

2.3.6 Cod (*Gadus morhua*) in Division Va (Iceland grounds)

ICES stock advice

ICES advises that when the Icelandic management plan is applied, catches in the fishing year 2015/2016 should be no more than 239 000 t.

Stock development over time

The spawning-stock biomass (SSB) of Icelandic cod is increasing and is higher than has been observed over the last four decades. Fishing mortality (F) has declined significantly in the last decade and is presently at a historical low. Year classes are estimated to have been relatively stable since 1988, but with the mean around the lower values observed in the period 1955 to 1985.

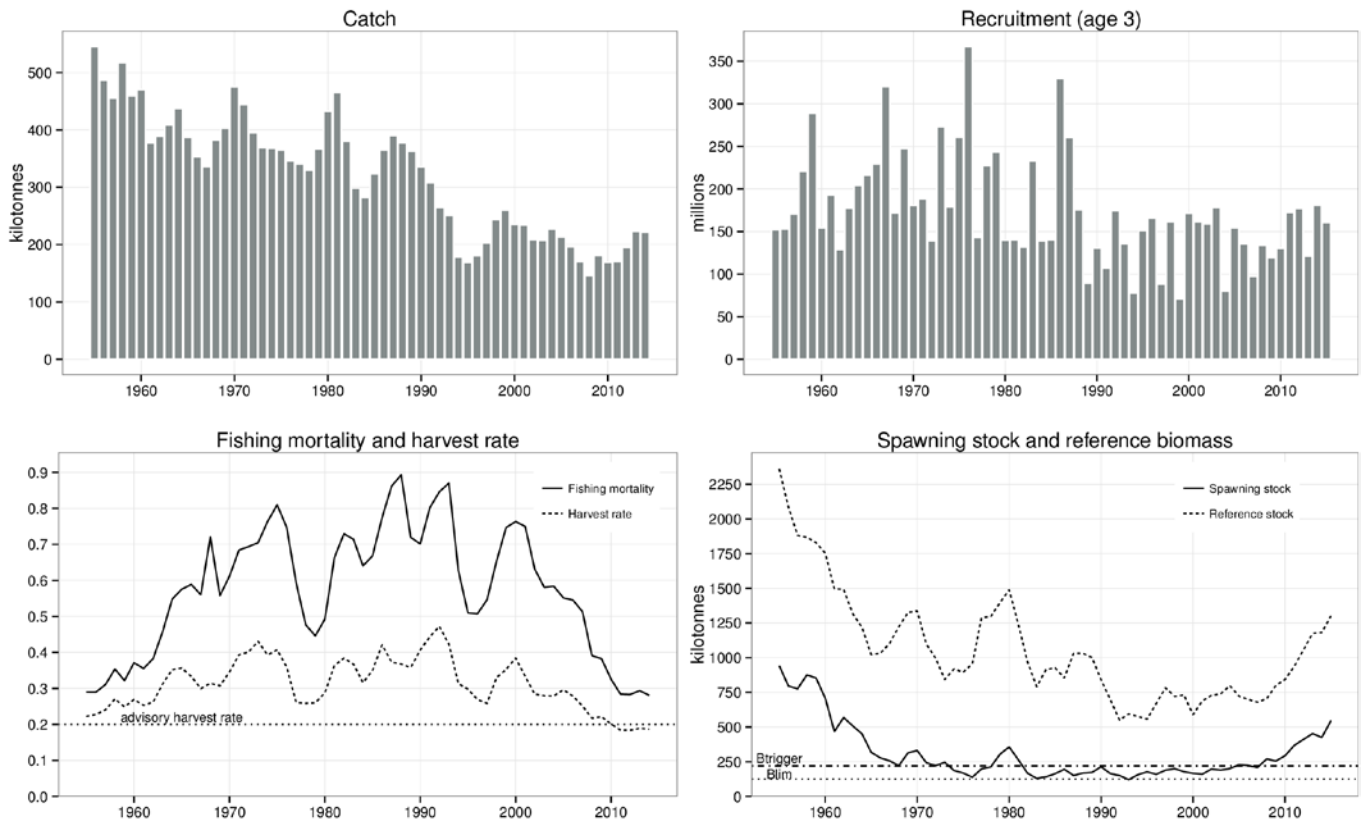


Figure 2.3.6.1 Cod in Division Va (Iceland grounds). Summary of stock assessment. Reference stock is the biomass of 4+ cod. $B_{trigger}$ refers to the SSB levels.

Stock and exploitation status

Table 2.3.6.1 Cod in Division Va (Iceland grounds). State of the stock and fishery , relative to reference points.

		Fishing pressure				Stock size				
		2012	2013	2014		2013	2014	2015		
Maximum Sustainable Yield	HR _{MSY}	✓	✓	✓	Appropriate	MSY	✓	✓	✓	Above trigger
Precautionary approach	HR _{pa} , HR _{lim}	✓	✓	✓	Below candidate reference points	B _{pa} , B _{lim}	✓	✓	✓	Above candidate reference points
Management Plan	HR _{MGT}	✓	✓	✓	Within expected range	MGT	✓	✓	✓	Above trigger
						B _{trigger}	✓	✓	✓	

Catch options

Table 2.3.6.2 Cod in Division Va (Iceland grounds). The basis for the catch options.

Variable	Value	Source	Notes
F ages 5–10 (2015)	0.26	ICES (2015a)	TAC constraint
SSB (2016)	589 kt	ICES (2015a)	
B4+ (2016)	1 371 kt	ICES (2015a)	
R _{age3} (2017)	186 millions	ICES (2015a)	
Total catch (2015)	228 kt	ICES (2015a)	Estimated catch until the end of the fishing season (31.08.2015) and estimated catch in the first four months of the next fishing season (01.09–31.12.2015).
Discards (2015)		ICES (2015a)	Negligible

Table 2.3.6.3 Cod in Division Va (Iceland grounds). The catch options.

Rationale	Landings (2015/16)	Basis	F (2016)	SSB (2017)	B4+ biomass (2017)	%SSB change *	% TAC change
Management plan	239	Harvest control rule	0.26	623	1350	+6%	+5%

Weights in thousand tonnes.

* SSB 2017 relative to SSB 2016.

Basis of the advice

Table 2.3.6.4 Cod in Division Va (Iceland grounds). The basis of the advice.

Advice basis	Management plan.
Management plan	The Icelandic Ministry of Fisheries and Agriculture fisheries management plan for Icelandic cod (Icelandic Fisheries, 2015).

Quality of the assessment

This assessment is considered consistent.

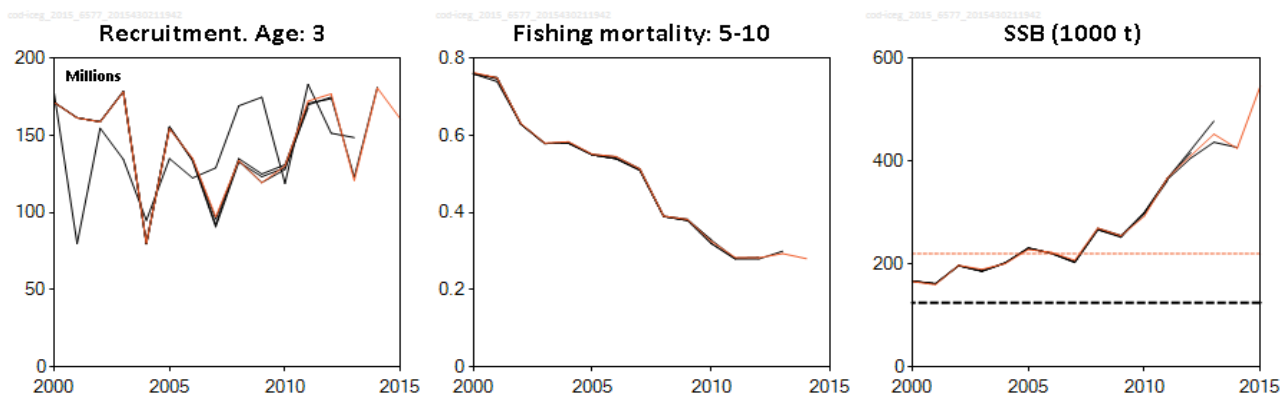


Figure 2.3.6.2 Cod in Division Va (Iceland grounds). Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

There is no information to present for this stock.

Reference points

Table 2.3.6.5 Cod in Division Va (Iceland grounds). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	220 000 t	Trigger point in HCR considered consistent with ICES MSY framework.	ICES 2010
	HR_{MSY}	20%	Stochastic HCR evaluation. Percentage of age 4+ biomass.	ICES 2010
Precautionary approach	B_{lim}	125 000 t	B_{loss}	ICES 2010
	B_{pa}	Not defined		
	HR_{lim}	Not defined		
Management plan	HR_{pa}	Not defined		
	MGT $B_{trigger}$	220 000 t		
	HR_{MGT}	20%	Percentage of age 4+ biomass.	

Basis of the assessment

Table 2.3.6.6 Cod in Division Va (Iceland grounds). The basis of the assessment.

ICES stock data category	1 (ICES, 2015b).
Assessment type	A forward-based statistical catch-at-age model that is implemented in the AD model builder, using catches in the model and in the forecast.
Input data	Landings-at-age and age-structured spring and autumn survey indices.
Discards and bycatch	Not included, considered negligible.
Indicators	None.
Other information	Immigration has been taken into account.
Working group	North-Western Working Group (NWWG).

Information from stakeholders

There is no information to present for this stock.

History of advice, catch, and management

Table 2.3.6.7 Cod in Division Va (Iceland grounds). History of ICES advice, the agreed TAC, and ICES estimates of landings by national fishing year (September to August the following year).

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC	ICES landings for the fishing year	ICES landings for the calendar year
1988*	National advice	300	350		378
1989*	National advice	300	325		356
1990*	National advice	250	300		335
1991*	National advice	240	245		309
1991/1992	National advice	250	265	274	274
1992/1993	Reduce F by 40%	154	205	241	241
1993/1994	Reduce F by 40%	150	165	197	197
1994/1995	Reduce F by 50%	130	155	165	169
1995/1996	Apply catch rule	155	155	170	182
1996/1997	Apply catch rule	186	186	202	203
1997/1998	Apply catch rule	218	218	227	243
1998/1999	Apply catch rule	250	250	254	260
1999/2000	Apply catch rule	247	250	257	236
2000/2001	Apply catch rule	203	220**	221	235
2001/2002	Apply catch rule	164	190**	217	209
2002/2003	Apply catch rule	183	179**	198	206
2003/2004	Apply catch rule	210	209	225	226
2004/2005	Apply catch rule	205	205	214	214
2005/2006	Apply catch rule	198	198	209	196
2006/2007	Apply catch rule	187	193***	187	170
2007/2008	Apply catch rule	152	130	140	147
2008/2009	Apply F_{max}	< 124	160^	168	181
2009/2010	Apply F_{max}	< 135	150^^	168	169
2010/2011	Apply catch rule	160	160	165	165
2011/2012	Apply catch rule	177	177	185	196
2012/2013	Apply catch rule	196	196	212	223
2013/2014	Apply catch rule	215	215	225	221
2014/2015	Apply catch rule	218	218		
2015/2016	Apply catch rule	239			

Weights in thousand tonnes.

* Calendar year.

** Amended catch rule.

*** Catch rule 2006.

^ Initial TAC set to 130 according to the catch rule, raised to 160 in January 2009.

^^ Set according to the catch rule.

History of catch and landings

Table 2.3.6.8 Cod in Division Va (Iceland grounds). Catch distribution by fleet in 2014 as estimated by ICES.

Total catch (2014)	Commercial landings					Commercial discards
	44% bottom trawl	36% longline	9% gillnet	5% Danish seine	7% hooks	
221 kt	221 kt					Negligible

Summary of the assessment

Table 2.3.6.9 Cod in Division Va (Iceland grounds). Assessment summary. Weights in thousand tonnes, recruitment at age 3.

Year	Recruits	SSB	Reference_biomass	Yield	F5_10	Harvest_rate
1955	151.988	941.981	2 361.190	545.250	0.29	0.22
1956	152.797	795.988	2 085.480	486.909	0.29	0.23
1957	170.633	775.735	1 881.630	455.182	0.31	0.24
1958	220.714	875.551	1 867.800	517.359	0.35	0.27
1959	289.052	853.637	1 829.410	459.081	0.32	0.25
1960	154.360	708.947	1 753.890	470.121	0.37	0.27
1961	192.903	467.292	1 496.600	377.291	0.36	0.25
1962	128.941	568.921	1 492.510	388.985	0.38	0.26
1963	177.514	507.766	1 315.590	408.800	0.46	0.31
1964	204.038	451.023	1 219.020	437.012	0.55	0.35
1965	216.371	317.608	1 022.480	387.106	0.58	0.36
1966	229.142	277.232	1 031.370	353.357	0.59	0.33
1967	320.125	256.458	1 102.690	335.721	0.56	0.30
1968	171.900	221.565	1 222.540	381.770	0.72	0.31
1969	247.444	313.603	1 325.290	403.205	0.56	0.31
1970	180.463	331.007	1 336.640	475.077	0.61	0.35
1971	188.594	242.420	1 097.650	444.248	0.68	0.39
1972	139.255	221.685	996.656	395.166	0.69	0.40
1973	273.048	245.326	843.598	369.205	0.70	0.43
1974	178.957	186.955	918.054	368.133	0.76	0.39
1975	260.742	168.249	895.165	364.754	0.81	0.41
1976	367.198	138.466	955.181	346.253	0.75	0.36
1977	143.272	198.573	1 288.760	340.086	0.59	0.26
1978	227.531	212.192	1 296.860	329.602	0.48	0.26
1979	243.309	303.839	1 396.080	366.462	0.45	0.26
1980	139.936	356.551	1 489.030	432.237	0.49	0.29
1981	140.346	263.850	1 241.260	465.032	0.66	0.36
1982	131.631	167.079	969.996	380.068	0.73	0.38
1983	232.927	129.989	790.639	298.049	0.71	0.37
1984	139.028	140.961	913.010	282.022	0.64	0.32
1985	140.289	163.443	926.811	323.428	0.67	0.35
1986	329.650	195.872	853.810	364.797	0.77	0.42
1987	260.379	150.765	1 029.860	389.915	0.86	0.37
1988	175.504	167.899	1 031.580	377.554	0.89	0.37
1989	89.187	172.633	1 001.710	363.125	0.72	0.36
1990	130.600	213.825	840.680	335.316	0.70	0.41
1991	106.873	164.307	697.921	307.759	0.80	0.44
1992	174.568	150.513	550.430	264.834	0.85	0.47
1993	135.552	121.063	595.107	250.704	0.87	0.42
1994	77.726	156.469	576.020	178.138	0.63	0.31
1995	151.183	176.977	556.752	168.592	0.51	0.30
1996	165.618	158.996	670.328	180.701	0.51	0.27
1997	88.259	189.069	782.972	203.112	0.55	0.26
1998	161.541	200.247	720.515	243.987	0.65	0.33
1999	70.798	178.018	731.021	260.147	0.75	0.35
2000	171.607	165.971	590.023	235.092	0.76	0.38
2001	161.433	159.861	687.596	234.229	0.75	0.33

Year	Recruits	SSB	Reference_biomass	Yield	F5_10	Harvest_rate
2002	158.887	197.402	728.295	208.487	0.63	0.28
2003	178.277	189.739	738.905	207.543	0.58	0.28
2004	80.200	200.710	798.720	226.762	0.58	0.28
2005	154.405	228.099	721.935	213.403	0.55	0.30
2006	135.220	222.803	698.554	196.077	0.55	0.28
2007	97.208	207.394	679.381	170.300	0.51	0.25
2008	133.857	269.852	703.665	146.104	0.39	0.22
2009	119.407	254.908	798.690	181.151	0.38	0.22
2010	130.256	293.057	843.149	168.880	0.33	0.20
2011	172.277	367.435	936.570	170.425	0.28	0.18
2012	176.983	410.695	1 055.700	194.795	0.28	0.18
2013	120.903	452.691	1 175.500	223.277	0.29	0.19
2014	180.786	424.930	1 180.980	221.340	0.28	0.19
2015	160.725	546.658	1 302.040	NA	NA	NA
2016	115.383	NA	NA	NA	NA	NA
2017	186.270	NA	NA	NA	NA	NA

Sources and references

Icelandic Fisheries. 2015. The Icelandic Ministry of Fisheries and Agriculture fisheries management plan for Icelandic cod. http://www.fisheries.is/main-species/cod/management_plan/nr/349. Accessed 7 June 2015.

ICES. 2010. Report of the ICES Advisory Committee, 2010. ICES Advice 2010, Book 2.

ICES. 2013. Report of the North-Western Working Group (NWWG), 25 April–02 May 2013, ICES Headquarters, Copenhagen. ICES CM 2013/ACOM:07. 1538 pp.

ICES. 2014a. Advice basis. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.

ICES. 2014b. Report of the North-Western Working Group (NWWG), 24 April–1 May 2014, ICES Headquarters, Copenhagen, Denmark. ICES CM 2014/ACOM:07. 902 pp.

ICES 2015a. Report of the North-Western Working Group (NWWG), 28 April–5 May 2015, ICES Headquarters, Copenhagen, Denmark. ICES CM 2015/ACOM:07.

ICES. 2015b. Advice basis. *In* Report of the ICES Advisory Committee, 2015. ICES Advice 2015, Book 1. In preparation.

ICES 2015c. Report of the Benchmark Workshop on Icelandic Stocks (WKICE), 26–30 January 2015, Copenhagen, Denmark. ICES CM 2015/ACOM:31. 325 pp.