

Megrim (*Lepidorhombus whiffiagonis*) in divisions 7.b–k, 8.a–b, and 8.d (west and southwest of Ireland, Bay of Biscay)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2018 should be no more than 15 720 tonnes. If discard rates do not change from the average of the last three years (2014–2016), this implies landings of no more than 12 884 tonnes.

Stock development over time

The spawning-stock biomass (SSB) has been above $MSY B_{trigger}$ since 2008. The fishing mortality (F) has decreased since 2004, although it is still above F_{MSY} . Recruitment (R) has been relatively stable throughout the time-series.



Figure 1 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Summary of the stock assessment. Recruitment, F, and SSB are displayed with confidence intervals (95%). Assumed values of recruitment are unshaded.

Stock and exploitation status

Table 1 Megrim in divisions 7.b–k, 8.a–b, and 8.d. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗	Above	✓	✓	✓	Above trigger
Precautionary Approach	F_{pa} F_{lim}	✓	✓	✓	Harvested sustainably	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	—	—	—	Not applicable	—	—	—	Not applicable

Catch options

Table 2 Megrim in divisions 7.b–k, 8.a–b, and 8.d. The basis for the catch options.

Variable	Value	Source	Notes
F (2017)	0.22	ICES (2017a)	F ₂₀₁₆
SSB (2018)	89644 t	ICES (2017a)	
R (2017)	227470 thousand	ICES (2017a)	Geometric mean of recruitment (1984–2014)
R (2018)	227470 thousand	ICES (2017a)	Geometric mean of recruitment (1984–2014)
Catch (2017)	16025 t	ICES (2017a)	Based on F(2017)
Landings (2017)	12941 t	ICES (2017a)	Using average discard rate of 2014–2016
Discards (2017)	3084 t	ICES (2017a)	Using average discard rate of 2014–2016

Table 3 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F _{total} (2018)	SSB (2019)	% SSB change *	% Advice change **
ICES advice basis							
MSY approach: F _{MSY}	15720	12884	2836	0.191	97909	9%	–2%
Other options							
F = 0	0	0	0	0	116398	30%	–100%
F _{pa}	32592	26472	6120	0.45	78284	–13%	103%
F _{lim}	37007	29970	7037	0.53	73187	–18%	131%
SSB (2019) = B _{lim}	69111	54410	14701	1.44	37100	–59%	331%
SSB (2019) = B _{pa}	64809	51288	13521	1.26	41800	–53%	305%
SSB (2019) = MSY B _{trigger}	64809	51288	13521	1.26	41800	–53%	305%
F = F ₂₀₁₇	17871	14630	3241	0.22	95444	6%	12%

* SSB 2019 relative to SSB 2018.

** Catches in 2018 relative to the advised catch in 2017 (16 021 t).

Basis of the advice

Table 4 Megrim in divisions 7.b–k, 8.a–b, and 8.d. 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

This is the second time since 2006 that ICES has provided advice based on an analytical assessment of this stock. Before 2016 the advice was based on a category 3 assessment (ICES, 2012, 2015).

There is uncertainty in the recruitment estimates for recent years.

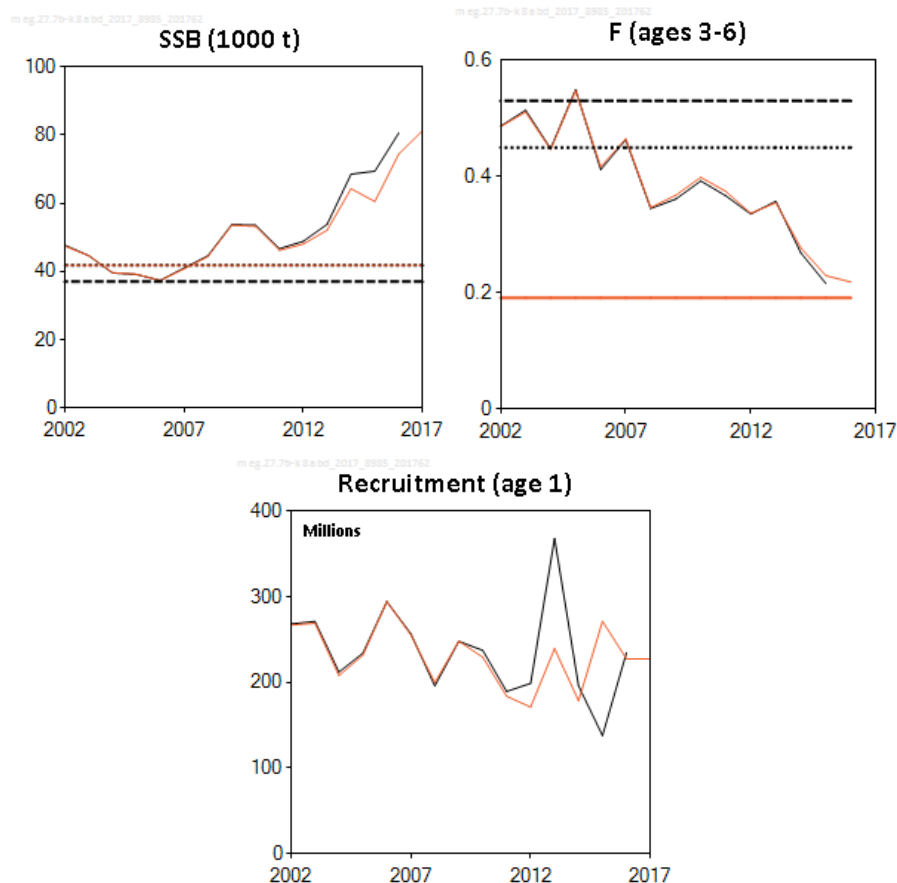


Figure 2 Megrim in divisions 7.b-k, 8.a-b, and 8.d. Historical assessment results.

Issues relevant for the advice

Discards are included in the assessment and ICES has provided catch advice for this stock since 2016.

The ICES advice is for *L. whiffiagonis*, whereas the TAC is for *L. whiffiagonis* and *L. boscii* combined.

The two megrim species (*L. whiffiagonis* and *L. boscii*) are not separated in the landings and a single TAC covers both species. 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. ICES does not presently have catch data for *L. boscii* in this area and, therefore, does not know how much this species contributes to the overall megrim landings. Data from research surveys indicate a strong predominance of *L. whiffiagonis*. More information will be available next year when both megrim species are included in the ICES data call.

Reference points

Table 5 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	41800 t	B_{pa}	ICES (2016a)
	F_{MSY}	0.191	Stochastic simulations based on segmented regression, with the breakpoint fixed at the lowest observed biomass.	ICES (2016a)
Precautionary approach	B_{lim}	37100 t	B_{loss} , which is the lowest biomass observed corresponding to year 2006.	ICES (2016a)
	B_{pa}	41800 t	$B_{lim}e^{1.645 \sigma}$; $\sigma_B = 0.07$	ICES (2016a)
	F_{lim}	0.533	The F that gives 50% probability of SSB being above B_{lim} .	ICES (2016a)
	F_{pa}	0.45	$F_{lim}e^{-1.645 \sigma}$; $\sigma_F = 0.102$	ICES (2016a)
Management plan	SSB _{mgt}	Not defined		ICES (2016a)
	F_{mgt}	Not defined		ICES (2016a)

Basis of the assessment

Table 6 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2016c).
Assessment type	Bayesian statistical catch at age (ICES, 2017) using catches in the model and forecast.
Input data	Commercial catches (international landings, ages and length frequencies from catch sampling). Survey indices: EVHOE-WIBTS-Q4 and SP-PGFS-WIBTS-Q4. Commercial indices: SP-VIGOTR7 (VIGO84, VIGO99), and IRTBB. Maturity ogive from Anon. (1998). Natural mortalities: a fixed value of 0.2 is used for all age groups and all years.
Discards and bycatch	Discards are included in the assessment.
Indicators	None.
Other information	The stock was benchmarked in 2016 (IBP Megrim; ICES, 2016b).
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 Megrim in divisions 7.b–k, 8.a–b, and 8.d. ICES advice and landings. All weights are in tonnes.

Year	ICES advice	Predicted catch / landings corresponding to advice	Agreed TAC*	ICES landings	Discards	ICES catch
1987	Not assessed	-	16460	17114	1705	18819
1988	Not assessed	-	18100	17577	1725	19302
1989	Not assessed	-	18100	19233	2582	21815
1990	Not assessed	-	18100	14370	3284	17654
1991	No advice	-	18100	15094	3282	18376
1992	No advice	-	18100	15600	2988	18588
1993	Within safe biological limits	-	21460	14929	3108	18037
1994	Within safe biological limits	-	20330	13684	2700	16384
1995	No particular concern	-	22590	15862	3206	19068
1996	No long-term gain in increased F	16600	21200	15109	3026	18135
1997	No advice	14300	25000	14230	3066	17296
1998	No increase in F	15200	25000	14345	5371	19716
1999	Reduce F below F_{pa}	14600	20000	13305	3297	16601
2000	Reduce F below F_{pa}	< 14200	20000	15031	1870	16750

Year	ICES advice	Predicted catch / landings corresponding to advice	Agreed TAC*	ICES landings	Discards	ICES catch
2001	Reduce F below F_{pa}	< 14100	16800	15778	2262	18040
2002	Reduce F below F_{pa}	< 13000	14900	15987	2813	18800
2003	Reduce F below F_{pa}	< 16100	16000	15711	4008	19719
2004	Reduce F below F_{pa}	< 20200	20200	14358	6243	20602
2005	Reduce F below F_{pa}	< 22600	21500	12888	3275	16163
2006	Reduce F below F_{pa}	<13600	20425	12037	3751	15788
2007	Less than average landings 2003–05	< 14200	20425	13060	3033	16092
2008	Less than average landings 2004–06	< 13000	20425	11048	2860	13908
2009	Same advice as last year	< 13000	20425	15064	3278	18342
2010	No increase in effort	< 13000	20425	15101	5343	20444
2011	See scenarios	-	20106	13226	4187	17413
2012	Catch and effort reduction	-	19101	14433	3704	18137
2013	Decrease landings by 4% (20% increase, followed by 20% PA reduction)	< 12000	19101	16025	4885	20910
2014	Same advice as 2013	< 12000	19101	13277	2569	15846
2015	Increase landings by no more than 13%	< 15180	19101	11569	1507	13076
2016	Precautionary approach (increase recent advised landings by no more than 20%)	≤ 18216	20056	11548	2445	13992
2017	MSY approach (catch advice)	≤ 16021	15043			
2018	MSY approach (catch advice)	≤ 15720				

* Includes *L. boscii* and divisions 7.a and 8.e.

History of the catch and landings

Table 8 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings		Discards
13 992 tonnes	Trawl 98.6%	Other gears 1.4%	2445 tonnes
	11 548 tonnes		

Table 9 Megrim in divisions 7.b–k, 8.a–b, and 8.d. History of commercial catch and landings; the ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	France	Spain	U.K. (England & Wales)	U.K. (Scotland)	Ireland	Belgium	Unallocated	ICES estimated landings	ICES estimated discards	ICES estimated catch
1984								16659	2169	18828
1985								17865	1732	19597
1986	4896	10242	2048		1563	178		18927	2321	21248
1987	5056	8772	1600		1561	125		17114	1705	18819
1988	5206	9247	1956		995	173		17577	1725	19302
1989	5452	9482	1451		2548	300		19233	2582	21815
1990	4336	7127	1380		1381	147		14370	3284	17654
1991	3709	7780	1617		1956	32		15094	3282	18376
1992	4104	7349	1982		2113	52		15600	2988	18588
1993	3640	6526	2131		2592	40		14929	3108	18037
1994	3214	5624	2309		2420	117		13684	2700	16384
1995	3945	6129	2658		2927	203		15862	3206	19068

Year	France	Spain	U.K. (England & Wales)	U.K. (Scotland)	Ireland	Belgium	Unallocated	ICES estimated landings	ICES estimated discards	ICES estimated catch
1996	4146	5572	2493		2699	199		15109	3026	18135
1997	4333	5472	2875		1420	130		14230	3066	17296
1998	4232	4870	2492		2621	129		14345	5371	19716
1999	3751	4615	2193		2597	149		13305	3297	16601
2000	4173	6047	2185		2512	115		15031	1870	16750
2001	3645	7575	1710		2767	80		15778	2262	18040
2002	2929	8797	1787		2413	62		15987	2813	18800
2003	3227	8340	1732		2249	163		15711	4008	19719
2004	2817	7526	1622		2288	106		14358	6243	20602
2005	2972	5841	1764		2155	156		12888	3275	16163
2006	2763	5916	1509		1751	99		12037	3751	15788
2007	2745	6895	1462		1763	195		13060	3033	16092
2008	2578	5402	1387		1514	167		11048	2860	13908
2009	3032	8062	1840		1918	209		15064	3278	18342
2010	3651	7095	1805		2283	261		15101	5343	20444
2011	3235	3500	1845		2227	330	2089	13226	4187	17413
2012	4012	4055	1744		3047	609	966	14433	3704	18137
2013	4549	4982	2918		3038	538		16025	4885	20910
2014	4311	3318	2753	176	2391	179	150	13277	2569	15846
2015	3073	2864	2804	147	2436	246	1	11569	1507	13076
2016	3141	2672	2694	145	2593	302	1	11548	2445	13992

Summary of the assessment

Table 10 Megrim in divisions 7.b–k, 8.a–b, and 8.d. Assessment summary. Weights are in tonnes. Highs and lows are confidence intervals (95%).

Year	Recruitment Age 1	High	Low	SSB	High	Low	Landings	Discards	F Ages 3–6	High	Low
	thousands			tonnes			tonnes				
1984	231562	251905	212068	70116	73056	67355	16659	2169	0.213	0.236	0.193
1985	207576	226777	191216	71043	74121	68152	17865	1732	0.239	0.262	0.219
1986	197252	216839	180798	71607	74807	68498	18927	2321	0.231	0.253	0.211
1987	182876	202639	166383	74923	78198	71824	17114	1705	0.229	0.25	0.208
1988	195238	214574	178436	65388	68325	62542	17577	1725	0.26	0.284	0.238
1989	243877	268040	223372	55089	57728	52527	19233	2582	0.334	0.366	0.304
1990	254733	278525	234685	47273	49732	44988	14370	3284	0.379	0.414	0.349
1991	286030	309849	262017	48462	50936	46155	15094	3282	0.435	0.474	0.399
1992	243176	264217	225530	50075	52489	47792	15600	2988	0.363	0.398	0.333
1993	187270	204001	173789	54014	56504	51703	14929	3108	0.375	0.407	0.346
1994	195777	212268	181353	52901	55207	50716	13684	2700	0.336	0.366	0.308
1995	238420	258877	219443	58842	61419	56418	15862	3206	0.353	0.384	0.324
1996	249657	271934	228759	52869	55244	50636	15109	3026	0.352	0.383	0.323
1997	210932	230726	193150	56284	58674	54018	14230	3066	0.313	0.341	0.287
1998	266633	291252	242965	58482	61058	56045	14345	5371	0.333	0.364	0.304
1999	228646	251571	209535	49287	51585	47036	13305	3297	0.342	0.375	0.313
2000	291388	318987	266027	50174	52373	47895	15031	1870	0.35	0.382	0.321
2001	235278	258804	214987	51910	54209	49519	15778	2262	0.418	0.455	0.384
2002	267023	293772	243270	47482	49697	45348	15987	2813	0.486	0.524	0.448
2003	269057	296248	245487	44660	46751	42702	15711	4008	0.511	0.553	0.469
2004	208041	228326	191118	39667	41567	37824	14358	6243	0.446	0.485	0.412
2005	231959	253131	213361	39203	41043	37440	12888	3275	0.548	0.596	0.504
2006	294428	321168	271443	37389	39189	35665	12037	3751	0.417	0.455	0.382

Year	Recruitment Age 1	High	Low	SSB	High	Low	Landings	Discards	F Ages 3–6	High	Low
	thousands			tonnes			tonnes				
2007	255495	280301	234087	40770	42715	38914	13060	3033	0.465	0.505	0.427
2008	199925	219872	182843	44364	46459	42351	11048	2860	0.346	0.379	0.318
2009	248080	274781	225468	53588	56252	51070	15064	3278	0.368	0.4	0.338
2010	229549	253736	207910	53219	56057	50471	15101	5343	0.399	0.437	0.364
2011	183882	204988	165261	46195	48909	43651	13226	4187	0.374	0.412	0.34
2012	171155	192950	150435	48048	51267	45220	14433	3704	0.337	0.374	0.302
2013	239562	277999	205297	52098	56055	48636	16025	4885	0.355	0.395	0.317
2014	178589	224278	142405	64300	70069	59230	13277	2569	0.277	0.312	0.245
2015	271390	386926	192578	60526	66899	54849	11569	1507	0.229	0.263	0.199
2016	227470*	233507*	221412*	74423	83354	66187	11548	2445	0.218	0.257	0.185
2017	227470*	233507*	221412*	81357	933335	70846					

* Geometric mean of recruitment (1984–2014).

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