

Sole (*Solea solea*) in Division 7.e (western English Channel)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 1810 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 below F_{MSY} and spawning-stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

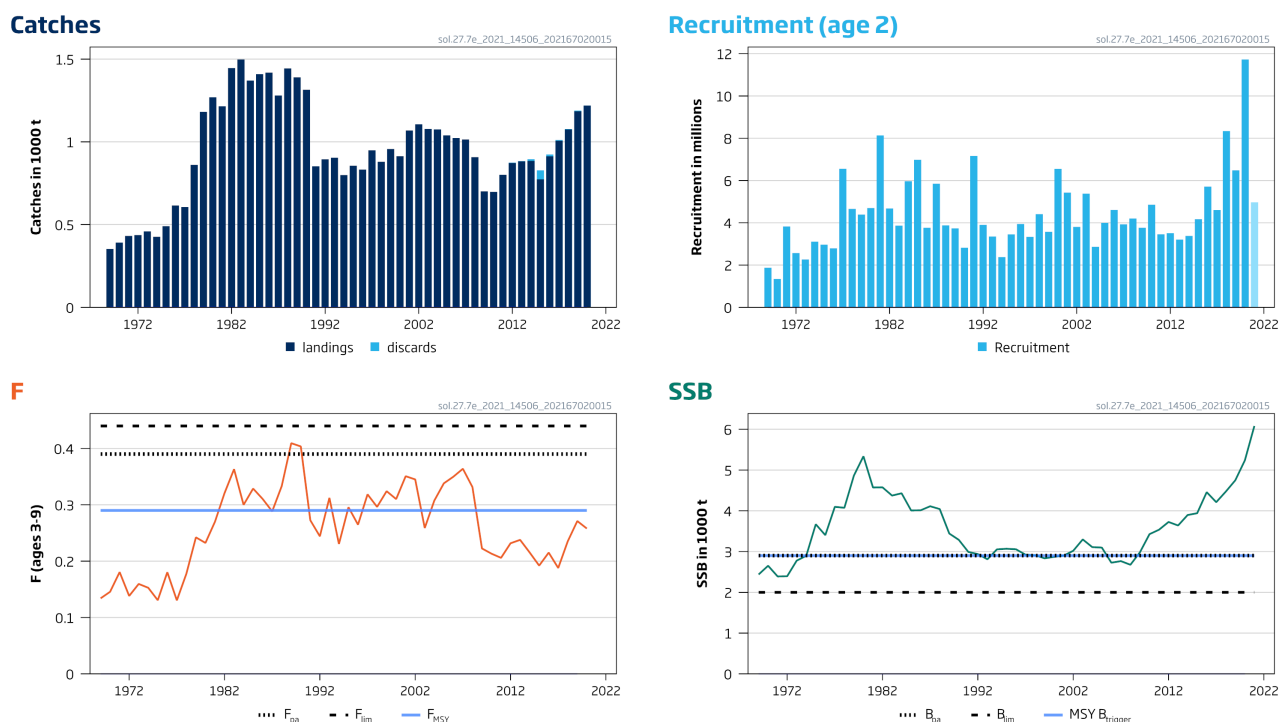


Figure 1 Sole in Division 7.e. Summary of the stock assessment. The assumed recruitment value for 2021 is shaded in a lighter colour. Discard estimates are only available from 2012 onwards.

Catch scenarios

Table 1 Sole in Division 7.e. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 3-9}$ (2021)	0.26	$F_{sq} = F_{average\ 2018-2020}$
SSB_{2022}	6437	Short-term forecast; in tonnes
$R_{age\ 2}$ (2021–2022)	4967	Geometric mean (2011–2020); in thousands
Catch (2021)	1586	Short-term forecast; in tonnes
Projected landings (2021)	1583	Short-term forecast; in tonnes
Projected discards (2021)	3	Average discard rate of 2018–2020 (0.21%); in tonnes. Not used in the assessment.

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

Basis	Total catch* (2022)	Projected landings (2022)	Projected discards (2022)	F _{projected landings} (2022)	SSB (2023)	% SSB change**	% TAC change***	% advice change^
ICES advice basis								
MSY approach: F _{MSY}	1810	1806	4	0.29	6034	-6.3	-6.0	-6.0
Other scenarios								
EU MAP^^: F _{MSY}	1810	1806	4	0.29	6034	-6.3	-6.0	-6.0
F = MAP^^ F _{MSY lower}	1068	1066	2	0.160	6765	5.1	-45	-45
F = MAP^^ F _{MSY upper}	2069	2065	4	0.34	5780	-10.2	7.5	7.5
F = 0	0	0	0	0	7820	21	-100	-100
F _{pa}	2316	2311	5	0.39	5538	-14	20	20
F _{lim}	2550	2544	5	0.44	5309	-17.5	32	32
SSB ₂₀₂₃ = B _{lim}	5991	5978	13	1.78	2000	-69	210	210
Rollover TAC	1925	1921	4	0.31	5921	-8.0	0	0
SSB ₂₀₂₃ = B _{pa} = MSY B _{trigger}	5036	5025	11	1.22	2900	-55	162	162
SSB ₂₀₂₃ = SSB ₂₀₂₂	1400	1397	3	0.22	6437	0	-27	-27
F = F ₂₀₂₁	1619	1616	3	0.25	6222	-3.3	-15.9	-15.9

* Total catch derived from the projected landings and the assumed discard rate.

** SSB 2023 relative to SSB 2022.

*** Total catch in 2022 relative to TAC 2021 (1925 tonnes).

^ Advice value for 2022 relative to the advice value for 2021 (1925 tonnes).

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

Basis of the advice

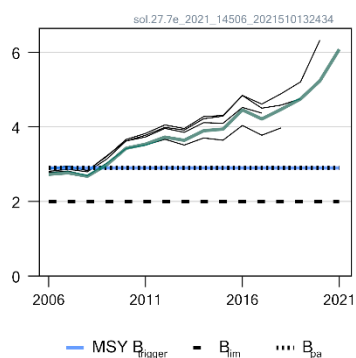
Table 3 Sole in Division 7.e. The basis of the advice.

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.

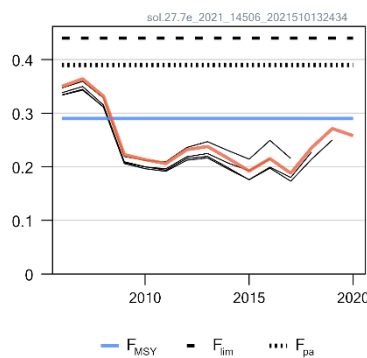
Quality of the assessment

The Q1SWBeam survey (B2732) was delayed in 2020 because of COVID-19 restrictions. Sensitivity analyses shown that this has had minimal impact on the perception of the stock status.

SSB (1000 t)



F (ages 3-9)



Rec (age 2; Millions)

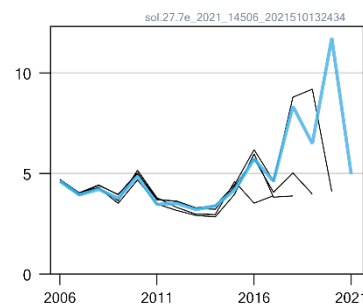


Figure 2 Sole in Division 7.e. Historical assessment results (final-year SSB estimate and recruitment assumption included).

Issues relevant for the advice

The catch advice for 2021 has increased substantially from 2020 and is unlikely to be fully taken by the fishery. Consequently, the average fishing pattern in recent years (2018–2020) was used in the forecast.

Reference points

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

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	2900	The 5th percentile of the distribution of SSB when fishing with no error in EqSim simulations at F_{MSY} (0.29); tonnes	ICES (2017)
	F_{MSY}	0.29	Median point estimate of EqSim simulations	ICES (2017)
Precautionary approach	B_{lim}	2000	Rounded $B_{pa}/1.4$; tonnes	ICES (2017)
	B_{pa}	2900	Rounded B_{loss} (1999 year class). Lowest SSB with high recruitment; tonnes.	ICES (2017)
	F_{lim}	0.44	Segmented regression simulation of stock–recruitment, with B_{lim} as the breakpoint and no error	ICES (2017)
	F_{pa}	0.39	F_{P05} ; the F that leads to $SSB \geq B_{lim}$ with 95% probability	ICES (2017, 2021a)
Management plan	MAP MSY $B_{trigger}$	2900	MSY $B_{trigger}$; tonnes	EU (2019), ICES (2017)
	MAP B_{pa}	2900	B_{pa} ; tonnes	EU (2019), ICES (2017)
	MAP B_{lim}	2000	B_{lim} ; tonnes	EU (2019), ICES (2017)
	MAP F_{MSY}	0.29	F_{MSY}	EU (2019), ICES (2017)
	MAP range F_{lower}	0.16	Minimum F which produces at least 95% of maximum yield	EU (2019), ICES (2017)
	MAP range F_{upper}	0.34	Maximum F which produces at least 95% of maximum yield	EU (2019), ICES (2017)

Basis of the assessment

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

ICES stock data category	1 (ICES, 2021b)
Assessment type	Age-based analytical assessment (FLXSA)(ICES, 2021a)
Input data	Commercial landings-at-age data; two survey indices: UK-FSP (B4381) and UK-Q1SWBeam (B2732) and two commercial tuning fleets (UK-CBT-late and UK-COT); natural mortality is assumed constant over ages and years at 0.1; fixed maturity ogive from divisions 7.f and 7.g
Discards and bycatch	Not included in the assessment, but used to provide catch advice
Indicators	None
Other information	Last inter-benchmark in 2015 (IBPWCF1at2; ICES, 2015)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

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

Year	ICES advice	Catch corresponding to advice	Landings corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards
1987	No increase in F		1150	1150	1110	1280	
1988	No decrease in SSB; TAC		1300	1300	950	1444	
1989	No decrease in SSB; TAC		1000	1000	800	1390	
1990	SSB = 3000 tonnes; TAC		900	900	750	1315	
1991	TAC		540	800	840	852	
1992	70% of F_{1990}		770	800	770	895	
1993	35% reduction in F		700	900	790	904	
1994	No increase in F		1000	1000	840	800	
1995	No increase in F		860	950	880	856	
1996	$F_{1996} < F_{1994}$		680	700	740	833	
1997	No increase in F		690	750	860	949	
1998	No increase in F		670	670	770	880	
1999	Reduce F below F_{pa}		670	700	660	957	

Year	ICES advice	Catch corresponding to advice	Landings corresponding to advice	Agreed TAC	Official landings	ICES landings	ICES discards
2000	Reduce F below F_{pa}		< 640	660	660	914	
2001	Reduce F below F_{pa}		< 580	600	650	1069	
2002	Reduce F below F_{pa}		< 450	525	540	1106	
2003	Rebuilding plan or $F = 0$		-	394	620	1078	
2004	$F = 0$ or recovery plan 1		0	300	490	1075	
2005	80% reduction in F or recovery plan		< 230	865	960	1039	
2006	80% reduction in F or recovery plan		< 240	940	964	1022	
2007	68% reduction in F or recovery plan		< 350	900	953	1015	
2008	75% reduction in F		< 260	765	815	908	
2009	70% reduction in F		< 320	650	785	701	
2010	Reduce fishing effort and catches		-	618	761	698	
2011	MSY framework		< 660	710	877	801	
2012	MSY framework		< 740	777	870	872	2
2013	MSY framework		< 960	894	889	883	1
2014	MSY approach		< 832	832	886	885	10
2015	MSY approach		< 851	851	777	774	54
2016	MSY approach		≤ 1226	979	915	913	10
2017	MSY approach	≤ 1198		1178	1000	1007	4
2018	MSY approach	≤ 1239		1202	1086	1075	3
2019	MSY approach	≤ 1272		1242	1176*	1185	4
2020	Management plan	1478 (range 878–1685)		1478	1218*	1219	< 1
2021	Management plan	1925 (range 1141–2197)		1925			
2022	MSY approach	≤ 1810					

* Preliminary official landings.

History of the catch and landings

Table 7 Sole in Division 7.e. Catch distribution by fleet in 2020 as estimated by ICES.

Catch	Landings				Discards			
	Beam trawl	Otter trawl	Gillnets	Other gears	Beam trawl	Otter trawl	Gillnets	Other gears
1220 tonnes	66%	18.6%	11.3%	4.2%	40%	60%	0%	0%
	1219 tonnes				< 1 tonne			

Table 8 Sole in Division 7.e. History of official landings and ICES estimates. All weights are in tonnes.

Year	Belgium	France	Netherlands	Ireland	UK and Channel Islands	Official total	ICES landings	ICES discards
1974		323				323	427	
1975	3	271			217	491	491	
1976	4	352			260	616	616	
1977	3	331			272	606	606	
1978	4	384			453	841	861	
1979	1	515			665	1181	1181	
1980	45	447		13	764	1269	1269	
1981	16	415	1		788	1220	1215	
1982	98	321			1028	1447	1446	
1983	47	405	3		1043	1498	1498	
1984	48	421			901	1370	1370	
1985	58	130			911	1099	1409	
1986	62	467			840	1369	1419	

Year	Belgium	France	Netherlands	Ireland	UK and Channel Islands	Official total	ICES landings	ICES discards
1987	48	432			632	1112	1280	
1988	67	98			784	949	1444	
1989	69	112	6		613	800	1390	
1990	41	81			636	758	1315	
1991	35	325			477	837	852	
1992	41	267			468	776	895	
1993	59	236			498	793	904	
1994	33	257			546	836	800	
1995	21	294			565	880	856	
1996	8	297			428	733	833	
1997	13	348		1	496	858	949	
1998	40	343			389	772	880	
1999	13				396	409	957	
2000	4	241			413	658	914	
2001	19	224			407	650	1069	
2002	33	198			309	540	1106	
2003	1	363		1	255	620	1078	
2004	7	302			185	494	1075	
2005	26	406			527	959	1039	
2006	32	357			575	964	1022	
2007	34	384			536	953	1015	
2008	28	312		< 1	474	815	908	
2009	17	386			382	785	701	
2010	17	375			369	761	698	
2011	22	424			431	877	801	
2012	39	325		< 1	506	871	872	2
2013	30	319			540	889	883	1
2014	25	351		< 1	510	886	885	10
2015	42	245		< 1	490	777	774	54
2016	46	245			624	915	913	10
2017	56	198		< 1	746	1000	1007	4
2018	68	217	< 1	< 1	801	1086	1075	3
2019*	47	203	< 1	< 1	926	1176	1185	4
2020*	58	194	< 1		966	1218	1219	< 1

* Preliminary official landings.

Summary of the assessment

Table 9 Sole in Division 7.e. Assessment summary. Weights are in tonnes, numbers in thousands.

Year	Recruitment (age 2)	Stock size SSB	Landings	Discards**	Fishing mortality (ages 3–9)
1969	1874	2437	353		0.134
1970	1343	2652	391		0.146
1971	3826	2390	432		0.181
1972	2568	2395	437		0.138
1973	2264	2778	459		0.160
1974	3107	2896	427		0.153
1975	2967	3670	491		0.131
1976	2791	3403	616		0.180
1977	6556	4098	606		0.130
1978	4657	4074	861		0.178
1979	4389	4865	1181		0.24
1980	4702	5338	1269		0.23
1981	8130	4572	1215		0.27
1982	4680	4575	1446		0.32
1983	3866	4374	1498		0.36

Year	Recruitment (age 2)	Stock size SSB	Landings	Discards**	Fishing mortality (ages 3–9)
1984	5968	4430	1370		0.30
1985	6982	4009	1409		0.33
1986	3765	4013	1419		0.31
1987	5848	4112	1280		0.29
1988	3878	4043	1444		0.33
1989	3736	3443	1390		0.41
1990	2818	3287	1315		0.40
1991	7163	2991	852		0.27
1992	3903	2938	895		0.24
1993	3351	2811	904		0.31
1994	2378	3054	800		0.23
1995	3454	3069	856		0.30
1996	3942	3056	833		0.26
1997	3335	2923	949		0.32
1998	4409	2913	880		0.30
1999	3576	2834	957		0.32
2000	6548	2871	914		0.31
2001	5429	2901	1069		0.35
2002	3808	3019	1106		0.35
2003	5380	3298	1078		0.26
2004	2865	3109	1075		0.31
2005	3995	3098	1039		0.34
2006	4610	2727	1023		0.35
2007	3931	2766	1015		0.36
2008	4205	2676	908		0.33
2009	3769	2983	701		0.22
2010	4857	3427	698		0.21
2011	3458	3536	801		0.21
2012	3507	3726	872	2	0.23
2013	3202	3640	883	1	0.24
2014	3382	3897	885	10	0.22
2015	4172	3941	774	54	0.192
2016	5715	4457	913	10	0.22
2017	4605	4212	1007	4	0.188
2018	8338	4471	1075	3	0.24
2019	6486	4749	1185	4	0.27
2020	11728	5236	1219	0	0.26
2021	4967*	6063			

* Geometric mean (2011–2020).

** Discards are not included in the assessment.

Sources and references

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

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