

ECOREGION Iceland and East Greenland
STOCK Haddock in Division Va (Icelandic haddock)

Advice for 2013

ICES advises on the basis of the precautionary approach that catches in 2013 should be no more than 32 000 t.

Stock status

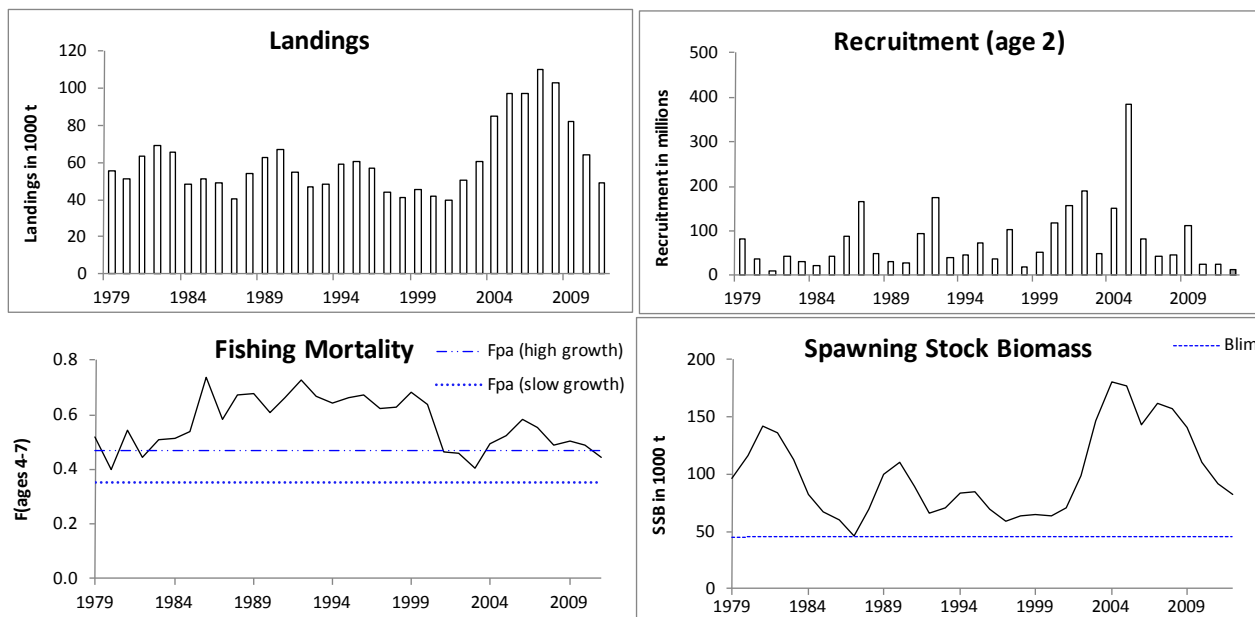
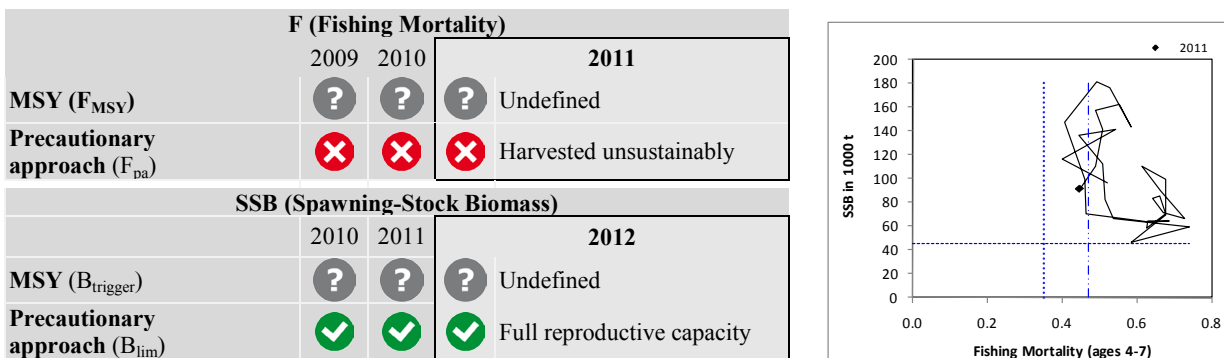


Figure 2.4.3.1 Haddock in Division Va. Summary of stock assessment (weights in thousand tonnes). Top right: SSB/ F for the time-series used in the assessment.

SSB increased from 2001 to 2005 after several strong year classes. Since then the spawning stock has decreased. Fishing mortality is currently above F_{pa} (0.35, accounting for low growth). Recruitment was high for the year classes 1998–2003, with five strong year classes of which the 2003 year class was very strong. Recruitment has been below the long-term average since the 2004 year class. The 2008–2011 year classes are estimated to be very poor.

Management plans

A management plan in accordance with the MSY approach is under development and will likely be put into force this year.

Biology of the stock

Growth of haddock is considered density dependent and the high biomass in recent years may therefore have contributed to the slower observed growth after 2003. Growth has started to improve after a number of years with poor growth, and is estimated to be above average in 2011. Mean weight-at-age remains low for most year classes contributing to the SSB.

Environmental influence on the stock

Haddock in Icelandic waters is near the northern boundary of its distribution. In cold periods the area north and east of Iceland is probably too cold for haddock, but in warmer periods the temperature in this area is suitable for haddock. The areas north and east of Iceland constitute a large part of the Icelandic continental shelf, so in warm periods much larger areas are available for haddock. Landing figures from the early 1960s support the observation that the stock can become very large in warm periods. The groundfish surveys show that the proportion of the haddock stock inhabiting the waters north of Iceland has increased from 2000 to 2006 and has remained high since then.

The fisheries

Haddock is caught in directed haddock fisheries, as well as in mixed demersal fisheries targeting cod. Recent changes in seawater temperature have had considerable effects on the spatial distribution and the distribution of the catches. In recent years an increasing proportion of haddock has been caught by longliners. The discard estimates for haddock have been ranging between 0.7% and 5% by weight since 2001 (see Section 7 of the NWWG report “Overview on ecosystem, fisheries and their management” – ICES, 2012).

Catch distribution Total landings (2011) are 49.5 kt, with 44% taken by bottom trawl, 41% by longlines, 13% by Danish seine, and 2% by other gear. Discarding is considered minor since 2001.

Quality considerations

The assessment is considered very consistent. Discards are not included in the assessment. Discards in 2011 were small, as they have been in most years since 2001. The main uncertainty in the assessment relates to difference between assessments based on each of the two surveys, with the final assessment fitting in between.

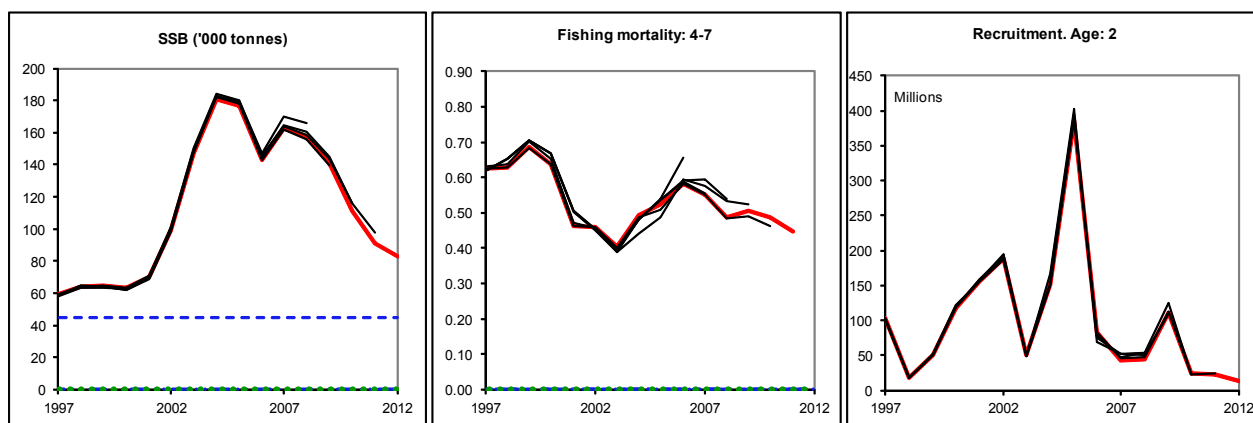


Figure 2.4.3.2 Haddock in Division Va. Historical assessment results (final-year recruitment estimates included).

Scientific basis

Assessment type	Adapt-type model (in ADMB).
Input data	Landings-at-age and two survey indices (Icelandic spring and fall groundfish surveys).
Discards and bycatch	Discards are not included in the assessment.
Indicators	None.
Other information	None.
Working group report	NWWG

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Reference points

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
MSY Approach	MSY B_{trigger}	Not defined	
	F_{MSY}	Not defined	
Precautionary Approach	B_{lim}	45 000 t	B_{loss} (ICES, 2011).
	B_{pa}	Not defined	
	F_{lim}	Not defined	
	F_{pa}	0.47 0.35	$F_{\text{pa}} = F_{\text{med}}$ proposed in 2000 with normal/high growth rate. Adjusted to 0.35 with low growth rate.

(unchanged since: 2011)

Outlook for 2013

Basis: $F(2012) = \text{TAC constraint} = 44$; $F=0.4$; $\text{SSB}(2013) = 85$; $R(2013) = 21.5$ million (Adapt); landings (2012) = 44.

Rationale	Landings (2013)	Basis	F (2013)	SSB (2014)	%SSB change ¹⁾	% TAC change ²⁾
Precautionary (modified to account for size)	32	$F_{\text{pa}} = 0.35$	0.35	71	-17	-28
Zero catch	0	$F = 0$	0.00	102	20	-100
Less than 5% probability of $\text{SSB}_{2015} < B_{\text{lim}}$	27	$F = 0.28$	0.28	76	-11	-37
<i>Status quo</i>	39	F_{2011}	0.44	65	-24	-12
<i>Proposed HCR</i>	31		0.33	72	-15	-30

Weights in thousand tonnes.

¹⁾ SSB 2014 relative to SSB 2013.

²⁾ Landings 2012/2013 relative to TAC 2011/2012.

Precautionary approach

The fishing mortality in 2013 should be no more than (0.35), corresponding to landings of less than 32 000 t.

Additional considerations

Management considerations

Given the low incoming recruitment, fishing at F_{pa} in 2012–2014 would result in a non-negligible probability of SSB falling below B_{lim} within 3 years. F around 0.28 will lead to the probability of $\text{SSB}_{2015} < B_{\text{lim}}$ being around 5%.

Work is in progress to evaluate candidate harvest control rules that are in conformity with the ICES MSY framework. This work is based on an approach similar to the one used for Icelandic saithe and cod. The proposed rule is based on landings as a proportion of biomass of fish above a certain size and is presented in the Working Group report (ICES, 2012).

SSB is predicted to decrease over the next years when the average year classes (2004–2007) disappear from the stock and are replaced by the poor (2008–2011) year classes. The 2008–2011 year classes are the smallest four year classes in sequence seen since 1979 or further back. With such low year classes, the maximum yield would be expected to be less than 20 000 t.

Regulations and their effects

The regulation is a TAC supplemented with technical measures like area closures for protecting juveniles, and minimum mesh size. The regulatory system includes provision for real-time closures of areas where juveniles are a high proportion of the catch. The effects of these measures have not been evaluated. Trawl grids are mandatory in certain areas.

Changes in fishing technology and fishing patterns

Discards have been low since 2001. Before that discards of undersized fish were high and variable during 1994–1997. Discarding seems related to the overlap between the spatial distribution of the fisheries and recruits and is higher when fishing mortality is high and stock size low. At low stock sizes juveniles mix more with adults.

Information from the fishing industry

Commercial cpue from the most important fleets targeting haddock are available for 20 years or more, but these data are not used in the analytical assessment. The cpue data show much more stability than the results from the assessment. The discrepancy between cpue and stock abundance is partly due to the increase in haddock biomass occurring in areas north of Iceland, where there is little fishing effort.

Data and methods

The assessment is based on age-disaggregated landings from 1979 to 2011 and on survey data from the March survey 1985–2012 and the October survey 1995–2010. The models used are an Adapt-type model, a time-series analysis, XSA, and a separable model used for evaluation of the harvest control rule for the stock. The selection pattern in the separable model is a function of mean weight-at-age, not age directly. The assessment does not include discards.

Comparison with previous assessment and advice

This year's assessment is conducted in the same way as last year. The assessment does not show any retrospective pattern.

The basis for the advice is the same as last year.

Source

ICES. 2012. Report of the North-Western Working Group, 26 April–3 May 2012. ICES CM 2012/ACOM:07.

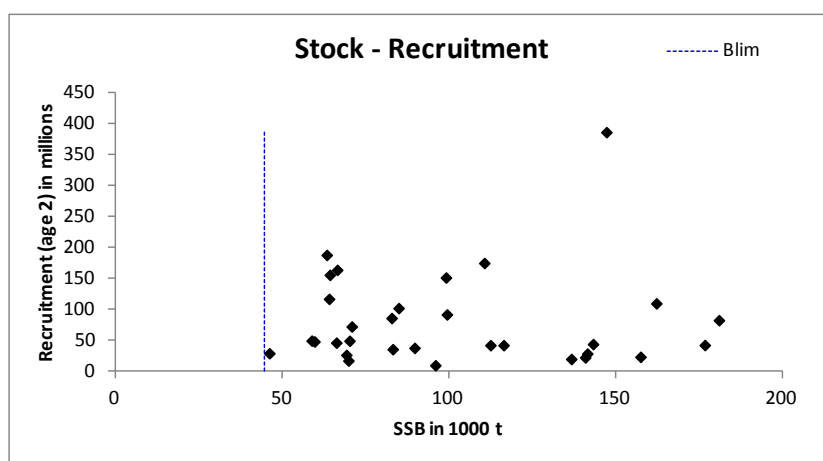


Figure 2.4.3.3 Haddock in Division Va. Stock–recruitment plot.

Table 2.4.3.1 Haddock in Division Va. ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	ICES landings for the fishing year	ICES landings for the calendar year
1987	National advice	<50	60		41
1988 ¹	National advice	<60	65		54
1989 ¹	National advice	<60	65		63
1990 ¹	National advice	<60	65		67
1991 ²	National advice	<38	48		54
1991/1992 ³	National advice	<50	50	48	47
1992/1993 ³	National advice	<60	65	48	49
1993/1994 ³	National advice	<65	65	57	59
1994/1995 ³	National advice	<65	65	61	61
1995/1996 ³	National advice	<55	60	54	57
1996/1997 ³	National advice	<40	45	51	44
1997/1998 ³	National advice	<40	45	38	41
1998/1999 ³	National advice	<35	35	46	45
1999/2000 ³	F reduced below F_{med}	<35	35	42	42
2000/2001 ³	F reduced below provisional F_{pa}	<31	30	40	40
2001/2002 ³	F reduced below provisional F_{pa}	<30	41	45	50
2002/2003 ³	F reduced below provisional F_{pa}	<55	55	56	61
2003/2004 ³	F reduced below provisional F_{pa}	<75	75	79	84
2004/2005 ³	F reduced below provisional F_{pa}	<97	90	98	97
2005/2006 ³	F reduced below provisional F_{pa}	<110	105	98	98
2006/2007 ³	F reduced below provisional F_{pa}	<112	105	110	110
2007/2008 ³	F reduced below provisional F_{pa}	120	100	102	102
2008/2009	F reduced below 0.35	<83	93	82	82
2009/2010	F reduced below 0.35	<57	63	73	64
2010/2011	F reduced below 0.35	<51	50	53	
2011/2012	F reduced below 0.35	<42	45		
2012/2013	F reduced below 0.35	<32			

Weights in thousand tonnes.

¹ Calendar year.

² January/August.

³ National TAC for year ending 31 August.

Table 2.4.3.2 Icelandic haddock (Division Va). Summary of the assessment.

Year	Recruitment in thousands at age 2	Biomass 3+ tonnes	SSB tonnes	Landings tonnes	Yield/SSB	F4-7
1979	80923	162177	96072	55330	0.576	0.521
1980	37390	192244	116521	51110	0.439	0.398
1981	10426	206988	141628	63558	0.449	0.542
1982	42788	180380	136817	69428	0.507	0.444
1983	29306	148112	112589	65942	0.586	0.508
1984	20574	112797	82961	48282	0.582	0.515
1985	42788	102394	66652	51102	0.767	0.537
1986	86501	96480	59837	48859	0.817	0.739
1987	164036	105395	46298	40760	0.88	0.584
1988	48742	153708	69391	54204	0.781	0.675
1989	29778	168184	99537	62885	0.632	0.676
1990	27094	145507	110745	67198	0.607	0.611
1991	92280	122708	89825	54692	0.609	0.664
1992	175094	106310	66379	47121	0.71	0.728
1993	38437	130461	71000	48123	0.678	0.669
1994	46842	127836	83295	59502	0.714	0.641
1995	72857	124042	85054	60884	0.716	0.661
1996	36341	108036	70008	56890	0.813	0.675
1997	102509	87152	58993	43764	0.742	0.624
1998	17976	97121	64203	41192	0.642	0.627
1999	50160	91024	64439	45411	0.705	0.685
2000	117308	90674	63507	42105	0.663	0.636
2001	156016	115000	70340	39654	0.564	0.462
2002	188084	168156	99249	50498	0.509	0.461
2003	49866	219674	147350	60883	0.413	0.404
2004	151764	252575	181089	84828	0.468	0.492
2005	385847	258893	176847	97225	0.55	0.525
2006	83024	299177	143347	97614	0.681	0.582
2007	43021	295783	162319	109966	0.677	0.553
2008	44529	247415	157573	102872	0.653	0.488
2009	110125	189982	141004	82045	0.582	0.506
2010	24044	162037	110958	64168	0.578	0.487
2011	23122	138234	91371	49433	0.541	0.446
2012	13515	121144	82681			
Mean 79-2011	79685	157777	101127	61137	0.631	0.569