

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

ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for the Western Waters and adjacent waters is applied, catches in 2020 that correspond to the F ranges in the MAP are between 878 and 1685 tonnes. According to the MAP, catches higher than those corresponding to F_{MSY} (1478 tonnes) can only be taken under conditions specified in the MAP, whilst the entire range is considered precautionary when applying the ICES advice rule.

Stock development over time

Spawning–stock biomass (SSB) has increased since 2008 and is well above MSY $B_{trigger}$. Fishing mortality (F) has been below F_{MSY} since 2009. Recruitment (R) has been variable without a trend and is currently around the long-term geometric mean.

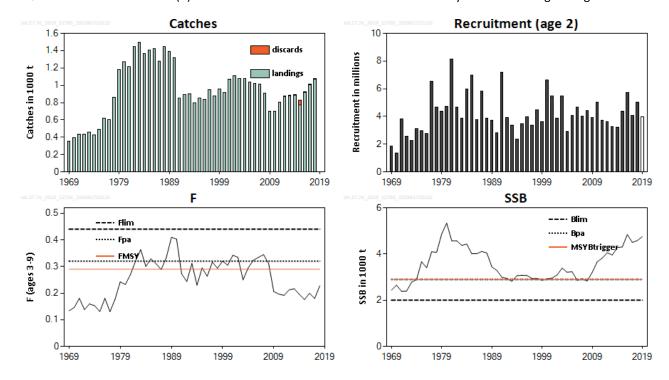


Figure 1 Sole in Division 7.e. Summary of the stock assessment. ICES estimated catches, recruitment, fishing mortality, and spawning—stock biomass. Assumed recruitment values are not shaded. Discard estimates are only available from 2012 onwards.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below F_{MSY} , F_{pa} , and F_{lim} , and that the spawning–stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

 Table 1
 Sole in Division 7.e. State of the stock and fishery relative to reference points.

Table 1 Sole in Division 7.c. state of the stock and fishery relative to reference points.										
		Fishing pressure					Stock size			
		2016 2017 2018			2017 2018 2019		2019			
Maximum sustainable yield	F _{MSY}	•	•	0	Below		MSY B _{trigger}	•	•	Above trigger
Precautionary approach	F _{pa} ,F _{lim}	•	•	0	Harvested sustainably		B _{pa} ,B _{lim}	•	•	Full reproductive capacity
Management plan	F _{MGT}	•	•	•	Within the range		B _{MGT}	②	•	Above trigger

Catch scenarios

Table 2 Sole in Division 7.e. Assumptions made for the interim year and in the forecast.

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Variable	Value	Notes
F ages 3–9 (2019)	0.23	$F_{sq} = F_{Average}(2016-2018)$ rescaled to F_{2018}
SSB ₂₀₂₀	4 731	Tonnes; Fishing at F _{sq}
R age 2 (2019–2020)	3 973	Thousands; GM (1969–2018)
Catch (2019)	1 224	Tonnes; Wanted plus unwanted catch
Wanted catch (2019)	1 216	Tonnes; Fishing at F _{sq}
Unwanted catch (2019)	7	Tonnes; Average ratio of 2016–2018 (0.61%)

Table 3 Sole in Division 7.e. Annual catch scenarios. All weights are in tonnes.

Catch ** (2020) Catch ** (2020) Catch ** (2020) Change *** Change ^ Change ^ Change ^ Change ^ Change ^ Change ^ Change *** Change ***	date of the bit islott 7 to 7 th that catch section os 7 th Weights are in contrest.								
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Basis		catch **	catch **		SSB (2021)			% Advice change ^^
F = MAP F _{MSY lower} 878 873 5 0.160 4915 3.9 -29 F = MAP F _{MSY upper} 1685 1675 10 0.34 4134 -12.6 36 Other scenarios F = 0 0 0 0 5772 22 -100 F _{pa} 1603 1594 10 0.32 4213 -11.0 29	ICES advice basis								
	EU MAP ^^^: F _{MSY}	1478	1469	9	0.29	4334	-8.4	19.0	16.2
	F = MAP F _{MSY lower}	878	873	5	0.160	4915	3.9	-29	-31
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	F = MAP F _{MSY upper}	1685	1675	10	0.34	4134	-12.6	36	32
F _{pa} 1603 1594 10 0.32 4213 -11.0 29	Other scenarios								
	F = 0	0	0	0	0	5772	22	-100	-100
F _{lim} 2065 2053 13 0.44 3767 -20 66	F _{pa}	1603	1594	10	0.32	4213	-11.0	29	26
	F _{lim}	2065	2053	13	0.44	3767	-20	66	62
SSB ₂₀₂₁ = B _{lim} 3930 3906 24 1.20 2000 -58 216	SSB ₂₀₂₁ = B _{lim}	3930	3906	24	1.20	2000	-58	216	209
SSB ₂₀₂₁ = B _{pa} = MSY B _{trigger} 2972 2954 18 0.74 2900 -39 139	SSB ₂₀₂₁ = B _{pa} = MSY B _{trigger}	2972	2954	18	0.74	2900	-39	139	134
F = F ₂₀₁₉ 1201 1194 7 0.23 4602 -2.7 -3.3	F = F ₂₀₁₉	1201	1194	7	0.23	4602	-2.7	-3.3	-5.6

^{*} Total catch derived from the wanted catch and the unwanted catches ratio.

The advice has increased because of an upward revision in stock size and an increase in SSB.

^{** &}quot;Wanted" and "unwanted" catch are used to describe fish that would be landed and discarded, respectively, in the absence of the EU landing obligation, based on discard rate estimates for 2016–2018.

^{***} SSB 2021 relative to SSB 2020.

[^] Total catch in 2020 relative to TAC in 2019 (1242 tonnes).

^{^^} Advice value for 2020 relative to the advice value for 2019 (1272 tonnes).

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

Basis of the advice

Table 4 Sole in Division 7.e. The basis of the advice.

Advice basis	Management plan
Management plan	The EU multiannual plan (MAP) for stocks in in the Western Waters and adjacent waters applies to this stock. The plan specifies conditions for setting fishing opportunities depending on stock status and making use of the F _{MSY} range for the stock. In accordance with the MAP, catches higher than those corresponding to FMSY can only be taken providing SSB is greater than MSYB _{trigger} , and one of the following conditions is met: a) if it is necessary for the achievement of objectives of mixed fisheries; b) if is necessary to avoid serious harm to a stock caused by intra- or inter-species stock dynamics; c) in order to limit variations in fishing opportunities between consecutive years to not more than 20%.
	ICES considers that the F _{MSY} range for this stock used in the MAP is precautionary.
	Full details of the plan are described in EU (2019).

Quality of the assessment

The assessment is relatively uncertain since the historical perception of SSB and F changes between years. Compared to last year's assessment, the SSB is revised upward and F is revised downward.

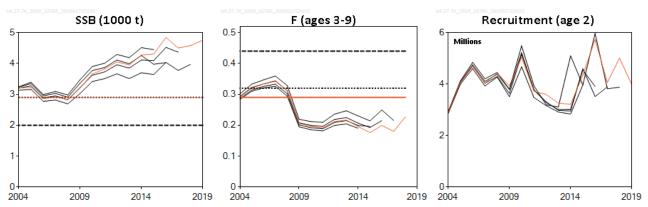


Figure 2 Sole in Division 7.e. Historical assessment results (final-year recruitment assumptions included).

Issues relevant for the advice

There is no information to present to this stock.

Reference points

 Table 5
 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	Tonnes; The 5th percentile of the distribution of SSB when fishing at F_{MSY} (0.29) with no error.	ICES (2017)
	F _{MSY}	0.29	Median point estimate of EqSim simulations.	ICES (2017)
	B _{lim}	2000	Tonnes; Rounded B _{pa} /1.4	ICES (2017)
Precautionary	B _{pa}	2900	Tonnes; Rounded B_{loss} (1999 year class). Lowest SSB with high recruitment.	ICES (2017)
approach	F _{lim} 0.44		Segmented regression simulation of stock–recruitment, with B_{lim} as the breakpoint and no error.	ICES (2017)
	F_{pa}	0.32	$F_{lim} \times exp(-1.645 \times \sigma); \sigma = 0.2.$	ICES (2017)
	MAP MSY B _{trigger}	2900	Tonnes; MSY B _{trigger}	EU (2019), ICES (2017)
	MAP B _{pa}	2900	Tonnes; B _{pa}	EU (2019), ICES (2017)
Managamant	MAP B _{lim}	2000	Tonnes; B _{lim}	EU (2019), ICES (2017)
Management	MAP F _{MSY}	0.29	F _{MSY}	EU (2019), ICES (2017)
plan	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 6 Sole in Division 7.e. Basis of the assessment and advice.

ICES stock data category	1 (<u>ICES, 2018</u>)					
Assessment type	Age-based analytical assessment (XSA) that uses landings in the model, and discards are then included to					
Assessment type	calculate a catch forecast (ICES, 2019).					
	Commercial catch-at-age data; two survey indices (UK-FSP and UK-Q1SWBeam) and two commercial tuning					
Input data	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 (IBPWCFlat2; ICES, 2015)					
Working group	Working Group for the Celtic Seas Ecoregion (<u>WGCSE</u>)					

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 7 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.

	All weights are in t	onnes.					
Year	ICES advice	Catch corresponding	Landings corresponding to	Agreed TAC	Official	ICES	ICES
		to advice	advice		landings	landings	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 t; 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	
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		< 230	865	960	1039	
	recovery plan						
2006	80% reduction in F or recovery plan		< 240	940	961	1022	
2007	68% reduction in F or recovery plan		< 350	900	954	1015	
2008	75% reduction in F		< 260	765	812	908	
2009	70% reduction in F		< 320	650	784	701	
2010	Reduce fishing effort and catches		-	618	761	698	
2011	MSY framework		< 660	710	876	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	914	913	10
2017	MSY approach	≤ 1198		1178	1000 *	1007	4
2018	MSY approach	≤ 1239		1202	1074 *	1075	3
2019	MSY approach	≤ 1272		1242			
2020	Management plan	1478 (range 878– 1685)					
	1	1000)					

^{*} Preliminary.

History of the catch and landings

Table 8 Sole in Division 7.e. Catch distribution by fleet in 2018 as estimated by ICES.

Catch		Lar	ndings		Discards			
	Beam trawl	Otter trawl	Gillnets	Other gears	Beam trawl	Otter trawl	Gillnets	Other gears
1078 tonnes	63%	19%	13%	5%	4%	96%	< 1%	0%
		1075	tonnes		3 tonnes			

 Table 9
 Sole in Division 7.e. History of official landings and ICES estimates. All weights are in tonnes.

Table 9	Sole i	n Division 7.	e. History of of	ticiai ianc	lings and ICES estimates.	All weights are in to	nnes.	
Year	Belgium	France	Netherlands	Ireland	UK and Channel Islands	Official total	ICES landings	ICES discards
1974		323					427	
1975	3	271			217		491	
1976	4	352			260		616	
1977	3	331			272		606	
1978	4	384			453		861	
1979	1	515			665		1181	
1980	45	447		13	764		1269	
1981	16	415	1		788		1215	
1982	98	321			1028		1446	
1983	47	405	3		1043		1498	
1984	48	421			901		1370	
1985	58	130			911		1409	
1986	62	467			840		1419	
1987	48	432			632		1280	
1988	67	98			784		1444	
1989	69	112	6		613		1390	
1990	41	81			636		1315	
1991	35	325			477		852	
1992	41	267			468		895	
1993	59	236			498		904	
1994	33	257			546		800	
1995	21	294			565		856	
1996	8	297			428		833	
1997	13	348		1	496		949	
1998	40	343			389		880	
1999	13				396		957	
2000	4	241			413		914	
2001	19	224			407		1069	
2002	33	198		_	309		1106	
2003	1	363		1	255		1078	
2004	7	302			185		1075	
2005	26	406			527		1039	
2006	32	357			572		1022	
2007	34	384		0	536		1015	
2008	28	312		0	472		908	
2009	17	386			381		701	
2010	17	375			370		698	
2011	22	424		_	431		801	2
2012	39	325		0	506		872	2
2013	30	319			540		883	10
2014	25	351		0	509		884	10
2015	42 46	245		0	490 623		774	54
2016 2017 ^	56	245 198		- 1	746		913	10 4
	68		_ 1	< 1	746		1007	3
2018 ^	ზმ	217	< 1	< T	789		1075	3

[^] Preliminary.

Summary of the assessment

 Table 10
 Sole in Division 7.e. Assessment summary. Weights are in tonnes, numbers in thousands.

Year Recruitment (age 2) Stock size (SSB Landings Discards** Fishing montality (ages 3-9) 11969 1874 2437 353 0.134 0.134 1970 1343 2652 391 0.136 0.136 1971 3826 2290 432 0.131 0.138 1973 2264 2778 459 0.160 0.160 1974 3107 2896 427 0.153 0.150 1975 2967 3670 491 0.131 1975 1976 2792 3403 616 0.180 0.131 1976 2792 3403 616 0.180 0.131 1977 6557 4098 606 0.130 1918 1979 4389 4665 1181 0.24 0.130 1918 1919 4389 4665 1181 0.24 1918 1918 811 4572 1215 0.27 1918 1918 5131 4572 1215 0.27	Table 10	Sole in Division 7.e. Assessme	nt summary. Weight:	s are in tonnes, numbe	ers in thousands.	
1970	Year	Recruitment	Stock size			_
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 2997 3670 491 0.131 1976 2792 3403 616 0.180 1977 6557 4098 606 0.130 1978 4658 4074 861 0.178 1979 4389 4865 1181 0.24 1980 4703 5338 1269 0.23 1981 8131 4572 1215 0.27 1982 4680 4575 1446 0.32 1983 3867 4374 1498 0.36 1984 5969 4431 1370 0.30 1985 6984 4010 1409 0.33 1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1989 3381 4045 1444 0.33 1989 3738 3465 3260 0.29 1989 3386 3366 4376 4374 4389 0.36 1999 2220 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3310 2943 895 0.24 1994 2386 3064 800 0.23 1995 3374 2941 949 0.32 1996 3366 3071 833 800 0.23 1997 3374 2941 949 0.32 1999 3616 2888 957 0.32 1999 3616 2888 957 0.32 1999 3616 2888 957 0.32 1999 3616 2888 957 0.32 1999 3616 2888 957 0.32 1990 300 4426 2888 957 0.32 1990 300 3646 300 0.23 1991 3776 3786 3869 3860 0.23 1995 3374 2941 949 0.32 1997 3374 2941 949 0.32 1999 3616 2888 957 0.32 1990 3620 3666 3071 833 0.26 1997 3374 2941 949 0.32 1990 3616 2888 957 0.32 2000 4068 3231 1005 0.34 2001 5476 2985 366 360 0.33 2007 4039 2922 1015 0.34 2008 4426 2832 908 0.31 2009 3934 3260 3956 883 1 0.25 2011 3725 3825 801 0.39 2012 3364 3077 465 469 469 2013 3366 3366 3366 3366 3071 337 2004 2896 3211 1075 0.32 2005 4068 3231 1075 0.34 2006 4698 2863 1023 0.33 2007 4039 2922 1015 0.34 2010 5038 3664 698 696 69	1969	1874	2437	353		0.134
1972	1970	1343	2652	391		0.146
1973	1971	3826	2390	432		0.181
1974 3107 2896 427 0.153 1975 2967 3670 491 0.131 1976 2792 3403 616 0.180 1977 6557 4098 606 0.130 1978 4658 4074 861 0.128 1979 4389 4865 1181 0.24 1980 4703 5338 1269 0.23 1981 8131 4572 1215 0.27 1982 4680 4575 1446 0.32 1983 3867 4374 1498 0.36 1984 5969 4431 1370 0.33 1984 5969 4431 1370 0.33 1985 6984 4010 1409 0.33 1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1988 3881 4045 1444 0.33 1989 3738 3845 1390 0.41 1990 2820 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3910 2943 895 0.24 1993 3356 2818 904 0.31 1995 3469 3081 866 0.29 1998 3966 3071 833 0.26 1997 3374 2941 949 0.33 1996 3966 3071 833 0.26 1997 3374 2996 852 0.27 1999 3366 3071 833 0.26 1997 3374 2941 949 0.32 1998 4450 2939 880 0.29 1999 3616 2868 957 0.32 1999 3616 2868 957 0.32 1999 3616 2868 957 0.32 1999 3616 2868 957 0.32 1999 3616 2868 957 0.32 1000 5476 2936 883 103 0.33 2000 4068 3231 1039 0.32 2001 5476 2936 883 103 0.33 2005 4068 3231 1039 0.32 2006 4698 2863 1033 0.33 2007 4039 2922 1015 0.34 2008 4426 2832 908 0.31 2009 3943 3366 698 0.196 2011 3725 3825 801 0.196 2011 3725 3825 801 0.196 2012 3597 4053 3664 698 0.196 2013 3260 3956 883 1 0.02 2014 3315 4277 885 10 0.196 2015 4354 4367 4756 0.02 2017 4061 4592 1007 4 0.180 2019 3937 4756 0.02	1972	2568	2395	437		0.138
1975 2967 3670 491 0.131 1976 2792 3403 616 0.180 1977 6557 4098 606 0.130 1978 4658 4074 861 0.178 1979 4388 4865 1181 0.24 1980 4703 5338 1269 0.23 1981 8131 4572 1215 0.27 1982 4680 4575 1446 0.32 1983 3867 4374 1498 0.36 1984 5569 4431 1370 0.30 1985 6984 4010 1409 0.33 1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1988 3881 4045 1444 0.33 1989 3733 3445 1390 0.41 1990 2820 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3910 2943 895 0.24 1994 2386 3064 800 0.23 1995 3469 3081 856 0.29 1996 3366 3074 383 0.26 1997 3374 2941 949 0.32 1998 4450 2939 880 0.02 1999 3616 2868 957 0.32 1999 366 366 3071 383 0.26 1997 3374 2941 949 0.32 1999 366 2868 957 0.32 2000 6647 2916 914 0.30 2001 538 366 366 698 0.19 2002 3864 3091 1106 0.33 2003 5456 3392 1078 0.25 2004 2896 3211 1075 0.29 2005 4068 3231 1039 0.32 2007 4039 2922 1015 0.34 2008 4426 2832 908 0.19 2017 4061 4592 1007 4 0.180 2018 5018 5018 4584 1075 3 0.23 2019 2017 4061 4592 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.180 2019 3973* 4756 1007 4 0.1	1973	2264	2778	459		0.160
1976	1974	3107	2896	427		0.153
1977	1975	2967	3670	491		0.131
1978	1976	2792	3403	616		0.180
1979	1977	6557	4098	606		0.130
1980	1978	4658	4074	861		0.178
1981 8131 4572 1215 0.27 1982 4680 4575 1446 0.32 1983 3867 4374 1498 0.36 1984 5969 4431 1370 0.30 0.30 1985 6984 4010 1409 0.33 1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1988 3881 4045 1444 0.33 1989 3738 3445 1390 0.41 1990 2820 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3910 2943 895 0.24 1994 2386 3064 800 0.23 1995 3469 3081 856 0.29 1995 3469 3081 856 0.29 1996 3966 3071 833 0.26 1997 3374 2941 949 0.32 1999 3616 2868 957 0.32 2000 6647 2916 914 0.30 203 2001 5476 2598 3098 3098 0.34 2002 3864 3091 106 3033 2003 5456 3392 1078 2020 3038 3260 7018 2020 2008 4426 2832 908 3034 3036	1979	4389	4865	1181		0.24
1982	1980	4703	5338	1269		0.23
1983 3867	1981	8131	4572	1215		0.27
1984 5969 4431 1370 0.30 1985 6984 4010 1409 0.33 1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1988 3881 4045 1444 0.33 1989 3738 3445 1390 0.41 1990 2820 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3910 2943 895 0.24 1993 3356 2818 904 0.31 1994 2386 3064 800 0.23 1995 3469 3081 856 0.29 1996 3966 3071 833 0.26 1997 3374 2941 949 0.32 1998 4450 2939 880 0.29 1999 3616 2868 957 0.32	1982	4680	4575	1446		0.32
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1986 3766 4015 1419 0.31 1987 5850 4113 1280 0.29 1988 3881 4045 1444 0.33 1989 3738 3445 1390 0.41 1990 2820 3290 1315 0.40 1991 7176 2996 852 0.27 1992 3910 2943 895 0.24 1993 3356 2818 904 0.31 1994 2386 3064 800 0.23 1995 3469 3081 856 0.29 1996 3966 3071 833 0.26 1997 3374 2941 349 0.32 1998 4450 2939 880 0.29 1999 3616 2868 957 0.32 2000 6647 2916 914 0.30 2001 5476 2958 1069 0.34 2002 3864 3091 1106 0.33 2003 5456 3392 1078 0.25 2004 2896 3211 1075 0.29 2005 4068 3231 1039 0.32 2006 4698 3281 1039 0.32 2007 4039 2922 1015 0.34 2008 4426 2832 908 0.31 2009 3943 3266 6883 1023 0.33 2001 5538 3664 698 0.196 2011 3725 3825 801 0.196 2011 3725 3825 801 0.196 2012 2013 3260 3396 883 1 0.22 2014 3215 4277 885 10 0.196 2015 4354 4307 774 54 0.176 2016 5735 4843 913 10 0.199 2017 4061 4502 1007 4 0.180 2018 5018 4584 1075 3 0.23 2019 3973* 4756 0.196	1984	5969	4431	1370		0.30
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2019 3973* 4756						
				1075	3	0.23
			4756			

^{*}Geometric mean (1969–2018).

^{**}Discards are not included in the assessment.

Sources and references

EU. 2019. Regulation (EU) 2019/472 of the European Parliament and of the Council of 19 March 2019 establishing a multiannual plan for stocks fished in the Western Waters and adjacent waters, and for fisheries exploiting those stocks, amending Regulations (EU) 2016/1139 and (EU) 2018/973, and repealing Council Regulations (EC) No 811/2004, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007 and (EC) No 1300/2008. http://data.europa.eu/eli/reg/2019/472/oj

ICES. 2015. Report of the Second Inter-Benchmark Protocol on West of Channel Flatfish (IBPWCFlat2), June–September 2015, by correspondence. ICES CM 2015/ACOM:55. 142 pp.

ICES. 2017. Report of the Workshop to consider F_{MSY} ranges for stocks in ICES categories 1 and 2 in Western Waters (WKMSYREF4), 13–16 October 2015, Brest, France. ICES CM 2015/ACOM:58. 187 pp. https://doi.org/10.17895/ices.pub.5348

ICES. 2018. Advice basis. In Report of the ICES Advisory Committee, 2018. ICES Advice 2018, Book 1, Section 1.2. https://doi.org/10.17895/ices.pub.4503

ICES. 2019. Report of the Working Group for the Celtic Seas Ecoregion. ICES Scientific Reports. 1:29. XXXX pp. http://doi.org/10.17895/ices.pub.4982.

Recommended citation: ICES. 2019. Sole (Solea solea) in Division 7.e (western English Channel). In Report of the ICES Advisory Committee, 2019. ICES Advice 2019, sol.27.7e, https://doi.org/10.17895/ices.advice.4804

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