

## Plaice (*Pleuronectes platessa*) in Subarea 4 (North Sea) and Subdivision 20 (Skagerrak). Replacing advice provided in 2022

### ICES advice on fishing opportunities

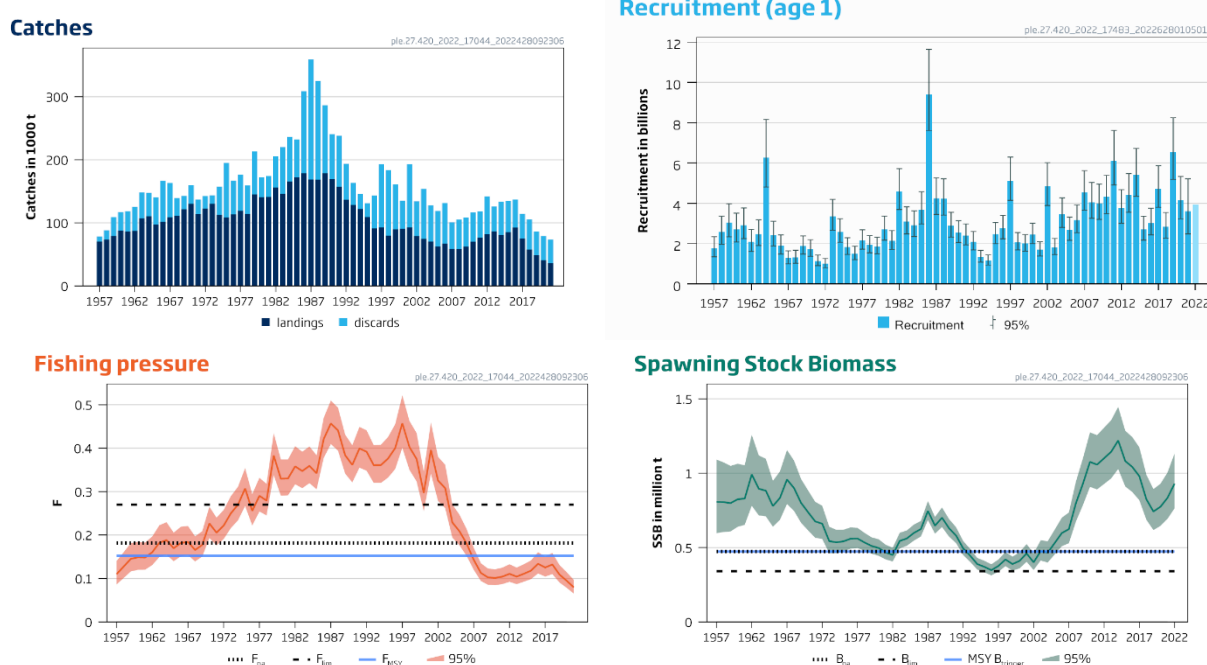
**Please note: The present advice replaces the advice given in June 2022 for catches in 2023.**

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 149 987<sup>†</sup> tonnes.

ICES notes the existence of a precautionary management plan, developed and adopted by one of the relevant management authorities for this stock.

### Stock development over time

Fishing pressure on the stock is below  $F_{MSY}$  and spawning-stock size is above MSY  $B_{trigger}$ ,  $B_{pa}$ , and,  $B_{lim}$ .



**Figure 1** Plaice in Subarea 4 and Subdivision 20. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a lighter colour.

### Catch scenarios

**Table 1** Plaice in Subarea 4 and Subdivision 20. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 2-6}$ (2022)	0.080	$F_{sq} = F_{ages\ 2-6}$ (2021).
SSB (2023)	977 491	Short-term forecast (STF); tonnes
$R_{age1}$ (2022–2023)	3 952 706	Resampled recruitments from the years 2012–2021 (geometric mean shown); thousands
Total catch (2022)	79 774	STF, using exploitation pattern and $F_{ages\ 2-6}$ in 2021; tonnes

<sup>†</sup>Advice correction: The advice given in 2022 was recalculated because it did not consider subtracting the part of ple27.420 catches that are caught in Division 7d (due to migration of 50% of the mature individuals in quarter 1).

Variable	Value	Notes
Projected landings (2022)	45 821	STF, assuming average landings ratio by age 2019–2021; tonnes
Projected discards (2022)	33 953	STF, assuming average landings ratio by age 2019–2021; tonnes

**Table 2** Plaice in Subarea 4 and Subdivision 20. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch* (2023)	Projected landings * (2023)	Projected discards ** (2023)	F <sub>total</sub> ages 2–6 ^^ (2023)	F <sub>projected</sub> landings ages 2–6 (2023)	F <sub>projected</sub> discards ages 2–3 (2023)	SSB (2024)	% SSB change ***	% TAC change^	% advice change^
ICES advice basis										
MSY approach: F <sub>MSY</sub>	149 987	89 313	60 674	0.152	0.064	0.088	939 221	–3.9	5.2	5.2
Other scenarios										
F = F <sub>MSY</sub> upper	177 438	105 637	71 801	0.182	0.077	0.105	916 347	–6.30	25	25
F = F <sub>MSY</sub> lower	117 049	69 713	47 336	0.117	0.049	0.068	966 970	–1.08	–17.90	–17.90
F = 0	0	0	0	0	0	0	1 065 304	8.90	–100	–100
F <sub>pa</sub>	177 438	105 637	71 801	0.182	0.077	0.105	916 347	–6.3	25	25
SSB (2024) = B <sub>lim</sub>	909 542	538 127	371 415	1.53	0.64	0.88	341 003	–65	540	540
SSB (2024) = B <sub>pa</sub>	729 742	432 398	297 344	1.04	0.44	0.60	473 850	–52	410	410
SSB (2024) = MSY B <sub>trigger</sub>	729 742	432 398	297 344	1.04	0.44	0.60	473 850	–52	410	410
Rollover advice	142 508	85 184	57 324	0.144	0.061	0.083	945 297	–3.3	0	0
F <sub>2023</sub> = F <sub>2022</sub>	80 632	48 076	32 556	0.080	0.034	0.046	997 551	2.1	–43	–43

\* “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 2019–2021. Total catch is equal to the sum of “Projected landings” and “Projected discards”. Both projected landing and projected discards refer to Subarea 4 and Subdivision 20, calculated as the projected total stock catch (i.e. total stock catches which includes catches of the subarea 4 and subdivision 20 plaice stock that are taken in Division 7.d) and deducting the catches of the subarea 4 and subdivision 20 plaice stock forecast to be taken in Division 7.d in 2023. The subtracted value (334 t of projected landings and 384 t of projected discards) is estimated based on the plaice catch advice for Division 7.d for 2023.

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

\*\*\* SSB 2024 relative to SSB 2023.

^ Total catch in 2023 relative to the advice value 2022 and TAC (142 508 tonnes).

^^ F<sub>projected</sub> landings and F<sub>projected</sub> discards do not add up to the F<sub>total</sub> as they are calculated using different ages.

### Basis of the advice

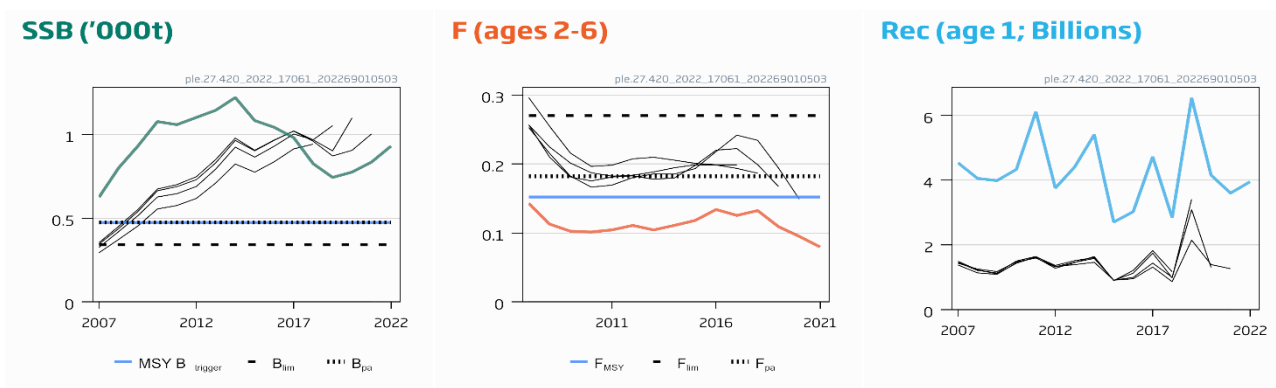
**Table 3** Plaice in Subarea 4 and Subdivision 20. The basis of the advice.

Advice basis	MSY approach
Management plan	An EU multiannual management plan (MAP) has been agreed by the EU for this stock (EU, 2018). There is no agreement with Norway and UK regarding this plan, and it is not used as the basis of the advice for this shared stock. ICES was requested by the EC and UK to provide advice based on the MSY approach and to include F <sub>MSY</sub> ranges in the catch scenarios.

### Quality of the assessment

The assessment was updated during a benchmark in early 2022 (ICES, 2022a). A combined BTS and IBTS-Q3 index was applied to replace the two individual survey indices. Age-specific natural mortalities were applied to replace the fixed 0.1 value across all ages. The stock assessment model was changed (Table 5). Reference points were updated (Table 4).

The benchmark updates led to changes in the trajectory of SSB and recruitment of the stock while fishing pressure was scaled down (Figure 2). Changes also included a reduction in the estimated proportion of older fish in the stock (the plus group accounts for 48% of 2020 SSB in 2021 assessment to 17% in the current assessment).

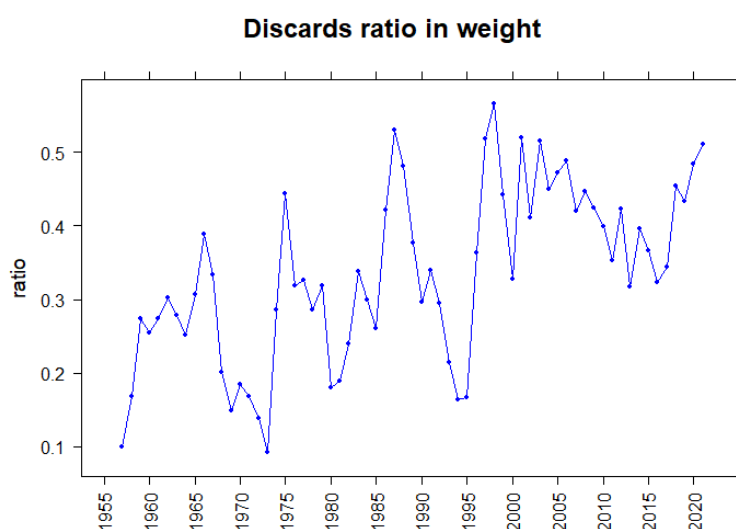


**Figure 2** Plaice in Subarea 4 and Subdivision 20. Historical assessment results (final-year recruitment included for each line, corresponding to the forecast recruitment in the interim year). The reference points were revised in 2022 following a benchmark, and only assessment results from the final year should be compared to the reference points indicated.

### Issues relevant for the advice

Between 2014 and 2018, the majority of the Dutch beam trawlers have switched to pulse trawls, resulting in reallocation of fishing effort to fishing grounds in the southern part of Division 4.c targeting sole. The discards ratio for plaice has been increasing in the same period (Figure 3), from 40% in 2014 to 51% in 2021. Following the EU decision in February 2019 to revise the technical measures regulations, pulse trawling is prohibited since 30 June 2021.

ICES advice for ple.27.420 is for catches from subarea 4 and subdivision 20. Fish from this stock which migrate out of the stock area and are caught in subdivision 7d have been accounted for in the advice.



**Figure 3** Discards–catch ratio of plaice in weight.

## Reference points

**Table 4** Plaice in Subarea 4 and Subdivision 20. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	473 850	$B_{pa}$ ; in tonnes	ICES (2022a)
	$F_{MSY}$	0.152	Stochastic simulations (EqSim) based on the recruitment period 1957–2020	ICES (2022a)
Precautionary approach	$B_{lim}$	341 003	$B_{loss}$ , lowest estimated SSB from benchmark assessment, which equals the SSB of year 1996; in tonnes	ICES (2022a)
	$B_{pa}$	473 850	$B_{lim} \times \exp(1.645 \times \sigma)$ , $\sigma = 0.20$ ; in tonnes	ICES (2022a)
	$F_{lim}$	0.270	The F that on average leads to $B_{lim}$ from EqSim	ICES (2022a)
	$F_{pa}$	0.182	$F_{P.05}$ with advice rule (AR): The F that provides a 95% probability for SSB to be above $B_{lim}$	ICES (2022a)
EU Management plan (MAP)*	MAP MSY $B_{trigger}$	473 850	MSY $B_{trigger}$ ; in tonnes	ICES (2022a)
	MAP $B_{lim}$	341 003	$B_{lim}$ ; in tonnes	ICES (2022a)
	MAP $F_{MSY}$	0.152	$F_{MSY}$	ICES (2022a)
	MAP target range $F_{lower}$	0.117–0.152	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2022a)
	MAP target range $F_{upper}$	0.152–0.182	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2022a)

\* EU multiannual plan (MAP) for the North Sea (EU, 2018).

## Basis of the assessment

**Table 5** Plaice in Subarea 4 and Subdivision 20. Basis of the assessment and advice.

ICES stock data category	1 ( <a href="#">ICES, 2022c</a> )
Assessment type	Age-based analytical assessment (SAM, Nielsen and Berg, 2014; ICES, 2022b) that uses catches in the model and in the forecast
Input data	Commercial catch, ages, and length frequencies from port and observer and self-sampling. Five survey indices: combined BTS and IBTS Q3 (1996–2021, [B2453], [G2829]), BTS-Isis (1985–1995, [B2453]), SNS (split into two series, SNS1 1970–1999 and SNS2 2000–2021, [B3499]), and IBTS Q1 (2007–2021, [G1022]). Both the BTS+IBTS Q3 and IBTS Q1 survey indices are updated yearly using a Delta-GAM model (Berg <i>et al.</i> , 2014). Natural mortality is age dependent and was estimated using Peterson-Wroblewski method during benchmark and it is time invariant. Maturity-at-age is assumed constant over time.
Discards, BMS landings, and bycatch	Data from the majority of fleets were included in the assessment. In 2021, 75% of the total discards in Subarea 4 were obtained from sampling programmes. For Subdivision 20, 47% of the total discards were obtained from sampling programmes. BMS landings, where reported, are included with discards in the assessment from 2016 onwards.
Indicators	None
Other information	Catch information, landings since 1984, and discards since 2002 for plaice from Subdivision 20 (Skagerrak) are now added to plaice for Subarea 4 (North Sea). Plaice migrate into Division 7.d during quarter 1; 50% of the mature catches in Division 7.d were assigned, therefore, to the North Sea plaice stock during the stock assessment. This stock was last benchmarked in 2022 (ICES, 2022a).
Working groups	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak ( <a href="#">WGNSSK</a> )



**Table 6b** Plaice in Subarea 4 and Subdivision 20. **Skagerrak (Subdivision 20)**. ICES advice, TAC, official 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 <sup>^</sup>	Agreed TAC	Official landings	ICES landings	ICES discards**
1992	TAC	14 000		11 200	11 823	9554	
1993	Precautionary TAC	-		11 200	11 407	9854	
1994	If required, precautionary TAC	-		11 200	11 334	9551	
1995	If required, precautionary TAC	-		11 200	10 766	9380	
1996	If required, precautionary TAC	-		11 200	10 517	8003	
1997	No advice	-		11 200	10 292	7814	
1998	No increase in F from the present level	11 900		11 200	8431	6449	
1999	No increase in F from the present level	11 000		11 200	8719	7049	
2000	$F < F_{pa}$	11 800		11 200	8826	6989	
2001	$F < F_{pa}$	9400		9400	11 653	9231	
2002	$F < F_{pa}$	8510		6420	8789	7102	574
2003	$F < F_{pa}$	18 400		10 400	9110	7143	1437
2004	$F < F_{pa}$	*		9500	9090	8033	2873
2005	$F < F_{pa}$	< 9500		7600	6764	6099	2081
2006	No increase in F	< 9600		7600	9565	8345	2243
2007	Maintain current TAC	< 9600		8500	8747	7621	2862
2008	No increase in catch	< 9400		9300	8657	8356	1043
2009	Same advice as last year	< 9400		9300	6748	6514	610
2010	Same advice as last year	< 9400		9300	9057	8700	842
2011	Average landings from last three years (2007–2009)	< 8000		7900	8251	8218	1040
2012	Reduce catch	-		7900	7611	7680	846
2013	Increase catch by 7% – protect eastern component		< 8 400	9142	6911	6812	1161
2014	Increase catch by 7% – protect eastern component	< 8972	< 10 196	10 056	9004	9213	1022
2015	Decrease catch (2012–2013) by 13% – protect eastern component	≤ 6287	≤ 7 232	10 056	10 171	9804	676
2016	Apply second stage of the management plan	-	≤ 216 345	11 766	10 883	10 900	1908
2017	MSY approach	-	≤ 158 201	17 639	8467	8775	1353
2018	MSY approach	-	≤ 142 481	15 343	5958	6229	1487
2019	MSY approach	-	≤ 142 217	16 782	4614	8091	316
2020	MSY approach	-	≤ 166 499	19 647	5179	7826	2 363
2021	MSY approach (value revised in May 2021)	-	≤ 167 785	19 188	4286	6775	2628
2022	MSY approach	-	≤ 142 508	16 816			
2023	MSY approach		≤ 149 987				

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

\*\* Since 2016, discards include BMS landings.

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

## History of the catch and landings

**Table 7** Plaice in Subarea 4 and Subdivision 20. Catch distribution by fleet in Subarea 4 and Subdivision 20 in 2021 as estimated by ICES. Weights are in tonnes.

by ice. Weights are in tonnes.				
Catch	Landings			Discards
72 903	Beam trawl 52%	Otter trawl 33%	Other 15%	37 213
	35 690			



Year	Belgium	Denmark	France	Germany	Netherlands	Norway	Sweden	UK	Others	Landings (official)	Landings (ICES estimates)	BMS landings (official)
2008	3 396	8 229	125	3 138	20 312	1 051	20	11 411	0	47 682	48 875	
2009	3 474	n/a	n/a	2 931	29 142	1 116	1	13 143	0	n/a	54 973	
2010	3 699	435	383	3 601	26 689	1 089	5	14 765	0	50 666	60 674	
2011	4 466	11 634	344	3 812	29 272	1 223	3	15 169	0	65 923	67 386	
2012	4 862	12 245	281	3 742	32 201	1 022	5	16 888	0	71 246	73 830	
2013	6 462	13 650	249	4 903	33 537	843	3	19 334	0	78 982	78 905	
2014	7 105	12 004	276	4 203	29 309	577	5	17 370	0	69 179	70 847	
2015	5 522	14 401	223	5 171	32 074	169	7	17 240	0	74 807	74 963	
2016	6 659	16 398	169	4 371	32 227	94	9	18 731	0	78 659	81 059	
2017	5 317	12 518	151	2 526	28 775	67	5	14 993	0	64 352	65 442	5
2018	4 894	9 666	112	2 580	22 586	69	3	9 603	0	49 513	50 783	90
2019	3 912	6 583	61	2 059	19 289	57	3	7 410	0	39 374	39 970	207
2020*	2 560	5 636	25	1 396	16 870	37	5	5 582	0	32 110	32 736	184
2021*	2 898	4 901	9	1 255	14 757	24	4	4 859	0	28 708	28 915	197

n/a = not available.

\* preliminary



**Table 9** Plaice in Subarea 4 and Subdivision (SD) 20. Historical official landings, along with ICES estimated landings for plaice in Subdivision (SD) 20 for each country participating in the fishery. All weights are in tonnes.

Year	Denmark	Sweden	Germany	Belgium	Norway	Netherlands	Landings (ICES estimates)	Landings (official)	BMS landings (official)
1972	5 095	70			3		5 168		
1973	3 871	80			6		3 957		
1974	3 429	70			5		3 504		
1975	4 888	77			6		4 971		
1976	9 251	51		717	6		10 025		
1977	12 855	142		846	6		13 849		
1978	13 383	94		371	9		13 857		
1979	11 045	67		763	9		11 884		
1980	9 514	71		914	11		10 510	-	
1981	8 115	110		263	13		8 501		
1982	7 789	146		127	11		8 073		
1983	6 828	155		133	14		7 130		
1984	7 560	311		27	22		7 921		
1985	9 646	296		136	18		10 095		
1986	10 645	202		505	26		11 378		
1987	11 327	241		907	27		12 503	15 694	
1988	9 782	281		716	41		10 820	12 858	
1989	5 414	320		230	33		5 997	7 710	
1990	8 729	779		471	69		10 048	12 078	
1991	5 809	472	15	315	68		6 679	8 685	
1992	8 514	381	16	537	106		9 554	11 823	
1993	9 125	287	37	326	79		9 854	11 407	
1994	8 783	315	37	325	91		9 551	11 334	
1995	8 468	337	48	302	224		9 380	10 766	
1996	7 304	260	11		428		8 003	10 517	
1997	7 306	244	14		249		7 814	10 292	
1998	6 132	208	11		98		6 449	8 431	
1999	6 473	233	7		336		7 049	8 719	
2000	6 680	230	5		67		6 989	8 826	
2001	9 045	125			61		9 231	11 653	
2002	6 773	141	3		164	3	7 102	8 789	
2003	5 079	143	8		385	1 484	7 143	9 110	
2004	5 999	545	67		111	1 288	8 033	9 090	
2005	4 684	554	14		9	823	6 099	6 764	
2006	6 563	366	21		352	1 059	8 345	9 565	
2007	5 656	281	21		166	1 503	7 621	8 747	
2008	7 163	220	17		117	775	8 356	8 657	
2009	5 828	92	13		62	506	6 514	6 748	
2010	7 101	127	13		103	1 331	8 700	9 057	
2011	7 746	179	13		230	15	8 218	8 251	
2012	7 338	155	12		136	10	7 680	7 611	
2013	6 326	160	10		138	181	6 812	6 911	
2014	7 484	240	46		48	506	8 324	9 004	
2015	7 808	274	14		69	1 639	9 804	10 171	
2016	8 035	218	14	0	84	2 550	10 900	10 883	
2017	6 864	159	11	0	154	1 588	8 775	8 467	2
2018	4 382	70	7	0	26	1 743	6 229	5 958	19
2019	4 605	40	15	0	9	3 422	8 091	4 614	13
2020	5 099	65	50	0	7	2 605	7 826	5 179*	6
2021	4 224	41	44	0	2	2 464	6 775	4 286*	7

\* preliminary

**Table 10** Plaice in Subarea 4 and Subdivision 20. History of official commercial landings, along with ICES catches estimates for the stock. All weights are in tonnes.

Year	Total landings 4 + SD 20 (ICES estimates)	Total discards 4 + SD 20 ** (ICES estimates)	Total landings 4 + SD 20 (Official)	Landings 7d *** (ICES estimates)	Discards 7d *** (ICES estimates)
1980	150 461	31 080	101 928	328	
1981	148 198	33 031	93 996	585	
1982	162 619	49 127	97 930	635	
1983	151 160	74 483	100 812	731	
1984	164 070	70 816	114 996	702	
1985	169 933	60 549	148 311	786	
1986	176 725	129 953	127 902	893	
1987	166 173	190 524	146 488	1046	
1988	165 295	156 423	151 270	1258	
1989	175 815	107 793	160 118	1281	
1990	166 288	71 225	168 339	1306	
1991	154 682	80 935	152 250	1116	
1992	134 744	57 049	135 305	860	
1993	126 967	35 016	126 685	655	
1994	119 943	23 785	121 013	826	
1995	107 736	21 828	107 176	718	
1996	89 676	52 049	90 550	741	
1997	90 862	100 145	91 775	867	
1998	77 983	103 751	78 796	716	
1999	87 711	70 976	87 336	814	
2000	88 139	44 311	90 977	1149	
2001	91 078	100 309	91 353	682	
2002	77 319	55 099	78 494	716	
2003	73 632	79 275	74 779	366	
2004	69 469	57 478	70 098	418	
2005	61 799	56 250	61 672	389	
2006	66 288	64 160	65 498	324	16
2007	57 365	42 373	57 778	477	25
2008	57 231	46 993	56 339	451	37
2009	61 487	45 902	n/a	335	43
2010	69 374	46 570	59 723	385	76
2011	75 604	41 593	74 174	275	76
2012	81 510	59 914	78 857	418	225
2013	85 717	40 025	85 893	402	200
2014	80 060	52 937	78 183	496	432
2015	84 767	50 108	84 978	593	348
2016	91 959	43 971	89 542	785	395
2017	74 217	38 966	72 819	711	762
2018	57 012	47 792	55 471	788	446
2019	48 063	36 713	43 988	681	657
2020	40 562	38 110	37 289*	326	223
2021	35 690	37 213	32 994*	241	316

n/a = not available.

\* preliminary

\*\* Since 2016, discards include BMS landings.

\*\*\* Part of the catches in Division 7.d during spawning migration in the first quarter.



Year	Recruitment (Age 1)			Spawning-stock biomass			Fishing pressure (Ages 2–6)			Landings *	Discards ***
	R	High	Low	SSB	High	Low	F	High	Low		
2013	4 414 532	5 477 549	3 557 813	1 144 205	1 356 603	965 061	0.104	0.125	0.087	86 222	40 025
2014	5 410 268	6 728 239	4 350 470	1 219 831	1 446 685	1 028 550	0.111	0.133	0.093	80 686	53 011
2015	2 704 338	3 360 267	2 176 446	1 082 277	1 285 848	910 934	0.118	0.142	0.099	85 360	49 225
2016	3 026 454	3 758 059	2 437 275	1 042 356	1 243 427	873 800	0.134	0.161	0.112	92 744	44 251
2017	4 726 987	5 870 235	3 806 390	980 394	1 174 492	818 373	0.125	0.150	0.104	74 928	39 372
2018	2 840 331	3 546 489	2 274 779	825 079	990 700	687 146	0.132	0.159	0.110	57 800	48 000
2019	6 543 052	8 252 857	5 187 479	742 891	893 403	617 736	0.109	0.131	0.091	48 745	37 376
2020	4 155 293	5 339 116	3 233 955	774 884	929 416	646 045	0.095	0.115	0.079	40 888	38 270
2021	3 599 961	5 219 935	2 482 735	834 755	1 004 922	693 403	0.080	0.097	0.065	35 930	37 523
2022	3952706**			930 214	1 133 626	764 258					

\* These values include part of the catches in Division 7.d in the first quarter.

\*\* Geometric mean of resampled recruitments from the years 2012–2021.

\*\*\* Since 2016, discards include BMS landings.

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[Download the stock assessment data and figures.](#)

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