

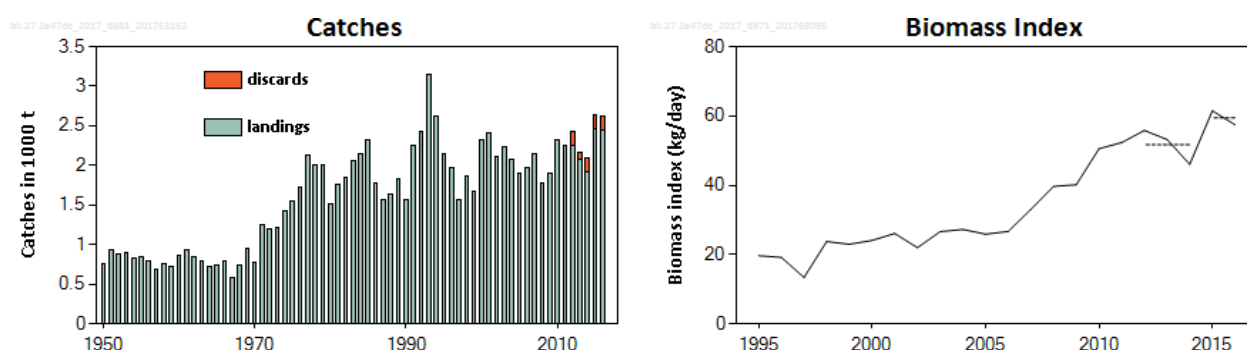
## Brill (*Scophthalmus rhombus*) in Subarea 4 and divisions 3.a and 7.d–e (North Sea, Skagerrak and Kattegat, English Channel)

### ICES stock advice

ICES advises that when the precautionary approach is applied, catches should be no more than 3170 tonnes in each of the years 2018 and 2019. If discard rates do not change from the average of the last three years (2014–2016), this implies landings of no more than 2943 tonnes.

### Stock development over time

The biomass index has been gradually increasing over the time-series with moderate interannual variability. It has been higher in the last two years than in the three previous years.

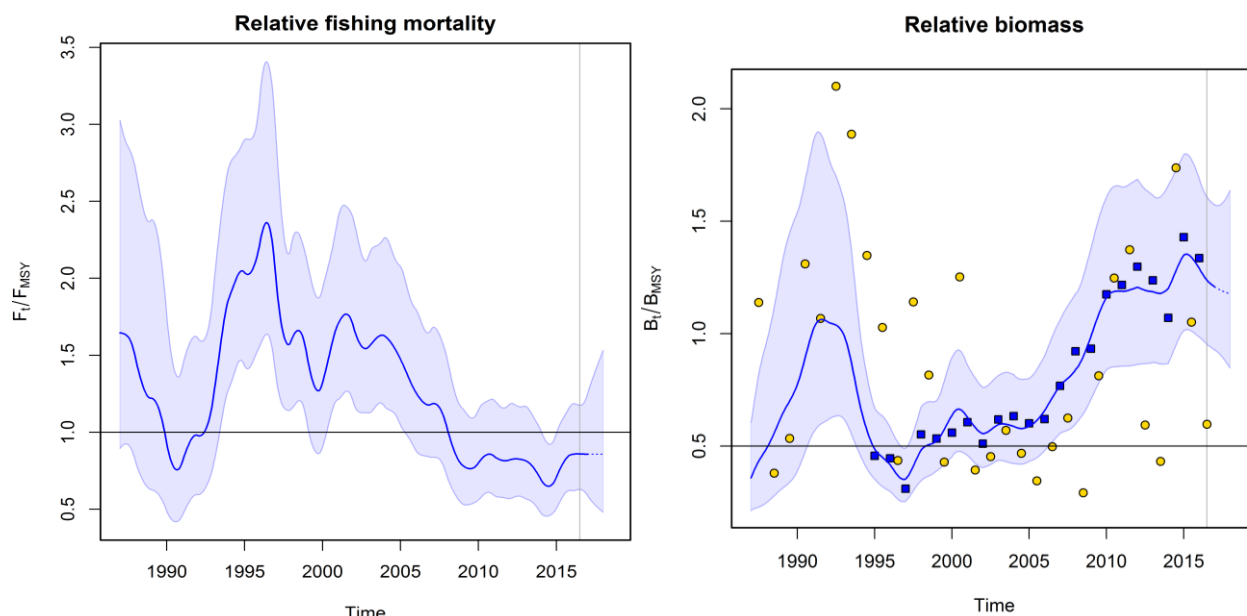


**Figure 1** Brill in Subarea 4 and divisions 3.a and 7.d–e. Summary of the stock assessment. Biomass index is the standardized lpupe from the Dutch beam-trawl fleet for vessels > 221 kW. Dashed lines indicate the average of the respective year ranges.

### Stock and exploitation status

**Table 1** Brill in Subarea 4 and divisions 3.a and 7.d–e. State of the stock and fishery relative to reference points. The fishing pressure and stock size status indicators are based on the SPiCT analyses shown in Figure 2.

		Fishing pressure				Stock size		
		2014	2015	2016		2014	2015	2016
Maximum sustainable yield	$F_{MSY}$ proxy	✓	✓	✓ Below		$MSY B_{trigger}$ proxy	✓	✓ Above
Precautionary approach	$F_{pa}, F_{lim}$	✓	✓	✓ Below possible reference points		$B_{pa}, B_{lim}$	✓	✓ Above possible reference points
Management plan	$F_{MGT}$	—	—	— Not applicable		$B_{MGT}$	—	— Not applicable
Qualitative evaluation	—	—	—	—		—	—	—



**Figure 2** Brill in Subarea 4 and divisions 3.a and 7.d–e. SPiCT analysis showing fishing mortality relative to  $F_{MSY}$  (left) and exploitable biomass relative to  $B_{MSY}$  (right). The symbols in the relative biomass plot indicate observed biomass indices (blue squares = standardized  $lpue$  from the Dutch beam-trawl fleet for vessels > 221 kW that was applied as the biomass index in the assessment; yellow dots =  $BTS\_ISI\_Q3$ ) while the shaded areas in both plots indicate 95% confidence intervals. The horizontal lines indicate levels relative to the  $F_{MSY}$  and  $MSY B_{trigger}$  proxies. The Dutch  $lpue$  index used for the SPiCT assessment is based on a longer time-series than the one for the indicator used in the advice.

## Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012). The standardized  $lpue$  from the Dutch beam-trawl fleet (vessels > 221 kW) was used as a biomass index ( $kg d^{-1}$ ). The advice is based on a comparison of the two latest values (index A) with the three preceding values (index B) and then multiplied by the recent advised catch. The index is estimated to have increased by less than 20% and thus the uncertainty cap was not applied.

The Surplus Production in Continuous Time (SPiCT; Pedersen and Berg, 2017) analysis suggests the fishing mortality is below, and the stock size above, proxies of the MSY reference points (Figure 2); therefore, no additional precautionary buffer was applied.

**Table 2** Brill in Subarea 4 and divisions 3.a and 7.d–e. The basis for the catch options.\*

Index A (2015–2016)	59 $kg d^{-1}$	
Index B (2012–2014)	52 $kg d^{-1}$	
Index ratio (A/B)	1.15	
Uncertainty cap	Not applied	-
Advised catch for 2016–2017	2756 tonnes	
Discard rate (2014–2016)	7.2%	
Precautionary buffer	Not applied	-
Catch advice**	3170 tonnes	
Landings corresponding to the catch advice***	2943 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  $\times$  index ratio.

\*\*\* Advised catch for 2016–2017  $\times$  index ratio  $\times$  (1 – discard rate).

## Basis of the advice

**Table 3** Brill in Subarea 4 and divisions 3.a and 7.d–e. The basis of the advice.

Advice basis	Precautionary approach
Management plan	ICES is not aware of any agreed precautionary management plan for brill in this area.

## Quality of the assessment

The advice is based on a commercial biomass index (Dutch beam-trawl fleet, vessels > 221 kW) used as an indicator of stock size. Between 2014 and 2017 the use of pulse trawls in the Dutch fishery operating in the North Sea has increased to 76 vessels (65 of which are > 221 kW) and a handful of vessels operating with traditional beam trawls are now left. The increased use of pulse trawls and other adaptations, like fuel-saving wings, may affect catchability and selectivity of North Sea brill. The effect of these changes on the *Ipue* as an index has not yet been quantified.

Dutch producer organizations have increased the minimum market landing size and capped the weekly landings to stay within the TAC, which has likely biased the commercial biomass index downwards for 2016.

The current surveys in this area are not designed for catching brill, especially large brill. A fishery-independent index covering the entire distribution area of the stock and targeting brill could improve the assessment.

## Issues relevant for the advice

Brill is mainly a bycatch species in fisheries for plaice and sole. Management of brill and turbot under a combined species TAC prevents effective control of the single-species exploitation rates. A TAC combining two high-value species (turbot and brill) under a low TAC can, in some instances, lead to highgrading of the lesser-valued species (brill) or to discarding of the smaller, marketable size classes of brill.

Discarding is related to the size of the fish and the size of the TAC. Subsequently, since there is a low TAC, producer organizations have agreements on minimum landing size/weight at the national level, which has likely resulted in increased discarding. The assessment uses a commercial biomass index that is solely based on landings; as a result the index and the advice may be affected by the increased discarding.

In 2017, for the first time, the fishing pressure and stock size status indicators are based on the SPiCT analyses. The *Ipue* time-series was revised in 2017, extending it backwards in time to coincide with the data used in the SPiCT analyses.

## Reference points

**Table 4** Brill in Subarea 4 and divisions 3.a and 7.d–e. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{trigger proxy}}$	$\frac{B}{B_{\text{MSY}}} = 0.5^*$	Relative value from SPiCT model. $B_{\text{MSY}}$ is estimated directly from the SPiCT assessment model and changes when the assessment is updated.	ICES (2017)
	$F_{\text{MSY proxy}}$	$\frac{F}{F_{\text{MSY}}} = 1^*$	Relative value from SPiCT model. $F_{\text{MSY}}$ is estimated directly from the SPiCT assessment model and changes when the assessment is updated.	ICES (2017)
Precautionary approach	$B_{\text{lim}}$	Not defined		
	$B_{\text{pa}}$	Not defined		
	$F_{\text{lim}}$	Not defined		
	$F_{\text{pa}}$	Not defined		
Management plan	$\text{SSB}_{\text{mgt}}$	Not defined		
	$F_{\text{mgt}}$	Not defined		

\* No reference points are defined for this stock in terms of absolute values. The SPiCT-estimated values of the ratios  $F/F_{\text{MSY}}$  and  $B/B_{\text{MSY}}$  are used to estimate stock status relative to the proxy MSY reference points.

## Basis of the assessment

**Table 5** Brill in Subarea 4 and divisions 3.a and 7.d–e. Basis of assessment and advice.

ICES stock data category	3 (ICES, 2016).
Assessment type	Commercial lpue trends-based assessment (ICES, 2017).
Input data	Commercial catches (international landings and discards), one commercial biomass index (lpue Dutch beam-trawl fleet > 221 kW).
Discards and bycatch	Discards are estimated around 7.168% (average 2014–2016). Discards are available from 2012 onwards. In 2016, discards are provided for 92.66% of the landings.
Additional indicators	SPiCT assessment.
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 6** Brill in Subarea 4 and divisions 3.a and 7.d–e. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC * in 4 and 2.a turbot & brill	Official catch in 4 and 2.a turbot & brill	Official landings in 4, 3.a, 7.d,e brill	Discards in 4, 3.a, 7.d,e brill	ICES catch in 4, 3.a, 7.d,e brill
2000		-	9000	5534	2327		
2001		-	9000	5674	2409		
2002		-	6750	5052	2108		
2003		-	5738	4721	2233		
2004		-	4877	4568	2071		
2005		-	4550	4355	1904		
2006		-	4323	4152	1964		
2007		-	4323	4750	2139		
2008		-	5263	4011	1781		
2009		-	5263	4253	1900		
2010		-	5263	4192	2317		
2011		-	4642	4304	2250		
2012	No increase in catch	-	4642	4426	2249	178	2427
2013	No new advice, same as for 2012	-	4642	4474	2082	89	2171
2014	No more than 20% increase in recent average catch (2010– 2012)	< 2727	4642	4128	1942	170	2086
2015	No new advice, same as for 2014	< 2727	4642	4677	2537	175	2645
2016	Precautionary approach (decrease catches by 6%)	< 2756	4488	4679**	2411**	177	2621
2017	Precautionary approach (same advised catch value as given for 2016)	< 2756	4937				
2018	Precautionary approach (increase catches by 15%)	< 3170					
2019	Precautionary approach (same advised catch value as given for 2018)	< 3170					

\* EU combined TAC (wanted catch) for turbot and brill in EU waters of Division 2.a and Subarea 4.

\*\* Preliminary.

## History of the catch and landings

**Table 7** Brill in Subarea 4 and divisions 3.a and 7.d–e. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings				Discards
2621 tonnes	Beam trawls 65%	Otter trawls 18%	Trammel/gillnets 10%	Other gears 6%	177 tonnes
	2444 tonnes				

**Table 8** Brill in Subarea 4 and divisions 3.a and 7.d–e. History of commercial landings by area for each country participating in the fishery. All weights are in tonnes.

Brill in Division 27.3.a							
Year	Belgium	Germany	Denmark	Netherlands	Norway	Sweden	TOTAL
1950	0	0	234	0	0	85	319
1951	0	0	260	0	4	73	337
1952	0	0	170	0	1	65	236
1953	0	0	175	0	0	71	246
1954	0	0	155	0	1	78	234
1955	0	0	150	0	0	62	212
1956	0	0	163	0	0	50	213
1957	0	0	110	0	0	38	148
1958	0	0	166	0	0	37	203
1959	0	0	175	0	0	58	233
1960	0	0	272	0	0	46	318
1961	0	0	255	0	0	50	305
1962	0	0	207	0	0	0	207
1963	0	0	120	0	0	0	120
1964	0	0	106	0	0	0	106
1965	0	0	155	0	0	0	155
1966	0	0	187	0	0	0	187
1967	0	0	106	0	0	0	106
1968	0	0	100	0	0	0	100
1969	0	0	99	0	0	0	99
1970	0	0	97	0	0	0	97
1971	0	0	104	0	0	0	104
1972	0	0	120	0	0	0	120
1973	0	0	131	0	0	0	131
1974	0	0	200	0	0	0	200
1975	0	0	167	1	0	19	187
1976	1	0	185	26	0	12	224
1977	1	0	276	99	0	12	388
1978	0	0	178	27	0	11	216
1979	0	0	156	17	0	11	184
1980	2	0	69	1	0	10	82
1981	0	0	54	0	0	5	59
1982	1	0	64	1	0	8	74
1983	0	0	73	3	0	7	83
1984	0	0	89	0	0	8	97
1985	0	0	100	0	0	10	110
1986	0	0	94	0	0	13	107
1987	0	0	93	0	0	12	105
1988	0	0	91	0	0	10	101
1989	0	0	88	0	0	9	97
1990	1	0	116	0	0	11	128
1991	1	0	81	0	7	10	99
1992	1	0	123	0	7	15	146
1993	2	0	184	0	10	16	212
1994	0	0	191	0	12	19	222

Brill in Division 27.3.a							
Year	Belgium	Germany	Denmark	Netherlands	Norway	Sweden	TOTAL
1995	0	0	124	0	13	14	151
1996	0	0	94	0	12	6	112
1997	0	0	83	0	11	12	106
1998	0	0	108	0	10	14	132
1999	0	0	126	0	13	18	157
2000	0	0	112	0	12	17	141
2001	0	0	73	0	13	12	98
2002	0	0	66	0	12	12	90
2003	0	0	99	1	12	16	128
2004	0	0	119	4	15	18	156
2005	0	0	101	3	16	13	133
2006	0	1	105	3	16	15	140
2007	0	1	119	3	15	20	158
2008	0	2	138	1	13	30	184
2009	0	1	98	1	14	33	147
2010	0	1	95	1	9	16	122
2011	0	1	103	0	15	12	131
2012	0	0	89	0	16	15	120
2013	0	0	70	0	9	13	92
2014	0	0	59	0	8	11	79
2015	0	0	104	11	8	21	144
2016	0	0	124	7	8	25	164

Brill in Subarea 27.4									
Year	Belgium	Germany	Denmark	France	UK	Netherlands	Norway	Sweden	TOTAL
1950	34	0	39	0	183	108	1	19	384
1951	23	0	53	0	322	93	1	19	511
1952	21	0	65	0	350	117	3	9	565
1953	23	0	49	0	376	130	0	11	589
1954	19	0	53	0	330	106	14	7	529
1955	23	0	51	0	357	137	3	0	571
1956	28	0	47	0	276	156	0	9	516
1957	32	0	27	0	247	154	0	8	468
1958	43	0	42	0	223	162	0	10	480
1959	41	0	30	0	219	125	0	9	424
1960	55	0	37	0	235	150	1	8	486
1961	102	0	40	0	264	166	0	9	581
1962	97	0	42	0	238	214	0	0	591
1963	79	0	59	0	307	175	0	0	620
1964	79	0	46	0	161	279	0	0	565
1965	71	0	56	0	127	281	0	0	535
1966	100	0	63	0	119	264	0	0	546
1967	138	0	29	0	105	137	0	0	409
1968	152	0	43	0	110	274	0	0	579
1969	145	0	47	0	102	364	0	0	658
1970	114	0	42	0	76	386	0	0	618
1971	187	0	72	0	94	720	0	0	1073
1972	213	0	65	0	51	665	0	0	994
1973	185	0	55	0	39	710	0	0	989
1974	135	0	68	0	44	905	0	0	1152
1975	164	0	76	13	44	925	0	0	1222
1976	148	0	65	10	45	940	0	0	1208
1977	166	0	88	17	60	1079	0	0	1410
1978	175	0	123	26	84	967	0	0	1375
1979	188	0	154	10	103	908	0	0	1363

Brill in Subarea 27.4									
Year	Belgium	Germany	Denmark	France	UK	Netherlands	Norway	Sweden	TOTAL
1980	129	0	104	8	45	747	0	0	1033
1981	148	0	66	5	42	957	0	0	1218
1982	182	0	53	11	41	1007	0	0	1294
1983	182	0	62	23	28	1153	0	0	1448
1984	190	0	73	30	29	1200	0	0	1522
1985	187	0	71	35	46	1370	0	0	1709
1986	131	0	76	4	46	950	0	0	1207
1987	140	0	50	17	48	715	0	0	970
1988	102	0	33	18	52	880	0	0	1085
1989	112	0	43	9	58	1080	0	0	1302
1990	168	0	139	24	82	480	0	0	893
1991	205	38	145	28	147	1111	8	0	1682
1992	203	59	77	34	218	1196	22	1	1810
1993	291	63	118	38	268	1647	14	0	2439
1994	208	90	109	28	235	1235	11	0	1916
1995	194	67	55	24	145	943	6	0	1434
1996	206	47	64	15	175	732	8	0	1247
1997	129	48	38	1	135	590	16	0	957
1998	160	58	58	11	172	808	16	0	1283
1999	161	51	91	0	156	805	16	0	1280
2000	167	77	93	16	141	998	16	0	1508
2001	182	66	67	12	158	1075	13	0	1573
2002	145	58	52	10	120	907	10	0	1302
2003	145	70	57	9	119	934	12	0	1346
2004	140	66	77	7	168	772	19	0	1249
2005	120	62	89	7	138	716	28	0	1160
2006	105	55	75	9	154	765	12	0	1175
2007	110	47	52	12	156	854	9	0	1240
2008	117	42	86	5	93	650	11	0	1004
2009	109	54	96	8	105	786	4	0	1162
2010	104	75	97	12	136	1072	4	0	1500
2011	101	57	122	13	137	1061	6	0	1497
2012	110	71	126	12	102	1084	7	0	1512
2013	100	63	123	10	117	972	4	0	1389
2014	98	69	96	9	116	811	9	4	1212
2015	154	115	122	7	136	1159	1	0	1694
2016	175	90	131	8	156	965	1	0	1526

Brill in Divisions 27.7.d, e								
Year	Belgium	Denmark	France	UK	Ireland	Netherlands	Channel Islands (UK)	TOTAL
1950	11	0	0	48	0	0	0	59
1951	8	0	0	70	0	0	0	78
1952	6	0	0	66	0	0	0	72
1953	2	0	0	60	0	0	0	62
1954	1	0	0	59	0	0	0	60
1955	4	0	0	57	0	0	0	61
1956	2	0	0	58	0	0	0	60
1957	4	0	0	66	0	0	0	70
1958	2	0	0	65	0	0	0	67
1959	1	0	0	58	0	0	0	59
1960	6	0	0	46	0	0	0	52
1961	1	0	0	46	0	0	0	47
1962	3	0	0	52	0	0	0	55
1963	1	0	0	50	0	0	0	51

Brill in Divisions 27.7.d, e								
Year	Belgium	Denmark	France	UK	Ireland	Netherlands	Channel Islands (UK)	TOTAL
1964	0	0	0	60	0	0	0	60
1965	2	0	0	46	0	0	0	48
1966	0	0	0	53	0	0	0	53
1967	1	0	0	66	0	0	0	67
1968	3	0	0	54	0	0	0	57
1969	2	0	121	67	0	0	0	190
1970	10	0	0	49	0	0	0	59
1971	18	0	0	48	0	0	0	66
1972	20	0	0	52	0	3	0	75
1973	20	0	0	70	0	0	0	90
1974	25	0	0	56	0	0	0	81
1975	24	0	55	56	0	0	2	137
1976	41	0	170	72	0	0	2	285
1977	45	0	197	77	0	0	4	323
1978	58	3	227	120	0	0	3	411
1979	55	0	262	140	0	0	2	459
1980	64	2	213	118	3	0	2	402
1981	83	0	271	130	0	0	6	490
1982	105	0	225	149	0	1	7	487
1983	107	0	234	181	0	1	3	526
1984	114	0	226	186	0	0	5	531
1985	94	0	213	177	0	0	10	494
1986	115	0	183	147	0	0	11	456
1987	126	0	216	141	0	0	10	493
1988	112	0	202	133	0	0	5	452
1989	89	0	213	121	0	0	2	425
1990	99	0	249	187	0	0	8	543
1991	81	0	249	140	0	0	0	470
1992	82	0	223	151	0	0	7	463
1993	78	0	256	152	0	0	4	490
1994	88	0	227	170	0	0	5	490
1995	91	0	248	200	1	0	18	558
1996	105	0	240	253	0	0	10	608
1997	107	0	185	198	1	0	10	501
1998	70	0	196	173	0	2	10	451
1999	97	0	0	127	0	3	13	240
2000	164	0	260	232	1	4	17	678
2001	212	0	256	251	0	2	17	738
2002	204	0	268	227	0	1	16	716
2003	217	0	287	238	1	1	15	759
2004	165	0	259	223	1	3	15	666
2005	138	0	267	183	0	2	21	611
2006	180	0	281	170	0	3	15	649
2007	205	0	325	199	0	1	11	741
2008	154	0	225	199	0	2	13	593
2009	131	0	278	171	0	1	10	591
2010	145	0	340	198	0	1	11	695
2011	141	0	277	204	0	0	0	622
2012	121	0	263	232	0	1	0	617
2013	143	0	237	214	0	1	6	601
2014	165	0	243	232	0	1	10	651
2015	162	0	278	248	0	2	9	699
2016	143	0	286	284	0	1	5	719



## Summary of the assessment

**Table 9** Brill in Subarea 4 and divisions 3.a and 7.d–e. Assessment summary. Weights are in tonnes.

Year	Biomass index (kg d <sup>-1</sup> )	Landings	Discards
1950		762	
1951		926	
1952		873	
1953		897	
1954		823	
1955		844	
1956		789	
1957		686	
1958		750	
1959		716	
1960		856	
1961		933	
1962		853	
1963		791	
1964		731	
1965		738	
1966		786	
1967		582	
1968		736	
1969		947	
1970		774	
1971		1243	
1972		1189	
1973		1210	
1974		1433	
1975		1546	
1976		1717	
1977		2121	
1978		2002	
1979		2006	
1980		1517	
1981		1767	
1982		1855	
1983		2057	
1984		2150	
1985		2313	
1986		1770	
1987		1568	
1988		1638	
1989		1824	
1990		1564	
1991		2251	
1992		2419	
1993		3141	
1994		2628	
1995	19.7	2143	
1996	19.2	1967	
1997	13.4	1564	
1998	23.8	1866	
1999	23.0	1677	
2000	24.1	2327	
2001	26.1	2409	

Year	Biomass index (kg d <sup>-1</sup> )	Landings	Discards
2002	22.0	2108	
2003	26.6	2233	
2004	27.3	2071	
2005	25.9	1904	
2006	26.7	1964	
2007	33.0	2139	
2008	39.7	1781	
2009	40.2	1900	
2010	50.5	2317	
2011	52.3	2250	
2012	55.8	2249	178
2013	53.2	2082	89
2014	46.0	1916	170
2015	61.5	2470	175
2016	57.4	2444	177

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