

ECOREGION North Sea
STOCK Turbot in Subarea IV (North Sea)

Advice for 2014

Based on ICES approach to data limited stocks, ICES advises that catches of turbot in Subarea IV should be no more than 2978 t. All catches are assumed to be landed.

Stock status

F (Fishing Mortality)			
	2010	2011	2012
Qualitative evaluation	↘	↘	↘ Declining
SSB (Spawning-Stock Biomass)			
	2010	2011	2012
Qualitative evaluation	→	→	↗ Increasing from low level

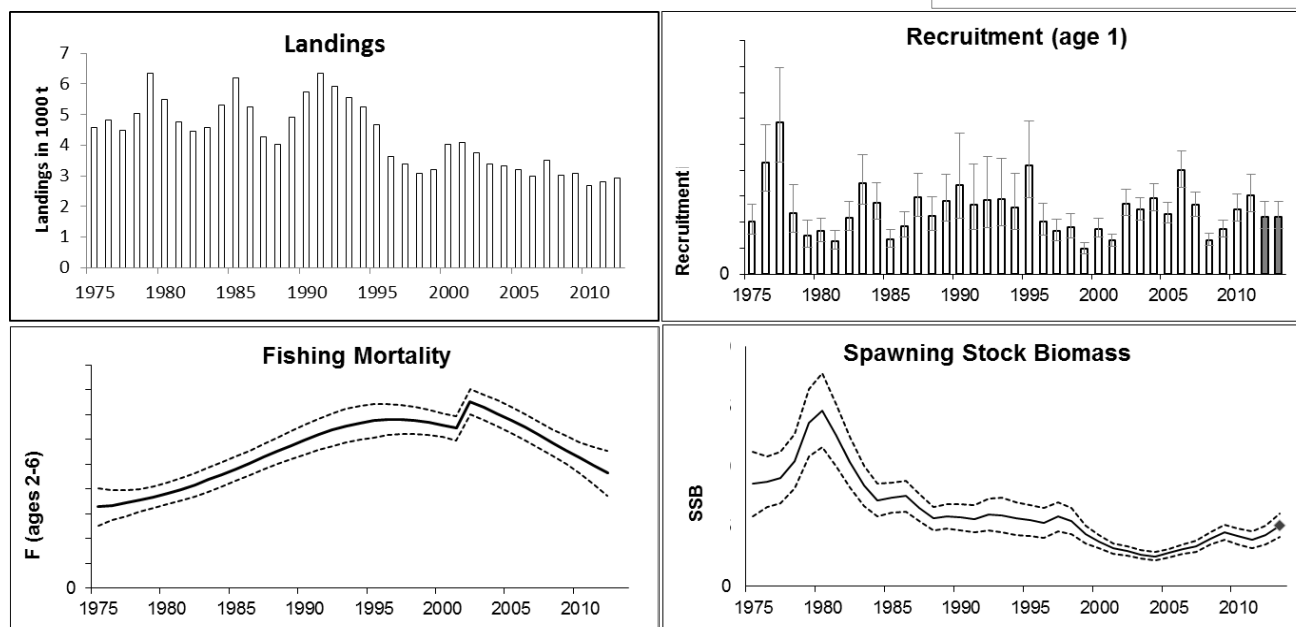
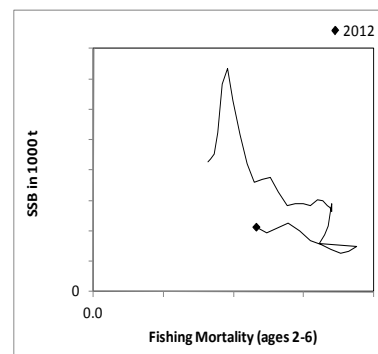


Figure 6.4.32.1 Turbot in Subarea IV. Official landings and summary of stock trends from the assessment. Assumed values are shaded. For F and SSB, the centre line indicates the model best estimate, dashed top and bottom lines indicate 95% confidence limits. Top right: SSB and F for the time-series used in the assessment

A trends-based assessment for turbot in the North Sea is presented for the first time. Landings of turbot have been stable since 1995. Recruitment is variable around the long-term average. The sudden increase in F is because of a reduction of the minimum landing size in 2001. Since then fishing mortality has declined. Spawning-stock biomass is at a low level, but has been gradually increasing in recent years.

Management plans

No specific management objectives are known to ICES. An EU TAC is set for EU waters of Division IIa and Subarea IV together with brill (ICES, 2013a).

Biology

Turbot is one of the fastest growing flatfish. Turbot is a typical visual feeder and feeds mainly on other bottom-living fish and small pelagic fish and could be regarded as a top predator. In general, turbot is a rather sedentary species, but there are some indications of migratory patterns. For example in the North Sea, migrations from the nursery grounds in the southeastern part to more northerly areas have been recorded. Adult turbot are more tolerant of the colder conditions in the northern areas of the North Sea where temperatures are too low for juveniles to survive.

The fisheries

Turbot is an economically valuable bycatch in the fishery for flatfish and demersal species using beam trawl, otter trawl, and static gear. There is a targeted gillnet fishery that takes less than 10% of the total catch. Discarding in the trawl fisheries for turbot is low. No official minimum landing size has been set, but Belgian and Dutch producer organizations have adopted voluntary minimum landing sizes between 25 and 30 cm. A reduction in fishing effort on target flatfish species such as plaice and sole may have influenced the turbot catches.

Catch distribution	Total catch (2012) = 2.914 kt, where 100% were landings (~90% beam and otter trawls, ~10% gill- and trammelnets).
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Quality considerations

Age data only exist for several short periods. The collection of data needs to be continued for the whole area in order to get a better understanding of the state of turbot stocks in the Northeast Atlantic area.

The methods applied to derive quantitative advice for data-limited stocks are expected to evolve as they are further developed and validated. The harvest control rules are expected to stabilize stock size, but they may not be suitable if the stock size is low and/or overfished.

Scientific basis

Assessment type	Trends-based statistical age-structured assessment (Data-limited stock category 2.1.1).
Input data	Commercial catches (episodic age frequencies from catch sampling raised to international landings), two survey indices (SNS, BTS-Isis), one commercial index (NL_BT2). Assumed constant annual maturity ogive and natural mortality (ages and years).
Discards and bycatch	Not included and assumed negligible.
Indicators	None
Other information	The stock was benchmarked in 2012 (IBPNES, ICES, 2012), where it was decided to split the advice between Division IIIa and Subarea IV.
Working group report	WGNSSK .(ICES, 2013b)

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Reference points

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
MSY Approach	MSY B _{trigger}	Undefined.	
	F _{MSY}	0.34	F _{max} as proxy for F _{MSY} (range: 0.31–0.37).
Precautionary approach	Not defined.		

(Changed in 2013)

Outlook for 2014

Basis: trends-based forecast: $F(2013) = \text{constant landings} = F(2012) \times 0.79 = 0.34$; $R(2013) = \text{Geometric Mean}(1957-2012)$; $\text{Landings}(2013) = \text{Landings}(2012) = 2914$.

Rationale	Catches (2014)	Basis	F (2014)	%SSB index change 2014-2015
MSY framework	2978	F _{MSY} proxy (= F ₂₀₁₃)	0.34	+ 12%

Weights in tonnes.

ICES approach to data-limited stocks

For data-limited stocks with analytical assessment and forecast that are only treated qualitatively, ICES uses a short-term forecast applying the F_{MSY} proxy (or lower, if the stock biomass is estimated to be below MSY B_{trigger}) as a target to be reached by 2015. A change limit of $\pm 20\%$ is applied to the advice.

For this stock, no MSY B_{trigger} has been defined, and the method has been applied based on maintaining fishing mortality at the F_{MSY} proxy. This implies fishing mortality should be kept at 0.34, resulting in landings of no more than 2978 t in 2014. This is expected to lead to an increase in SSB of 12% from 2014 to 2015. All catches are assumed to be landed.

Additional considerations

Turbot is mainly a bycatch species in fisheries for plaice and sole. TACs may not be appropriate as a management tool for bycatch species.

Impacts of fisheries on the ecosystems

Currently the mixed flatfish fishery (targeting sole and plaice, but also contributing to the majority of turbot landings) is dominated by beam and otter trawls, with bycatch of both commercial and non-commercial species and a physical impact on the seabed. Bottom trawling can impact biomass, production, and species richness.

Regulations and their effects

Regulated effort restrictions in the EU were introduced in 2003 (annexes to the annual TAC regulations) for the protection of the North Sea cod stock. In addition, a long-term plan for the recovery of cod stocks was adopted in 2008 (EC regulation 1342/2008). In 2009, the effort management programme switched from a days-at-sea to a kW-day system (EC regulation 43/2009), in which different amounts of kW-days are allocated within each area by Member State to different groups of vessels depending on gear and mesh size. Bottom otter trawls (OTB) with a mesh size equal to or larger than 100 mm, and included in TR1, have since 2009 been affected by the regulation. The beam-trawl fleet (BT2) was affected by this regulation only once in 2009, but not afterwards.

The current sole and plaice long-term management plan (Council Regulation (EC) No. 676/2007) also specifically reduces effort as a management measure, affecting BT2 and occasionally trammelnet (GT1) gears since the implementation of the plan. Effort ceilings are updated annually. However, for 2013, the European Council decided upon a roll-over of effort level of 2012 into 2013 for both the cod and the sole/plaice management plans.

Overall nominal effort (kW-days) by EU demersal trawls, seines, beam trawls, gill- and trammelnets, and longlines (all mesh sizes included) in the North Sea, Skagerrak, and Eastern Channel has been substantially reduced since the implementation of the two successive effort management plans in 2003 and 2008 (–40% between 2003 and 2012, –16% between 2008 and 2012). Effort by the beam trawl fleet in small mesh size (80–120 mm, BT2) has shown a sharp decline (–45% between 2003 and 2012), while effort in large mesh size (≥ 120 mm, BT1) has increased significantly in 2012 after a decade of continuous decline.

Changes in fishing technology and fishing patterns

The increased use of “SumWing” and electric “pulse trawls” will likely affect catchability and selectivity of North Sea turbot, though this effect has not yet been quantified. In 2011, approximately 30 licenses for Pulse trawls were taken into operation, increasing to 42 in 2012. Potential future impact either on the turbot stock itself or the stock assessment is unknown.

Uncertainties in the assessment and forecast

An analytic assessment is available for the first time but, because of uncertainties in some of the inputs and model settings, it is treated as indicative of trends in fishing mortality, recruitment, biomass, and future catches, rather than as a full analytical assessment. The assessment estimates, their forecasts, and status relative to reference points are considered to be consistent with each other and can therefore be used to provide management advice. Work is ongoing to make the necessary improvements to the assessment to elevate North Sea turbot to a Category 1 stock under the ICES data-limited stocks classification.

In 2001 the Dutch national minimum landings size for turbot was reduced from 30 to 25 cm. From 2002 onwards all age structure data for landings of this stock are from Dutch samples. This resulted in an increase in landings of age 2 fish, leading to a sudden increase in mean fishing mortality over ages 2 to 6. Prior to 2001, it is unclear if fish at age 2 were discarded or not reported.

Data requirements

The collection of data needs to be continued in order to get a better understanding of the state of turbot stocks in the Northeast Atlantic. Priority should be given to improvement of catch-at-age information available from different countries.

Comparison of previous assessment and advice

This is the first year that an assessment has been presented for turbot in Subarea IV. Previously qualitative advice was given for this stock, including Division IIIa. This year a trends-based assessment is given and the advice is based on ICES approach to data-limited stocks.

Assessment and management area

IBPNEW (ICES, 2012) recommended assessing and managing the North Sea (Subarea IV) turbot stock as a distinct unit. Turbot is managed in Subarea IV and Division IIa in a TAC combined with brill.

Sources

- ICES. 2012. Report of the Inter-Benchmark Protocol on New Species (Turbot and Sea bass; IBPNew 2012), 1–5 October 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:45. 239 pp.
- ICES. 2013a. Brill in Subarea IV and Divisions IIIa and VIId.e. *In* Report of the ICES Advisory Committee, 2013. ICES Advice, 2013. Book 6, Section 6.4.1.
- ICES. 2013b. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 24–30 April 2013. ICES CM 2013/ACOM:13.

Table 6.4.32.1 Turbot in Subarea IV. ICES advice, management, and official landings.

Year	ICES Advice	Predicted catch		Agreed TAC ¹⁾	Official landings turbot & brill	Official landings turbot
		corresp. to advice turbot	turbot & brill			
2000		-	9		6.326	4.026
2001		-	9		6.501	4.101
2002		-	6.750		5.850	3.750
2003		-	5.738		5.575	3.375
2004		-	4.877		5.419	3.319
2005		-	4.550		5.095	3.195
2006		-	4.323		4.877	2.977
2007		-	4.323		5.610	3.510
2008		-	5.263		4.807	3.007
2009		-	5.263		4.991	3.091
2010		-	5.263		4.992	2.692
2011		-	4.642		5.007	2.807
2012	No increase in catches	-	4.642		5.214 ²⁾	2.914 ²⁾
2013	No new advice, same as for 2012	-	4.642			
2014	Apply F_{MSY} proxy for data limited stocks	< 2.978				

Weights in thousand tonnes.

¹⁾ EU combined TAC for turbot and brill in EU waters of Division IIa and Subarea IV.²⁾ Preliminary.

Table 6.4.32.2 Turbot in Subarea IV. Official landings per country (in kt).

Year	Netherlands	UK	Denmark	Belgium	France	Germany	Norway	Other ²⁾	IV totals
1975	3.349	0.503	0.387	0.159	0.021	0.169	0.000	0.001	4.589
1976	3.253	0.632	0.588	0.147	0.038	0.157	0.000	0.002	4.816
1977	2.973	0.683	0.474	0.146	0.038	0.173	0.000	0.000	4.486
1978	3.196	0.752	0.693	0.170	0.051	0.174	0.000	0.000	5.036
1979	3.999	0.838	1.164	0.187	0.022	0.152	0.000	0.003	6.365
1980	3.241	0.559	1.360	0.163	0.017	0.146	0.000	0.000	5.486
1981	3.073	0.404	1.044	0.142	0.006	0.087	0.000	0.000	4.756
1982	3.029	0.335	0.880	0.153	0.014	0.043	0.000	0.000	4.454
1983	3.163	0.277	0.893	0.174	0.024	0.044	0.000	0.000	4.576
1984	3.800 ¹⁾	0.282	0.886	0.242	0.040	0.046	0.000	0.001	5.297
1985	4.600 ¹⁾	0.312	0.983	0.222	0.037	0.034	0.000	0.000	6.188
1986	3.810 ¹⁾	0.287	0.997	0.134	0.005	0.032	0.000	0.000	5.264
1987	2.760 ¹⁾	0.345	0.988	0.130	0.021	0.028	0.000	0.000	4.272
1988	2.660	0.328	0.858	0.129	0.024	0.042	0.000	0.001	4.042
1989	3.666	0.333	0.637	0.176	0.030	0.085	0.000	0.000	4.927
1990	3.732	0.437	1.046	0.292	0.052	0.185	0.000	0.007	5.751
1991	3.780	0.688	1.233	0.350	0.064	0.186	0.030	0.009	6.340
1992	3.495	0.902	0.907	0.317	0.081	0.163	0.066	0.003	5.934
1993	2.939	1.013	0.818	0.355	0.123	0.252	0.047	0.000	5.547
1994	2.724	0.882	0.862	0.330	0.141	0.263	0.042	0.000	5.244
1995	2.476	0.703	0.761	0.315	0.108	0.276	0.033	0.000	4.672
1996	1.776	0.687	0.618	0.210	0.160	0.157	0.036	0.000	3.644
1997	1.854	0.619	0.479	0.169	0.001	0.215	0.045	0.000	3.382
1998	1.695	0.582	0.392	0.198	0.022	0.164	0.033	0.001	3.087
1999	1.808	0.488	0.411	0.224	0.000	0.224	0.032	0.000	3.187
2000	2.280	0.549	0.469	0.302	0.021	0.349	0.055	0.001	4.026
2001	2.226	0.642	0.506	0.333	0.017	0.297	0.079	0.001	4.101
2002	1.898	0.551	0.677	0.244	0.015	0.280	0.085	0.000	3.750
2003	1.893	0.431	0.486	0.193	0.018	0.289	0.065	0.001	3.375
2004	1.762	0.463	0.518	0.207	0.015	0.278	0.075	0.001	3.319
2005	1.903	0.347	0.429	0.159	0.018	0.274	0.065	0.000	3.195
2006	1.828	0.381	0.338	0.146	0.022	0.221	0.040	0.001	2.977
2007	2.263	0.485	0.310	0.173	0.033	0.203	0.043	0.000	3.510
2008	1.744	0.371	0.457	0.182	0.022	0.199	0.033	0.000	3.007
2009	1.698	0.422	0.548	0.172	0.024	0.197	0.030	0.000	3.091
2010	1.469	0.385	0.466	0.118	0.037	0.191	0.026	0.000	2.692
2011	1.540	0.396	0.548	0.122	0.029	0.144	0.028	0.000	2.807
2012	1.739	0.362	0.482	0.145	0.030	0.120	0.036	0.000	2.914

Weights in thousand tonnes.

¹⁾ No official landings for the Netherlands between 1984 and 1987 in the ICES landings database. Values are inserted from the IBPNEW report (ICES, 2012).²⁾ "Other" includes Sweden and, in early years, Ireland and Faroe Islands.