

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

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2017 should be no more than 4690 tonnes. If this stock is not under the EU landing obligation in 2017 and discard rates do not change from the average of the recent ten years (2006–2015), this implies landings of no more than 4130 tonnes.

Stock development over time

The spawning-stock biomass (SSB) has increased from the lowest observed in 2014 and is estimated to be above MSY $B_{trigger}$ in 2015. Fishing mortality (F) has declined over time but has been above F_{MSY} since 2014. Recruitment during 2008–2012 is estimated to be extremely weak. Recruitment improved in 2013–2014 and decreased again in 2015.

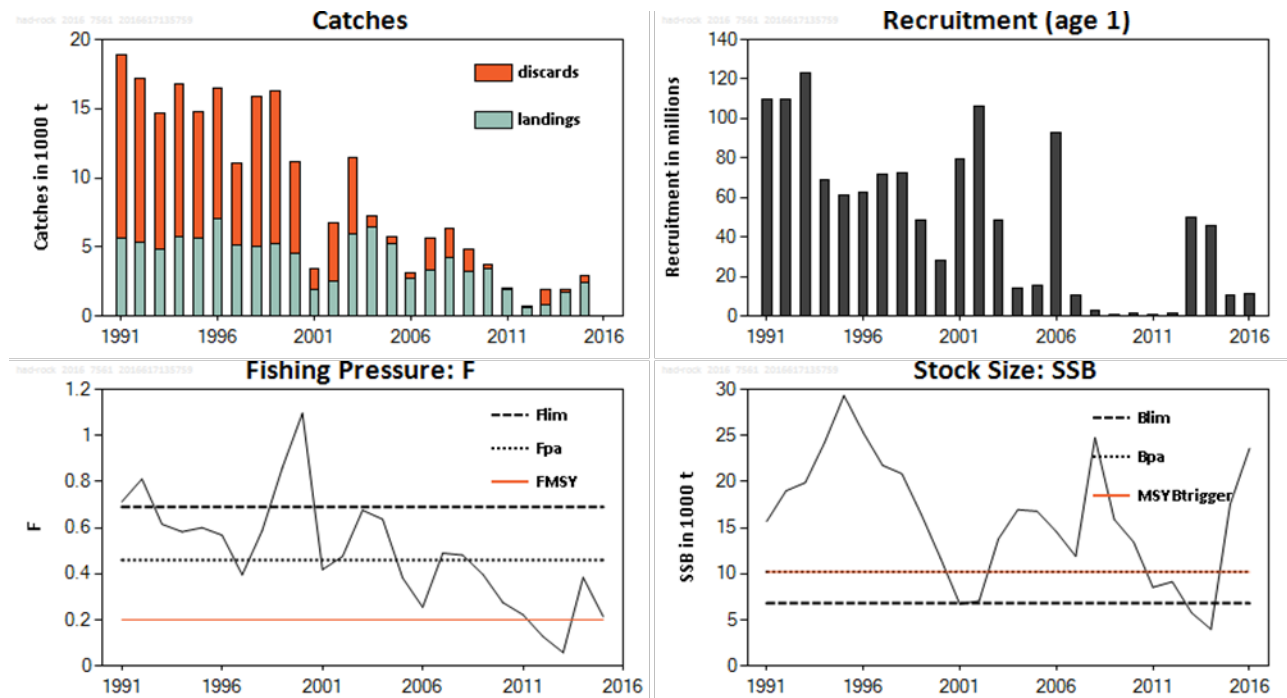


Figure 5.3.28.1 Haddock in Division 6.b. Summary of stock assessment (weights in thousand tonnes).

Stock and exploitation status

Table 5.3.28.1 Haddock in Division 6.b. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	F_{MSY}	✓	✗	✗ Above	MSY	✗	✓ Above trigger
Precautionary approach	F_{pa} , F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa} , B_{lim}	✗	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	– Not applicable	SSB_{MGT}	–	– Not applicable

Catch options

Table 5.3.28.2 Haddock in Division 6.b. The basis for the catch options.

Variable	Value	Notes	Source
F ages 2–5 (2016)	0.1429	F consistent with the estimate catch in 2016	ICES (2016a)
SSB (2017)	25 225 t	Short-term forecast	ICES (2016a)
R _{age 1} (2016)	11 287 thousands	RCT3 estimate	ICES (2016a)
R _{age 1} (2017)	10 633 thousands	25th percentile of the recruitment time-series	ICES (2016a)
Catch (2016)	4332 t	Short-term forecast	ICES (2016a)
Landings (2016)	3602 t	EU TAC 3225 t + estimated Russian catch 377 t	ICES (2016a)
Discards (2016)	703 t	EU discards, based on mean discard rate-at-age for the period 2006–2015	ICES (2016a)

Table 5.3.28.3 Haddock in Division 6.b. The catch options. Weights are in thousand tonnes.

Rationale	Catch (2017)	Wanted catch* (2017)	Unwanted catch* (2017)	Basis	F total (2017)	F wanted catch* (2017)	F unwanted catch* (2017)	SSB (2018)	% SSB change**	% TAC change***
MSY approach	4.69	4.13	0.56	F _{MSY}	0.20	0.15	0.05	23.5	-7	15
Precautionary approach	9.47	8.33	1.14	F _{pa}	0.46	0.36	0.12	18.1	-28	131
Proposed management strategy	4.54	4.00	0.54	F _{HCR} [^]	0.19	0.13	0.04	23.7	-6	11
Zero catch	0.00	0.00	0.00	F = 0	0.00	0.00	0.00	28.9	15	-100
Other options	3.34	2.94	0.40	-15% catch ₂₀₁₆ ^{^^}	0.14	0.10	0.03	25.0	-1	-18
	3.93	3.46	0.47	Catch ₂₀₁₆ ^{^^}	0.16	0.13	0.04	24.4	-3	-4
	4.69	4.13	0.56	average F _{2011–2015}	0.2012	0.15	0.05	23.5	-7	15
	4.52	3.98	0.54	+15% catch ₂₀₁₆ ^{^^}	0.19	0.13	0.04	23.7	-6	10
	16.87	14.76	2.11	SSB ₂₀₁₈ = B _{pa} = MSY B _{trigger}	1.08	0.82	0.27	10.2	-60	310
	20.31	17.70	2.61	SSB ₂₀₁₈ = B _{lim}	1.57	1.18	0.39	6.8	-73	391
	12.75	11.19	1.56	F _{lim}	0.69	0.53	0.17	14.5	-43	211

* “Wanted catch” is used to describe fish that would be landed in the absence of the EU landing obligation. The “unwanted catch” refers to the component that was previously discarded (ICES, 2016b). The split into wanted and unwanted catch is based on the average ratio (at age) of discards to catches over the period 2006–2015.

** SSB 2018 relative to SSB 2017.

*** Wanted catch in 2017 relative to the EU TAC 2016 + Russian catches in 2016.

[^] F_{HCR} derived from a two-step process: F = 0.2 followed by the TAC constraint, where the TAC₂₀₁₇ = TAC_{F=0.2} + 0.2 × (TAC₂₀₁₆ – TAC_{F=0.2}). To calculate the catch option of the proposed management strategy, ICES uses the advised catches for 2016 as the TAC₂₀₁₆; therefore, the formula for TAC₂₀₁₆ corresponds to catches of 4690 + 0.2 × (3932 – 4690) = 4538 t.

^{^^} Relative to the ICES catch advice for 2016 for this stock, given in 2015.

Basis of the advice

Table 5.3.28.4 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. A management strategy is under consideration and not yet adopted. The strategy was evaluated by ICES in 2013 (ICES, 2013). ICES concluded that a maximum F value of 0.2 in the harvest control rule was required to ensure consistency with the precautionary approach under low recruitment conditions.

Quality of the assessment

The current assessment is consistent with the one from last year. The number of sampled trips for landings and discards in later years has been very low. Haddock abundance for age 4 years and older is low. This leads to higher variability in catch and survey estimates of those year classes, increasing the uncertainty in F. Therefore, five-year average values were used in the catch options.



Figure 5.3.28.2 Haddock in Division 6.b. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

A discard ban has been in place in the NEAFC regulatory area since 2009.

Reference points

Table 5.3.28.5 Haddock in Division 6.b. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	10 200 t	B_{pa} .	ICES (2016c)
	F_{MSY}	0.2	Segmented regression with B_{loss} , the lowest observed spawning-stock biomass (Eqsim).	ICES (2016c)
Precautionary approach	B_{lim}	6 800 t	$B_{lim} = B_{loss}$, the lowest observed spawning stock estimated in previous assessments.	ICES (2016d)
	B_{pa}	10 200 t	$B_{pa} = B_{lim} \times 1.5$. This is considered to be the minimum SSB required to obtain a high probability (95%) of maintaining SSB above B_{lim} , taking into account the uncertainty of assessments.	ICES (2016d)
	F_{lim}	0.69	Based on a 50% probability of being above B_{lim} in a stochastic simulation with a segmented regression using breakpoint at B_{lim}	ICES (2016d)
	F_{pa}	0.46	$F_{pa} = F_{lim}/1.5$	ICES (2016d)
Management plan	SSB_{MGT}	10 200 t	B_{pa}	ICES (2013)
	F_{MGT}	0.2	Based on harvest control rule evaluations.	ICES (2013)

Basis of the assessment

Table 5.3.28.6 Haddock in Division 6.b. The basis of the assessment.

ICES stock data category	1 (ICES, 2016b)
Assessment type	Analytical age-based assessment (XSA) that uses catches in the model and in the forecast.
Input data	Commercial landings, estimated discards, age composition of catches; one survey index (Rock-WIBTS-Q3); fixed maturity ogive (knife-edge at age 3), fixed natural mortality (0.2).
Discards and bycatch	Discards are included in the assessment, based on the main fleets.
Indicators	Russian trawl-acoustic survey and the trawl survey-based assessment, statistical catch-at-age analysis (StatCam analytical model).
Other information	A benchmark is planned for 2017
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. The sampling coverage is now more likely to reflect fishing patterns, although the number of samples remains low. Increasing observer coverage of catches at Rockall, including the collection of age data from the landing component of the catch during observer trips will help improve the overall biological sampling for the stock.

History of the advice, catch, and management

Table 5.3.28.7 Haddock in Division 6.b. History of ICES advice, the agreed TAC, and ICES estimates of landings. Weights are in thousand tonnes.

Year	ICES advice Single-stock exploitation boundaries from 2004 onwards	Predicted catch corresp.to advice	Predicted landings corresp. to advice	Agreed TAC ^{^^^}	Official landings	ICES landings	Discards
1987	Precautionary TAC	10.0			8.0	8.4	n/a
1988	Precautionary TAC	10.0			7.6	7.9	n/a
1989	<i>Status quo</i> F; TAC	18.0			6.6	6.7	n/a
1990	Precautionary TAC	5.5			8.2	3.9	n/a
1991	Precautionary TAC	5.5			5.9	5.7	13.23
1992	Precautionary TAC	3.8			4.5	5.3	11.87
1993	80% of F(91)	3.0			4.1	4.8	9.85
1994	If required, precautionary TAC	-			3.7	5.7*	11.02
1995	No long-term gain in increasing F	5.1**			5.5	5.6	9.17
1996	No long-term gains in increasing F	6.9**			6.8	7.1	9.36
1997	No advice given	4.9**			5.2	5.2	5.89
1998	No increase in F	4.9			5.1	4.5	10.86
1999	Reduce F below F_{pa}	3.8	-		6.0	5.1	11.06
2000	Reduce F below F_{pa}	< 3.5	-		5.7***	5.3 [^]	6.61
2001	Reduce F below F_{pa}	< 2.7	-		2.3***	2.0 [^]	1.54
2002	Reduce F below 0.2	< 1.3	-		3.0	3.3	4.15
2003	Lowest possible F	-	-		6.1	6.2	5.52
2004	Lowest possible catch ^{^^}		-	0.702	6.3	6.4	0.88
2005	Lowest possible catch ^{^^}		-	0.702	5.2	5.2	0.51
2006	Lowest possible catch ^{^^}		-	0.597	2.8	2.8	0.39
2007	Reduce F below F_{pa} ^{^^}	< 7.11	-	4.615	3.3	3.3	2.24
2008	Keep F below F_{pa} ^{^^}	< 10.6	-	6.916	4.2	4.2	2.10

Year	ICES advice Single-stock exploitation boundaries from 2004 onwards	Predicted catch corresp.to advice	Predicted landings corresp. to advice	Agreed TAC ^{^^^}	Official landings	ICES landings	Discards
2009	No long-term gains in increasing F ^{^^}	-	< 4.3	5.879	3.8	3.8	1.56
2010	No long-term gains in increasing F ^{^^}	-	< 3.3	4.997	3.4	3.4	0.31
2011	See scenarios	-		3.748	1.9	1.9	0.15
2012	MSY approach	-	< 3.3	3.300	0.7	0.7	0.02
2013	No directed fisheries, minimize bycatch and discards	0	0	0.99	0.8	0.8	1.1
2014	MSY approach	< 1.62	< 0.98	1.21	1.7	1.7	0.3
2015	MSY approach	< 4.31	< 2.93	2.580	2.5	2.4	0.5
2016	MSY approach	≤ 3.932	≤ 3.225 [#]	3.225			
2017	MSY approach	≤ 4.69	≤ 4.13				

n/a = not available.

* Including misreporting.

** Landings at *status quo* F.

*** Incomplete data.

[^] Discards are not taken into account for the assessment, and data of the Russian fleet that lands the whole catch were adjusted to exclude fish below MLS of 30 cm.

^{^^} 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 TAC for Division 6.b and subareas 12 and 14.

[#] Wanted catch.

History of catch and landings

Table 5.3.28.8 Haddock in Division 6.b. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)	Landings		Discards
	Trawl	Longline	Trawl
2972 t	97%	3%	100%
	2445 t		527 t

Table 5.3.28.9 Haddock in Division 6.b. History of landings; the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Faroe Islands	France	Iceland	Ireland	Norway	Portugal	Russian Federation	Spain	UK (E,W&NI)	UK (Scot.)	Total	Unallocated catch	ICES landings estimate
1996	-	-**	-	747	24	-	-	1	293	5753	6818	-543	6275
1997	-	-	+	895	24	-	-	22	165	4114	5220	-591	4629
1998	-	-	-	704	40	4	-	21	561	3768	5098	-599	4499
1999	-	-	167	1021	61	-	458	25	288	3970	5990	-851	5139
2000	n/a	5	-	824	152	-	2154	47	36	2470	5688	-357	5331 [^]
2001	n/a	2	-	357	70	-	630	51	-	1205	2315	-279	2036 [^]
2002	-	-	-	206	49	-	1630	7	-	11 453	3037	299	3336 [^]
2003	-	1	-	169	60	-	4237	19	56	1607	6148	94 ^{^^}	6242 [^]
2004	-	-	-	19	32	-	5844	-	-	411***	6306	139 ^{^^}	6445
2005	-	-	-	105	33	-	4708	-	-	332***	5178	1	5179
2006	2	-	-	41	123	-	2154	5	-	440***	2765	0	2765
2007	2	-	-	338	84	-	1282	-	-	1643***	3349	0	3349
2008	16	-	-	721	36	-	1669	-	-	1779***	4221	0	4221

Year	Faroe Islands	France	Iceland	Ireland	Norway	Portugal	Russian Federation	Spain	UK (E,W&NI)	UK (Scot.)	Total	Unallocated catch	ICES landings estimate
2009	16	-	-	352	71	-	55	-	-	2951***	3445	0	3445
2010	42	-	-	169	65	-	198	-	-	2931***	3405	0	3405
2011	2	< 1	-	123	40	-	-	-	-	1738***	1903	0	1903
2012	53	-	-	31	48	-	1	-	-	577***	710	0	710
2013	-	-	--	105	121	-	4	-	--	596	826	0	826
2014	1	2		95	38		388			1152	1675	0	1675
2015*	1			190	66		136			2052	2445	0	2445

* Preliminary.

** Included in Division 6.a.

*** Includes UK England, Wales, and N. Ireland landings.

^ Includes the total Russian catch.

^^ Non-official.

n/a = not available.

Summary of the assessment

Table 5.3.28.10 Haddock in Division 6.b. Assessment summary.

Year	Recruitment at age 1 (thousands)	SSB (tonnes)	Landings (tonnes)	Discards (tonnes)	Mean F Ages (2–5)
1991	109 846	15 679	5655	13 228	0.713
1992	109 500	18 986	5320	11 871	0.811
1993	123 014	19 882	4784	9853	0.615
1994	68 640	24 233	5733	11 023	0.582
1995	61 422	29 325	5587	9168	0.6
1996	62 517	25 297	7075	9356	0.567
1997	71 771	21 760	5166	5894	0.395
1998	72 553	20 841	4984	10 862	0.588
1999	48 739	16 445	5221	11 062	0.86
2000	28 231	11 689	4558	6609	1.096
2001	79 660	6718	1918	1535	0.418
2002	106 180	7052	2571	4152	0.475
2003	48 686	13 776	5961	5521	0.676
2004	14 198	16 944	6400	883	0.636
2005	15 644	16 779	5191	505	0.382
2006	92 765	14 558	2759	386	0.255
2007	10 444	11 890	3348	2242	0.489
2008	3131	24 745	4205	2100	0.48
2009	1097	15 883	3237	1557	0.397
2010	1466	13 437	3404	306	0.275
2011	523	8530	1905	152	0.222
2012	1239	9131	710	16	0.128
2013	50 139	5766	825	1143	0.058
2014	46 030	3985	1675	274	0.384
2015	10 633	17 560	2445	527	0.214
2016	11 287*	23 605			
Average	48 052	15 942	4025	4809	0.493

*RCT3 estimate.

Sources and references

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