

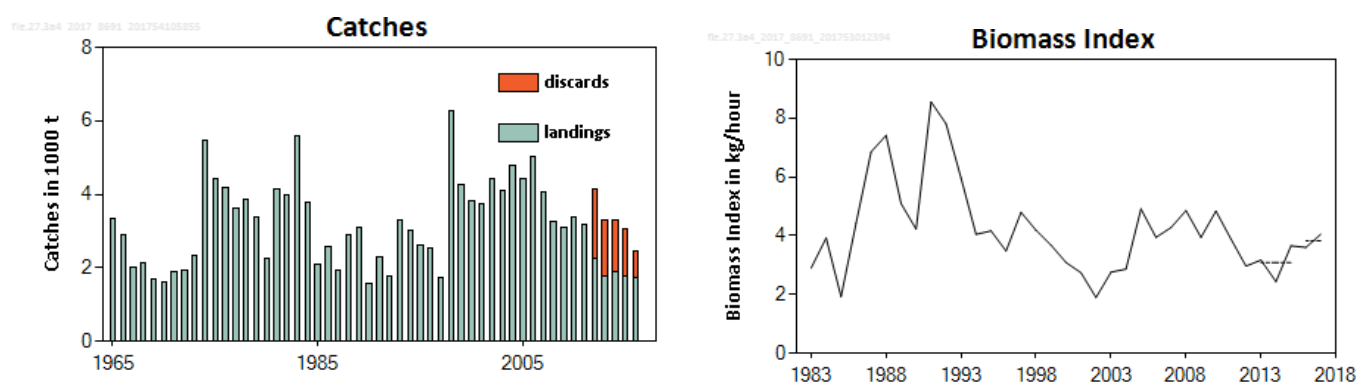
## Flounder (*Platichthys flesus*) in Subarea 4 and Division 3.a (North Sea, Skagerrak and Kattegat)

### ICES stock advice

ICES advises that when the precautionary approach is applied, catches should be no more than 6274 tonnes in each of the years 2018 and 2019. If discard rates do not change from the average of the last three years (2014–2016), this implies landings of no more than 3890 tonnes.

### Stock development over time

Landings have been decreasing since 2006 and are stable in the most recent years. The available survey information indicates no clear trend in stock biomass.

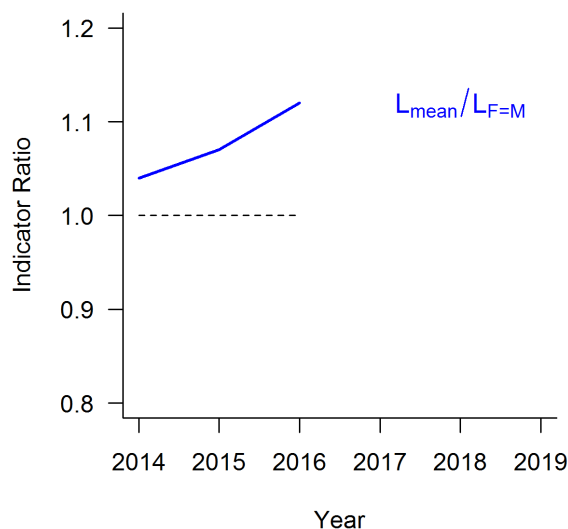


**Figure 1** Flounder in Subarea 4 and Division 3.a. Summary of the stock assessment. Left: Official landings and estimated discards (in thousand tonnes). Between 1984 and 1997 Dutch landings were not recorded. Discard data are only included from 2012. Right: Mature biomass indices ( $\text{kg h}^{-1}$ ) for Division 3.a and Subarea 4 (from IBTS Q1, excluding roundfish areas 1 and 2). Dashed lines indicate the average biomass index of the respective year range.

### Stock and exploitation status

**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 Table 2.

		Fishing pressure			Stock size				
		2015	2016	2017	2015	2016	2017		
Maximum sustainable yield	$F_{MSY}$ proxy	✓	✓	✓ Below	$MSY$	?	?	?	Undefined
Precautionary approach	$F_{pa}, F_{lim}$	✓	✓	✓ Below possible reference points	$B_{pa}, B_{lim}$	?	?	?	Undefined
Management plan	$F_{MGT}$	—	—	— Not applicable	$B_{MGT}$	—	—	—	Not applicable
Qualitative evaluation	-	—	—	— -	-	↗	→	↗	Increasing



**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  $F_{\text{MSY}}$  proxy when the index ratio value is higher than 1.

### Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012). A mature biomass index based on the IBTS Q1 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 catch. The index is estimated to have increased by more than 20% and thus the uncertainty cap was applied.

Flounder is mainly a bycatch species in the coastal fisheries of the North Sea. Large effort reductions of about 60% in the beam and otter trawl fisheries, which take a large proportion of the catch, took place in the period 2003–2015 (STECF, 2016). Length-based indicators based on samples from commercial catches (2014–2016) suggest that in relation to conservation, optimum yield, and MSY criteria (Table 2) there are no apparent issues with the exploitation of this stock. Therefore, no additional precautionary buffer was applied.

**Table 2** Flounder in Subarea 4 and Division 3.a. The basis for the catch options.\*

Index A (2016–2017)		3.83 kg h <sup>-1</sup>
Index B (2013–2015)		3.09 kg h <sup>-1</sup>
Index ratio (A/B)		1.24
Uncertainty cap	Applied	1.2
Advised catch for 2016–2017		5228 tonnes
Discard rate (2014–2016)		0.38
Precautionary buffer	Not applied	-
Catch advice**		6274 tonnes
Landings corresponding to the catch advice***		3890 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 catch for 2016–2017] × [uncertainty cap].

\*\*\* [Advised catch for 2016–2017] × [uncertainty cap] × [1 –discard rate].

## Basis of the advice

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

Advice basis	Precautionary approach.
Management plan	ICES is not aware of any agreed precautionary management plan for flounder in this area.

## 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 and are not indicative of catches.

Discard estimation was possible for the years 2012–2016. Discard information was available for the most important fisheries, but discard values had to be raised in some cases. This procedure may introduce uncertainty in the estimation of total catch. Furthermore, no reliable data on discards are available for beam trawlers with small mesh sizes. As most of the fishing effort 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.

## 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 38% of the total catch. Survival rates of discards are unknown.

ICES was requested to assess the risk to the stock of dab and flounder of having no catch limits for the stock (ICES, 2017a). ICES advised that the risk of having no catch limits for the stocks of dab and flounder is currently considered to be low and not inconsistent with the objectives of the Common Fisheries Policy (ICES, 2017a). Consequently, the combined TAC for dab and flounder for Subarea 4 and Division 2.a was removed by the European Commission Council Regulation (EU) 2017/595 in March (EU, 2017).

The advised catch is much higher than the recent catch. Available information on exploitation does not indicate that the stock is over exploited.

## Reference points

**Table 4** 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 $B_{trigger\_proxy}$	Not defined		
	$F_{MSY\_proxy}$	26.8 cm (2015–2016)	Expected mean length of catch above $L_c$ when $F = M$ , assuming $M/K = 1.5$ .	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		

## Basis of the assessment

**Table 5** Flounder in Subarea 4 and Division 3.a. Basis of the assessment and advice.

ICES stock data category	3 ( <a href="#">ICES, 2016</a> ).
Assessment type	Survey trends-based assessment (ICES, 2017b).
Input data	Catch statistics, one survey index (IBTS Q1, excluding roundfish areas 1 and 2).
Discards and bycatch	Discards were quantified for the years 2012–2016. Discards ranged between 28% and 46% of the total
Additional indicators	Length-based indicators.
Other information	None.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak ( <a href="#">WGNSSK</a> )

## Information from stakeholders

There is no additional available information for this stock.

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

**Table 6** Flounder in Subarea 4 and Division 3.a. 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	ICES advice	Predictions corresp. to advice		Agreed TAC * in 2.a and 4, dab & 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 & flounder	flounder			
2006		-	-	17100	14923	5007			
2007		-	-	17100	14192	4067			
2008		-	-	18810	11791	3241			
2009		-	-	18810	10148	3089			
2010		-	-	18810	11195	3364			
2011		-	-	18434	10565	3191			
2012	No increase in catch	-	-	18434	9059	2305	2242	1899	4143
2013	No new advice, same as for 2012	-	-	18434	7960	1876	1764	1514	3277
2014	No more than 7% increase in landings	< 3160 **	-	18434	7025	2062	1905	1407	3312
2015	No new advice, same as for 2014	< 3160 **	-	18434	6204	1881	1762	1283	3045
2016	Precautionary approach (increase catches by no more than 20%)		< 5228 ***	18434	6691 ^	1738 ^	1750	686	2436
2017	Precautionary approach (same advised catch value as given for 2016)		< 5228 ***	no TAC					
2018	Precautionary approach (increase catches by no more than 20%)		< 6274	-					
2019	Precautionary approach (increase catches by no more than 20%)		< 6274	-					

\* 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 7** Flounder in Subarea 4 and Division 3.a. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings			Discards
	Beam trawl 86%	Otter trawl 6%	Others 8 %	
2436 tonnes	1750 tonnes			686 tonnes

**Table 8** Flounder in Subarea 4 and Division 3.a. History of commercial catch and landings; the official estimates (1950–2016) and ICES estimates (2012–2016) 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
1996	262	1439	68	43	0	0	193	0	2005

Year	Belgium	Denmark	France	Germany	Netherlands	Norway	UK	Other	Total
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	1	31	0	1874
2015*	301	97	18	19	1356	15	0	0	1806
2016*	194	87	20	27	1277	0	25	0	1630

\* Preliminary catch statistics.

**Subarea 4: ICES estimates of landings and discards**

Year	Landings	Discards
2012	2118	1643
2013	1592	1164
2014	1708	866
2015	1685	963
2016	1644	572

**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
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

Year	Denmark	Germany	Netherlands	Norway	Sweden	Total
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
2016*	105	0	0	0	3	108

\* Preliminary catch statistics.

**Division 3.a: ICES estimates of landings and discards**

Year	Landings	Discards
2012	118	257
2013	171	349
2014	196	717
2015	76	295
2016	106	114



**Summary of the assessment**

**Table 9** Flounder in Subarea 4 and Division 3.a. Assessment summary. Weights are in tonnes.

Year	Biomass Index	Landings	Discards
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	
1978		3859	
1979		3396	
1980		2259	
1981		4153	
1982		4000	
1983	2.9	5581	
1984	3.9	3776	
1985	1.93	2098	
1986	4.4	2565	
1987	6.9	1923	
1988	7.4	2911	
1989	5.1	3080	
1990	4.2	1589	
1991	8.6	2283	
1992	7.8	1783	
1993	6.0	3288	
1994	4.1	3006	
1995	4.7	2623	
1996	3.5	2547	
1997	4.8	1727	
1998	4.2	6285	
1999	3.7	4260	
2000	3.1	3821	
2001	2.7	3727	
2002	1.90	4414	
2003	2.8	4110	
2004	2.9	4772	
2005	4.9	4428	
2006	4.0	5007	
2007	4.3	4067	
2008	4.9	3241	
2009	4.0	3089	
2010	4.8	3364	
2011	3.9	3191	
2012	3.0	2242	1899
2013	3.2	1764	1514
2014	2.4	1905	1407
2015	3.7	1762	1283
2016	3.6	1750	686
2017	4.0		

## Sources and references

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