

## Sole (*Solea solea*) in Subarea 4 (North Sea)

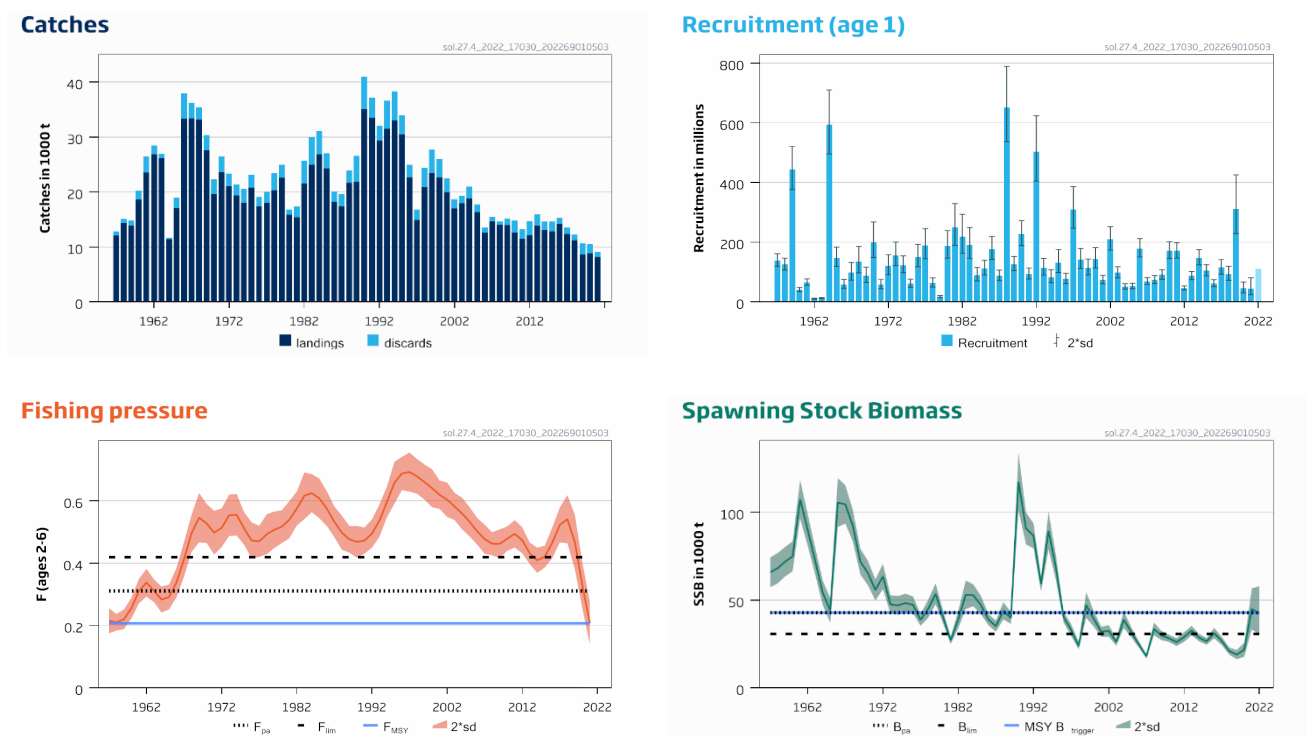
### ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 9152 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 above  $F_{MSY}$  but below  $F_{pa}$  and  $F_{lim}$ ; spawning-stock size is below MSY  $B_{trigger}$  and between  $B_{pa}$  and  $B_{lim}$ .



**Figure 1** Sole in Subarea 4. Summary of the stock assessment. Estimates of discards are only available since 2002. The assumed recruitment value in 2022 is shaded in a lighter colour.

### Catch scenarios

**Table 1** Sole in Subarea 4. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 2-6}$ (2022)	0.21	Average exploitation pattern (2017–2021), scaled to $F_{ages\ 2-6}$ in 2021
SSB (2023)	38 776	Short-term forecast (STF), in tonnes.
$R_{age\ 1}$ (2022, 2023)	110 824	Geometric mean of recruitment (GM; 1957–2020), in thousands.
Total catch (2022)	10 429	STF, in tonnes.
Projected landings (2022)	9605	STF, assuming average landing ratio by age 2019–2021, in tonnes.
Projected discards (2022)	824	STF, assuming average discard ratio by age 2019–2021, in tonnes.

**Table 2** Sole in Subarea 4. 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 1–3) (2023)	SSB (2024)	% SSB change^	% TAC change^^	% advice change^^
ICES advice basis										
MSY approach: F <sub>MSY</sub> × SSB (2023) /MSY B <sub>trigger</sub>	9 152	8 467	685	0.19	0.18	0.04	41 078	5.9	–40	–40
Other scenarios										
F = F <sub>MSY</sub>	10 012	9 260	752	0.21	0.20	0.04	40 315	4.0	–35	–35
F = F <sub>MSY</sub> lower	6 207	5 747	460	0.12	0.08	0.02	43 695	12.7	–60	–60
F = F <sub>MSY</sub> lower × SSB (2023) /MSY B <sub>trigger</sub>	5 652	5 234	418	0.11	0.08	0.02	44 189	14.0	–63	–63
F = 0	0	0	0	0	0	0	49 224	27	–100	–100
F <sub>pa</sub>	14 276	13 185	1 091	0.31	0.29	0.06	36 539	–5.8	–6.9	–6.9
F <sub>lim</sub>	18 281	16 858	1 422	0.42	0.40	0.08	33 005	–14.9	19.2	19.2
SSB (2024) = B <sub>pa</sub>	7 171	6 638	533	0.14	0.14	0.03	42 838	10.5	–53	–53
SSB (2024) = B <sub>lim</sub>	20 755	19 121	1 634	0.49	0.46	0.10	30 828	–20	35	35
SSB (2024) = MSY B <sub>trigger</sub>	7 171	6 638	533	0.14	0.14	0.03	42 838	10.5	–53	–53
F = F <sub>2022</sub>	10 031	9 277	754	0.21	0.20	0.04	40 299	3.9	–35	–35
Rollover advice	15 330	14 153	1 177	0.34	0.32	0.07	35 608	–8.2	0.00	0.00

\* Differences between the total catch and the sum of projected landings and discards result from rounding.

\*\* Including BMS landings, assuming recent discard rate.

^ SSB 2024 relative to SSB 2023.

^^ Total catch in 2023 relative to the advice value 2022 and TAC (15 330 tonnes).

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

The change in advice (–40%) is mainly due to the downward revision of the large 2018 year class and its final contribution to spawning biomass. In addition, SSB is declining below MSY B<sub>trigger</sub> in 2023, implying a reduced F<sub>target</sub>.

### Basis of the advice

**Table 3** Sole in Subarea 4. The basis of the advice.

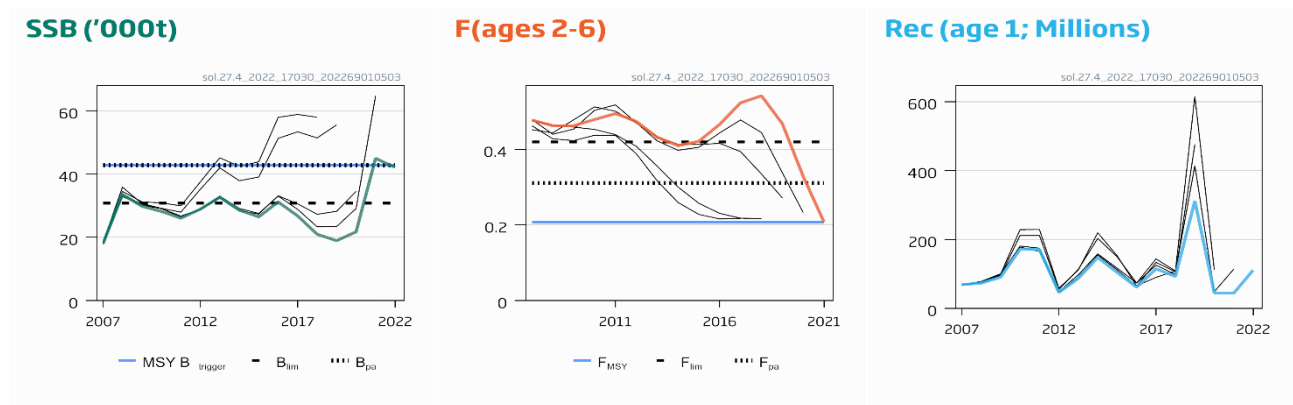
Advice basis	MSY approach
Management plan	ICES is aware of the multiannual management plan (MAP) which has been adopted by the EU for this stock (EU, 2018) and which ICES considers to be precautionary. There is no agreed shared management plan with UK for this stock, and ICES provides advice according to ICES MSY approach. Catch scenarios consistent with the MAP F <sub>MSY</sub> ranges are provided.

### Quality of the assessment

The assessment model currently presents a large retrospective pattern in estimated SSB and fishing mortality, which could lead to further revisions in stock status. Possible explanations for this pattern are still not well understood.

Between 2014 and 2018, the pulse trawl fleet was the main fishery targeting sole in the North Sea (ICES, 2018). Following the EU decision in February 2019 to revise the technical measures regulations, pulse gear is prohibited from 30 June 2021 (EU, 2019). This has caused changes in the selection pattern, which might contribute to the retrospective pattern of the assessment.

Despite the retrospective pattern observed, ICES consider the advice to be in line with ICES precautionary approach.



**Figure 2** Sole in Subarea 4. Historical assessment results (final-year recruitment included for each line, corresponding to the forecast recruitment in the interim year). The stock was benchmarked in 2020.

### Issues relevant for the advice

Sole in the North Sea is under EU landing obligation and Norway and UK national legislation regulating discards. Catch monitoring programs estimate that discarding in 2021 amounted to 10.5% of the total catch. Below minimum size (BMS) landings of sole reported to ICES are currently much lower than the estimates of discards and represented <0.5% of the total catch in 2021.

### Reference points

**Table 4** Sole in Subarea 4. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B <sub>trigger</sub>	42 838	B <sub>pa</sub> ; in tonnes.	ICES (2020a)
	F <sub>MSY</sub>	0.207	EQsim analysis, assuming a hockey stick stock–recruit relationship, based on the recruitment period 1958–2018	ICES (2020a)
Precautionary approach	B <sub>lim</sub>	30 828	Breakpoint of the hockey stick stock–recruit relationship, based on the recruitment period 1958–2018; in tonnes.	ICES (2020a)
	B <sub>pa</sub>	42 838	B <sub>lim</sub> × exp (1.645 × σ), σ = 0.20; in tonnes.	ICES (2020a)
	F <sub>lim</sub>	0.420	EQsim analysis, based on the recruitment period 1958–2018	ICES (2020a)
	F <sub>pa</sub>	0.311	The F that provides a 95% probability for SSB to be above B <sub>lim</sub> (F <sub>P05</sub> with advice rule [AR]).	ICES (2020a, 2022)
EU management plan (MAP)*	MAP MSY B <sub>trigger</sub>	42 838	MSY B <sub>trigger</sub> ; in tonnes.	ICES (2020a)
	MAP B <sub>lim</sub>	30 828	B <sub>lim</sub> ; in tonnes.	ICES (2020a)
	MAP F <sub>MSY</sub>	0.207	F <sub>MSY</sub>	ICES (2020a)
	MAP target range F <sub>lower</sub>	0.123–0.207	Consistent with ranges provided by ICES (2020b), resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2020a)
	MAP target range F <sub>upper</sub>	0.207–0.311	Consistent with ranges provided by ICES (2020b), resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2020a)

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

## Basis of the assessment

**Table 5** Sole in Subarea 4. Basis of the assessment and advice.

ICES stock data category	1 ( <a href="#">ICES, 2022a</a> )
Assessment type	Age-based analytical assessment (Aarts and Poos, 2009; ICES, 2022b) that uses catches in the model and in the forecast.
Input data	Commercial catches (age frequencies from catch sampling), two survey indices (BTS combined [NL, DE, BE] Q3 [B2453] and SNS Q3 [B3499]). Natural mortality is assumed constant at 0.1 (except for 1963, when it is set at 0.9). Maturity-at-age is assumed to be knife-edged (at age 3) and constant over time.
Discards, BMS landings, and bycatch	Discard data from 2002 are included in the assessment; discards before 2002 are estimated by the model. In 2021, 84% of the landings had associated discarding information, and 83% of the discards were sampled. BMS landings, where reported, are included with discards in the assessment from 2016.
Indicators	None
Other information	The stock was last benchmarked in 2020 (ICES, 2020a). The main change was the inclusion of a single index combining various BTS Q3 surveys (NL, DE, and BE; ICES, 2020a).
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak ( <a href="#">WGNSSK</a> )

## History of the advice, catch, and management

**Table 6** Sole in Subarea 4. ICES advice, and ICES estimates of landings and discards reported to ICES. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	Agreed TAC	ICES landings	ICES discards <sup>a</sup>	ICES catch <sup>a</sup>
1987	Rebuild SSB to 40 000 t; TAC	11 000		14 000	17 368		
1988	Increase SSB towards 50 000 t; TAC	11 000		14 000	21 590		
1989	Increase SSB towards 50 000 t; TAC	14 000		14 000	21 805		
1990	80% of F (88); TAC	25 000		25 000	35 120		
1991	SSB > 50 000 t; TAC	27 000		27 000	33 513		
1992	TAC	21 000		25 000	29 341		
1993	No long-term gains in increased F	29 000		32 000	31 491		
1994	No long-term gains in increased F	31 000		32 000	33 002		
1995	No long-term gains in increased F	28 000		28 000	30 467		
1996	Mixed fishery, link plaice advice	23 000		23 000	22 651		
1997	< 80% of F (95)	14 600		18 000	14 901		
1998	75% of F (96)	18 100		19 100	20 868		
1999	F < F <sub>pa</sub> (80% of F (97))	20 300		22 000	23 475		
2000	F < F <sub>pa</sub>	< 19 800		22 000	22 641		
2001	F < F <sub>pa</sub>	< 17 700		19 000	19 944		
2002	F < 0.37	< 14 300		16 000	16 945	1712	18 657
2003	F < F <sub>pa</sub>	< 14 600		15 900	17 920	1364	19 284
2004	F < F <sub>pa</sub>	< 17 900		17 000	18 757	2181	20 938
2005	F < F <sub>pa</sub>	< 17 300		18 600	16 355	1341	17 696
2006	Keep SSB above B <sub>pa</sub>	< 11 900		17 700	12 594	994	13 588
2007	SSB above B <sub>pa</sub>	< 10 800		15 000	14 635	871	15 506
2008	SSB above B <sub>pa</sub>	< 9800		12 800	14 071	545	14 616
2009	Apply management plan	< 14 000		14 000	13 952	1261	15 213
2010	Apply management plan	< 14 100		14 100	12 603	2246	14 849
2011	See scenarios	-		14 100	11 485	1703	13 188
2012	Apply first stage of the management plan	< 15 700		16 200	11 602	2528	14 130
2013	Apply first stage of the management plan	< 14 000		14 000	13 137	2119	15 256
2014	Apply first stage of the management plan	< 11 900		11 900	13 060	1568	14 628

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	Agreed TAC	ICES landings	ICES discards <sup>^</sup>	ICES catch <sup>^</sup>
2015	Apply second stage of the management plan	< 11 400		11 900	12 867	1763	14 630
2016	Apply second stage of the management plan		≤ 12 800	13 262	14 127	1205	15 332
2017	Apply second stage of the management plan		≤ 15 300	16 123	12 370	1246	13 616
2018	Apply second stage of the management plan		≤ 15 726	15 694	11 199	1056	12 255
2019	MAP* F ranges: $F_{lower}$ to $F_{upper}$ ( $F = 0.113 - 0.367$ ), but $F_{higher}$ than $F_{MSY} = 0.202$ only under conditions specified in the MAP		7451–21 644, but catches greater than 12 801 only under conditions specified in the MAP	12 555	8647	1949	10 596
2020	Management plan		17 545 (range 10 192–29 767)	17 545	8863	1652	10 515
2021	Management plan		21 361 (range 13 237–32 920)	21 361	8185	959	9144
2022	MSY approach		≤ 15 330	15 330			
2023	MSY approach		≤ 9152				

<sup>^</sup> Since 2016, discards include BMS landings.

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

### History of the catch and landings

**Table 7** Sole in Subarea 4. Catch distribution by fleet in 2021 as estimated by and reported to ICES.

Catch	Landings				Discards
9144 tonnes	Beam trawl 92%	Gillnets & trammel nets 5%	Bottom trawls 1.9%	Other 1%	959 tonnes
	8185 tonnes				

**Table 8** Sole in Subarea 4. History of landings; the official reported landings are presented by country and total. Official reported BMS landings, ICES estimated landings, and the TAC are presented. All weights are in tonnes.

Year	Belgium	Denmark	France	Germany	Netherlands	UK	Other	Total landings	Official BMS landings	ICES total landings	TAC
1982	1 900	524	686	266	17 686	403	2	21 467		21 579	21 000
1983	1 740	730	332	619	16 101	435	0	19 957		24 927	20 000
1984	1 771	818	400	1 034	14 330	586	1	18 940		26 839	20 000
1985	2 390	692	875	303	14 897	774	3	19 934		24 248	22 000
1986	1 833	443	296	155	9 558	647	2	12 934		18 201	20 000
1987	1 644	342	318	210	10 635	676	4	13 829		17 368	14 000
1988	1 199	616	487	452	9 841	740	28	13 363		21 590	14 000
1989	1 596	1 020	312	864	9 620	1 033	50	14 495		21 805	14 000
1990	2 389	1 427	352	2 296	18 202	1 614	263	26 543		35 120	25 000
1991	2 977	1 307	465	2 107	18 758	1 723	271	27 608		33 513	27 000
1992	2 058	1 359	548	1 880	18 601	1 281	277	26 004		29 341	25 000
1993	2 783	1 661	490	1 379	22 015	1 149	298	29 775		31 491	32 000
1994	2 935	1 804	499	1 744	22 874	1 137	298	31 291		33 002	32 000
1995	2 624	1 673	640	1 564	20 927	1 040	312	28 780		30 467	28 000
1996	2 555	1 018	535	670	15 344	848	229	21 199		22 651	23 000
1997	1 519	689	99	510	10 241	479	204	13 741		14 901	18 000
1998	1 844	520	510	782	15 198	549	339	19 742		20 868	19 100
1999	1 919	828	n/a	1 458	16 283	645	501	21 634*		23 475	22 000
2000	1 806	1 069	362	1 280	15 273	600	539	20 929		22 641	22 000
2001	1 874	772	411	958	13 345	597	394	18 351		19 944	19 000
2002	1 437	644	266	759	12 120	451	292	15 969		16 945	16 000

Year	Belgium	Denmark	France	Germany	Netherlands	UK	Other	Total landings	Official BMS landings	ICES total landings	TAC
2003	1605	703	728	749	12 469	521	363	17 138		17 920	15 850
2004	1477	808	655	949	12 860	535	544	17 828		18 757	17 000
2005	1374	831	676	756	10 917	667	357	15 579		16 355	18 600
2006	987	582	714	475	8299	912	36	12 004		12 594	17 670
2007	973	413	591	458	10 364	1 208	5	14 011		14 635	15 000
2008	1379	501	574	514	9456	851	16	13 290		14 071	12 800
2009	1368	476	910	555	9606	952	1	13 867		13 952	14 000
2010	1268	406	630	537	8770	943	2	12 556		12 603	14 100
2011	864	347	566	327	8137	820	2	11 063		11 485	14 100
2012	607	418	634	440	9085	610	3	11 797		11 602	16 200
2013	706	497	687	561	9967	870	1	13 290		13 137	14 000
2014	966	314	675	642	9018	843	0	12 458		13 060	11 900
2015	935	271	542	765	9273	813	0	12 598		12 867	11 900
2016	768	355	362	861	9600	706	0	12 652		14 127	13 262
2017	557	433	393	761	9482	514	0	12 139^	30	12 370	16 123
2018	404	368	432	721	8581	432	3	10 939^	57	11 199	15 694
2019	253^	110	108	619^	6914^	333^	1	8339^	47	8647	12 555
2020	240^	123	37	920^	6707^	542^	0	8569^	5	8863	17 545
2021	1184^	172	166	643^	6167^	476^	0	8808^	43	8185	21 361

\* These totals do not include reported official landings of all countries.

\*\* Preliminary reported official landings.

^ Including BMS landings.

n/a = not available

## Summary of the assessment

**Table 9** Sole in Subarea 4. Assessment summary. Recruitment in thousands, weights are in tonnes. High and low are 2 standard deviations.

Year	Recruitment (Age 1)			Spawning-stock biomass			Landings*	Discards*,**	Catch*,**	Fishing pressure (ages 2–6)		
	R	High	Low	SSB	High	Low				F	High	Low
1957	138 275	161 239	118 581	65 786	74 308	57 264	12 067	781	12 064	0.22	0.26	0.175
1958	124 991	146 235	106 834	68 123	76 832	59 414	14 287	765	14 284	0.21	0.24	0.184
1959	442 856	520 766	376 602	71 875	80 317	63 433	13 832	994	13 829	0.22	0.25	0.189
1960	40 660	48 142	34 341	74 984	83 559	66 409	18 620	1 556	18 618	0.26	0.29	0.22
1961	65 447	77 103	55 554	107 430	118 544	96 316	23 566	2 914	23 564	0.31	0.35	0.27
1962	10 643	12 548	9 028	90 031	99 185	80 877	26 877	1 611	26 875	0.34	0.38	0.29
1963	12 388	14 595	10 515	72 286	80 081	64 491	26 164	771	26 161	0.31	0.35	0.28
1964	593 030	709 814	495 460	54 228	61 250	47 206	11 342	304	11 339	0.28	0.33	0.24
1965	147 561	183 428	118 708	44 095	51 150	37 040	17 043	1 970	17 040	0.29	0.33	0.25
1966	58 454	75 187	45 445	105 570	119 540	91 600	33 340	4 619	33 337	0.34	0.39	0.29
1967	97 929	131 858	72 731	104 560	115 490	93 630	33 439	2 751	33 436	0.41	0.47	0.36
1968	134 323	185 936	97 036	92 398	101 494	83 302	33 179	2 238	33 176	0.50	0.56	0.44
1969	87 116	116 450	65 172	71 925	79 355	64 495	27 559	2 751	27 556	0.55	0.63	0.47
1970	199 586	267 839	148 726	65 431	72 459	58 403	19 684	2 566	19 681	0.53	0.59	0.46
1971	57 469	75 457	43 769	55 794	61 907	49 681	23 652	2 863	23 649	0.50	0.57	0.43
1972	119 731	157 960	90 753	63 500	70 787	56 213	21 087	2 258	21 083	0.51	0.58	0.45
1973	155 905	200 498	121 229	47 538	52 822	42 254	19 308	2 013	19 304	0.55	0.62	0.49
1974	122 762	154 261	97 694	47 015	52 340	41 690	17 990	2 576	17 986	0.56	0.62	0.49
1975	60 718	76 118	48 434	48 328	53 734	42 922	20 773	2 350	20 769	0.51	0.56	0.46
1976	150 542	192 729	117 590	47 283	52 088	42 478	17 326	1 774	17 322	0.47	0.53	0.41
1977	188 151	245 620	144 128	38 735	42 156	35 314	18 003	1 981	18 000	0.47	0.52	0.42
1978	63 007	80 504	49 313	44 998	50 147	39 849	20 280	3 111	20 276	0.49	0.56	0.43
1979	17 060	21 638	13 451	53 582	59 604	47 560	22 598	2 366	22 594	0.51	0.57	0.45
1980	186 839	238 704	146 242	40 139	43 746	36 532	15 806	1 034	15 802	0.52	0.57	0.46
1981	249 696	329 364	189 298	27 099	29 302	24 896	15 403	1 949	15 399	0.54	0.60	0.48
1982	218 600	293 520	162 804	38 947	43 973	33 921	21 578	4 156	21 574	0.58	0.63	0.52
1983	190 613	248 933	145 956	53 048	61 193	44 903	24 927	5 072	24 923	0.62	0.69	0.54

Year	Recruitment (Age 1)			Spawning-stock biomass			Landings*	Discards*,**	Catch*,**	Fishing pressure (ages 2–6)		
	R	High	Low	SSB	High	Low				F	High	Low
1984	89 859	115 153	70 121	52 755	59 061	46 449	26 839	4 322	26 836	0.63	0.69	0.56
1985	112 084	139 497	90 057	47 284	52 623	41 945	24 248	2 749	24 244	0.61	0.67	0.54
1986	176 487	219 446	141 937	38 970	42 160	35 780	18 201	1 945	18 197	0.58	0.63	0.52
1987	87 291	106 707	71 408	35 159	38 359	31 959	17 368	2 293	17 365	0.53	0.58	0.48
1988	650 828	789 038	536 826	43 949	48 901	38 997	21 590	2 300	21 586	0.50	0.55	0.44
1989	125 995	152 125	104 354	39 805	43 215	36 395	21 804	4 712	21 801	0.48	0.52	0.43
1990	226 387	272 001	188 422	117 490	134 140	100 840	35 121	5 843	35 117	0.47	0.52	0.42
1991	93 246	113 459	76 635	90 858	99 967	81 749	33 514	3 664	33 510	0.47	0.51	0.43
1992	502 324	624 009	404 368	86 633	93 828	79 438	29 341	2 678	29 338	0.50	0.54	0.45
1993	114 348	145 495	89 868	59 130	63 414	54 846	31 491	5 108	31 488	0.54	0.59	0.48
1994	82 868	107 540	63 856	89 494	100 341	78 647	33 002	5 311	32 999	0.60	0.65	0.55
1995	131 137	175 427	98 029	67 997	75 180	60 814	30 468	3 535	30 465	0.66	0.73	0.59
1996	76 344	95 703	60 901	40 288	43 376	37 200	22 650	2 265	22 647	0.69	0.74	0.63
1997	308 970	386 505	246 989	33 039	36 483	29 595	14 902	1 898	14 899	0.69	0.76	0.63
1998	141 634	179 036	112 045	23 948	26 077	21 819	20 867	3 542	20 865	0.68	0.73	0.62
1999	113 777	143 315	90 328	47 202	54 549	39 855	23 475	4 240	23 472	0.66	0.72	0.60
2000	143 344	181 611	113 140	39 354	43 826	34 882	22 641	3 329	22 639	0.64	0.70	0.58
2001	73 277	88 886	60 409	31 964	34 819	29 109	19 944	2 542	19 941	0.62	0.67	0.57
2002	208 981	252 087	173 247	32 467	35 775	29 159	16 946	1 712	18 658	0.60	0.66	0.55
2003	97 149	117 434	80 367	26 129	28 303	23 955	17 921	1 364	19 284	0.58	0.63	0.54
2004	50 818	60 970	42 356	38 902	43 753	34 051	18 757	2 181	20 938	0.56	0.61	0.51
2005	52 313	62 323	43 911	31 627	34 555	28 699	16 355	1 341	17 696	0.53	0.58	0.49
2006	178 617	211 945	150 530	24 719	26 581	22 857	12 594	994	13 588	0.50	0.55	0.46
2007	68 734	81 468	57 991	17 965	19 269	16 661	14 635	871	15 506	0.48	0.52	0.43
2008	73 424	87 721	61 456	33 596	37 250	29 942	14 071	545	14 616	0.46	0.50	0.43
2009	90 310	107 560	75 826	29 829	32 471	27 187	13 952	1 261	15 213	0.46	0.51	0.42
2010	171 099	201 543	145 254	28 217	30 278	26 156	12 603	2 246	14 849	0.48	0.52	0.44
2011	170 758	198 421	146 951	26 061	28 293	23 829	11 485	1 703	13 188	0.49	0.54	0.45
2012	46 074	53 436	39 726	28 925	31 681	26 169	12 168	2 528	14 696	0.47	0.52	0.43
2013	87 029	102 021	74 241	32 691	35 415	29 967	13 839	2 119	15 958	0.43	0.47	0.40
2014	147 561	175 287	124 221	28 619	30 773	26 465	13 072	1 568	14 640	0.41	0.45	0.37
2015	104 297	125 186	86 894	26 480	28 359	24 601	12 827	1 763	14 589	0.42	0.46	0.39
2016	61 451	74 392	50 762	31 209	34 203	28 215	14 118	1 205	15 323	0.47	0.52	0.42
2017	114 577	141 812	92 572	26 775	29 145	24 405	12 327	1 246	13 573	0.52	0.58	0.47
2018	92 596	118 922	72 098	20 977	23 051	18 903	11 209	1 056	12 265	0.54	0.62	0.46
2019	311 763	425 500	228 429	18 951	21 637	16 265	8 658	1 949	10 607	0.47	0.56	0.38
2020	44 846	66 627	30 186	21 761	25 809	17 713	8 841	1 649	10 490	0.33	0.40	0.25
2021	43 910	81 040	23 797	45 001	56 654	33 348	8 185	959	9 144	0.21	0.28	0.139
2022	11 0824***			42 148	57 945	30 261						

\* Catches presented are the sum of product (SOP) values from catch and weight-at-age used in the assessment model.

\*\* Since 2002, discard estimates are raised from the observer programme. Discards prior to 2002 are reconstructed by the model and are not included in the total catch column.

\*\*\* Geometric mean (1957–2020).



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