

Catch scenarios

Table 2 Plaice in Subarea 4 and Subdivision 20. Assumptions made for the interim year and in the forecast. All weights are in tonnes, recruitment is in thousands.

Variable	Value	Notes
$F_{\text{ages 2-6}}$ (2020)	0.167	Average exploitation pattern (2017–2019), scaled to average $F_{\text{ages 2-6}}$ in 2019
SSB (2021)	1 161 280	Short-term forecast (STF)
R_{age1} (2020–2021)	1 299 703	Geometric mean (GM, 2007–2016)
Total catch (2020)	114 441	STF
Projected landings (2020)	58 854	STF, average landings rate by age 2017–2019
Projected discards (2020)	55 587	STF, average discards rate by age 2017–2019

Table 3 Plaice in Subarea 4 and Subdivision 20. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2021)	Projected landings * (2021)	Projected discards ** (2021)	$F_{\text{total ages 2-6}}$ (2021) ^{^^^}	$F_{\text{projected landings ages 2-6}}$ (2021)	$F_{\text{projected discards ages 2-3}}$ (2021)	SSB (2022)	% SSB change ***	% TAC change ^	% advice change ^^
ICES advice basis										
MSY approach: F_{MSY}	167785	91424	76361	0.21	0.085	0.21	1251928	7.8	0.77	0.77
Other scenarios										
$F = \text{MAP } F_{\text{MSY}}$ upper	230033	125931	104102	0.30	0.121	0.30	1192176	2.7	38	38
$F = \text{MAP } F_{\text{MSY}}$ lower	119975	65183	54792	0.146	0.059	0.146	1298045	11.8	-28	-28
$F = 0$	0	0	0	0.00	0.00	0.00	1416031	22	-100	-100
F_{pa}	274144	150643	123501	0.37	0.149	0.37	1150050	-0.97	65	65
F_{lim}	358855	198795	160060	0.52	0.21	0.52	1069713	-7.9	116	116
SSB (2022) = B_{lim}	1382057	979775	402282	12.1	4.9	12.1	207288	-82	730	730
SSB (2022) = B_{pa}	1274334	875492	398842	8.5	3.4	8.5	290203	-75	670	670
SSB (2022) = MSY B_{trigger}	925459	567592	357867	2.8	1.13	2.8	564599	-51	460	460
Rollover TAC	166499	90713	75786	0.21	0.084	0.21	1253171	7.9	0	0
$F_{2021} = F_{2020}$	136005	73957	62048	0.167	0.068	0.167	1282562	10.4	-18.3	-18.3

* “Projected” (marketable) landings and discards are used to describe fish that would be landed and discarded in the absence of the EU landing obligation, based on average discard rate estimates for 2017–2019. Both projected landing and projected discards refer to Subarea 4 and Subdivision 20, calculated as the projected total stock catch (including Division 7.d) deducted by the catch of plaice from Subarea 4 taken in Division 7.d in 2021. The subtracted value (633 t of projected landings and 920 t of projected discards) is estimated based on the plaice catch advice for Division 7.d for 2021.

** Including BMS landings (EU stocks), assuming recent discard rates.

*** SSB 2022 relative to SSB 2021.

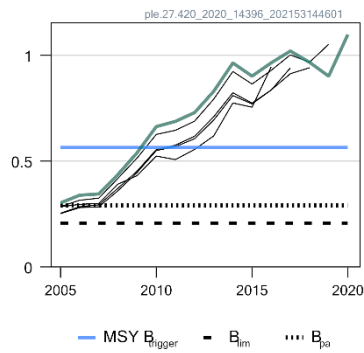
^ Total catch in 2021 relative to the combined TAC of Subarea 4 and Subdivision 20 in 2020 (166 499 t).

^^ Total catch in 2021 relative to the advice value 2020 (166 499 t).

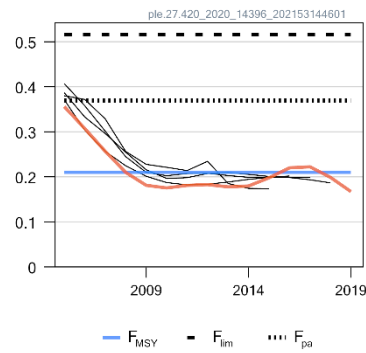
^^^ $F_{\text{projected landings}}$ and $F_{\text{projected discards}}$ do not sum up to the F_{total} , as they are calculated using different ages.

Quality of the assessment

Spawning Stock Biomass



Fishing pressure (ages 2-6)



Rec (age 1; Billions)

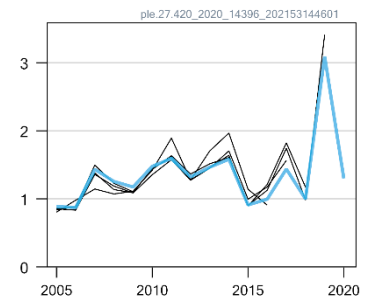


Figure 2 Plaice in Subarea 4 and Subdivision 20. Historical assessment results (final-year recruitment included for each line, corresponding to the forecast recruitment in the interim year).

History of the advice, catch, and management

Table 4a Plaice in Subarea 4 and Subdivision 20. **North Sea (Subarea 4)**. ICES advice, TAC, and official and ICES estimates of landings and discards. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards
1987	F < F (84); TAC	120000		150000	130794	153670	190524
1988	70% of F (85); TAC	150000		175000	138412	154475	156423
1989	Reduce F; Buffer SSB	< 175000		185000	152408	169818	107793
1990	Status quo F; TAC	171000		180000	156261	156240	71225
1991	No increase in F; TAC	169000		175000	143565	148003	80935
1992	No long-term gains in increasing F	- *		175000	123482	125190	57049
1993	No long-term gains in increasing F	170000 *		175000	115278	117113	35016
1994	No long-term gains in increasing F	- *		165000	109679	110392	23785
1995	Significant reduction in F	87000 **		115000	96410	98356	21828
1996	Reduction in F of 40%	61000		81000	80033	81673	52049
1997	Reduction in F of 20%	80000		91000 ***	81483	83048	100145
1998	Fish at F = 0.3	82000		87000	70365	71534	103751
1999	Fish at F = 0.3	106000		102000	78617	80662	70976
2000	Fish at F = 0.3	95000		97000	82151	81150	44311
2001	Fish at F = 0.26	78000		78000	79700	81847	100309
2002	F < F _{pa}	< 77000		77000	69705	70217	54525
2003	Fish at F = 0.23	60000		73000	65669	66489	77838
2004	Recovery plan	-		61000	61008	61436	54605
2005	Rebuild the SSB above B _{pa} in 2006	35000		59000	54908	55700	54169
2006	Rebuild the SSB above B _{pa} in 2007	48000		57000	55933	57943	61917
2007	Rebuild the SSB above B _{pa} in 2008	< 32000		50000	49031	49744	39511
2008	Rebuild the SSB above B _{pa} in 2009	< 35000		49000	47682	48875	45950
2009	Limit total landings to 55 500 t	< 55500		55500	NA	54973	45292
2010	Limit total landings to 63 825 t	< 63800		63800	50666	60674	45728
2011	See scenarios	< 64200		73400	65923	67386	40553
2012	Apply first stage of the management plan	< 84410		84400	71246	73830	59068
2013	Apply first stage of the management plan	< 97070		97100	78982	78905	38864
2014	Apply first stage of the management plan	< 111631		111600	69179	70847	51915
2015	(November update) Apply second stage of the management plan	< 128376	179301	128376	74807	74963	49432
2016	Apply second stage of the management plan	-	≤ 216345 ^	131714	78659	81059	42063 ^^^
2017	MSY approach	-	≤ 158201 ^	129917	64352	65442	37613 ^^^
2018	MSY approach	-	≤ 142481 ^	112643	49513	50783	46305 ^^^
2019	MSY approach	-	≤ 142217 ^	125435	39374	39972	33397 ^^^
2020	MSY approach	-	≤ 166499 ^	146852			
2021	MSY approach	-	≤ 167785 ^,^^				

* Catch at *status quo* F.

** Catch at 20% reduction in F.

*** After revision from 77 000 t.

^ From 2016 onwards, the advice is for the combined North Sea and Skagerrak stock.

^^ Corrected due to updated historical survey indices. Previous advice was ≤ 162607.

^^^ Since 2016, discards include BMS landings.

NA = not available.

Table 4b Plaice in Subarea 4 and Subdivision 20. **Skagerrak (Subdivision 20)**. ICES advice, TAC, and ICES estimates of landings and discards. All weights are in tonnes. Advice until 2012 was provided for Skagerrak and Kattegat separately. Since 2016, the Skagerrak component has been merged with plaice in Subarea 4.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	Agreed TAC	ICES landings	ICES discards
1992	TAC	14000		11200	9554	
1993	Precautionary TAC	-		11200	9854	
1994	If required, precautionary TAC	-		11200	9551	
1995	If required, precautionary TAC	-		11200	9380	
1996	If required, precautionary TAC	-		11200	8003	
1997	No advice	-		11200	7814	
1998	No increase in F from the present level	11900		11200	6449	
1999	No increase in F from the present level	11000		11200	7049	
2000	$F < F_{pa}$	11800		11200	6989	
2001	$F < F_{pa}$	9400		9400	9231	
2002	$F < F_{pa}$	8510		6420	7102	574
2003	$F < F_{pa}$	18400		10400	7143	1437
2004	$F < F_{pa}$	*		9500	8033	2873
2005	$F < F_{pa}$	< 9500		7600	6099	2081
2006	No increase in F	< 9600		7600	8345	2243
2007	Maintain current TAC	< 9600		8500	7621	2862
2008	No increase in catch	< 9400		9300	8356	1043
2009	Same advice as last year	< 9400		9300	6514	610
2010	Same advice as last year	< 9400		9300	8700	842
2011	Average landings from last three years (2007–2009)	< 8000		7900	8218	1040
2012	Reduce catch	-		7900	7680	846
2013	Increase catch by 7% – protect eastern component		< 8400	9142	6812	1161
2014	Increase catch by 7% – protect Eastern component	< 8972	< 10196	10056	9213	1022
2015	Decrease catch (2012–2013) by 13% – protect Eastern component	≤ 6287	≤ 7232	10056	9804	676
2016	Apply second stage of the management plan	-	≤ 216345 ^	11766	10900	1908 **
2017	MSY approach	-	≤ 158201 ^	17639	8775	1353 **
2018	MSY approach	-	≤ 142481 ^	15343	6229	1487 **
2019	MSY approach	-	≤ 142217 ^	16782	8091	3316 **
2020	MSY approach	-	≤ 166499 ^	19647		
2021	MSY approach	-	≤ 167785 ^,^^			

* The exploitation of this stock should be conducted in the context of mixed fisheries.

** Since 2016, discards include BMS landings.

^ From 2016 onwards, the advice is for the combined North Sea and Skagerrak stock.

^^ Corrected due to updated historical survey indices. Previous advice was ≤ 162607 .

Summary of the assessment

Table 5 Plaice in Subarea 4 and Subdivision 20. Assessment summary. Recruitments are in thousands, weights are in tonnes. High and low refer to 95% confidence intervals.

Year	Recruitment			Spawning-stock biomass			Fishing pressure			Landings *	Discards	Official BMS landings
	Age 1	Low	High	SSB	Low	High	Ages 2–6	Low	High			
1957	47750	42069	54164	342297	288104	396496	0.24	0.21	0.28	70563	7880	
1958	71043	62769	80468	355213	300638	409782	0.28	0.25	0.31	73354	14837	
1959	87548	77186	99394	362378	308008	416752	0.31	0.27	0.34	79300	29864	
1960	80772	71134	91722	381172	326822	435518	0.32	0.29	0.36	87541	29793	
1961	86422	76073	98261	392960	339992	445928	0.33	0.29	0.36	85984	32490	
1962	61377	53889	69852	483141	413280	553000	0.34	0.30	0.37	87472	37903	
1963	60823	53530	69067	441325	384492	498148	0.36	0.33	0.40	107118	41258	
1964	246221	218745	277386	431475	376268	486672	0.39	0.35	0.43	110540	37031	
1965	66426	59017	74701	385007	344794	425226	0.39	0.35	0.43	97143	43080	
1966	57766	51337	65034	404553	359248	449852	0.37	0.33	0.40	101834	64718	
1967	42867	37884	48462	473262	424362	522158	0.35	0.31	0.38	108819	54546	
1968	41964	36833	47796	460248	415808	504692	0.35	0.32	0.38	111534	27987	
1969	67201	58440	77272	404713	365418	444002	0.36	0.33	0.40	121651	21169	
1970	67394	58667	77436	371905	332568	411232	0.37	0.34	0.40	130342	29640	
1971	42530	37109	48786	360121	323394	396846	0.37	0.34	0.40	113944	22995	
1972	36271	31477	41765	363462	327690	399230	0.39	0.36	0.43	122843	19632	
1973	142545	123736	164214	302814	272036	333584	0.44	0.40	0.47	130429	13354	
1974	109257	93833	127206	302117	274740	329500	0.48	0.44	0.52	112540	44945	
1975	78815	67275	92252	304426	278820	330040	0.48	0.44	0.52	108536	86699	
1976	66555	56266	78667	326686	301832	351548	0.45	0.41	0.48	113670	53247	
1977	102967	85774	123669	324852	301636	348064	0.44	0.40	0.47	119188	57501	
1978	87622	73801	103954	327106	304368	349852	0.47	0.44	0.50	113984	45655	
1979	92060	77306	109678	306008	283496	328524	0.53	0.49	0.57	145347	67935	
1980	109638	93537	128633	321876	297918	345842	0.56	0.52	0.60	140764	31080	
1981	100096	85978	116423	289958	268476	311444	0.55	0.51	0.59	141233	33031	
1982	191378	164867	222334	280675	260270	301070	0.53	0.49	0.57	156153	49127	
1983	135165	116471	156911	334876	312454	357306	0.51	0.47	0.54	145779	74483	
1984	130646	110702	154235	365882	342054	389706	0.50	0.47	0.54	165772	70816	
1985	185098	156383	218987	400334	376074	424586	0.54	0.51	0.58	171838	60549	
1986	440558	371696	521778	415269	389738	440802	0.61	0.57	0.64	178878	129953	
1987	187191	158901	220310	469430	440206	498654	0.64	0.60	0.69	168759	190524	
1988	173363	149658	200931	414385	388990	439770	0.62	0.58	0.65	168552	156423	

Year	Recruitment			Spawning-stock biomass			Fishing pressure			Landings *	Discards	Official BMS landings
	Age 1	Low	High	SSB	Low	High	Ages 2–6	Low	High			
1989	127632	110022	147915	446828	419324	474336	0.59	0.55	0.63	178891	107793	
1990	112526	97169	130434	405629	383450	427810	0.60	0.56	0.63	169453	71225	
1991	98887	84762	115293	366627	345966	387294	0.63	0.59	0.66	157277	80935	
1992	81114	69622	94466	309866	293229	326511	0.63	0.59	0.67	136727	57049	
1993	53293	46309	61312	273605	257984	289236	0.58	0.55	0.61	128506	35016	
1994	60499	52553	69651	235705	221381	250019	0.56	0.52	0.59	121925	23785	
1995	100667	87278	116073	233946	218776	249124	0.60	0.56	0.63	109348	21828	
1996	86468	75494	99014	213982	197803	230157	0.68	0.63	0.72	91386	52049	
1997	228662	202279	258701	204775	188287	221253	0.70	0.65	0.76	92958	100145	
1998	81313	72101	91767	233306	213914	252706	0.65	0.60	0.70	79810	103751	
1999	75576	66441	85885	230981	210584	251376	0.59	0.54	0.64	89726	70976	
2000	89223	78277	101603	256948	232542	281358	0.57	0.52	0.62	90754	44311	
2001	60290	52765	68956	256465	229476	283464	0.57	0.52	0.62	92912	100309	
2002	174090	152051	199358	236801	208154	265446	0.55	0.49	0.61	79178	55099	
2003	60919	53020	70011	265898	229878	301922	0.48	0.43	0.54	74722	79275	
2004	136498	118388	157489	267846	225840	309860	0.41	0.35	0.47	70511	57478	
2005	88816	77721	101513	302437	252584	352296	0.36	0.30	0.41	62796	56250	
2006	87223	76471	99525	338826	278866	398794	0.31	0.26	0.36	67143	64160	
2007	143180	125631	163036	344640	280528	408752	0.26	0.21	0.30	58576	42373	
2008	125496	110470	142676	436680	353490	519870	0.21	0.173	0.25	58336	46993	
2009	117324	102721	133928	539661	434348	644972	0.181	0.147	0.22	62360	45902	
2010	147685	130491	167003	663144	532528	793752	0.175	0.143	0.21	70340	46570	
2011	159367	141132	180120	687927	549978	825882	0.181	0.149	0.21	76507	41593	
2012	132297	117376	148999	729305	581110	877490	0.183	0.151	0.21	82018	59914	
2013	146509	129867	165143	830259	663168	997352	0.178	0.148	0.21	86222	40025	
2014	158070	138783	179902	964101	766770	1161430	0.180	0.149	0.21	80686	52937	
2015	90973	79685	103880	901874	717204	1086536	0.198	0.166	0.23	85360	49100	
2016	99456	85893	115147	964686	759770	1169610	0.22	0.183	0.26	92744	44205**	0
2017	143736	120821	170889	1020551	796540	1244660	0.22	0.184	0.26	74928	39355**	7
2018	99790	78900	126108	967322	746760	1187880	0.199	0.164	0.23	57800	47877**	109
2019	309324	215237	444780	901578	700820	1102340	0.167	0.130	0.20	48745	37126**	220
2020	1299703***			1098391****								

* These values include part of the catches in Division 7.d in the first quarter (Q1).

** Since 2016, discards minus the BMS landings from EU fleets officially reported in logbooks.

*** GM estimate of 2007–2016: the last ten years prior to the recent three years.

**** Survivals from the assessment.

Sources and references

ICES. 2020. ICES 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. 2021. Plaice (*Pleuronectes platessa*) in Subarea 4 (North Sea) and Subdivision 20 (Skagerrak). In Report of the ICES Advisory Committee, 2021. ICES Advice 2020, ple.27.420.
<https://doi.org/10.17895/ices.advice.8113>.