

Sole (*Solea solea*) in divisions 8.a–b (northern and central Bay of Biscay)

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 2023 that correspond to the F ranges in the plan are between 1563 tonnes and 2685 tonnes.

Stock development over time

Fishing pressure on the stock is below F_{MSY} and spawning-stock size is below $MSY B_{trigger}$ and between B_{pa} and B_{lim} .

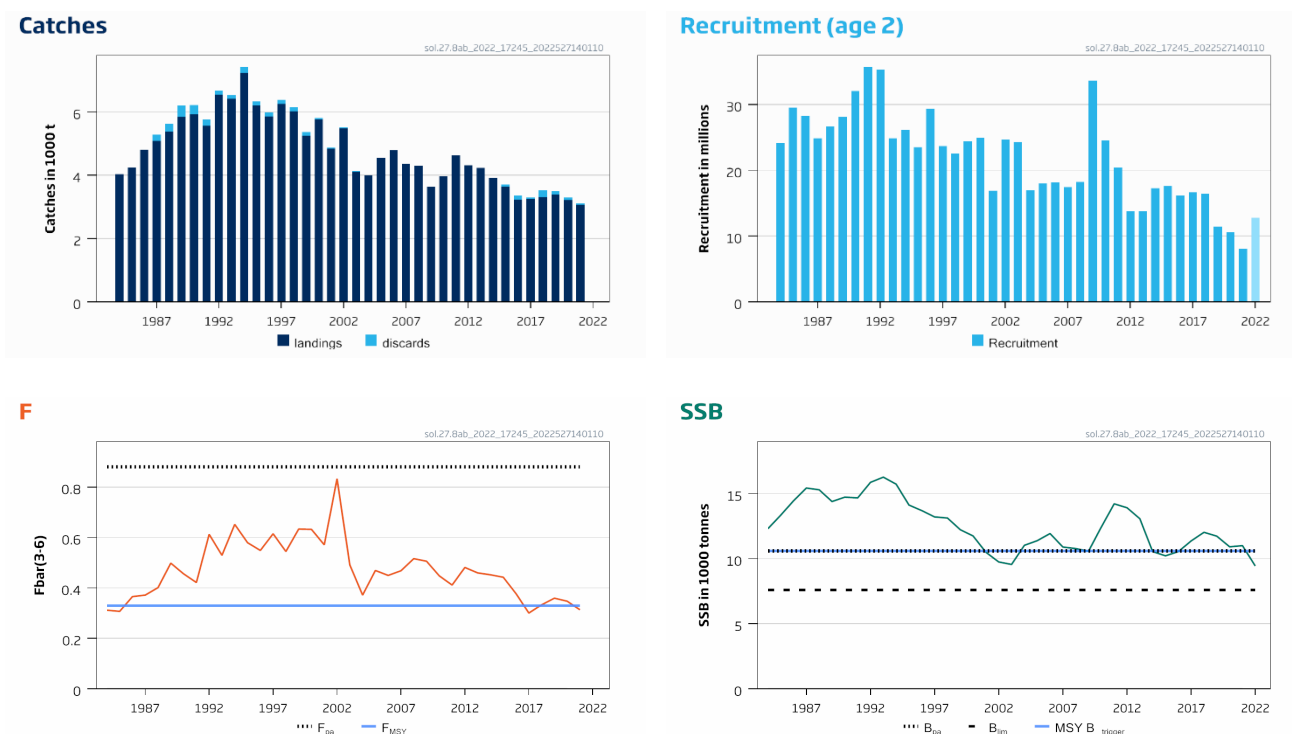


Figure 1 Sole in divisions 8.a–b. Summary of the stock assessment. Catches include discard estimates (no estimates between 2004 and 2015). The assumed recruitment value for 2022 is shaded in a lighter colour.

Catch scenarios

Table 1 Sole in divisions 8.a–b. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{age\ 3-6}$ (2022)	0.28	TAC constraints because of a substantial reduction of the TAC in 2022 (2233 tonnes). The selection pattern derived from $F(2019-2021)$.
SSB (2023)	9806	Short-term forecast (STF); in tonnes.
$R_{age\ 2}$ (2022–2023)	12757	Geometric mean (2016–2021); in thousands.
Projected landings (2022)	2233	STF assuming average landing ratios in 2019–2021; in tonnes.
Projected discards (2022)	51	Computed using the average discard ratio (2.3%) over 2015–2021 but not used in the assessment; in tonnes.

Table 2 Sole in divisions 8.a–b. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch* (2023)	Landings (2023)	Discards (2023)	F _{ages 3-6} Projected landings (2023)	SSB (2024)	% SSB change #	% TAC change ##	% advice change ^^^
ICES advice basis								
EU MAP ^ : $F = F_{MSY} \times SSB_{2023}/MSYB_{trigger}$	2685	2625	60	0.31	10062	2.1	20	20
EU MAP ^ : $F = F_{MSY\ lower} \times SSB_{2023}/MSYB_{trigger}$	1563	1528	35	0.17	11206	13.7	-30	24^^
Other scenarios								
MSY approach = F_{MSY}	2834	2771	63	0.33	9910	0.5	27	27
$F = 0$	0	0	0	0	12807	30	-100	-100
F_{PA}	6065	5930	135	0.88	6637	-33	172	172
$SSB_{2024} = B_{lim}$	5110	4995	114	0.69	7600	-23	129	129
$SSB_{2024} = B_{pa} = MSYB_{trigger}$	2157	2109	48	0.24	10600	7.5	-3.4	-3.4
$SSB_{2024} = SSB_{2023}$	2884	2819	64	0.34	9859	0	29	29
$F = F_{2022}$	2378	2325	53	0.27	10374	5.2	6.5	6.5
Landings 2022 = landings from TAC of 2233 tonnes	2284	2233	51	0.26	10470	6.2	2.3	2.3
Total catch equal to TAC ₂₀₂₂	2233	2183	50	0.25	10524	6.7	0	0

* Total catch is calculated based on projected landings and the assumed projected discard ratio (2.3%).

^ The EU multiannual plan (MAP; EU, 2019).

^^ Advice value for 2023 relative to the advice value for 2022 for the MAP $F_{MSY\ lower}$ (1265 tonnes).

^^^ Advice value for 2023 relative to advice value for 2022 (2233 tonnes).

SSB₂₀₂₄ relative to SSB₂₀₂₃.

Total catch in 2023 relative to TAC in 2022 (2233 tonnes)

The 20% increase in advice is mainly due to a decrease in the assumed fishing mortality in the intermediate year (2022) and an upward revision to the estimates of recruitment for the latest years (2019 to 2020).

Basis of the advice

Table 3 Sole in divisions 8.a–b. The basis of the advice.

Advice basis	Management plan approach
Management plan	The EU multiannual plan (MAP) for stocks 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, “provided that the stock is above $MSY\ B_{trigger}$:
	(a) if, on the basis of scientific advice or evidence, it is necessary for the achievement of the objectives laid down in Article 3 in the case of mixed fisheries;
	(b) if, on the basis of scientific advice or evidence, it is necessary to avoid serious harm to a stock caused by intra- or interspecies stock dynamics; or
	(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 Regulation 2019/472 (EU, 2019).

Quality of the assessment

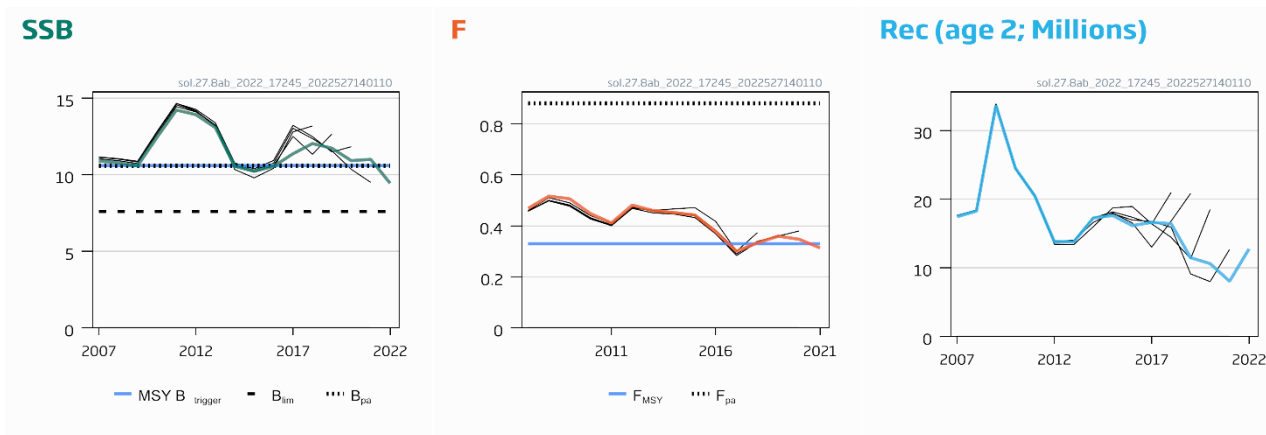


Figure 2 Sole in divisions 8.a–b. Historical assessment results (final-year recruitment assumptions included for each line).

This year's assessment has resulted in an upward revision of SSB and recruitment in recent years.

Issues relevant for the advice

TAC constraints were used as the basis for the calculation of F in 2022 whereas F status quo was used in previous years. The change was done due to the substantial TAC reduction for 2022.

Assumed recruitment for the intermediate year tends to be revised considerably downward with successive assessments, making the forecast somewhat optimistic.

Reference points

Table 4 Sole in divisions 8.a–b. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	10 600	B_{pa} ; in tonnes.	ICES (2016a)
	F_{MSY}	0.33	Stochastic simulations using a segmented regression stock–recruitment model.	ICES (2016a)
Precautionary approach	B_{lim}	7600	$B_{lim} = B_{pa} / \exp(\sigma \times 1.645)$; $\sigma = 0.20$; in tonnes.	ICES (2016b)
	B_{pa}	10 600	Lowest SSB with good recruitment and increase of SSB; in tonnes.	ICES (2016b)
	F_{lim}	Undefined	F_{lim} (0.6) is no longer considered appropriate given the estimate of F_{pa} .	ICES (2016b)
	F_{pa}	0.88	$F_{p.05}$ with Advice Rule (AR): The F that provides a 95% probability for SSB to be above B_{lim} .	ICES (2016b, 2021a)
Management plan	MAP MSY $B_{trigger}$	10 600	MSY $B_{trigger}$; in tonnes.	ICES (2016a), EU (2019)
	MAP B_{lim}	7600	B_{lim} ; in tonnes.	ICES (2016a), EU (2019)
	MAP F_{MSY}	0.33	F_{MSY}	ICES (2016a), EU (2019)
	MAP range F_{lower}	0.180	Consistent with ranges, resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2016a), EU (2019)
	MAP range F_{upper}	0.49	Consistent with ranges, resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2016a), EU (2019)

Basis of the assessment

Table 5 Sole in divisions 8.a–b. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a).
Assessment type	Age-based analytical assessment that uses landings in the model; discards are then included to calculate a catch forecast (FLXSA; ICES, 2022b).
Input data	Commercial catch (French, Belgian and Spanish), ages and length frequencies from catch sampling; one survey index, the Bay of Biscay Beam Trawl Survey (ORHAGO [B1706] in 2007–2021); four commercial indices (FR-SABLES and FR-ROCHELLE in 1991–2009, FR-BB-IN-Q4 in 2000–2021, and FR-BB-OFF-Q2 in 2000–2012). Maturity ogive fixed, estimated in 2000. Assumed natural mortality fixed at 0.1.
Discards and bycatch	Not included in the assessment, but used to provide catch advice.
Indicators	None.
Other information	Last benchmarked in 2013 (ICES, 2013).
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE).

History of the advice, catch, and management

Table 6 Sole in divisions 8.a–b. History of ICES advice, the agreed TAC, and official and ICES estimates of commercial landings and discards. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES catch
1987	Not assessed	-	4400	4379	5086	198	5284
1988	Precautionary TAC	3700	4000	4443	5382	254	5636
1989	No increase in effort; TAC	4500	4800	5782 *	5845	356	6201
1990	No increase in F; TAC	5100	5200	5532 *	5916	303	6219
1991	Precautionary TAC	4700	5300	4707 *	5569	198	5767
1992	F = F (90)	5000	5300	6359 *	6550	123	6673
1993	No long-term gain in increasing F	-	5700	6496	6420	104	6524
1994	No long-term gain in increasing F	-	6600	7095	7229	184	7413
1995	No long-term gain in increasing F	5400	6600	5872	6205	130	6335
1996	No increase in F	5000	6600	4302	5854	142	5996
1997	40% reduction in F	3100	5400	4961	6259	118	6377
1998	No increase in F	7600	6000	4334	6027	127	6154
1999	Reduce F below F_{pa}	< 5000	5400	3784	5249	110	5359
2000	F at F_{pa}	< 5800	5800	5749	5760	51	5811
2001	TAC 2001, at most TAC 2000	< 5800	6314	4912	4836	39	4875
2002	Establish rebuilding plan or no fishing	-	4000	3985	5486	22	5508
2003	Establish rebuilding plan or no fishing	-	3800	4105	4108	21	4129
2004	65% reduction in F or recovery plan #	< 2000	3600	4072	4002	-	-
2005	F at F_{pa}	< 4100	4140	4371	4539	-	-
2006	F at F_{pa}	< 4200 or management plan	4060	4432	4793	-	-
2007	Management plan: 10% reduction in F	4540	4540	4117	4363	-	-
2008	Reach B_{pa} in 2009	3850	4582	3336	4299	-	-
2009	F at F_{pa}	< 4430	4390	4755	3650	-	-
2010	F at <i>status quo</i> (F_{sq})	< 4900	4829	4699	3966		
2011	See scenarios	-	4250	4645	4632		
2012	MSY transition	4000	4250	4204 ##	4321 ##		
2013	MSY transition	3500	4100	4492	4235		
2014	MSY transition	3270	3800	4110	3928		

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES catch
2015	MSY approach	2407	3800	3775	3644	62 ^	3706 ^
2016	MSY approach	≤ 2393	3420	3346	3232	134 ^	3366 ^
2017	MSY approach	≤ 3107	3420	3236	3249	55 ^	3304 ^
2018	MSY approach	≤ 3725	3621	3468	3308	79 ^	3332 ^
2019	MSY approach	≤ 3967	3872	3351	3376	88 ^	3464 ^
2020	Management plan	3768 (range 2209–5196)	3666	3221	3219	74 ^	3293 ^
2021	Management plan	3483 (range 2036–4814)	3483	3063	3069	40^	3109 ^
2022	Management plan	2233 (range 1265–2233)	2233				
2023	Management plan	2685 (range 1563–2685)**					

* Not reported for all countries.

** Catches corresponding to $F = F_{MSY} \times SSB_{2023}/MSYB_{trigger}$, EU MAP range in brackets (MAP; EU, 2019). In accordance with the MAP, catches higher than those corresponding to F_{MSY} can only be taken providing SSB is greater than $MSYB_{trigger}$. Since SSB is less than $MSYB_{trigger}$ at the beginning of 2023, the range is truncated.

Single-stock boundaries; the exploitation of this stock should be conducted in the context of mixed fisheries.

A carry-over of 10% for the French quota was decided.

^ Calculated from the landings estimate and an estimated discard rate (1.64% in 2015, 4% in 2016, 1.7% in 2017, 2.4% in 2018, 2.6% in 2019, 2.3% in 2020, 1.3% in 2021).

History of catch and landings

Table 7 Sole in divisions 8.a–b. Catch distribution by fleet in 2021 as estimated by ICES. All weights are in tonnes.

Table 7. Sole in divisions 3.a - b: Catch distribution by fleet in 2021 as estimated by ICES. All weights are in tonnes.					
Catch	Landings				Discards
3110	72% fixed net	14% offshore otter trawlers	7% offshore beam trawlers	7% inshore trawlers	41
	3069				

Table 8 Sole in divisions 8.a–b. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Official landings						ICES landings	Discards	ICES catches
	Belgium	France #	Netherlands	Spain	Others	Total			
1979	0	2376		62 *		2443	2619	-	-
1980	33 *	2549		107 *		2689	2986	-	-
1981	4 *	2581 *	13 *	96 *		2694	2936	-	-
1982	19 *	1618 *	52 *	57 *		1746	3813	-	-
1983	9 *	2590	32 *	38 *		2669	3628	-	-
1984	N/A	2968	175 *	40 *		3183	4038	99 ##	4137
1985	25 *	3424	169 *	308 *		3925	4251	64 ##	4315
1986	52 *	4228	213 *	75 *		4567	4805	27 ##	4832
1987	124 *	4009	145 *	101 *		4379	5086	198 ##	5284
1988	135 *	4308		0		4443	5382	254 ##	5636
1989	311 *	5471		0		5782	5845	356 ##	6201
1990	301 *	5231		0		5532	5916	303 ##	6219
1991	389 *	4315		3		4707	5569	198 ##	5767
1992	440 *	5928		0		6359	6550	123 ##	6673
1993	400 *	6096		13		6496	6420	104 ##	6524
1994	466 *	6627		2 ***		7095	7229	184 ##	7413
1995	546 *	5326		0		5872	6205	130 ##	6335
1996	460 *	3842		0		4302	5854	142 ##	5996
1997	435 *	4526		0		4961	6259	118 ##	6377
1998	469 *	3821	44	0		4334	6027	127 ##	6154

Year	Official landings						ICES landings	Discards	ICES catches
	Belgium	France #	Netherlands	Spain	Others	Total			
1999	504	3280		0		3784	5249	110##	5359
2000	451	5293		5 ***		5749	5760	51##	5811
2001	361	4350	201	0		4912	4836	39##	4875
2002	303	3680		2 ***		3985	5486	21##	5507
2003	296	3805		4 ***		4105	4108	20##	4128
2004	324	3739		9 ***		4072	4002	-	-
2005	358	4003		10		4371	4539	-	-
2006	393	4030		9		4432	4793	-	-
2007	401	3707		9		4117	4363	-	-
2008	305	3018		11	2 *	3336	4299	-	-
2009	364	4391				4755	3650	-	-
2010	451	4248				4699	3966	-	-
2011	386	4259				4645	4632	-	-
2012	385	3819				4204	4321	-	-
2013	312	4181				4492	4235	-	-
2014	307	3793		10		4110	3928	-	-
2015	302	3465		8		3775	3644	62	3706
2016	288	3054		4		3346	3232	134	3366
2017	274	2953		8		3236	3249	55	3304
2018	295	3165		8		3468	3308	79	3332
2019	322	3032		24		3351	3376	88	3464
2020**	299	2901		21		3221	3219	74	3293
2021**	246	2791		20		3063	3069	41	3110

* Reported in Subarea 8.

** Preliminary.

*** Reported as *Solea* spp. (*Solea lascaris* and *Solea solea* in Subarea 8).

Including reported in Subarea 8 or in divisions 8.c and 8.d.

Discards = partial estimates for the French offshore trawler fleet.

Summary of the assessment

Table 9 Sole in divisions 8.a–b. Assessment summary. Weights are in tonnes, recruitment in thousands.

Year	Recruitment Age 2	SSB	Landings	Discards**	F Landings Ages 3–6
1984	24138	12309	4038	99	0.31
1985	29495	13349	4251	64	0.31
1986	28268	14453	4805	27	0.37
1987	24861	15437	5086	198	0.37
1988	26705	15302	5382	254	0.4
1989	28090	14399	5845	356	0.5
1990	32040	14736	5916	303	0.46
1991	35647	14678	5569	198	0.42
1992	35287	15876	6550	123	0.61
1993	24845	16274	6420	104	0.53
1994	26140	15735	7229	184	0.65
1995	23514	14130	6205	130	0.58
1996	29316	13702	5854	142	0.55
1997	23692	13217	6259	118	0.61
1998	22573	13133	6027	127	0.54
1999	24359	12235	5249	110	0.63
2000	24952	11751	5760	51	0.63
2001	16885	10500	4836	39	0.57
2002	24691	9753	5486	22	0.83
2003	24270	9564	4108	21	0.49
2004	16958	11036	4002		0.37
2005	17966	11390	4539		0.47
2006	18117	11938	4793		0.45

Year	Recruitment Age 2	SSB	Landings	Discards**	F Landings Ages 3–6
2007	17432	10902	4363		0.47
2008	18247	10784	4299		0.52
2009	33651	10582	3650		0.51
2010	24513	12448	3966		0.45
2011	20441	14224	4632		0.41
2012	13824	13922	4321		0.48
2013	13773	13078	4235		0.46
2014	17252	10548	3928		0.45
2015	17612	10228	3644	62	0.44
2016	16145	10549	3232	134	0.38
2017	16616	11372	3249	55	0.3
2018	16421	12036	3308	79	0.33
2019	11470	11736	3376	88	0.36
2020	10612	10922	3219	74	0.35
2021	8041	11008	3069	41	0.31
2022	12757*	9444			

* Geometric mean (2016–2021).

** Discards are not used in the assessment, but used for projected discards.

Sources and references

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

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