

Megrim (*Lepidorhombus ssp.*) in Division 6.b (Rockall)

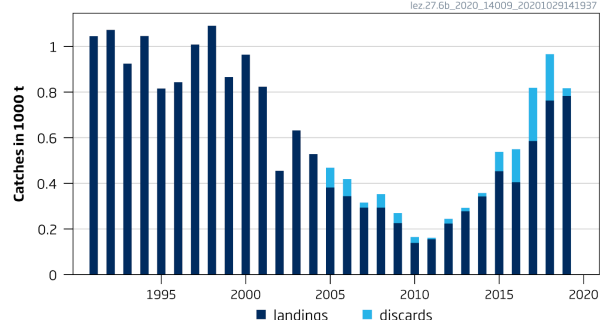
ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches in 2021 should be no more than 512 tonnes.

Note: This advice sheet is abbreviated due to the COVID-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

Stock development over time

Catches



Biomass Index

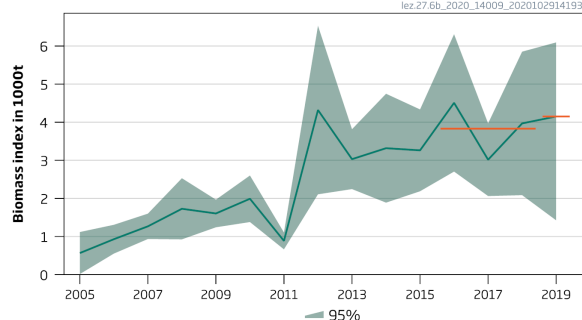


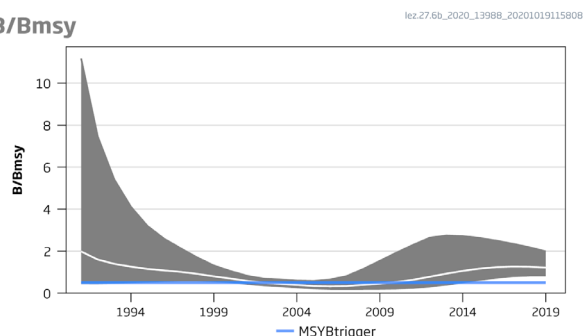
Figure 1 Megrim in Division 6.b. Summary of the stock assessment. Catches and stock-size indicator (biomass from the SIAMISS–Q2 survey). The horizontal lines in the biomass plot indicate the average of the respective year range. The horizontal orange lines indicate the average of the most recent two years (with 2020 not available) and the previous three years.

Stock and exploitation status

Table 1 Megrim in Division 6.b. State of the stock and the fishery relative to reference points.

		Fishing pressure				Stock size		
		2017	2018	2019		2018	2019	2020
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below proxy	MSY	✓	✓
Precautionary approach	F_{pa} , F_{lim}	✓	✓	✓	Below possible reference points	B_{pa} , B_{lim}	✓	✓
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	✓	✓
Qualitative evaluation	—	—	—	—		—	—	✓
								Likely above possible reference points

B/B_{msy}



F/F_{msy}

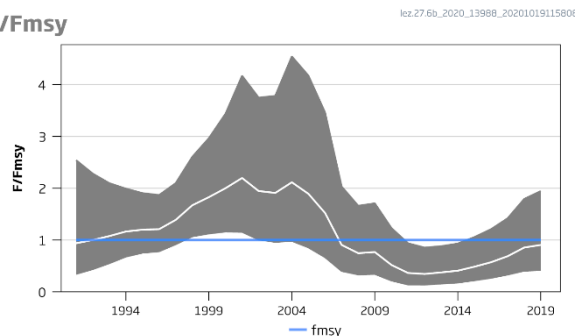


Figure 2 Megrim in Division 6.b. SPiCT analysis showing exploitable biomass relative to B_{MSY} , and fishing mortality relative to F_{MSY} . $MSY B_{trigger}$ corresponds to $0.5 \times B_{MSY}$.

Catch scenarios

The ICES framework for category 3 stocks was applied (ICES, 2012). The Scottish–Irish Anglerfish and Megrin Industry–Science Survey in Subarea 6 and Division 4.a (SIAMISS-Q2) was used as the index of stock development. The survey was cancelled in 2020 due to COVID-19. The advice is based on the ratio of the mean of the last two index values (Index A, with 2020 treated as missing) and the mean of the three preceding values (Index B), multiplied by the recent advised catch. This is equivalent to assuming that the 2020 value is equal to the 2019 biomass index.

The precautionary buffer has not previously been applied for this stock. SPiCT analysis indicates that fishing pressure is below proxies of the MSY reference points. While there is no estimate for stock size in 2020, the high estimate for 2019 relative to the MSY $B_{trigger}$ indicates that the stock size in 2020 is likely to be above MSY $B_{trigger}$ (Figure 2). Therefore, the precautionary buffer was not applied to the advice. The discard rate in 2019 was 4% of the total catch.

Table 2 Megrin in Division 6.b. The basis for the catch scenarios. All weights are in tonnes. *

Index A (2019–2020; 2020 not available)	4150 tonnes	
Index B (2016–2018)	3835 tonnes	
Index ratio (A/B)	1.08	
Uncertainty cap	Not applied	
Advised catch for 2020	473 tonnes	
Precautionary buffer	Not applied	
Catch advice **	512 tonnes	
% advice change ^	8.2%	

* The figures in the table are rounded. Calculations were done with unrounded inputs and computed values may not match exactly when calculated using the rounded figures in the table.

** [Advised catch for 2020] × [index ratio].

^ Advice value for 2021 relative to the advice value for 2020.

Quality of the assessment

The SIAMISS-Q2 survey was not completed in 2020 because of the COVID-19 disruption; therefore, the stock-size indicator is unknown for 2020.

History of the advice, catch, and management

Table 3 Megrim in Division 6.b. ICES advice, official landings, and ICES estimated discards. All weights are in tonnes.

Year	ICES advice *	Catches corresponding to advice	Landings corresponding to advice	Agreed TAC Division 5.b (EC) and subareas 6, 12, and 14	Official landings Division 6.b	ICES discards **
1990	Not assessed		-	4840	804	
1991	No advice		-	4840	1045	
1992	No advice		-	4840	1073	
1993	No long-term gain in increased F		-	4840	925	
1994	No long-term gain in increased F		-	4840	1046	
1995	No advice		-	4840	816	
1996	No advice		-	4840	843	
1997	No advice		-	4840	1009	
1998	Adequate catch controls		-	4840	1091	
1999	Maintain current TAC		4840	4840	866	
2000	Maintain current TAC		4840	4840	964	
2001	Maintain current TAC		4840	4360	824	
2002	Maintain current TAC		4360	4360	455	
2003	Maintain current TAC		4360	4360	632	
2004	Reduce TAC to recent landings		3600	3600	528	
2005	Reduce TAC to recent landings		2300	2880	382	87
2006	Reduce TAC to recent landings		2300	2880	344	75
2007	Reduce TAC to recent landings		2100	2880	106	22
2008	Reduce TAC to recent landings		1400	2592	294	59
2009	Same advice as last year		1400	2799	226	44
2010	No increase in effort		-	3079	139	26
2011	No increase in catches		-	3387	155	7
2012	No increase in catches		-	3387	224	21
2013	Catch decrease by 7%		< 160	3387	278	15
2014	Landings increase of no more than 20%		< 207	4074	343	15
2015	Landings increase of no more than 20%		< 262	4129	453	85
2016	Precautionary approach (no more than 20% increase of recent advised landings)		≤ 314	5214	405	145
2017	Precautionary approach	≤ 379	≤ 342	5682	586	233
2018	Precautionary approach	≤ 443	-	5432	763 ^	203
2019	Precautionary approach	≤ 419	-	5782	783 ^	34
2020	Precautionary approach	≤ 473	-	5901		
2021	Precautionary approach	≤ 512				

* Prior to 2011, advice was given for megrim in divisions 4.a, 6.a, and 6.b combined.

** Discard data are only available from 2005 onwards.

^ Preliminary.

Summary of the assessment

Table 4 Megrim in Division 6.b. Assessment summary. High and low refers to 95% confidence intervals. All weights in tonnes.

Year	Biomass index			B/B _{MSY}			Landings	Discards	Low	F/F _{MSY}	High
	Low	Value	High	Low		High					
1991	NA	NA	NA	0.477	1.99	8.29	1045	NA	0.347	0.938	2.54
1992	NA	NA	NA	0.474	1.6	5.41	1073	NA	0.438	1.00	2.28
1993	NA	NA	NA	0.493	1.4	3.95	925	NA	0.552	1.08	2.10
1994	NA	NA	NA	0.520	1.26	3.06	1046	NA	0.681	1.16	1.99
1995	NA	NA	NA	0.547	1.15	2.44	816	NA	0.755	1.20	1.91
1996	NA	NA	NA	0.578	1.08	2.03	843	NA	0.783	1.21	1.87
1997	NA	NA	NA	0.602	1.01	1.71	1009	NA	0.919	1.39	2.10
1998	NA	NA	NA	0.602	0.917	1.40	1091	NA	1.07	1.67	2.61
1999	NA	NA	NA	0.573	0.802	1.12	866	NA	1.13	1.83	2.97
2000	NA	NA	NA	0.523	0.697	0.929	964	NA	1.16	2.00	3.44
2001	NA	NA	NA	0.449	0.585	0.762	824	NA	1.16	2.20	4.17
2002	NA	NA	NA	0.373	0.495	0.657	455	NA	1.01	1.95	3.75
2003	NA	NA	NA	0.330	0.449	0.610	632	NA	0.964	1.91	3.78
2004	NA	NA	NA	0.278	0.394	0.558	528	NA	0.984	2.11	4.54
2005	14	566	1118	0.227	0.345	0.525	382	87	0.858	1.89	4.17
2006	551	929	1308	0.199	0.329	0.541	344	75	0.670	1.52	3.46
2007	934	1267	1601	0.190	0.343	0.617	106	22	0.403	0.91	2.03
2008	925	1728	2531	0.200	0.399	0.797	294	59	0.335	0.746	1.66
2009	1241	1605	1968	0.205	0.457	1.02	226	44	0.345	0.768	1.71
2010	1380	1991	2602	0.219	0.53	1.29	139	26	0.219	0.519	1.23
2011	663	885	1107	0.254	0.637	1.60	155	7	0.142	0.364	0.938
2012	2107	4320	6533	0.316	0.782	1.94	224	21	0.140	0.345	0.853
2013	2244	3030	3816	0.404	0.927	2.13	278	15	0.160	0.375	0.881
2014	1888	3318	4748	0.514	1.06	2.19	343	15	0.179	0.408	0.932
2015	2187	3262	4336	0.631	1.17	2.17	453	85	0.223	0.485	1.06
2016	2704	4507	6311	0.733	1.24	2.09	405	145	0.270	0.571	1.21
2017	2061	3015	3970	0.807	1.27	1.99	586	233	0.333	0.687	1.42
2018	732	3984	6460	0.843	1.26	1.88	763	203	0.408	0.855	1.79
2019	1424	4150	6095	0.845	1.22	1.76	783	34	0.421	0.905	1.95
2020	NA	NA	NA	NA	NA	NA					

NA = not available.

Sources and references

EU. 2019. Regulation (EU) 2019/472 of the European Parliament and of the Council of 19 March 2019 establishing a multiannual plan for stocks fished in the Western Waters and adjacent waters, and for fisheries exploiting those stocks, amending Regulations (EU) 2016/1139 and (EU) 2018/973, and repealing Council Regulations (EC) No 811/2004, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007 and (EC) No 1300/2008. Official Journal of the European Union, L 83: 1–17. <http://data.europa.eu/eli/reg/2019/472/oj>.

ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM:68. 42 pp. <https://doi.org/10.17895/ices.pub.5322>.

ICES. 2020. Working Group for the Celtic Seas Ecoregion (WGCSE). ICES Scientific Reports, 2:40. 924 pp. <http://doi.org/10.17895/ices.pub.5978>.

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Annex 1

ICES Advice on fishing opportunities, catch, and effort
Celtic Seas and Oceanic Northeast Atlantic ecoregions
Published 31 October 2019

Megrim (*Lepidorhombus ssp.*) in Division 6.b (Rockall)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches in 2020 should be no more than 175 tonnes.

Stock development over time

The spawning–stock biomass (SSB) generally increased up to 2012, and has been relatively stable since then.

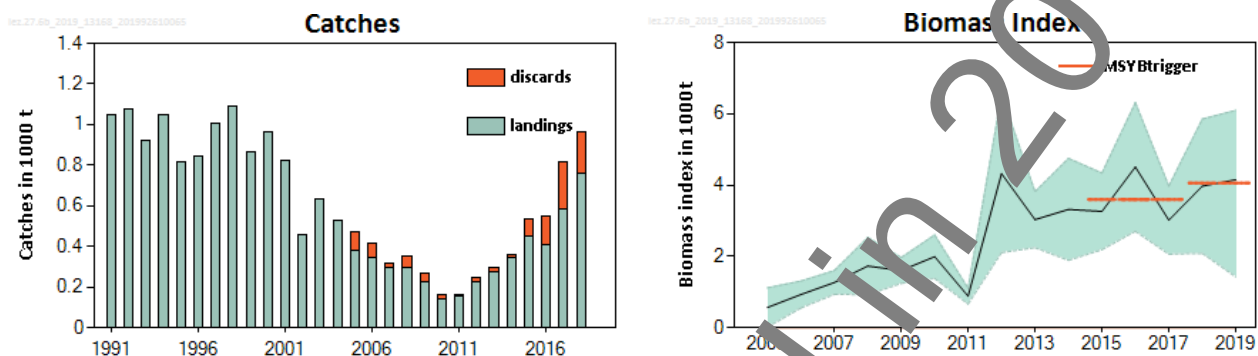


Figure 1 Megrim in Division 6.b. Summary of the stock assessment. Catches and stock size indicator (biomass from the SIAMISS–Q2 survey in thousand tonnes) with 95% confidence interval. The horizontal lines in the biomass plot indicate the average of the respective year range.

Stock and exploitation status

The fishing mortality is below, and the stock size above, proxies of the maximum sustainable yield (MSY) reference points.

Table 1 Megrim in Division 6.b. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2016	2017	2018	2017	2018	2019
Maximum sustainable yield	F_{MSY}	✓	✓	✓	MSY	✓	✓
				Below proxy	$B_{trigger}$	✓	✓
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓			
				Below possible reference points	B_{pa}, B_{lim}	✓	✓
Management plan	F_{MGT}	?	?	?			
				Undefined	B_{MGT}	✓	✓
							Above proxy
							Above possible reference points
							Above proxy

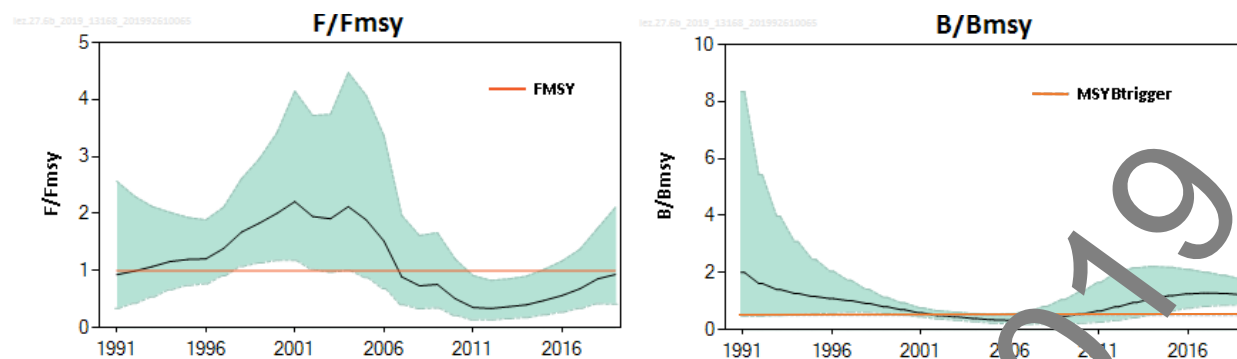


Figure 2 Megrin in Division 6.b. SPiCT analysis showing exploitable biomass relative to B_{MSY} and fishing mortality relative to F_{MSY} . The shaded areas in both plots indicate 95% confidence intervals. The horizontal lines indicate F_{MSY} and $MSY B_{trigger}$ proxies. $MSY B_{trigger}$ corresponds to $0.5 \cdot B_{MSY}$.

Catch scenarios

The ICES framework for category 3 stocks was applied (ICES, 2012). The Scottish and Irish anglerfish and megrim industry–science survey for the Northern shelf (SIAMISS-Q2) survey biomass index was used as an indicator of stock development. The advice is based on the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B), multiplied by the recent advised catch. The index is estimated to have increased by less than 20%; thus, the uncertainty cap was not applied.

The Surplus Production in Continuous Time (SPiCT; Pedersen and Berg, 2017) analysis suggests that fishing mortality is below, and stock size above, proxies of MSY reference points (Figure 2). No additional precautionary buffer was therefore applied. The discard rate in 2018 was 21% of the total catch.

Table 2 Megrin in Division 6.b. The basis for the catch scenarios. All weights are in tonnes. *

Index A (2018–2019)		4060 t
Index B (2015–2017)		3595 t
Index ratio (A/B)		1.13
Uncertainty cap	Not applied	
Advised catch for 2019		419 t
Precautionary buffer	Not applied	
Catch advice **		473 t
% Advice change ^		12.9%

* The figures in the table are rounded. Calculations were done with unrounded inputs, and computed values may not match exactly when calculated using the rounded figures in the table.

** [Advised catch for 2019] \times [index ratio].

^ Advice value for 2020 relative to the advice value for 2019.

The catch advised for 2020 is higher than that for 2019, because of an increase in the stock size indicator.

Basis of the advice

Table 3 Megrin in Division 6.b. The basis of the advice.

Advice basis	Precautionary approach.
Management plan	The EU multiannual plan (MAP) for stocks in the Western Waters (EU, 2019) and adjacent waters applies to this stock. The MAP stipulates that when the F_{MSY} ranges are not available, fishing opportunities should be based on the best available scientific advice.

Quality of the assessment

The advice is based on the industry–science survey catch per unit of effort (CPUE) (SIAMISS-Q2), used as an indicator of stock size. The degree of uncertainty associated with the index is high.

Discard estimates are available from 2005. Discard rates are, however, poorly estimated because few samples are collected each year.

Fishing mortality is estimated with high uncertainty.

Issues relevant for the advice

ICES provides catch advice, as vessels targeting gadoids at Rockall have been subject to the landings obligation for megrim since 2017 (EU, 2016).

A single TAC covers the entire ICES Division 5.b (EC), as well as subareas 6, 12, and 14. Management for megrim in Division 6.b should be implemented at the scale of this stock unit, to ensure that fishing opportunities are in line with the scale of the resource.

Reference points

Table 4 Megrim in Division 6.b. Reference points, values, and their technical basis

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{trigger proxy}}$	$B/B_{\text{MSY}} = 0.5 *$	$0.25 \times K$. Relative value. B_{MSY} is estimated directly from the SPiCT surplus production model, and changes when the assessment is updated.	ICES (2015, 2019)
	$F_{\text{MSY proxy}}$	$F/F_{\text{MSY}} = 1 *$	$r/2$. Relative value. F_{MSY} is estimated directly from the SPiCT surplus production model, and changes when the assessment is updated.	ICES (2015, 2019)
Precautionary approach	B_{lim}	Undefined		
	B_{pa}	Undefined		
	F_{lim}	Undefined		
	F_{pa}	Undefined		
Management plan	MAP MSY $B_{\text{trigger proxy}}$	$0.5 *$	MAP MSY $B_{\text{trigger proxy}}$	EU (2019); ICES (2019)
	MAP $F_{\text{MSY proxy}}$	$1 *$	$F_{\text{MSY proxy}}$	EU (2019); ICES (2019)

* No reference points are defined for this stock in terms of absolute values. The SPiCT-estimated values of the ratios F/F_{MSY} and B/B_{MSY} are used to estimate stock status relative to the proxy MSY reference points.

Basis of the assessment

Table 5 Megrim in Division 6.b. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2018).
Assessment type	Survey trends-based assessment (ICES, 2019).
Input data	Commercial landings; one dedicated industry–science survey index (SCO-IV-VI-AMISS-Q2).
Discards and bycatch	Discard estimates are available from 2005 onwards.
Indicators	SPiCT (Pedersen and Berg, 2017).
Other information	Last benchmarked in 2011 (WKFLAT; ICES, 2011).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE).

Information from stakeholders

Since 2014, there has been effort by the Scottish industry–science observer sampling scheme to improve coverage in subareas 4 and 6. However, the number of samples remains low for this stock. Increasing observer coverage of catches at Rockall will help improve the overall biological sampling for the stock. Recognizing the low sampling levels, the Scottish industry will continue to liaise with science on sampling opportunities.

History of the advice, catch, and management

Table 6 Megrim in Division 6.b. ICES advice, official landings, and ICES estimated discards. All weights are in tonnes.

Year	ICES advice *	Catches corresponding to advice	Landings corresponding to advice	Agreed TAC Division 5.b (EC) and subareas 6, 12, and 14	Official landings Division 6.b	ICES discards**
1990	Not assessed		-	4840	804	
1991	No advice		-	4840	1045	
1992	No advice		-	4840	1071	
1993	No long-term gain in increased F		-	4840	925	
1994	No long-term gain in increased F		-	4840	1046	
1995	No advice		-	4840	816	
1996	No advice		-	4840	843	
1997	No advice		-	4840	1009	
1998	Adequate catch controls		-	4840	1091	
1999	Maintain current TAC		4840	4840	866	
2000	Maintain current TAC		4840	4840	964	
2001	Maintain current TAC		4840	4360	824	
2002	Maintain current TAC		4360	4360	455	
2003	Maintain current TAC		4360	4360	632	
2004	Reduce TAC to recent landings		3600	3600	528	
2005	Reduce TAC to recent landings		2880	2880	382	87
2006	Reduce TAC to recent landings		3000	2880	344	75
2007	Reduce TAC to recent landings		2100	2880	106	22
2008	Reduce TAC to recent landings		1400	2592	294	59
2009	Same advice as last year		1400	2799	226	44
2010	No increase in effort		-	3079	139	26
2011	No increase in catches		-	3387	155	7
2012	No increase in catches		-	3387	224	21
2013	Catch decrease by 7%		< 160	3387	278	15
2014	Landings increase of no more than 20%		< 207	4074	343	15
2015	Landings increase of no more than 20%		< 262	4129	453	85
2016	Precautionary approach (no more than 20% increase of recent advised landings)		≤ 314	5214	405	145
2017	Precautionary approach	≤ 379	≤ 342	5682	586	233
2018	Precautionary approach	≤ 443		5432	763 [^]	203
2019	Precautionary approach	≤ 419		5782		
2020	Precautionary approach	≤ 473				

* Prior to 2011, advice was given for megrim in divisions 4.a, 6.a, and 6.b combined.

** Discard data are only available from 2005 onwards.

[^] Preliminary.

History of the catch and landings

Table 7 Megrim in Division 6.b. Catch distribution by fleet in 2018 as estimated by ICES.

Catch	Wanted catch	Unwanted catch
966 tonnes	Otter trawls ~ 100%	203 tonnes
	763 tonnes	

Table 8 Megrim in Division 6.b. History of catch and landings; official landings presented by country and ICES estimated catch. All weights are in tonnes.

Year	France	Ireland	Spain	UK (England, Wales, & Northern Ireland)	UK (England & Wales)	UK (Scotland)	UK	Official landings	ICES catch
1990	-	196	363	19	-	226	-	804	-
1991	-	240	587	14	-	204	-	1045	-
1992	-	139	683	53	-	198	-	1073	-
1993	-	128	594	56	-	147	-	925	-
1994	-	176	574	38	-	258	-	1056	-
1995	-	117	520	27	-	152	-	816	-
1996	-	124	515	92	-	112	-	843	-
1997	-	141	628	76	-	164	-	1009	-
1998	-	218	549	116	-	208	-	1091	-
1999	-	127	404	57	-	278	-	866	-
2000	4	167	427	57	-	309	-	964	-
2001	< 0.5	176	370	42	-	236	-	824	-
2002	< 0.5	87	120	41	-	207	-	455	-
2003	-	83	93	74	-	38	-	632	-
2004	-	43	71	42	-	72	-	528	-
2005	-	68	88	19	-	207	-	382	469
2006	-	95	59	9	-	181	-	344	419
2007	-	87	19	-	-	188	-	294	316
2008	-	68	84	-	1	71	-	294	353
2009	-	48	0	-	-	178	-	226	270
2010	-	47	0	-	-	-	92	139	165
2011	-	72	17	-	-	-	66	155	162
2012	-	120	15	-	-	-	89	224	245
2013	-	181	39	-	-	-	58	278	293
2014	-	230	18	-	-	-	95	343	358
2015	-	256	67	-	-	-	130	453	538
2016	-	272	27	-	-	-	106	405	550
2017	-	358	46	-	-	167	-	586	819
2018	-	438*	62*	14*	-	249*	-	763*	966

* Preliminary.

Summary of the assessment

Table 9 Megrim in Division 6.b. Assessment summary. High and low refers to 95% confidence intervals.

Year	Biomass index	High	Low	B/B _{MSY}	High	Low	Landings	Discards	F/F _{MSY}	High	Low
	In tonnes				In tonnes						
1991	NA	NA	NA	2.01	8.35	0.48	1045	NA	0.87	2.9	0.26
1992	NA	NA	NA	1.62	5.43	0.48	1073	NA	1.04	2.7	0.33
1993	NA	NA	NA	1.41	3.98	0.50	925	NA	1.02	2.5	0.42
1994	NA	NA	NA	1.27	3.09	0.52	1046	NA	1.12	2.3	0.55
1995	NA	NA	NA	1.16	2.46	0.55	816	NA	1.17	2.1	0.64
1996	NA	NA	NA	1.09	2.05	0.58	843	NA	1.19	2.1	0.69
1997	NA	NA	NA	1.02	1.73	0.60	1009	NA	1.39	2.2	0.88
1998	NA	NA	NA	0.92	1.41	0.60	1091	NA	1.69	2.6	1.1
1999	NA	NA	NA	0.80	1.13	0.57	866	NA	1.86	2.9	1.2
2000	NA	NA	NA	0.70	0.94	0.52	964	NA	2.1	3.4	1.26
2001	NA	NA	NA	0.59	0.77	0.45	824	NA	2.3	4.1	1.26
2002	NA	NA	NA	0.49	0.66	0.37	455	NA	2	3.8	1.08
2003	NA	NA	NA	0.45	0.61	0.33	632	NA	1.97	3.8	1.02
2004	NA	NA	NA	0.39	0.56	0.28	538	NA	2.2	4.6	1.04
2005	566	1118	14	0.35	0.52	0.23	382	87	1.92	4.2	0.89
2006	929	1308	551	0.33	0.54	0.20	344	75	1.52	3.4	0.67
2007	1267	1601	934	0.35	0.63	0.19	106	22	0.87	2.1	0.35
2008	1728	2531	925	0.41	0.82	0.20	294	59	0.7	1.82	0.27
2009	1605	1968	1241	0.47	1.06	0.41	226	44	0.72	1.85	0.28
2010	1991	2602	1380	0.54	1.34	0.22	139	26	0.48	1.39	0.163
2011	885	1107	663	0.65	1.65	0.21	155	7	0.33	1.05	0.105
2012	4320	6533	2107	0.80	1.99	0.32	224	21	0.32	0.93	0.109
2013	3030	3816	2244	0.95	2.17	0.42	278	15	0.35	0.94	0.133
2014	3318	4748	1888	1.08	2.21	0.53	343	15	0.39	0.98	0.155
2015	3262	4336	2187	1.19	2.49	0.65	453	85	0.47	1.1	0.2
2016	4507	6311	2704	1.26	2.11	0.75	405	145	0.56	1.26	0.25
2017	3015	3970	2061	1.28	2.01	0.82	586	233	0.67	1.47	0.31
2018	3984	6460	732	1.27	1.90	0.85	763	203	0.77	1.83	0.32
2019	4150	6095	1424	1.23	1.78	0.85			0.93	2.1	0.41
2020				1.19	1.73	0.82					

NA = not available.

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