

## Herring (*Clupea harengus*) in Subdivision 28.1 (Gulf of Riga)

### ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for the Baltic Sea is applied, the catches in 2021 that correspond to the F ranges in the plan are between 27 702 tonnes and 41 423 tonnes. According to the MAP, catches higher than those corresponding to  $F_{MSY}$  (35 771 tonnes) can only be taken under conditions specified in the MAP, whilst the entire range is considered precautionary when applying the ICES advice rule. This advice applies to all catches from the stock in subdivisions 28.1 and 28.2.

Note: This advice is abbreviated due to the Covid-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

### Stock development over time



**Figure 1** Herring in Subdivision 28.1. Summary of the stock assessment. The assumed recruitment for 2020 is unshaded. SSB at spawning time in 2020 is predicted.

### Stock and exploitation status

**Table 1** Herring in Subdivision 28.1. State of the stock and the fishery relative to reference points.

	Fishing pressure			Stock size				
	2017	2018	2019	2018	2019	2020		
Maximum sustainable yield	$F_{MSY}$	✓	✓	✓	Below	$B_{trigger}$	✓	Above trigger
Precautionary approach	$F_{pa}, F_{lim}$	✓	✓	✓	Harvested sustainably	$B_{pa}, B_{lim}$	✓	Full reproductive capacity
Management plan	$F_{MGT}$	✓	✓	✓	Within the range	$SSB_{MGT}$	✓	Above

**Catch scenarios**

**Table 2** Herring in Subdivision 28.1. Assumptions made for the interim year and in the forecast. Weights are in tonnes. Recruitment is in thousands.

Variable	Value	Notes
F <sub>ages 3-7</sub> (2020)	0.26	F based on catch constraint
SSB (2020)	136024	Projected SSB at spawning time
R <sub>age 1</sub> (2020–2022)	3212088	Geometric mean of year classes 1989–2017
Total catch (2020)	30382	Catch constraint of 30 382 tonnes*

\* Catch constraint in 2020: TAC for Gulf of Riga management area 34 445 tonnes + Gulf of Riga herring caught in the central Baltic 314 tonnes – central Baltic herring caught in the Gulf of Riga 4377 tonnes = 30 382 tonnes.

**Table 3** Herring in Subdivision 28.1. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2021)	F (2021)	SSB (2021)	SSB (2022)	% SSB change **	% Advice change ***
ICES advice basis						
EU MAP *: F <sub>MSY</sub>	35771	0.32	129580	120724	-6.8%	17.7%
EU MAP *: F <sub>lower</sub>	27702	0.24	131416	129832	-1.21%	18.4%^
EU MAP *: F <sub>upper</sub>	41423	0.38	128235	114426	-10.8%	18%^
Other scenarios						
F <sub>MSY</sub>	35771	0.32	129580	120724	-6.8%	17.7%
F = 0	0	0	137089	162076	18.2%	-100%
F = F <sub>pa</sub>	62303	0.63	122766	91786	-25%	105%
F = F <sub>lim</sub>	79500	0.88	117507	73959	-37%	162%
SSB (2022) = B <sub>lim</sub>	114130	1.61	103508	40800	-61%	276%
SSB (2022) = B <sub>pa</sub>	96575	1.19	111332	57100	-49%	218%
SSB (2022) = MSY B <sub>trigger</sub>	93521	1.13	112523	60000	-47%	208%
F = F <sub>2020</sub>	29868	0.26	130933	127375	-2.7%	-1.69%

\* MAP multiannual plan (EU, 2016).

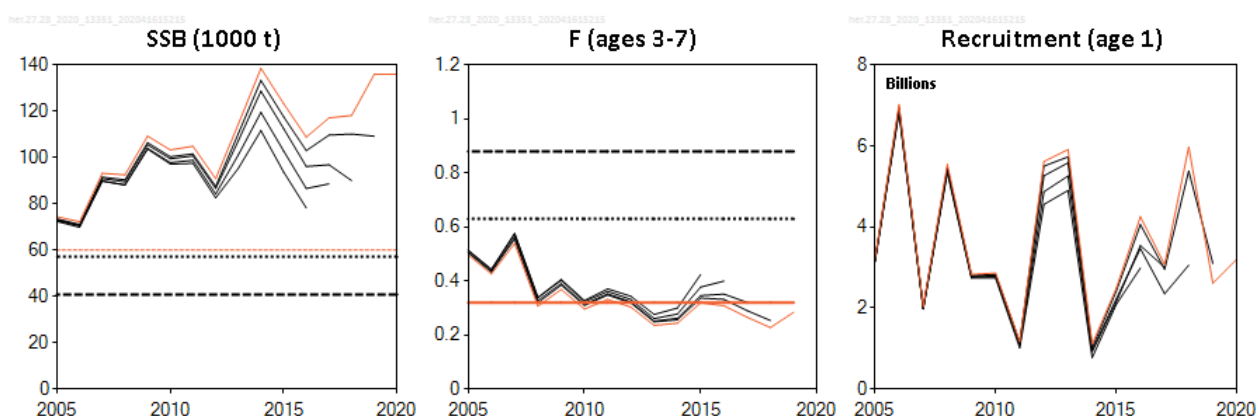
\*\* SSB 2022 relative to SSB 2021.

\*\*\* Total catch in 2021 relative to ICES advice for 2020 (30 382 tonnes for the Gulf of Riga herring stock).

^ ICES advice for F<sub>lower</sub> for 2021 relative to ICES advice F<sub>lower</sub> for 2020 (23 395 tonnes).

^^ ICES advice for F<sub>upper</sub> for 2021 relative to ICES advice F<sub>upper</sub> for 2020 (35 094 tonnes).

**Quality of the assessment**



**Figure 2** Herring in Subdivision 28.1. Historical assessment results (recruitment in the final year is based on a geometric mean assumption).

### Issues relevant for the advice

The assessment and the advice takes account of all of the Gulf of Riga herring stock, both that harvested in and that harvested outside of the Gulf of Riga. The TAC proposed for the Gulf of Riga area is based on the advised catch for the Gulf of Riga herring stock, plus the assumed catch of herring from the central Baltic stock harvested in the Gulf of Riga, minus the assumed catch of the Gulf of Riga herring taken outside the Gulf of Riga. The values of the two latter are given by the average over the last five years.

1. Central Baltic herring assumed to be taken in the Gulf of Riga in 2020 (Subdivision 28.1) is 4189 tonnes (average 2015–2019);
2. Gulf of Riga herring assumed to be taken in Subdivision 28.2 in 2020 is 514 tonnes (average 2015–2019).

As an example, following the ICES MSY approach (here identical to the MAP  $F_{MSY}$ ), catches from the Gulf of Riga herring stock in 2021 should be no more than 35 771 tonnes. The corresponding TAC in the Gulf of Riga management area for 2021 would be calculated as 35 771 tonnes – 514 tonnes + 4189 tonnes = 39 446 tonnes.

### History of the advice, catch, and management

**Table 4** Herring in Subdivision 28.1. ICES advice, TAC for the Gulf of Riga, and catches of Gulf of Riga herring stock from the Gulf of Riga. All weights are in tonnes.

Year	ICES advice	Catch from stock corresp. to advice	Agreed TAC for Gulf of Riga	Catches of Gulf of Riga herring stock
1987	Reduce F towards $F_{0.1}$	8000	-	12884
1988	Reduce F towards $F_{0.1}$	6000	-	16791
1989	F should not exceed present level	20000	-	16783
1990	F should not exceed present level	20000	-	14931
1991	No separate advice for this stock	-	-	14791
1992	No separate advice for this stock	-	-	20000
1993	No separate advice for this stock	-	-	22200
1994	No separate advice for this stock	-	-	24300
1995	No separate advice for this stock	-	-	32656
1996	No separate advice for this stock	-	-	32584
1997	Current exploitation rate within safe biological limits	35000	-	39843
1998	Current exploitation rate within safe biological limits	35000	-	29443
1999	Current exploitation rate within safe biological limits	34000	-	31403
2000	Current exploitation rate within safe biological limits	37000	-	34069
2001	Current exploitation rate within safe biological limits	34100	-	38785
2002	Current exploitation rate within safe biological limits	33200	-	39701
2003	F below $F_{pa}$	< 41000	41000	40803
2004	F = $F_{sq}$	39000	39300	39115
2005	F = $F_{sq}$	35300	38000	32225
2006	F = $F_{pa}$	39900	40000	31232
2007	F = $F_{pa}$	33900	37500	33742
2008	F < $F_{pa}$	< 30100	36100	31137
2009	F < $F_{pa}$	< 31500	34900	32554
2010	F < $F_{pa}$	< 33400	36400	30174
2011	F < $F_{pa}$	< 33000	32700	29639
2012	MSY transition	< 25500	30600	28115
2013	MSY framework	< 23200	30600	26511
2014	MSY	< 25800	30700	26253
2015	MSY ( $F_{MSY} = 0.35$ )	< 34300	38800	32851
2016	MSY approach ( $F_{MSY} = 0.32$ )	≤ 26200	34900	30865

Year	ICES advice	Catch from stock corresp. to advice	Agreed TAC for Gulf of Riga	Catches of Gulf of Riga herring stock
2017	MSY approach ( $F_{MSY} = 0.32$ )	$\leq 23100$	31100	28058
2018	MAP target F ranges: $F_{lower}$ to $F_{upper}$ ( $F = 0.24-0.38$ ), but F higher than $F_{MSY} = 0.32$ only under conditions specified in the MAP	19396–29195, but catch higher than 24919 only under conditions specified in the MAP	28999	25747
2019	MAP target F ranges: $F_{lower}$ to $F_{upper}$ ( $F = 0.24-0.38$ ), but F higher than $F_{MSY} =$ $0.32$ only under conditions specified in the MAP	20664–31237, but catch higher than 26932 only under conditions specified in the MAP	31044	28922
2020	MAP target F ranges: $F_{lower}$ to $F_{upper}$ ( $F = 0.24-0.38$ ), but F higher than $F_{MSY} = 0.32$ only under conditions specified in the MAP	23395–35094, but catch higher than 30382 only under conditions specified in the MAP	34445	
2021	Management Plan	35771 (ranges 27702–41423)		

### Summary of the assessment

**Table 5** Herring in Subdivision 28.1. Assessment summary. Weights are in tonnes; recruitment in thousands.

Year	Recruitment (age 1)	SSB*	Catches	F (ages 3–7)
1977	943222	54522	24186	0.69
1978	1076482	49356	16728	0.38
1979	976944	46739	17142	0.43
1980	1110340	46712	14998	0.35
1981	908420	47221	16769	0.45
1982	1688991	42758	12777	0.42
1983	1253648	50858	15541	0.47
1984	2027187	39914	15843	0.71
1985	1387985	51936	15575	0.54
1986	1120294	64282	16927	0.51
1987	3928311	51521	12884	0.42
1988	560920	96695	16791	0.52
1989	1292204	63287	16783	0.36
1990	3644814	77323	14931	0.24
1991	3689164	87262	14791	0.25
1992	4318119	106119	20000	0.27
1993	3255933	120755	22200	0.23
1994	2786684	124922	24300	0.23
1995	3468223	116652	32656	0.34
1996	4663893	105732	32584	0.36
1997	1594037	103482	39843	0.49
1998	2765927	81998	29443	0.44
1999	2895256	84066	31403	0.42
2000	2643906	83881	34069	0.45
2001	6085227	79309	38785	0.52
2002	2280487	100849	39701	0.46
2003	7102467	86577	40803	0.53
2004	1027151	92782	39115	0.58
2005	3193548	74442	32225	0.50
2006	7022420	72259	31232	0.43
2007	2030081	93228	33742	0.54
2008	5547611	92565	31137	0.31
2009	2830143	109289	32554	0.37
2010	2864924	103305	30174	0.30

Year	Recruitment (age 1)	SSB*	Catches	F (ages 3–7)
2011	1167994	104897	29639	0.33
2012	5619073	90888	28115	0.30
2013	5915620	114422	26511	0.24
2014	1106071	138637	26253	0.24
2015	2489287	123340	32851	0.32
2016	4254796	108855	30865	0.31
2017	3070813	117166	28058	0.27
2018	5974504	118237	25747	0.23
2019	2611633	136095	28921	0.28
2020	3212088**	136024***		

\* At spawning time.

\*\* Geometric mean of year classes 1989–2017.

\*\*\* Predicted.

### Sources and references

EU. 2016. Regulation (EU) 2016/1139 of the European Parliament and of the Council of 6 July 2016 establishing a multiannual plan for the stocks of cod, herring and sprat in the Baltic Sea and the fisheries exploiting those stocks, amending Council Regulation (EC) No 2187/2005 and repealing Council Regulation (EC) No 1098/2007. Official Journal of the European Union, L 191, 15.7.2016. 15 pp. <http://data.europa.eu/eli/reg/2016/1139/oj>.

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