

Plaice (*Pleuronectes platessa*) in Division 7.a (Irish Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 3503 tonnes.

Stock development over time

The spawning-stock biomass (SSB) has increased since 2012 and has been well above $MSY B_{trigger}$ since 2013. Recruitment (R) has fluctuated but has been decreasing from 2014. Fishing mortality (F) has been rapidly decreasing since 1992 and has been below F_{MSY} since 2011.

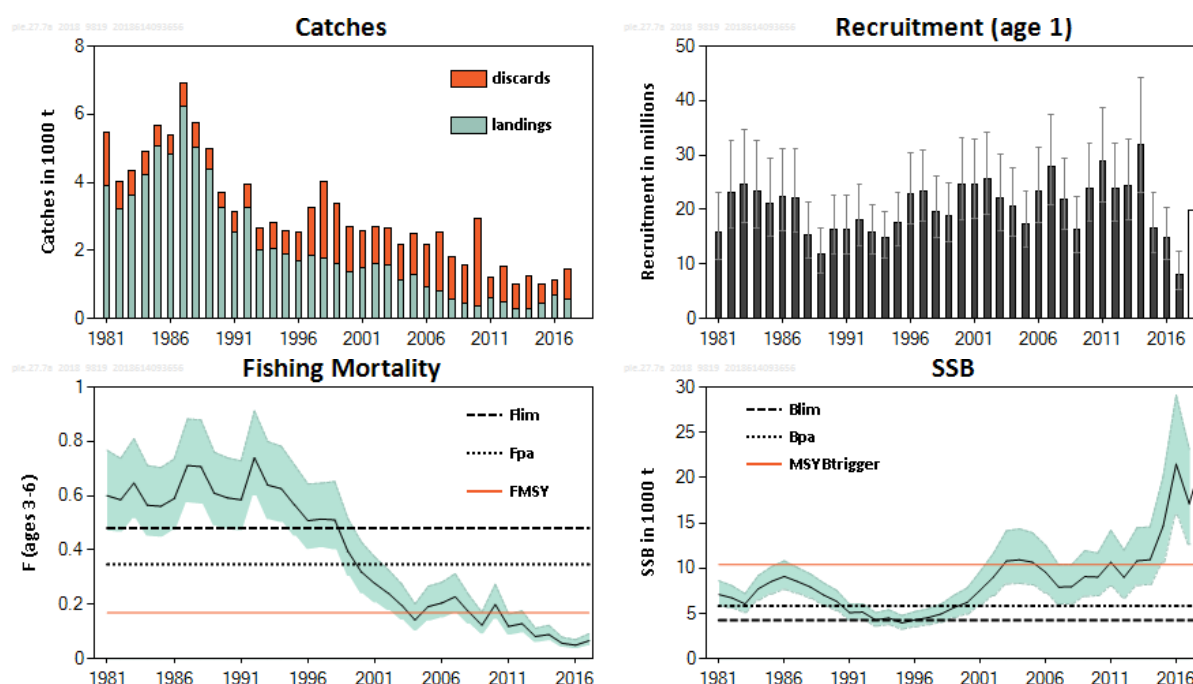


Figure 1 Plaice in Division 7.a. Summary of the stock assessment. Assumed recruitment values are not shaded. Shaded areas in F and SSB plots and error bars in the recruitment plot represent $2 \times$ standard deviation.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY} , F_{pa} and F_{lim} ; and spawning-stock size is above $MSY B_{trigger}$, B_{pa} , and B_{lim} .

Table 1 Plaice in Division 7.a. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size		
		2015	2016	2017		2016	2017	2018
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	$MSY B_{trigger}$	✓	✓
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa}, B_{lim}	✓	✓
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—
								✓
								Full reproductive capacity
								Not applicable

Catch scenarios

Table 2 Plaice in Division 7.a. Assumptions made for the interim year and the forecast.

Variable	Value	Notes
$F_{\text{ages 3-6}}$ (2018)	0.06	F_{sq} = Average of F (2015–2017)
SSB (2019)	23 088 tonnes	Fishing at F_{sq}
$R_{\text{age 1}}$ (2018)	19 912 thousands	GM (1981–2017)
Total catch (2018)	1424 tonnes	Fishing at F_{sq} plus surviving discards
Landings (2018)	816 tonnes	Average landing rate over the last three years (2015–2017) applied to the total catch
Discards (2018)	608 tonnes	Average discard rate over the last three years (2015–2017) applied to the total catch
Discard survival rate	40%	Catchpole <i>et al.</i> (2015)
Surviving discards (2018)	243 tonnes	Average discard rate over the last three years (2015–2017), assuming 40% of the discards survive
Dead discards (2018)	365 tonnes	Average discard rate over the last three years (2015–2017), assuming 60% of the discards die

Table 3 Plaice in Division 7.a. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2019)	Wanted catch (2019)	Total unwanted catch * (2019)	F_{total} (2019)	F_{wanted} (2019)	F_{unwanted} ** (2019)	SSB (2020)	% SSB change ***	% TAC change ^	% Advice change ^^
ICES advice basis										
MSY approach: F_{MSY}	3503	2131	1372	0.169	0.04	0.128	22398	–3	19	5
Other scenarios										
$F = 0$	0	0	0	0	0	0	25584	11	–100	–100
$F = F_{\text{pa}}$	6763	4123	2640	0.35	0.08	0.27	19446	–16	130	103
$F = F_{\text{lim}}$	8831	5391	3440	0.48	0.116	0.36	17582	–24	201	165
$\text{SSB}(2020) = B_{\text{lim}}$	24072	14806	9266	2.4	0.58	1.8	4250	–82	726	622
$\text{SSB}(2020) = B_{\text{pa}}$	22183	13642	8541	2.0	0.47	1.5	5825	–75	661	565
$\text{SSB}(2020) = \text{MSY } B_{\text{trigger}}$	16901	10368	6533	1.17	0.28	0.89	10392	–55	478	407
$F = F_{2018}$	1253	761	492	0.06	0.01	0.04	24443	6	–58	–62

* Dead + surviving unwanted catch.

** F_{unwanted} concerns dead unwanted catch only.

*** SSB 2020 relative to SSB 2019.

^ Wanted catch advice value for 2019 relative to TAC in 2018 (1793 t).

^^ Catch advice value for 2019 relative to catch advice value for 2018 (3336 t).

The advice for 2019 is 5% higher than that for 2018 consistent with the increase in biomass.

Basis of the advice

Table 4 Plaice in Division 7.a. The basis of the advice.

Advice basis	MSY approach
Management plan	The EU has proposed a multiannual management plan for the Western Waters, which is not yet finalized (EU, 2018).

Quality of the assessment

The assessment was benchmarked in 2017 (ICES, 2017). The assessment model (SAM; Nielsen and Berg, 2014) uses catches based on modelled estimates of discards prior to 2004. The historical (1981–2003) modelled discard estimates introduce additional uncertainty in the model. The model estimates of stock development since 2004 are more reliable as they are based on discard sampling. The assessment only uses the dead portion of the discards (60%; based on Catchpole *et al.*, 2015), but in the forecast the estimates are raised to include the surviving discards.

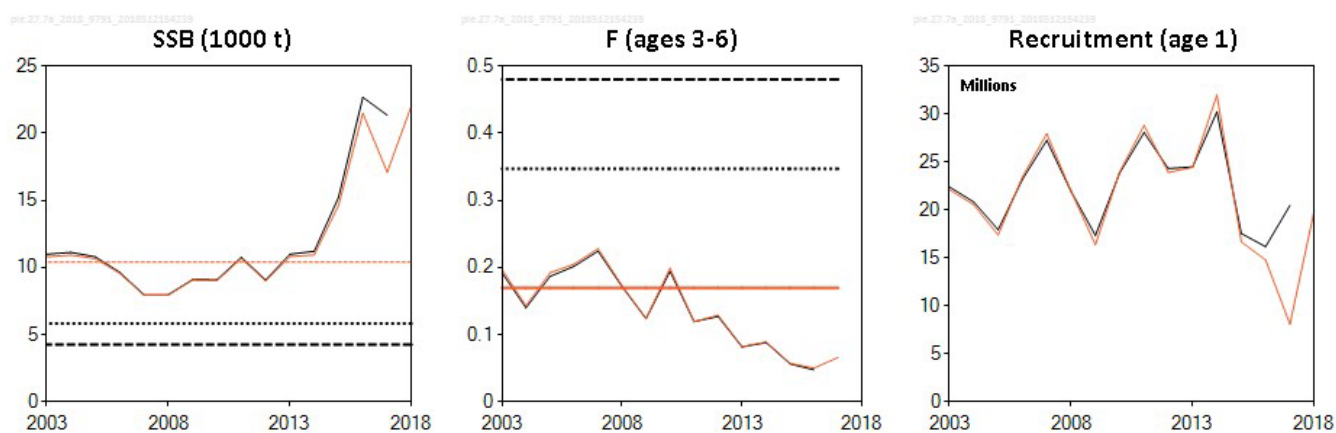


Figure 2 Plaice in Division 7.a. Historical assessment results.

Issues relevant for the advice

Since 2004, the majority of the catch has been discarded (62% average discard by weight since 2004). The rate of discarding has been variable over the time-series.

Reference points

Table 5 Plaice in Division 7.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B_{trigger}	10392 tonnes	Lower 5 th percentile of the biomass distribution in the terminal year	ICES (2017)
	F_{MSY}	0.169	Stochastic simulations with segmented regression from the entire time-series (1981–2015)	ICES(2017)
Precautionary approach	B_{lim}	4250 tonnes	Median breakpoint of a stochastic fitting of the segmented regression stock–recruitment function	ICES(2017)
	B_{pa}	5825 tonnes	$B_{\text{lim}} \times \exp(1.645 \times \sigma)$; $\sigma = 0.192$	ICES(2017)
	F_{lim}	0.48	F with 50% probability of $\text{SSB} < B_{\text{lim}}$	ICES(2017)
	F_{pa}	0.35	$F_{\text{lim}} \times \exp(-1.645 \times \sigma)$; $\sigma = 0.198$	ICES(2017)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Plaice in Division 7.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016)
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2018) that uses landings and discards in the model. Forecast is based on a deterministic approach.
Input data	Commercial catch-at-age data; three survey indices (UK (E&W)-BTS-Q3, NIGFS-WIBTS-Q1, and NIGFS-WIBTS-Q4); fixed maturity ogive; natural mortality constant over the years and different across the ages.
Discards and bycatch	Discard values available from 2004. Estimates of modelled discards for 1981–2003 (WKIRISH3; ICES, 2017). Only the dead fraction of discards (estimated to be 0.6) is accounted for in the model. In the forecast discard values are raised to include the live portion.
Indicators	None
Other information	Last benchmark in 2017 (WKIRISH3; ICES, 2017)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

There is no additional available information for this stock.

History of the advice, catch, and management

Table 7 Plaice in Division 7.a. History of ICES advice, the agreed TAC, and ICES estimates of landings and discards. Weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Landings corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards***
1987	F high; no long-term gains in increasing F	-	5000	5000	5600	6220	-
1988	No increase in F	-	4800	5000	4400	5005	-
1989	80% of F(87); TAC	-	5800	5800	4200	4372	-
1990	Halt decline in SSB; TAC	-	5100	5100	4000	3275	-
1991	Rebuild SSB to SSB(90); TAC	-	3300	4500	2800	2554	-
1992	70% of F(90)	-	3000	3800	3200	3267	-
1993	F = 0.55 ~ 2800 t	-	2800	2800	2000	1996	-
1994	Long-term gains in decreasing F	-	< 3700	3100	2100	2066	-
1995	Long-term gains in decreasing F	-	2400*	2800	2000	1874	-
1996	No long-term gain in increasing F	-	2500	2450	1900	1707	-
1997	No advice	-	-	2100	2000	1871	-
1998	No increase in F	-	2400	2400	1800	1765	-
1999	Keep F below F_{pa}	-	2400	2400	1600	1600	-
2000	Keep F below F_{pa}	-	< 2300	2400	1400	1371	-
2001	Keep F below F_{pa}	-	< 2400	2000	1500	1473	-
2002	Keep F below F_{pa}	-	< 2800	2400	1500	1623	-
2003	No increase in F	-	1900	1675	1600	1559	-
2004	$F < F_{pa}$	-	1600	1340	1100	1143	1031
2005	$F < F_{pa}$	-	2970	1608	1300	1281	1210
2006	$F < F_{pa}$	-	5900	1608	937	934	1254
2007	$F < F_{pa}$	-	6500	1849	802	805	1744
2008	$F < F_{pa}$	-	5200	1849	563	563	1268
2009	No long-term gains in increasing F above $F_{0.1}$	-	1430	1430	458	457	1132
2010	No long-term gains in increasing F above $F_{0.1}$	-	1630	1630	377	378	2561
2011	Effort should be consistent with no increase in catches	-	-	1627	596	595	603
2012	Catches should not increase	-	-	1627	508	503	1010
2013	Landings should be no more than 2% more than recent landings (last 3 years)	-	< 490	1627	339	303	725
2014	Catches should be no more than 1% more than recent catches (last 3 years)	< 1827	< 497	1220	282	287	943
2015	Catches should be no more than recent catches (last 3 years)	< 1244	< 394	1098	439	440	572
2016	Precautionary approach (same advised catch value as given for 2015)	≤ 1244	$\leq 343^{**}$	1098	742*	682	437
2017	Precautionary approach (same advised catch value as given for 2015)	≤ 1493	$\leq 436^{**}$	1098	585*	586	852
2018	MSY approach	≤ 3336	$\leq 1793^{**}$	1793			
2019	MSY approach	≤ 3503					

* Preliminary.

** Wanted catch.

*** Total discards.

History of the catch and landings

Table 8 Plaice in Division 7.a. Catch distribution by fleet in 2017 as estimated by ICES.

Catch		Landings			Discards		
76% dead	24% surviving	Beam trawl	Otter trawl	Other gears	Beam trawl	Otter trawl	Other gear types
1438 t		58%	32%	10%	52%	40%	8%
		586 t			852 t		
					60% dead		40% surviving

Table 9 Plaice in Division 7.a. History of commercial catch and landings for each country participating in the fishery; both the official and ICES estimated values are presented. Weights in tonnes.

Year	Belgium	France	Ireland	Netherlands	UK (NI, Eng. & Wales)	UK (Isle of Man)	UK (Scotland)	Total official landings	ICES discards	Unallocated	ICES estimates of catches
1994	332	13	547	-	1082	14	63	2051	863	15	2801
1995	327	10	557	-	1050	20	60	2024	747	-150	2592
1996	344	11	538	69	878	16	18	1874	832	-167	2518
1997	459	8	543	110	798	11	25	1954	1285	-83	3246
1998	327	8	730	27	679	14	18	1803	1952	-38	4028
1999	275	5	541	30	687	5	23	1566	1657	34	3397
2000	325	14	420	47	610	6	21	1443	1223	-72	2678
2001	482	9	378	-	607	1	11	1488	1070	-15	2573
2002	636	8	370	-	569	1	7	1591	1135	32	2708
2003	628	7	490	-	409	1	9	1544	1077	15	2668
2004	431	2	328	-	369	0	4	1134	927	9	2173
2005	566	9	272	-	422	0	1	1270	1183	11	2492
2006	343	2	179	0	413	0	0	937	1330	-3	2188
2007	194	2	194	0	412	0	0	802	1523	3	2549
2008	157	2	102	0	300	1	1	562	1298	1	1830
2009	197	0	73	0	185	1	2	457	1022	0	1588
2010	138	0	89	0	148	0	3	379	2295	-1	2939
2011	332	0	118	0	145	0	0	594	763	1	1198
2012	236	0	106	0	154	0	0	496	865	7	1511
2013	144	0	67	0	91	0	0	303	695	0	1028
2014	100	0	123	0	59	0	0	282	913	5	1230
2015	115	0	244	0	80	0	0	439	492	1	1012
2016	82	0	605	-	56	-	-	742*	498	-60	1119
2017	77	0	446	-	62	-	-	585*	852	1	1438

* Preliminary.

Summary of the assessment

Table 10 Plaice in Division 7.a. Assessment summary. Weights are in tonnes. High and low refer to 2 × standard deviation.

Year	Recruitment (age 1)	High	Low	SSB	High	Low	Landings	Dead discards	Surviving discards	F (ages 3–6)	High	Low
1981	15792	23225	10738	7089	8602	5843	3665	816	544	0.60	0.77	0.47
1982	23236	32753	16484	6719	8062	5599	3476	534	356	0.59	0.74	0.47
1983	24734	34630	17666	6060	7174	5119	3515	413	275	0.65	0.81	0.52
1984	23321	32553	16707	7708	9163	6485	4211	367	245	0.56	0.71	0.45
1985	21154	29503	15168	8526	10144	7166	4775	338	226	0.56	0.70	0.45
1986	22297	31067	16003	9090	10804	7649	5059	365	243	0.59	0.74	0.47
1987	22197	31096	15845	8527	10062	7226	5474	367	245	0.71	0.88	0.57
1988	15396	21426	11064	7923	9358	6708	4832	440	294	0.71	0.88	0.57
1989	11727	16627	8271	7043	8381	5919	4046	343	228	0.61	0.76	0.49
1990	16322	22679	11747	6352	7560	5337	3440	276	184	0.59	0.74	0.47
1991	16368	22584	11862	5091	6012	4311	2642	310	207	0.59	0.73	0.47
1992	18150	24749	13311	5153	6083	4365	3054	406	271	0.74	0.91	0.60
1993	15731	20771	11915	4277	5073	3606	2212	504	336	0.64	0.80	0.51
1994	14760	19516	11163	4504	5406	3753	2312	518	345	0.63	0.78	0.50
1995	17590	23227	13321	3958	4767	3287	1913	448	299	0.57	0.71	0.45
1996	22949	30322	17369	4288	5202	3534	1774	499	332	0.51	0.64	0.40
1997	23437	30897	17779	4545	5510	3749	1733	771	514	0.51	0.65	0.41
1998	19709	26013	14932	4935	6030	4040	1549	1171	781	0.51	0.65	0.40
1999	18768	24908	14141	5660	7019	4563	1534	994	663	0.39	0.51	0.30
2000	24530	33239	18103	6215	7806	4949	1452	734	489	0.32	0.43	0.24
2001	24606	32813	18451	7583	9654	5957	1561	642	428	0.28	0.37	0.21
2002	25510	34199	19028	9005	11614	6982	1557	681	454	0.24	0.33	0.177
2003	22122	30175	16218	10791	14122	8245	1535	646	431	0.197	0.28	0.142
2004	20546	27765	15203	10922	14335	8321	1095	556	371	0.143	0.20	0.102
2005	17393	23311	12977	10658	13909	8166	1304	710	473	0.192	0.27	0.138
2006	23465	31322	17579	9558	12523	7295	1083	798	532	0.21	0.28	0.149
2007	27973	37549	20838	7922	10379	6046	762	914	609	0.23	0.31	0.167
2008	21970	29393	16421	7952	10388	6087	633	779	520	0.173	0.24	0.127
2009	16367	22274	12027	9065	11932	6886	476	613	408	0.124	0.171	0.090
2010	23990	32163	17895	9014	11667	6965	362	1377	918	0.199	0.27	0.144
2011	28822	38808	21406	10663	14180	8019	687	458	305	0.119	0.164	0.086
2012	23929	32175	17795	8983	11990	6730	460	519	346	0.129	0.176	0.094
2013	24452	32881	18184	10811	14463	8082	372	417	278	0.082	0.112	0.059
2014	31994	44143	23189	10934	14551	8216	339	548	365	0.089	0.123	0.065
2015	16676	23099	12039	14636	20087	10664	417	295	197	0.057	0.079	0.041
2016	14782	20402	10710	21496	29109	15874	674	299	199	0.050	0.070	0.036
2017	8085	12257	5333	17106	23156	12636	586	511	341	0.066	0.092	0.047
2018	19912*			22077								

*GM recruitment (1981–2017).

Sources and references

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