

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

ICES advice on fishing opportunities

Please note: The present advice replaces the advice given in June 2021 for catches in 2022.

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 1337[†] tonnes.

ICES notes the existence of a precautionary management plan, developed and adopted by some 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 above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

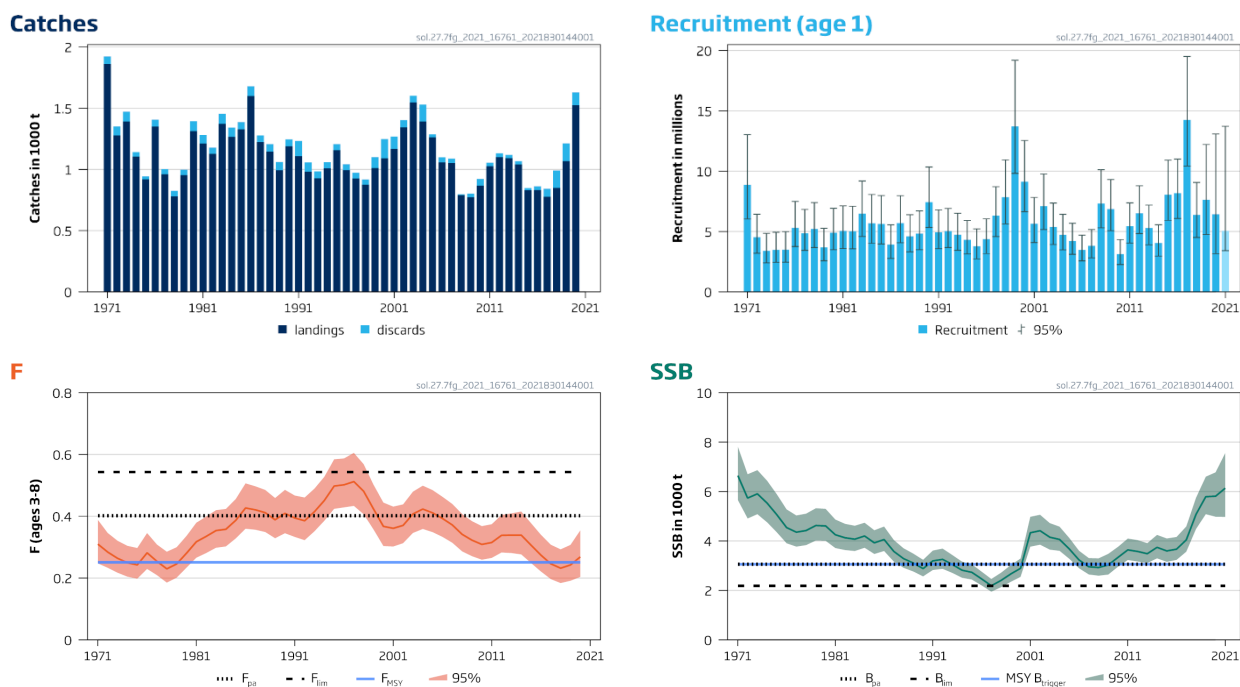


Figure 1 Sole in divisions 7.f and 7.g. Summary of the stock assessment. The assumed recruitment value for 2021 is shaded in a lighter colour.

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
$F_{ages\ 3-8}$ (2021)	0.258	Based on a catch of 1413 t for 2021.
SSB_{2022}	5953	Short-term forecast fishing at $F=0.258$; Tonnes.
$Rage_1$ (2021)	5055	Median recruitment, resampled from the years 1971–2018; Thousands.*
$Rage_1$ (2022)	5218	Median recruitment, resampled from the years 1971–2018; Thousands.*
Catch (2021)	1413	Catch advice for 2021; Tonnes.**
Projected landings (2021)	1328	Assuming average landings ratio by age 2018–2020; Tonnes.
Projected discards (2021)	85	Assuming average discard ratio by age 2018–2020; Tonnes.

** Random resampling of historical recruitment estimates leads to different values.

**The TAC 2021 was not available. Therefore, the catch advice for 2021 was used.

[†] Value corrected. The assessment and advice was revised due to the discovery of an error in the setting of the catch numbers for age 1 and 2 for 1971–2003 in the SAM model. Values and figures have been updated in this sheet.

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

Basis	Total catch (2022)	Projected landings * (2022)	Projected discards ** (2022)	F _{total} (2022)	F _{projected landings} (2022)	F _{projected discards} (2022)	SSB (2023)	% SSB change ***	% TAC change ^	% Advice change ^^
ICES advice basis										
MSY approach= F _{MSY}	1337	1261	76	0.251	0.24	0.0150	5719	-3.9	-5.4	-5.4
Other scenarios										
F=EU MAP ^{^^^} : F _{MSY}	1337	1261	76	0.251	0.24	0.0150	5719	-3.9	-5.4	-5.4
F=EU MAP ^{^^^} F _{MSY lower}	765	722	43	0.136	0.128	0.0080	6318	6.1	-46	-46
F=EU MAP ^{^^^} F _{MSY upper}	2227	2096	131	0.46	0.43	0.028	4796	-19.4	58	58
F = 0	0	0	0	0	0	0	7119	19.6	-100	-100
F _{pa}	1992	1875	117	0.40	0.38	0.024	5038	-15.4	41	41
F _{lim}	2523	2372	151	0.54	0.51	0.033	4486	-25	79	79
SSB ₂₀₂₃ = B _{lim}	4747	4422	325	1.51	1.42	0.091	2184	-63	236	236
SSB ₂₀₂₃ = B _{pa} = MSY B _{trigger}	3898	3648	250	1.04	0.97	0.062	3057	-49	176	176
F = F ₂₀₂₁	1368	1290	78	0.258	0.242	0.0160	5687	-4.5	-3.2	-3.2
SSB ₂₀₂₃ = SSB ₂₀₂₂	1116	1053	63	0.21	0.193	0.012	5953	0	-21	-21

* Marketable landings, assuming recent discard rate.

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

*** SSB 2023 relative to SSB 2022.

^ Total catch in 2022 relative to TAC 2021 (1413 tonnes).

^^ Advice value for 2022 relative to the advice value for 2021 (1413 tonnes).

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

Basis of the advice

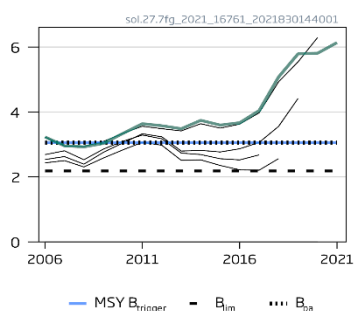
Table 3 Sole in divisions 7.f and 7.g. The basis of the advice.

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.

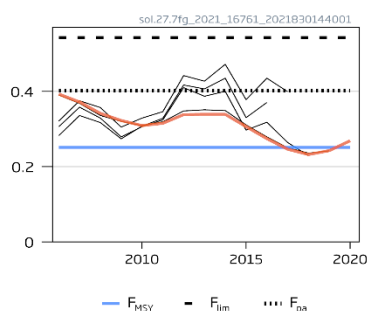
Quality of the assessment

Due to COVID-19, discard estimates are based on incomplete sampling of the fisheries. The main fleet is sufficiently sampled for catch, therefore this is considered to have minimal impact on the assessment.

SSB (1000 t)



F_{bar}



Rec (age 1; Millions)

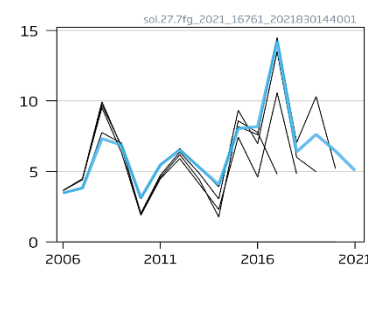


Figure 2 Sole in divisions 7.f and 7.g. Historical assessment results (final-year SSB estimate and recruitment assumption included for each line). This stock was benchmarked in 2020 (ICES, 2020a) at which point the F_{bar} was changed from F₄₋₈ to F₃₋₈.

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)

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, 2021a)
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2021b) 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) 1988–2020); five commercial biomass indices (BE-CBT [1971–1983 and 1984–1996], BE-CBT3 [2006–2020], and UK[E&W]-CBT [1984–2005 and 2006–2020]); 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	1392	
2004	Reduce F below F_{pa}		< 1000	1050	1130	1249	140
2005	Reduce F below F_{pa}		< 840	1000	997	1044	23
2006	Reduce F below F_{pa}		< 880	950	921	946	41
2007	Reduce F below F_{pa}		< 840	893	943	945	36
2008	Keep F below F_{pa}		< 1000	964	780	800	8
2009	No long-term gains in increasing F		< 940	993	807	805	30
2010	No long-term gains in increasing F		< 920	993	871	876	56
2011	See scenarios		-	1241	1013	1029	28
2012	MSY approach		< 1060	1060	1099	1104	32
2013	MSY approach		< 1100	1100	1086	1092	26
2014	MSY approach		< 920	1001	1044	1042	27
2015	MSY approach		< 652	851	827	830	17
2016	MSY approach	≤ 760	≤ 745	779	831	831	31
2017	MSY approach	≤ 806		845	780	776	65
2018	MSY approach	≤ 931		920	849	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			
2022	MSY approach	≤ 1337					

* Preliminary.

** Catch advice for 2020 updated in October 2019 (ICES, 2019).

History of the catch and landings

Table 7 Sole in divisions 7.f and 7.g. Catch distribution by fleet in 2020 as estimated by ICES.

Total catch	Landings			Discards	
	Beam trawlers	Otter trawlers	Other gears	Beam trawlers	Otter trawlers
1630 tonnes	89%	11%	< 1%	100%	0%
	1524 tonnes			106 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	1398
2005	645	-	101	34	217	-	-	997	1118
2006	576	-	75	38	232	-	-	921	946
2007	582	-	85	32	244	-	-	943	945
2008	466	-	68	28	218	-	-	780	800
2009	513	-	74	26	194	-	-	807	805
2010	620	-	45	27	179	-	-	871	876
2011	766	-	50	30	168	-	-	1013	1029
2012	843	-	48	33	175	-	-	1099	1104
2013	789	-	49	42	206	-	-	1086	1092
2014	705	-	59	28	252	-	-	1044	1042
2015	671	-	24	27	105	-	-	827	830
2016	563	-	72	21	175	-	-	831	831
2017	553	-	49	28	149	-	-	780	776
2018	607	-	44	28	171	-	-	849	850
2019**	800	-	42	33	193	-	< 1	1068	1068
2020**	1121	-	44	51	291	-	< 1	1507	1524

* 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. Low and high refer to 95% confidence intervals.

Year	Recruitment age 1			SSB			Landings**	Discards***	Fishing mortality ages 3-8		
	Value	High	Low	Value	High	Low			Value	High	Low
1971	8868	13033	6034	6647	7815	5655	1861	62	0.31	0.39	0.25
1972	4536	6439	3196	5735	6701	4909	1278	74	0.28	0.35	0.23
1973	3414	4849	2404	5909	6869	5083	1391	81	0.26	0.32	0.22
1974	3473	4935	2444	5532	6438	4754	1105	36	0.25	0.30	0.20
1975	3497	4988	2452	5061	5889	4349	919	26	0.24	0.30	0.198
1976	5304	7489	3757	4542	5280	3907	1350	57	0.28	0.35	0.23
1977	4845	6830	3437	4357	5033	3771	961	41	0.25	0.31	0.21
1978	5218	7401	3678	4424	5106	3833	780	45	0.23	0.29	0.185
1979	3684	5270	2576	4626	5326	4018	954	45	0.25	0.30	0.20
1980	4911	6920	3486	4610	5302	4008	1314	81	0.28	0.34	0.23
1981	5055	7125	3587	4252	4870	3713	1212	70	0.32	0.38	0.27
1982	5028	7095	3562	4129	4694	3633	1128	51	0.33	0.40	0.28
1983	6490	9188	4585	4073	4617	3594	1373	81	0.35	0.42	0.30
1984	5690	8067	4013	4202	4740	3725	1266	77	0.36	0.42	0.30
1985	5630	7984	3971	3925	4435	3474	1328	59	0.39	0.46	0.33
1986	3922	5557	2768	4059	4585	3593	1600	80	0.43	0.51	0.36
1987	5693	7970	4067	3577	4042	3165	1222	56	0.42	0.50	0.36
1988	4607	6391	3321	3286	3706	2915	1146	61	0.41	0.49	0.35
1989	4837	6708	3488	3107	3490	2765	992	70	0.39	0.46	0.33
1990	7431	10346	5337	2883	3240	2566	1189	57	0.41	0.49	0.35
1991	4930	6797	3576	3195	3613	2825	1107	126	0.39	0.47	0.33
1992	5042	6916	3676	3258	3694	2874	981	77	0.39	0.46	0.32
1993	4736	6517	3442	3049	3434	2707	928	56	0.41	0.49	0.35
1994	4311	5918	3140	2818	3164	2511	1009	52	0.45	0.53	0.39
1995	3775	5216	2733	2732	3060	2439	1157	50	0.50	0.58	0.42
1996	4380	6051	3171	2467	2762	2203	995	47	0.50	0.59	0.43
1997	6317	8710	4582	2191	2464	1948	927	46	0.51	0.61	0.43
1998	7848	10942	5629	2406	2718	2129	875	43	0.48	0.57	0.41
1999	13725	19192	9816	2667	3027	2349	1012	89	0.42	0.50	0.36
2000	9129	12546	6643	2896	3292	2548	1091	158	0.37	0.44	0.30
2001	5650	7823	4081	4333	4980	3769	1168	101	0.36	0.43	0.30
2002	7103	9769	5165	4416	5063	3851	1345	58	0.37	0.44	0.31
2003	5371	7356	3921	4152	4724	3649	1547	54	0.41	0.48	0.35
2004	4726	6427	3476	4062	4580	3601	1391	140	0.42	0.50	0.36
2005	4206	5681	3113	3677	4123	3279	1263	23	0.41	0.48	0.35
2006	3467	4695	2560	3232	3605	2897	1058	41	0.39	0.46	0.33
2007	3815	5167	2816	2958	3310	2644	1052	36	0.37	0.44	0.31
2008	7326	10115	5307	2926	3298	2595	790	8	0.34	0.41	0.29
2009	6865	9306	5065	3032	3481	2641	772	30	0.32	0.38	0.27
2010	3130	4332	2261	3339	3766	2960	867	56	0.31	0.37	0.26
2011	5454	7372	4036	3639	4099	3230	1027	28	0.32	0.37	0.27
2012	6517	8793	4830	3577	4036	3170	1101	32	0.34	0.40	0.28
2013	5292	7186	3898	3485	3914	3104	1093	26	0.34	0.41	0.28
2014	4060	5561	2965	3743	4247	3299	1041	27	0.34	0.42	0.28
2015	8041	10914	5924	3597	4102	3154	831	17	0.31	0.38	0.25
2016	8180	11001	6082	3669	4162	3234	832	31	0.27	0.34	0.22
2017	14256	19508	10417	4045	4589	3566	778	65	0.25	0.31	0.197

Year	Recruitment age 1			SSB			Landings**	Discards***	Fishing mortality ages 3-8		
	Value	High	Low	Value	High	Low			Value	High	Low
2018	6389	9068	4502	5080	5753	4485	850	141	0.23	0.29	0.184
2019	7621	12208	4757	5793	6602	5083	1068	145	0.24	0.31	0.191
2020	6434	13083	3164	5811	6777	4982	1524	106	0.27	0.35	0.20
2021	5055*	13725	3414	6138	7563	4974					

* Median resampled recruitment (1971–2018) as estimated by a stochastic projection.

** Landings are ICES estimates.

*** ICES discard estimates only available from 2004 to 2020. 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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