

ECOREGION Celtic Sea and West of Scotland
STOCK Sole in Division VIIe (Western Channel)

Advice summary for 2011

Management Objective (s)	Landings in 2011
MSY approach with caution at low stock size	Less than 660 t
Cautiously avoid impaired recruitment (Precautionary Approach)	n/a
Cautiously avoid impaired recruitment and achieve other objective(s) of a management plan (e.g., catch stability)	n/a

Stock status

Fishing mortality	2007	2008	2009
F_{MSY}	Above	Above	Below
F_{PA}/F_{lim}	Not defined	Not defined	Not defined
Spawning Stock Biomass (SSB)	2008	2009	2010
MSY $B_{trigger}$	Below	Below	Below
B_{PA}/B_{lim}	Not defined	Not defined	Not defined

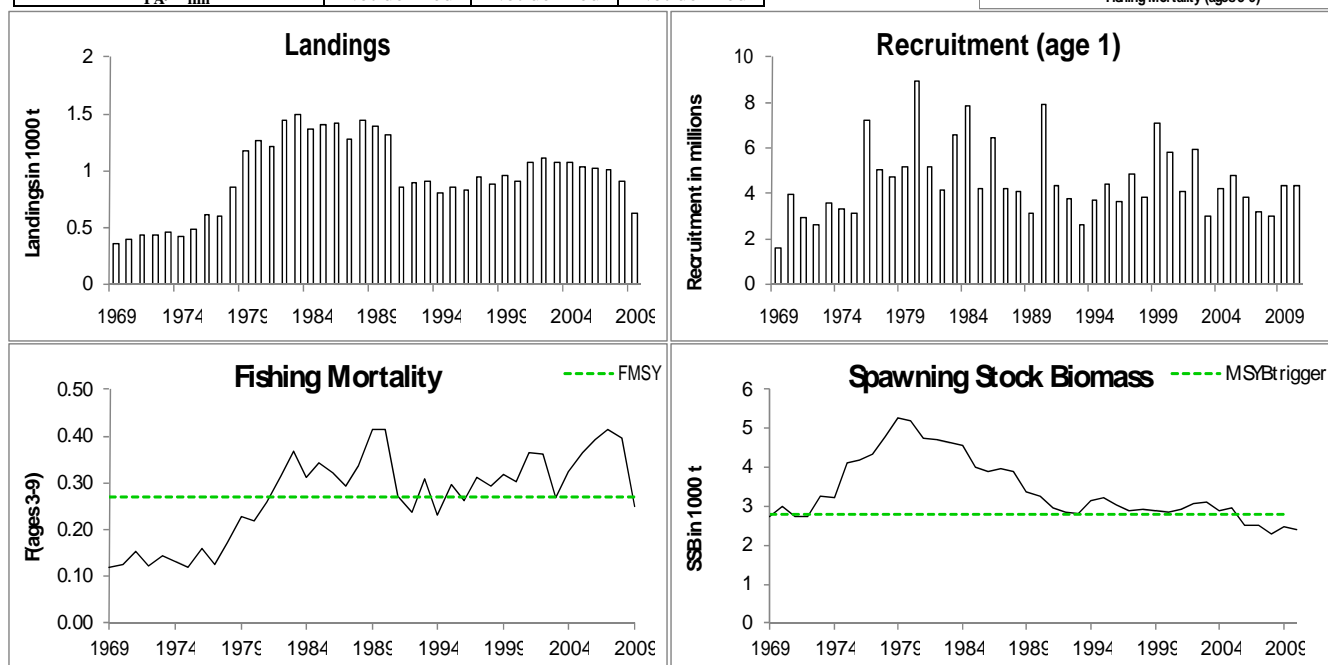
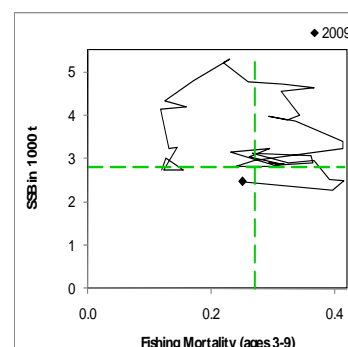


Figure 5.4.14.1 Sole in Division VIIe (Western Channel). Summary of stock assessment (weights in '000 tonnes). Top right: SSB and F over the years.

The large reduction of F in 2009 reflects the reduction in fishing effort. SSB is around the lowest observed values in the time series. Recruitment has been fluctuating without trend.

Management plans

Council Regulation ([EC. No. 509/2007](#)) establishes a multi-annual plan for the sustainable exploitation of Division VIIe sole. This results in a TAC of 710 t in 2011. ICES has not evaluated this plan.

The fisheries

The principal gears used for this stock are beam trawls, otter trawls, and gillnets. Sole is the target species of an offshore beam trawl fleet, which is concentrated off the south Cornish and Devon coast. This fishery also takes substantial catches of plaice, anglerfish, lemon sole, and cuttlefish. Otter trawlers and gillnetters take sole mainly as a bycatch fishery, and a targeted fishery at spawning time.

Catch by fleet Not available

Effects of the fisheries on the ecosystem

Beam trawling, especially using chain-mat gear, is known to have a significant impact on the benthic communities, although less so on soft substrates and in areas which have been historically exploited by this fishing method. Discard rates of non-commercial species and commercial species of unmarketable size are substantial. Some beam trawlers are experimenting with benthic drop-out panels that release about 75% of benthic invertebrates from the catches. Full square mesh codends are being tested in order to reduce the capture of benthos further and improve the selection profile of gadoids.

Quality considerations

Key uncertainties with regards to the data quality / assessment quality of this stock are the uncertainty regarding the degree of mixing between this and adjacent stocks, particularly with regards to recruitments, and the fact that the survey covers only part of the stock. On the basis of the previous retrospective bias in the assessment it is possible that the apparent large reduction in F for 2009 may be adjusted upwards in subsequent assessments.

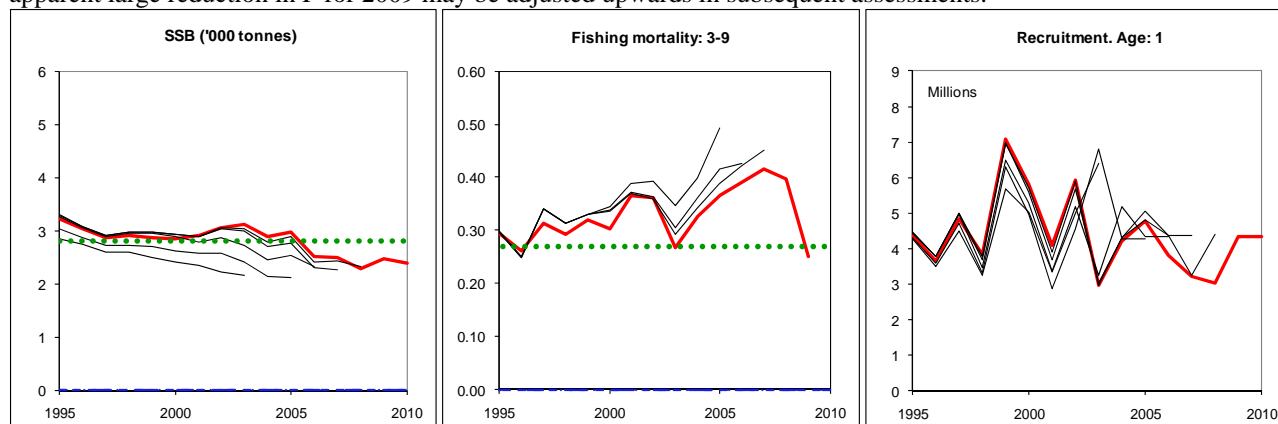


Figure 5.4.14.2 Sole in Division VIIe (Western Channel). Historical assessment results (final year recruitment estimate has been replaced by the GM_{69-07}). Note that the age range for F changed from 3–7 to 3–9 in 2009.

Scientific basis

Assessment type	Age based analytical assessment (XSA)
Input data	Commercial catch-at-age data 1 survey index (UK - BWEC-BTS) 2 current commercial tuning fleets (UK-CBT and UK-COT) 2 historic commercial tuning fleets prior to 1987 (KL-inshore and UK offshore)
Discards and bycatch	Not relevant to the assessment
Indicators	Western Channel Sole and Plaice FSP survey
Other information	WKFLAT (ICES, 2009) rejected the assessment because of a retrospective pattern that is now no longer apparent.
Working group report	WGCSE

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Reference points

	Type	Value	Technical basis
MSY Approach	MSY $B_{trigger}$	2800 t	Provisional, based on former B_{pa}
	F_{MSY}	0.27	Provisional, based on management plan simulations (2006)
Precautionary approach	B_{lim}	Not defined	
	B_{pa}	Not defined	
	F_{lim}	Not defined	
	F_{pa}	Not defined	

(unchanged since: 2010)

Yield and spawning biomass per Recruit F-reference points (2010):

	Fish Mort Ages 3-9	Yield/R	SSB/R
Average last 3 years	0.35	0.21	0.59
F_{max}^*	-	-	-
$F_{0.1}$	0.12	0.19	1.52
F_{med}	0.27	0.21	0.77

* F_{max} not well defined

Outlook for 2011

Basis: $F(2010) = TAC\ constraint = 0.24$; $F_{sq} = F_{07-09} = 0.35$; $SSB(2011) = 2\ 500$; $R(2010) = GM_{69-07} 4332$ thousand; landings (2010) = 618

Rationale	Landings (2011)	Basis	F (2011)	SSB (2012)	%SSB change ¹⁾	% TAC change ²⁾
MSY framework	660	$F_{MSY}^* (SSB\ 2011/MSY\ B_{trigger})$	0.24	2770	+ 9%	+ 7%
Management plan	710	15% TAC variation	0.26	2730	+7 %	+15 %
Zero catch	0	0	0	3410	+34 %	-100 %
Status quo	530	$F_{sq}^* 0.5$	0.19	2900	+14 %	-15 %
	620	$F_{sq}^* 0.6$	0.22	2810	+11 %	0
	710	$F_{sq}^* 0.7$	0.26	2730	+7 %	+15 %
	740	$F_{MSY} (F_{sq}^* 0.76)$	0.27	2700	+6 %	+19 %
	810	$F_{Mgt} (F_{sq}^* 0.85)$	0.30	2630	+3 %	+31 %
	930	F_{sq}	0.35	2520	-1 %	+50 %

Weights in tonnes.

¹⁾ SSB 2012 relative to SSB 2011.

²⁾ Landings 2011 relative to TAC 2010.

MSY approach

Following the ICES MSY framework implies fishing mortality to be at 0.24 (14% lower than F_{MSY} because SSB is 14% below MSY $B_{trigger}$). This implies landings of less than 660 t in 2011.

Management plan

Council Regulation (EC) No. 509/2007 establishes a multi-annual plan for the sustainable exploitation of Division VIIe sole. Years 2007–2009 were deemed a recovery plan, with subsequent years being deemed a management plan. For 2010, 2011, and 2012 the TAC shall be set at the highest value resulting from either a 15% reduction in F compared to average F (2007–2009) or an F of 0.27, with a maximum TAC variation of no more than 15%.

Following the agreed management plan implies an F for 2011 of 0.3 (15% lower than the average F (2007–2009) or $0.85 \cdot 0.35$). Since this would result in a TAC increase of more than 15%, the resulting TAC is the maximum 15% increase of 710 t in 2011. This is expected to lead to a SSB increase of 7% in 2012. This plan has not been evaluated by ICES.

Additional considerations

Management considerations

Sole are widespread and usually taken in conjunction with other species to varying degrees, dependent on location and season. Fisheries with beam trawls can target sole, anglerfish and cuttlefish depending on season and vessel size. The most productive sole fishery grounds are located close to ports, while the highest catches of anglerfish for example are taken further south and west in Division VIIe. Therefore, effort restrictions and/or high fuel costs will have a tendency to increase F in sole and reduce F in anglerfish. Area-misreported landings between Divisions VIId and VIIe have been a problem in the past, but have been greatly reduced in recent years.

Regulations and their effects

In addition to the days-at-sea regulations there has been a recent UK decommissioning scheme that has reduced the number of beam trawlers in the southwest fleet. Fishing mortality in 2009 is estimated to have declined which is consistent with the decline in effort in the main fleet exploiting this stock.

Management of this stock is mainly by TAC, which has largely been ineffective at regulating the fishery prior to 2009. In 2005 effort restrictions were implemented for beam trawlers in this fishery in order to enforce the TAC and improve data quality. To date these restrictions have not been limiting this fishery despite a decommissioning scheme, in part due to the large numbers of days available, but also because in the UK fleet there appears to be some latent effort / over capacity in the beam trawl fleet.

Technical measures applied to this stock include a minimum landing size (24 cm) and minimum mesh size of 80 mm for beam trawlers. Local regulations restricting certain gear and vessel types are also in place.

Information from the fishing industry

The UK fishing industry reported high abundance of sole for the area in 2009, and that improved compliance with the TAC through increased enforcement had resulted in a redistribution of effort to other divisions as well as concentrating on fishing opportunities on other species within the area.

The fisheries science partnership, conducted cooperatively between CEFAS and the UK industry has provided evidence for the wide dispersal and wide-ranging age distribution for this stock.

Comparison with previous assessment and advice

The 2009 ICES assessment was based on survey trends due to a strong retrospective pattern in the analytical assessment rendering results unsuitable for management. The revised update assessment shows a reduction in the retrospective bias and hence is considered adequate for providing advice.

The basis for the advice last year was the precautionary considerations. This year's advice is based on the ICES MSY approach.

Sources

ICES. 2010. Report of the Working Group on the Celtic Seas Ecoregion (WGCSE), 12–20 May 2010, Copenhagen, Denmark. ICES CM 2010/ACOM:12.

ICES. 2009. Report of the Benchmark and Data Compilation Workshop for Flatfish (WKFLAT 2009), 6–13 February 2009, Copenhagen, Denmark. ICES CM 2009/ACOM:31.

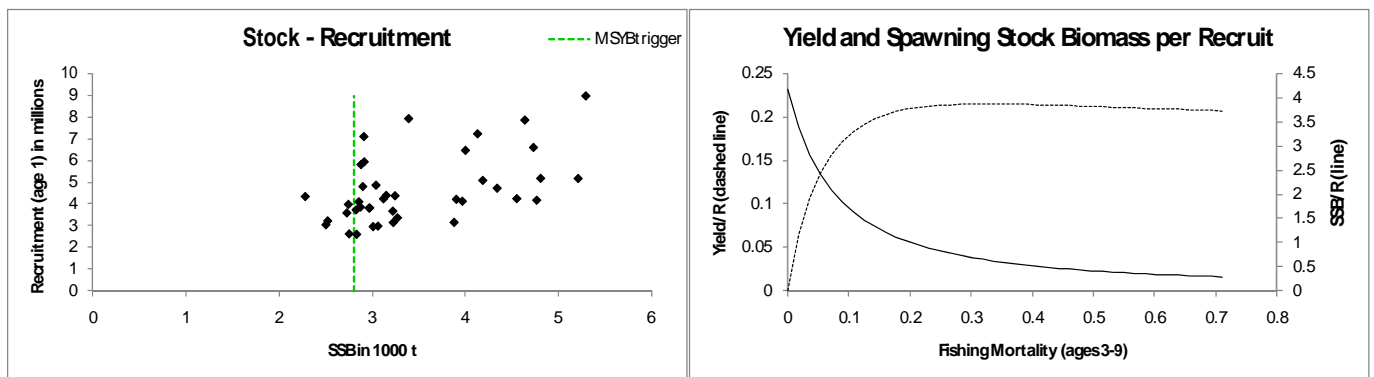


Figure 5.4.14.1 Sole in Division VIIe (Western Channel). Yield per recruit analysis and stock–recruitment plot.

Table 5.4.14.1 Sole in Division VIIe (Western Channel). Advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	Official landings	ICES Landings
1987	No increase in F	1.15	1.15	1.11	1.28
1988	No decrease in SSB; TAC	1.3	1.3	0.95	1.44
1989	No decrease in SSB; TAC	1	1	0.8	1.39
1990	SSB = 3000 t; TAC	0.9	0.9	0.75	1.31
1991	TAC	0.54	0.8	0.84	0.85
1992	70% of F(90)	0.77	0.8	0.77	0.89
1993	35% reduction in F	0.7	0.9	0.79	0.9
1994	No increase in F	1	1	0.84	0.8
1995	No increase in F	0.86	0.95	0.88	0.86
1996	F96 < F94	0.68	0.7	0.74	0.83
1997	No increase in F	0.69	0.75	0.86	0.95
1998	No increase in F	0.67	0.67	0.77	0.88
1999	Reduce F below Fpa	0.67	0.7	0.66	0.96
2000	Reduce F below Fpa	< 0.64	0.64	0.66	0.92 ¹
2001	Reduce F below Fpa	< 0.58	0.6	0.65	1.07
2002	Reduce F below Fpa	< 0.45	0.53	0.54	1.11
2003	Rebuilding plan or F=0	-	0.39	0.62	1.08
2004	F=0 or recovery plan 1	0	0.3	0.49	1.08
2005	80% reduction in F or recovery plan	< 0.23	0.865	0.96	1.04
2006	80% reduction in F or recovery plan	< 0.24	0.94	0.97	1.02
2007	68% reduction in F or recovery plan	< 0.35	0.9	0.82	1.02 ¹
2008	75% reduction in F	< 0.26	0.765	0.67	0.91 ¹
2009	70% reduction in F	< 0.32	0.65	0.38 ²	0.63 ²
2010	Reduce fishing effort and catches	-	0.62		
2011	MSY framework	< 0.66			

Weights in '000 t.

¹⁾ Revisions by WGCSE 2010.

²⁾ Preliminary

Table 5.4.14.2 Sole in Division VIIe (Western Channel). Nominal landings (t) as used by the WG.

Year	Belgium	France	Netherlands	Ireland	Jersey	Guernsey	UK-E+W+Ni	UK-other	Unallocated	Total
1974		323							104	427
1975	3	271				2	215	2	0	491
1976	4	352				1	259	1	0	616
1977	3	331					272		0	606
1978	4	384					453		20	861
1979	1	515				2	663	2	0	1181
1980	45	447		13		1	763	1	0	1269
1981	16	415	1			4	784	4	-5	1215
1982	98	321				15	1013	15	-1	1446
1983	47	405	3		2	16	1025	18	0	1498
1984	48	421			9	14	878	23	0	1370
1985	58	130			9	8	894	17	310	1409
1986	62	467			3	6	831	9	50	1419
1987	48	432			1	5	626	6	168	1280
1988	67	98			0.5	4	780	4	495	1444
1989	69	112	6			3	610	3	590	1390
1990	41	81			1	3	632	4	557	1315
1991	35	325					477		15	852
1992	41	267				2	457	11	119	895
1993	59	236			1		479	19	111	904
1994	33	257					546	2	-38	800
1995	21	294			1	2	562	3	-24	856
1996	8	297					428	9	91	833
1997	13	348		1	13	13	470	26	91	949
1998	40	343			17	3	369	20	108	880
1999	13	0			18	3	375	21	548	957
2000	4	241			22	5	386	27	256	914
2001	19	224			20	5	382	25	419	1069
2002	33	198			15	5	289	20	566	1106
2003	1	363		1	15	5	235	20	458	1078
2004	7	302			7	6	172	13	581	1075
2005	26	406			17	5	505	22	80	1039
2006	32	357			4	4	568	8	57	1022
2007	34	383		2	2		525	2	69	1015
2008	28	183		0.3	2	6	463	8	230	908
2009	18	0		1	1.3		354	1.3	252	626

Table 5.4.14.2 Sole in Division VIIe (Western Channel). Assessment summary table.

Year	Recruits[000']	TSB[t]	SSB[t]	Landings[t]	Yield//SSB	FBar3-9
1969	1608	3338	2740	352.72	0.13	0.119
1970	3974	3599	3006	389.61	0.13	0.126
1971	2954	3285	2749	431.92	0.16	0.154
1972	2617	3557	2724	436.55	0.16	0.122
1973	3579	3894	3267	458.25	0.14	0.144
1974	3356	3999	3222	426.52	0.13	0.131
1975	3142	5136	4127	500.63	0.12	0.119
1976	7205	5584	4183	614.25	0.15	0.16
1977	5071	6018	4337	604.58	0.14	0.124
1978	4713	6571	4804	868.31	0.18	0.171
1979	5162	6746	5289	1170.17	0.22	0.229
1980	8942	6702	5206	1268.1	0.24	0.22
1981	5156	6332	4762	1217.81	0.26	0.26
1982	4164	6221	4728	1437.95	0.3	0.317
1983	6580	5888	4634	1503.84	0.32	0.367
1984	7835	5820	4548	1362.66	0.3	0.312
1985	4233	5968	3997	1400.09	0.35	0.343
1986	6445	5619	3899	1418.02	0.36	0.323
1987	4202	5415	3964	1279.28	0.32	0.293
1988	4113	5150	3875	1443.13	0.37	0.337
1989	3145	4509	3388	1389.36	0.41	0.413
1990	7902	5190	3242	1306.25	0.4	0.414
1991	4367	4476	2963	852.2	0.29	0.27
1992	3803	4179	2829	895.68	0.32	0.239
1993	2596	3606	2823	903.83	0.32	0.308
1994	3720	4225	3146	800.26	0.25	0.231
1995	4384	4464	3217	855.85	0.27	0.295
1996	3662	4640	3038	833.38	0.27	0.261
1997	4850	3778	2870	949.66	0.33	0.313
1998	3846	3936	2907	880.05	0.3	0.293
1999	7078	4910	2876	955.93	0.33	0.319
2000	5796	4897	2853	911.73	0.32	0.303
2001	4089	4479	2910	1068.62	0.37	0.365
2002	5922	4752	3058	1105.32	0.36	0.362
2003	2975	4396	3117	1078.12	0.35	0.267
2004	4225	4190	2895	1073.92	0.37	0.325
2005	4789	4253	2970	1036.77	0.35	0.366
2006	3811	3717	2519	1015.53	0.4	0.391
2007	3214	3695	2499	1014.65	0.41	0.415
2008	3037	3516	2277	908.12	0.4	0.397
2009	4332 ^a	3552	2469	625.17	0.25	0.251

^a) 2009 recruitment value from the XSA (5252) replaced by $GM_{(69-07)}$