Haddock (*Melanogrammus aeglefinus*) in Division 6.b (Rockall)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches should be no more than 4078 tonnes in each of the years 2023 and 2024.

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

Stock development over time

The fishing pressure proxy on the stock is below $F_{MSY\ proxy}$ (Figure 2), and the stock-size index is above MSY $B_{trigger\ proxy}$ ($I_{trigger}$).

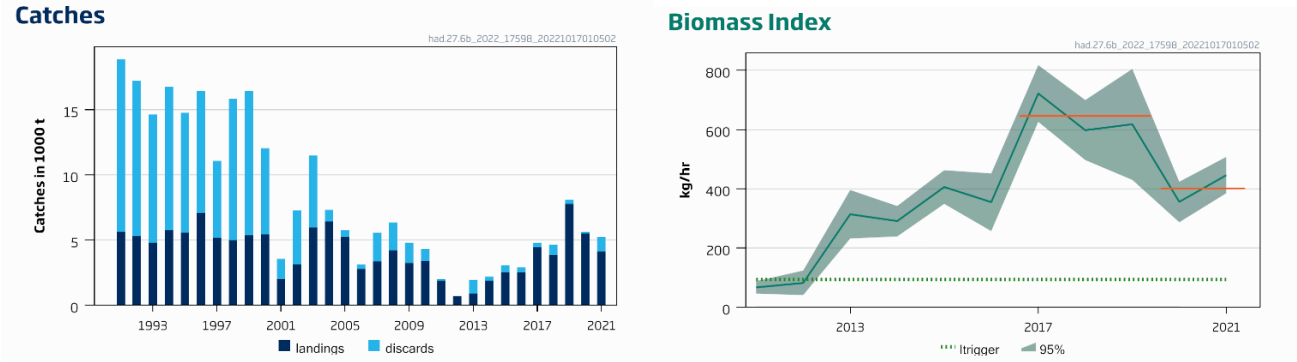

Figure 1 Haddock in Division 6.b. Summary of the stock assessment. ICES landings and discards, and stock biomass index from the Rock-WIBTS-Q3 survey. The horizontal orange lines indicate the average of the biomass index from 2017 to 2019 and from 2020 to 2021.

Catch scenarios

ICES framework for category 3 stocks was applied (rfb rule, method 2.1, ICES, 2022c). A survey biomass index was used as an indicator of stock development. The advice is based on the recent advised catches (2022), multiplied by the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B), a ratio of observed mean length in the catch relative to the target mean length, a biomass safeguard, and a precautionary multiplier. The stability clause was considered and applied to limit the decrease in catch advice to 30%. The discard rate (mean 2019–2021) was 9.2%.

Table 1 Haddock in Division 6.b. The basis for the catch scenarios. Catches are in tonnes.*

Previous catch advice A_y (2022)		5825 tonnes
Stock biomass trend		
Index A (2020, 2021)		401 kg hr^{-1}
Index B (2017, 2018, 2019)		646 kg hr^{-1}
r: Index ratio (A/B)		0.62
Fishing pressure proxy		
Mean catch length ($L_{mean} = L_{2021}$)		39.0 cm
MSY proxy length ($L_{F=M}$)		37.4 cm
f: multiplier for relative mean length in catches ($L_{mean}/L_{F=M\ 2020}$)		1.04
Biomass safeguard		
Last index value (I_{2021})		446 kg hr^{-1}
Index trigger value ($I_{trigger} = I_{loss} \times 1.4$)		93.5 kg hr^{-1}
b: multiplier for index relative to trigger $\min\{I_{2021}/I_{trigger}, 1\}$		1
Precautionary multiplier to maintain biomass above B_{lim} with 95% probability		
m: multiplier (generic multiplier based on life history)		0.90
RFB calculation**		3389 tonnes
Stability clause (+20%/−30% compared to A_y, only applied if b ≥ 1)	Applied	0.70
Discard rate		9.2%
Catch advice for 2023 and 2024 (A_y × stability clause)		4078 tonnes
Projected landings corresponding to advice***		3704 tonnes
% advice change^		−30 %

* 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.
**$Ay{+}1 = Ay \times r \times f \times b \times m$.
*** [Advised catch for 2023] × [1 – discard rate].
^ Advice value for 2023 and 2024 relative to the advice value for 2022 (5825 tonnes).

The current advice has decreased compared to last year's advice because of a change in the advice method and a declining trend in the recent stock biomass.

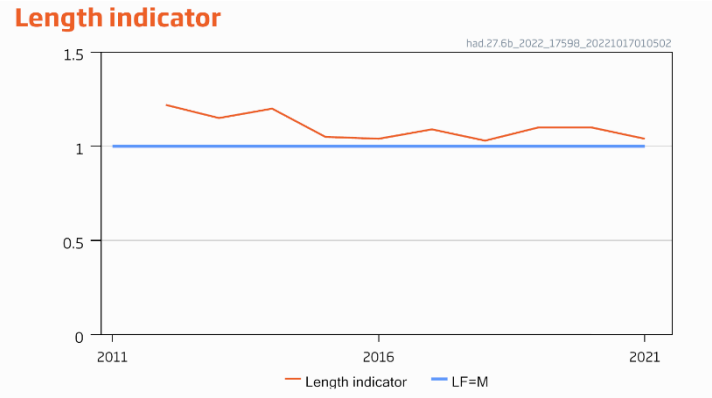

Figure 2 Haddock in Division 6.b. Length indicator: mean length of fish in the catch relative to MSY proxy reference length, $L_{F=M}$. The exploitation status is below $F_{MSY\ proxy}$ when the indicator ratio value is higher than 1 (shown by a blue line).

Basis of the advice

Table 2 Haddock in Division 6.b. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no agreed management plan for haddock in this area. Two management strategies (NEAFC and EU MAP) have been assessed to be precautionary. NEAFC requested ICES to evaluate the harvest control rules (HCRs) that use F_{MSY} as a target. ICES concluded that the NEAFC HCRs in the long-term management strategy for Rockall haddock were consistent with the precautionary approach (ICES, 2019). 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.

Quality of the assessment

In previous years an age-structured assessment model has been used to provide advice as a category 1 stock. This year, methods to update the previously utilised survey index were unavailable and the agreed assessment (and forecast) could not be carried out. Consequently the assessment this year is based on a new biomass index derived from the Rock-WIBTS-Q3 survey as an indicator of stock size and a mean catch length indicator as a proxy for fishing pressure (under a category 3 approach). This survey has good coverage of the stock area and it is considered representative of the stock trend.

While at-sea observer sampling for discards remains sparse for Rockall haddock, the estimated catch-at-length data are considered to be of sufficient quality for the calculation of length indicators.

Growth parameter estimates for this stock show significant variation between cohorts, and median values were used. An underestimate of the asymptotic length would lead to an underestimate of the MSY proxy reference length ($L_{F=M}$). The length indicator is estimated to be just above this reference point implying that the fishing pressure is just below the F_{MSY} proxy. This uncertainty in growth parameters has no effect on the advice as the reduction is capped.

Issues relevant for the advice

Advice for this stock was previously given following ICES MSY approach based on a Category 1 stock assessment; the applied method gives advice following ICES MSY approach for data limited stocks using the empirical rfb rule (Fischer *et al.*, 2021).

The basis for the advice (rfb rule) has a biennial advice interval and so advice is provided for 2 years (ICES, 2022c).

Reference points

Table 3 Haddock in Division 6.b. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger\ proxy}$	93.5	Biomass index trigger value ($I_{trigger}$), defined as $I_{trigger} = I_{loss} \times 1.4$, where I_{loss} (66.764 kg h^{-1}) is the lowest observed historical biomass index value from 2011. In kg per hour.	ICES (2022b, 2022c)
	$F_{MSY\ proxy}$	1	$L_{mean}/L_{F=M}$; Mean catch length divided by MSY proxy reference length ($L_{F=M}$ = 37.4 cm).	ICES (2022b, 2022c)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 4 Haddock in Division 6.b. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2022a)
Assessment type	Survey biomass trend applying the *rfb* rule for advice (ICES, 2022b).
Input data	Commercial catch (international landings and discards, length frequencies from catch sampling); one survey index (Rock-WIBTS-Q3 [G4436]); growth parameters estimated from survey data
Discards and bycatch	Discards are included in the assessment
Indicators	Length based indicator
Other information	This stock was benchmarked in 2019 (ICES, 2020). The stock changed from category 1 to category 3 in 2022 (ICES, 2022a).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

Table 5 Haddock in Division 6.b. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice, with single-stock exploitation boundaries from 2004 onwards	Catch corresponding to advice	Landings corresponding to advice	Agreed TAC^^	Official landings	ICES landings	ICES discards+
1987	Precautionary TAC	10000			7995	8432	n/a
1988	Precautionary TAC	10000			7574	7929	n/a
1989	*Status quo* F; TAC	18000			6643	6728	n/a
1990	Precautionary TAC	5500			8213	3884	n/a
1991	Precautionary TAC	5500			5853	5656	13230
1992	Precautionary TAC	3800			4520	5321	11874
1993	80% of F (91)	3000			4113	4781	9854
1994	If required, precautionary TAC	-			3735	5732	11028
1995	No long-term gain in increasing F	5100			5491	5588	9170
1996	No long-term gains in increasing F	6900			6818	7072	9356
1997	No advice given	4900			5220	5167	5893
1998	No increase in F	4900			5098	4986	10863
1999	Reduce F below F_{pa}	3800			5990	5356	11065
2000	Reduce F below F_{pa}	< 3500			5688	5445	6611
2001	Reduce F below F_{pa}	< 2700			2315	2020	1536
2002	Reduce F below 0.2	< 1300			3037	3118	4154
2003	Lowest possible F	-			6148	5968	5520
2004	Lowest possible catch^			702	6306	6434	883
2005	Lowest possible catch^			702	5178	5239	505
2006	Lowest possible catch^			597	2765	2756	386
2007	Reduce F below F_{pa}^	< 7110		4615	3349	3347	2242
2008	Keep F below F_{pa}^	< 10600		6916	4222	4222	2104
2009	No long-term gains in increasing F^	-	< 4300	5879	3440	3241	1556
2010	No long-term gains in increasing F^	-	< 3300	4997	3405	3404	907
2011	See scenarios	-		3748	1897	1860	152
2012	MSY approach	-	< 3300	3300	710	686	26
2013	No directed fisheries, minimize bycatch and discards	0	0	990	826	889	1065
2014	MSY approach	< 1620	< 980	1210	1713	1845	332

Year	ICES advice, with single-stock exploitation boundaries from 2004 onwards	Catch corresponding to advice	Landings corresponding to advice	Agreed TAC^^	Official landings	ICES landings	ICES discards+
2015	MSY approach	< 4310	< 2930	2580	2445	2510	554
2016	MSY approach	≤ 3932	≤ 3225	3225	2585	2504	401
2017	MSY approach	≤ 4690	≤ 4130	4690	4586	4430	379
2018	MSY approach	≤ 5163		5163	3865*	3850	788
2019	MSY approach	≤ 10469		10469	6807^^^*	7782^^^	303
2020	MSY approach	≤ 10472		10472	5401^^^#	5510^^^	130
2021	MSY approach	≤ 6239		8375	4088^^^#	4095^^^	1117
2022	MSY approach	≤ 5825		5825			
2023	MSY approach	≤ 4078					
2024	MSY approach	≤ 4078					

^ Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.
^^ Agreed EU and UK TAC for Division 6.b and subareas 12 and 14.
^^^ Including below minimum size (BMS) landings.
*Incomplete: part of the data being unavailable under data confidentiality clauses.
Preliminary.
+Updated in 2022.
n/a = Not available.

History of the catch and landings

Table 6 Haddock in Division 6.b. Catch distribution by fleet in 2021 as estimated by ICES.

Catch	Landings*		Discards
5212 tonnes	Otter trawl 99%	Longline 1%	1117 tonnes
	4095 tonnes		

*Including BMS landings.

Table 7 Haddock in Division 6.b. History of commercial catch and landings. All weights are in tonnes. Updated in 2022.

Year	Faroe Islands	France	Iceland	Ireland	Norway	Portugal	Russian Federation	Spain	UK (E,W, & NI)	UK (Scot.)	UK (total)	Total	Unallocated catch	Landings from NEAFC area**	ICES landings#
1996	-	-	-	747	24	-	-	1	293	5753		6818	254	n/a	7072
1997	-	-	+	895	24	-	-	22	165	4114		5220	−53	n/a	5167
1998	-	-	-	704	40	4	-	21	561	3768		5098	−112	n/a	4956
1999	-	-	167	1021	61	-	458	25	288	3970		5990	−634	n/a	5356
2000	-	5	-	824	152	-	2154	47	36	2470		5688	−243	n/a	5445^
2001	-	2	-	357	70	-	630	51	-	1205		2315	−295	n/a	2020^
2002	-	-	-	206	49	-	1630	7	+	1145		3037	81	n/a	3118^
2003	-	-	-	169	60	-	4237	19	56	1607		6148	−180	n/a	5968^
2004	-	-	-	19	32	-	5844	-	-	411		6306	128	n/a	6434
2005	-	-	-	105	33	-	4708	-	-	332		5178	61	n/a	5239
2006	2	+	-	41	123	-	2154	5	1	439		2765	−9	n/a	2756
2007	2	-	-	338	84	-	1282	+	8	1635		3349	−2	n/a	3347
2008	16	-	-	721	36	-	1669	1	-	1779		4222	0	n/a	4222
2009	10	1	-	352	71	-	55	+	-	2951		3440	−199	n/a	3241
2010	42	-	-	169	65	-	198	+	-	2931		3405	−1	n/a	3404

Year	Faroe Islands	France	Iceland	Ireland	Norway	Portugal	Russian Federation	Spain	UK (E,W, & NI)	UK (Scot.)	UK (total)	Total	Unallocated catch	Landings from NEAFC area**	ICES landings#
2011	2	+	-	123	40	-	-	-	-	1732		1897	−37	n/a	1860
2012	53	-	-	31	48	-	1	-	-	577		710	−24	33	686
2013	-	-	-	105	121	-	4	-	-	596		826	63	147	889
2014	24	2	-	94	55	-	388	-	-	1152		1713	132	423	1845
2015	1	-	-	190	66	-	136	-			2052	2445	65	241	2510
2016	+	-	-	362	63	-	-	-			2160	2585^^	−81	565	2504^^
2017	+	-	-	500	26	-	153	-			3907	4586	−156	715	4430
2018	-	-	-	431##	16	-	-	-			3418	3865##	−15	782##	3850
2019	-	8	-	4##	13	-	245	1			6536	6807##^^	975	809	7782^^
2020*	-	-	-	679	14	-	133	+			4575	5401^^	109	745	5510^^
2021*	+	+	-	510		-	20	-			3558	4088^^	7	1183	4095^^

* Preliminary official landings.
**Official landings except 2020 & 2021 which include ICES estimates.
^ Includes the total Russian catch.
^^ Including below minimum size (BMS) landings.
+ <0.5 tonnes.
# Updated in 2022.
Incomplete: part of the data being unavailable under data confidentiality clauses.
n/a = Not available.

Summary of the assessment

Table 8 Haddock in Division 6.b. Assessment summary. Weights are in tonnes. High and low refer to 95% confidence intervals.

Year	Biomass index (kg hr^{-1})			Landings	Discards	Length indicator
	Low	Value	High			
1991				5656	13231	
1992				5321	11874	
1993				4781	9854	
1994				5732	11028	
1995				5588	9170	
1996				7072	9356	
1997				5167	5893	
1998				4986	10863	
1999				5356	11065	
2000				5445	6611	
2001				2020	1536	
2002				3118	4154	
2003				5968	5520	
2004				6434	883	
2005				5239	505	
2006				2756	386	
2007				3347	2242	
2008				4222	2104	
2009				3241	1556	
2010				3404	907	
2011	46	67	88	1860	152	
2012	41	82	124	686	26	1.22
2013	232	314	396	889	1065	1.15
2014	239	291	342	1845	332	1.20
2015	349	406	463	2510	554	1.05
2016	257	355	452	2504	401	1.04
2017	626	722	818	4430	379	1.09
2018	497	598	700	3850	788	1.03

Year	Biomass index (kg hr^{-1})			Landings	Discards	Length indicator
	Low	Value	High			
2019	430	618	805	7782*	303	1.10
2020	287	356	424	5510*	130	1.10
2021	385	446	508	4095*	1117	1.04

* Including below minimum size (BMS) landings.

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

Fischer, S. H., De Oliveira, J. A. A., Mumford, J. D., and Kell, L. T. 2021. Application of explicit precautionary principles in data-limited fisheries management. ICES Journal of Marine Science, 78: 2931–2942. https://doi.org/10.1093/icesjms/fsab169

ICES. 2019. Workshop for harvest control component of long-term Management Plan for Rockall haddock (WKROCKMSE). ICES Scientific Reports, 1:59. 130 pp. http://doi.org/10.17895/ices.pub.5546

ICES. 2020. Benchmark Workshop on Rockall haddock (*Melanogrammus aeglefinus*) in Division 6.b (Rockall) (WKROCK; outputs from 2019 meeting). ICES Scientific Reports, 2:2. 69 pp. http://doi.org/10.17895/ices.pub.5547

ICES. 2022a. Advice on fishing opportunities. *In* Report of the ICES Advisory Committee, 2022. ICES Advice 2022, section 1.1.1. https://doi.org/10.17895/ices.advice.19928060

ICES. 2022b. Working Group for the Celtic Seas Ecoregion (WGCSE). ICES Scientific Reports. 4:45. http://doi.org/10.17895/ices.pub.19863796

ICES. 2022c. ICES technical guidance for harvest control rules and stock assessments for stocks in category 2 and 3. *In* Report of ICES Advisory Committee, 2022. ICES Advice 2022, Section 16.4.11. https://doi.org/10.17895/ices.advice.19801564

Download the stock assessment data and figures.

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