ICES Advice on fishing opportunities, catch, and effort
Celtic Seas and Oceanic Northeast Atlantic ecoregions
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Haddock (*Melanogrammus aeglefinus*) in Division 6.b (Rockall)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 5825 tonnes.

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

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

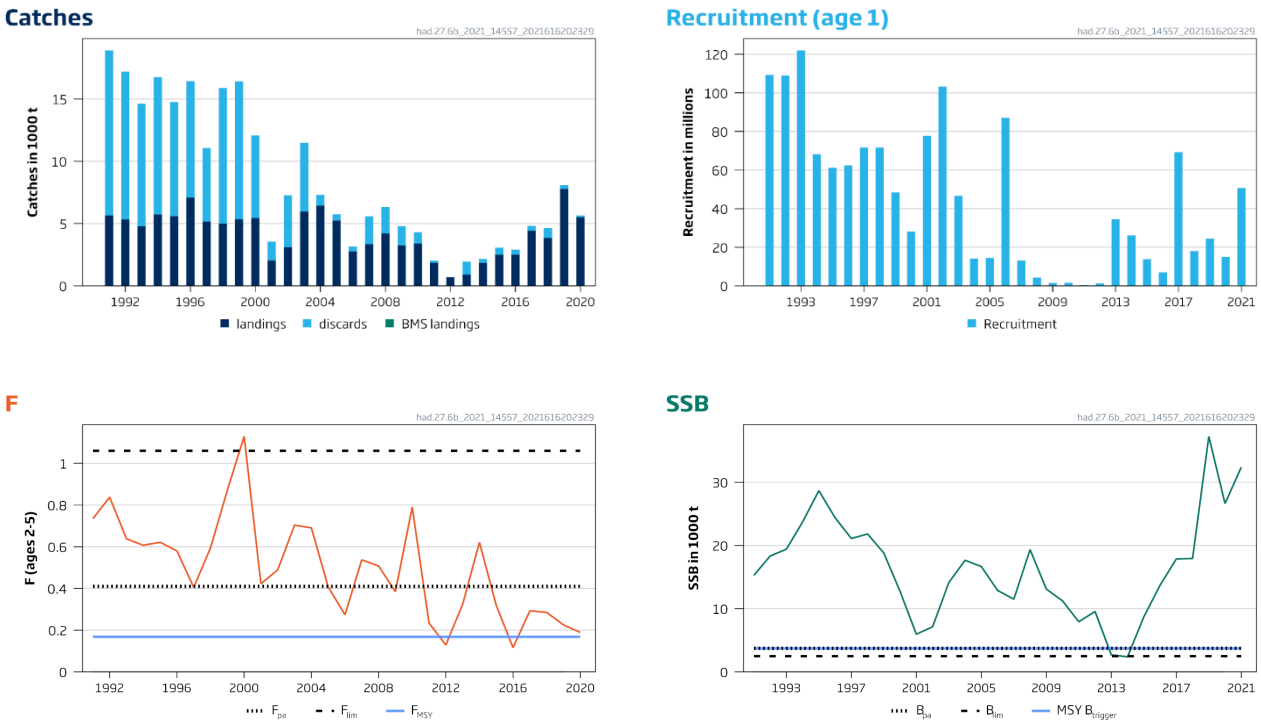

Figure 1 Haddock in Division 6.b. Summary of the stock assessment.

Catch scenarios

Table 1 Haddock in Division 6.b. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages2–5}$ (2021)	0.233	$F_{2021} = F_{average\ (2018–2020)}$
SSB 2022	29 717	Fishing at F_{2021}; in tonnes.
$R_{age\ 1}$ (2021)	50 739	Survey estimate in 2020 (RCT3); in thousands.
$R_{age\ 1}$ (2022)	13832	Recruitment corresponding to the 25th percentile rank of the recruitment time-series; in thousands.
Catch (2021)	6999	Fishing at F_{2021}; in tonnes.
Projected landings (2021)	6136	Assuming average landing patterns (2011–2020); in tonnes.
Projected discards (2021)	863	Assuming average discard patterns (2011–2020); in tonnes.

Table 2[†] Haddock in Division 6.b. Annual catch scenarios[‡]. All weights are in tonnes. No information on % TAC change is shown because the TAC area differs from the stock distribution area.

Basis	Total catch (2022)	Projected landings (2022)	Projected discards (2022)	F_{total} (2022)	$F_{projected\ landings}$ (2022)	$F_{projected\ discards}$ (2022)	SSB (2023)	% SSB change*	% advice change^
ICES advice basis									
MSY approach: F_{MSY}	5825	5052	773	0.168	0.135	0.033	44783	51	−6.6
Other scenarios									
NEAFC proposed management strategy 1^^	6335	5493	842	0.184	0.1479	0.0361	44144	49	1.54
NEAFC proposed management strategy 2^^^	6700	5809	891	0.195	0.157	0.0384	43687	47	7.4
F = 0	0	0	0	0	0	0	52100	75	−100
F_{pa}	12774	11040	1734	0.41	0.33	0.0805	36113	22	105
F_{lim}	25411	21770	3641	1.06	0.85	0.208	20605	−31	307
$SSB_{2023} = B_{lim}$	41377	34623	6754	3.80	3.05	0.7439	2474	−92	563
$SSB_{2023} = B_{pa} = MSY\ B_{trigger}$	40118	33680	6438	3.23	2.60	0.6346	3712	−88	543
$SSB_{2023} = SSB_{2022}$	17947	15462	2485	0.63	0.51	0.1241	29717	0	188
$F = F_{2021}$	7954	6902	1052	0.23	0.187	0.046	42684	44	27
F = MAP # $F_{MSY\ lower}$	3745	3251	494	0.105	0.084	0.021	47391	59	–40
F = MAP # $F_{MSY\ upper}$	8944	7746	1198	0.27	0.22	0.053	40883	38	43

* SSB 2023 relative to SSB 2022.
^ Advice value for 2022 relative to the advice value for 2021 (6239 tonnes).
^^ $TACF_{HCR}$ is derived from a two-step process: $F_{MSY} = 0.168$ followed by the TAC constraint "a", where the $TAC_{2022} = TAC_{FMSY} + 0.2 \times (TAC_{2021} - TAC_{FMSY})$. To calculate the catch scenario of the proposed management strategy, ICES uses the advised catches for 2021 as the TAC_{2021}; the formula for TAC_{2022}, therefore, corresponds to catches of 5825 + 0.2 × (8375−5825) =6335 tonnes.
^^^ MSY with TAC constraint "b", which implies no more than 20% below or 25% above of the TAC of preceding year (TAC_{y-1}).
# EU multiannual plan (MAP) for the Western Waters (EU, 2019).

The advice for 2022 is lower than the advice for 2021 because the perception of the stock has been revised downwards.

Basis of the advice

Table 3 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 has 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, 2019a). 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

Recent assessments have revised SSB downwards, while F has been revised upwards in 2018–2020.

At-sea observer sampling for discards remains sparse for Rockall haddock, which leads to uncertainty in fishery selectivity patterns and catch estimates data used in the assessment. The assessment model used (FLXSA) assumes catch is measured with no uncertainty and so does not account for this sampling issue.

[†] Version 2: Addition of the $F_{MSY\ lower}$ scenario.
[‡] Version 3: The NEAFC management strategy options have been updated using the agreed TAC for 2021 in the calculations.

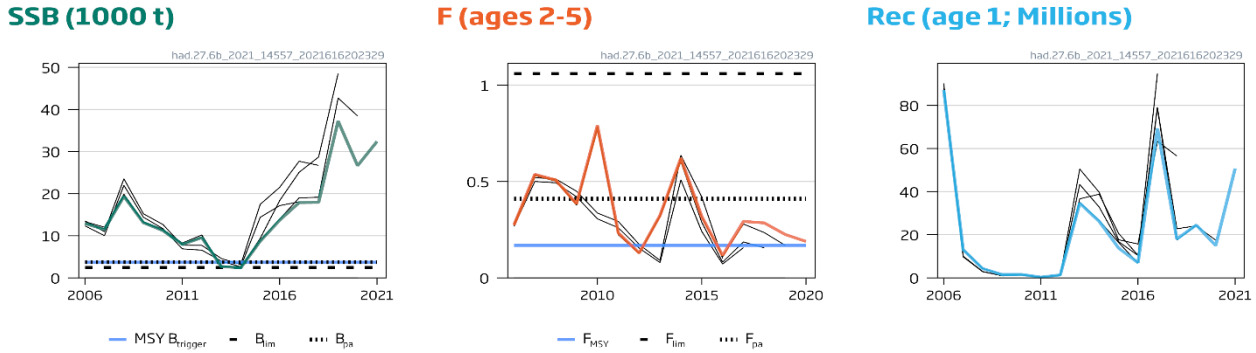

Figure 2 Haddock in Division 6.b. Historical assessment results. Historical assessment results (final-year SSB and recruitment estimates included). The assessment was benchmarked in 2019 (ICES, 2020).

Issues relevant for the advice

ICES provides advice based on the MSY approach because no existing precautionary management plan has been agreed by the relevant management authorities (EU, UK, and NEAFC). Catch options associated with the EU MAP and NEAFC management strategies are included in Table 2.

The spawning–stock biomass is projected to increase significantly in 2023 because the large 2020 year-class (age 1 in 2021) will all become mature.

Reference points

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

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	3712	$B_{pa;}$ in tonnes.	ICES (2019a)
	F_{MSY}	0.168	Segmented regression with B_{loss}, the lowest observed SSB (EqSim)	ICES (2019a)
Precautionary approach	B_{lim}	2474	$B_{lim} = B_{loss}$ = SSB in 2014, the lowest observed spawning–stock estimated in previous assessments; in tonnes.	ICES (2019a)
	B_{pa}	3712	$B_{pa} = B_{lim} \times 1.4$. This is considered to be the minimum SSB required to obtain a high probability (95%) of maintaining SSB above B_{lim}; in tonnes.	ICES (2019a)
	F_{lim}	1.06	Based on a 50% probability of being above B_{lim} in a stochastic simulation with a segmented regression using breakpoint at B_{lim}	ICES (2019a)
	F_{pa}	0.41	F_{P05}; the F that leads to SSB ≥ B_{lim} with 95% probability	ICES (2019a, 2021a)
Management plan*	SSB_{mgt}	372	B_{pa}; in tonnes.	ICES (2019a)
	F_{mgt}	0.168	F_{MSY}	ICES (2019a)
Management plan**	MAP MSY $B_{trigger}$	3712	MSY $B_{trigger}$; in tonnes.	ICES (2019a)
	MAP B_{lim}	2474	B_{lim}, in tonnes.	ICES (2019a)
	MAP F_{MSY}	0.168	F_{MSY}	ICES (2019a)
	EU MAP range F_{lower}	0.105	Consistent with range resulting in no more than 5% reduction in long-term yield compared with MSY (see methods in ICES (2016)	ICES (2019a)
	EU MAP range F_{upper}	0.27	Consistent with range resulting in no more than 5% reduction in long-term yield compared with MSY (see methods in ICES (2016).	ICES (2019a)

* Proposed NEAFC multiannual plan (MAP).
** The EU multiannual plan (MAP) for stocks in the Western Waters and adjacent has been agreed by the EU for this stock (EU, 2019).

Basis of the assessment

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

ICES stock data category	1 (ICES, 2021b)
Assessment type	Age-structured model (FLXSA) that uses catches in the model and in the forecast (ICES, 2021a)
Input data	Commercial landings, estimated discards, age composition of catches; one survey index (Rock-WIBTS-Q3 [G4436]); fixed maturity ogive (knife-edge at age 3), fixed natural mortality (0.2)
Discards and bycatch	Discards are included in the assessment
Indicators	Russian trawl-acoustic survey and the trawl survey-based assessment, statistical catch-at-age analysis (StatCam analytical model) and SAM assessment
Other information	This stock was benchmarked in 2019 (ICES, 2020)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

Table 6 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	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	13228
1992	Precautionary TAC	3800			4520	5321	11871
1993	80% of F (91)	3000			4113	4781	9853
1994	If required, precautionary TAC	-			3735	5732*	11023
1995	No long-term gain in increasing F	5100**			5491	5587	9168
1996	No long-term gains in increasing F	6900**			6818	7072	9356
1997	No advice given	4900**			5220	5167	5894
1998	No increase in F	4900			5098	4986	10862
1999	Reduce F below F_{pa}	3800	-		5990	5356	11062
2000	Reduce F below F_{pa}	< 3500	-		5688	5445	6609
2001	Reduce F below F_{pa}	< 2700	-		2315	2020	1535
2002	Reduce F below 0.2	< 1300	-		3037	3118	4152
2003	Lowest possible F	-	-		6148	5968	5521
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	4221	4222	2100
2009	No long-term gains in increasing F^	-	< 4300	5879	3445	3241	1557
2010	No long-term gains in increasing F^	-	< 3300	4997	3405	3404	306
2011	See scenarios	-		3748	1903	1860	152
2012	MSY approach	-	< 3300	3300	710	686	16
2013	No directed fisheries, minimize bycatch and discards	0	0	990	826	889	1143
2014	MSY approach	< 1620	< 980	1210	1675	1845	274

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	Discards
2015	MSY approach	< 4310	< 2930	2580	2445	2510	527
2016	MSY approach	≤ 3932	≤ 3225	3225	2585	2504	301
2017	MSY approach	≤ 4690	≤ 4130	4690	4610	4430	396
2018	MSY approach	≤ 5163		5163	3868	3850	788
2019	MSY approach	≤ 10469		10469	7686#	7782^^^	302
2020	MSY approach	≤ 10472		10472	5401#	5512^^^	131
2021	MSY approach	≤ 6239		8375			
2022	MSY approach	≤ 5825					

* Including misreporting.
** Landings at *status quo* F.
^ 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.
# Preliminary.
n/a = Not available.

History of the catch and landings

Table 7 Haddock in Division 6.b. Catch distribution by fleet in 2020 as estimated by ICES.

Catch =	Landings*		Discards
5643 tonnes	Otter trawl > 99%	Longline < 1%	131 tonnes
	5512 tonnes		

*Including BMS landings.

Table 8 Haddock in Division 6.b. History of commercial catch and landings. All weights are in tonnes.

Year	Faroe Islands	France	Iceland	Ireland	Norway	Portugal	Russian Federation	Spain	UK (E,W, & NI)	UK (Scot.)	Total	Unallocated catch	Landings from NEAFC area	ICES landings estimate
1996	-	-**	-	747	24	-	-	1	293	5753	6818	−543	n/a	6275
1997	-	-	+	895	24	-	-	22	165	4114	5220	−591	n/a	4629
1998	-	-	-	704	40	4	-	21	561	3768	5098	−599	n/a	4499
1999	-	-	167	1021	61	-	458	25	288	3970	5990	−851	n/a	5139
2000	n/a	5	-	824	152	-	2154	47	36	2470	5688	−357	n/a	5331^
2001	n/a	2	-	357	70	-	630	51	-	1205	2315	−279	n/a	2036^
2002	-	-	-	206	49	-	1630	7	-	1145	3037	299	n/a	3336^
2003	-	1	-	169	60	-	4237	19	56	1607	6148	94^^	n/a	6242^
2004	-	-	-	19	32	-	5844	-	-	411***	6306	139^^	n/a	6445
2005	-	-	-	105	33	-	4708	-	-	332***	5178	1	n/a	5179
2006	2	-	-	41	123	-	2154	5	-	440***	2765	0	n/a	2765
2007	2	-	-	338	84	-	1282	-	-	1643***	3349	0	n/a	3349
2008	16	-	-	721	36	-	1669	-	-	1779***	4221	0	n/a	4221
2009	16	-	-	352	71	-	55	-	-	2951***	3445	0	n/a	3445
2010	42	-	-	169	65	-	198	-	-	2931***	3405	0	n/a	3405
2011	2	< 1	-	123	40	-	-	-	-	1738***	1903	0	n/a	1903
2012	53	-	-	31	48	-	1	-	-	577***	710	0	26	710
2013	-	-	-	105	121	-	4	-	-	596	826	0	91	826
2014	1	2	-	95	38	-	388	-	-	1152	1675	0	86	1675
2015	1	-	-	190	66	-	136	-	-	2052	2445	0	202	2445
2016	-	-	-	362	63	-	-	-	-	2160	2585^^^	0	624	2585^^^
2017	-	-	-	500	26		153			3930	4610	0	309	4610
2018				433	16		-			3418	3868	0	494	3868
2019*		8		888	13		245	1		6542	7686^^^	0	804	7782^^^
2020*		2		679	14		133			4573	5401^^^	0	791	5512^^^

* Preliminary official landings.
** Included in Division 6.a.
*** Includes UK England, Wales, and N. Ireland landings.
^ Includes the total Russian catch.
^^ Non-official.
^^^ Including below minimum size (BMS) landings.
n/a = Not available.

Summary of the assessment

Table 9 Haddock in Division 6.b. Assessment summary. Weights are in tonnes and recruitment in thousands.

Year	Recruitment age 1	SSB	Landings**	BMS Landings	Discards	F ages (2–5)
1991	109360	15262	5656		13240	0.73
1992	109018	18330	5321		11878	0.84
1993	122000	19413	4781		9858	0.64
1994	68239	23717	5732		11030	0.61
1995	61263	28673	5587		9173	0.62
1996	62421	24381	7072		9365	0.58
1997	71666	21100	5167		5900	0.41
1998	71678	21820	4986		10903	0.59
1999	48438	18792	5356		11066	0.87
2000	28113	12719	5445		6637	1.13
2001	77850	5957	2020		1536	0.42
2002	103304	7124	3118		4158	0.49
2003	46702	14136	5968		5522	0.70
2004	14155	17658	6434		883	0.69
2005	14462	16666	5239		505	0.41
2006	87139	12890	2756		386	0.27
2007	13054	11497	3347		2242	0.54
2008	4312	19346	4222		2104	0.51
2009	1564	13098	3241		1556	0.38
2010	1588	11223	3404		907	0.79
2011	340	7926	1860		152	0.23
2012	1355	9554	686		29	0.129
2013	34615	2688	889		1065	0.32
2014	26176	2378	1845		332	0.62
2015	13832	8706	2510		554	0.32
2016	7016	13694	2504	< 0.5	401	0.116
2017	69342	17871	4430		379	0.29
2018	18051	17927	3850		788	0.28
2019	24499	37243	7778	4	303	0.23
2020	14947	26630	5510	2	131	0.189
2021	50739*	32393				

* Year class strength prediction based on survey estimate in 2020 (RCT3).
** ICES landings estimate without BMS landings

Sources and references

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Download the stock assessment data and figures.

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