5.3.14 Haddock (*Melanogrammus aeglefinus*) in Division VIb (Rockall)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2016 should be no more than 3932 tonnes. If this stock is not under the EU landing obligation in 2016 and discard rates do not change from the average of the recent nine years (2006–2014), this implies landings of no more than 3225 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 increased to above the F_{MSY} and F_{pa} in 2014. Recruitment during 2008–2012 is estimated to be extremely weak. Recruitment has improved since then but is still lower than the values estimated at the beginning of the time-series.

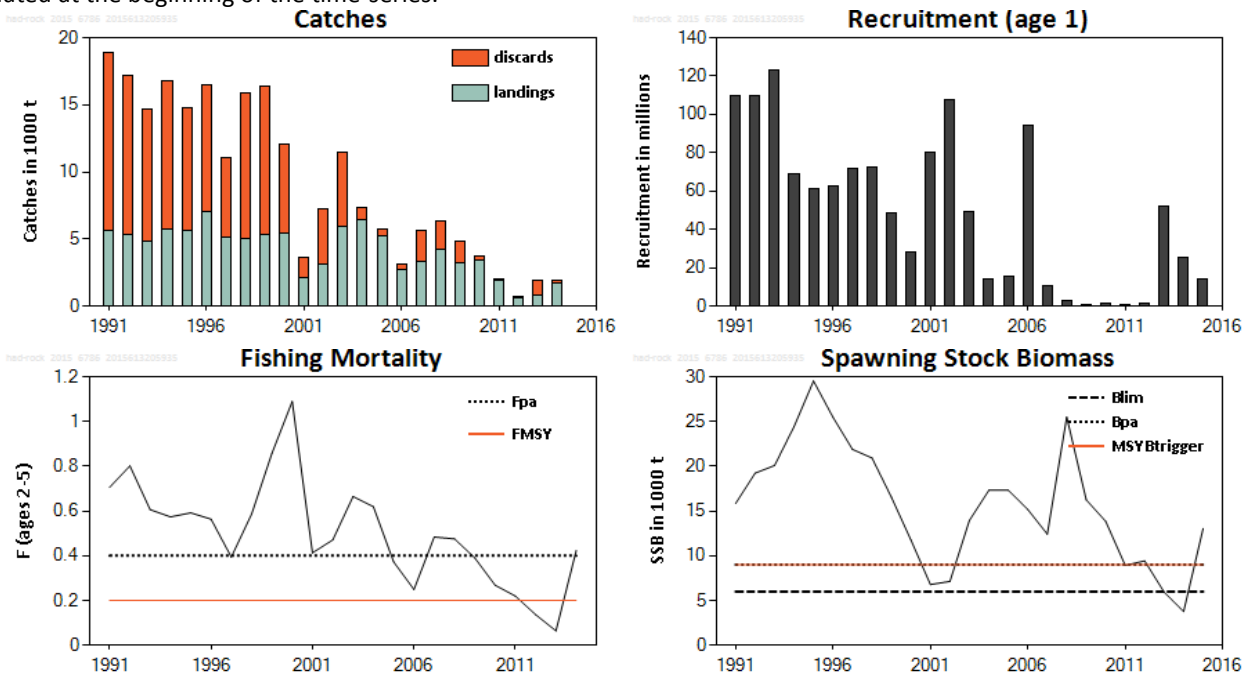

Figure 5.3.14.1 Haddock in Division VIb. Summary of stock assessment (weights in thousand tonnes).

Stock and exploitation status

Table 5.3.14.1 Haddock in Division VIb. State of the stock and fishery, relative to reference points.

		Fishing pressure					Stock size				
		2012	2013	2014			2013	2014	2015	
Maximum Sustainable Yield	F_{MSY}	✓	✓	✗	Above	MSY $B_{trigger}$	✗	✗	✓	Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	○	Increased risk	B_{pa}, B_{lim}	✗	✗	✓	Full reproductive capacity
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable

Catch options

Table 5.3.14.2 Haddock in Division VIb. The basis for the catch options.

Variable	Value	Source	Notes
F ages 2–5 (2015)	0.21	ICES (2015a)	Total catch constraint
SSB (2016)	17098	ICES (2015a)	
$R_{age\ 1}$ (2015)	14377	ICES (2015a)	RCT3 estimate
$R_{age\ 1}$ (2016)	10545	ICES (2015a)	Rank of 25% percentile of the recruitment time-series
Catch (2015)	4052	ICES (2015a)	
Landings (2015)	2988	ICES (2015a)	EU TAC 2580 t + estimated Russian catch 408 t
Discards (2015)	1064	ICES (2015a)	EU discards, based on mean discard rate-at-age for the period 2006–2014

Table 5.3.14.3 Haddock in Division VIb. The catch options. Weights in tonnes.

Rationale	Catch (2016)	Wanted catch* (2016)	Unwanted catch* (2016)	Basis	F total (2016)	F wanted catch* (2016)	F unwanted catch* (2016)	SSB (2017)	%SSB change**	%TAC change ***
MSY approach	3932	3225	707	F_{MSY}	0.20	0.14	0.06	17871	+5%	+8%
Precautionary approach	7013	5740	1273	F_{pa} = 0.4	0.40	0.29	0.11	14294	−16%	+92%
Proposed management strategy	4007	3287	720	F_{HCR}^	0.21	0.15	0.06	17779	+4%	+10%
Zero catch	0	0	0	F = 0	0.00	0.00	0.00	22496	+32%	−100%
Other options	3664	3006	658	−15% catch advice change^^	0.18	0.13	0.05	18181	+6%	+1%
	4310	3534	776	Stable catch advice^^	0.22	0.16	0.06	17426	+2%	+18%
	4312	3536	776	average $F_{2010–2014}$	0.22	0.16	0.06	17424	+2%	+18%
	4956	4063	893	+15% catch advice change^^	0.26	0.19	0.07	16673	−2%	+36%

* "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, 2015b). The split into wanted and unwanted catch is based on the average ratio (at age) of discards to catches over the period 2006–2014.

** SSB 2017 relative to SSB 2016.

*** Wanted catch in 2016 relative to the EU TAC 2015 + Russian catches in 2015.

^ F_{HCR} derived from a two-step process: F = 0.2 followed by the TAC constraint, where the $TAC_{2016} = TAC_{F=0.2} + 0.2 \times (TAC_{2015} - TAC_{F=0.2})$. To calculate the catch option of the proposed management strategy, ICES uses the advised catches for 2015 as the TAC2015; therefore, the formula for TAC_{2016} corresponds to catches of 3932 + 0.2 x (4310 – 3932) = 4007 t.

^^ Relative to the ICES catch advice for this stock given in 2014 for 2015.

Basis of the advice

Table 5.3.14.4 Haddock in Division VIb. 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 HCR was required to ensure consistency with the precautionary approach under low recruitment conditions.

Quality of the assessment

The current assessment is consistent with last year's, but the final estimate of fishing mortality is very uncertain. The number of sampled discard trips in the last years has been very low. Haddock at age 3 years and older are rare in samples because the year classes were very weak. This also increases the uncertainty in F. Therefore, in the catch options five-year average values were used and a catch constraint applied in the intermediate year (2015). The catch constraint value is close to the ICES advice for 2015.

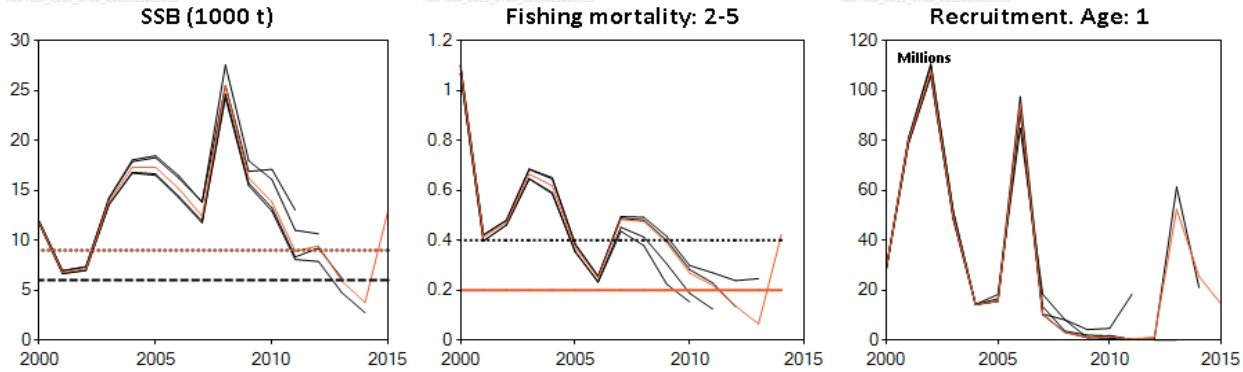

Figure 5.3.14.2 Haddock in Division VIb. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

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

Reference points

Table 5.3.14.5 Haddock in Division VIb. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	9000 t	B_{pa}.	ICES (2010)
	F_{MSY}	0.2	Based on stochastic simulations (ICES, 2013).	ICES (2014)
Precautionary approach	B_{lim}	6000 t	$B_{lim} = B_{loss}$, the lowest observed spawning stock estimated in previous assessments.	ICES (1998)
	B_{pa}	9000 t	$B_{pa} = B_{lim} \times 1.5$. This is considered to be the minimum SSB required to obtain a high probability of maintaining SSB above B_{lim}, taking into account the uncertainty of assessments.	ICES (1998)
	F_{lim}	Not defined.	Not defined due to uninformative stock recruitment data.	
	F_{pa}	0.4	This F is adopted by analogy with other haddock stocks as the F that provides a small probability that SSB will fall below B_{pa} in the long term.	ICES (1998)
Management plan	SSB_{MGT}	Not defined.		
	F_{MGT}	Not defined.		

Basis of the assessment

Table 5.3.14.6 Haddock in Division VIb. The basis of the assessment.

ICES stock data category	1 (ICES, 2015b).
Assessment type	Analytical age-based assessment (XSA) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, ages and length frequencies from catch and landing samplings); one survey index (Rock-WIBTS-Q3); fixed maturity ogive (knife-edge at age 3), fixed natural mortality (0.2).
Discards and bycatch	Discards were 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	None.
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE).

Information from stakeholders

Since 2014, there has been effort to improve coverage by the Scottish industry/science observer sampling scheme in Subareas IV and VI. The sampling coverage now is more likely to reflect fishing patterns.

History of advice, catch, and management

Table 5.3.14.7 Haddock in Division VIb. History of ICES advice, the agreed TAC, and ICES estimates of landings. Weights 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	*Status quo* 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
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^^^			
2016	MSY approach	≤ 3.932	≤ 3.225[#]				

* 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 VIb and Subareas XII and XIV.

n/a = Not available.

[#] Wanted catch.

History of catch and landings

Table 5.3.14.8 Haddock in Division VIb. Catch distribution by fleet in 2014 as estimated by ICES.

Catch (2014)	Landings		Discards
1949 t	98% trawl	2% longline	274 t (16% by weight and 48% by numbers), all trawl
	1675 t		

Table 5.3.14.9 Haddock in Division VIb. History of commercial catch and landings; both 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	-	11453	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
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

* Preliminary.
** Included in Division VIa.
*** Includes UK England, Wales, and N. Ireland landings.
^ Includes the total Russian catch.
^^ Non-official.
n/a = not available.

Summary of the assessment

Table 5.3.14.10 Haddock in Division VIb. Assessment summary.

Year	Recruitment age 1 thousands	SSB (tonnes)	Landings (tonnes)	Discards (tonnes)	Mean F Age range (2–5)
1991	110072	15833	5655	13228	0.71
1992	109691	19224	5320	11871	0.80
1993	123125	20082	4784	9853	0.61
1994	68776	24440	5733	11023	0.57
1995	61462	29525	5587	9168	0.59
1996	62546	25453	7075	9356	0.56
1997	71810	21876	5166	5894	0.39
1998	72670	20918	4984	10862	0.59
1999	48789	16520	5221	11062	0.86
2000	28303	11743	4558	6609	1.09
2001	80232	6778	1918	1535	0.41
2002	107607	7126	2571	4152	0.47
2003	49463	13932	5961	5521	0.66
2004	14220	17317	6400	883	0.62
2005	15637	17316	5191	505	0.37
2006	94216	15168	2759	386	0.25
2007	10545	12411	3348	2242	0.48
2008	3179	25480	4205	2100	0.48
2009	1082	16236	3237	1557	0.39
2010	1343	13837	3404	306	0.27
2011	414	8918	1905	152	0.22
2012	1209	9430	710	16	0.14
2013	52430	5924	825	1143	0.06
2014	25564	3763	1675	274	0.42
2015	14377*	13052			
Average	50599	15802	4091	4987	0.5008

*RCT3 estimate.

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