

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

ICES stock advice

ICES advises on the basis of the MSY approach that catches in 2017 should be no more than 211 tonnes. If discard rates do not change from the average of the last five years (2011–2015), this implies landings of no more than 194 tonnes.

Stock development over time

The spawning-stock biomass (SSB) has increased from the minimum observed in 2009 and is now above MSY $B_{trigger}$. Fishing mortality (F) declined continuously until 2010, but has increased since then and is now above F_{MSY} . After a period of low recruitment (R), it has increased in the last five years.

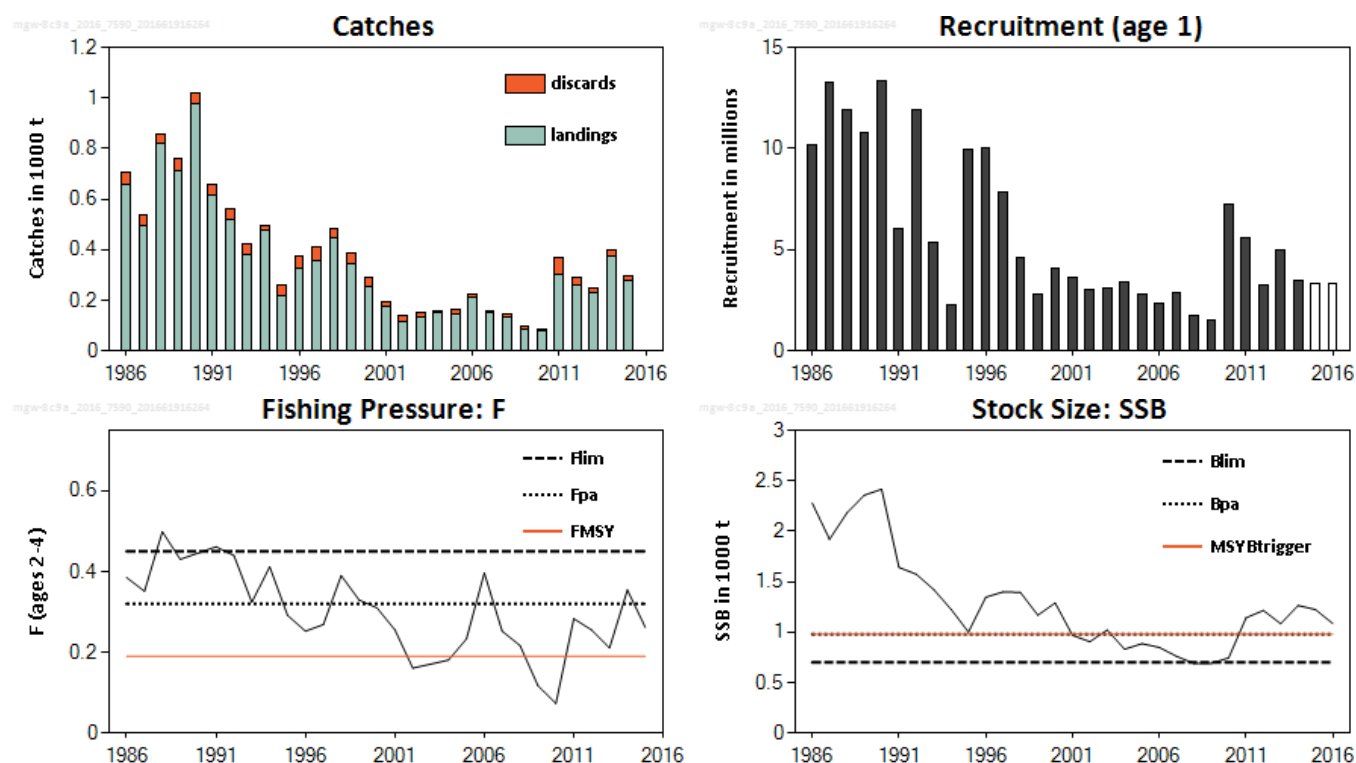


Figure 7.3.24.1 Megrim in divisions 8.c and 9.a. Summary of stock assessment (weights in thousand tonnes). Assumed recruitment values are unshaded.

Stock and exploitation status

Table 7.3.24.1 Megrim in divisions 8.c and 9.a. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size		
		2013	2014	2015		2014	2015	2016
Maximum sustainable yield	F_{MSY}	✗	✗	✗ Above	MSY $B_{trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa}	✓	○	✓ Harvested sustainably	B_{pa}, B_{lim}	✓	✓	✓ Full reproductive capacity
	F_{lim}							
Management plan	F_{MGT}	-	-	- Not applicable	SSB _{MGT}	-	-	- Not applicable

Catch options

Table 7.3.24.2 Megrim in divisions 8.c and 9.a. The basis for the catch options.

Variable	Value	Source	Notes
F (2016)	0.28	ICES (2016a)	Average $F_{2013-2015}$
SSB (2017)	1000 t	ICES (2016a)	
Recruitment (2016 to 2018)	3.301 million	ICES (2016a)	GM 1998–2013
Total catch (2016)	310 t	ICES (2016a)	Based on F_{2016}
Landings (2016)	285 t	ICES (2016a)	According to 2011–2015 average discard rates at age
Discards (2016)	25 t	ICES (2016a)	According to 2011–2015 average discard rates at age

Table 7.3.24.3 Megrim in divisions 8.c and 9.a. The catch options. Weights are in tonnes.

Rationale	Total catch 2017	Landings 2017	Discards 2017	Basis	Fishing mortality (F)			SSB 2018	% SSB change*	% Advice change**
					Total 2017	Landings 2017	Discards 2017			
MSY approach	211	194	17	F_{MSY} [$F_{sq} \times 0.7$]	0.19	0.179	0.011	1021	2	13
Precautionary approach	247	227	20	$SSB_{2018} = B_{pa}$ [$F_{sq} \times 0.825$]	0.227	0.215	0.013	980	–2	33
Other options	0	0	0	$F = 0$	0	0	0	1274	27	–100
	166	152	13	F multiplier for F_{MSY} of <i>L. boscii</i> *** [$F_{sq} \times 0.52$]	0.144	0.136	0.008	1076	8	–11
	35	32	3	$F_{sq} \times 0.1$	0.028	0.026	0.002	1233	23	–81
	159	146	13	$F_{sq} \times 0.5$	0.138	0.13	0.008	1084	8	–15
	186	171	15	Advice for 2016 [$F_{sq} \times 0.595$]	0.164	0.155	0.009	1053	5	0
	290	266	24	$F_{sq} \times 1$	0.276	0.26	0.015	928	–7	56
	327	300	27	F_{pa} [$F_{sq} \times 1.16$]	0.32	0.302	0.018	885	–12	76
	424	387	37	F_{lim} [$F_{sq} \times 1.633$]	0.45	0.425	0.025	769	–23	128
	482	439	43	$SSB_{2018} = B_{lim}$ [$F_{sq} \times 1.96$]	0.54	0.51	0.03	700	–30	159
	247	227	20	$SSB_{2018} = MSY B_{trigger}$ [$F_{sq} \times 0.825$]	0.227	0.215	0.013	980	–2	33

* SSB 2018 relative to SSB 2017.

** Total catch 2017 relative to advised catch for 2016 (186 t).

*** F-multiplier corresponding to the MSY approach for *L. boscii*, see Section 7.3.23.

Basis of the advice

Table 7.3.24.4 Megrim in divisions 8.c and 9.a. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no management plan for megrim in this area.

Quality of the assessment

The inclusion of discards in the 2014 assessment led to a slight upward revision of the recruitment, but has not altered the overall perception of stock trends.

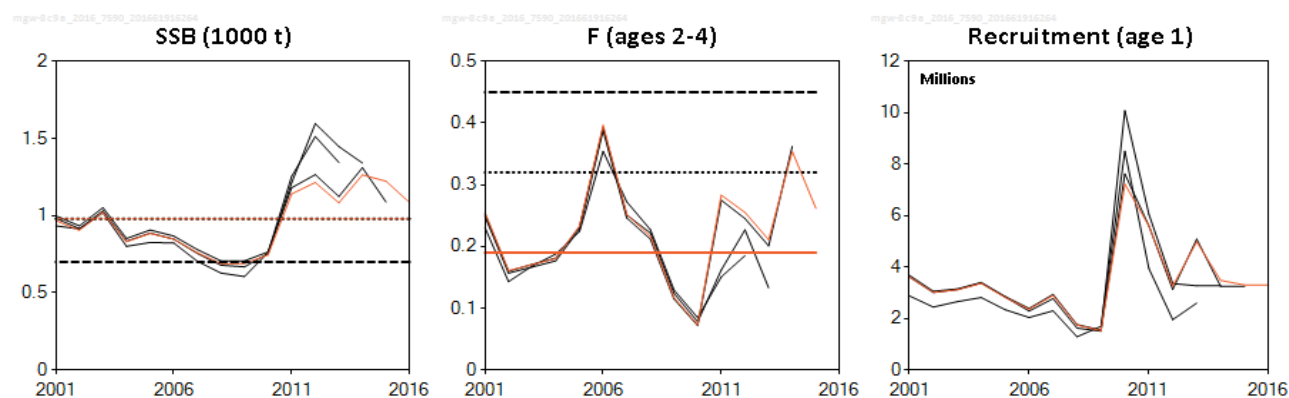


Figure 7.3.24.2 Megrim in divisions 8.c and 9.a. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

The two megrim species are not separated in the landings and a single TAC covers both of them. For these reasons, ICES provided advice in previous years applying a common multiplier of the current F for both megrim species; the value of the multiplier used in the advice corresponded to that required to get fishing mortality for both stocks at or below F_{MSY} in the advice year. ICES considers that management of the two megrim species under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of either species. Therefore, this year's advice is based on the single-species F_{MSY} .

If the TAC continues to be set for both megrim species combined, then using the common F -multiplier approach (as has been done in the ICES advice in previous years), would result in combined megrim catches in 2017 of no more than:

1363 t (both megrim species) = 1197 t (*L. boscii* single-species catch advice) + 166 t (*L. whiffiagonis* catch resulting from the *L. boscii* F -multiplier).

A mixed-fisheries analysis covering the Iberian waters stocks of hake, megrim, four-spot megrim, and white anglerfish is provided for the first time this year (ICES, 2016b).

Reference points

Table 7.3.24.5 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 $B_{trigger}$	980 t	B_{pa}	ICES (2016c)
	F_{MSY}	0.19	Stochastic simulations based on segmented regression	ICES (2016c)
Precautionary approach	B_{lim}	700 t	B_{loss}	ICES (2016d)
	B_{pa}	980 t	$B_{pa} = B_{lim} \times \exp(\sigma \times 1.645)$; $\sigma = 0.2$	ICES (2016d)
	F_{lim}	0.45	Based on segmented regression simulation of recruitment with B_{lim} as the breakpoint and no error	ICES (2016d)
	F_{pa}	0.32	$F_{pa} = F_{lim} \times \exp(-\sigma \times 1.645)$; $\sigma = 0.2$	ICES (2016d)
Management plan	SSB_{MGT}	Not applicable		
	F_{MGT}	Not applicable		

Basis of the assessment

Table 7.3.24.6 Megrim in divisions 8.c and 9.a. The basis of the assessment.

ICES stock data category	1 (ICES, 2016e)
Assessment type	Age-based assessment (XSA; ICES, 2016a) 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 (SpGFS-WIBTS-Q4) (1988–2012, 2014–2015); two commercial indices (SP-LCGOTBDEF (1986–2015) and SP-AVSOTBDEF (1986–2015)); constant maturity ogive (BIOSDEF, 1998); assumed natural mortality (0.2).
Discards and bycatch	Included in the assessment for all data series from the majority of the fleet.
Indicators	None
Other information	This stock was benchmarked in 2014 (WKSOUTH; ICES, 2014).
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE)

Information from stakeholders

There is no available information.

History of the advice, catch, and management

Table 7.3.24.7 Megrim in divisions 8.c and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of landings. Weights are in thousand tonnes.

Year	ICES advice*	Predicted total landings corresp. to advice*	Predicted landings corresp. to advice <i>L. whiffi.</i>	Agreed TAC * **	ICES landings *	ICES landings <i>L. whiffi.</i> #	Discards
1987	Not dealt with			13.0	2.19	0.50	0.04
1988	Not dealt with			13.0	3.04	0.82	0.04
1989	Not dealt with			13.0	3.34	0.71	0.05
1990	Not dealt with			13.0	2.93	0.98	0.04
1991	No advice			14.3	2.29	0.61	0.04
1992	No advice			14.3	2.44	0.52	0.04
1993	<i>L. boscii</i> no gain in increasing F, <i>L. whiffi.</i> safe biological limits			8.0	1.76	0.38	0.04
1994	No gains in increasing F			6.0	1.88	0.48	0.01
1995	Concern about low SSB			6.0	1.87	0.22	0.04
1996	Mixed fishing aspects			6.0	1.43	0.33	0.04
1997	Reduce F by at least 50%			6.0	1.25	0.36	0.05
1998	Reduce F by at least 50%	0.9		6.0	1.57	0.45	0.04
1999	Reduce F by at least 50%	1.0		6.0	1.46	0.34	0.04
2000	Reduce F by at least 20%	< 1.5		5.0	1.29	0.25	0.03
2001	No increase in F	1.61		5.0	1.11	0.17	0.02
2002	No increase in F	1.55		4.0	0.84	0.12	0.02
2003	No increase in F	1.55		2.4	1.01	0.13	0.01
2004	No increase in F	1.38		1.336	1.14	0.15	0.01
2005	No increase in F***	1.09		1.336	1.13	0.15	0.02
2006	No increase in F	1.2		1.269	1.30	0.21	0.02
2007	No increase in F	1.4		1.440	1.26	0.15	0.00
2008	No increase in F	1.4		1.430	1.11	0.13	0.01
2009	Same advice as last year	1.4		1.430	1.22	0.08	0.01
2010	Reduce F to $F_{0.1}$	0.9		1.287	1.38	0.08	0.00
2011	MSY framework	< 0.89	< 0.11	1.094	1.43	0.30	0.07
2012	MSY framework	< 0.86	< 0.10	1.214	1.21	0.26	0.03
2013	MSY framework	< 0.89	< 0.11	1.214	1.16	0.23	0.02
2014	MSY approach	< 2.26	< 0.30	2.257	1.53	0.38	0.02
2015	MSY approach	< 1.01	< 0.19	1.377	1.42	0.28	0.02
2016	MSY approach^	≤ 1.259	≤ 0.186	1.363			
2017	MSY approach^, ^^	-	≤ 0.211				

* For both species combined.

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

*** Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.

Includes unallocated landings.

^ Advice is for catch.

^^ Advice is for single species.

History of catch and landings

Table 7.3.24.8 Megrim in divisions 8.c and 9.a. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings		Discards
297 t	94% bottom otter trawl	6% other gears	21 t
	276 t		

Table 7.3.24.9 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			
	Div. 8.c	Div. 9.a**	Div. total	Div. 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
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

* Data revised in 2012.

** Division 9.a, excluding the Gulf of Cadiz.

*** Unallocated landings included.

^ Spanish data revised in 2015.

^^ Preliminary.

Summary of the assessment

Table 7.3.24.10 Megrim in divisions 8.c and 9.a. Assessment summary. Weights are in tonnes.

Year	Recruitment Age 1 (thousands)	SSB (tonnes)	Landings (tonnes)	Discards (tonnes)	Mean F Ages 2–4
1986	10204	2278	659	46	0.385
1987	13248	1920	497	40	0.351
1988	11931	2181	817	42	0.499
1989	10749	2356	714	47	0.43
1990	13340	2416	977	45	0.446
1991	6053	1641	614	41	0.461
1992	11908	1573	516	42	0.44
1993	5330	1422	383	38	0.324

Year	Recruitment Age 1 (thousands)	SSB (tonnes)	Landings (tonnes)	Discards (tonnes)	Mean F Ages 2–4
1994	2267	1226	479	13	0.412
1995	9956	1001	218	40	0.292
1996	10042	1345	329	44	0.252
1997	7825	1398	356	52	0.269
1998	4600	1393	446	36	0.39
1999	2767	1168	343	43	0.33
2000	4055	1289	253	35	0.31
2001	3619	968	175	19	0.256
2002	3015	905	117	19	0.161
2003	3113	1021	134	15	0.171
2004	3366	831	149	11	0.181
2005	2819	885	147	19	0.233
2006	2359	848	210	16	0.396
2007	2893	760	155	0	0.252
2008	1744	689	133	11	0.217
2009	1531	690	84	11	0.117
2010	7224	745	83	5	0.073
2011	5601	1141	302	69	0.283
2012	3258	1215	262	31	0.255
2013	4984	1083	231	18	0.211
2014	3482	1264	377	23	0.354
2015	3301*	1223	276	21	0.262
2016	3301*	1085			

* Recruitment in 2015 and 2016 is the GM (1998–2013).

Sources and references

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