

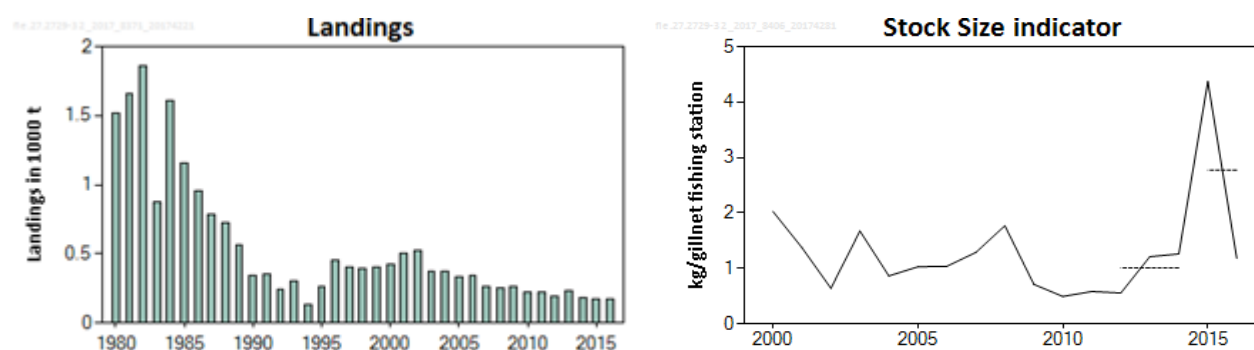
## Flounder (*Platichthys flesus*) in subdivisions 27 and 29–32 (northern central and northern Baltic Sea)

### ICES stock advice

ICES advises that when the precautionary approach is applied, commercial landings in each of the years 2018 and 2019 should be no more than 395 tonnes. ICES cannot quantify the corresponding total catches.

### Stock development over time

The combined biomass index from four surveys conducted in subdivisions 27, 29, and 32 has been highly variable over the full time-series. The index has shown an increase in later years, but a decrease in 2016.

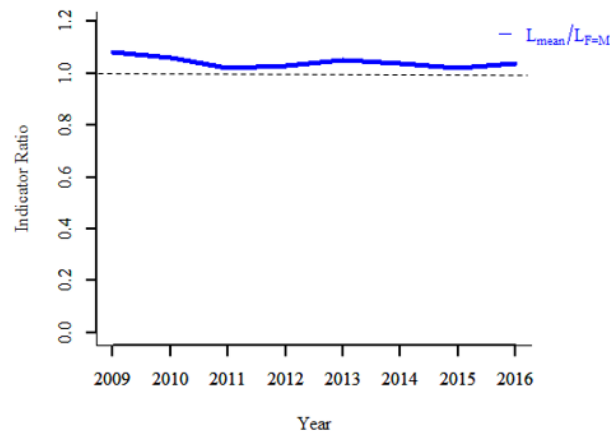


**Figure 1** Flounder in subdivisions (SDs) 27 and 29–32. Left panel: ICES landings (thousand tonnes). Right panel: Combined biomass index ( $\text{kg} \times [\text{gillnet fishing station}]^{-1}$ ) of four surveys (Muuga Bay [SD 32], Küdema Bay [SD 29], Muskö [SD 27], and Kvädöfjärden [SD 27]). The dashed lines denote the average of the biomass index of the respective year range.

### Stock and exploitation status

**Table 1** Flounder in subdivisions 27 and 29–32. State of the stock and fishery relative to reference points. The status evaluation is based on reference point proxies (ICES, 2017).

		Fishing pressure				Stock size			
		2014	2015	2016		2014	2015	2016	
Maximum sustainable yield	$F_{MSY}$ proxy	✓	✓	✓	Below	?	?	?	Undefined
Precautionary approach	$F_{pa}$ , $F_{lim}$	✓	✓	✓	Below possible reference points	?	?	?	Undefined
Management plan	$F_{MGT}$	-	-	-	Not applicable	-	-	-	Not applicable
Qualitative evaluation	-	-	-	-	-	→	↗	↘	Decreasing



**Figure 2** Flounder in subdivisions 27 and 29–32. Index ratio  $L_{mean}/L_{F=M}$  from the length-based indicator (LBI; ICES, 2015) method used for the evaluation of the exploitation status. The exploitation status is below the  $F_{MSY}$  proxy when the index ratio value is higher than 1.

### Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012). The trends in a combined biomass index of four surveys (Muuga Bay (SD 32), Küdema Bay (SD 29), Muskö (SD 27), and Kvädöfjärden (SD 27);  $\text{kg} \times [\text{gillnet fishing station}]^{-1}$ ) was 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 landings.

The index is estimated to have increased by more than 20% and thus the uncertainty cap was applied in estimating the landings advice. Fishing mortality is below proxies of the MSY reference points (as indicated by a length-based analysis). The stock size relative to reference points is unknown. The stock size indicator has increased by more than 50% in the last five years; the precautionary buffer was last applied in 2014 and no additional precautionary buffer was considered necessary this year. Discarding is known to take place, but ICES cannot quantify the corresponding catch.

**Table 2** Flounder in subdivisions 27 and 29–32. The basis for the catch options.\*

Index A (2015, 2016)	2.8 $\text{kg day}^{-1}$	
Index B (2012, 2013, 2014)	1.01 $\text{kg day}^{-1}$	
Index ratio (A/B)	2.7	
Uncertainty cap	Applied	1.2
Advised landings for 2017	329 tonnes	
Discard rate	Unknown	
Precautionary buffer	Not applied	-
Landings advice**	395 tonnes	

\* The figures in the table are rounded. Calculations were done with unrounded inputs and computed values may not match exactly when calculated using the rounded figures in the table.

\*\* [advised landings for 2017]  $\times$  [uncertainty cap].

### Basis of the advice

**Table 3** Flounder in subdivisions 27 and 29–32. The basis of the advice.

Advice basis	Precautionary approach.
Management plan	Bycatch of this species is taken into account in the EU Multiannual Plan for the Baltic Sea (EU, 2016).

## Quality of the assessment

The advice is based on a stock size indicator, calculated as the weighted average of biomass indices from four surveys. Weighting of the four survey indices is required but adds uncertainty to the combined index. In the 2015 Küdema Bay survey (Subdivision 29) the biomass indicator showed a fourfold increase that is probably not representative of the stock development. Substitution of the Küdema Bay 2015 survey value with a value estimated from the average increase in the same area from 2014 and 2015 had no effect last year and would not change the advice provided this year.

The estimated discard ratio in subdivisions 27 and 29–32 varies between countries, fleets, and vessels. Discarding practices are controlled by factors such as market price and cod catches. Given the high variability in the discard ratios, current discard estimates are very uncertain and cannot be used.

## Issues relevant for the advice

This is the only flounder stock where the majority of the catches result from a direct flounder fishery; however, this stock is currently not regulated by a TAC. In the northern Baltic Sea the importance of recreational fishery is substantial. In Sweden and Finland, the flatfish catch from the recreational fishery probably equals or even exceeds that from the commercial catch. In Estonia, the reported recreational catch is on average estimated to be 20–30% of the commercial landings. The quality of these estimates is, however, too low to be included in quantitative advice.

## Reference points

**Table 4** Flounder in subdivisions 27 and 29–32. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger\_proxy}$			
	$F_{MSY\_proxy}$	22 cm	Length-based indicator (LBI; ICES, 2015); expected mean length of catch (above the length at first catch) when $F = M$ .	ICES (2017)
Precautionary approach	$B_{lim}$			
	$B_{pa}$			
	$F_{lim}$			
	$F_{pa}$			
Management plan	$SSB_{mgt}$			
	$F_{mgt}$			

## Basis of the assessment

**Table 5** Flounder in subdivisions 27 and 29–32. Basis of assessment and advice.

ICES stock data category	3 ( <a href="#">ICES, 2016</a> ).
Assessment type	Survey trends (ICES, 2017).
Input data	Commercial landings and survey data from Estonian Marine Institute in the Muuga Bay (SD 32) and Küdema Bay (SD 29), and from Swedish University of Agricultural Sciences in Muskö (SD 27) and Kvädöfjärden (SD 27).
Discards and bycatch	Discarding is known to take place but cannot be quantified.
Indicators	None.
Other information	Recreational catches are known to be substantial but cannot be quantified. This stock was benchmarked in 2014 (WKBALFLAT; ICES, 2014).
Working group	Baltic Fisheries Assessment Working Group ( <a href="#">WGBFAS</a> )

## Information from stakeholders

There is no available information.

## History of the advice, catch, and management

**Table 6** Flounder in subdivisions 27 and 29–32. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice*	Predicted landings corresp. to advice*	Agreed TAC	ICES estimated landings SDs 27 and 29–32
2000	No advice	-	-	422
2001	No advice	-	-	503
2002	No advice	-	-	523
2003	No advice	-	-	374
2004	No advice	-	-	373
2005	No advice	-	-	330**
2006	No advice	-	-	344**
2007	No advice	-	-	263
2008	No advice	-	-	249
2009	No advice	-	-	262
2010	No advice	-	-	227
2011	No advice	-	-	221
2012	Reduce catches	-	-	190
2013	Catches should be reduced by 5%*	< 15100*	-	237
2014	Landings should be reduced by 15%*	< 13500*	-	183
2015	Decrease landings by 2% (20% increased, followed by 20% PA reduction)	< 228	-	176
2016	Precautionary approach (≤ 20% increase)	≤ 274	-	173
2017	Precautionary approach (≤ 20% increase)	≤ 329	-	
2018	Precautionary approach (≤ 20% increase relative to advised landings for 2017)	≤ 395		
2019	Precautionary approach (≤ 20% increase relative to advised landings for 2017)	≤ 395		

\* Advice prior to 2015 was for flounder in subdivisions 22–32.

\*\* Includes also recreational landings for Estonia.

## History of the catch and landings

**Table 7** Flounder in subdivisions 27 and 29–32. Catch distribution by fleet in 2016 as estimated by ICES.

Total catch (2016)	Commercial landings		Recreational landings	Discards
Unknown	85% with passive gears	15% with active gears	Recreational landings are substantial but could not be quantified	Discarding is known to take place but could not be quantified
	173 t			

**Table 8** Flounder in subdivisions 27 and 29–32. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Country	SD 27	SD 29	SD 30	SD 31	SD 32	Total
1980	Finland*		27	14	1	11	53
	Sweden	20	32				52
	USSR		334			1080	1414
	Total	20	393	14	1	1091	1519
1981	Finland*		67	4		7	78
	Sweden	21	34				55
	USSR		445			1078	1523
	Total	21	546	4	0	1085	1656
1982	Finland*		38	6		6	50
	Sweden	65	3				68

Year	Country	SD 27	SD 29	SD 30	SD 31	SD 32	Total
	USSR		615			1121	1736
	Total	65	656	6	0	1127	1854
1983	Finland*		28	7		3	38
	Sweden	212	9				221
	USSR		497			1114	1611
	Total	212	534	7	0	1117	1870
1984	Finland*		27	10		6	43
	Sweden	53	2				55
	USSR		286			1226	1512
	Total	53	315	10	0	1232	1610
1985	Finland*		21	9		7	37
	Sweden	47	2				49
	USSR		265			806	1071
	Total	47	288	9	0	813	1157
1986	Finland*		36	11		5	52
	Sweden	60	3				63
	USSR		281			556	837
	Total	60	320	11	0	561	952
1987	Denmark	1					1
	Finland*		37	18		3	58
	Sweden	51	2				53
	USSR		279			397	676
	Total	52	318	18	0	400	788
1988	Finland*		43	21		5	69
	Sweden	68	3				71
	USSR		257			331	588
	Total	68	303	21	0	336	728
1989	Finland*		39	24		6	69
	Sweden	66	3				69
	USSR		214			214	428
	Total	66	256	24	0	220	566
1990	Finland*		35	19		4	58
	USSR		144			141	285
	Total	0	179	19	0	145	343
1991	Finland*		53	17		5	75
	Sweden	88					88
	Estonia		135			51	186
	Total	88	188	17	0	56	349
1992	Finland*		48	10		5	63
	Sweden	86	3				89
	Estonia		47			46	93
	Total	86	98	10	0	51	245
1993	Finland*		52	26		5	83
	Sweden	83					83
	Estonia		86			55	141
	Total	83	138	26	0	60	307
1994	Denmark	9					9
	Finland*		47	24		8	79
	Sweden	33	10				43
	Estonia		3			4	7
	Total	42	60	24	0	12	138
1995	Denmark		1				1
	Finland*		54	29		6	89

Year	Country	SD 27	SD 29	SD 30	SD 31	SD 32	Total
	Sweden	81					81
	Estonia		52			35	87
	Total	81	107	29	0	41	258
1996	Finland*		47	36		9	92
	Sweden	114					114
	Estonia		99			145	244
	Total	114	146	36	0	154	450
1997	Finland*		35	32		13	80
	Sweden	105					105
	Estonia		96			125	221
	Total	105	131	32	0	138	406
1998	Finland*		36	21		14	71
	Sweden	70					70
	Estonia		79			87	166
	Total	70	115	21	0	101	307
1999	Denmark	0	1				1
	Finland*		43	22	2	9	76
	Sweden	15					15
	Estonia		150			164	314
	Total	15	194	22	2	173	406
2000	Denmark	1					1
	Finland*		34	13	0	9	56
	Sweden	73					73
	Estonia**		166			126	292
	Total	74	200	13	0	135	422
2001	Denmark	10					10
	Finland*		28	14	0	7	50
	Sweden	85			3		88
	Estonia**		135			220	355
	Total	100	164	14	3	227	503
2002	Finland*		16	8		11	35
	Sweden	90		5			95
	Estonia**		166			226	392
	Total	90	182	13	0	247	523
2003	Denmark	1					1
	Finland*	0	16	9	0	7	31
	Sweden	57					57
	Estonia**		156			128	284
	Total	57	172	9	0	135	374
2004	Finland*		13	18	0	4	34
	Sweden	45					45
	Estonia**		127			167	294
	Total	45	140	18	0	171	373
2005	Finland*		11	10	0	3	23
	Sweden	47	2	0			49
	Estonia		144			114	258
	Total	47	157	10	0	117	330
2006	Finland*		11	4.166	0	2	17
	Sweden	33					33
	Estonia		165			129	294
	Total	33	176	4	0	131	344
2007	Finland*		6	1	0	2	9
	Sweden	39	0	0	0		39

Year	Country	SD 27	SD 29	SD 30	SD 31	SD 32	Total
	Estonia**		110			104	214
	Total	39	116	1	0	107	263
2008	Finland		5	1	0	5	11
	Sweden	49	0	0			49
	Estonia**		103			86	189
	Total	49	108	1	0	89	249
2009	Finland		6	1	0	3	10
	Sweden	41	0	0			41
	Estonia**		109			102	210
	Total	41	115	1	0	105	262
2010	Finland	0	6	1	0	3	10
	Sweden	36	0	0			36
	Estonia**		85			96	180
	Total	36	91	1	0	99	227
2011	Finland	0	5	1	0	2	9
	Sweden	34	0	0	1		35
	Estonia**	0	94	0	0	83	177
	Total	34	99	1	1	85	221
2012	Finland		3	0	0	1	5
	Poland***		3				3
	Sweden	36	0		0		36
	Estonia**		79			67	147
	Total	36	85	0	0	69	190
2013	Finland		3	1	0	1	5
	Poland		3				3
	Sweden	31	0				31
	Estonia		123			75	198
	Total	31	129	1	0	77	237
2014	Finland		2	0	0	1	4
	Poland		0				
	Sweden	29	0				29
	Estonia		85			65	150
	Total	29	87	0	0	67	183
2015	Finland		3	0	0	1	4
	Poland		0				0
	Sweden	26	0	0			27
	Estonia		81			64	145
	Total	26	85	0	0	64	176
2016	Finland		2	0	0	1	3
	Poland						0
	Sweden	22	0				22
	Estonia		96			52	148
	Total	22	98	0	0	53	173

\* Finland 1980–2007: Landings from SDs 27 and 28 are included in SD 29, and landings from SD 31 are included in SD 30.

\*\* Data for Estonia in 2000–2004 and 2007–2012 have been corrected with figures from the Estonian Ministry of Environment. Older data include recreational fishery.

\*\*\* Poland 2012 corrected.

Zero values indicate landings under 0.5 tonnes.

## Summary of the assessment

**Table 9** Flounder in subdivisions (SDs) 27 and 29–32. Biomass index for the surveys in Muuga Bay (SD 32), Küdema Bay (SD 29), Muskö (SD 27), Kvädöfjärden (SD 27), and the combined index ( $\text{kg} \times [\text{gillnet fishing station}]^{-1}$ ). The two indices from SD 27 are combined using the arithmetic mean. The SD 32, SD 29, and the combined SD 27 index are all combined using a weighted average, where the weights are proportional to the landings in each of the SDs.

Survey	Muuga–Q4* SD 32	Kudema–Q4* SD 29	Kvädöfjärden–Q4* SD 27	Muskö–Q4* SD 27	Combined for SD 27**	Combined SDs 27 and 29–32***
1989			1.05			
1990			1.52			
1991			0.53			
1992			1.75	5.04	3.40	
1993	0.49		1.72	4.98	3.35	
1994	0.20		1.15	1.23	1.19	
1995	0.43		1.08	0.94	1.01	
1996	0.40		0.56	0.17	0.37	
1997	0.47		0.72	0.62	0.67	
1998	0.73		1.14	0.69	0.91	
1999	0.28		0.87	0.20	0.53	
2000	0.25	3.45	1.45	1.09	1.27	2.03
2001	0.65	2.32	1.40	1.11	1.25	1.38
2002	0.17	1.01	1.43	0.56	0.99	0.64
2003	0.30	2.89	0.52	1.10	0.81	1.67
2004	0.47	1.37	0.50	0.87	0.68	0.86
2005	0.39	1.70	0.20	0.53	0.36	1.03
2006	0.42	1.57	0.31	1.02	0.67	1.04
2007	0.10	2.24	0.58	2.51	1.54	1.29
2008	0.11	2.68	1.29	4.44	2.87	1.77
2009	0.36	0.86	0.20	2.20	1.20	0.71
2010	0.14	0.79	0.45	1.04	0.75	0.49
2011	0.24	0.97	0.16	0.50	0.33	0.58
2012	0.13	1.03	0.14	0.48	0.31	0.56
2013	0.13	2.03	0.32	0.95	0.63	1.21
2014	0.09	2.35	0.43	0.98	0.70	1.26
2015	0.07	8.70	0.53	1.32	0.92	4.37
2016	0.11	1.90	0.43	0.76	0.60	1.18

\* Biomass prior to 2009 is estimated from numbers and length distribution.

\*\* Arithmetic mean.

\*\*\* Weighted mean with the respective SD landings.



## 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 191/1. <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1139&rid=1>.
- ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp.
- ICES. 2014. Report of the Benchmark Workshop on Baltic Flatfish Stocks (WKBALFLAT), 27–31 January 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:39. 320 pp.
- ICES. 2015. Report of the Fifth Workshop on the Development of Quantitative Assessment Methodologies based on Life-history Traits, Exploitation Characteristics and other Relevant Parameters for Data-limited Stocks (WKLIFE V), 5–9 October 2015, Lisbon, Portugal. ICES CM 2015/ACOM:56. 157 pp.
- ICES. 2016. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.
- ICES. 2017. Report of the Baltic Fisheries Assessment Working Group (WGBFAS), 12–19 April 2016, ICES Headquarters, Copenhagen, Denmark. ICES CM 2016/ACOM:11.