

Sole (*Solea solea*) in divisions 7.f and 7.g (Bristol Channel, Celtic Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 1338 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 at F_{MSY} ; spawning-stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

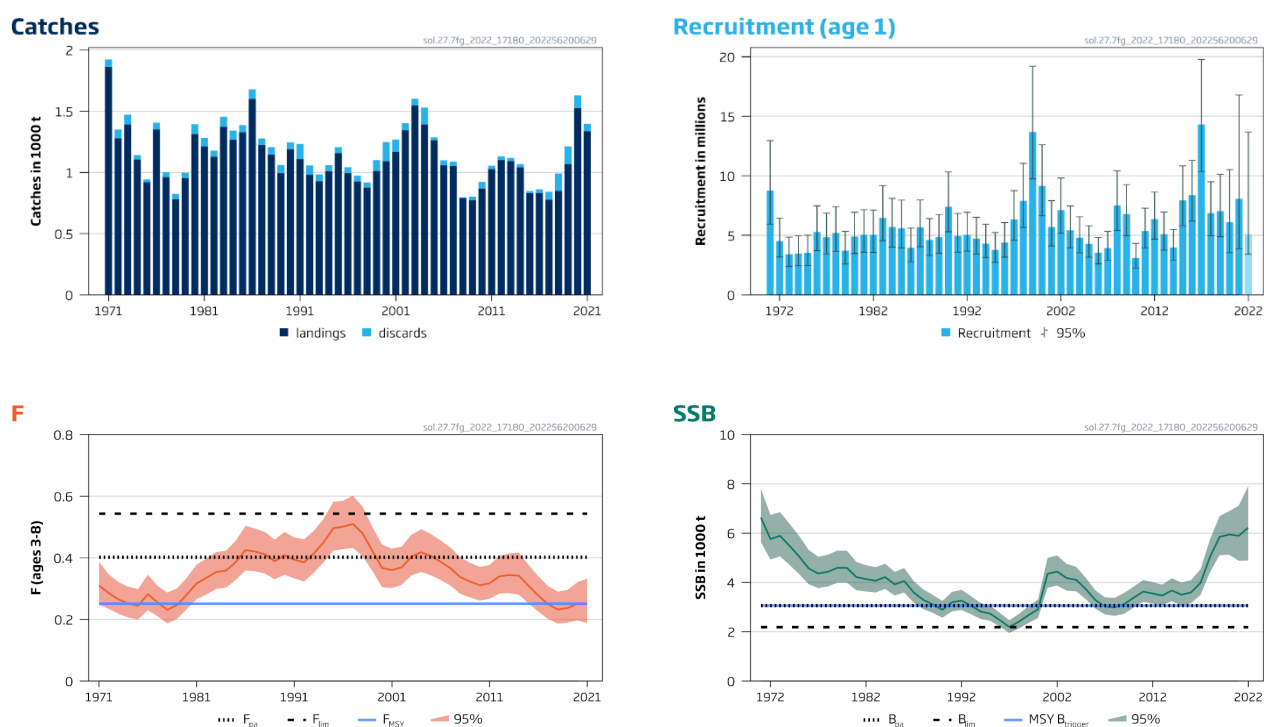


Figure 1 Sole in divisions 7.f and 7.g. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a lighter colour.

Catch scenarios

Table 1 Sole in divisions 7.f and 7.g. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 3-8}$ (2022)	0.246	Based on a catch of 1337 tonnes for 2022
SSB_{2023}	6120	Short-term forecast; in tonnes.
$R_{age\ 1}$ (2022-2023)	5111	Median recruitment, resampled from the years 1971–2019; in thousands.
Catch (2022)	1337	TAC for 2022; in tonnes.
Projected landings (2022)	1258	Assuming average landings ratio by age 2019–2021; in tonnes.
Projected discards (2022)	79	Assuming average discard ratio by age 2019–2021; in tonnes.

Table 2 Sole in divisions 7.f and 7.g. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	Projected landings* (2023)	Projected discards** (2023)	F_{total} (2023)	$F_{projected}$ landings (2023)	$F_{projected}$ discards (2023)	SSB (2024)	% SSB change ***	% TAC change ^	% advice change ^^
ICES advice basis										
MSY approach: $F = F_{MSY}$	1338	1258	80	0.251	0.23	0.0180	5903	-3.5	0.075	0.075
Other scenarios										
EU MAP^^^: F_{MSY}	1338	1258	80	0.251	0.23	0.0180	5903	-3.5	0.075	0.075
EU MAP^^^: F_{MSY} lower	765	720	45	0.136	0.126	0.0097	6504	6.3	-43	-43
EU MAP^^^: F_{MSY} upper	2232	2097	135	0.462	0.43	0.033	4963	-18.9	67	67
$F = 0$	0	0	0	0	0	0	7307	19.4	-100	-100
$F = F_{pa}$	1996	1877	119	0.402	0.37	0.029	5212	-14.8	49	49
$F = F_{lim}$	2531	2377	154	0.543	0.50	0.039	4647	-24	89	89
$SSB_{2024} = B_{lim}$	4919	4572	347	1.59	1.48	0.114	2184	-64	268	268
$SSB_{2024} = B_{pa} = MSY B_{trigger}$	4063	3797	266	1.10	1.02	0.078	3057	-50	204	204
$F = F_{2022}$	1312	1234	78	0.246	0.23	0.0175	5930	-3.1	-1.87	-1.87
$SSB_{2024} = SSB_{2023}$	1130	1064	66	0.21	0.193	0.0148	6120	0	-15.5	-15.5

* Marketable landings, assuming recent discard rate.

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

*** SSB 2024 relative to SSB 2023.

^ Total catch in 2023 relative to TAC 2022 (1337 tonnes).

^^ Advice value for 2023 relative to the advice value for 2022 (1337 tonnes).

^^^ EU multiannual plan (MAP) for the Western Waters and adjacent waters (EU, 2019).

Basis of the advice

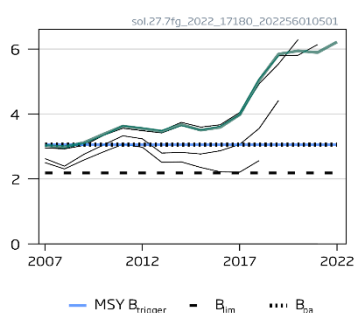
Table 3 Sole in divisions 7.f and 7.g. The basis of the advice.

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, 2019) 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_{MSY} ranges are provided.

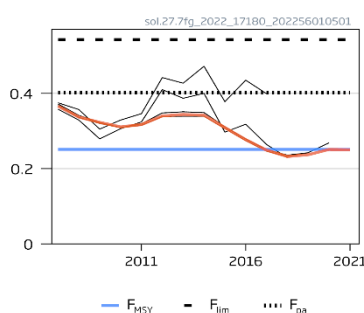
Quality of the assessment

Discard estimates are based on incomplete sampling of the fisheries in recent years. However, the main fleet is considered to be represented and therefore this is considered to have minimal impact on the assessment.

SSB (1000 t)



Fbar



Rec (age 1; Millions)

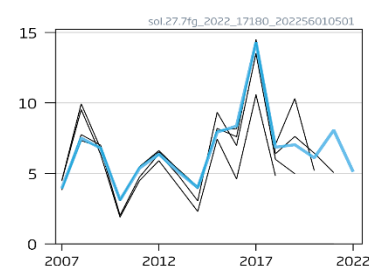


Figure 2

Sole in divisions 7.f and 7.g. Historical assessment results (final-year SSB estimate and recruitment assumption included for each line). This stock was benchmarked in 2020 (ICES, 2020a) the reference points were revised and at which point the F_{bar} was changed from F_{4-8} to F_{3-8} . Therefore, only assessment results from the last three years should be compared to the reference points indicated.

Issues relevant for the advice

There is no information to present for this stock.

Reference points

Table 4 Sole in divisions 7.f and 7.g. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	3057	B_{pa} ; in tonnes.	ICES (2020b)
	F_{MSY}	0.251	Eqsim analysis based on the recruitment period 1971–2018.	ICES (2020b)
Precautionary approach	B_{lim}	2184	B_{loss} estimated in 2020, corresponding to SSB in 1997; in tonnes.	ICES (2020b)
	B_{pa}	3057	$B_{lim} \times 1.4$; in tonnes	ICES (2020b)
	F_{lim}	0.543	Eqsim analysis, based on the recruitment period 1971–2018	ICES (2020b)
	F_{pa}	0.402	F_{POS} ; F that leads to $SSB \geq B_{lim}$ with 95% probability	ICES (2020b)
Management plan*	MAP MSY $B_{trigger}$	3057	MSY $B_{trigger}$; in tonnes	EU (2019), ICES (2020b)
	MAP B_{pa}	3057	B_{pa} ; in tonnes	EU (2019), ICES (2020b)
	MAP B_{lim}	2184	B_{lim} ; in tonnes	EU (2019), ICES (2020b)
	MAP F_{MSY}	0.251	F_{MSY}	EU (2019), ICES (2020b)
	MAP range F_{lower}	0.136–0.251	Consistent with ranges provided by ICES (2020b), resulting in no more than 5% reduction in long-term yield compared with MSY	EU (2019), ICES (2020b)
	MAP range F_{upper}	0.251–0.462	Consistent with ranges provided by ICES (2020b), resulting in no more than 5% reduction in long-term yield compared with MSY	EU (2019), ICES (2020b)

* EU multiannual plan (MAP) for the Western Waters and adjacent waters (EU, 2019).

Basis of the assessment

Table 5 Sole in divisions 7.f and 7.g. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2022b) that uses landings and discards in the model and in the forecast
Input data	Total international landings, ages and length frequencies from catch sampling by métier; one survey index (UK[E&W]-BTS-Q3 (B6596) 1988–2021); five commercial biomass indices (BE-CBT [1971–1983 and 1984–1996], BE-CBT3 [2006–2021], and UK(E & W)-CBT [1984–2005 and 2006–2021]); maturity data (ICES, 2020a); natural mortality is assumed to be constant. Catch numbers for age 1 and 2 prior to 2004 are not used in the assessment model.
Discards and bycatch	Discard numbers available from 2004 onwards. Discards prior to 2004 are calculated using a constant ratio of discards to landings by age based on data from 2004–2018 (ICES, 2020a).
Indicators	None
Other information	Last benchmark in 2020 (ICES, 2020a)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

Table 6 Sole in divisions 7.f and 7.g. History of ICES advice, agreed TAC, official landings, and ICES estimates for landings and discards. All weights are in tonnes.

Year	ICES advice	Catches corresponding to advice	Landings corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards
1987	Status quo F; TAC		1600	1600	1264	1222	
1988	F = F (pre-86); TAC		900	1100	1204	1146	
1989	F at F (81–85); TAC		1000	1000	992	992	
1990	No increase in F		1200	1200	1239	1189	
1991	No increase in F		1100	1200	1496	1107	
1992	No long-term gains in increasing F		1100	1200	1060	981	
1993	No long-term gains in increasing F		-	1100	1030	928	
1994	No long-term gains in increasing F		-	1100	1018	1009	
1995	No increase in F		1000	1100	1165	1157	
1996	20% reduction in F		800	1000	1081	995	
1997	20% reduction in F		800	900	1038	927	
1998	20% reduction in F		700	850	1013	875	
1999	Reduce F below F_{pa}		810	960	947	1012	
2000	Reduce F below F_{pa}		< 1160	1160	1040	1091	
2001	Reduce F below F_{pa}		< 810	1020	1120	1168	
2002	Reduce F below F_{pa}		< 1000	1070	1118	1345	
2003	Reduce F below F_{pa}		< 1240	1240	1207	1547	
2004	Reduce F below F_{pa}		< 1000	1050	1130	1391	140
2005	Reduce F below F_{pa}		< 840	1000	997	1263	23
2006	Reduce F below F_{pa}		< 880	950	921	1058	41
2007	Reduce F below F_{pa}		< 840	893	943	1052	36
2008	Keep F below F_{pa}		< 1000	964	781	790	8
2009	No long-term gains in increasing F		< 940	993	806	772	30
2010	No long-term gains in increasing F		< 920	993	871	867	56
2011	See scenarios		-	1241	1027	1027	28
2012	MSY approach		< 1060	1060	1099	1101	32
2013	MSY approach		< 1100	1100	1085	1093	26
2014	MSY approach		< 920	1001	1042	1041	27
2015	MSY approach		< 652	851	830	831	17
2016	MSY approach	≤ 760	≤ 745	779	830	832	31
2017	MSY approach	≤ 806		845	777	778	65
2018	MSY approach	≤ 931		920	850	850	141
2019	MSY approach	≤ 864		1009	1068	1068	145
2020	Management plan	1686 (range 993–2597)		1652	1507*	1524	106
2021	Management plan	1413 (range 811–2364)		1413	1365*	1336	62
2022	MSY approach	≤ 1337		1337			
2023	MSY approach	≤ 1338					

* Preliminary.

History of the catch and landings

Table 7 Sole in divisions 7.f and 7.g. Catch distribution by fleet in 2021 as estimated by ICES.

Total catch	Landings			Discards		
1398 tonnes	Beam trawlers 87%	Otter trawlers 13%	Other gears < 1%	Beam trawlers 87%	Otter trawlers 13%	Other gears < 1%
	1336 tonnes			62 tonnes		

Table 8 Sole in divisions 7.f and 7.g. History of official and ICES estimated landings (tonnes).

Year	Belgium	Denmark	France	Ireland	UK (E. and W., N.I.)	UK (Scotland)	Other	Total official	ICES landings
1986	1039*	2	146	188	611	-	3	1989	1600
1987	701*	-	117	9	437	-	-	1264	1222
1988	705*	-	110	72	317	-	-	1204	1146
1989	684*	-	87	18	203	-	-	992	992
1990	716*	-	130	40	353	0	-	1239	1189
1991	982*	-	80	32	402	0	-	1496	1107
1992	543*	-	141	45	325	6	-	1060	981
1993	575*	-	108	51	285	11	-	1030	928
1994	619*	-	90	37	264	8	-	1018	1009
1995	763*	-	88	20	294	-	-	1165	1157
1996	695*	-	102	19	265	0	-	1081	995
1997	660*	-	99	28	251	0	-	1038	927
1998	675*	-	98	42	198	-	-	1013	875
1999	604	-	61	51	231	0	-	947	1012
2000	694	-	74	29	243	-	-	1040	1091
2001	720	-	77	35	288	-	-	1120	1168
2002	703	-	65	32	318	-	-	1118	1345
2003	715	-	124	26	342	-	-	1207	1547
2004	735	-	79	33	283	-	-	1130	1391
2005	645	-	101	34	217	-	-	997	1263
2006	576	-	75	38	232	-	-	921	1058
2007	582	-	85	32	245	-	-	943	1052
2008	466	-	68	28	218	-	-	781	790
2009	513	-	73	26	195	-	-	806	772
2010	620	-	44	27	180	-	-	871	867
2011	775	-	54	30	168	-	-	1027	1027
2012	843	-	48	33	175	-	-	1099	1101
2013	789	-	49	42	205	-	-	1085	1093
2014	703	-	58	28	252	-	-	1042	1041
2015	674	-	24	27	105	-	-	830	831
2016	563	-	72	21	174	-	-	830	832
2017	551	-	49	28	149	-	-	777	778
2018	607	-	44	27	171	-	-	850	850
2019	800	-	42	33	193	-	< 1	1068	1068
2020**	1121	-	44	51	291	-	< 1	1507	1524
2021**	859	-	61	48	395	-	2	1365	1336

* Including divisions 7.g–k.

**Preliminary official landings.

Summary of the assessment

Table 9 Sole in divisions 7.f and 7.g. Assessment summary. Weights are in tonnes and recruitment in thousands. 'High' and 'Low' refer to 95% confidence intervals.

Year	Recruitment age 1			SSB			Landings**	Discards***	Fishing mortality ages 3-8		
	Low	Value	High	Low	Value	High			Low	Value	High
1971	5929	8764	12954	5642	6636	7805	1861	62	0.25	0.31	0.39
1972	3178	4526	6445	4926	5762	6741	1278	74	0.23	0.28	0.35
1973	2392	3408	4855	5062	5891	6855	1391	81	0.22	0.27	0.32
1974	2439	3476	4953	4709	5484	6387	1105	36	0.21	0.25	0.31
1975	2452	3507	5015	4338	5055	5891	919	26	0.20	0.24	0.30
1976	3726	5278	7475	3925	4571	5323	1350	57	0.23	0.28	0.35
1977	3432	4852	6859	3770	4361	5045	961	41	0.21	0.26	0.31
1978	3660	5208	7409	3833	4431	5123	780	45	0.187	0.23	0.29
1979	2589	3715	5331	3986	4593	5292	954	45	0.20	0.25	0.30
1980	3470	4903	6928	3990	4594	5288	1314	81	0.23	0.28	0.34
1981	3577	5055	7143	3681	4217	4832	1212	70	0.27	0.32	0.38
1982	3561	5038	7127	3633	4134	4704	1128	51	0.28	0.34	0.40
1983	4556	6467	9178	3589	4070	4616	1373	81	0.30	0.35	0.42
1984	4010	5698	8097	3737	4219	4762	1266	77	0.30	0.36	0.42
1985	3941	5600	7957	3468	3920	4431	1328	59	0.33	0.39	0.46
1986	2778	3947	5608	3591	4058	4585	1600	80	0.36	0.43	0.50
1987	4043	5677	7971	3173	3587	4055	1222	56	0.36	0.42	0.50
1988	3312	4605	6404	2919	3293	3715	1146	61	0.35	0.41	0.48
1989	3494	4856	6748	2765	3108	3493	992	70	0.33	0.39	0.46
1990	5296	7394	10324	2570	2890	3250	1189	57	0.35	0.41	0.48
1991	3583	4950	6837	2826	3198	3619	1107	126	0.33	0.39	0.47
1992	3671	5045	6933	2877	3264	3703	981	77	0.32	0.39	0.46
1993	3429	4728	6518	2709	3053	3439	928	56	0.35	0.41	0.49
1994	3137	4313	5931	2512	2820	3167	1009	52	0.39	0.45	0.53
1995	2731	3781	5236	2443	2736	3065	1157	50	0.42	0.50	0.58
1996	3166	4383	6068	2207	2472	2768	995	47	0.43	0.50	0.59
1997	4588	6338	8754	1948	2191	2465	927	46	0.43	0.51	0.60
1998	5663	7907	11041	2131	2409	2723	875	43	0.41	0.48	0.57
1999	9744	13679	19202	2352	2672	3037	1012	89	0.36	0.42	0.50
2000	6648	9156	12610	2558	2909	3309	1091	158	0.30	0.37	0.44
2001	4109	5702	7914	3780	4349	5003	1168	101	0.30	0.36	0.43
2002	5166	7121	9816	3871	4441	5094	1345	58	0.31	0.37	0.44
2003	3954	5429	7453	3668	4176	4753	1547	54	0.34	0.40	0.48
2004	3525	4806	6553	3636	4104	4632	1391	140	0.35	0.42	0.49
2005	3160	4283	5804	3318	3729	4191	1263	23	0.34	0.41	0.48
2006	2607	3544	4818	2936	3286	3678	1058	41	0.33	0.39	0.46
2007	2886	3924	5336	2700	3028	3397	1052	36	0.31	0.37	0.43
2008	5411	7507	10415	2645	2987	3373	790	8	0.28	0.34	0.40
2009	4982	6791	9256	2724	3119	3572	772	30	0.27	0.32	0.38
2010	2236	3110	4326	2982	3378	3827	867	56	0.26	0.31	0.37
2011	3953	5364	7280	3211	3627	4098	1027	28	0.27	0.32	0.38
2012	4690	6362	8630	3139	3551	4017	1101	32	0.28	0.34	0.41
2013	3759	5111	6950	3078	3470	3912	1093	26	0.28	0.34	0.41
2014	2898	3987	5486	3236	3674	4171	1041	27	0.28	0.34	0.42
2015	5799	7926	10833	3070	3503	3998	831	17	0.25	0.31	0.38
2016	6197	8365	11292	3152	3591	4092	832	31	0.23	0.28	0.34
2017	10348	14305	19774	3489	3979	4539	778	65	0.20	0.25	0.31
2018	4956	6861	9498	4415	5040	5754	850	141	0.186	0.23	0.29
2019	4886	7032	10120	5107	5846	6692	1068	145	0.190	0.24	0.30
2020	3542	6104	10519	5126	5945	6894	1524	106	0.197	0.25	0.32
2021	3880	8071	16786	4879	5894	7119	1336	62	0.188	0.250	0.333
2022	3408	5111*	13679	4886	6221	7915					

* Median resampled recruitment (1971–2019) as estimated by a stochastic projection.

** Landings are ICES estimates.

*** ICES discard estimates only available from 2004 to 2021. Discards prior to 2004 are calculated using a discard rate-at-age based on 2004–2018 discard data.

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

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