

6.3.31 Plaice (*Pleuronectes platessa*) in Subarea IV (North Sea) and Division IIIa (Skagerrak)

ICES stock advice

Please note: This advice was updated in November 2015 (ICES, 2015f).

ICES advises that when the the second stage of the EU management plan (Council Regulation No. 676/2007) is applied, catches in 2016 should be no more than 213 440 tonnes in Subarea IV and Division IIIa (Skagerrak part) combined. If this stock is not under the EU landing obligation in 2016 and discard rates do not change from the average (2012–2014), this implies landings of no more than 159 197 tonnes.

Stock development over time

The combined North Sea and Skagerrak stock is well above $MSY B_{trigger}$, increased in the past ten years, and has reached a record-high. Recruitment has been around the long-term average since the mid-2000s. In recent years, fishing mortality (F) has been estimated around F_{MSY} .

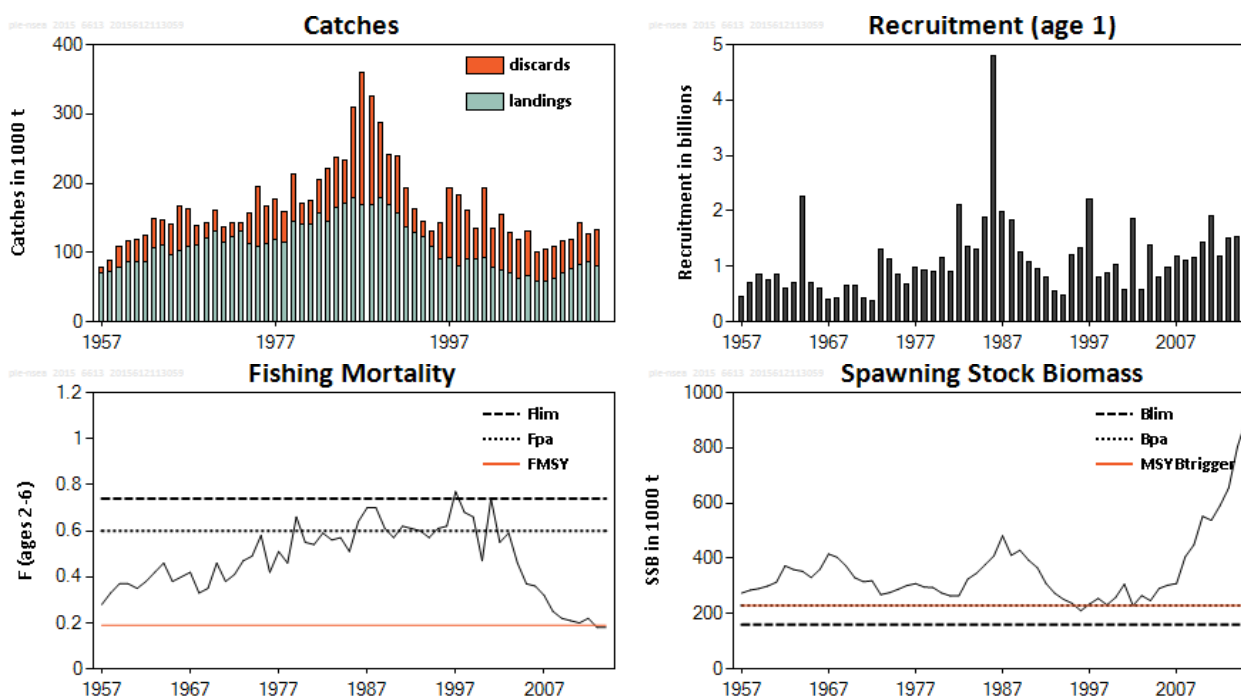


Figure 6.3.31.1 Plaice in Subarea IV and Division IIIa combined. Summary of stock assessment (weights in thousand tonnes).

Stock and exploitation status

Table 6.3.31.1 Plaice in Subarea IV and Division IIIa. State of the stock and fishery, relative to reference points.

		Fishing pressure			Stock size			
		2012	2013	2014	2013	2014	2015	
Maximum Sustainable Yield	F_{MSY}	✘	✔	✔	Appropriate	MSY	✔	Above trigger
Precautionary approach	F_{pa} , F_{lim}	✔	✔	✔	Harvested sustainably	B_{pa} , B_{lim}	✔	Full reproductive capacity
Management plan	F_{MGT}	✔	✔	✔	Below	SSB_{MGT}	✔	Above

Catch options

Following a review of the stock structure of plaice in the North Sea and the Skagerrak, the two areas are now combined in one assessment. The basis for the advice is stage 2 of the existing the EU management plan (EU, 2007) on fishing mortality and TAC constraints.

Table 6.3.31.2 Plaice in Subarea IV and Division IIIa. The basis for the catch options.

Variable	Value	Source	Notes
F ages 2–6 (2015)	0.18	ICES (2015a)	Exploitation pattern average 2012–2014 rescaled to 2014
SSB (2016)	956796 t	ICES (2015a)	Short-term forecast (STF), tonnes
R _{age1} (2015)	650882	ICES (2015a)	RCT3, thousands
R _{age1} (2016)	973397	ICES (2015a)	Geometric mean (GM, 1957–2012), thousands
Total catch (2015)	142650 t	ICES (2015a)	Tonnes
Commercial landings (2015)	99252 t	ICES (2015a)	
Discards (2015)	43355	ICES (2015a)	Average discard ratio by age 2012–2014 in numbers

Table 6.3.31.3 Plaice in Subarea IV and Division IIIa. The catch options. All weights in tonnes.

Rationale	Total catch 2016	Wanted catch (2016) *,**	Unwanted catch (2016) *,**	Basis	F(2–6) total 2016	F(2–6) Wanted catch 2016	F(2–3) Unwanted catch 2016	SSB 2017	% SSB change***	% TAC change wanted catch^
Management plan	213440	159197	54178	TAC + 15%	0.295	0.15	0.27	940500	-2	15
MSY approach	142718	106231	36442	F _{MSY}	0.19	0.1	0.18	1012053	6	-22
Precautionary approach	385933	290337	95480	F _{pa}	0.6	0.31	0.56	766690	-20	111
Zero catch	0	0	0	F = 0				1159449	21	-100
Other options	122850	91381	31431	F ₂₀₁₅ × 0.90	0.162	0.08	0.15	1032238	8	-33
	135677	100965	34669	F ₂₀₁₅	0.18	0.09	0.17	1019204	7	-26
	148308	110414	37848	F ₂₀₁₅ × 1.10	0.198	0.1	0.18	1006377	5	-19
	185819	138432	47330	Stable TAC	0.25	0.13	0.24	968468	1	0
	216350	161495	54788	F _{MP} from Management Plan	0.3	0.15	0.28	937411	-2	18
	253725	189693	63955	F ₂₀₁₅ × 2	0.36	0.19	0.33	899634	-6	38
<i>Mixed fisheries options – minor differences with calculation above can occur because of the different methodology used (ICES, 2015b).</i>										
Maximum	256904			A	0.36			895080	-6	
Minimum	53796			B	0.07			1099694	15	
Cod	121400			C	0.16			1031386	8	
SQ effort	135452			D	0.18			1017210	6	
Value	161206			E	0.21			991254	4	
Effort_Mgt	122943			F	0.16			1029829	8	

**“Wanted” and “unwanted” catch are used to described fish that would be landed and discarded in the absence of the EU landing obligation based on average discard rates estimates for 2012–2014.

** Wanted catch of plaice in Subarea IV and Division IIIa (Skagerrak part), calculated as the projected total stock wanted catch less the wanted catch of plaice from Subarea IV taken in Division VIId. The subtracted value (1384 t) is estimated based on the plaice catch advice for Division VIId for 2016, using the recent 3-year average (2012–2014) proportion of plaice from Subarea IV in the annual plaice landings in Division VIId. Similarly, 597 t of unwanted catch of plaice from Subarea IV are projected to be taken in Division VIId. These are removed from the unwanted catch. TAC change restrictions of 15% are applied after subtracting the Division VIId catches.

*** SSB 2017 relative to SSB 2016.

^ Wanted catch 2016 relative to TAC 2015.

Mixed-fisheries assumptions

(note: “fleet’s stock share” is used to describe the share of the fishing opportunities for each particular fleet, which has been calculated based on the single-stock advice for 2016 and the historical proportion of the stock landings taken by the fleet):

- A. Maximum scenario: Each fleet stops fishing when its last stock share is exhausted.
- B. Minimum scenario: Each fleet stops fishing when its first stock share is exhausted.
- C. Cod scenario: Each fleet stops fishing when its cod stock share is exhausted.
- D. SQ (*status quo*) effort scenario: The effort of each fleet in 2015 and 2016 is as in 2014.
- E. Value scenario: The effort of each fleet is equal to the weighted average of the efforts required to catch the fleet’s quota share of each of the stocks, where the weights are the relative catch values of each stock in the fleet’s portfolio.
- F. Effort management scenario: Effort reductions according to cod and flatfish management plans.

Basis of the advice

Table 6.3.31.4 Plaice in Subarea IV and Division IIIa. The basis of the advice.

Advice basis	EU management plan (EU, 2007).
Management plan	The plan consists of two stages and is now in stage two; implementation of this second stage (as stipulated in article 5 of the EC regulation) is not yet defined. Application of stage two of the plan is based on transitional arrangements until an evaluation of the plan has been conducted (as stipulated in article 5 of the EC regulation). ICES is using the existing management plan for advice on the combined stock.

Quality of the assessment

A large proportion of the catch in the western Skagerrak is considered to originate from the North Sea component of the stock, mainly in the summer on mixed feeding aggregations. Therefore, Skagerrak is now assessed together with the North Sea. The quality of the assessment is considered to have been improved by using the new stock definition.

Studies suggest that North Sea plaice has shown a shift northward into deeper waters. Juvenile plaice have been observed to be distributed more offshore in recent years. This distribution shift has been attributed to climate change (Engelhard *et al.*, 2011). For this reason, the coastal SNS survey has shown a decline in catch rates, whereas the Beam Trawl Survey has shown an increase, also in the younger ages. On this basis the SNS time-series was split into two series (before and after 2000) to improve the quality of the assessment.

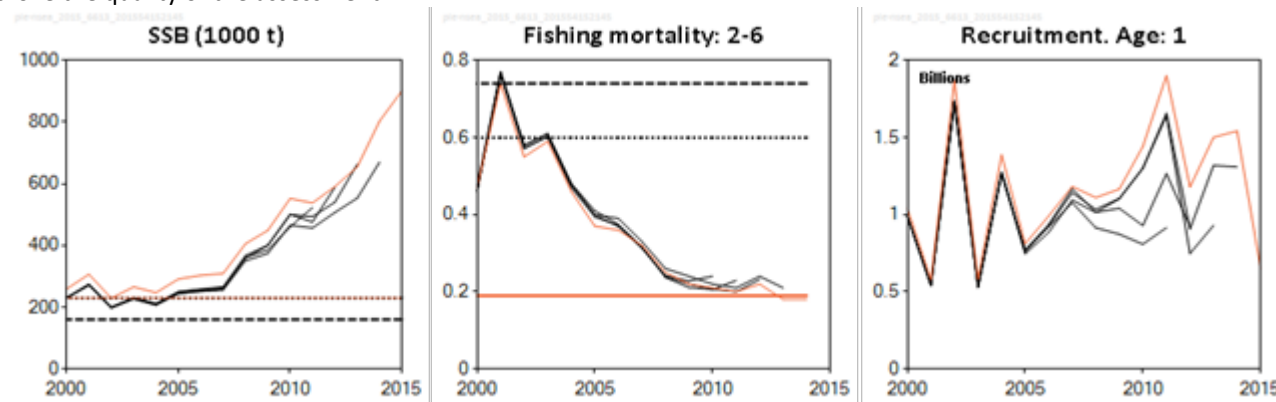


Figure 6.3.31.2 Plaice in Subarea IV and Division IIIa. Historical assessment results (final-year recruitment estimates included). Note that the scale shift in SSB is due to the addition of Skagerrak to the stock definition in 2015.

Issues relevant for the advice

Following the EU multiannual plan stage 2 would imply fishing at the target rate of 0.3, which results in a TAC (landings) increase of 18%. Therefore, the maximum TAC increase of 15% is applied.

The effect of the inclusion of the Skagerrak with the North Sea into a combined stock on the precautionary status of the EU multiannual plan based on plaice from the North Sea has not been assessed. However, given the status of the combined stock, there is no immediate concern for the stock. It is recommended that a management plan should be developed and assessed for the combined stock.

A large proportion of the catch in the western Skagerrak is considered to originate from the North Sea component of the stock, mainly in the summer on mixed feeding aggregations. There are also local plaice components resident in the Skagerrak. These cannot be easily distinguished and assessed separately. There does not appear to be much mixing of the combined stock with these local components in eastern Skagerrak. The status of these components is unknown and catches should not increase in the eastern Skagerrak to avoid local depletion.

Results from a North Sea mixed fisheries analysis are presented in ICES (2015e). Assuming fishing patterns and catchability in 2015 and 2016 are unchanged from those in 2014, and in the case of a strictly implemented discard ban, North Sea whiting and *Nephrops* FU 6 (if it was managed with an own TAC for the FU) would be the most limiting stocks, constraining 46% and 34% of the 2014 effort, respectively. Results for the plaice stock are also included as additional rows in the catch options table of this advice sheet.

Reference points

Table 6.3.31.5 Plaice in Subarea IV and Division IIIa. Reference points, values, and their technical basis. Reference points are based on the North Sea stock only (apart from F_{MSY}).

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	230000 t	Default to value of B_{pa}	
	F_{MSY}	0.19	ADGMSYREF3 for the combined stock	ICES (2014b)
Precautionary approach	B_{lim}	160000 t	$B_{loss} = 160000$ t, the lowest observed biomass in 1997 as assessed in 2004	ICES (2004)
	B_{pa}	230000 t	$1.44 \times B_{lim}$	ICES (2004)
	F_{lim}	0.74	F_{loss} for ages 2–6	ICES (2004)
	F_{pa}	0.60	5th percentile of F_{loss} (0.6) that implies $B_{eq} > B_{pa}$ and a 50% probability that $SSB \sim B_{pa}$	ICES (2004)
Management plan	SSB_{MP}	230000 t	Stage one: Article 2	EU management plan (EU, 2007)
	F_{MP}	0.30	Stage two: Article 4.2 – F_{MSY} constrained to $F \geq 0.3$	EU management plan (EU, 2007)

Basis of the assessment

Table 6.3.31.6 Plaice in Subarea IV and Division IIIa. The basis of the assessment.

ICES stock data category	1 (ICES, 2015c).
Assessment type	Age-based analytical assessment (XSA; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catches from landings, ages and length frequencies from port sampling. Three survey indices (combined BTS (BTS-Tridens and BTS-Isis; 1996–2014), BTS-Isis (1985–1995), and the SNS (split into two series, SNS1 1984–1999, SNS2 2000–2014)). Maturity-at-age assumed constant; natural mortality-at-age assumed constant at 0.1.
Discards and bycatch	Included in the assessment, data series from the majority of the fleet. Discard information in 2014 was available for 63% of the the landings in the North Sea and for 80% in the Skagerrak.
Indicators	IBTS and commercial cpue indicators in the Skagerrak.
Other information	Catch information since 1984 (landings)/2002 (discards) for plaice from Division IIIa (Skagerrak) is now added to plaice for Subarea IV (North Sea). The SNS survey was split into two time-series, 1984–1999 and 2000–2014. The Skagerrak stock component was benchmarked in 2015 (ICES, 2015d).
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed Fisheries Advice (WGMIXFISH-NS).

Information from stakeholders

The cumulative index of perceptions of the abundance of plaice (Figure 6.3.31.3) increased in all areas during the last decade (Napier, 2014).

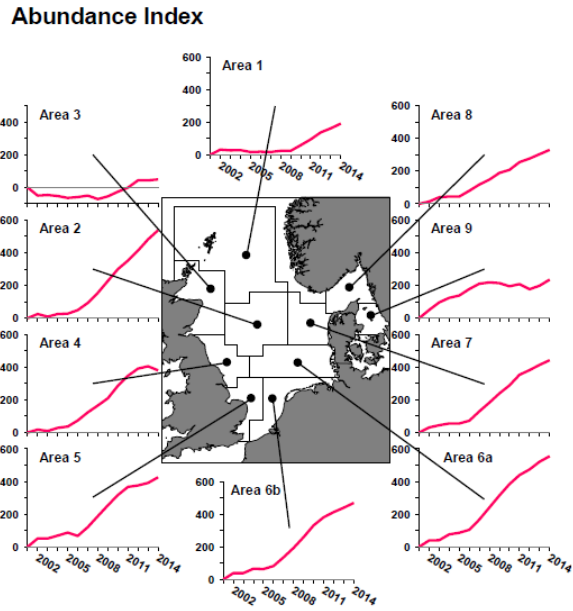


Figure 6.3.31.3 Cumulative time-series of index of perceptions of abundance of plaice, by area (see page 14 of Napier (2014) for an explanation of the index).

History of advice, catch, and management

Table 6.3.31.7a Plaice in Subarea IV (Skagerrak not included). History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice	Predicted landings corresponding to advice	Predicted catch corresp. to advice [^]	Agreed TAC	Official landings	ICES landings	ICES discards
1987	F < F(84); TAC	120		150	131	154	191
1988	70% of F(85); TAC	150		175	138	154	156
1989	Reduce F; Buffer SSB	< 175		185	152	170	108
1990	status quo F; TAC	171		180	156	156	71
1991	No increase in F; TAC	169		175	144	148	81
1992	No long-term gains in increasing F	.*		175	123	125	57
1993	No long-term gains in increasing F	170 *		175	115	117	35
1994	No long-term gains in increasing F	.*		165	110	110	24
1995	Significant reduction in F	87 **		115	96	98	22
1996	Reduction in F of 40%	61		81	80	82	52
1997	Reduction in F of 20%	80		91 ***	82	83	100
1998	Fish at F = 0.3	82		87	70	72	104
1999	Fish at F = 0.3	106		102	79	81	71
2000	Fish at F = 0.3	95		97	84	81	44
2001	Fish at F = 0.26	78		78	80	82	100
2002	F < F _{pa}	< 77		77	70	70	54
2003	Fish at F = 0.23	60		73	66	67	77
2004	Recovery plan	-		61	61	61	54
2005	Rebuild the SSB above B _{pa} in 2006	35		59	55	56	54
2006	Rebuild the SSB above B _{pa} in 2007	48		57	56	58	62
2007	Rebuild the SSB above B _{pa} in 2008	< 32		50	49	50	39
2008	Rebuild the SSB above B _{pa} in 2009	< 35		49	48	49	44
2009	Limit total landings to 55 500 t	< 55.5		55.5	NA	55	44
2010	Limit total landings to 63 825 t	< 63.8		63.8	51	61	45
2011	See scenarios	< 64.2		73.4	66	67	40
2012	Apply first stage of the management plan	< 84.410		84.4	71	74	59
2013	Apply first stage of the management plan	< 97.070		97.1	79	79	39
2014	Apply first stage of the management plan	< 111.631		111.6	69	71	52
2015	(November update) Apply second stage of the management plan	< 128.376	179.301	128.376			
2016	Apply second stage of the management plan		≤ 213.440				

* Catch at status quo F.

** Catch at 20% reduction in F.

*** After revision from 77 000 t.

[^] As of 2016 the advice is for the combined North Sea and Skagerrak stocks.

NA = not available.

Table 6.3.31.7b Plaice in Skagerrak. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes. Advice until 2012 was given for Skagerrak and Kattegat combined. For 2016 the Skagerrak has been merged with plaice in Subarea IV.

Year	ICES advice	Predicted landings correspond. to advice	Predicted catch corresp. to advice	Agreed TAC	ICES landings	ICES discards
1992	TAC	14		11.2	9.6	
1993	Precautionary TAC	-		11.2	9.9	
1994	If required, precautionary TAC	-		11.2	9.6	
1995	If required, precautionary TAC	-		11.2	9.4	
1996	If required, precautionary TAC	-		11.2	8	
1997	No advice	-		11.2	7.8	
1998	No increase in F from the present level	11.9		11.2	6.4	
1999	No increase in F from the present level	11		11.2	7	
2000	$F < F_{pa}$	11.8		11.2	7	
2001	$F < F_{pa}$	9.4		9.4	9.2	
2002	$F < F_{pa}$	8.51		6.42	7.1	0.574
2003	$F < F_{pa}$	18.4		10.4	7.1	1.437
2004	$F < F_{pa}^3$	³		9.5	8	2.873
2005	$F < F_{pa}$	< 9.5		7.6	6.1	2.081
2006	No increase in F	< 9.6		7.6	8.4	2.243
2007	Maintain current TAC	< 9.6		8.5	7.6	2.862
2008	No increase in catch	< 9.4		9.3	8.3	1.043
2009	Same advice as last year	< 9.4		9.3	6.5	0.610
2010	Same advice as last year	< 9.4		9.3	8.7	0.842
2011	Last three years' average landings (2007–2009)	< 8.0		7.9	8.2	1.040
2012	Reduce catch	-		7.9	7.6	0.846
2013	Increase catch by 7% – protect Eastern component		< 8.4	9.142	6.824	1.161
2014	Increase catch by 7% – protect Eastern component	< 8.972	< 10.196	10.056	8.981	1.022
2015	Decrease catch (2012–2013) by 13% – protect Eastern component	≤ 6.287	≤ 7.232	10.056		

History of catch and landings

Table 6.3.31.8 Plaice in Subarea IV and Division IIIa. Catch distribution by fleet in 2014 as estimated by ICES.

Catch (2014)	Landings			Discards
133623 t	53% beam trawl	41% trawl	6% other gears	52937 t
	80686 t			

Table 6.3.31.9a Plaice in Subarea IV. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Belgium NS	Denmark NS	France NS	Germany NS	Nether-lands NS	Norway NS	Sweden NS	UK NS	Others NS	Total (ICES estimate) NS	Landings (official) NS	Landings SK (ICES estimate)	Landings (NS+SK)	Discards (NS+SK)	Landings SK (official)*
1980	7005	27057	711	4319	39782	15	7	23032		139951	101928	10510	150461	31080	-
1981	6346	22026	586	3449	40049	18	3	21519		139697	93996	8 501	148198	33031	
1982	6755	24532	1046	3626	41208	17	6	20740		154546	97930	8 073	162619	49127	
1983	9716	18749	1185	2397	51328	15	22	17400		144030	100812	7 130	151160	74483	
1984	11393	22154	604	2485	61478	16	13	16853		156149	114996	7921	165772	70816	
1985	9965	28236	1010	2197	90950	23	18	15912		159838	148311	10095	171838	60549	
1986	7232	26332	751	1809	74447	21	16	17294		165347	127902	11378	178878	129953	
1987	8554	21597	1580	1794	76612	12	7	20638		153670	130794	12503	168759	190524	15694
1988	11527	20259	1773	2566	77724	21	2	24497	43	154475	138412	10820	168552	156423	12858
1989	10939	23481	2037	5341	84173	321	12	26104		169818	152408	5997	178891	107793	7710
1990	13940	26474	1339	8747	78204	1756	169	25632		156240	156261	10048	169453	71225	12078
1991	14328	24356	508	7926	67945	560	103	27839		148003	143565	6679	157277	80935	8685
1992	12006	20891	537	6818	51064	836	53	31277		125190	123482	9554	136727	57049	11823
1993	10814	16452	603	6895	48552	827	7	31128		117113	115278	9854	128506	35016	11407
1994	7951	17056	407	5697	50289	524	6	27749		110392	109679	9551	121925	23785	11334
1995	7093	13358	442	6329	44263	527	3	24395		98356	96410	9380	109348	21828	10766
1996	5765	11776	379	4780	35419	917	5	20992		81673	80033	8003	91386	52049	10517
1997	5223	13940	254	4159	34143	1620	10	22134		83048	81483	7814	92958	100145	10292
1998	5592	10087	489	2773	30541	965	2	19915	1	71534	70365	6449	79810	103751	8431
1999	6160	13468	624	3144	37513	643	4	17061		80662	78617	7049	89726	70976	8719
2000	7260	13408	547	4310	35030	883	3	20710		81150	82151	6989	90754	44311	8826
2001	6369	13797	429	4739	33290	1926	3	19147		81847	79700	9231	92912	100309	11653
2002	4859	12552	548	3927	29081	1996	2	16740		70217	69705	7102	79178	55099	8789
2003	4570	13742	343	3800	27353	1967	2	13892		66489	65669	7143	74722	79275	9110
2004	4314	12123	231	3649	23662	1744	1	15284		61436	61008	8033	70511	57478	9090
2005	3396	11385	112	3379	22271	1660	0	12705		55700	54908	6099	62796	56250	6764

Year	Belgium NS	Denmark NS	France NS	Germany NS	Nether-lands NS	Norway NS	Sweden NS	UK NS	Others NS	Total (ICES estimate) NS	Landings (official) NS	Landings SK (ICES estimate)	Landings (NS+SK)	Discards (NS+SK)	Landings SK (official)*
2006	3487	11907	132	3599	22764	1614	0	12429		57943	55933	8345	67143	64160	9565
2007	3866	8128	144	2643	21465	1224	4	11557	-	49744	49031	7621	58576	42373	8747
2008	3396	8229	125	3138	20312	1051	20	11411		48875	47682	8356	58336	46993	8657
2009	3474	N/A*	N/A*	2931	29142	1116	1	13143	-	54973	N/A*	6514	62360	45902	6748
2010	3699	435	383	3601	26689	1089	5	14765	-	60674	50666	8700	70340	46570	9057
2011	4466	11634	344	3812	29272	1223	3	15169	-	67386	65923	8218	76507	41593	8251
2012	4862	12245	281	3742	32201	1022	5	16888	-	73830	71246	7680	82018	59914	7611
2013	6462	13650	249	4903	33537	843	3	19334	-	78905	78982	6812	86222	40025	6911
2014	7105	12004	276	4203	29309	577	5	17370	-	70847	69179	9213	80686	52937	9004

*Official landings available for the combined Division IIIa area.

Table 6.3.31.9b Plaice in Skagerrak. ICES estimated landings for each country participating in the fishery.

Year	Denmark	Sweden	Germany	Belgium	Norway	Netherlands	Total
1972	5095	70			3		5168
1973	3871	80			6		3957
1974	3429	70			5		3504
1975	4888	77			6		4971
1976	9251	51		717	6		10025
1977	12855	142		846	6		13849
1978	13383	94		371	9		13857
1979	11045	67		763	9		11884
1980	9514	71		914	11		10510
1981	8115	110		263	13		8501
1982	7789	146		127	11		8073
1983	6828	155		133	14		7130
1984	7560	311		27	22		7920
1985	9646	296		136	18		10096
1986	10645	202		505	26		11378
1987	11327	241		907	27		12502
1988	9782	281		716	41		10820
1989	5414	320		230	33		5997
1990	8729	779		471	69		10048

Year	Denmark	Sweden	Germany	Belgium	Norway	Netherlands	Total
1991	5809	472	15	315	68		6679
1992	8514	381	16	537	106		9554
1993	9125	287	37	326	79		9854
1994	8783	315	37	325	91		9551
1995	8468	337	48	302	224		9379
1996	7304	260	11		428		8003
1997	7306	244	14		249		7813
1998	6132	208	11		98		6449
1999	6473	233	7		336		7049
2000	6680	230	5		67		6982
2001	9045	125			61		9231
2002	6773	141	3		164	3	7084
2003	5079	143	8		385	1484	7098
2004	5999	545	67		111	1288	8011
2005	4684	554	14		9	823	6084
2006	6563	366	21		352	1059	8361
2007	5656	281	21		166	1503	7626
2008	7163	220	17		117	775	8292
2009	5828	92	13		62	506	6500
2010	7101	127	13		103	1331	8676
2011	7746	179	13		230	15	8183
2012	7338	155	12		136	10	7651
2013	6326	160	10		138	181	6815
2014	7484	240	46		48	506	8981

Summary of the assessment

Table 6.3.31.10 Plaice in Division IV and IIIa. Assessment summary with weights (in tonnes).

Year	Recruitment Age 1	SSB tonnes	Landings tonnes	Discards tonnes	Catch	Mean F Ages 2–6	F Landings Ages 2–6	F Discards Ages 2–3
	thousands							
1957	460518	274522	70563	7880	78443	0.28	0.23	0.12
1958	700350	285276	73354	14837	88191	0.33	0.25	0.19
1959	864891	290983	79300	29864	109164	0.37	0.24	0.24
1960	760716	300102	87541	29793	117334	0.37	0.27	0.23
1961	866067	313758	85984	32490	118474	0.35	0.24	0.27
1962	593498	373171	87472	37903	125375	0.38	0.24	0.29
1963	694671	359434	107118	41258	148376	0.42	0.27	0.35
1964	2254825	353366	110540	37031	147571	0.46	0.3	0.32
1965	701920	330960	97143	43080	140223	0.38	0.28	0.24
1966	594050	360172	101834	64718	166552	0.4	0.24	0.33
1967	407196	416311	108819	54546	163365	0.42	0.25	0.31
1968	438896	404080	111534	27987	139521	0.33	0.21	0.21
1969	658811	372570	121651	21169	142820	0.35	0.26	0.17
1970	664223	330537	130342	29640	159982	0.46	0.34	0.28
1971	420332	315802	113944	22995	136939	0.38	0.29	0.21
1972	374301	319303	122843	19632	142475	0.41	0.32	0.18
1973	1320357	269029	130429	13354	143783	0.47	0.41	0.13
1974	1136003	276144	112540	44945	157485	0.49	0.41	0.2
1975	864717	288328	108536	86699	195235	0.58	0.39	0.43
1976	691694	302098	113670	53247	166917	0.42	0.3	0.27
1977	990834	308979	119188	57501	176689	0.51	0.34	0.31
1978	920721	296209	113984	45655	159639	0.46	0.35	0.22
1979	905459	294828	145347	67935	213282	0.66	0.48	0.35
1980	1148911	274897	140764	31080	171844	0.55	0.49	0.15
1981	901571	264161	141233	33031	174264	0.54	0.47	0.16
1982	2111360	265710	156153	49127	205280	0.59	0.5	0.2
1983	1368390	325125	145779	74483	220262	0.56	0.45	0.25
1984	1299666	346561	165772	70816	236588	0.57	0.43	0.26
1985	1881003	377395	171838	60549	232387	0.51	0.42	0.21
1986	4797419	408903	178878	129953	308831	0.64	0.49	0.33
1987	1979316	481714	168759	190524	359283	0.7	0.5	0.49
1988	1831280	411237	168552	156423	324975	0.7	0.44	0.5
1989	1251215	429803	178891	107793	286684	0.61	0.39	0.44
1990	1084413	393373	169453	71225	240678	0.57	0.4	0.36
1991	960137	366184	157277	80935	238212	0.62	0.41	0.43
1992	811927	309023	136727	57049	193776	0.61	0.42	0.36
1993	565983	273910	128506	35016	163522	0.6	0.48	0.25
1994	481704	252186	121925	23785	145710	0.57	0.48	0.22
1995	1198727	237700	109348	21828	131176	0.61	0.53	0.19
1996	1339800	210524	91386	52049	143435	0.62	0.48	0.32
1997	2216078	235124	92958	100145	193103	0.77	0.51	0.64
1998	815099	255425	79810	103751	183561	0.68	0.37	0.55
1999	883857	232038	89726	70976	160702	0.66	0.41	0.36
2000	1040828	258964	90754	44311	135065	0.47	0.34	0.24
2001	579126	306592	92912	100309	193221	0.74	0.33	0.64
2002	1868745	229237	79178	55099	134277	0.55	0.36	0.38
2003	582322	265587	74722	79275	153997	0.59	0.39	0.41

2004	1387269	247063	70511	57478	127989	0.46	0.28	0.39
2005	810661	291166	62796	56250	119046	0.37	0.19	0.34
2006	990524	303194	67143	64160	131303	0.36	0.2	0.36
2007	1182367	309077	58576	42373	100949	0.32	0.16	0.34
2008	1110178	405463	58336	46993	105329	0.25	0.15	0.22
2009	1165898	449107	62360	45902	108262	0.22	0.13	0.2
2010	1442054	552201	70340	46570	116910	0.21	0.12	0.18
2011	1901552	537817	76507	41593	118100	0.2	0.11	0.13
2012	1179067	591044	82018	59914	141932	0.22	0.11	0.2
2013	1501698	654913	86222	40025	126247	0.18	0.1	0.16
2014	1542295	803308	80686	52937	133623	0.18	0.08	0.18
2015	650882	901694						
Average	1121159	354125	109663	55826		0.47		

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