	< 3.0	104.4	3.4
2012	No increase in catches	< 3.0	106.0	5.4
2013	Reduce catches by more than 20%	< 2.1	106.0	4.6
2014	Increase catches by no more than 20%	< 4.3	137.8	4.8
2015	Increase catches by no more than 20%	< 5.534	158.5	4.5
2016	Precautionary approach (\leq 20% increase in catch)	\leq 6.641	120.9	
2017	Precautionary approach	\leq 6.442		

*TAC for subdivisions 29N, 30, and 31 (IBSFC Management Unit 3), and from 2005 for subdivisions 30 and 31.

History of catch and landings

Table 8.3.13.6 Herring in Subdivision 31. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings			Discards
4 527 t	96% trawls	3% trapnets	1% gillnets	Discarding is considered to be negligible.
	4 527 t			

Table 8.3.13.7 Herring in Subdivision 31. History of official landings, presented for each country participating in the fishery. Weights in tonnes.

Year	Finland	Sweden	Total
1980	8899	760	9659
1981	7206	620	7826
1982	7982	670	8652
1983	7011	696	7707
1984	8322	594	8916
1985	8595	717	9312
1986	8754	336	9090
1987	7788	320	8108
1988	8501	267	8768
1989	4005	423	4428
1990	7603	295	7898
1991	6800	400	7200
1992	6900	400	7300
1993	8752	383	9135
1994	5195	411	5606
1995	3898	563	4461
1996	5080	114	5194
1997	4195	86	4281
1998	5358	224	5582
1999	3909	248	4157
2000	2479	113	2592
2001	2755	67	2822
2002	3532	219	3750
2003	3855	150	4004
2004	5831	142	5973
2005	4800	169	4970
2006	2684	269	2954
2007	2992	253	3245
2008	2309	175	2484
2009	2166	209	2375
2010	1898	177	2075
2011	3218	132	3350
2012	5206	161	5367
2013	4486	126	4612
2014	4637	195	4832
2015*	4370	157	4527

*Preliminary.

Summary of the assessment

Table 8.3.13.8 Herring in Subdivision 31. Assessment summary with weights in tonnes.

Year	Relative recruitment (age 1)	Relative SSB	Total catch in tonnes	Relative mean F (ages 3–7)
1980	2.40	1.69	9659	0.72
1981	0.76	1.38	7826	0.90
1982	0.61	1.57	8652	1.01
1983	2.44	1.45	7707	1.41
1984	1.80	1.45	8916	0.74
1985	0.92	1.65	9312	0.72
1986	0.70	1.90	9090	0.86
1987	0.93	1.78	8108	0.75
1988	0.29	1.66	8768	0.90
1989	2.61	1.36	4428	0.54
1990	1.12	1.40	7898	0.72
1991	0.48	1.57	7200	0.64
1992	0.71	1.25	7300	0.94
1993	0.68	1.03	9135	1.49
1994	0.45	0.76	5606	1.19
1995	1.54	0.55	4461	1.29
1996	1.05	0.63	5194	1.58
1997	0.63	0.58	4281	1.62
1998	0.40	0.61	5582	2.18
1999	0.38	0.49	4157	1.93
2000	1.71	0.42	2592	0.92
2001	0.70	0.55	2822	0.84
2002	1.18	0.65	3750	0.82
2003	1.35	0.70	4004	0.92
2004	0.42	0.70	5973	1.37
2005	0.51	0.66	4970	1.32
2006	0.82	0.53	2954	0.85
2007	1.56	0.56	3245	0.95
2008	0.36	0.48	2484	0.74
2009	0.20	0.70	2375	0.68
2010	1.35	0.64	2075	0.42
2011	1.21	0.75	3350	0.49
2012	1.02	1.03	5367	0.87
2013	0.62	1.04	4612	0.85
2014	1.03	0.94	4832	1.07
2015	1.06	0.89	4527	0.78

Sources and references

ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp.

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ICES. 2016b. Report of the Baltic Fisheries Assessment Working Group (WGBFAS), 12–19 April 2016, ICES Headquarters, Copenhagen, Denmark. ICES CM 2016/ACOM:11.