

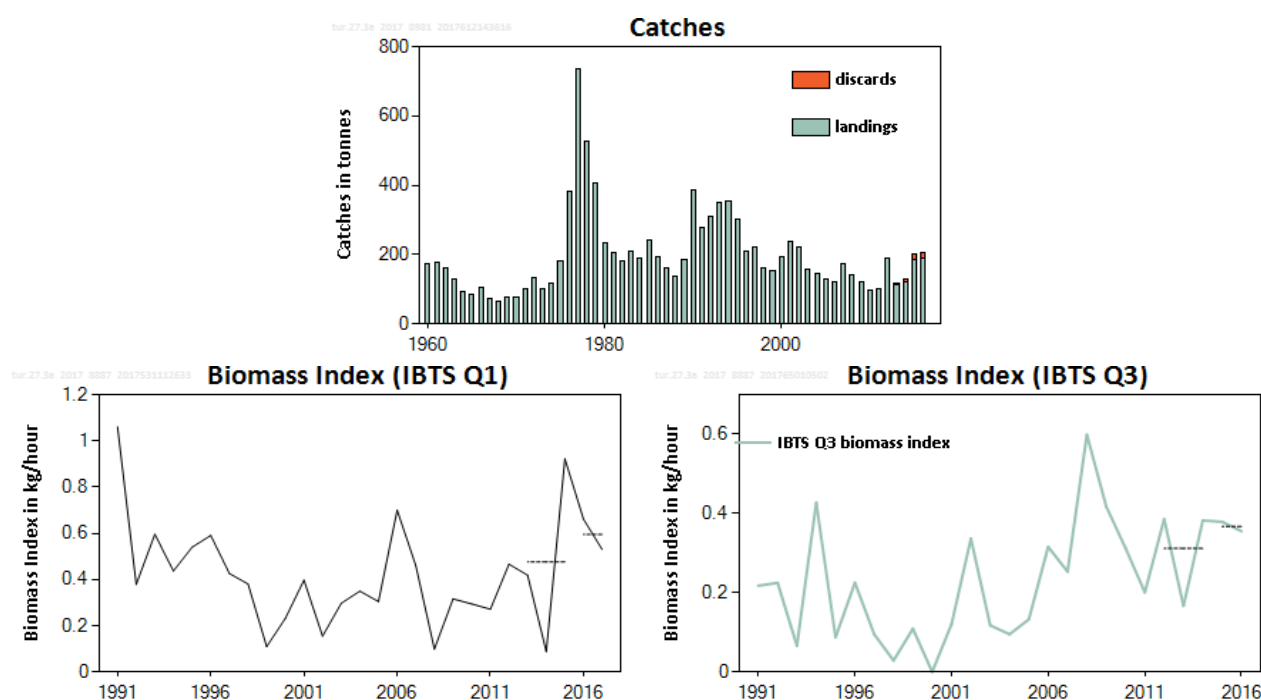
## Turbot (*Scophthalmus maximus*) in Division 3.a (Skagerrak and Kattegat)

### ICES stock advice

ICES advises that when the precautionary approach is applied, catches should be no more than 84 tonnes in each of the years 2018 and 2019. If discard rates do not change from the average of the last years (2014–2016), this implies landings of no more than 77 t.

### Stock development over time

The IBTS Q1 biomass index is variable and has been fluctuating without trend over time. The IBTS Q3 biomass index is also variable but has shown an increased level after 2005.



**Figure 1** Turbot in Division 3.a. Summary of the stock assessment. Top: Official landings until 2013, and ICES estimated discard values (tonnes). Discard data have only been included since 2013. Bottom: Biomass indices (trend in catch per unit of effort since 1991 ( $\text{kg h}^{-1}$ ) from IBTS Q1 and IBTS Q3).

### Stock and exploitation status

**Table 1** Turbot in Division 3.a. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	$F_{MSY}$	?	?	?	Undefined	$MSY B_{trigger}$	?	?	?
Precautionary approach	$F_{pa}, F_{lim}$	?	?	?	Undefined	$B_{pa}, B_{lim}$	?	?	?
Management plan	$F_{MGT}$	—	—	—	Not applicable	$B_{MGT}$	—	—	—
Qualitative evaluation	—	?	?	?	Insufficient information	—	↗	↘	↘

### Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012a). Both the IBTS Q1 and Q3 biomass indices ( $\text{kg h}^{-1}$ ) were applied as indices of stock development. The advice is based on a comparison of, for each index, the two latest values

(index A) with the three preceding values (index B), then averaged across the two indices and multiplied by the recent advised catch. The averaged index is estimated to have increased by slightly more than 20%, thus the uncertainty cap was applied.

The precautionary buffer was last applied in 2013. Because there is no information on stock size or fishing pressure, the precautionary buffer is applied again in 2017.

**Table 2** Turbot in Division 3.a. The basis for the catch options.\*

Index A	Q1(2016:2017): 0.60 kg h <sup>-1</sup> ; Q3(2015–2016): 0.37 kg h <sup>-1</sup>	
Index B	Q1(2013:2015): 0.48 kg h <sup>-1</sup> ; Q3(2012–2014): 0.31 kg h <sup>-1</sup>	
Index ratio (A/B)	Q1: 1.25 and Q3: 1.18; average: 1.21	
Uncertainty cap	Applied	1.2
Advised catch for 2016–2017	88 tonnes	
Discard rate (2014–2016)	8.4%	
Precautionary buffer	Applied	0.8
Catch advice**	84 tonnes	
Landings corresponding to the catch advice***	77 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] × [precautionary buffer].

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

## Basis of the advice

**Table 3** Turbot in 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 this stock.

## Quality of the assessment

This year, the advice is based on the IBTS (North Sea International Bottom Trawl Survey), while the BITS (Baltic International Trawl Survey) was used previously. This change was made considering the limited amount of catches taken in the area covered by the BITS survey (Kattegat only).

The current surveys in this area are not designed for catching turbot, especially large turbot (Van der Reijden *et al.*, 2015). It is uncertain if the survey covers the main areas of distribution for turbot. A fishery-independent index covering the entire distribution area of the stock and targeting turbot could improve the assessment.

Stock identity and boundaries remain unclear.

## Issues relevant for the advice

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

## Reference points

No reference points are defined for this stock. An attempt has been made this year to calculate MSY proxy reference points for this stock. However, there were concerns about the application of the method to this stock and further investigations are needed (ICES, 2017).

## Basis of the assessment

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

ICES stock data category	3 (ICES, 2016).
Assessment type	Survey trends-based assessment (ICES, 2017).
Input data	Commercial catches (international landings), two survey indices (IBTS Q1 + Q3).
Discards and bycatch	Discards are estimated around 8.4% (average 2014–2016). Discard ratios provided for 72% of the landings in 2016.
Indicators	None.
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** 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	Predicted catch corresp. to advice	Official landings turbot 3.a	ICES discards	ICES catches
2011	No advice	-	99		
2012	No increase in catches	-	189		
2013	No new advice, same as for 2012	-	111	7	120
2014	Reduce recent average catch by 20% (2010–2012)	≤ 102	120	11	131
2015	No new advice, same as for 2014	≤ 102	175	18	202
2016	Precautionary approach (decrease catches by no more than 20%)	≤ 88	179	16	204
2017	Precautionary approach (same advised catch value as given for 2016)	≤ 88			
2018	Precautionary approach	≤ 84			
2019	Precautionary approach	≤ 84			

## History of the catch and landings

**Table 6** Turbot in Division 3.a. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings			Discards
204 tonnes	Otter trawl and seines 48%	Beam trawl 19%	Others 33%	16 tonnes
	188 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	0	336	0	0	10	0	349
1994	2	0	313	0	0	15	22	352
1995	4	0	268	0	0	17	11	300
1996	0	0	185	0	0	13	11	209
1997	0	0	200	0	0	9	11	220
1998	0	0	148	0	0	7	8	163
1999	0	0	139	0	0	10	6	155
2000	0	0	180	0	0	6	6	192
2001	0	0	227	0	0	8	3	238
2002	0	0	205	0	0	11	5	221
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	168	0	0	8	14	189
2013	0	0	91	0	0	5	15	111
2014	0	0	94	0	0	6	17	120
2015	0	0	135	0	20	8	11	175
2016	0	0	137	0	25	6	10	179

### Summary of the assessment

**Table 8** Turbot in Division 3.a. Assessment summary. Weights are in tonnes.

Year	Biomass index (kg h <sup>-1</sup> )		ICES landings	Discards
	IBTS Q1	IBTS Q3		
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			183	
1976			383	
1977			736	
1978			525	
1979			406	
1980			233	
1981			207	
1982			182	
1983			209	
1984			188	
1985			241	
1986			193	
1987			161	
1988			138	
1989			184	
1990			386	
1991	1.06	0.22	276	
1992	0.38	0.22	309	
1993	0.60	0.07	349	
1994	0.44	0.43	352	
1995	0.54	0.09	300	
1996	0.59	0.23	209	
1997	0.43	0.09	220	
1998	0.38	0.03	163	
1999	0.11	0.11	155	
2000	0.23	0.00	192	

Year	Biomass index (kg h <sup>-1</sup> )		ICES landings	Discards
	IBTS Q1	IBTS Q3		
2001	0.40	0.12	238	
2002	0.15	0.34	221	
2003	0.30	0.12	159	
2004	0.35	0.10	147	
2005	0.30	0.13	127	
2006	0.70	0.32	121	
2007	0.46	0.25	173	
2008	0.10	0.60	143	
2009	0.32	0.42	120	
2010	0.29	0.31	95	
2011	0.27	0.20	99	
2012	0.47	0.39	189	
2013	0.42	0.17	111	7
2014	0.09	0.38	120	11
2015	0.92	0.38	184	18
2016	0.66	0.36	188	16
2017	0.53			

## Sources and references

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