

Flounder (*Platichthys flesus*) in Subarea 4 and Division 3.a (North Sea, Skagerrak and Kattegat)

ICES advice on fishing opportunities

ICES has not been requested to provide advice on fishing opportunities for this stock.

Stock development over time

The available survey information indicates no clear trend in stock biomass.

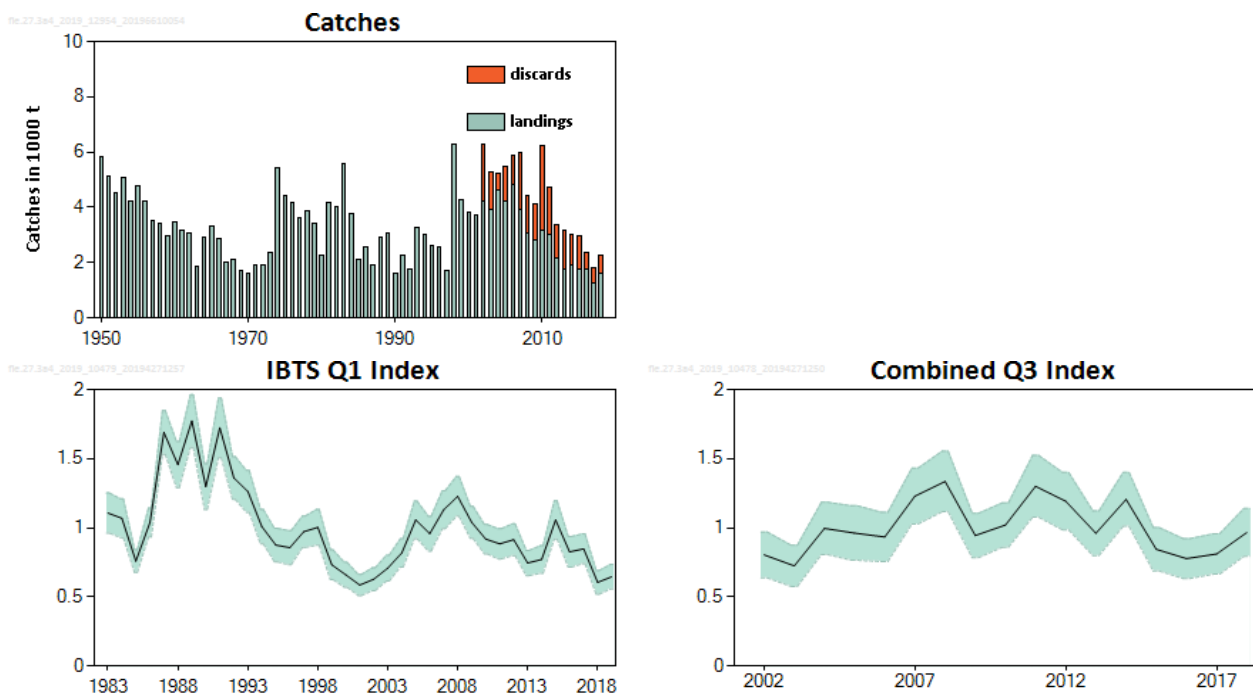


Figure 1 Flounder in Subarea 4 and Division 3.a. Summary of the stock assessment. Upper left: Official landings and estimated discards (in thousand tonnes). Between 1984 and 1997, Dutch landings were not recorded. Discard data are only available from 2002. Lower left: Relative index from IBTS Q1. Lower right: Relative index combining IBT SQ3, BTS, and SNS. The indices are standardized to their mean.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY} ; no reference points for stock size have been defined for this stock.

Table 1 Flounder in Subarea 4 and Division 3.a. State of the stock and fishery relative to reference points. The fishing pressure indicators are based on the length-based analyses shown in Figure 2.

		Fishing pressure			Stock size		
		2016	2017	2018	2017	2018	2019
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$? ? ? Undefined
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	Below possible reference points	B_{pa}, B_{lim}	? ? ? Undefined
Management plan	F_{MGT}	—	—	—		B_{MGT}	— — —
Qualitative evaluation	-	—	—	—		-	→ ↘ → stable

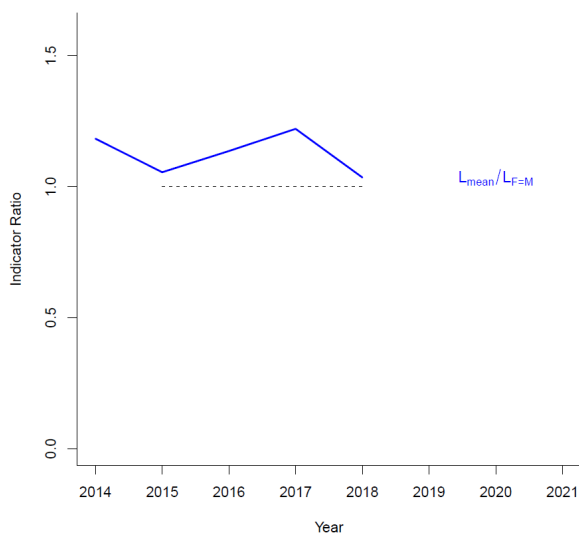


Figure 2 Flounder in Subarea 4 and Division 3.a. The index ratio $L_{\text{mean}}/L_{F=M}$ from the length-based indicator (LBI; ICES, 2017b) method is used for the evaluation of the exploitation status. The exploitation status is below the F_{MSY} proxy when the index ratio value is higher than 1.

Catch scenarios

ICES has not been requested to provide advice on fishing opportunities for this stock.

Basis of the advice

ICES has not been requested to provide advice on fishing opportunities for this stock.

Table 2 Flounder in Subarea 4 and Division 3.a. The basis of the advice.

Advice basis	ICES has not been requested to provide advice on fishing opportunities for this stock
Management plan	The EU multiannual plan (MAP) for stocks in the North Sea (EU, 2018) and adjacent waters applies to by-catches of this stock.
	The MAP stipulates that when the FMSY ranges are not available, fishing opportunities should be based on the best available scientific advice.
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Quality of the assessment

Flounder is mainly a bycatch species in the demersal fisheries for North Sea plaice and sole, with a high discard rate. Landings data prior to 1998 are not complete.

Discard information is available for the years 2002–2018 for the most important fisheries. However, no reliable data on discards are available for beam trawlers targeting brown shrimp. As most of the fishing effort of this fleet takes place in the coastal zone, which is the main distribution area of flounder, the discarding in these fisheries may have a considerable impact on the stock.

Flounder was last benchmarked in 2018. During this benchmark workshop, a SPiCT assessment model was agreed upon to estimate the exploitation status relative to F_{MSY} proxies (ICES, 2018b). However, updating the SPiCT assessment model with 2017 and 2018 data increased the uncertainties to unacceptable levels. The LBI method is used, therefore, as it was for the previous advice (ICES, 2017b).

Issues relevant for the advice

Flounder is mainly a bycatch species in the demersal fisheries in coastal areas of the North Sea. Large effort reductions of about 60% in beam and otter trawl fisheries took place in the period 2003–2015 (STECF, 2016). The discarding rate of the most recent three years was 29% of the total catch. Survival rates of discards are unknown.

In 2017, ICES advised that the risk of having no catch limits for the dab and flounder stocks was considered to be low and not inconsistent with the objectives of the Common Fisheries Policy (CFP) (ICES, 2017a). Dab and flounder are no longer managed under a TAC. ICES stated that this advice was valid as long as dab and flounder remained largely bycatch species, with the main fleets catching dab and flounder continuing to fish the target species (plaice and sole) sustainably within the FMSY ranges provided by ICES. If this situation changes, or flounder is no longer within safe biological limits, this advice would need to be reconsidered.

Reference points

Table 3 Flounder in Subarea 4 and Division 3.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{trigger proxy}}$	Not defined		
	$F_{\text{MSY proxy}}$	$\frac{L_{\text{mean}}}{L_{F=M}} = 1^*$	Relative value from LBI analysis, assuming $M/K = 1.5$. $L_{F=M}$ is based on L_c (Length at 50% of modal abundance) which varies each year.	ICES (2017b)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

* No reference points are defined for this stock in terms of absolute values. The LBI-estimated values of the ratio $L_{\text{mean}}/L_{F=M}$ is used to estimate exploitation status relative to the proxy MSY reference point.

Basis of the assessment

Available data and approaches for the assessment are described below; ICES has not, however, been requested to provide advice on fishing opportunities for this stock in 2019.

Table 4 Flounder in Subarea 4 and Division 3.a. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2018).
Assessment type	Survey trends-based assessment (ICES, 2019).
Input data	Catch statistics, catch length dsitributions, two survey indices (delta GAM IBTS Q1; delta GAM quarter 3 combining IBTSQ3, BTS, SNS).
Discards and bycatch	Discards were quantified for the years 2002–2018. Discards ranged between 12% and 49% of the total catch. In 2018 discard information was provided for 86% of the total landings.
Additional indicators	Length-based indicators.
Other information	None.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Information from stakeholders

There is no additional available information for this stock.

History of the advice, catch, and management

Table 5 Flounder in Subarea 4 and Division 3.a. History advice, TACs, official landings and ICES estimated catch. All weights are in tonnes.

Year	ICES advice	Corresponding to advice		Agreed TAC * in 2.a and 4, dab and flounder	Official landings in 4 and 3.a		ICES wanted catch in 4 and 3.a, flounder	ICES unwanted catch in 4 and 3.a, flounder	ICES total catch in 4 and 3.a, flounder
		Landings	Catches		Dab and flounder	Flounder			
2006		-	-	17100	14923	5009	4837	1026	5863
2007		-	-	17100	14192	4065	3908	2082	5990
2008		-	-	18810	11791	3240	3067	1376	4443
2009		-	-	18810	10148	3088	2804	1342	4146
2010		-	-	18810	11195	3365	3166	3087	6253
2011		-	-	18434	10565	3193	3041	1694	4735
2012	No increase in catch	-	-	18434	9059	2310	2189	1205	3394
2013	No new advice, same as for 2012	-	-	18434	7960	1876	1750	1415	3165
2014	No more than 7% increase in landings	< 3160 **	-	18434	7024	2067	1907	1127	3034
2015	No new advice, same as for 2014	< 3160 **	-	18434	6425	1913	1762	1228	2990
2016	Precautionary approach (increase catches by no more than 20%)		< 5228 ***	18434	6692	1739	1750	628	2378
2017	Precautionary approach (same advised catch value as given for 2016)		< 5228 ***	no TAC		1344	1244	588	1832
2018	Precautionary approach (increase catches by no more than 20%)		< 6274	-		1582 ^	1587	657	2244
2019	Precautionary approach (increase catches by no more than 20%)		< 6274	-					
2020	No catch advice requested								
2021	No catch advice requested								

* EU combined TAC for dab and flounder in EU waters of 2.a and 4.

** Advice based on landings.

*** Advice based on recent three years' average catch.

^ Preliminary.

History of the catch and landings

Table 6 Flounder in Subarea 4 and Division 3.a. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)	Landings			Discards
	Beam trawl 77%	Otter trawl 11%	Others 12%	
2244 tonnes	1587 tonnes			657 tonnes

Table 7 Flounder in Subarea 4 and Division 3.a. History of commercial catch and landings; the official estimates (1950–2018) and ICES estimates (2012–2018) are presented by area for each country participating in the fishery. All weights are in tonnes.

Subarea 4: official landings

Year	Belgium	Denmark	France	Germany	Netherlands	Norway	UK	Other	Total
1950	67	1514	0	641	937	0	67	241	3467
1951	119	1143	0	329	949	0	81	127	2748
1952	91	1210	0	257	841	0	71	186	2656
1953	270	1372	0	397	886	0	92	203	3220
1954	142	1225	0	281	696	0	71	121	2536
1955	145	1244	0	353	871	0	88	109	2810
1956	132	1389	0	277	1097	0	102	2	2999
1957	81	910	0	250	825	0	112	0	2178
1958	99	784	0	257	1088	0	94	0	2322
1959	62	533	0	424	857	0	79	1	1956
1960	82	614	0	540	733	0	49	8	2026
1961	68	776	0	390	579	0	81	13	1907
1962	37	1146	0	313	717	0	53	2	2268
1963	16	501	0	263	467	0	65	0	1312
1964	30	1141	0	305	563	0	48	6	2093
1965	121	1349	0	248	549	0	54	3	2324
1966	32	946	0	229	573	0	71	2	1853
1967	43	540	0	193	331	0	57	25	1189
1968	75	894	0	152	160	0	43	1	1325
1969	54	582	0	158	161	0	33	0	988
1970	50	316	0	135	405	0	57	0	963
1971	60	685	0	173	297	0	70	0	1285
1972	63	991	0	159	275	0	60	0	1548
1973	63	290	0	172	1424	0	53	0	2002
1974	115	766	0	190	2661	0	58	0	3790
1975	68	437	0	155	2191	0	87	1	2939
1976	94	575	0	209	2077	0	70	54	3079
1977	107	320	0	208	1732	0	127	11	2505
1978	122	203	0	198	1519	0	169	0	2211
1979	129	181	31	275	1260	0	201	0	2077
1980	190	300	33	229	806	0	140	0	1698
1981	164	669	14	200	1068	0	133	0	2248
1982	110	630	31	200	1597	0	121	0	2689
1983	88	564	36	197	2059	0	125	0	3069
1984	272	518	15	103	0	0	122	0	1030
1985	163	379	14	128	0	0	109	0	793
1986	155	456	1	91	0	0	111	0	814
1987	132	394	32	106	0	0	90	0	754
1988	160	509	44	105	682	0	98	0	1598
1989	200	632	28	95	916	0	80	0	1951
1990	153	467	69	147	0	0	45	0	881
1991	260	377	51	902	0	0	69	0	1659
1992	152	492	35	521	0	0	76	0	1276
1993	194	1812	47	356	0	0	136	0	2545
1994	196	642	57	921	0	0	247	0	2063
1995	301	628	103	843	0	0	250	0	2125

Year	Belgium	Denmark	France	Germany	Netherlands	Norway	UK	Other	Total
1996	262	1439	68	43	0	0	193	0	2005
1997	110	988	10	25	0	0	157	0	1290
1998	283	154	40	13	4938	0	132	0	5560
1999	326	123	0	11	3158	0	54	0	3672
2000	289	100	46	17	2656	5	52	0	3165
2001	241	92	42	4	2608	3	32	0	3022
2002	165	83	51	2	3531	3	55	0	3890
2003	206	94	33	3	3172	9	120	0	3637
2004	335	96	46	5	3720	18	74	0	4294
2005	241	171	17	5	3363	38	111	0	3946
2006	168	152	19	2	4020	39	216	0	4616
2007	298	166	56	45	2925	11	119	0	3620
2008	306	228	30	39	2231	3	57	0	2894
2009	272	273	38	46	2124	3	59	0	2815
2010	251	126	20	58	2612	6	87	0	3160
2011	262	112	17	25	2566	1	65	0	3048
2012	348	100	11	23	1672	0	38	0	2192
2013	346	93	13	28	1199	0	24	0	1703
2014	376	107	15	30	1314	0	31	0	1873
2015	277	97	19	19	1409	0	0	0	1836
2016	194	87	20	27	1277	0	25	0	1630
2017	97	101	0	28	944	1	14	0	1185
2018 *	104	114	n.a.	23	1130	1	18	0	1390

* Preliminary catch statistics.

Subarea 4: ICES estimates of landings and discards

Year	Landings	Discards
2002	3690	1115
2003	3447	800
2004	4122	612
2005	3728	946
2006	4445	811
2007	3472	1195
2008	2727	1176
2009	2535	958
2010	2965	2680
2011	2899	721
2012	2072	954
2013	1579	1073
2014	1714	420
2015	1685	954
2016	1644	544
2017	1090	335
2018	1395	362

Division 3.a: Official landings

Year	Denmark	Germany	Netherlands	Norway	Sweden	Total
1950	1632	92	0	0	657	2381
1951	1548	88	0	0	759	2395
1952	1161	48	0	0	683	1892
1953	1135	17	0	0	724	1876
1954	1138	13	0	0	528	1679
1955	1265	11	0	0	667	1943
1956	1229	6	0	0	0	1235
1957	1331	12	0	0	0	1343
1958	1099	12	0	0	0	1111
1959	1003	3	0	0	0	1006
1960	875	10	0	0	566	1451

Year	Denmark	Germany	Netherlands	Norway	Sweden	Total
1961	821	9	0	0	442	1272
1962	812	3	0	0	0	815
1963	554	0	0	0	0	554
1964	822	1	0	0	0	823
1965	1016	0	0	0	0	1016
1966	1027	0	0	0	0	1027
1967	811	3	0	0	0	814
1968	808	2	0	0	0	810
1969	721	0	0	0	0	721
1970	667	0	0	0	0	667
1971	611	1	0	0	0	612
1972	365	0	0	0	0	365
1973	346	0	0	0	0	346
1974	1656	2	0	0	0	1658
1975	1377	1	0	0	89	1467
1976	949	2	4	0	144	1099
1977	1036	0	19	0	64	1119
1978	1560	10	14	0	64	1648
1979	1219	0	0	0	100	1319
1980	426	0	0	0	135	561
1981	1831	0	0	0	74	1905
1982	1236	0	0	0	75	1311
1983	2352	0	0	0	160	2512
1984	2463	0	0	0	283	2746
1985	1203	0	0	0	102	1305
1986	1585	0	0	0	166	1751
1987	1050	0	0	0	119	1169
1988	1164	0	0	0	149	1313
1989	996	0	0	0	133	1129
1990	650	1	0	0	57	708
1991	574	0	0	0	50	624
1992	455	0	0	0	52	507
1993	673	3	0	0	67	743
1994	865	1	0	0	77	943
1995	403	19	0	0	76	498
1996	429	9	0	0	104	542
1997	367	2	0	0	68	437
1998	637	5	0	0	83	725
1999	558	6	0	0	24	588
2000	609	17	0	0	30	656
2001	672	2	0	1	30	705
2002	493	0	0	1	30	524
2003	452	3	0	0	18	473
2004	462	2	0	0	14	478
2005	467	0	0	0	15	482
2006	380	0	0	0	13	393
2007	419	3	1	0	22	445
2008	326	4	0	0	16	346
2009	238	2	0	0	33	273
2010	188	0	0	0	17	205
2011	129	0	0	0	16	145
2012	110	0	0	0	8	118
2013	162	0	0	0	11	173
2014	190	0	0	1	4	194
2015	74	0	0	0	3	77

Year	Denmark	Germany	Netherlands	Norway	Sweden	Total
2016	106	0	0	0	3	109
2017	153	0	0	1	5	159
2018 *	189	0	0	0	3	192

* Preliminary catch statistics.

Division 3.a: ICES estimates of landings and discards

Year	Landings	Discards
2002	526	969
2003	475	569
2004	480	26
2005	485	319
2006	391	216
2007	436	887
2008	341	200
2009	269	385
2010	201	408
2011	142	973
2012	117	251
2013	171	342
2014	193	707
2015	77	274
2016	106	84
2017	154	253
2018	193	295

Summary of the assessment

Table 8 Flounder in Subarea 4 and Division 3.a. Assessment summary. Weights are in tonnes.

Year	IBTS Q1			Combined Q3 Index			Landings	Discards
	Index	High	Low	Index	High	Low		
1950							5848	
1951							5143	
1952							4548	
1953							5096	
1954							4215	
1955							4753	
1956							4234	
1957							3521	
1958							3433	
1959							2962	
1960							3477	
1961							3179	
1962							3083	
1963							1866	
1964							2916	
1965							3340	
1966							2880	
1967							2003	
1968							2135	
1969							1709	
1970							1630	
1971							1897	
1972							1913	
1973							2348	
1974							5448	
1975							4406	
1976							4178	
1977							3624	

Year	IBTS Q1			Combined Q3 Index			Landings	Discards
	Index	High	Low	Index	High	Low		
1978							3859	
1979							3396	
1980							2259	
1981							4153	
1982							4000	
1983	1.11	1.25	0.96				5581	
1984	1.07	1.21	0.93				3776	
1985	0.76	0.84	0.68				2098	
1986	1.04	1.14	0.93				2565	
1987	1.69	1.85	1.53				1923	
1988	1.46	1.62	1.29				2911	
1989	1.77	1.96	1.58				3080	
1990	1.3	1.46	1.13				1589	
1991	1.72	1.94	1.51				2283	
1992	1.36	1.51	1.21				1783	
1993	1.26	1.41	1.11				3288	
1994	1.01	1.13	0.88				3006	
1995	0.87	1	0.75				2623	
1996	0.86	0.98	0.73				2547	
1997	0.97	1.08	0.86				1727	
1998	1	1.13	0.87				6285	
1999	0.73	0.84	0.62				4260	
2000	0.66	0.75	0.57				3821	
2001	0.59	0.66	0.51				3727	
2002	0.63	0.71	0.54	0.8	0.97	0.64	4217	2084
2003	0.71	0.8	0.61	0.72	0.87	0.58	3922	1370
2004	0.82	0.92	0.72	1	1.18	0.81	4601	637
2005	1.06	1.19	0.92	0.96	1.16	0.76	4214	1265
2006	0.96	1.08	0.83	0.93	1.11	0.76	4837	1026
2007	1.13	1.27	0.99	1.23	1.43	1.03	3908	2082
2008	1.23	1.37	1.08	1.33	1.55	1.12	3067	1376
2009	1.04	1.16	0.92	0.94	1.1	0.78	2804	1342
2010	0.92	1.02	0.81	1.02	1.18	0.86	3166	3087
2011	0.88	0.99	0.77	1.3	1.52	1.08	3041	1694
2012	0.91	1.03	0.8	1.19	1.4	0.98	2189	1205
2013	0.75	0.84	0.65	0.96	1.12	0.8	1750	1415
2014	0.77	0.87	0.67	1.2	1.4	1.01	1907	1127
2015	1.06	1.19	0.92	0.84	1	0.69	1762	1228
2016	0.83	0.94	0.71	0.78	0.92	0.63	1750	628
2017	0.85	0.96	0.74	0.81	0.96	0.66	1244	588
2018	0.6	0.69	0.52	0.97	1.14	0.79	1587	657
2019	0.65	0.73	0.56					

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