

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

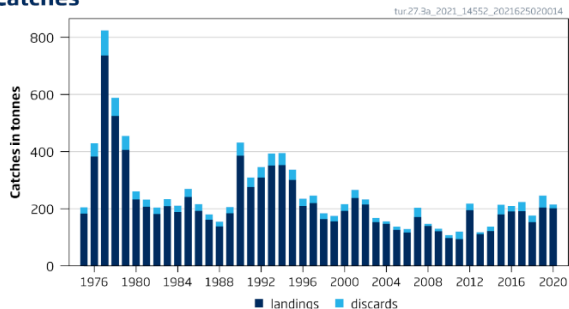
ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 224 tonnes. If discard rates do not change from the average of the last three years (2018–2020), this implies landings of no more than 197 tonnes.

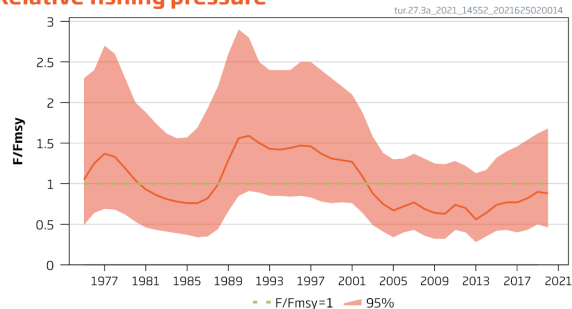
Stock development over time

Fishing pressure on the stock is below F_{MSY} and the stock size is above MSY $B_{trigger}$.

Catches



Relative fishing pressure



Relative exploitable biomass

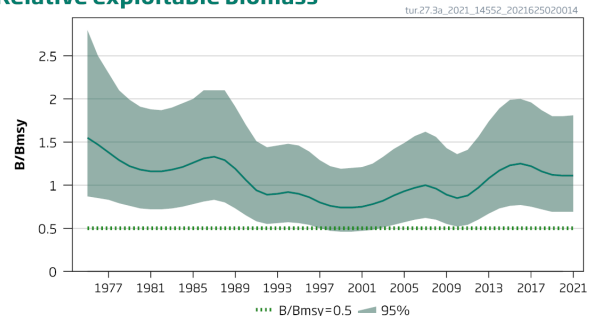


Figure 1 Turbot in Division 3.a. Summary of the stock assessment that includes the period 1975–2020 and the short-term forecast for the relative exploitable biomass in 2021. Top: ICES landings and discards. Bottom left: relative fishing pressure (F/F_{MSY}). Bottom right: relative exploitable biomass (B/B_{MSY}). MSY $B_{trigger}$ is set to $B/B_{MSY} = 0.5$.

Catch scenarios

Table 1 Turbot in Division 3.a. The basis for the catch scenarios. Catches are in tonnes.

Variable	Value	Notes
F_{2021}/F_{MSY}	0.88	<i>Status quo F</i>
B_{2022}/B_{MSY}	1.11	Short-term forecast (STF) under <i>status quo F</i>
Catch (2021)	218	STF of catch under <i>status quo F</i>
Discard rate (2021, 2022)	12.1%	Average 2018–2020, percentage
Projected landings (2021)	192	Based on the average discard rate
Projected discards (2021)	26	Based on the average discard rate

* 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.

Table 2 Turbot in Division 3.a. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2022)	Projected landings (2022)	Projected discards (2022)	Fishing mortality F_{2022}/F_{MSY}	Stock size B_{2023}/B_{MSY}	% B change *
ICES advice basis						
MSY approach (35th percentile of predicted catch distribution under $F = F_{MSY}$)	224	197	27	0.90	1.11	-0.120
Other scenarios						
$F = F_{MSY}$	248	218	30	1.00	1.10	-1.08
$F = F_{sq}$	218	192	26	0.88	1.11	0.103
$F = 0$	0	0	0	0	1.21	8.1
$F = F_{MSY}$, all fractiles	194	171	23	0.77	1.13	1.07

* Biomass 2023 relative to biomass 2022

Basis of the advice

Table 3 Turbot in Division 3.a. The basis of the advice.

Advice basis	MSY approach
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 and updated catch data. 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. The assessment method and settings described in the stock annex were used to provide advice based on a short-term forecast. The advice is based on the 35th percentile of the projected catch distribution, which is more precautionary than the median and accounts for the estimated uncertainty.

Issues relevant for the advice

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

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

As this is mainly a bycatch species, a change in catch over time may also be influenced by changed effort levels and targeting in bycatch fleets.

Reference points

Table 4 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	$\frac{B}{B_{\text{MSY}}} = 0.5^*$	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)
	$F_{\text{MSY proxy}}$	$\frac{F}{F_{\text{MSY}}} = 1^*$	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 5 Turbot in Division 3.a. Basis of the assessment and advice.

ICES stock data category	2 (ICES, 2021a)
Assessment type	SPiCT assessment (ICES, 2021b)
Input data	Commercial catches (discard information available since 2002) and a combination of surveys, including the beam trawl survey (BTS: [B2453]), the North Sea International Bottom Trawl Survey (NS-IBTS Q1 [G1022] and Q3 [G2829]), the Baltic International Trawl Survey (BITS, Q1 [G2916] and Q4 [G8863]), and two commercial trawl surveys (sole [G4052] and cod [G7026]) covering Division 3.a. (ICES, 2020a)
Discards and bycatch	Reported discard rates are available for 2002–2020. The average discard rate (10.49%) for 2002–2018 is used to reconstruct the discards in earlier years (1975–2001).
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 (WGNESSK)

History of the advice, catch, and management

Table 6 Turbot in Division 3.a. ICES advice and official landings. All weights are in tonnes. There is no TAC for turbot in this area. Small differences between catch and the sum of landings and discards are due to rounding.

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	23	217
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	34	214
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	176
2019	Precautionary approach	≤ 84	198	204	42	246
2020	No catch advice requested	-	191	202	13	215

Year	ICES advice	Catch corresponding to advice	Official landings turbot Division 3.a	ICES landings	ICES discards	ICES catches
2021	No catch advice requested	-				
2022	Precautionary approach	≤ 224				

History of the catch and landings

Table 7 Turbot in Division 3.a. Catch distribution by fleet in 2020 as estimated by ICES.

Catch (2020)	Landings			Discards
215 tonnes	Otter trawl and seines 49%	Beam trawl 31%	Others 20%	13 tonnes
	202 tonnes			

Table 8 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

Year	Belgium	Germany	Denmark	UK	Netherlands	Norway	Sweden	Total
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
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	< 1	167	0	0	8	14	189
2013	0	< 1	91	0	0	5	15	111
2014	0	1	94	0	3	6	18	122
2015	0	< 1	135	0	20	8	11	174
2016	< 1	< 1	137	0	25	6	11	179
2017	0	< 1	154	0	16	7	12	189
2018	0	< 1	109	0	23	8	10	150
2019	< 1	< 1	118	0	68	5	7	198
2020	0	< 1	124	0	55	5	7	191

Summary of the assessment

Table 9 Turbot in Division 3.a. Assessment summary. Weights are in tonnes. The relative exploitable biomass, fishing pressure, and their corresponding 95% confidence bounds.

Year	Relative exploitable biomass			Landings	Discards*	Relative fishing pressure		
	B/B _{MSY}	High	Low			F/F _{MSY}	High	Low
	tonnes							
1975	1.55	2.8	0.87	183	22	1.05	2.3	0.49
1976	1.47	2.5	0.85	383	46	1.25	2.4	0.64
1977	1.38	2.3	0.83	736	88	1.37	2.7	0.69
1978	1.29	2.1	0.79	525	63	1.33	2.6	0.68
1979	1.22	1.99	0.76	406	49	1.19	2.3	0.62
1980	1.18	1.91	0.73	233	28	1.04	2.0	0.53
1981	1.16	1.88	0.72	207	25	0.93	1.88	0.46
1982	1.16	1.87	0.72	182	22	0.86	1.74	0.43
1983	1.18	1.90	0.73	209	25	0.81	1.62	0.41
1984	1.21	1.95	0.75	188	23	0.78	1.56	0.39
1985	1.26	2.0	0.78	241	29	0.76	1.57	0.37
1986	1.31	2.1	0.81	193	23	0.76	1.69	0.34
1987	1.33	2.1	0.83	161	19	0.82	1.93	0.35
1988	1.29	2.1	0.80	138	17	0.99	2.2	0.44
1989	1.19	1.91	0.73	184	22	1.29	2.6	0.66
1990	1.06	1.70	0.65	386	46	1.56	2.9	0.85
1991	0.94	1.51	0.58	276	33	1.59	2.8	0.91
1992	0.89	1.44	0.55	309	37	1.50	2.5	0.89
1993	0.90	1.46	0.56	351	42	1.43	2.4	0.85

Year	Relative exploitable biomass			Landings	Discards*	Relative fishing pressure		
	B/B _{MSY}	High	Low			F/F _{MSY}	High	Low
				tonnes				
1994	0.92	1.48	0.57	353	42	1.42	2.4	0.85
1995	0.9	1.46	0.56	301	36	1.44	2.4	0.84
1996	0.86	1.39	0.54	210	25	1.47	2.5	0.85
1997	0.80	1.29	0.50	220	26	1.46	2.5	0.83
1998	0.76	1.22	0.47	164	20	1.37	2.4	0.78
1999	0.74	1.19	0.46	156	19	1.31	2.3	0.76
2000	0.74	1.2	0.46	193	23	1.29	2.2	0.77
2001	0.75	1.21	0.47	238	28	1.27	2.1	0.76
2002	0.78	1.25	0.48	215	18	1.09	1.88	0.64
2003	0.82	1.33	0.51	153	15	0.88	1.58	0.49
2004	0.88	1.42	0.54	147	9	0.75	1.38	0.41
2005	0.93	1.49	0.57	126	11	0.67	1.30	0.34
2006	0.97	1.57	0.60	117	12	0.72	1.31	0.40
2007	1.00	1.62	0.62	171	32	0.77	1.37	0.43
2008	0.96	1.56	0.60	140	7	0.69	1.31	0.36
2009	0.89	1.43	0.55	121	9	0.64	1.25	0.32
2010	0.85	1.36	0.52	97	11	0.63	1.24	0.32
2011	0.88	1.41	0.54	94	26	0.74	1.28	0.43
2012	0.97	1.56	0.60	195	23	0.70	1.22	0.40
2013	1.08	1.74	0.67	111	7	0.56	1.13	0.28
2014	1.17	1.89	0.73	122	15	0.64	1.17	0.35
2015	1.23	1.99	0.76	180	34	0.74	1.32	0.42
2016	1.25	2.0	0.77	191	19	0.77	1.40	0.43
2017	1.22	1.96	0.75	192	32	0.77	1.46	0.40
2018	1.16	1.87	0.72	153	23	0.82	1.54	0.43
2019	1.12	1.80	0.69	204	42	0.90	1.62	0.50
2020	1.11	1.80	0.69	202	13	0.88	1.68	0.46
2021	1.11	1.81	0.69					

*Since 2018, discards include BMS landings from EU and UK fleets.

Sources and references

EU. 2018. Regulation (EU) 2018/973 of the European Parliament and of the Council of 4 July 2018 establishing a multiannual plan for demersal stocks in the North Sea and the fisheries exploiting those stocks, specifying details of the implementation of the landing obligation in the North Sea and repealing Council Regulations (EC) No 676/2007 and (EC) No 1342/2008. Official Journal of the European Union, L. 179. 13 pp. <http://data.europa.eu/eli/reg/2018/973/oj>.

ICES. 2020a. Benchmark Workshop for Flatfish stocks in the North Sea and Celtic Sea (WKFlatNSCS). ICES Scientific Reports, 2:23. 966 pp. <http://doi.org/10.17895/ices.pub.5976>.

ICES. 2020b. Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). ICES Scientific Reports, 2:61. <http://doi.org/10.17895/ices.pub.6092>.

ICES. 2021a. Advice on fishing opportunities. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, section 1.1.1. <https://doi.org/10.17895/ices.advice.7720>.

ICES. 2021b. Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). ICES Scientific Reports. 3:66. <https://doi.org/10.17895/ices.pub.8211>. *In prep.*

[Download the stock assessment data and figures.](#)

Recommended citation: ICES. 2021. Turbot (*Scophthalmus maximus*) in Division 3.a (Skagerrak and Kattegat). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, tur.27.3a. <https://doi.org/10.17895/ices.advice.7878>.