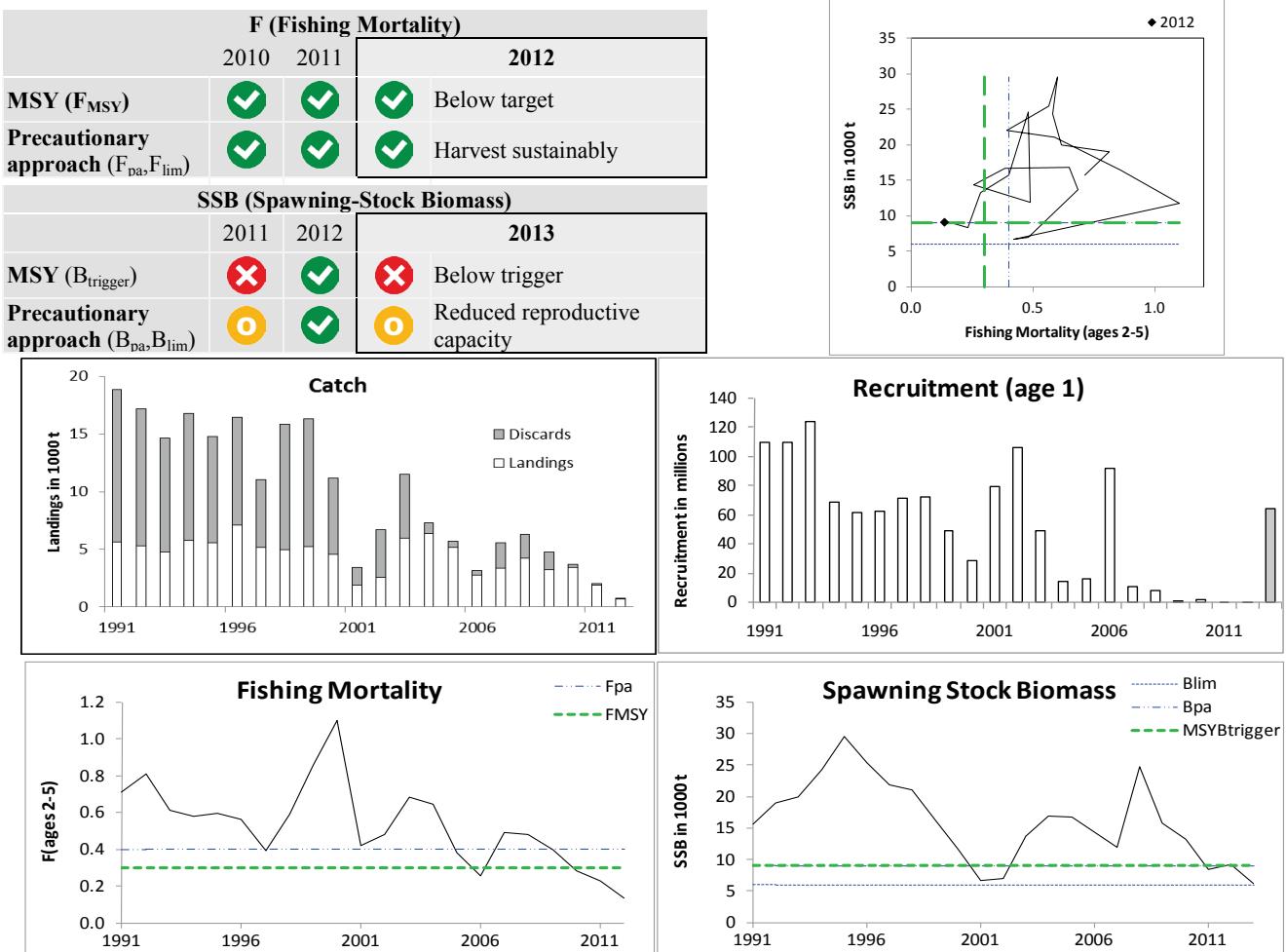


ECOREGION STOCK Celtic Sea and West of Scotland
Haddock in Division VIb (Rockall)
Advice for 2014

ICES advises on the basis of the MSY approach that catches should be no more than 1620 t in 2014. If discard rates (at age) do not change from the average of the last seven years (2006–2012), this implies landings of no more than 980 t.

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

Stock status**Figure 5.4.9.1**

Haddock in Division VIb (Rockall). Summary of stock assessment (weights in thousand tonnes). Predicted recruitment values are shaded. Top right: SSB and F for the time-series used in the assessment.

The spawning-stock biomass increased up to 2008 as a result of the 2001 and 2005 year classes but has decreased constantly since then. SSB in 2013 is below B_{pa} . Fishing mortality has declined over time and is now below the F_{MSY} proxy. Recruitment during 2007–2012 is estimated to be extremely weak. The 2013 survey data indicate that the 2012 year class (corresponding to the 2013 recruitment) is above the most recent estimates of recruitment.

Management plans

A management plan is under development and was evaluated by ICES in 2013 ([ICES, 2013a](#)). ICES concluded that a maximum F value of 0.2 in the HCR was required to ensure consistency with the precautionary approach under the low recruitment conditions observed since 2004.

Biology

The haddock stock at Rockall is an entirely separate stock from that on the continental shelf of the British Isles. The Rockall haddock stock has lower growth rates and individuals achieve a smaller size than in other haddock populations in the Northeast Atlantic.

Environmental influence on the stock

Recruitment during 2007–2012 has been extremely low despite a moderate SSB. This may be related to rising seawater temperature on the Rockall bank. An increase in temperature leads to an acceleration of metabolic processes and an increase in the energy and food consumption. At the same time there was a significant reduction of *Calanus finmarchicus* which is the main food item for larval and juvenile haddock at Rockall. This situation of food scarcity could have resulted in increased predation and food competition by grey gurnard. All these factors may have led to a reduction in the recruitment of Rockall haddock.

The fisheries

Haddock in Division VIb are caught in a directed fishery and as a bycatch in demersal trawl and gillnet fisheries. Haddock are mostly taken in fisheries deploying otter trawls, but also by pair trawlers and gillnetters. In recent years, discards have been significantly reduced as a result of the small number of young haddock in the population.

Catch distribution Total catches (2012) = 726 t (710 t landings, 16 t discards (2% by weight and 14% by numbers)).

Effects of the fisheries on the ecosystem

In order to protect cold-water corals, four areas (northwest Rockall, Logachev Mounds, west Rockall Mounds, and Empress of British Banks) have been closed to demersal mobile and static gears since 2007.

Quality considerations

At the current low population abundance, the forecast of yield in 2014 and SSB in 2015 is highly dependent on the estimates of the 2012 year class (i.e. 2013 age 1 recruitment). The 2013 Rock-WIBTS-Q3 survey indicates that this year class is stronger than other recent year classes, in line with the results from the 2012 survey. Because of the extremely low recruitment during 2007–2012 most of the present haddock population is of age 1 or in the plus group. Hence the average fishing mortality of ages 2–5 (reference age range) does not cover the bulk of the population at present.

Recent assessments have consistently underestimated F and overestimated SSB and recruitment.

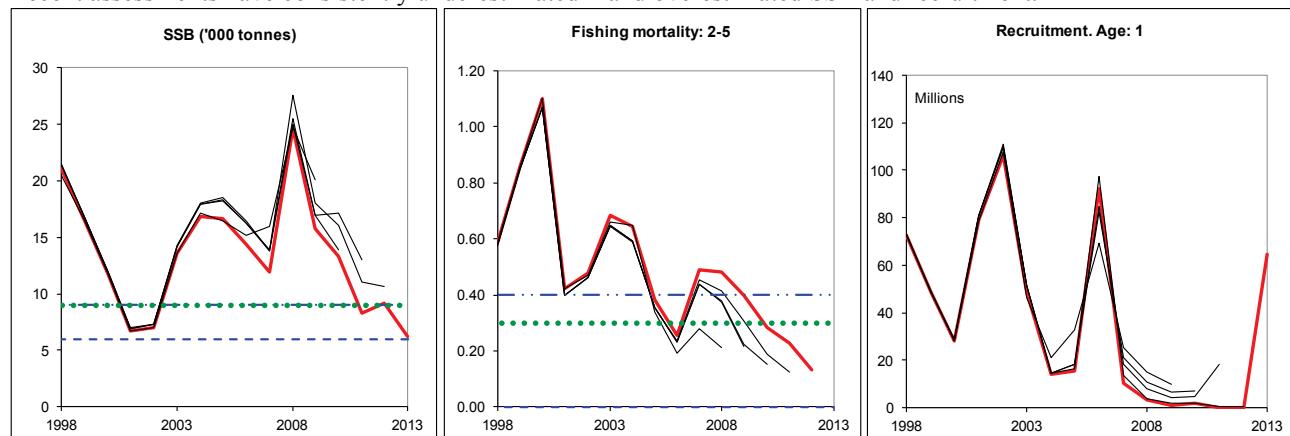


Figure 5.4.9.2 Haddock in Division VIb (Rockall). Historical assessment results (final-year recruitment estimates included).

Scientific basis

Assessment type	Analytical age-based assessment (XSA).
Stock data category	1
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 years old), fixed natural mortality (0.2).
Discards and bycatch	Discards have been included in the assessment since 1991, from UK (Scotland) and Ireland.
Indicators	None.
Other information	The 2013 Rock-WIBTS-Q3 was used to inform about recruitment in 2013. Russian trawl acoustic survey and the trawl survey-based assessment, statistical catch-at-age analysis (StatCam analytical model).
Working group report	WGCSE (ICES, 2013b).

ECOREGION **Celtic Sea and West of Scotland**
STOCK **Haddock in Division VIb (Rockall)**
Reference points

	Type	Value	Technical basis
MSY Approach	MSY $B_{trigger}$	9000 t	B_{pa} .
	F_{MSY}	0.3	Provisional proxy by analogy with North Sea haddock. Fishing mortalities close to F_{sq} in 2010.
Precautionary Approach	B_{lim}	6000 t	$B_{lim} = B_{loss}$, the lowest observed spawning stock estimated in previous assessments.
	B_{pa}	9000 t	$B_{pa} = B_{lim} * 1.5$. 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.
	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.

(Unchanged since: 2010).

Outlook for 2014

Basis: $F_{2013} = TAC \text{ constraint} = 0.15$; $R(2013) [RCT3] = 64475 \text{ thousands}$; $TAC \text{ constraint for landings (2013)} = 0.99$; total catch (2013) = 1.22; SSB (2014) = 4.311; $R(2014) [25 \text{ percentile of the historical } R \text{ time-series}] = 10445 \text{ thousands}$.

Rationale	Catch (2014)	Landings (2014)	Discards (2014)	Basis	F total (2014)	F landings (2014)	F discards (2014)	SSB (2015)	%SSB change ¹⁾	%TAC change ²⁾
MSY approach	1.62	0.98	0.64	$F_{MSY} \times SSB_{2014} / MSY B_{trigger}$	0.14	0.11	0.04	21.7	+403%	-1%
Precautionary approach	4.10	2.43	1.68	$F_{pa} = 0.4$	0.40	0.29	0.11	18.7	+334%	+145%
Proposed Management plan	2.01	1.21	0.80	$F_{HCR} = 0.2 \text{ and } TAC_{2014} = TAC_{F=0.2} + 0.2 \times (TAC_{2013} - TAC_{F=0.2})$	0.18	0.13	0.05	21.2	+393%	+22%
Zero catch	0.0	0.0	0.0	$F = 0$	0.0	0.0	0.0	23.7	+446%	-100%
Other options	2.20	1.33	0.88	$F_{HCR} = 0.2$	0.20	0.15	0.05	21.0	+387%	+34%
	2.35	1.42	0.94	average F 2010–2012	0.21	0.16	0.06	20.8	+381%	+43%
	1.38	0.84	0.55	-15% TAC	0.12	0.09	0.03	22.0	+410%	-15%
	1.63	0.99	0.65	0% TAC	0.15	0.11	0.04	21.7	+403%	0%
	3.20	1.91	1.29	F_{MSY}	0.30	0.22	0.08	19.8	+357%	+93%
	1.89	1.14	0.75	+15% TAC	0.17	0.12	0.05	21.4	+396%	+15%

Weights in thousand tonnes.

¹⁾ SSB 2015 relative to SSB 2014.²⁾ Landings 2014 relative to TAC 2013.

Total catches have been divided into landings and discards using the average ratio (at age) of discards to catches over the period 2006–2012.

MSY approach

Following the ICES MSY approach implies a fishing mortality at $F_{MSY-HCR} = F_{MSY} \times SSB_{2014}/MSY B_{trigger} = 0.14$, resulting in catches of no more than 1620 t in 2014. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 980 t. This is expected to lead to an SSB of 21 700 t in 2015, which is above MSY $B_{trigger}$.

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

Precautionary approach

Under the precautionary approach catches in 2014 should be no more than 4100 t. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 2430 t. This is expected to lead to an SSB of 18 700 t in 2015, which is above B_{pa} .

Further management measures should be introduced to reduce catches of small haddock and to protect the incoming recruitment in 2013.

Management plan

ICES evaluated a new HCR proposal for the Rockall haddock stock in August 2013 ([ICES, 2013a](#)) and found that a maximum F of 0.2 was required in the HCR to ensure consistency with the precautionary approach, under the low recruitment conditions observed since 2004. If $F = 0.2$ in 2014, then SSB is forecast to be above B_{pa} at the end of 2014. In these circumstances, the proposed HCR initially calculates catches according to a fishing mortality of 0.2 in 2014, followed by the application of a TAC constraint adjustment. This results in $F = 0.18$ in 2014, corresponding to catches of no more than 2010 t in 2014. If discard rates (at age) do not change from the average of the period 2006–2012, this implies landings of no more than 1210 t.

The TAC in the proposed management plan refers to total catch, not just landings. The management plan additionally indicates that measures should be put in place to ensure that total catch does not exceed the established TAC, including measures to record and minimize discards. After the introduction of these measures, the human consumption TAC method currently used by ICES should not be applied.

Additional considerations

ICES evaluation of a proposed HCR in August 2013 ([ICES, 2013a](#)) noted that if the low recruitment generally observed since 2004 were to prevail in the future, it is unlikely that the ICES HCR for the MSY approach with the existing reference points would be considered precautionary. This year the ICES MSY approach option corresponds to higher SSB in 2015 than the proposed management plan HCR (which has been evaluated and found to be precautionary). ICES is providing advice this year that follows the MSY approach with an F_{MSY} proxy of 0.3, but this may need to be reconsidered in the future.

The TAC presently only applies to catches in the EU zone. The TAC should apply to all areas and countries having fisheries for this stock. Since 1999 part of Division VIb has been in international waters where non-EU vessels are not subject to TAC. This allows for an unregulated fishery in the Rockall area. In later years, effort and catch of non-EU fleets have significantly declined and there was no non-EU fishery in 2011, whereas it was very low in 2012.

The forecast predicts future catches disaggregated into landing and discard components. The discard ratio (over the whole population) averages around 60% (by weight) during 1991–2003 and 20% in 2004–2011. In 2012 the discard ratio became very low as a result of poor year classes prior to 2012. Some countries land the whole catch while others discard part of the catch. Discards are expected to increase in 2013 and 2014 as a consequence of the stronger 2012 year class. Further management measures should be introduced to reduce catches of small haddock in order to maximize their contribution to future yield and SSB.

Haddock is taken in a mixed fishery together with monk and megrim. Some of the fisheries include substantial catches of blue whiting and non-assessed species such as grey gurnard.

The effects of regulations

Following the NEAFC agreement in March 2001, an area of the NEAFC zone around Rockall was closed to fishing. In spring 2002, part of the shallow water in the EU component was also closed to trawling. The main goal of the ban was to protect young haddock distributed in shallow water. At the request of NEAFC, ICES has this year provided advice on the Rockall closure area and additional measures for the protection of juveniles ([ICES, 2013b](#)). ICES concluded that the overall impact of the current closure area is difficult to assess, and advised that a number of technical and operational measures could be examined to improve the selection pattern of the entire fishery.

Data and methods

The assessment is based on catch numbers-at-age and one survey index (Rock-WIBTS-Q3). After an interruption in 2010, the survey was resumed in 2011 with a new gear, but an analysis showed that there was no detectable difference between the older and new survey on haddock indices (ICES, 2012). The survey area coverage was also reviewed and extended into deeper waters starting from 2011. In most cases the survey areas that include areas with depths less than

200 m are regarded as the standard survey areas. The indices obtained from the standard survey areas were used for the assessment. New survey indices will be used for the assessment once the time-series for the whole area of haddock distribution is of sufficient length.

Discarding occurs in part of the fishery and has been estimated and used in the assessment.

Uncertainties in assessment and forecast

A main uncertainty in the assessment concerns the estimates of discards in the EU fleets. In some years, including 2012, these are directly estimated from sampling on-board Scottish and Irish vessels, whereas in other years they are inferred using survey length frequencies, average fishery selectivity and discarding ogives, and length frequencies from port sampling. In 2010 there was no discard sampling or survey, and average discard rates were applied. Additionally, there are doubts on the degree of age-reading agreement by international experts. The determination of the fishing mortality for the latest strong year class (2005) is uncertain because that year class is now included in the plus group.

The 2005 and 2012 year classes are predicted to dominate the stock biomass in 2014 and 2015, and therefore the estimates of these year classes have a strong impact on the short-term forecast.

Comparison with previous assessment and advice

The assessment is an update of last year's assessment. Fishing mortality in 2011 has been revised upward by 85%, and SSB in 2012 has been revised downward by 13%, when compared with last year's assessment.

The basis for the advice is the same as last year, the MSY approach.

Sources

- ICES, 2012. Report of the International Bottom Trawl Survey Working Group (IBTSWG), 27–30 March, Lorient, France. ICES CM 2012/SSGESST:03.
- ICES. 2013a. Request from NEAFC to evaluate the proposals for the harvest control components of the management plan for Rockall haddock fisheries. *In* Report of the ICES Advisory Committee, 2013. ICES Advice 2013, Book 5, Section 5.3.3.2.
- ICES. 2013b. Request from NEAFC on the closure area and additional measures for the protection of juvenile haddock on Rockall Bank. *In* Report of the ICES Advisory Committee, 2013. ICES Advice 2013, Book 5, Section 5.3.3.3.
- ICES. 2013c. Report of the Working Group on Celtic Seas Ecosystems (WGCSE), 8–17 May 2013, Copenhagen, Denmark. ICES CM 2013/ACOM:13.

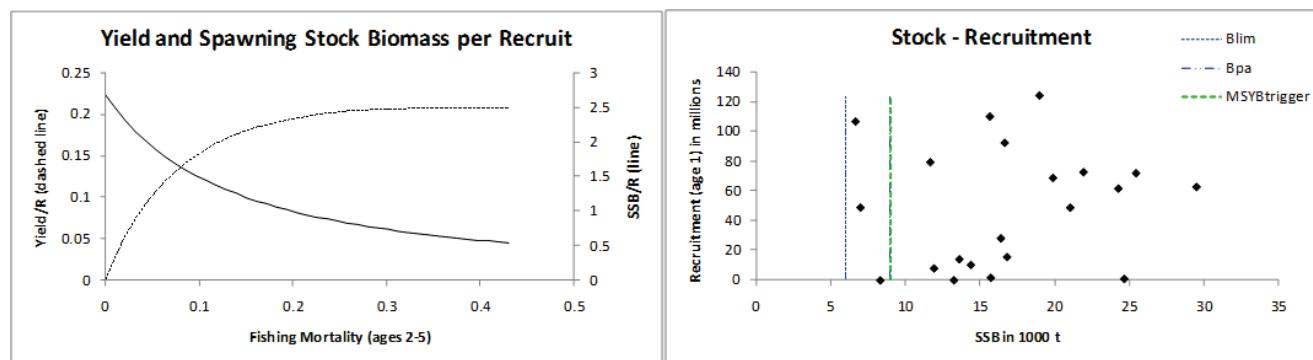


Figure 5.4.9.3 Haddock in Division VIb (Rockall). Yield-per-recruit analysis (left panel) and stock-recruitment relationship (right panel).

Table 5.4.9.1 Haddock in Division VIb (Rockall). ICES advice, management, landings, and discards.

Year	ICES Advice Single-stock exploitation boundaries from 2004 onwards	Predicted corresp. to advice	catch	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 ¹	11.02	
1995	No long-term gain in increasing F	5.1 ²		5.5	5.6	9.17	
1996	No long-term gains in increasing F	6.9 ²		6.8	7.1	9.36	
1997	No advice given	4.9 ²		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 ³	5.3 ⁴	6.61	
2001	Reduce F below F_{pa}	< 2.7		2.3 ³	2.0 ⁴	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 ⁵		0.702 ⁸	6.3	6.4	0.88	
2005	Lowest possible catch ⁵		0.702 ⁸	5.2	5.2	0.51	
2006	Lowest possible catch ⁵		0.597 ⁸	2.8	2.8	0.39	
2007	Reduce F below F_{pa}^5	< 7.11	4.615 ⁸	3.3	3.3	2.24	
2008	Keep F below F_{pa}^5	< 10.6 ⁶	6.916 ⁸	4.2	4.2	2.10	
2009	No long-term gains in increasing F ⁵	< 4.3 ⁷	5.879 ⁸	3.8	3.8	1.56	
2010	No long-term gains in increasing F ⁵	< 3.3 ⁷	4.997 ⁸	3.4	3.4	0.31	
2011	See scenarios	-	3.748 ⁸	1.9	1.9	0.15	
2012	MSY approach	< 3.3 ⁷	3.300 ⁸	0.7	0.7	0.02	
2013	No directed fisheries, minimize bycatch and discards	0	0.99 ⁸				
2014	MSY approach	< 1.62 ⁶					

Weights in thousand tonnes.

¹ Including misreporting.

² Landings at *status quo* F.

³ Incomplete data.

⁴ Discards are not taken into account for the assessment, and data of the Russian fleet which lands the whole catch were adjusted to exclude fish below MLS of 30 cm.

⁵ Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries protecting stocks outside safe biological limits.

⁶ This corresponds to catch (= landings + discards).

⁷ This corresponds to landings.

⁸ Agreed EU TAC for Division VIb and Subareas XII and XIV.

n/a = Not available.

Table 5.4.9.2 Haddock in Division VIb (Rockall). Landings (tonnes) in 1995–2012, as officially reported to ICES, and ICES estimates.

COUNTRY	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 ¹
Faroe Islands	-	-	-	-	-	n/a	n/a	-	-	-	-	2	2	16	16	42	2	53
France	... ²	-	-	-	-	5	2	-	1	-	-	-	-	-	-	-	< 1	
Iceland	-	-	+	-	167	-	-	-	-	-	-	-	-	-	-	-	-	
Ireland	677	747	895	704	1021	824	357	206	169	19	105	41	338	721	352	169	123	31
Norway	29	24	24	40	61	152	70	49	60	32	33	123	84	36	71	65	40	48
Portugal	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	
Russian Federation	-	-	-	-	458	2154	630	1630	4237	5844	4708	2154	1282	1669	55	198	-	1
Spain	28	1	22	21	25	47	51	7	19	-	-	5	-	-	-	-	-	
UK (E,W&NI)	318	293	165	561	288	36	-	-	56	-	-	-	-	-	-	-	-	
UK (Scot.)	4439	5753	4114	3768	3970	2470	1205	1145 ³	1607	411 ³	332 ³	440 ³	1643 ³	1779 ³	2951 ³	2931 ³	1738 ³	577 ³
Total	5491	6818	5220	5098	5990	5688	2315	3037	6148	6306	5178	2765	3349	4221	3445	3405	1903	710
Unallocated catch	-379	-543	-591	-599	-851	-357	-279	299	94 ⁵	139 ⁵	1	0	0	0	0	0	0	
ICES estimate	5112	6275	4629	4499	5139	5331 ⁴	2036 ⁴	3336 ⁴	6242 ⁴	6445	5179	2765	3349	4221	3445	3405	1903	710

¹Preliminary.

²Included in Division VIa.

³Includes UK England, Wales, and N. Ireland landings.

⁴Includes the total Russian catch.

⁵Non-official.

n/a = not available.

Table 5.4.9.3 Haddock in Division VIb (Rockall). Summary of stock assessment.

Year Age 1 thousand	Recruitment tonnes	SSB tonnes	Catches tonnes	Landings tonnes	Discards tonnes	Mean F Total Ages 2–5
1991	109844	15667	18883	5655	13228	0.7131
1992	109616	18986	17191	5320	11871	0.8117
1993	123694	19888	14637	4784	9853	0.6145
1994	68540	24268	16756	5733	11023	0.5807
1995	61451	29501	14755	5587	9168	0.5976
1996	62515	25451	16431	7075	9356	0.5632
1997	71764	21934	11060	5166	5894	0.391
1998	72446	21047	15846	4984	10862	0.5893
1999	48687	16406	16283	5221	11062	0.8596
2000	28204	11683	11167	4558	6609	1.099
2001	79065	6680	3658	1918	1535	0.4201
2002	106259	7010	7269	2571	4152	0.4791
2003	48764	13627	11490	5961	5521	0.6838
2004	14195	16820	7320	6400	883	0.646
2005	15672	16662	5696	5191	505	0.3834
2006	92038	14398	3142	2759	386	0.2544
2007	10443	11930	5590	3348	2242	0.4888
2008	3103	24655	6321	4205	2100	0.4808
2009	1043	15733	4794	3237	1557	0.3994
2010	1826	13262	3710	3404	306	0.2824
2011	168	8333	2057	1905	152	0.2293
2012	58	9218	726	710	16	0.1328
2013	64475*	6224				
Average	50733	16060	9763	4349	5376	0.532

* RCT3 estimate.

5.4.9

Appendix: ICES suggestion for the Harvest Control Rule for Rockall haddock fishery

ICES suggested in the harvest control rule advice provided in August 2013 (ICES, 2013a) that the HCR that was found to be consistent with the precautionary approach should be rewritten as follows, to avoid ambiguities in its application.

In the following, the TACs refer to total catches, not just landings. Measures shall be put in place to ensure that total catch does not exceed the established TAC, including measures to record and minimise discards. After the introduction of these measures, the method of setting a human consumption TAC currently used by ICES shall not be applied.

“1. Every effort shall be made to maintain a level of spawning-stock biomass (SSB) greater than B_{pa} and a minimum level of SSB greater than B_{lim} .

In paragraphs 2–5, $SSB_{0.2}$ denotes the SSB at the end of the year in which the TAC is applied, assuming $F = 0.2$ during that year. No iterative process is involved anywhere in the calculations in paragraphs 2–5.

2. For [20XX] and subsequent years the Parties agreed to set a TAC to be consistent with a fishing mortality rate of no more than 0.2 for appropriate age groups, when $SSB_{0.2}$ is estimated to be above B_{pa} .

3. The Parties agreed that the TAC that results from the application of the fishing mortality referred to in paragraph 2 will be adjusted according to the following formula:

$$TAC_y = TAC_f + 0.2 \times (TAC_{y-1} - TAC_f)$$

where TAC_y is the TAC that is to be set by the management plan, TAC_{y-1} is the TAC that was fixed the previous year, and TAC_f is the TAC resulting from the provisions in paragraphs 1 and 2.

4. Where $SSB_{0.2}$ is estimated to be below B_{pa} but above B_{lim} , the TAC shall not exceed a level, which will result in a fishing mortality rate equal to

$$0.2 - [0.2 \times (B_{pa} - SSB_{0.2}) / (B_{pa} - B_{lim})].$$

This consideration overrides paragraph 3.

5. Where $SSB_{0.2}$ is estimated to be below B_{lim} , there should be no directed fishery for haddock ($F = 0.0$) and bycatch and discards of haddock should be minimized. This consideration overrides paragraph 3.

6. No later than the end of the fifth year after the implementation of the Plan the Parties shall review the Plan, taking into account inter alia advice from ICES concerning the performance of the Plan.”