

## Sole (*Solea solea*) in Division 7.d (eastern English Channel)

### ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2024 should be no more than 1 504 tonnes.

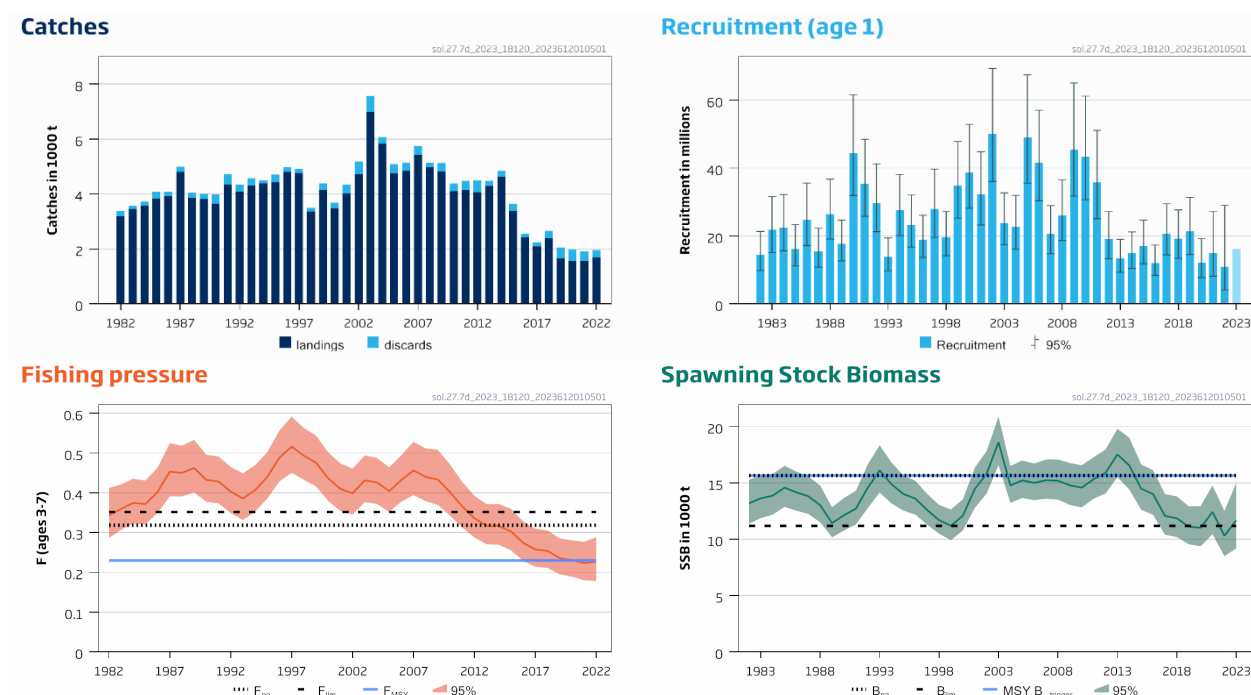
ICES notes the existence of a precautionary management plan, developed and adopted by one of the relevant management authorities for this stock.

### ICES advice on conservation aspects

ICES has not identified any conservation aspects.

### Stock development over time

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



**Figure 1** Sole in Division 7.d. Summary of the stock assessment. The assumed recruitment value for 2023 is shaded in a lighter colour. Discards are reconstructed prior to 2004 and include below minimum size (BMS) landings.

### Conservation status

ICES is not aware of any information on stock/species-specific conservation status.

### Catch scenarios

**Table 1** Sole in Division 7.d. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 3-7}$ (2023)	0.20	Based on a catch constraint for 2023. Average exploitation pattern (2018–2022).
SSB (2024)	11849	Short-term forecast (STF); tonnes.
$R_{age1}$ (2023, 2024)	16105	Resampled recruitments from the years 2012–2021 (geometric mean shown); thousands.
Total catch (2023)	1747	TAC for 2023; tonnes.
Projected landings (2023)	1518	STF, assuming average landings ratio by age 2018–2022; tonnes.
Projected discards (2023)	229	STF, assuming average discard ratio by age 2018–2022; tonnes.

**Table 2** Sole in Division 7.d. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2024)	Projected landings <sup>^</sup> (2024)	Projected discards <sup>^^</sup> (2024)	F <sub>total</sub> (ages 3–7) (2024)	F <sub>projected landings</sub> (ages 3–7) (2024)	F <sub>projected discards</sub> (ages 3–7) (2024)	SSB (2025)	% SSB change*	% TAC change**	% advice change**
ICES advice basis										
MSY approach: F <sub>MSY</sub> × SSB (2024)/MSY B <sub>trigger</sub>	1504	1294	210	0.174	0.141	0.033	12387	4.5	–13.9	–13.9
Other scenarios										
F <sub>MSY lower</sub> × SSB (2024)/ MSY B <sub>trigger</sub>	1048	902	146	0.118	0.096	0.022	12922	9.1	–40	–40
F = 0	0	0	0	0	0	0	14131	19.3	–100	–100
F <sub>pa</sub>	2588	2228	360	0.318	0.26	0.059	11138	–6.0	48	48
F <sub>lim</sub>	2820	2427	393	0.352	0.29	0.066	10872	–8.2	61	61
SSB (2025) = B <sub>lim</sub>	2552	2196	356	0.31	0.26	0.058	11181	–5.6	46	46
SSB (2025) = B <sub>pa</sub> = MSY B <sub>trigger</sub> <sup>#</sup>										
F = F <sub>2023</sub>	1739	1499	240	0.20	0.166	0.038	12114	2.2	–0.46	–0.46
F <sub>MSY lower</sub>	1361	1171	190	0.156	0.127	0.029	12551	5.9	–22	–22
F <sub>MSY</sub>	1938	1670	268	0.230	0.187	0.043	11874	0.21	10.9	10.9

<sup>^</sup> Marketable landings.

<sup>^^</sup> Including BMS landings, assuming recent discard rate.

\* SSB 2025 relative to SSB 2024 (11849 tonnes).

\*\* Total catch in 2024 relative to the advice value 2023 and TAC (both 1747 tonnes).

<sup>#</sup> B<sub>pa</sub> and MSY B<sub>trigger</sub> cannot be achieved in 2025, even with zero catches.

The change in advice (–13.9%) is the result of a further decline of the stock weight at age in 2022, lower recruitment estimated for 2022 than assumed last year, and lower target F for the advice year.

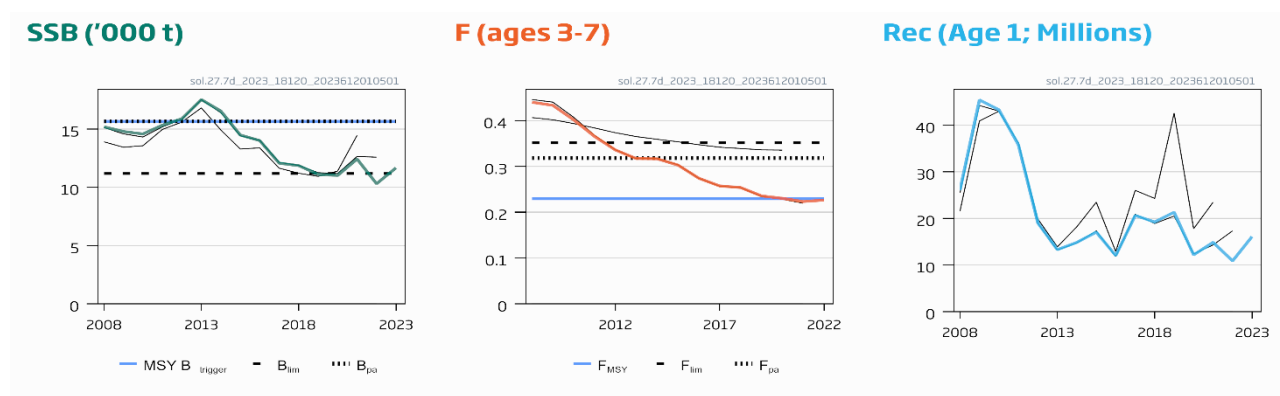
## Basis of the advice

**Table 3** Sole in Division 7.d. The basis of the advice.

Advice basis	MSY approach.
Management plan	ICES is aware of the multiannual management plan (MAP) that has been adopted by the EU for this stock (EU, 2019) and that 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. $F_{MSY}$ ranges are provided.

## Quality of the assessment

Information on two tuning fleets, the UK beam trawl survey (UK-BTS) and the Belgian commercial beam trawl (BE-CBT-LPUE), was missing in the terminal year of input data for the assessment of this stock. The effect of this issue has been investigated and, although one year of missing stations did not have a substantial impact on the current assessment outputs, it may become a problem if the issue persists in the future.



**Figure 2** Sole in Division 7.d. 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 the interbenchmark protocol (ICES, 2022a), and only assessment results from the last two years should be compared to the reference points indicated. The 2019 and 2020 assessment results are missing because category 3 advice was provided.

## Issues relevant for the advice

Technical measures applicable to the mixed demersal beam trawl fishery affect both sole and plaice. The minimum mesh size of 80 mm for the sole fishery generates high discards of plaice, which have a larger minimum landing size than sole. The use of larger mesh sizes would reduce the catch of undersized plaice and sole but would also result in a loss of marketable sole in the short term.

A declining trend in weight-at-age has been observed since the beginning of the time series in 1980; this is for all the age classes except age 0, for which the decrease started in 2005.

## Reference points

**Table 4** Sole in Division 7.d. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	15654	$B_{pa}$ ; in tonnes.	ICES (2022a)
	$F_{MSY}$	0.230	Stochastic simulations (EqSim) with segmented regression fixed at $B_{lim}$ based on recruitment period 1982–2020.	ICES (2022a)
Precautionary approach	$B_{lim}$	11181	$B_{loss}$ , lowest observed SSB (2020) with 2021 as the last year of catch data; in tonnes.	ICES (2022a)
	$B_{pa}$	15654	$B_{lim} \times 1.4$ ; in tonnes.	ICES (2022a)

Framework	Reference point	Value	Technical basis	Source
	$F_{lim}$	0.352	The $F$ that on average leads to $B_{lim}$ from EqSim.	ICES (2022a)
	$F_{pa}$	0.318	The $F$ that provides a 95% probability for SSB to be above $B_{lim}$ ( $F_{P.05}$ with advice rule [AR]).	ICES (2022a)
EU Management plan (MAP)*	MAP MSY $B_{trigger}$	15654	MSY $B_{trigger}$ ; in tonnes.	ICES (2022a)
	MAP $B_{lim}$	11181	$B_{lim}$ ; in tonnes.	ICES (2022a)
	MAP $F_{MSY}$	0.230	$F_{MSY}$	ICES (2022a)
	MAP range $F_{lower}$	0.156–0.230	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022a)
	MAP range $F_{upper}$	0.230–0.287	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 Western Waters (EU, 2019).

## Basis of the assessment

**Table 5** Sole in Division 7.d. Basis of the assessment and advice.

ICES stock data category	1 ( <a href="#">ICES, 2023a</a> )
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2023b) that uses catches and surveys in the model and in the forecast.
Input data	Commercial catches: international landings and discards, age compositions from catch data; three survey indices: UK(E&W)-BTS [B2453], UK(E&W)-YFS [B6805] and FR-YFS [B5507]; three commercial indices: BE-CBT, FR-COTB, and UK(E&W)-CBT; natural mortality and maturity-at-age are assumed to be time invariant (ICES, 2017, 2021, 2022a).
Discards, BMS landings, and bycatch	Discards are reconstructed from 1982–2003. Discards (including ICES estimated BMS) are combined with the landings as input in the model. In 2022, 74% of the landings had associated discarding information, and 63% of the discards were sampled.
Indicators	None
Other information	This stock was benchmarked in 2021 (ICES, 2021) and interbenchmarked in 2022 (ICES, 2022a).
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 Division 7.d. ICES advice, TAC, official landings, and ICES catch estimates. 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	Precautionary TAC	3100		3850	3841	4791	197
1988	<i>Status quo</i> (shot) TAC	3400		3850	3302	3853	198
1989	<i>Status quo</i> (shot) TAC	3800		3850	2945	3805	192
1990	No effort increase; TAC	3700		3850	3036	3647	342
1991	<i>Status quo</i> $F$ ; TAC	3400		3850	3784	4351	368
1992	TAC	2700		3500	3794	4072	275
1993	70% of $F(91)$ ~ 2800 tonnes	2800		3200	3862	4299	273
1994	Reduce $F$	< 3800		3800	4038	4383	122
1995	No increase in $F$	3800		3800	3743	4420	282
1996	No long-term gain in increasing $F$	4700		3500	4098	4797	174
1997	No advice	-		5230	3941	4764	147
1998	No increase in effort	4500		5230	3047	3363	127
1999	Reduce $F$ to $F_{pa}$	3800		4700	3900	4135	247
2000	$F < F_{pa}$	< 3900		4100	3832	3476	201

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards
2001	$F < F_{pa}$	< 4700		4600	4617	4025	317
2002	$F < F_{pa}$	< 5200		5200	5399	4733	444
2003	$F < F_{pa}$	< 5400		5400	6247	6977	584
2004	$F < F_{pa}$	< 5900		5900	5667	5819	258
2005	$F < F_{pa}$	< 5700		5700	4620	4748	344
2006	$F < F_{pa}$	< 5700		5720	4832	4830	315
2007	$F < F_{pa}$	< 6440		6220	5313	5421	332
2008	$F < F_{pa}$	< 6590		6590	4972	4963	183
2009	$F < F_{pa}$	< 4380		5274	5282	4828	287
2010	$F < F_{pa}$	< 3190		4219	4449	4108	273
2011	See scenarios	< 4840		4852	4203	4136	342
2012	MSY transition	< 5600		5580	4043	4058	445
2013	MSY transition	< 5900		5900	4442	4295	180
2014	MSY transition	< 3251		4838	4651	4626	216
2015	MSY approach	< 1931		3483	3411	3385	263
2016	MSY approach		$\leq 2685$	3258	2529	2433	106
2017	MSY approach		$\leq 2487$	2724	2223	2090	156
2018	MSY approach		$\leq 3866$	3405	2312	2395	263
2019	MSY approach		$\leq 2571$	2515	1773	1648	404
2020	Precautionary approach		< 2846	2797	1706	1562	409*
2021	Precautionary approach		< 3248	3248	1661**	1574	350*
2022	MSY approach		$\leq 2380$	2380	1790**	1695	334*
2023	MSY approach		$\leq 1747$	1747			
2024	MSY approach		$\leq 1504$				

\* Including BMS reported to ICES

\*\* Preliminary

## History of the catch and landings

**Table 7** Sole in Division 7.d. Catch distribution by fleet in 2022 as estimated by and reported to ICES.

Catch	Landings				Discards*
2029 tonnes	Trammel-/gillnets 31%	Beam trawls 35%	Bottom trawls 30%	Other gears 3.9%	334 tonnes
	1695 tonnes				

\* Discards include BMS landings from EU and UK fleets.

**Table 8** Sole in Division 7.d. History of commercial catch and landings; both the official and ICES estimated values are presented by country. Weights are in tonnes.

Year	Official landings						ICES estimates	
	Belgium	France	UK (E + W)	Others	BMS landings	Total	Landings	Discards
1974	159	383	309	3		854	884	
1975	132	464	244	1		841	882	
1976	203	599	404	-		1206	1305	
1977	225	737	315	-		1277	1335	
1978	241	782	366	-		1389	1589	
1979	311	1129	402	-		1842	2215	
1980	302	1075	159	-		1536	1923	
1981	464	1513	160	-		2137	2477	
1982	525	1828	317	4		2674	3190	196
1983	502	1120	419	-		2041	3458	101
1984	592	1309	505	-		2406	3575	141
1985	568	2545	520	-		3633	3837	242
1986	858	1528	551	-		2937	3932	145
1987	1100	2086	655	-		3841	4791	197

Year	Official landings						ICES estimates	
	Belgium	France	UK (E + W)	Others	BMS landings	Total	Landings	Discards
1988	667	2057	578	-		3302	3853	198
1989	646	1610	689	-		2945	3805	192
1990	996	1255	785	-		3036	3647	342
1991	904	2054	826	-		3784	4351	368
1992	891	2187	706	10		3794	4072	275
1993	917	2322	610	13		3862	4299	273
1994	940	2382	701	15		4038	4383	122
1995	817	2248	669	9		3743	4420	282
1996	899	2322	877	-		4098	4797	174
1997	1306	1702	933	-		3941	4764	147
1998	541	1703	803	-		3047	3363	127
1999	880	2251	769	-		3900	4135	247
2000	1021	2190	621	-		3832	3476	201
2001	1313	2482	822	-		4617	4025	317
2002	1643	2780	976	-		5399	4733	444
2003	1657	3475	1114	1		6247	6977	584
2004	1485	3070	1112	-		5667	5819	258
2005	1221	2832	567	-		4620	4748	344
2006	1547	2627	658	0		4832	4830	315
2007	1530	2981	801	1		5313	5421	332
2008	1368	2880	724	0		4972	4963	183
2009	1475	3047	760	0		5282	4828	287
2010	1294	2476	679	0		4449	4108	273
2011	1222	2281	700	0		4203	4136	342
2012	941	2475	627	< 1		4043	4058	445
2013	952	2884	605	0		4442	4295	180
2014	1496	2507	648	< 1		4651	4626	216
2015	1048	1895	468	0		3411	3385	263
2016	799	1337	392	< 1		2529	2433	106
2017	697	1178	349	< 1		2223	2090	156
2018	653	1265	394	< 1		2312	2395	263
2019	603	925	245	< 1	< 1	1773	1648	404
2020	686	827	193	< 1	< 1	1706	1562	409**
2021*	621	806	233	1	< 1	1661	1574	350**
2022*	643	884	262	1	< 1	1790	1695	334**

\* Preliminary.

\*\* Including BMS reported to ICES.

## Summary of the assessment

**Table 9** Sole in Division 7.d. Assessment summary. Recruitment is in thousands, weights in tonnes. High and Low refer to 95% confidence intervals.

Year	Recruitment (Age 1)			Spawning stock biomass			Landings	Discards*	Fishing pressure (ages 3–7)		
	Low	R	High	Low	SSB	High			Low	F	High
1982	9806	14468	21347	11370	13184	15287	3190	196	0.29	0.34	0.41
1983	15103	21855	31624	11864	13627	15652	3458	101	0.31	0.36	0.42
1984	15622	22429	32203	12174	13867	15797	3575	141	0.32	0.37	0.44
1985	11190	16175	23380	12867	14581	16524	3837	242	0.32	0.37	0.43
1986	17150	24698	35569	12526	14159	16004	3932	145	0.35	0.40	0.46
1987	10810	15510	22256	12237	13812	15590	4791	197	0.39	0.45	0.53
1988	19087	26480	36735	11500	13025	14752	3853	198	0.39	0.45	0.52
1989	12631	17653	24673	10167	11429	12849	3805	192	0.40	0.46	0.53
1990	31950	44364	61602	10771	12128	13656	3647	342	0.38	0.43	0.50
1991	25804	35370	48484	11297	12711	14301	4351	368	0.37	0.43	0.49

Year	Recruitment (Age 1)			Spawning stock biomass			Landings	Discards*	Fishing pressure (ages 3–7)		
	Low	R	High	Low	SSB	High			Low	F	High
1992	21226	29581	41224	12753	14571	16647	4072	275	0.35	0.40	0.47
1993	9747	13762	19430	14143	16107	18343	4299	273	0.33	0.39	0.45
1994	20075	27662	38117	13163	14875	16809	4383	122	0.35	0.41	0.47
1995	16724	23147	32034	12540	14013	15658	4420	282	0.39	0.44	0.50
1996	13679	18892	26093	12174	13603	15200	4797	174	0.43	0.49	0.56
1997	19585	27873	39670	11293	12586	14027	4764	147	0.45	0.52	0.59
1998	14176	19627	27175	10477	11692	13046	3363	127	0.43	0.49	0.56
1999	25269	34777	47864	9909	11193	12644	4135	247	0.42	0.48	0.54
2000	28184	38611	52896	10781	12088	13554	3476	201	0.38	0.44	0.50
2001	23228	32270	44833	12767	14446	16347	4025	317	0.35	0.41	0.47
2002	36044	49995	69345	14044	15823	17826	4733	444	0.35	0.40	0.46
2003	17370	23831	32696	16570	18608	20897	6977	584	0.38	0.43	0.49
2004	16081	22669	31955	13217	14770	16505	5819	258	0.37	0.43	0.49
2005	35543	48966	67459	13656	15233	16993	4748	344	0.35	0.40	0.46
2006	30411	41641	57017	13463	15003	16720	4830	315	0.38	0.43	0.49
2007	14734	20650	28942	13591	15238	17084	5421	332	0.39	0.46	0.53
2008	18610	26096	36594	13513	15192	17080	4963	183	0.38	0.44	0.51
2009	31738	45444	65069	13035	14786	16773	4828	287	0.37	0.43	0.51
2010	30682	43329	61189	12822	14576	16569	4108	273	0.34	0.40	0.47
2011	25082	35811	51131	13592	15329	17287	4136	342	0.31	0.37	0.43
2012	13338	19045	27194	14048	15886	17964	4058	445	0.29	0.34	0.39
2013	9294	13296	19022	15508	17526	19805	4295	180	0.27	0.32	0.37
2014	10409	14857	21206	14396	16545	19015	4626	216	0.27	0.32	0.37
2015	11787	17053	24671	12604	14485	16647	3385	263	0.26	0.30	0.36
2016	8362	12032	17313	12163	14005	16127	2433	106	0.23	0.27	0.33
2017	14435	20635	29497	10390	12066	14013	2090	156	0.21	0.26	0.31
2018	13402	19255	27664	10188	11858	13803	2395	263	0.21	0.25	0.31
2019	14503	21329	31369	9550	11109	12922	1648	404	0.195	0.24	0.29
2020	7720	12177	19208	9369	11013	12944	1562	409	0.189	0.230	0.28
2021	8143	14881	27195	10440	12421	14777	1574	350	0.180	0.223	0.28
2022	4071	10874	29047	8486	10305	12513	1695	334	0.178	0.226	0.29
2023		16105**		9195	11670	15017					

\* Discard estimates prior to 2004 assume the average discard proportion by age for 2004–2008 (WKNSEA; ICES, 2021). Since 2020, discards include BMS landings from EU and UK fleets.

\*\* Recruitment in 2023 is the geometric mean of resampled recruitment estimates from 2012 to 2021.

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