

Turbot (*Scophthalmus maximus*) in Subarea 4 (North Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2021 should be no more than 3948 tonnes.

Management of turbot and brill under a combined species TAC prevents effective control of the single-species exploitation rates and could lead to the overexploitation of either species. ICES advises that management should be implemented at the species level.

Note: This advice sheet is abbreviated due to the COVID-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

Stock development over time

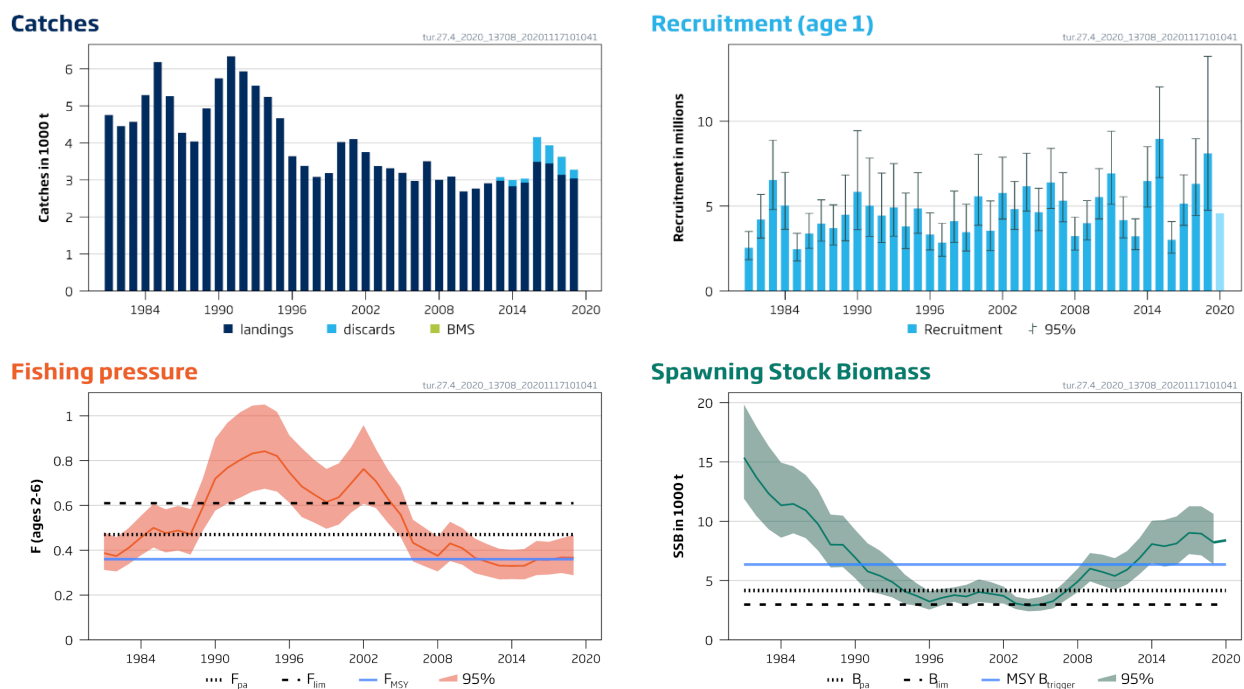


Figure 1[†] Turbot in Subarea 4. Summary of the stock assessment (weights in thousand tonnes). Discards are only available from 2013. Shaded areas represent 95% confidence intervals. Assumed recruitment is unshaded. Landings below minimum conservation reference size (BMS) are those officially reported.

Stock and exploitation status

Table 1 Turbot in Subarea 4. State of the stock and the fishery relative to reference points.

		Fishing pressure			Stock size		
		2017	2018	2019	2018	2019	2020
Maximum sustainable yield	F_{MSY}	✓	✗	✗	$B_{trigger}$	✓	✓
				Above			Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	B_{pa}, B_{lim}	✓	✓
				Harvested sustainably			Full reproductive capacity
Management plan	F_{MGT}	—	—	—	B_{MGT}	—	—

[†] Version 2: Line for F_{pa} corrected.

Catch scenarios

Table 2 Turbot in Subarea 4. Assumptions made for the interim year and in the forecast. All weights are in tonnes, recruitment in thousands.

Variable	Value	Notes
F (2020)	0.36	F_{sq} = average of $F_{ages\ 2-6}$ (2017–2019)
SSB (2021)	9161	Short-term forecast (STF)
$R_{age\ 1}$ (2020, 2021)	4563	Geometric mean (1981–2019)
Projected landings (2020)	3402	STF, assuming an F at <i>status quo</i> (F_{sq})

Table 3 Turbot in Subarea 4. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch * (2021)	Projected landings ** (2021)	Projected discards *** (2021)	F (projected landings, ages 2–6) (2021)	SSB (2022)	% SSB change ^	% advice change ^^
ICES advice basis							
MSY approach: F_{MSY}	3948	3514	435	0.36	9449	3.1	-13
Other scenarios							
$F_{MSY\ upper}$	4984	4435	549	0.48	8449	-7.8	9.8
$F_{MSY\ lower}$	2887	2569	318	0.25	10484	14.4	-36
F = 0	0	0	0	0	13337	46	-100
F_{pa}	4902	4363	540	0.47	8528	-6.9	8
F_{lim}	5980	5322	658	0.61	7498	-18.2	32
F_{sq}	3985	3547	439	0.36	9414	2.8	-12.2
SSB (2022) = B_{lim}	10948	9742	1205	1.69	2974	-68	141
SSB (2022) = B_{pa}	9587	8531	1055	1.28	4163	-55	111
SSB (2022) = MSY $B_{trigger}$	7194	6402	792	0.79	6353	-31	59
Rollover advice	4537	4038	499	0.43	8879	-3.1	0

* (Projected landings) / (1 – average discard rate); average discard rate by weight 2017–2019 = 11.0%.

** Marketable landings.

*** Including BMS landings, assuming average discard rate by weight 2017–2019 = 11.0%.

^ SSB 2022 relative to SSB 2021.

^^ Total catch in 2021 relative to the advice value for 2020 (4538 tonnes).

The change in advice (-13%) is due to a change in the basis for the advice, from the precautionary approach for 2020 to the MSY approach for 2021.

Quality of the assessment

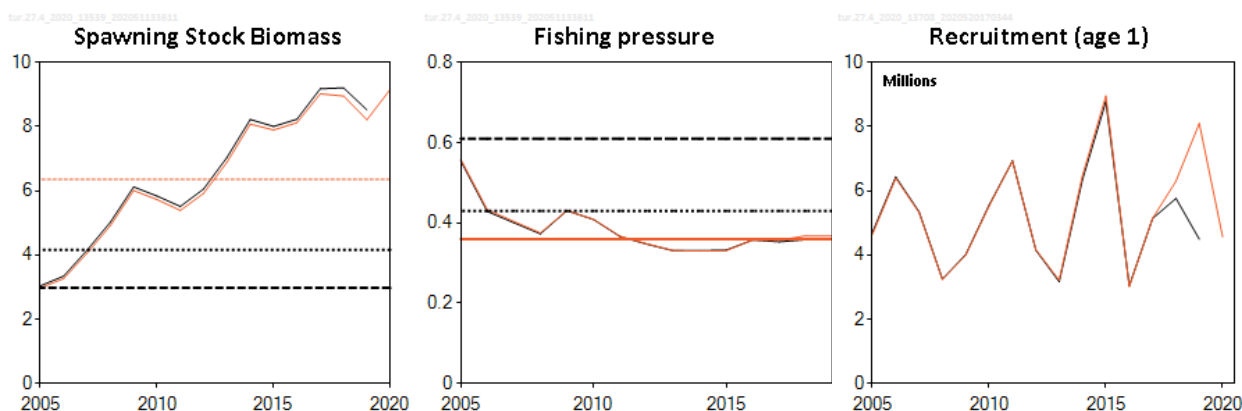


Figure 2 Turbot in Subarea 4. Historical assessment results (final-year recruitment included for each line, corresponding to the forecast recruitment in the interim year).

History of the advice, catch, and management

Table 4 Turbot in Subarea 4. ICES advice, ICES estimates of landings and discards, and official landings. All weights are in tonnes.

Year	ICES advice	Catch corresp. to advice	Agreed TAC* in Subarea 4 and Division 2.a (turbot and brill)	Official landings in Subarea 4 and Division 2.a (turbot and brill)	Official landings in Subarea 4 (turbot)	ICES landings in Subarea 4 (turbot)	ICES discards in Subarea 4 (turbot)	ICES catch in Subarea 4 (turbot)
2000		-	9000	5534	4026			
2001		-	9000	5674	4101			
2002		-	6750	5052	3750			
2003		-	5738	4721	3375			
2004		-	4877	4568	3319			
2005		-	4550	4355	3195			
2006		-	4323	4152	2977			
2007		-	4323	4750	3510			
2008		-	5263	4011	3007			
2009		-	5263	4253	3091			
2010		-	5263	4192	2692			
2011		-	4642	4304	2807			
2012	No increase in catches	-	4642	4426	2914			
2013	No new advice, same as for 2012	-	4642	4474	3084	2982	97	3079
2014	Apply F_{MSY} proxy for data-limited stocks	< 2978	4642	4128	2871	2834	158	2992
2015	ICES DLS approach (max. -20%)	< 2406	4642	4677	2978	2922	112	3034
2016	Precautionary approach (decrease catches by 20%)	< 1995	4488	4953	3421	3493	666	4159
2017	Precautionary approach	< 4952	5924	5106	3641	3441	496	3937
2018	Precautionary approach	< 4952	7102	4334 **	3166 **	3140	486	3626
2019	Precautionary approach	< 4952	8122	4476 **	3100 **	3045	230 ^	3275 ^
2020	Precautionary approach	< 4538	6498					
2021	MSY approach	< 3948						

* EU combined TAC for turbot and brill in EU waters of Division 2.a and Subarea 4.

** Preliminary.

^ Including below minimum size (BMS) landings.

Summary of the assessment

Table 5 Turbot in Subarea 4. Assessment summary. Weights are in tonnes, recruitment in thousands. High and low values indicate 95% confidence intervals.

Year	Recruitment			SSB			Landings	Discards [^]	Official BMS landings [^]	F (landings)		
	Age 1	High	Low	SSB	High	Low				Ages 2–6	High	Low
1981	2543	3504	1846	15371	19850	11903	4755			0.39	0.48	0.31
1982	4217	5690	3125	13709	17990	10447	4453			0.37	0.46	0.31
1983	6528	8877	4800	12330	16327	9312	4575			0.41	0.50	0.34
1984	5040	6987	3635	11346	14946	8614	5297			0.46	0.55	0.38
1985	2453	3401	1769	11463	14631	8980	6188			0.50	0.61	0.41
1986	3390	4572	2514	10916	13898	8574	5263			0.48	0.58	0.39
1987	3968	5366	2935	9747	12630	7522	4271			0.49	0.60	0.40
1988	3709	5077	2710	8032	10571	6102	4041			0.47	0.58	0.38
1989	4495	6832	2957	8015	10479	6131	4927			0.59	0.72	0.49
1990	5842	9441	3615	6935	9274	5187	5750			0.72	0.90	0.58
1991	5023	7828	3223	5774	8146	4093	6340			0.77	0.97	0.61
1992	4452	6946	2853	5403	7529	3877	5933			0.80	1.02	0.63
1993	4921	7503	3228	4877	6655	3575	5546			0.83	1.05	0.66
1994	3797	5771	2498	4088	5522	3026	5244			0.84	1.05	0.67
1995	4864	6965	3397	3696	4753	2875	4671			0.82	1.02	0.66
1996	3333	4596	2417	3234	4106	2547	3644			0.75	0.91	0.61
1997	2852	3982	2042	3541	4301	2915	3382			0.68	0.86	0.55
1998	4104	5883	2863	3769	4430	3207	3086			0.65	0.80	0.52
1999	3469	5109	2355	3658	4651	2876	3187			0.62	0.76	0.50
2000	5583	8049	3872	4032	5102	3187	4025			0.64	0.79	0.51
2001	3555	5304	2383	3881	4867	3094	4100			0.70	0.86	0.57
2002	5773	7878	4230	3707	4492	3060	3749			0.76	0.96	0.61
2003	4835	6449	3624	3065	3629	2589	3374			0.71	0.85	0.59
2004	6179	8115	4705	2882	3454	2405	3317			0.63	0.76	0.52
2005	4638	6052	3555	2978	3609	2456	3195			0.56	0.68	0.46
2006	6391	8395	4866	3263	4014	2652	2976			0.43	0.54	0.35
2007	5324	6969	4068	4057	4950	3324	3509			0.40	0.50	0.33
2008	3239	4349	2412	4914	6005	4021	3005			0.38	0.46	0.31
2009	3998	5326	3001	6009	7324	4930	3089			0.43	0.53	0.35
2010	5532	7207	4246	5727	7187	4564	2692			0.41	0.50	0.34
2011	6929	9408	5103	5391	6892	4216	2771			0.37	0.45	0.30
2012	4170	5550	3133	5921	7497	4677	2914			0.35	0.43	0.28
2013	3216	4254	2432	6894	8584	5536	2982	97		0.33	0.41	0.27
2014	6481	8496	4944	8080	10049	6497	2834	159		0.33	0.40	0.27
2015	8960	12020	6679	7896	10113	6165	2925	112		0.33	0.41	0.27
2016	3016	4086	2227	8125	10417	6338	3493	666		0.36	0.44	0.29
2017	5142	6837	3867	9023	11265	7227	3441	496		0.36	0.44	0.29
2018	6308	8962	4441	8957	11262	7123	3140	484*	2	0.37	0.45	0.30
2019	8102	13821	4750	8218	10622	6357	3045	227*	3	0.37	0.47	0.29
2020	4563**			8393***								

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

** Geometric mean (1981–2019).

*** From the short-term forecast.

[^] Discards and BMS landings are not used in the model.

Sources and references

ICES. 2020. 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>.

Recommended citation: ICES. 2020. Turbot (*Scophthalmus maximus*) in Subarea 4 (North Sea). In Report of the ICES Advisory Committee, 2020. ICES Advice 2020, tur.27.4. <https://doi.org/10.17895/ices.advice.5914>.