

Megrim (*Lepidorhombus* spp.) in divisions 4.a and 6.a (northern North Sea, West of Scotland)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 7200 tonnes.

ICES notes the existence of a precautionary management plan, developed and adopted by one of the relevant management authorities for this stock.

Management should be implemented at the stock level.

Stock development over time

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

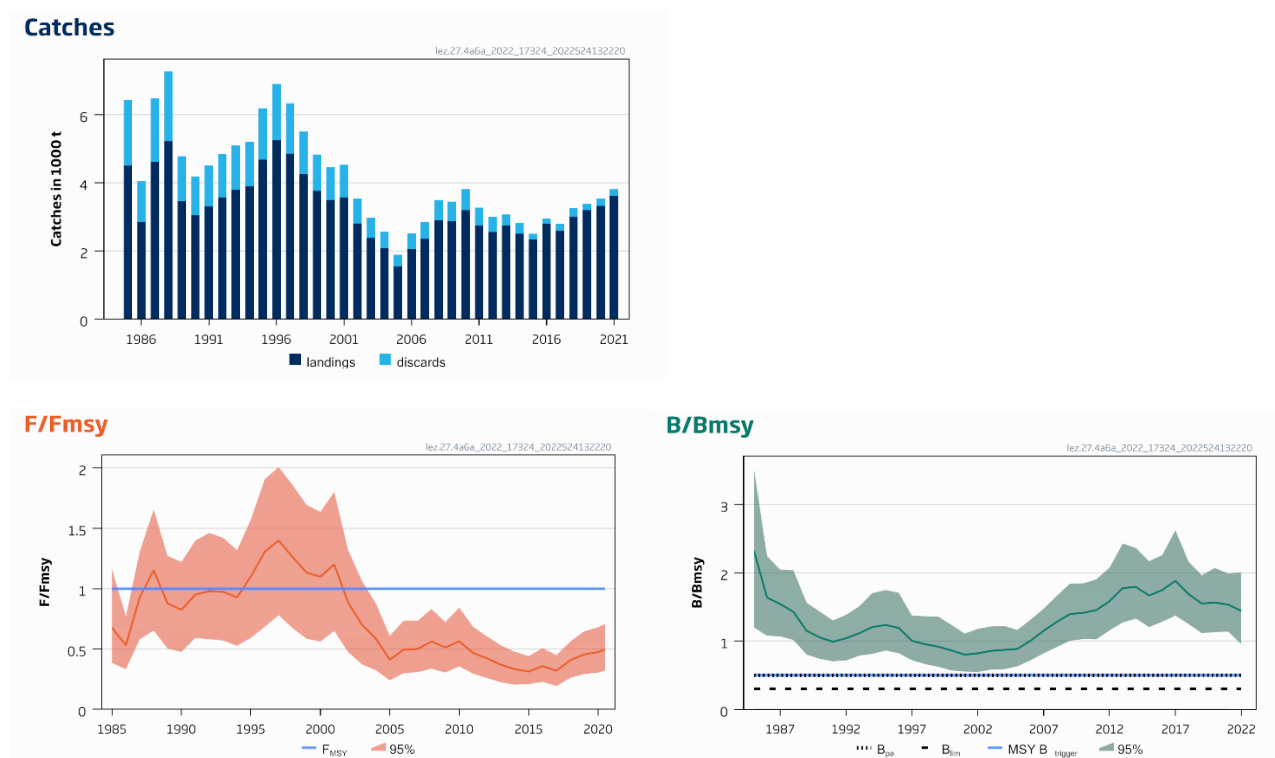


Figure 1 Megrim in divisions 4.a and 6.a. Summary of the stock assessment.

Catch scenarios

Table 1 Megrim in divisions 4.a and 6.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
F_{2022}/F_{MSY}	0.52	<i>Status quo</i> : F_{sq} = relative F (2021)
B_{2023}/B_{MSY}	1.53	Short-term forecast
Catch (2022)	3580	Short-term forecast; in tonnes
Projected landings (2022)	3380	Assuming average landings ratio (2019–2021); in tonnes
Projected discards (2022)	200	Assuming average discard ratio (2019–2021); in tonnes

Table 2 Megrim in divisions 4.a and 6.a. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	Projected landings (2023)	Projected discards (2023)	Fishing mortality F_{2023}/F_{MSY}	Stock size B_{2024}/B_{MSY}	% B change*	% advice change^
ICES advice basis							
MSY approach: $F = F_{MSY}$	7200	6798	402	1	1.32	-13.6	-2.0
Other scenarios							
EU MAP^^: F_{MSY}	7200	6798	402	1	1.32	-13.6	-2.0
EU MAP^^ F_{MSY} lower	5550	5240	310	0.76	1.41	-7.6	-24
EU MAP^^ F_{MSY} upper	7200	6798	402	1	1.32	-13.6	-2.0
$F = 0$	0	0	0	0	1.71	11.7	-100
$B_{2024} = B_{lim}$	26800	25302	1498	3.70	0.33	-79	264
$B_{2024} = B_{pa} = MSY B_{trigger}$	13000	12273	727	1.80	1.01	-34	77
$B_{2024} = B_{2023}$	3500	3304	196	0.48	1.52	0	-52
$F = F_{2022}$	3400	3210	190	0.52	1.52	0	-54

* Biomass 2024 relative to biomass 2023.

^ Advice value for 2023 relative to the advice value for 2022 (7350 tonnes).

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

Basis of the advice

Table 3 Megrim in divisions 4.a and 6.a. The basis of the advice.

Advice basis	MSY approach
Management plan	ICES is aware of the multiannual management plan (MAP) which has been adopted by the EU for this stock (EU, 2019) and which ICES considers to be precautionary. There is no agreed shared management plan with UK for this stock, and ICES provides advice according to ICES MSY approach. Catch scenarios consistent with the MAP F_{MSY} ranges are provided.

Quality of the assessment

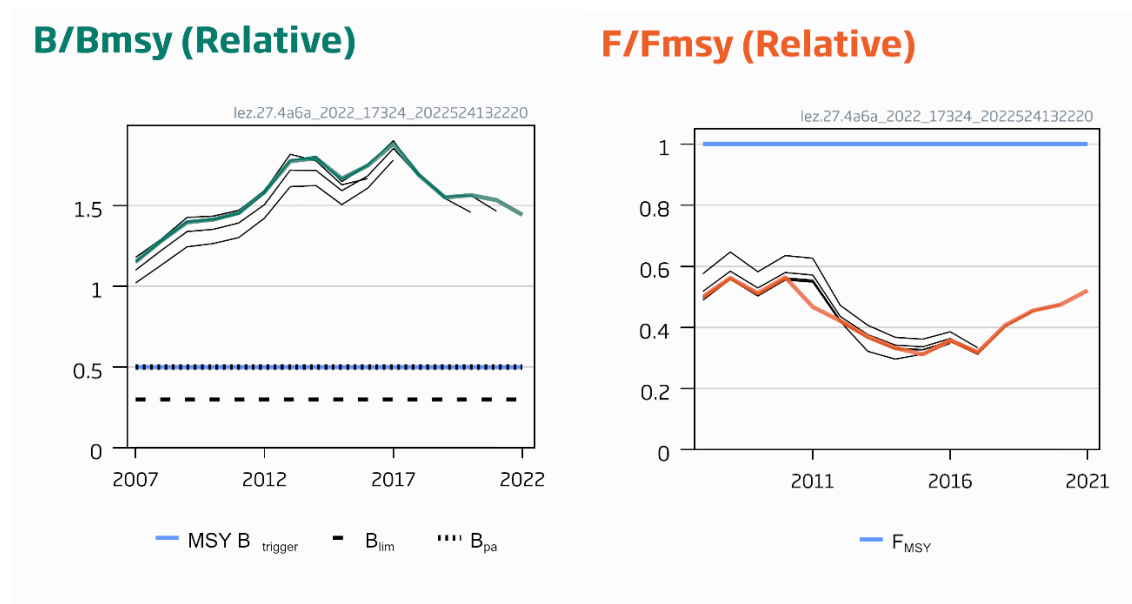


Figure 2 Megrim in divisions 4.a and 6.a. Historical assessment results (B/B_{MSY} final-year assumption included).

Issues relevant for the advice

This advice is for the two species, *L. whiffiagonis* and *L. boscii* combined. Available information indicates that *L. boscii* constitute a negligible proportion, based on historical sampling of the Scottish and Irish megrim catch.

ICES notes that the TAC is for subareas 4 and 6 and includes Division 6.b, for which advice is given separately. ICES advises that management should be implemented at the stock level.

Reference points

Table 4 Megrim in divisions 4.a and 6.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B_{trigger}	$0.5 \times B_{\text{MSY}}^*$	$0.25 \times K$. Relative value. B_{MSY} is estimated directly from the assessment surplus production model and changes when the assessment is updated.	ICES (2015a)
	F_{MSY}	$r/2^*$	Relative value. F_{MSY} is estimated directly from the assessment surplus production model and changes when the assessment is updated.	ICES (2015a)
Precautionary approach	B_{lim}	$0.30 \times B_{\text{MSY}}^*$	$0.15 \times K$. Relative value.	ICES (2015a)
	B_{pa}	$0.5 \times B_{\text{MSY}}^*$	MSY B_{trigger}	ICES (2017)
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	MAP MSY B_{trigger}	$0.5 \times B_{\text{MSY}}^*$	MSY B_{trigger}	ICES (2015b)
	MAP B_{lim}	$0.30 \times B_{\text{MSY}}^*$	B_{lim}	ICES (2015b)
	MAP F_{MSY}	F_{MSY}^*	F_{MSY}	ICES (2015b)
	MAP range F_{lower}	$0.77 \times F_{\text{MSY}}^*$	The lower bound is set at 0.39 of the intrinsic biomass growth rate	ICES (2015b)
	MAP range F_{upper}	F_{MSY}^*	The upper bound is set to the same level as F_{MSY}	ICES (2015b)

* Fishing mortality is presented only in relation to F_{MSY} , and total stock biomass is presented only in relation to B_{MSY} . K is the carrying capacity and r is the intrinsic biomass growth rate. These values are directly estimated from the stock assessment and change when the assessment is updated.

Basis of the assessment

Table 5 Megrim in divisions 4.a and 6.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Bayesian state–space biomass dynamic model that uses catches in the model and in the forecast (ICES, 2022b)
Input data	Commercial sampling of landings and discards; six survey indices SIAMISS-Q2 (G3745), IAMISS-Q2 (G1794), Sco-IBTS-Q1 (G1022), Sco-IBTS-Q3 (G2829), Sco-WIBTS-Q1 until 2010 (G1179), and Sco-WIBTS-Q4 until 2010 (G4299)
Discards and bycatch	Discards have been included in the assessment, from bottom otter trawl fleets. Discard estimates since 2013 are based on observed discards. Discard estimates prior to 2013 were reconstructed using limited sampling information.
Indicators	None
Other information	This stock was benchmarked at WKFLAT (ICES, 2011) and at IBPMEG (ICES, 2012)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

Table 6 Megrim in divisions 4.a and 6.a. History of ICES advice, the agreed TAC, official landings, and ICES estimates of landings and discards. All weights are in tonnes.

Year	ICES advice	Catches corresponding to advice*	Landings corresponding to advice	Agreed TAC in Div 2.a and Subarea 4	Agreed TAC in Subarea 6^	Official landings in subareas 4 and 6	ICES landings** in divisions 4.a and 6.a	ICES discards in divisions 4.a and 6.a^^
1991	No advice	-	-	-	4840	4415	3310	1204
1992	No advice	-	-	-	4840	4689	3574	1263
1993	No long-term gain in increased F	-	-	-	4840	4788	3802	1305
1994	No long-term gain in increased F	-	-	-	4840	5031	3900	1300
1995	No advice	-	-	-	4840	5565	4670	1511
1996	No advice	-	-	-	4840	6148	5253	1649
1997	No advice	-	-	-	4840	5944	4856	1478
1998	Adequate catch controls	-	-	3000	4840	5417	4253	1254
1999	Maintain current TAC	-	4840	3000	4840	4437	3759	1074
2000	Maintain current TAC	-	4840	2700	4840	4503	3494	966
2001	Maintain current TAC	-	4840	2700	4360	4381	3571	956
2002	Maintain current TAC	-	4360	2700	4360	3266	2803	725
2003	Maintain current TAC	-	4360	1890	4360	3008	2369	592
2004	Reduce TAC to recent landings	-	3600	1740	3600	2547	2067	499
2005	Reduce TAC to recent landings	-	2300	1740	2880	1920	1527	356
2006	Reduce TAC to recent landings	-	2300	1479	2880	2373	2054	461
2007	Reduce TAC to recent landings	-	2100	1597	2880	2733	2348	508
2008	Reduce TAC to recent landings	-	1400	1597	2592	3162	2894	602
2009	Same advice as last year	-	1400	1757	2799	3229	2871	574
2010	No increase in effort	-	-	3000	3079	3346	3197	614
2011	No increase in catches	-	-	1845	3387	2912	2743	526
2012	No increase in catches	-	-	1845	3387	2798	2545	449
2013	MSY framework	-	4700	1937	3387	2996	2737	327
2014	MSY approach	7000	5950	2083	4074	2823	2500	309
2015	Same advice as for 2014	7000	5950	2083	4129	2781	2340	159
2016	MSY approach	≤ 8567	≤ 7539	2639	5214	3209	2792	167
2017	Same advised values as for 2016	≤ 8567	≤ 7539	2639	5682	2686	2594	193
2018	MSY approach	≤ 7800	≤ 7217	2526	5432	3077	3087	230
2019	MSY approach	≤ 8250	≤ 7592	2887	5782	3163	3197	184
2020	Management plan	8350 (range 6450–8350)		2922	5901	3324***	3315	214
2021	Management plan	7300 (range 5700–7300)		2587	5225	3618***	3603	200
2022	MSY approach	≤ 7350		2763	5581			
2023	MSY approach	≤ 7200						

* Before 2011, advice was provided for megrim in divisions 4.a, 6.a, and 6.b combined.

** Landings in divisions 4.a and 6.a and unallocated landings from Subarea 4.

*** Preliminary.

^ Subarea 6; EC waters of Division 5.b; EC and international waters of subareas 12 and 14 (considered negligible).

^^ Discard estimates prior to 2013 were reconstructed using limited sampling information.

History of the catch and landings

Table 7 Megrim in divisions 4.a and 6.a. Catch distribution by fleet in 2021 as estimated by ICES.

Catch	Landings			Discards		
	Finfish trawls	<i>Nephrops</i> trawls	Other gears	Finfish trawls	<i>Nephrops</i> trawls	Other gears
	98%	< 1%	1.6%	34%	66%	< 1%
3803 tonnes	3603 tonnes			200 tonnes		

Table 8 Megrim in Division 6.a. History of commercial landings. All weights are in tonnes.

Year	Belgium	France	Ireland	Netherlands	Spain	UK (E, W, and NI)	UK (Scotland)	UK	Official total	ICES landings
1990	0	398	317	0	91	25	1093	-	1924	2210
1991	1	455	260	0	48	167	1223	-	2154	2432
1992	0	504	317	0	25	392	887	-	2125	2549
1993	0	517	329	0	7	298	896	-	2047	2721
1994	1	408	304	0	1	327	866	-	1907	2693
1995	0	618	535	0	24	322	952	-	2451	3498
1996	0	462	460	0	22	156	944	-	2044	4054
1997	0	192	438	1	87	123	954	-	1795	3272
1998	0	172	433	0	111	65	841	-	1622	2705
1999	0	0	438	0	83	42	831	-	1394	2648
2000	0	135	417	0	98	20	754	-	1424	2247
2001	0	252	509	0	92	7	770	-	1630	2473
2002	0	79	280	0	89	14	643	-	1105	1828
2003	0	92	344	0	98	13	558	-	1105	1642
2004	0	50	278	0	45	17	469	-	859	1328
2005	0	48	156	0	69	10	269	-	552	561
2006	0	53	221	0	52			346	672	875
2007	0	104	191	0	5			667	967	1301
2008	0	92	172	0	149			874	1287	1545
2009	0	174	188	0	112			953	1427	1387
2010	0	271	318	0	288			822	1699	1698
2011	0	153	227	0	217			715	1312	1297
2012	0	140	214	0	142			590	1086	1132
2013	0	105	203	0	213			470	991	949
2014	0	126	246	0	57			465	894	948
2015	0	140	311	0	140			520	1110	1110
2016	0	189	408	0	146			694	1437	1437
2017	0	132	336	0	313			579	1359	1359
2018	0	117	301	0	273			680	1370	1392
2019	0	122	271	0	368			844	1606	1611
2020*	0	119	250	0	302			710	1381	1380
2021*	0	123	378	0	335			633	1468	1464

* Preliminary official landings.

Table 9 Megrim in divisions 4.a. History of commercial landings; both the official and ICES estimated values are presented for each country. All weights are in tonnes.

Year	Belgium	Denmark	France	Germany	Germany, Fed. Rep.	Ireland	Netherlands	Norway	Spain	Sweden	UK (E, W, and NI)	UK (E&W)	UK (NI)	UK (Scotland)	UK	Official total	ICES landings
1990	4	2			3		24				17			1126		1176	837
1991	3	1		6			28				9			1169		1216	878
1992	2	4	36	3			27				47			1372		1491	1025
1993	7	6	25	4			30				8			1736		1816	1081
1994	2	1	27	1			28				19			2000		2078	1207
1995	7	2	24	2			26				44			2193		2298	1172
1996	5	7	14	1			9				4			3221		3261	1199
1997	3	5	16	2			20				3			3091		3140	1584
1998	5	18	14	4			30				5			2628		2704	1548
1999	4	21		1			26				4			2121		2177	1111
2000	10	29	7	3			20				2			2044		2115	1247
2001	2	52	5	1			11				2			1854		1927	1098
2002	5	8	6				9				3			1675		1706	975
2003	3	11	11	2		1	7	< 0.5			1			1235		1271	727
2004		7	9	2			11	< 0.5			1			1130		1160	739
2005		1	3	4			19	< 0.5			1			958		986	n/a
2006	0	3	4	1		0	6	1	0	0					1342	1357	1179
2007	0	11	18	4		0	1	1	0	0					1437	1472	1047
2008	0	31	20	1		0	1	4	0	0					1524	1581	1349
2009	0	54	9	0		0	0	6	0	0					1474	1543	1484
2010	0	22	1	0		0	1	2	0	0					1440	1466	1499
2011	0	23	10	3		0	0	1	0	0					1394	1431	1421
2012	0	35	5	3		0	0	1	0	0					1397	1441	1458
2013	0	48	8	3		0	0	17	0	0					1690	1765	1788
2014	0	35	6	1		0	0	12	0	0					1475	1530	1551
2015	0	26	7	0		0	0	8	0	0					1175	1217	1230
2016	0	46	13	2		0	2	21	0	0					1273	1357	1361
2017	0	60	36	3		0	< 0.5	29	0	0					1199	1327	1235
2018	0	61	67	1		0	1	34	0	0					1543	1706	1611
2019	0	63	103	4		0	1	46	0	0					1340	1557	1585
2020*	< 0.5	40	80	3		0	4	48	0	< 0.5					1768	1943	1935
2021*	0	73	74	9		0	1	49	0	< 0.5					1944	2150	2139

* Preliminary official landings.

Summary of the assessment

Table 10 Megrim in divisions 4.a and 6.a. Assessment summary. 'High' and 'Low' refers to 95% confidence intervals. All weights are in tonnes.

Year	B/B _{MSY}			Landings	Discards*	F/F _{MSY}		
	Low	Value	High			Low	Value	High
1985	1.20	2.33	3.54	4499	1928	0.38	0.68	1.16
1986	1.08	1.64	2.25	2858	1193	0.33	0.53	0.77
1987	1.07	1.54	2.05	4614	1874	0.58	0.93	1.31
1988	1.02	1.43	2.04	5212	2061	0.65	1.15	1.66
1989	0.80	1.15	1.56	3451	1327	0.50	0.88	1.27
1990	0.74	1.05	1.43	3047	1140	0.47	0.82	1.22
1991	0.70	0.99	1.30	3310	1204	0.59	0.95	1.40
1992	0.72	1.04	1.38	3574	1263	0.58	0.98	1.46
1993	0.79	1.12	1.51	3802	1305	0.57	0.97	1.42
1994	0.81	1.21	1.70	3900	1300	0.53	0.93	1.32
1995	0.86	1.24	1.75	4670	1511	0.59	1.10	1.57
1996	0.82	1.19	1.71	5253	1649	0.68	1.31	1.91
1997	0.72	1.00	1.37	4856	1478	0.78	1.40	2.01
1998	0.66	0.95	1.37	4253	1254	0.67	1.26	1.86
1999	0.62	0.92	1.36	3759	1074	0.59	1.13	1.70
2000	0.57	0.86	1.24	3494	966	0.56	1.10	1.64
2001	0.55	0.80	1.11	3571	956	0.65	1.20	1.80
2002	0.55	0.82	1.18	2803	725	0.47	0.88	1.32
2003	0.58	0.86	1.21	2369	592	0.37	0.70	1.06
2004	0.59	0.87	1.22	2067	499	0.32	0.58	0.88
2005	0.63	0.89	1.16	1527	356	0.24	0.41	0.61
2006	0.72	1.01	1.31	2054	461	0.30	0.49	0.73
2007	0.82	1.15	1.47	2348	508	0.31	0.50	0.73
2008	0.91	1.28	1.66	2894	602	0.34	0.56	0.83
2009	1.01	1.40	1.84	2871	574	0.30	0.51	0.72
2010	1.03	1.41	1.85	3197	614	0.36	0.56	0.84
2011	1.03	1.45	1.91	2743	526	0.29	0.47	0.68
2012	1.16	1.58	2.08	2545	449	0.26	0.42	0.60
2013	1.27	1.77	2.43	2737	327	0.22	0.37	0.53
2014	1.33	1.79	2.36	2500	309	0.20	0.33	0.48
2015	1.21	1.67	2.17	2340	159	0.21	0.31	0.44
2016	1.28	1.75	2.26	2792	167	0.23	0.36	0.51
2017	1.37	1.88	2.62	2594	193	0.19	0.32	0.45
2018	1.25	1.69	2.16	3003	255	0.26	0.41	0.56
2019	1.12	1.55	1.96	3197	184	0.29	0.45	0.65
2020	1.13	1.56	2.07	3316	214	0.30	0.47	0.68
2021	1.14	1.53	1.99	3603	200	0.34	0.52	0.74
2022	0.95	1.44	2.01					

* Discard estimates prior to 2013 were reconstructed using limited sampling information.

Sources and references

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

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