

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

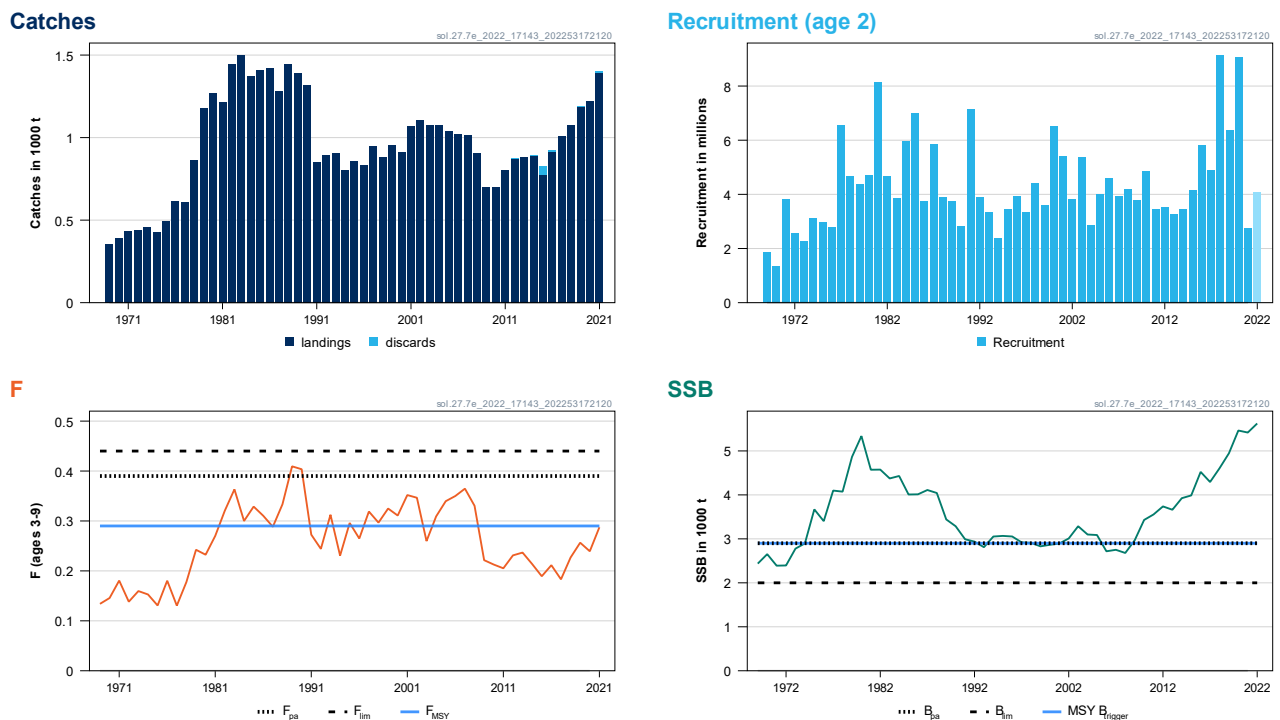
### ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 1394 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  $F_{MSY}$ , 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 2022 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
$F_{ages\ 3-9}$ (2022)	0.29	$F_{sq}$ ; rescaled to $F_{2021}$
$SSB_{2023}$	5052	Short-term forecast; in tonnes
$R_{age\ 2}$ (2022–2023)	4077	Geometric mean (1969–2021); in thousands
Catch (2022)	1507	Short-term forecast; in tonnes
Projected landings (2022)	1500	Short-term forecast; in tonnes
Projected discards (2022)	7	Average discard rate of 2019–2021 (0.44%); 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* (2023)	Projected landings (2023)	Projected discards (2023)	F <sub>projected landings</sub> (2023)	SSB (2024)	% SSB change**	% TAC change***	% advice change^
ICES advice basis								
MSY approach: F = F <sub>MSY</sub>	1394	1388	6	0.29	4541	-10.1	-23	-23
Other scenarios								
EU MAP^^: F <sub>MSY</sub>	1394	1388	6	0.29	4541	-10.1	-23	-23
EU MAP^^ F <sub>MSY lower</sub>	820	816	4	0.160	5103	1.01	-55	-55
EU MAP^^ F <sub>MSY upper</sub>	1596	1589	7	0.34	4344	-14.0	-11.8	-11.8
F = 0	0	0	0	0	5909	17.0	-100	-100
F = F <sub>pa</sub>	1788	1781	8	0.39	4156	-17.7	-1.19	-1.19
F = F <sub>lim</sub>	1971	1962	9	0.44	3979	-21	8.9	8.9
SSB <sub>2024</sub> = B <sub>lim</sub>	4036	4018	18	1.29	2000	-60	123	123
Rollover TAC	1810	1802	8	0.40	4135	-18.1	0	0
SSB <sub>2024</sub> = B <sub>pa</sub> = MSY B <sub>trigger</sub>	3088	3074	14	0.81	2900	-43	71	71
SSB <sub>2024</sub> = SSB <sub>2023</sub>	872	868	4	0.171	5052	0	-52	-52
F = F <sub>2022</sub>	1384	1378	6	0.29	4551	-9.9	-24	-24

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

\*\* SSB 2024 relative to SSB 2023.

\*\*\* Total catch in 2023 relative to TAC 2022 (1810 tonnes).

^ Advice value for 2023 relative to the advice value for 2022 (1810 tonnes).

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

The reduction in catch advice is mainly caused by the downward revision in recent SSB and low incoming recruitment.

### Basis of the advice

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

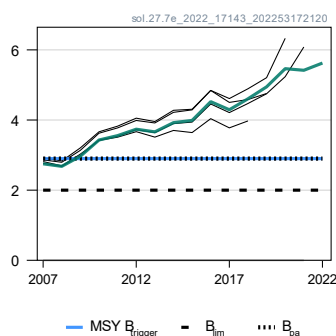
Advice basis	MSY approach
Management plan	ICES is aware of the multiannual management plan (MAP) which has been adopted by the EU for this stock (EU, 2019) and which ICES considers to be precautionary. There is no agreed shared management plan with UK for this stock, and ICES provides advice according to ICES MSY approach. Catch scenarios consistent with the MAP F <sub>MSY</sub> ranges are provided.

### Quality of the assessment

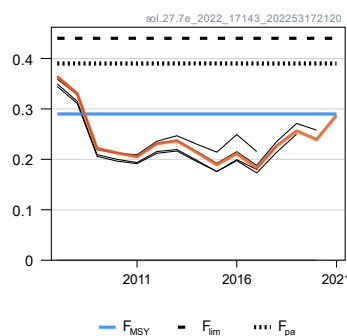
The assessment this year has reduced recruitment estimates for 2020 and 2021 with the addition of new data.

Last year's advice was derived using a shorter time series for the recruitment assumption. In this year's assessment, the full time series was used to compute the geometric mean used for the assumed incoming recruitment (R<sub>2022</sub>) instead of a shorter period last year due to high variability in the recent recruitments'.

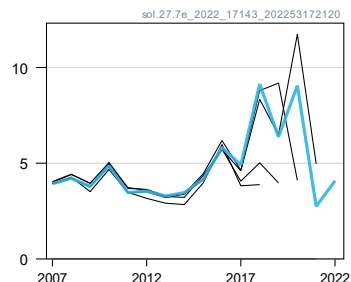
**SSB (1000 t)**



**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

There is no information to present for this stock.

### 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	$B_{pa}$ ; 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 $B_{loss}$ (SSB in 1999). 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 ( <a href="#">ICES, 2022a</a> )
Assessment type	Age-based analytical assessment (FLXSA; ICES, 2022b)
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 interbenchmark in 2015 (IBPWCFlat2; ICES, 2015)
Working group	Working Group for the Celtic Seas Ecoregion ( <a href="#">WGCSE</a> )

### 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	871	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		$\leq 1226$	979	915	913	10
2017	MSY approach	$\leq 1198$		1178	1000	1007	4
2018	MSY approach	$\leq 1239$		1202	1086	1075	3
2019	MSY approach	$\leq 1272$		1242	1182	1185	4
2020	Management plan	1478 (range 878–1685)		1478	1218*	1219	< 1
2021	Management plan	1925 (range 1141–2197)		1925	1395*	1392	13
2022	MSY approach	$\leq 1810$		1810			
2023	MSY approach	$\leq 1394$					

\* Preliminary official landings.

## History of the catch and landings

**Table 7** Sole in Division 7.e. Catch distribution by fleet in 2021 as estimated by ICES.

Catch	Landings				Discards			
1405 tonnes	Beam trawl 64%	Otter trawl 18.3%	Gillnets 10.0%	Other gears 7.7%	Beam trawl 4.5%	Otter trawl 95.5%	Gillnets 0%	Other gears 0%
	1392 tonnes				13 tonnes			

**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	

Year	Belgium	France	Netherlands	Ireland	UK and Channel Islands	Official total	ICES landings	ICES discards
1986	62	467			840	1369	1419	
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	208	< 1	< 1	925	1182	1185	4
2020*	58	194	< 1		966	1218	1219	< 1
2021*	104	243	< 1	< 1	1048	1395	1392	13

\* 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	4679	4575	1446		0.32

Year	Recruitment (age 2)	Stock size SSB	Landings	Discards**	Fishing mortality (ages 3–9)
1983	3866	4374	1498		0.36
1984	5968	4430	1370		0.30
1985	6982	4009	1409		0.33
1986	3765	4013	1419		0.31
1987	5847	4111	1280		0.29
1988	3878	4043	1444		0.33
1989	3735	3442	1390		0.41
1990	2817	3287	1315		0.40
1991	7161	2991	852		0.27
1992	3902	2937	895		0.24
1993	3350	2810	904		0.31
1994	2378	3053	800		0.23
1995	3452	3067	856		0.30
1996	3940	3054	833		0.26
1997	3331	2920	949		0.32
1998	4398	2910	880		0.30
1999	3585	2830	957		0.32
2000	6522	2865	914		0.31
2001	5423	2894	1069		0.35
2002	3815	3009	1106		0.35
2003	5381	3287	1078		0.26
2004	2870	3099	1075		0.31
2005	3994	3087	1039		0.34
2006	4612	2717	1023		0.35
2007	3934	2751	1015		0.36
2008	4209	2679	908		0.33
2009	3788	2967	701		0.22
2010	4864	3430	698		0.21
2011	3471	3555	801		0.21
2012	3540	3738	872	2	0.23
2013	3282	3662	883	1	0.24
2014	3464	3925	885	10	0.21
2015	4160	3988	774	54	0.189
2016	5817	4523	913	10	0.21
2017	4908	4293	1007	4	0.183
2018	9132	4605	1075	3	0.23
2019	6378	4946	1185	4	0.26
2020	9050	5464	1219	0	0.24
2021	2745	5418	1392	13	0.29
2022	4077*	5624			

\* Geometric mean (1969–2021).

\*\* 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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