

## Megrim (*Lepidorhombus whiffiagonis*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)

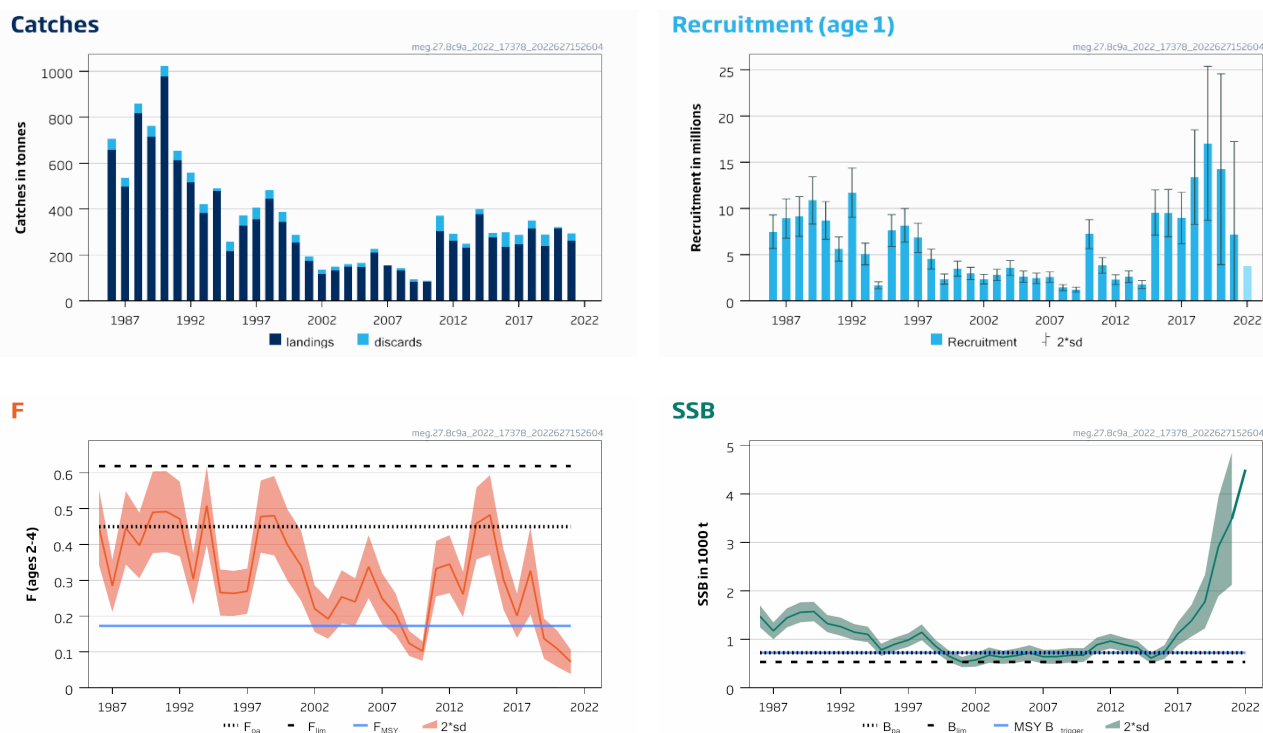
### ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for Western Waters and adjacent waters is applied, catches in 2023 that correspond to the F ranges in the MAP are between 654 tonnes and 1456 tonnes. According to the MAP, catches higher than those corresponding to  $F_{MSY}$  (968 tonnes) can only be taken under conditions specified in the MAP, while the entire range is considered precautionary when applying the ICES advice rule.

Management of catches of the two megrim species—megrim (*Lepidorhombus whiffiagonis*) and four-spot megrim (*Lepidorhombus bosci*)—under a combined species TAC prevents effective control of the single-species exploitation rates and could lead to the overexploitation of either species.

### Stock development over time

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



**Figure 1** Megrim in divisions 8.c and 9.a. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a lighter colour. The 2022 SSB estimate is a model forecast.

### Catch scenarios

**Table 1** Megrim in divisions 8.c and 9.a. The basis of the catch scenarios.

Variable	Value	Notes
$F_{ages\ 2-4}(2022)$	0.106	$F_{sq}$ = average F (2019–2021).
SSB (2023)	4650	Short-term forecast (STF); in tonnes.
$R_{age\ 1}$ (2022–2023)	3760	Geometric mean 1998–2019; in thousands.
Total catch (2022)	553	STF using $F_{sq}$ ; in tonnes.
Projected landings (2022)	531	STF assuming average landings ratio at age, 2019–2021; in tonnes.
Projected discards (2022)	22	STF assuming average discards ratio at age, 2019–2021; in tonnes.

**Table 2** Megrim in divisions 8.c and 9.a. Annual catch scenarios. All weights are in tonnes. Note: the % change in TAC is not computed because the TAC is for the two megrim species combined.

Basis	Total catch (2023)	Projected landings (2023)	Projected discards (2023)	F <sub>ages 2-4</sub> Total (2023)	F <sub>ages 2-4</sub> Projected landings (2023)	F <sub>ages 1-2</sub> Projected discards (2023)	SSB (2024)	% SSB change*	% advice change <sup>^^</sup>
ICES advice basis									
EU MAP <sup>^</sup> : F <sub>MSY</sub>	968	943	25	0.173	0.147	0.058	4140	-11.0	75
F = MAP <sup>^</sup> F <sub>MSY lower</sub>	654	638	16	0.112	0.095	0.037	4510	-3.0	18.2 <sup>^^</sup>
F = MAP <sup>^</sup> F <sub>MSY upper</sub>	1456	1418	38	0.28	0.24	0.093	3566	-23	163 <sup>^^</sup>
Other scenarios									
F = 0	0	0	0	0	0	0	5283	13.6	-100
F <sub>pa</sub>	2095	2038	57	0.45	0.38	0.150	2823	-39	279
F <sub>lim</sub>	2594	2520	74	0.62	0.52	0.21	2248	-52	369
SSB (2024) = B <sub>pa</sub>	3964	3828	136	1.51	1.28	0.50	725	-84	617
SSB (2024) = B <sub>lim</sub>	4150	4002	148	1.77	1.50	0.59	532	-89	650
SSB (2024) = MSY B <sub>trigger</sub>	3964	3828	136	1.51	1.28	0.50	725	-84	617
SSB <sub>2024</sub> = SSB <sub>2023</sub>	535	522	13	0.093	0.074	0.031	4650	0	-3.3
F = F <sub>2022</sub>	608	593	15	0.104	0.088	0.035	4564	-1.85	10

\* SSB 2024 relative to SSB 2023.

<sup>^</sup> The EU multiannual plan (MAP; EU, 2019).

<sup>^^</sup> Advice value for 2023 relative to the advice value for 2022 for the MAP F<sub>MSY lower</sub> (371 tonnes) and MAP F<sub>MSY upper</sub> (672 tonnes).

<sup>^^^</sup> Advice value for 2023 relative to advice value for 2022 (553 tonnes).

The advice for 2023 is 75% higher than the advice for 2022 because the stock was benchmarked in 2022 and a new model estimates a higher recruitment and SSB in recent years.

### Basis of the advice

**Table 3** Megrim in divisions 8.c and 9.a. 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 <sub>MSY</sub> range for the stock.
	In accordance with the MAP, “provided that the stock is above MSY B <sub>trigger</sub> :
	(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 inter-species 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 <sub>MSY</sub> 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

The benchmark changed the assessment model and data revisions were made, including the removal of all commercial abundance indices (ICES, 2022a). Fishing mortality and SSB show similar trends to historical assessments but recruitment has been revised upwards since 2018 in comparison with the previous year’s assessment. These changes triggered the calculation of new reference points. However, the perception of stock status, in relation to reference points, does not change in comparison to previous years’ assessments.



**Figure 2** Megrim in divisions 8.c and 9.a. Historical assessment results (final-year recruitment assumptions included for each line). The reference points were revised in 2022 following a benchmark and only the last assessment results should be compared to the reference points indicated.

### Issues relevant for the advice

The two megrim species are not totally separated in the landings statistics, and species-specific landings are estimated by ICES. A single TAC covers both species. ICES considers that management of the catches of the two megrim species under a combined TAC prevents effective control of single-species exploitation rates and could lead to the overexploitation of either species. Mixed-fisheries scenarios for the two megrim species will be provided in the Iberian waters fisheries overview later in the year.

### Reference points

**Table 4** Megrim in divisions 8.c and 9.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B <sub>trigger</sub>	725	B <sub>pa</sub> ; in tonnes.	ICES (2022a)
	F <sub>MSY</sub>	0.173	Stochastic simulations (EqSim) based on the recruitment period 1986–2020.	ICES (2022a)
Precautionary approach	B <sub>lim</sub>	532	B <sub>loss</sub> , biomass in 2001 as estimated in 2022; in tonnes.	ICES (2022a)
	B <sub>pa</sub>	725	B <sub>lim</sub> * exp(1.645 * σ), with σ = 0.188; in tonnes.	ICES (2022a)
	F <sub>lim</sub>	0.619	The F that results in long-term probability (SSB < B <sub>lim</sub> ) = 50% (EqSim).	ICES (2022a)
	F <sub>pa</sub>	0.45	F <sub>P05</sub> with Advice Rule (AR): the F that provides a 95% probability for SSB to be above B <sub>lim</sub> .	ICES (2022a)
Management plan	SSB <sub>mgt</sub>	Not applicable		
	F <sub>mgt</sub>	Not applicable		
	MAP MSY B <sub>trigger</sub>	725	MSY B <sub>trigger</sub> ; in tonnes.	ICES (2022a), EU (2019)
	MAP B <sub>lim</sub>	532	B <sub>lim</sub> ; in tonnes.	ICES (2022a), EU (2019)
	MAP F <sub>MSY</sub>	0.173	F <sub>MSY</sub>	ICES (2022a), EU (2019)
	MAP range F <sub>lower</sub>	0.112	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022a), EU (2019)
	MAP range F <sub>upper</sub>	0.284	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022a), EU (2019)

## Basis of the assessment

**Table 5** Megrim in divisions 8.c and 9.a. Basis of the assessment and advice.

ICES stock data category	1 ( <a href="#">ICES, 2022b</a> ).
Assessment type	Age-based assessment (a4a; ICES, 2022a, 2022c) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, ages, and length frequencies from catch sampling); one survey index, the Spanish North Coast Bottom Trawl Survey (SP-NSGFS-Q4 [G2784]), from 1988 to 2020 but excluding 2003 and 2013; constant maturity ogive; assumed natural mortality of 0.2 (ICES, 2022a).
Discards and bycatch	Included in the assessment for the full time-series for the majority of the fleets.
Indicators	None.
Other information	Last benchmarked in 2022 (ICES, 2022a).
Working group	Working Group for the Bay of Biscay and Iberian Waters Ecoregion ( <a href="#">WGBIE</a> ).

## History of the advice, catch, and management

**Table 6** Megrim in divisions 8.c and 9.a. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice for combined <i>Lepidorhombus</i> species *, **, ^	Catches corresponding to advice <i>L. whiffi.</i> **, ^	Agreed TAC *, ***,	ICES landings (combined <i>Lepidorhombus</i> species)*	ICES landings <i>L. whiffi.</i>	Discards
1987	Not assessed			13000	2185	497	40
1988	Not assessed			13000	3040	817	42
1989	Not assessed			13000	3343	714	47
1990	Not assessed			13000	2922	977	45
1991	No advice			14300	2296	614	41
1992	No advice			14300	2432	516	42
1993	L. boschii no gain in increasing F; <i>L. whiffi.</i> safe biological limits			8000	1767	383	38
1994	No gains in increasing F			6000	1882	479	13
1995	Concern about low SSB			6000	1870	218	40
1996	Mixed fishing aspects			6000	1426	329	44
1997	Reduce F by at least 50%			6000	1252	356	52
1998	Reduce F by at least 50%	900		6000	1569	446	36
1999	Reduce F by at least 50%	1000		6000	1468	343	43
2000	Reduce F by at least 20%	≤ 1500		5000	1294	253	35
2001	No increase in F	1610		5000	1105	175	19
2002	No increase in F	1550		4000	837	117	19
2003	No increase in F	1550		2400	1009	134	15
2004	No increase in F	1380		1336	1155	149	11
2005	No increase in F	1090		1336	1130	147	19
2006	No increase in F	1200		1269	1302	210	16
2007	No increase in F	1440		1440	1259	155	0.4
2008	No increase in F	1430		1430	1113	133	11
2009	Same advice as last year	1430		1430	1218	84	11
2010	Reduce F to F <sub>0.1</sub>	900		1287	1381	83	5
2011	MSY framework	< 890	< 110	1094	1430	302	69
2012	MSY framework	< 860	< 100	1214	1214	262	31
2013	MSY framework	< 890	< 110	1214	1163	231	18
2014	MSY approach	< 2257	< 300	2257	1531	377	23
2015	MSY approach	< 1013	< 192	1377	1424	276	21
2016	MSY approach	≤ 1259	≤ 186	1363	1322	235	63
2017	MSY approach		≤ 211	1159	1173	247	41
2018	MSY approach		≤ 292	1387	1129	315	37
2019	MSY approach		≤ 431	1872	981	239	51
2020	Management plan ^^		534 (range 357–648) #	2322	1026	315	5

Year	ICES advice	Landings corresponding to advice for combined <i>Lepidorhombus</i> species *, **, ^	Catches corresponding to advice <i>L. whiffi.</i> **, ^	Agreed TAC *, ***,	ICES landings (combined <i>Lepidorhombus</i> species)*	ICES landings <i>L. whiffi.</i>	Discards
2021	Management plan ^^		468 (range 312–571) #	2158	985	262	32
2022	Management plan ^^		553 (range 371–672) #	2445			
2023	Management plan ^^		968 (range 654–1456)				

\* For both megrim species combined.

\*\* Advice was provided for landings until 2015, and for catches from 2016 onward.

\*\*\* For Division 8.c and subareas 9 and 10; EU waters of CECF 34.1.1.

# Catches corresponding to  $F_{MSY}$ ; EU MAP range in brackets.

^ The advice for 2017 onward is for single species only.

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

## History of the catch and landings

**Table 7** Megrim in divisions 8.c and 9.a. Catch distribution by fleet in 2021 as estimated by ICES. All weights are in tonnes.

Catch	Landings		Discards
294	89% bottom otter trawl	11% other gear types	32
	262		

**Table 8** Megrim in divisions 8.c and 9.a. 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 catch**
	Spain			Portugal			
	Division 8.c	Division 9.a*	Total	Division 9.a			
1986	508	98	606	53	659	46	705
1987	404	46	450	47	497	40	537
1988	657	59	716	101	817	42	859
1989	533	45	578	136	714	47	761
1990	841	25	866	111	977	45	1022
1991	494	16	510	104	614	41	655
1992	474	5	479	37	516	42	558
1993	338	7	345	38	383	38	421
1994	440	8	448	31	479	13	492
1995	173	20	193	25	218	40	258
1996	283	21	305	24	329	44	373
1997	298	12	310	46	356	52	408
1998	372	8	380	66	446	36	482
1999	332	44	336	7	343	43	386
2000	238	5	243	10	253	35	288
2001	167	2	169	5	175	19	193
2002	112	3	115	3	117	19	137
2003	113	3	116	17	134	15	148
2004	142	1	144	5	149	11	159
2005	120	1	121	26	147	19	166
2006	173	2	175	35	210	16	226
2007	139	2	141	14	155	0.4	155
2008	114	2	116	17	133	11	144
2009	74	2	77	7	84	11	94
2010	66	8	74	10	83	5	88
2011	242	0	242	34	302	69	371

Year	Official landings				ICES landings**	Discards	ICES catch**
	Spain			Portugal			
	Division 8.c	Division 9.a*	Total	Division 9.a			
2012	151	11	161	18	262	31	293
2013	128	3	131	11	231	18	250
2014	225	5	231	30	377	23	399
2015	188	2	190	23	276	21	297
2016	171	1	172	15	235	63	298
2017	189	4	193	16	247	41	288
2018	227	8	234	7	315	37	352
2019	226	7	233	6	239	51	289
2020	278 <sup>#</sup>	26 <sup>#</sup>	305 <sup>#</sup>	10 <sup>#</sup>	315	5	320
2021	236 <sup>#</sup>	16 <sup>#</sup>	252 <sup>#</sup>	10 <sup>#</sup>	262	32	294

\* Division 9.a, excluding the Gulf of Cadiz until 2016.

\*\* Unallocated/unreported landings included.

<sup>#</sup> Preliminary.

## Summary of the assessment

**Table 9\*** Megrim in divisions 8.c and 9.a. Assessment summary. 'High' and 'Low' refer to two standard deviations. All weights are in tonnes and recruitment is in thousands.

Year	Recruitment (age 1)			Stock size			Landings	Discards	Fishing pressure (ages 2–4)		
	R	High	Low	SSB	High	Low			F	High	Low
	thousands			tonnes							
1986	7500	9324	5676	1477	1704	1249	659	46	0.45	0.56	0.34
1987	8921	11052	6790	1176	1351	1001	497	40	0.28	0.36	0.21
1988	9150	11306	6993	1442	1640	1244	817	42	0.45	0.55	0.34
1989	10885	13442	8328	1558	1766	1351	714	47	0.40	0.49	0.31
1990	8719	10759	6679	1573	1774	1372	977	45	0.49	0.60	0.38
1991	5625	6934	4315	1325	1504	1147	614	41	0.49	0.60	0.38
1992	11717	14373	9061	1262	1450	1074	516	42	0.47	0.58	0.37
1993	5084	6253	3915	1149	1315	984	383	38	0.30	0.38	0.23
1994	1703	2086	1319	1103	1264	941	479	13	0.51	0.62	0.40
1995	7630	9350	5910	784	912	656	219	40	0.27	0.33	0.20
1996	8180	10004	6356	900	1036	764	329	44	0.26	0.33	0.20
1997	6832	8412	5251	986	1127	844	356	52	0.27	0.33	0.21
1998	4537	5617	3457	1146	1310	981	446	36	0.48	0.58	0.38
1999	2370	2928	1812	866	995	737	343	43	0.48	0.59	0.37
2000	3507	4325	2688	655	774	537	253	35	0.40	0.50	0.30
2001	2984	3656	2313	532	639	425	175	19	0.34	0.44	0.24
2002	2370	2888	1852	576	717	436	117	19	0.22	0.29	0.156
2003	2810	3429	2192	674	835	513	134	15	0.192	0.25	0.137
2004	3576	4385	2766	631	768	494	149	11	0.25	0.33	0.180
2005	2639	3243	2034	665	813	516	147	19	0.24	0.31	0.174
2006	2458	3030	1886	722	880	564	210	16	0.34	0.43	0.25
2007	2584	3160	2007	643	786	500	155	0	0.25	0.32	0.178
2008	1449	1770	1127	643	792	495	133	11	0.21	0.26	0.147
2009	1231	1494	968	670	822	518	84	11	0.124	0.159	0.089
2010	7231	8800	5662	675	818	531	83	5	0.103	0.130	0.075
2011	3857	4705	3008	890	1040	740	302	69	0.33	0.41	0.26
2012	2313	2838	1788	964	1117	811	262	31	0.35	0.43	0.26
2013	2632	3265	1999	892	1036	748	231	18	0.26	0.32	0.197
2014	1781	2217	1345	830	964	697	377	23	0.46	0.56	0.36
2015	9572	12019	7124	614	723	506	276	21	0.48	0.59	0.37

\* Version 2: previous version had minor error (negative confidence interval changed to zero).

Year	Recruitment (age 1)			Stock size			Landings	Discards	Fishing pressure (ages 2–4)		
	R	High	Low	SSB	High	Low			F	High	Low
	thousands			tonnes							
2016	9515	12072	6958	740	883	597	235	63	0.30	0.39	0.22
2017	8972	11757	6187	1119	1360	878	247	41	0.20	0.26	0.139
2018	13405	18517	8292	1383	1710	1056	315	37	0.33	0.45	0.20
2019	17053	25393	8713	1779	2333	1225	239	51	0.138	0.194	0.081
2020	14261	24582	3939	2913	3934	1891	315	5	0.109	0.159	0.058
2021	7221	17252	0	3489	4854	2124	262	32	0.072	0.106	0.039
2022	3761*			4500							

\* Geometric mean (1998–2019).

## Sources and references

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