

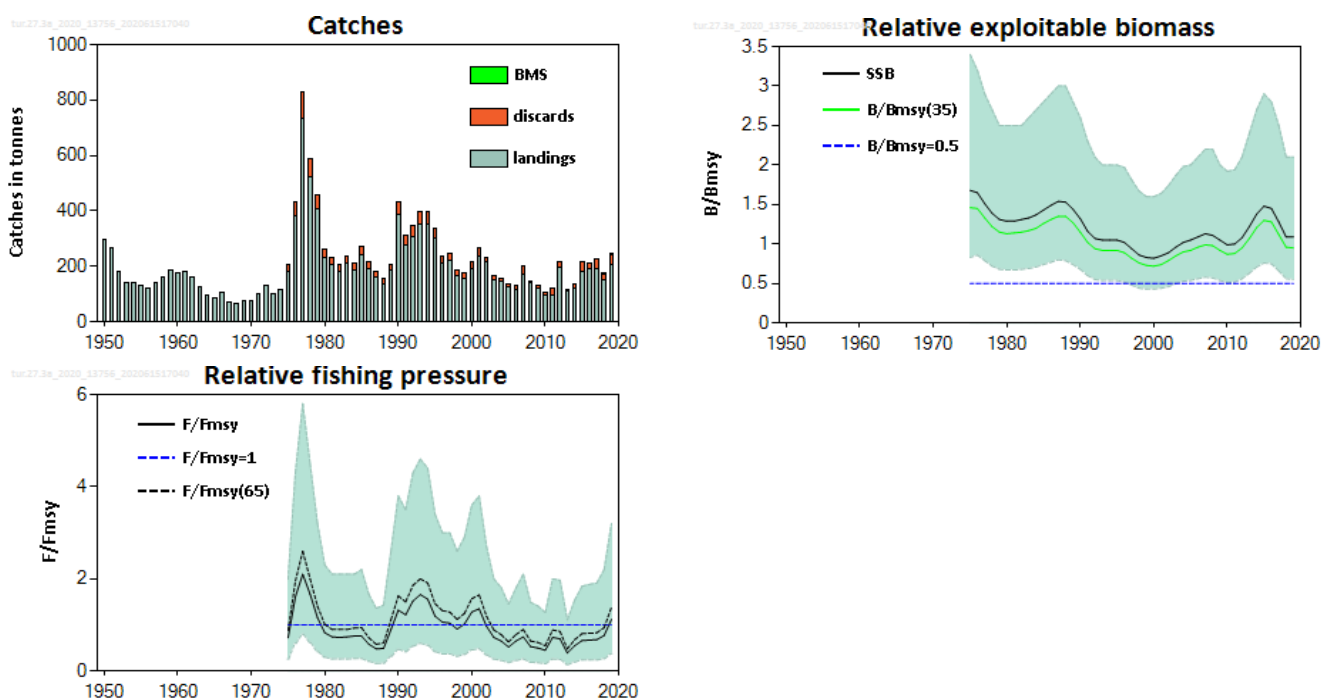
## Turbot (*Scophthalmus maximus*) in Division 3.a (Skagerrak and Kattegat)

### ICES advice on fishing opportunities

ICES has not been requested to provide advice on fishing opportunities for this stock for 2021.

### Stock development over time

Catches peaked in the late 1970s and early 1990s and have been more stable in recent years. Exploitable biomass ( $B/B_{MSY}$ ) declined towards 2000, with no trend in later years. Fishing pressure ( $F/F_{MSY}$ ) peaked in the late 1970s and early 1990s, with no trend in more recent years. The exploitable biomass ( $B/B_{MSY}$ ; 35th percentile) has remained above the  $B/B_{MSY}$  reference point. The fishing pressure ( $F/F_{MSY}$ ; 65th percentile) has been below the reference point in recent years, except in 2019.



**Figure 1** Turbot in Division 3.a. Summary of the stock assessment that includes the period 1975–2019. Relative exploitable biomass ( $B/B_{MSY}$ ) and relative fishing pressure ( $F/F_{MSY}$ ) are estimated at the end of each year. Landings below minimum conservation reference size (BMS) are those officially reported.

### Stock and exploitation status

**Table 1** Turbot in Division 3.a. State of the stock and the fishery. State of the stock and fishery relative to proxy reference points. The fishing pressure and stock size status indicators are based on the SPICT analyses. At the end of 2019, fishing pressure exceeded the proxy reference point.

Fishing pressure						Stock size				
		2017	2018	2019			2017	2018	2019	
Maximum sustainable yield	$F_{MSY}$	✓	✓	✗	Above proxy	$MSY B_{trigger}$	✓	✓	✓	Above proxy
Precautionary approach	$F_{pa}, F_{lim}$	?	?	?	Undefined	$B_{pa}, B_{lim}$	✓	✓	✓	Above possible reference points
Management plan	$F_{MGT}$	—	—	—	Not applicable	$B_{MGT}$	—	—	—	Not applicable
Qualitative evaluation	-	—	—	—	-	-	—	—	—	-

## 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** Turbot in 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 bycatches of this stock. The MAP stipulates that when the $F_{MSY}$ ranges are not available, fishing opportunities should be based on the best available scientific advice.

## Quality of the assessment

The stock was benchmarked in 2020 (ICES, 2020a). The benchmark developed a biomass index by compiling information from survey indices covering Division 3.a. A surplus production model in continuous time (SPiCT) was validated during the benchmark and used for the assessment. Although the assessment results show wide confidence limits, they were considered sufficient to provide information on stock status.

Stock identity and boundaries remain unclear. The benchmark provided some evidence of connectivity with the North Sea and Baltic Sea stocks, and of a hybrid zone in Division 3.a.

## Issues relevant for the advice

Discarding is related to the size of the fish. There is no minimum landing size (MLS) at the EU level; however, the minimum landing size is 30 cm in Denmark and most recorded discards are below this value.

To account for uncertainty, the 35th percentile of  $B/B_{MSY}$  and the 65th percentile of  $F/F_{MSY}$ , rather than the median values, are evaluated relative to the proxy reference points (WKLIFE IX; ICES, 2019a).

## Reference points

**Table 3** Turbot in Division 3.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$ proxy	$\frac{B}{B_{MSY}} = 0.5$ *	Relative value from the SPiCT model. $B_{MSY}$ is estimated directly from the SPiCT assessment model and changes when the assessment is updated.	ICES (2020b)
	$F_{MSY}$ proxy	$\frac{F}{F_{MSY}} = 1$ *	Relative value from the SPiCT model. $F_{MSY}$ is estimated directly from the SPiCT assessment model and changes when the assessment is updated.	ICES (2020b)
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 SPiCT-estimated values of the ratios  $F/F_{MSY}$  and  $B/B_{MSY}$  are used to estimate stock status relative to the proxy MSY reference points.

## Basis of the assessment

**Table 4** Turbot in Division 3.a. Basis of the assessment and advice.

ICES stock data category	3 ( <a href="#">ICES, 2019b</a> ).
Assessment type	SPiCT assessment (ICES, 2020a).
Input data	Commercial catches (international landings) and a combination of surveys, including the beam trawl survey (BTS), the North Sea International Bottom Trawl Survey (NS-IBTS), the Baltic International Trawl Survey (BITS), and two Danish national surveys (TN and TOR) covering Division 3.a. (ICES, 2020a).
Discards and bycatch	Reported discard rates are used for 2002–2019. The average discard rate (10.9%) for 2002–2018 is used for earlier years.
Indicators	None.
Other information	Latest benchmark was in 2020 (ICES, 2020a).
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 5** Turbot in Division 3.a. ICES advice and official landings. All weights are in tonnes. There is no TAC for turbot in this area.

Year	ICES advice	Catch corresponding to advice	Official landings turbot Division 3.a	ICES landings	ICES discards	ICES catches
2011	No advice	-	99	94	26	120
2012	No increase in catches	-	189	195	24	218
2013	No new advice, same as for 2012	-	111	111	7	118
2014	Reduce recent average catch by 20% (2010–2012)	≤ 102	122	122	15	137
2015	No new advice, same as for 2014	≤ 102	174	180	57	237
2016	Precautionary approach (decrease catches by no more than 20%)	≤ 88	179	191	19	210
2017	Precautionary approach (same advised catch value as given for 2016)	≤ 88	189	192	32	223
2018	Precautionary approach	≤ 84	150	153	23	177
2019	Precautionary approach	≤ 84	198	204	42	247
2020	No catch advice requested					
2021	No catch advice requested					

## History of the catch and landings

**Table 6** Turbot in Division 3.a. Catch distribution by fleet in 2019 as estimated by ICES.

Catch (2019)	Landings			Discards
246 tonnes	Otter trawl and seines 52%	Beam trawl 36%	Others 12%	42 tonnes
	204 tonnes			

**Table 7** Turbot in Division 3.a. History of commercial landings; official values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Belgium	Germany	Denmark	UK	Netherlands	Norway	Sweden	Total
1950	0	13	212	0	0	1	73	299
1951	0	6	191	0	0	6	62	265
1952	0	6	114	0	0	3	58	181
1953	0	4	80	0	0	4	51	139
1954	0	0	78	0	0	1	61	140
1955	0	4	77	0	0	0	49	130
1956	0	7	75	0	0	0	41	123
1957	0	3	108	0	0	0	30	141
1958	0	7	112	0	0	0	41	160
1959	0	6	132	0	0	3	43	184
1960	0	11	115	0	0	2	46	174
1961	0	4	130	0	0	0	45	179
1962	0	5	157	0	0	0	0	162
1963	0	4	124	0	0	0	0	128
1964	0	5	89	0	0	0	0	94
1965	0	6	79	1	0	0	0	86
1966	0	2	104	0	0	0	0	106
1967	0	4	68	1	0	0	0	73
1968	0	0	64	0	0	0	0	64
1969	0	1	75	0	0	0	0	76
1970	0	1	76	0	0	0	0	77
1971	0	1	100	0	0	0	0	101
1972	0	2	130	0	0	0	0	132
1973	0	2	98	0	0	0	0	100
1974	0	1	116	0	0	0	0	117
1975	0	2	167	0	7	0	7	183
1976	7	2	178	0	190	0	6	383
1977	7	4	331	0	389	0	5	736
1978	2	4	327	0	186	0	6	525
1979	8	0	307	0	87	0	4	406
1980	7	0	205	1	14	0	6	233
1981	2	0	183	2	12	0	8	207
1982	1	0	164	1	9	0	7	182
1983	4	0	171	0	24	0	10	209
1984	0	0	176	0	0	0	12	188
1985	1	0	224	0	0	0	16	241
1986	2	0	180	0	0	0	11	193
1987	5	0	147	0	0	0	9	161
1988	2	0	115	0	11	0	10	138
1989	2	0	173	0	0	0	9	184
1990	5	0	363	0	0	0	18	386
1991	4	0	244	0	0	7	21	276
1992	4	0	278	0	0	8	19	309
1993	3	2	336	0	0	10	0	351
1994	2	1	313	0	0	15	22	353
1995	4	1	268	0	0	17	11	301
1996	0	1	185	0	0	13	11	210
1997	0	0	200	0	0	9	11	220
1998	0	1	148	0	0	7	8	164
1999	0	1	139	0	0	10	6	156
2000	0	1	180	0	0	6	6	193
2001	0	0	227	0	0	8	3	238
2002	0	1	205	0	0	11	5	222
2003	0	0	128	0	13	14	4	159
2004	0	0	119	0	14	7	7	147
2005	0	0	108	0	7	6	6	127

Year	Belgium	Germany	Denmark	UK	Netherlands	Norway	Sweden	Total
2006	0	1	95	0	8	8	9	121
2007	0	1	138	0	15	7	12	173
2008	0	1	121	0	4	6	11	143
2009	0	1	94	0	2	6	17	120
2010	0	0	72	0	6	4	13	95
2011	0	1	78	0	0	7	13	99
2012	0	0	167	0	0	8	14	189
2013	0	0	91	0	0	5	15	111
2014	0	1	94	0	3	6	18	122
2015	0	0	135	0	20	8	11	174
2016	0	0	137	0	25	6	11	179
2017	0	0	154	0	16	7	12	189
2018	0	0	109	0	23	8	10	150
2019	0	0	118	0	68	5	7	198

### Summary of the assessment

**Table 8** Turbot in Division 3.a. Assessment summary. Weights are in tonnes. The relative exploitable biomass, fishing pressure, and their corresponding 95% confidence bounds and percentiles are end-of-the-year estimates.

Year	Relative exploitable biomass			Landings	Discards	BMS	Relative fishing pressure			F/F <sub>MSY</sub> (65 <sup>th</sup> percentile)	B/B <sub>MSY</sub> (35 <sup>th</sup> percentile)
	B/B <sub>MSY</sub>	High	Low				F/F <sub>MSY</sub>	High	Low		
1950				299							
1951				265							
1952				181							
1953				139							
1954				140							
1955				130							
1956				123							
1957				141							
1958				160							
1959				184							
1960				174							
1961				179							
1962				162							
1963				128							
1964				94							
1965				86							
1966				106							
1967				73							
1968				64							
1969				76							
1970				77							
1971				101							
1972				132							
1973				100							
1974				117							
1975	1.68	3.4	0.83	183	23		0.72	1.99	0.26	0.88	1.46
1976	1.65	3.2	0.86	383	48		1.61	4.3	0.60	1.95	1.45
1977	1.51	2.9	0.79	736	92		2.1	5.8	0.80	2.6	1.33
1978	1.39	2.7	0.72	525	65		1.67	4.5	0.62	2	1.22
1979	1.31	2.5	0.68	406	51		1.16	3.2	0.42	1.41	1.15
1980	1.29	2.5	0.67	233	29		0.83	2.3	0.30	1.01	1.13
1981	1.29	2.5	0.67	207	26		0.74	2.1	0.26	0.9	1.14
1982	1.31	2.5	0.68	182	23		0.73	2.1	0.26	0.9	1.15
1983	1.33	2.6	0.69	209	26		0.74	2.1	0.26	0.9	1.17
1984	1.37	2.7	0.71	188	23		0.76	2.1	0.27	0.93	1.2
1985	1.43	2.8	0.74	241	30		0.76	2.2	0.27	0.94	1.26
1986	1.49	2.9	0.77	193	24		0.58	1.66	0.21	0.72	1.31
1987	1.54	3.0	0.8	161	20		0.48	1.36	0.167	0.58	1.35
1988	1.53	3.0	0.79	138	17		0.49	1.43	0.170	0.61	1.35
1989	1.44	2.8	0.74	184	23		0.90	2.6	0.32	1.11	1.27

Year	Relative exploitable biomass			Landings	Discards	BMS	Relative fishing pressure			F/F <sub>MSY(65)</sub> (65 <sup>th</sup> percentile)	B/B <sub>MSY(35)</sub> (35 <sup>th</sup> percentile)
	B/B <sub>MSY</sub>	High	Low				F/F <sub>MSY</sub>	High	Low		
				tonnes							
1990	1.32	2.6	0.68	386	48		1.32	3.8	0.47	1.63	1.15
1991	1.16	2.3	0.6	276	34		1.22	3.5	0.42	1.5	1.02
1992	1.07	2.1	0.55	309	38		1.52	4.3	0.54	1.86	0.94
1993	1.05	2.0	0.54	351	44		1.66	4.6	0.60	2	0.92
1994	1.05	2.0	0.54	353	44		1.56	4.4	0.56	1.91	0.92
1995	1.05	2.0	0.54	301	37		1.19	3.4	0.42	1.46	0.92
1996	1.02	1.97	0.52	210	26		1.06	3.0	0.37	1.31	0.89
1997	0.94	1.81	0.48	220	27		1.04	3.0	0.37	1.28	0.82
1998	0.86	1.67	0.44	164	20		0.91	2.6	0.32	1.12	0.76
1999	0.83	1.6	0.43	156	19		1.02	2.9	0.36	1.25	0.73
2000	0.82	1.6	0.43	193	24		1.28	3.6	0.46	1.57	0.72
2001	0.85	1.64	0.44	238	30		1.35	3.8	0.48	1.65	0.74
2002	0.89	1.74	0.46	215	18		0.97	2.7	0.35	1.19	0.79
2003	0.96	1.87	0.5	153	15		0.73	2.0	0.26	0.89	0.85
2004	1.02	1.98	0.53	147	9		0.65	1.81	0.23	0.79	0.9
2005	1.05	2.0	0.54	126	11		0.52	1.45	0.184	0.63	0.92
2006	1.09	2.1	0.56	117	12		0.65	1.80	0.23	0.79	0.96
2007	1.13	2.2	0.58	171	32		0.74	2.1	0.26	0.9	0.99
2008	1.11	2.2	0.57	140	7		0.53	1.49	0.190	0.65	0.98
2009	1.05	2.0	0.54	121	9		0.50	1.41	0.180	0.62	0.92
2010	0.99	1.92	0.51	97	11		0.45	1.27	0.161	0.55	0.87
2011	1.00	1.94	0.52	94	26		0.73	2.0	0.26	0.89	0.88
2012	1.08	2.1	0.56	195	23		0.70	1.97	0.25	0.86	0.95
2013	1.22	2.4	0.63	111	7		0.39	1.11	0.140	0.48	1.07
2014	1.38	2.7	0.71	122	15		0.55	1.54	0.199	0.68	1.21
2015	1.48	2.9	0.76	180	34		0.66	1.84	0.24	0.81	1.3
2016	1.45	2.8	0.75	191	19		0.67	1.88	0.24	0.82	1.28
2017	1.28	2.5	0.66	192	32		0.68	1.91	0.24	0.83	1.12
2018	1.09	2.1	0.56	153	23*	0.035	0.77	2.2	0.27	0.94	0.96
2019	1.09	2.1	0.55	204	42*	0.128	1.12	3.2	0.38	1.38	0.95

\*Since 2018, discards minus BMS landings from EU fleets officially reported in logbooks.

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