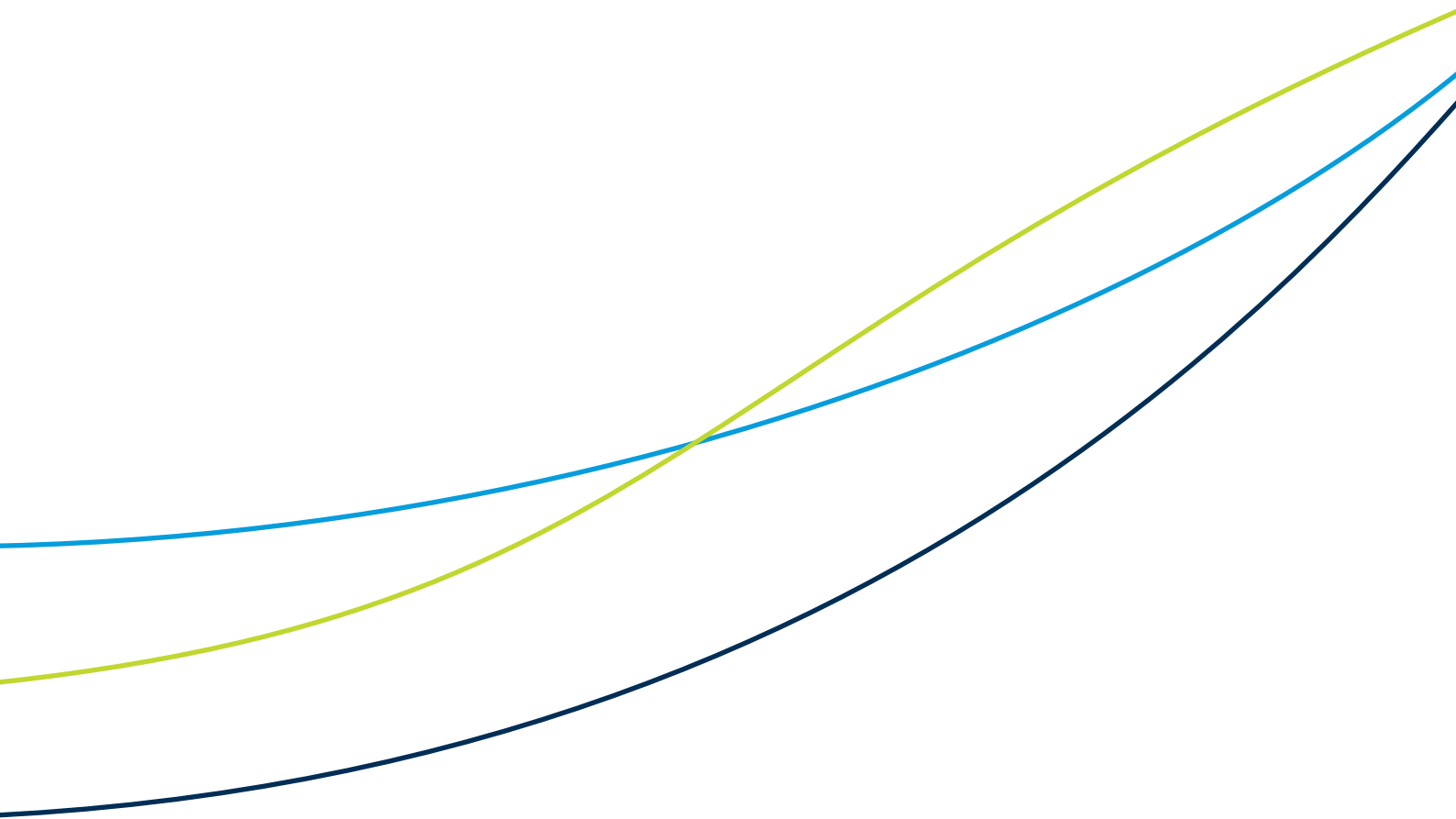


Skjal 2.

The Faroe Plateau Ecosystem. ICES 2017



Cod (*Gadus morhua*) in Subdivision 5.b.1 (Faroe Plateau)

ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2018 should be no more than 0.22, corresponding to a catch of no more than 4579 tonnes. ICES is not in a position to advise on the corresponding level of fishing effort.

Stock development over time

The spawning-stock biomass (SSB) has been below B_{lim} since 2005. Fishing mortality (F) has decreased from the year 2000 but is still above F_{msy} . The 2009–2015 year classes are estimated to be below average size. The 2016 year class is estimated to be the highest since 2009, though uncertainty is large.

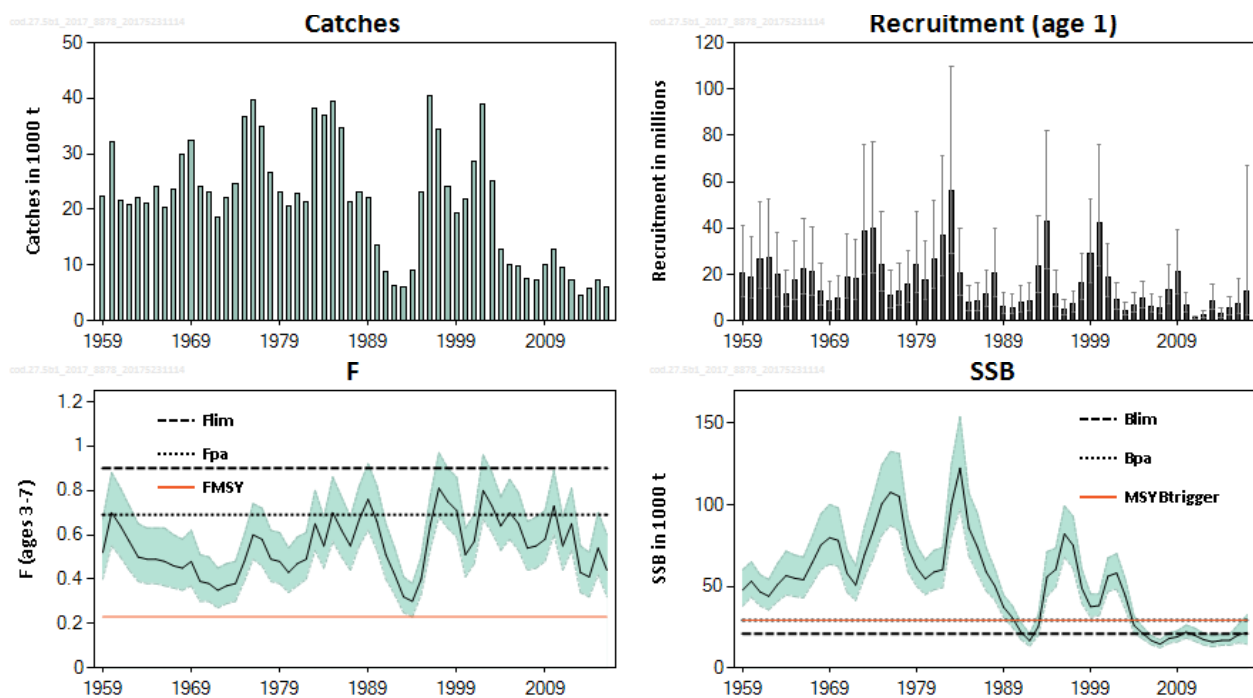


Figure 1 Cod in Subdivision 5.b.1. Summary of the stock assessment with point-wise 95% confidence intervals.

Stock and exploitation status

Table 1 Cod in Subdivision 5.b.1. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2014	2015	2016	2015	2016	2017
Maximum Sustainable Yield	F_{MSY}	✘	✘	✘ Above	$MSY B_{Trigger}$	✘	✘ Below trigger
Precautionary Approach	F_{pa}, F_{lim}	✔	✔	✔ Harvested sustainably	B_{pa}, B_{lim}	✘	✘ Increased risk
Management plan	F_{MGT}	—	—	— Not applicable	B_{MGT}	—	— Not applicable

Catch options

Table 2 Cod in Subdivision 5.b.1. The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–7 (2017)	0.44	ICES (2017a)	F ₂₀₁₇ as estimated by SAM
SSB (2018)	27725 t	ICES (2017a)	Based on F(2017) =0.44
R age 1(2018)	5709 thousand	ICES (2017a)	Median of resampled estimates from 2007-2016
R age 1(2019)	5709 thousand	ICES (2017a)	Median of resampled estimates from 2007-2016
Total catch (2017)	6630 t	ICES (2017a)	Based on F(2017) =0.44
Landings (2017)	6630 t	ICES (2017a)	Landings = catches
Discards (2017)	-	ICES (2017a)	Negligible

Table 3 Cod in Subdivision 5.b.1. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	F _{total} (2018)	SSB (2019)	% SSB change *
ICES advice basis				
MSY approach: F _{MSY} × SSB 2018 /MSY B _{trigger}	4579	0.22	39003	41
Other options				
F = 0	0	0	44494	60
F = F _{msy}	4729	0.23	38766	40
F = F ₂₀₁₇	8267	0.44	34292	24
F = F _{pa}	11628	0.69	30477	10
F = F _{lim}	13915	0.90	27698	0

* SSB 2019 relative to SSB 2018.

Basis of the advice

Table 4 Cod in Subdivision 5.b.1. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no management plan for this stock. A preliminary management plan, including a recovery plan, was formulated in 2011, but has not been implemented.

Quality of the assessment

The stock was benchmarked in 2017. Input data and assessment model were changed, and uncertainty estimates are now available to assess the quality of the assessment. The historical stock perception has not changed significantly.

The landings data are considered accurate. There are no strong incentives to discard fish under the effort management system. The sampling of the landings is adequate.

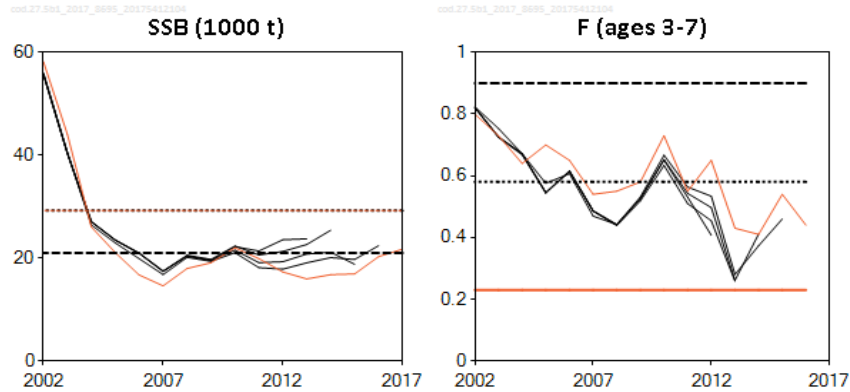


Figure 2 Cod in Subdivision 5.b.1. Historical assessment results. The age of recruitment changed from age 2 to age 1 at the 2017 benchmark; the recruitment plot is therefore not shown this year.

Issues relevant for the advice

An effort management system has been used since 1996. The Faroese Parliament decides the number of allocated fishing days for each new fishing season. The number of fishing days used by the main fleet targeting cod (longliners) only amounts to around half of the allocated days. With surplus allocated fishing days, this system is not limiting fishing pressure. ICES has not quantified the relationship between effort and F for this stock, since there is no apparent relationship between effort and F in the available data.

The Faroese parliament decided in 2007 to cancel all fishing licences for Faroese vessels in Faroese waters by 31 December 2017. A proposal for a new fisheries management system was delivered by the government to the Faroese parliament in May 2017. The new fisheries management system is expected to be implemented on 1 of January 2018.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery. Further development of management measures that includes the mixed-fishery issue would be useful.

Reference points

Table 5 Cod in Subdivision 5.b.1. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	29226 t	$B_{lim} * \exp(1.645 * \sigma)$ where $\sigma=0.20$	ICES(2017a)
	F_{MSY}	0.23	Stochastic simulations assuming segmented regression, Ricker and Beverton and Holt stock recruitment relationships	ICES(2017a)
Precautionary approach	B_{lim}	21000 t	B_{loss} in 1992 from the 1998 assessment	ICES(1998, 2017a)
	B_{pa}	29226 t	$B_{lim} * \exp(1.645 * \sigma)$ where $\sigma=0.20$	ICES(2017a)
	F_{lim}	0.90	Stochastic simulations (ICES, 2017): F that gives a 50% probability of $SSB > B_{lim}$	ICES(2017a)
	F_{pa}	0.69	$F_{lim} * \exp(-1.645 * \sigma)$ where $\sigma=0.16$	ICES(2017a)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Cod in Subdivision 5.b.1. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2016)
Assessment type	SAM with catch-at-age data and age-disaggregated indices, using catches in the model and in the forecast
Input data	Commercial catches, ages, and length frequencies from catch sampling; survey indices (FO-GFS-Q1 and FO-GFS-Q3); annual maturity data from FO-GFS-Q1; natural mortalities set at 0.2
Discards and bycatch	Discarding is considered negligible.
Indicators	None
Other information	The stock was benchmarked in 2017.
Working group	North-Western Working Group (NWWG)

Information from stakeholders

There is no information available.

History of the advice, catch, and management

Table 7 Cod in Subdivision 5.b.1. ICES advice and catch. All weights are in tonnes.

Fishing Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC***	ICES catch
1987	No increase in F	< 31000		21391
1988	No increase in F (Revised estimate)	< 29000 (23000)		23182
1989	No increase in F	< 19000		22068
1990	No increase in F	< 20000		13692
1991	TAC	< 16000		8750
1992	No increase in F	< 20000		6396
1993	No fishing	0		6107
1994	No fishing	0	8500/12500**,**	9046
1995	No fishing	0	12500*	23045
1996	F at lowest possible level	-	20000**	40422
1997	80% of F(95)	< 24000		34304
1998	30% reduction in effort from 1996/97	-		24005
1999	F less than proposed F_{pa} (0.35)	< 19000		19245
2000	F less than proposed F_{pa} (0.35)	< 20000		21833
2001	F less than proposed F_{pa} (0.35)	< 16000		28577
2002	75% of F(2000)	< 22000		38834
2003	75% of F(2001)	< 32000		25167
2004	25% reduction in effort	-		12840
2005	Rebuilding plan involving large reduction	-		10119
2006	Rebuilding plan involving large reduction	-		9844

Fishing Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC***	ICES catch
2007	Rebuilding plan involving large reduction in effort	-		7511
2008	No fishing. Development of a rebuilding plan.	0		7315
2009	No fishing. Development of a rebuilding plan.	0		9979
2010	No fishing. Development of a rebuilding plan.	0		12757
2011	Reduce F to below F_{pa}	< 16000		9692
2012	MSY framework, reduce F by 30%	< 10000		7204
2013	MSY approach, $F < 0.20$	< 4800		4473
2014	MSY approach, reduce F by 69 %	< 3600		5715
2015	MSY approach, reduce F by 23 %	< 4500		7394
2016	Lowest possible level (LPL) and develop a mixed-fishery management plan	LPL		5933
2017	MSY approach ($F \leq 0.16$)	≤ 2800		
2018	MSY approach ($F \leq 0.22$)	≤ 4579		

* In the quota year 1 September–31 August the following year.

** The TAC was increased during the quota year.

*** Not applicable since 1997.

^ Preliminary

History of the catch and landings

Table 8 Cod in Subdivision 5.b.1. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings			Discards
5933 tonnes	Longliners 58%	Jiggers 10%	Trawlers 32%	Negligible
	5933 tonnes			

Table 9 Cod in Subdivision 5.b.1. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes. The latter part of the table concerns an adjustment of the Faroese catches in order to account for different round/gutted conversion factors as well as the subtraction of cod originating from the Icelandic cod stock.

Year	Denmark	Faroe Islands	France	Germany	Iceland	Norway	Greenland	Portugal	UK (E/W/NI)	UK (Scotland)	Total
1986	8	34492	4	8		83	-		0	0	34595
1987	30	21303	17	12		21	-		8	0	21391
1988	10	22272	17	5		163	-		0	0	22467
1989	-	20535	-	7		285	-		0	0	20827
1990	-	12232	-	24		124	-		0	0	12380
1991	-	8203	-**	16		89	-		1	0	8309
1992	-	5938	3***	12		39	-		74	0	6066
1993	-	5744	1***	+		57	-		186	0	5988
1994	-	8724	-	2***		36	-		56	0	8818
1995	-	19079	2***	2		38	-		43	0	19164
1996	-	39406	1***	+		507	-		126	0	40040
1997	-	33556	-	+		410	-		61***	0	34027

1998	-	23308	-*	-	-	405	-	27***	0	23740
1999	-	19156	-*	39	-	450	-	51	0	19696
2000		0	1	2	-	374	-	18	0	395
2001		29762	9***	9	-	531*	-	50	0	30361
2002		40602	20	6	5	573	-	42	0	41248
2003		30259	14	7	-	447	-	15	0	30742
2004		17540	2	3	***	414	1	15	0	17975
2005		13556	-			201		24	0	13781
2006		11629	7	1	***	49	5	0	0	11691
2007		9905	1***			71	7	0	360	10344
2008		9394	1			40		0	383	9818
2009		10736	1			14	7	0	300	11058
2010		13878	1			10		0	312	14201
2011		11348	-			0		0	0	11348
2012		8437	0		28	0		0	0	8465
2013		5331	0		20	0	2	0	0	5333
2014		6655				6		0	226	6887
2015		7812				33	14	0	382	8241
2016		6736				31	5	0	515	7287

* Preliminary, ** Included in 5.b.2, *** Reported as 5.b.

Year	Officially reported	Faroes catches				Catches reported as 5.b.2			Foreign catches				Used in assessment
		In 5.b.1	Corrections in 5.b.1	On Faroe-Iceland ridge	In IIA within Faroe area jurisdiction	UK (E/W/Ni)	UK (Scotland)	UK	France***	Greenland***	Russia***	UK***	
1986	34595												34595
1987	21391												21391
1988	22467				715								23182
1989	20827				1229				12				22068
1990	12380				1090	-	205		17				13692
1991	8309				351	-	90						8750
1992	6066				154	+	176						6396
1993	5988					1	118						6107
1994	8818					1	227						9046
1995	19164	3330*	***			-	551						23045
1996	40040					-	382						40422
1997	34027					-	277						34304
1998	23740					-	265						24005
1999	19696				-661	-	210						19245
2000	395	21793*			-600	-	245						21833
2001	30361		-1766	-306		-	288						28577
2002	41248		-2409	-223		-	218	-				-	38834
2003	30742		-1795	-4034		-	254	-				-	25167
2004	17975		-1041	-4338		-	244	-				-	12840
2005	13781		-804	-3987			112 9	-				-	10119
2006	11691		-690	-1435			278						9844

Year	Officially reported	Faroese catches				Catches reported as 5.b.2			Foreign catches				Used in assessment
		In 5.b.1	Corrections in 5.b.1	On Faroe-Iceland ridge	In IIA within Faroe area jurisdiction	UK (E/W/Ni)	UK (Scotland)	UK	France***	Greenland***	Russia***	UK***	
2007	10344		-588	-2304			53			6			7511
2008	9818		-557	-1978			32						7315
2009	11058		-637	-510			38			26	4		9979
2010	14201		-823	-680			54			5			12757
2011	11348		-673	-986						3			9692
2012	8465		-500	-766						5			7204
2013	5333		-316	-544							0		4473
2014	6887		-395	-777									5715
2015	8241		-463	-384									7394
2016	7289*		-399	-958									5933

*) Preliminary, **) In order to be consistent with procedures used previous years, ***) Reported to Faroese Coastal Guard, ****) expected misreporting/discard.

Summary of the assessment

Table 10 Cod in Subdivision 5.b.1. Assessment summary. Weights are in tonnes.

Year	Recruitment (Age 1)	Rec. 97.5 percentile	Rec. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 3-7)	Mean F 97.5 percentile	Mean F 2.5 percentile
								Per year		
	thousands			tonnes			tonnes			
1959	20517	41078	10248	47701	60114	37851	22415	0.52	0.67	0.4
1960	18774	36041	9780	53127	65074	43373	32255	0.7	0.88	0.55
1961	26633	51096	13882	46618	57150	38027	21598	0.64	0.81	0.5
1962	27310	52579	14185	43918	54196	35590	20967	0.57	0.73	0.44
1963	19889	38253	10341	50954	63850	40662	22215	0.5	0.65	0.39
1964	11279	21848	5822	56575	71537	44742	21078	0.49	0.63	0.38
1965	17823	34490	9210	54975	69121	43724	24212	0.49	0.63	0.38
1966	22607	43855	11653	53990	67909	42924	20418	0.48	0.63	0.37
1967	20930	40611	10787	64341	80439	51464	23562	0.46	0.6	0.36
1968	12595	24495	6476	75370	94360	60201	29930	0.45	0.58	0.35
1969	8762	17140	4479	79830	100203	63599	32371	0.48	0.62	0.37
1970	9826	19340	4992	78136	98059	62260	24183	0.39	0.51	0.3
1971	18947	37130	9668	58015	72415	46478	23010	0.38	0.5	0.3
1972	18040	35179	9251	50844	62668	41250	18727	0.35	0.45	0.27
1973	38875	75753	19950	69201	86496	55364	22228	0.37	0.47	0.29
1974	39863	77392	20533	83773	104428	67203	24581	0.38	0.48	0.3
1975	24373	47235	12576	100568	124308	81361	36775	0.48	0.6	0.39
1976	11150	21737	5720	107642	132696	87318	39799	0.6	0.74	0.49
1977	12882	25015	6634	105152	131414	84138	34927	0.58	0.72	0.46
1978	15463	30041	7959	73277	91212	58869	26585	0.49	0.62	0.39
1979	24061	46770	12378	61343	75116	50095	23112	0.48	0.61	0.38
1980	17770	34443	9168	54552	66255	44915	20513	0.43	0.54	0.34
1981	26745	51601	13862	58756	72028	47930	22963	0.47	0.59	0.37
1982	36749	70881	19053	60222	73748	49176	21489	0.49	0.61	0.4

Year	Recruitment (Age 1)	Rec. 97.5 percentile	Rec. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 3-7)	Mean F 97.5 percentile	Mean F 2.5 percentile
	thousands			tonnes			tonnes	Per year		
1983	56195	109688	28790	100271	124417	80811	38133	0.65	0.8	0.53
1984	20546	39652	10646	122500	154024	97428	36979	0.55	0.68	0.45
1985	7854	15374	4012	85830	107199	68721	39484	0.7	0.86	0.57
1986	8523	16555	4388	73939	94572	57807	34595	0.62	0.77	0.5
1987	11372	21886	5909	58926	73587	47185	21391	0.55	0.68	0.44
1988	20331	39836	10376	50180	60521	41606	23182	0.67	0.82	0.55
1989	6062	11854	3100	37235	44581	31099	22068	0.76	0.92	0.62
1990	5785	11327	2955	30928	38196	25042	13692	0.66	0.82	0.53
1991	7793	15405	3942	22016	27789	17441	8750	0.51	0.65	0.4
1992	8289	16411	4187	16615	20829	13254	6396	0.42	0.54	0.33
1993	23391	45035	12150	25407	32471	19880	6107	0.32	0.41	0.25
1994	42660	81798	22248	55852	71220	43800	9046	0.3	0.38	0.23
1995	11687	21682	6300	60334	73428	49576	23045	0.4	0.5	0.33
1996	4970	9156	2697	82137	99336	67916	40422	0.64	0.77	0.53
1997	7073	12860	3890	75189	92845	60891	34304	0.81	0.97	0.68
1998	16369	29118	9202	48902	60350	39625	24005	0.75	0.9	0.63
1999	29119	52338	16201	37472	45243	31035	19245	0.71	0.86	0.59
2000	42486	76259	23670	38201	45351	32179	21833	0.51	0.63	0.41
2001	18499	33085	10343	56177	67368	46845	28577	0.57	0.69	0.47
2002	8960	16222	4949	58186	70058	48325	38834	0.8	0.96	0.67
2003	4399	7916	2445	44089	54249	35833	25167	0.73	0.88	0.61
2004	6786	12089	3809	26057	31556	21516	12840	0.64	0.77	0.53
2005	9469	16872	5314	21080	25072	17724	10119	0.7	0.85	0.58
2006	6316	11241	3548	16707	19700	14169	9844	0.65	0.79	0.53
2007	5709	10196	3197	14594	17261	12339	7511	0.54	0.66	0.44
2008	13305	24132	7336	17976	21427	15081	7315	0.55	0.68	0.45
2009	21057	39083	11345	19074	22753	15991	9979	0.58	0.71	0.48
2010	6709	12311	3656	21981	26267	18394	12757	0.73	0.89	0.6
2011	1100	2032	596	19897	24295	16295	9692	0.55	0.68	0.44
2012	2531	4565	1404	17296	21193	14117	7204	0.65	0.81	0.53
2013	8583	15935	4623	15945	19692	12911	4473	0.43	0.55	0.34
2014	2864	5423	1513	16773	20335	13834	5715	0.41	0.52	0.32
2015	5228	10016	2729	16920	20655	13860	7394	0.54	0.7	0.42
2016	7374	18226	2983	20277	26681	15410	5933	0.44	0.6	0.32
2017	12523	66805	2347	21720	32464	14532				

Sources and references

ICES. 1998. Report of the North-Western Working Group (NWWG), 28 April–06 May 1998, ICES Headquarters, Copenhagen. ICES CM 1998/ACFM:19. 350 pp.

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ICES. 2017a. Report of the North-Western Working Group (NWWG), 27 April–4 May, 2017, ICES Headquarters, Copenhagen. ICES CM 2017/ACOM:08.

4.3.2 Cod (*Gadus morhua*) in Subdivision 5.b.2 (Faroe Bank)

ICES stock advice

ICES advises that when the precautionary approach is applied, there should be zero catch in each of the years 2017, 2018, and 2019.

Stock development over time

Survey indices indicate that the stock is severely depleted. Exploitation ratios (proxies for fishing mortality) have remained at very low levels in recent years, and are considered to be below possible reference points.

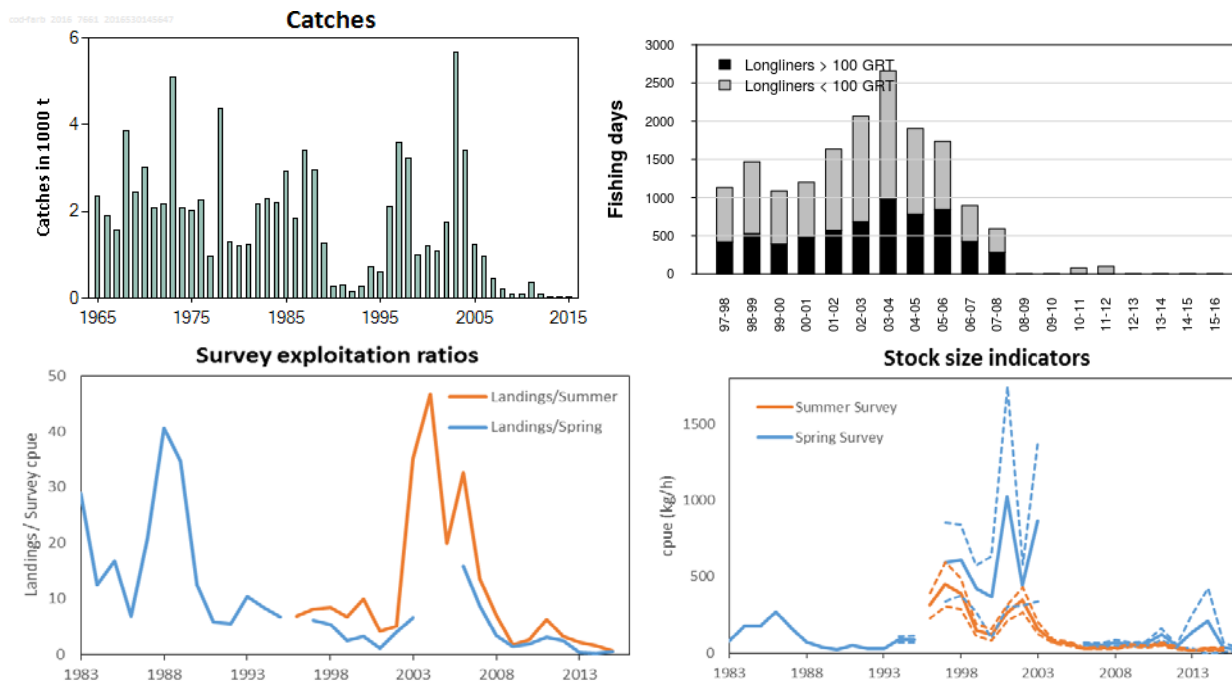


Figure 4.3.2.1 Cod in Subdivision 5.b.2 (Faroe Bank). Top left: ICES catches 1965–2015. Since 1992 catches on the Faroe Bank are considered to be taken only by Faroese and Norwegian vessels. Top right: Allocated fishing days 1997–2016 for longline gear types on the Faroe Bank. Bottom left: exploitation ratio (ratio of landings to survey cpue interpreted as an index of exploitation rate). Bottom right: Catch per unit of effort in the spring groundfish survey (1983–2016; blue line) and summer survey (1996–2015; orange line). Dashed lines show one standard error in the estimation of indexes.

Stock and exploitation status

Table 4.3.2.1 Cod in Subdivision 5.b.2 (Faroe Bank). 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}	?	?	?	MSY	?	?	?	Undefined
Precautionary approach	F_{pa}, F_{lim}	?	?	?	$B_{trigger}$?	?	?	Undefined
Management plan	F_{MGT}	-	-	-	B_{pa}, B_{lim}	?	?	?	Undefined
Qualitative evaluation		✓	✓	✓	SSB_{MG}	-	-	-	Not applicable
					T	✗	✗	✗	Below possible reference points

Catch options

New data on landings and indices from the annual Faroese surveys do not change the perception of the stock. ICES advises that because of the very low stock size, there should be zero catch from the stock. Given the current severely depleted status of the stock, it is likely to take several years for any possible recovery. Therefore, the advice is given for the next three years (2017–2019). Reopening the fishery should not be considered until both survey indices indicate a biomass at or above the average of the period 1996–2002.

Basis of the advice

Table 4.3.2.2 Cod in Subdivision 5.b.2 (Faroe Bank). The basis of the advice.

Advice basis	Precautionary approach.
Management plan	There is no management plan for this stock.

Quality of the assessment

The assessment is based on catch rates in two research surveys, and on exploitation ratios derived from landings data and survey indices. The uncertainty in the spring survey indices is large, while the summer survey has lower uncertainty. The recent depletion of the stock is confirmed by both surveys.

The landings estimates for this stock are uncertain as the vessels since 1996 have been allowed to fish both on the Faroe Plateau and on the Faroe Bank during the same trip.

Issues relevant for the advice

If the fishery management agency intends to manage the fisheries of the two stocks (Faroe Plateau cod and Faroe Bank cod) to protect the productive capacity of each individual stock, then it is necessary to identify the catch removed from each stock from all components of the fleet.

Reference points

No reference points are defined for this stock.

Basis of the assessment

Table 4.3.2.3 Cod in Subdivision 5.b.2 (Faroe Bank). The basis of the assessment.

ICES stock data category	3 (ICES, 2016)
Assessment type	Qualitative based on survey trends.
Input data	Landings and Faroese groundfish bottom trawl surveys (spring and summer)
Discards and bycatch	Considered negligible.
Indicators	None
Other information	None
Working group	North-Western Working Group (NWWG)

Information from stakeholders

There is no information available.

History of the advice, catch, and management

Table 4.3.2.4 Cod in Subdivision 5.b.2 (Faroe Bank). History of ICES advice, the agreed TAC, and landings.

Year	ICES advice	Predicted catch corresponding to advice	Agreed TAC**	Landings*
1987	No assessment	-		3.500
1988	No assessment	-		3.100
1989	Addition to Faroe Plateau TAC	~2.0		1.400
1990	Access limitation may be required	-		0.600
1991	Access limitation may be required			0.400
1992	No fishing	0.3		0.154
1993	TAC	0.5		0.266
1994	TAC	0.5		0.725
1995	Precautionary TAC	0.5		0.601
1996	Precautionary TAC	0.5	1.0	2.106
1997	Effort at present levels	0.7		3.594
1998	Effort at present levels	-		3.239
1999	Effort not to exceed that exerted in 1996–1997	-		1.001
2000	Effort not to exceed that of 1996–1998	-		1.194
2001	Effort not to exceed that of 1996–1999	-		1.080
2002	Effort not to exceed that of 1996–2000	-		1.756
2003	Effort not to exceed that of 1996–2001	-		5.676
2004	Effort not to exceed that of 1996–2002	-		3.411
2005	Effort not to exceed that of 1996–2002	-		1.232
2006	Effort not to exceed that of 1996–2002	-		0.955
2007	Effort not to exceed that of 1996–2002	-		0.450
2008	No fishing	0		0.218
2009	No fishing	0		0.080
2010	Same advice as last year	0		0.105
2011	Same advice as last year	0		0.370
2012	Same advice as last year	0		0.108
2013	Same advice as last year	0		0.038
2014	Same advice as last year	0		0.038
2015	Same advice as last year	0		0.017
2016	Same advice as last year	0		
2017	Precautionary approach	0		
2018	Precautionary approach	0		
2019	Precautionary approach	0		

Weights in thousand tonnes.

* Prior to 1992 official landings are presented, thereafter ICES estimates (catches on the Faroe Bank are considered to be taken only by Faroese and Norwegian vessels).

** Not applicable since 1997.

History of catch and landings

Table 4.3.2.5 Cod in Subdivision 5.b.2 (Faroe Bank). Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings	Discards
	100% Jigging	
17 t	17 t	Negligible

Table 4.3.2.6 Cod in Subdivision 5.b.2 (Faroe Bank). Nominal catches (tonnes) by country 1986–2015 as officially reported to ICES. From 1992 catches by the Faroe Islands and Norway are used in the assessment.

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999		
Faroe Islands	1836	3409	2966	1270	289	297	122	264	717	561	2051	3459	3092	1001		
Norway	6	23	94	128	72	38	32	2	8	40	55	135	147	88		
UK (E/W/Ni)	-	-	-	-	2**	1**	74**	186**	56**	43**	126***	61***	27***	-		
UK (Scotland)***	63	47	37	14	205	90	176	118	227	551	382	277	265	51		
Total	1905	3479	3097	1412	568	426	404	570	1008	1195	2614	3932	3531	210		
Used in assessment					289	297	154	266	725	601	2106	3594	3239	1350		
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Faroe Islands		1094	1840	5957	3607	1270	1005	471	231	81	111	393	115	40	40	18
Norway	49	51	25	72	18	37	10	7	1	4	1		0			0
Greenland	-	-	-	-	-	-	-	-	-	-	5		1			
UK (E/W/Ni)***	18	50	42	15	15	24	1									
UK (Scotland)	245***	288***	218***	254***	244***	1129***	278***	53	32	38	54				270	
Total	312	1483	2125	6298	3884	2460	1294	531	264	123	171	393	116	40	302	
Correction of Faroese catches in Subdivision 5.b.2		-65	-109	-353	-214	-75	-60	-28	-14	-5	-7	-23	-7	-2	-2	-1
Used in assessment	1194	1080	1756	5676	3411	1232	955	450	218	80	105	370	108	38	38	17

* Preliminary.

** Included in Subdivision 5.b.1.

*** Reported as Division 5.b.

Summary of the assessment

Table 4.3.2.7 Cod in Subdivision 5.b.2 (Faroe Bank). Catch per unit of effort in the spring groundfish survey and summer survey and exploitation ratios (ratios of landings to survey cpue, interpreted as an index of exploitation rate). When no survey index value was available, cells are left blank.

Year	Spring survey (kg h ⁻¹)	low (-1 × SE)	high (+1 × SE)	Exploitation ratio (Landings/ Spring survey)	Summer survey (kg h ⁻¹)	low (-1 × SE)	high (+1 × SE)	Exploitation ratio (Landings/ Summer survey)
1983	78.99			28.91				
1984	175.21			12.49				
1985	173.47			16.79				
1986	266.09			6.90				
1987	164.04			20.78				
1988	73.11			40.57				
1989	36.55			34.74				
1990	23.24			12.43				
1991	50.97			5.83				
1992	28.43			5.42				
1993	25.76			10.33				
1994	86.74	68.53	104.94	8.36				
1995	90.17	68.70	111.65	6.66				
1996					226.86	310.50	394.14	6.78
1997	593.42	337.49	849.34	6.06	305.29	449.16	593.02	8.00
1998	607.41	375.03	839.79	5.33	285.55	387.07	488.58	8.37
1999	421.00	270.88	571.11	2.38	111.99	149.54	187.10	6.69
2000	364.51	94.02	634.99	3.28	81.21	119.90	158.60	9.96
2001	1022.31	302.86	1741.76	1.06	210.80	262.59	314.38	4.11
2002	443.88	311.16	576.60	3.96	263.33	347.16	430.98	5.06
2003	867.09	338.03	1396.15	6.55	124.37	161.77	199.17	35.09
2004					61.22	73.04	84.86	46.70
2005					47.97	61.88	75.79	19.91
2006	60.51	51.19	69.82	15.78	24.57	29.27	33.97	32.62
2007	52.06	41.32	62.80	8.64	27.21	33.31	39.41	13.51
2008	64.02	44.76	83.28	3.41	26.28	31.17	36.07	6.99
2009	55.50	43.52	67.47	1.44	39.58	49.27	58.95	1.62
2010	58.08	39.33	76.82	1.81	34.67	41.64	48.61	2.52
2011	122.40	83.15	161.65	3.02	48.01	58.54	69.08	6.32
2012	44.54	35.49	53.59	2.42	26.26	34.25	42.24	3.15
2013	138.98	30.92	247.04	0.27	13.99	17.37	20.75	2.19
2014	209.20	-7.17	425.57	0.18	13.82	25.75	37.68	1.48
2015	37.19	6.66	67.71	0.46	14.41	24.82	35.23	0.68
2016	19.09	8.67	29.51					

Table 4.3.2.8 Cod in Subdivision 5.b.2 (Faroe Bank). Allocated fishing days 1997–2016 for longline gear types on the Faroe Bank.

Season	Large longliners (≥100 GRT)	Small longliners (< 100 GRT)
1997/1998	418	714
1998/1999	528	939
1999/2000	392	694
2000/2001	484	717
2001/2002	570	1065
2002/2003	684	1382
2003/2004	981	1678
2004/2005	781	1123
2005/2006	844	892
2006/2007	423	473
2007/2008	281	310
2008/2009	0	0
2009/2010	0	0
2010/2011	0	78
2011/2012	0	100
2012/2013	0	0
2013/2014	0	0
2014/2015	0	0
2015/2016	0	0

Sources and references

ICES. 2016a. General context of ICES advice. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2016b. Report of the North-Western Working Group (NWWG), 27 April–4 May, 2016, ICES Headquarters, Copenhagen. ICES CM 2016/ACOM:08.

Haddock (*Melanogrammus aeglefinus*) in Division 5.b (Faroes grounds)

ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2018 should be no more than 0.165, corresponding to catches of no more than 4570 t. ICES is not in a position to advise on the corresponding level of fishing effort.

Stock development over time

The spawning-stock biomass (SSB) has decreased since 2003 and is estimated to have been below B_{lim} since 2010, except in 2017. The fishing mortality (F) has decreased in recent years but is still above F_{MSY} . Recruitment (age 1) from 2004 onwards has been well below the long-term average. However, the 2016 year class is estimated to be above average.

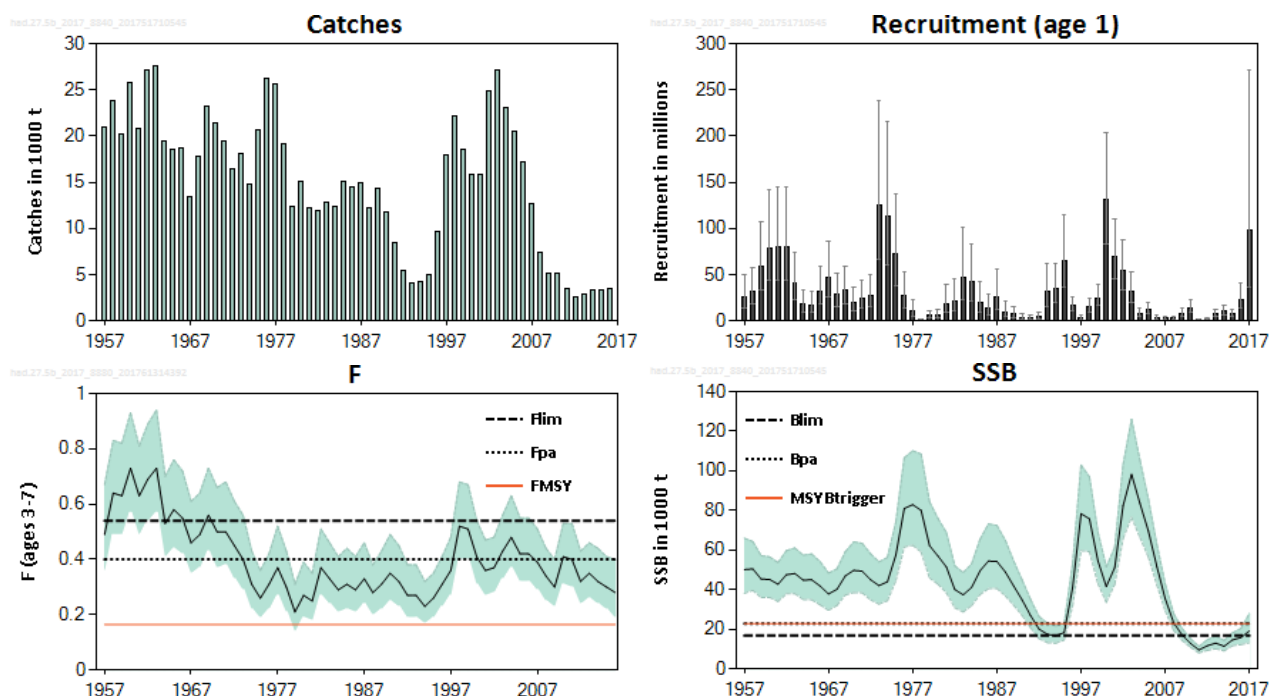


Figure 1 Haddock in Division 5.b. Summary of the stock assessment with point-wise 95% confidence intervals.

Stock and exploitation status

Table 1 Haddock in Division 5.b. State of the stock and fishery relative to reference points.

	Fishing pressure			Stock size			
		2014	2015	2016	2015	2016	2017
Maximum Sustainable Yield	F_{MSY}	✘	✘	✘ Above	$MSY B_{Trigger}$	✘	✘ Below trigger
Precautionary Approach	F_{pa}, F_{lim}	✔	✔	✔ Harvested sustainably	B_{pa}, B_{lim}	✘	✘ Increased risk
Management plan	F_{MGT}	—	—	— Not applicable	B_{MGT}	—	— Not applicable

Catch options

Table 2 Haddock in Division 5.b. The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–7 (2017)	0.28	ICES (2017)	F ₂₀₁₇ as estimated by SAM.
SSB (2018)	34 435 t	ICES (2017)	Based on F(2017) = 0.28.
R _{age 1} (2018)	8 371 thousand	ICES (2017)	Median of resampled estimates from 2000–2016.
R _{age 1} (2019)	8 371 thousand	ICES (2017)	Median of resampled estimates from 2000–2016.
Total catch (2017)	4 265 t	ICES (2017)	Based on F(2017) = 0.28.

Table 3 Haddock in Division 5.b. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	F _{total} (2018)	SSB (2019)	% SSB change *
ICES advice basis				
MSY approach: F _{MSY}	4570	0.165	79907	132
Other options				
F = 0	0	0	85604	149
F = F ₂₀₁₇	7396	0.28	76111	121
F = F _{pa}	10030	0.40	73107	112
F = F _{lim}	12814	0.54	69981	103

* SSB 2019 relative to SSB 2018.

Basis of the advice

Table 4 Haddock in Division 5.b. The basis of the advice.

Advice basis	MSY approach.
Management plan	There is no management plan for this stock. A preliminary management plan, including a recovery plan, was formulated in 2011, but has not been implemented.

Quality of the assessment

The stock was benchmarked in 2017. Input data and assessment model were changed, and uncertainty estimates are now available to assess the quality of the assessment. The historical stock perception has not changed significantly.

The landings data are considered accurate. There are no strong incentives to discard fish under the effort management system. The sampling of the landings is adequate. No major problems have been observed with the tuning indices (the two surveys).

There are indications that the 2016 year class may be well above average.

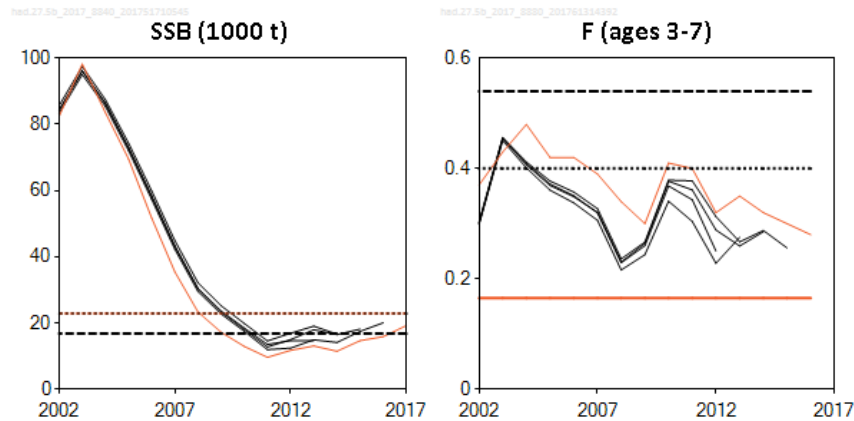


Figure 2 Haddock in Division 5.b. Historical assessment results. The age of recruitment has changed from age 2 to age 1 at the benchmark; therefore, the recruitment plot is not shown this year.

Issues relevant for the advice

An effort management system has been used since 1996. The Faroese parliament decides the number of allocated fishing days for each new fishing season. The number of fishing days used by the main fleet targeting cod (longliners) only amounts to around half of the allocated days. With surplus allocated fishing days, this system is not limiting fishing pressure.

ICES has not quantified the relationship between effort and F for this stock, as there is no apparent relationship between effort and F in the available data.

The Faroese parliament decided in 2007 to cancel all fishing licences for Faroese vessels in Faroese waters by 31 December 2017. A proposal for a new fisheries management system was delivered by the government to the Faroese parliament in May 2017. The new fisheries management system is expected to be implemented on 1st of January 2018.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery. Further development of management measures that includes the mixed-fishery issue would be useful.

Reference points

Table 5 Haddock in Division 5.b. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	22 843 t	B_{pa}	ICES (2017)
	F_{MSY}	0.165	Stochastic simulations based on segmented regression stock–recruitment relationship.	ICES (2017)
Precautionary approach	B_{lim}	16 780 t	The lowest biomass that has led to good recruitment.	ICES (2017)
	B_{pa}	22 843 t	$B_{lim} \times \exp(1.645 \times \sigma)$, where $\sigma = 0.19$.	ICES (2017)
	F_{lim}	0.54	Stochastic simulations (ICES, 2017) that gives a 50% probability of $SSB > B_{lim}$.	ICES (2017)
	F_{pa}	0.40	$F_{lim} \times \exp(-1.645 \times \sigma)$, where $\sigma = 0.18$.	ICES (2017)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Haddock in Division 5.b. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016).
Assessment type	SAM with catch-at-age data and age-disaggregated indices, using catches in the model and in the forecast.
Input data	Commercial catches (mainly Faroese catches, ages and length frequencies from catch sampling); survey indices (FO-GFS-Q1 and FO-GFS-Q3); annual maturity data from FO-GFS-Q1; natural mortalities set at 0.2.
Discards and bycatch	Discarding is assumed to be negligible.
Indicators	None.
Other information	Benchmarked in 2017.
Working group report	North-Western Working Group (NWWG)

Information from stakeholders

No information is available.

History of the advice, catch, and management

Table 7 Haddock in Division 5.b. ICES advice and catch. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987	No increase in F	17000		14882
1988	No increase in F	18000		12178
1989	No increase in F	11000		14325
1990	No increase in F	11000		11726
1991	TAC	11000		8429
1992	TAC	13000–15000		5476
1993	Reduction in F	8000		4026
1994	No fishing	0	6200	4252
1995	No fishing	0	6200	4948
1996	TAC	8300	12600	9642
1997	F = F(95)	9300		17924
1998	F = F(96)	16000		22210
1999	F < proposed F_{pa} (0.25)	9000		18482
2000	F < proposed F_{pa} (0.25)	22000		15821
2001	F < proposed F_{pa} (0.25)	20000		15890
2002	No fishing	0		24933
2003	F < proposed F_{pa} (0.25)	12000		27072
2004	F < proposed F_{pa} (0.25)	21000		23101
2005	F < proposed F_{pa} (0.25)	19000		20455
2006	F < proposed F_{pa} (0.25)	18000		17154
2007	F < 0.20	16000		12631
2008	F_{pa}	14000		7388
2009	No fishing and recovery plan	0		5197
2010	No fishing and recovery plan	0		5202
2011	No direct fishing; minimize bycatch, implement recovery plan	0		3540

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
2012	No direct fishing; minimize bycatch, implement recovery plan	0		2634
2013	No direct fishing; minimize bycatch, implement recovery plan	0		2950
2014	No direct fishing; minimize bycatch, implement recovery plan	0		3276
2015	No direct fishing; minimize bycatch, implement recovery plan	0		3395
2016	No direct fishing; minimize bycatch, implement recovery plan	0		3465
2017	MSY approach ($F \leq 0.17$)	≤ 3500		
2018	MSY approach ($F \leq 0.165$)	≤ 4570		

* Not applicable since 1997.

** Preliminary.

History of the catch and landings

Table 8 Haddock in Division 5.b. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings		Discards
	Longliners 79%	Trawlers 21%	
3465 tonnes	3465 tonnes		Negligible

Table 9 Haddock in Division 5.b. History of commercial catch and landings in subdivisions 5.b.1. and 5.b.2; both the official and ICES estimated values are presented for each country participating in the fishery. All weights are in tonnes. ICES estimated values used in the assessment (last column) are obtained by adding catch on the Faroe Bank (Subdivision 5.b.2) to the Faroe Plateau (Subdivision 5.b.1) and correction of conversion factors for round/gutted weight.

Year	Faroe Islands	England	France	Germany	Iceland	Norway	Scotland	Spain	Greenland	Russia	Total	Used in the assessment in Division 5.b
2000	15185	19	6	1	0	403	185	0	22	0	15821	15821
2001	15405	4	6	1	0	323	148	0	0	0	15887	15890
2002	24474	11	2	6	4	255	177	0	4	0	24933	24933
2003	26549	14	4	1	0	282	185	0	0	0	27035	27072
2004	22589	8	1	6	0	246	186	49	0	16	23101	23101
2005	20616	1	0	0	0	257	126	0	0	0	21000	20455
2006	16975	1	12	1	0	58	106	0	1	0	17154	17154
2007	12499	35	4	0	0	69	15	0	4	0	12626	12631
2008	7284	60	3	0	0	26	5	0	0	10	7388	7388
2009	5087	64	2	0	0	11	27	0	6	0	5197	5197
2010	5110	73	1	0	0	5	0	0	12	0	5201	5202
2011	3544	0	3	0	0	0	0	0	0	0	3547	3540
2012	2631	0	0	0	2	0	0	0	1	0	2634	2634
2013	2924	0	0	0	26	0	0	0	26*	0	2976	2950
2014	2827	350	0	0	0	3	74	0	0	0	3254	3276
2015	2940	449	0	0	0	6	0	0	0	0	3395	3395
2016	3202	252	0	0	0	11	0	0	0	0	3465	3465

* Not included in assessment catches.

Summary of the assessment

Table 10 Haddock in Division 5.b. Assessment summary. Weights are in tonnes.

Year	Recruitment (Age 1)	Recruit. 97.5 percentile	Recruit. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 3-7)	Mean F 97.5 percentile	Mean F 2.5 percentile
	thousands			tonnes				tonnes	per year	
1957	26530	50372	13972	50158	65958	38143	20995	0.49	0.67	0.36
1958	31896	58006	17538	50504	64310	39662	23871	0.64	0.83	0.49
1959	59499	106659	33191	45336	57139	35972	20239	0.63	0.82	0.49
1960	78895	141597	43959	45184	56562	36096	25727	0.73	0.93	0.57
1961	79881	144464	44170	42774	53713	34063	20831	0.63	0.81	0.49
1962	80073	144998	44219	47550	59688	37879	27151	0.69	0.89	0.54
1963	40716	73964	22413	48179	61041	38027	27571	0.73	0.94	0.57
1964	17917	32738	9806	44843	57396	35036	19490	0.53	0.7	0.41
1965	17307	31695	9451	44989	58022	34883	18479	0.58	0.76	0.44
1966	32436	59330	17733	41844	54112	32357	18766	0.55	0.72	0.42
1967	47006	86048	25678	37826	48389	29569	13381	0.46	0.61	0.35
1968	28386	51822	15549	40214	50474	32040	17852	0.49	0.64	0.37
1969	32633	59476	17904	46984	59171	37307	23272	0.56	0.73	0.43
1970	19878	36319	10880	49721	64123	38553	21361	0.5	0.66	0.37
1971	24055	43924	13174	49357	63386	38434	19393	0.5	0.68	0.38
1972	27202	49866	14839	45001	58149	34826	16485	0.45	0.61	0.33
1973	125775	237607	66578	42038	54032	32707	18035	0.4	0.56	0.29
1974	113579	214940	60017	43996	56264	34403	14773	0.31	0.43	0.22
1975	72284	137730	37936	57436	74136	44497	20715	0.26	0.36	0.19
1976	27482	53018	14245	81012	106595	61570	26211	0.31	0.42	0.22
1977	10019	22460	4469	82909	110126	62419	25555	0.37	0.52	0.27
1978	861	1943	381	80031	108481	59042	19200	0.3	0.43	0.21
1979	5802	11438	2943	62235	84356	45915	12424	0.21	0.31	0.14
1980	5975	12635	2825	57002	75956	42778	15016	0.27	0.39	0.19
1981	18569	39319	8770	51449	68857	38442	12233	0.25	0.35	0.18
1982	21309	45190	10048	40072	52014	30871	11937	0.37	0.51	0.27
1983	47375	100850	22255	37402	48661	28748	12894	0.33	0.46	0.24
1984	42570	83166	21791	41150	52991	31955	12378	0.29	0.41	0.21
1985	19972	42642	9355	49568	65427	37554	15143	0.31	0.44	0.22
1986	13301	28488	6211	54455	73141	40542	14477	0.29	0.41	0.21
1987	25604	55155	11886	54261	72469	40627	14882	0.33	0.46	0.24
1988	9544	20513	4440	48946	64963	36878	12178	0.28	0.38	0.2
1989	7429	15833	3486	41816	54419	32131	14325	0.31	0.43	0.22
1990	3338	7099	1570	34817	44855	27025	11726	0.35	0.49	0.25
1991	2908	6169	1371	26982	35049	20772	8429	0.32	0.45	0.23
1992	4293	9177	2008	20141	26505	15304	5476	0.27	0.38	0.19
1993	31254	62535	15620	17474	23010	13269	4026	0.27	0.38	0.19
1994	35270	61825	20121	16780	21704	12974	4252	0.23	0.32	0.17
1995	64456	114591	36256	18269	22897	14577	4948	0.26	0.35	0.19
1996	16474	26064	10412	41129	53116	31847	9642	0.31	0.41	0.23
1997	3897	6361	2388	78402	102958	59702	17924	0.36	0.48	0.27
1998	14894	23973	9253	75743	96930	59187	22210	0.52	0.68	0.4
1999	25027	39070	16031	54561	69084	43090	18482	0.51	0.67	0.4
2000	130456	203778	83516	41580	51496	33573	15821	0.41	0.54	0.31
2001	69922	109497	44650	51146	61275	42692	15890	0.36	0.47	0.27
2002	54446	88267	33584	82414	103067	65899	24933	0.37	0.48	0.28

Year	Recruitment (Age 1)	Recruit. 97.5 percentile	Recruit. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 3–7)	Mean F 97.5 percentile	Mean F 2.5 percentile
	thousands				tonnes			tonnes	per year	
2003	32299	52223	19976	98249	125991	76615	27072	0.43	0.56	0.33
2004	8371	13190	5313	83579	105276	66353	23101	0.48	0.63	0.37
2005	11939	19295	7387	69544	85655	56463	20455	0.42	0.55	0.32
2006	3379	5456	2093	51700	62919	42482	17154	0.42	0.55	0.32
2007	3343	5390	2073	35408	42811	29285	12631	0.39	0.51	0.29
2008	3416	5416	2155	23292	27915	19435	7388	0.34	0.44	0.25
2009	8156	13165	5052	17149	20490	14352	5197	0.3	0.4	0.23
2010	13947	22599	8608	12908	15260	10918	5202	0.41	0.53	0.31
2011	724	1193	439	9597	11394	8084	3540	0.4	0.53	0.3
2012	1748	2833	1079	11717	14701	9340	2634	0.32	0.43	0.24
2013	7244	11722	4477	13038	16703	10176	2950	0.35	0.46	0.26
2014	10045	16305	6188	11432	14349	9108	3276	0.32	0.44	0.24
2015	7171	11857	4338	14625	18193	11757	3395	0.3	0.41	0.22
2016	23162	40729	13172	15852	20461	12281	3465	0.28	0.4	0.19
2017	98629	271357	35848	19210	27952	13202				

Sources and references

ICES. 2016. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

ICES. 2017. Report of the North-Western Working Group (NWWG), 27 April–4 May, 2017, ICES Headquarters, Copenhagen. ICES CM 2017/ACOM:08.

Saithe (*Pollachius virens*) in Division 5.b (Faroes grounds)

ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2018 should be no more than 0.30, corresponding to a catch of no more than 35 003 t. ICES is not in a position to advise on the corresponding level of fishing effort.

Stock development over time

The spawning-stock biomass (SSB) was below MSY $B_{trigger}$ from 2011 to 2015, but is estimated to be above MSY $B_{trigger}$ in 2016 and 2017. Estimated recruitment has been well above the long-term average since 2015. Fishing mortality (F) has been above F_{MSY} since 1981.

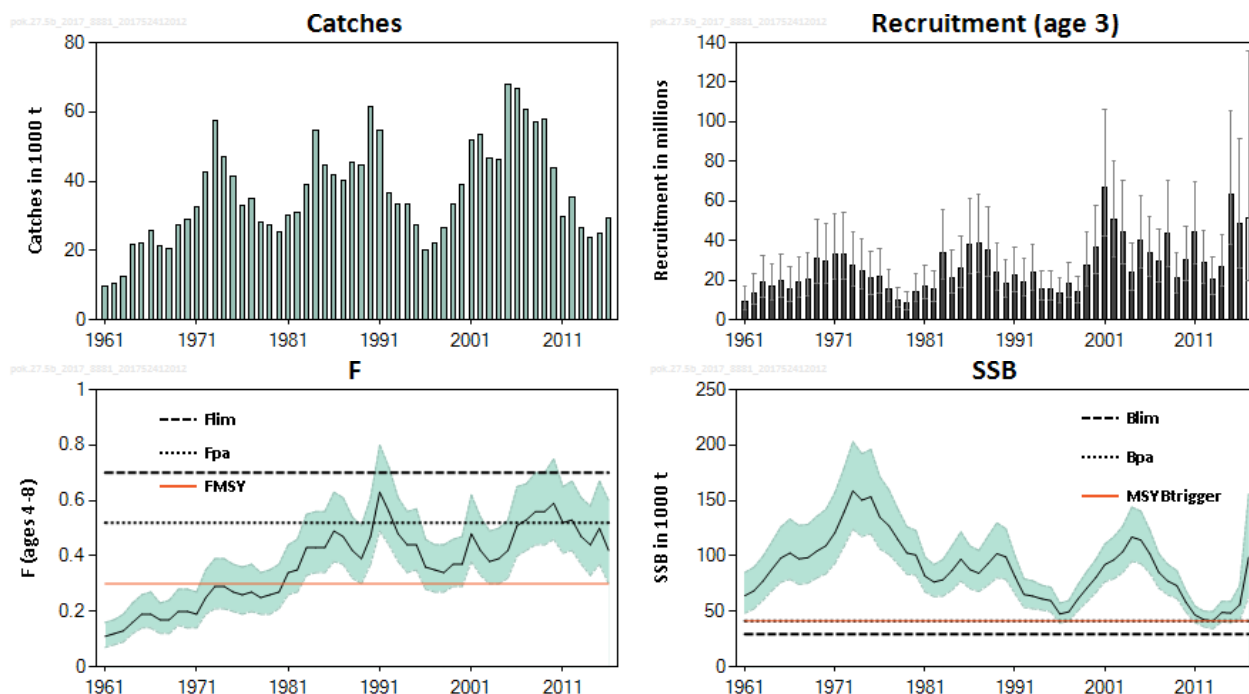


Figure 1 Saithe in Division 5.b. Summary of the stock assessment with point-wise 95% confidence intervals.

Stock and exploitation status

Table 1 Saithe in Division 5.b. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size				
		2014	2015	2016	2015	2016	2017		
Maximum Sustainable Yield	F_{MSY}	✗	✗	✗	MSY	✓	✓	✓	Above trigger
Precautionary Approach	F_{pa} F_{lim}	✓	✓	✓	B_{pa} , B_{lim}	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	—	—	—	B_{MGT}	—	—	—	Not applicable

Catch options

Table 2 Saithe in Division 5.b. The basis for the catch options.

Variable	Value	Source	Notes
F ages 4–8 (2017)	0.42	ICES (2017a)	F ₂₀₁₇ as estimated by SAM.
SSB (2018)	117 718 t	ICES (2017a)	
R _{age 3} (2018)	29 029 thousand	ICES (2017a)	Median of resampled estimates from 2012 to 2016.
R _{age 3} (2019)	29 029 thousand	ICES (2017a)	Median of resampled estimates from 2012 to 2016.
Total catch (2017)	46 375 t	ICES (2017a)	Based on F = 0.42.

Table 3 Saithe in Division 5.b. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	F _{total} (2018)	SSB (2019)	% SSB change *
ICES advice basis				
MSY approach: F _{MSY} = 0.30	35003	0.30	157871	34
Other options				
F = 0	0	0	263553	124
F = F ₂₀₁₇	58934	0.42	130221	11
F = F _{pa}	66438	0.52	116354	-1
F = F _{lim}	71365	0.70	90018	-24

* SSB 2019 relative to SSB 2018.

Basis of the advice

Table 4 Saithe in Division 5.b. The basis of the advice.

Advice basis	MSY approach.
Management plan	There is no management plan for this stock. A preliminary management plan was formulated in 2011, but has not been implemented.

Quality of the assessment

The stock was benchmarked in 2017 (ICES, 2017b). Input data and the assessment model were changed and, therefore, the historical stock perception has also changed.

The landings data are considered accurate. There are no strong incentives to discard fish under the current effort management system. The sampling of the landings is considered to be adequate.

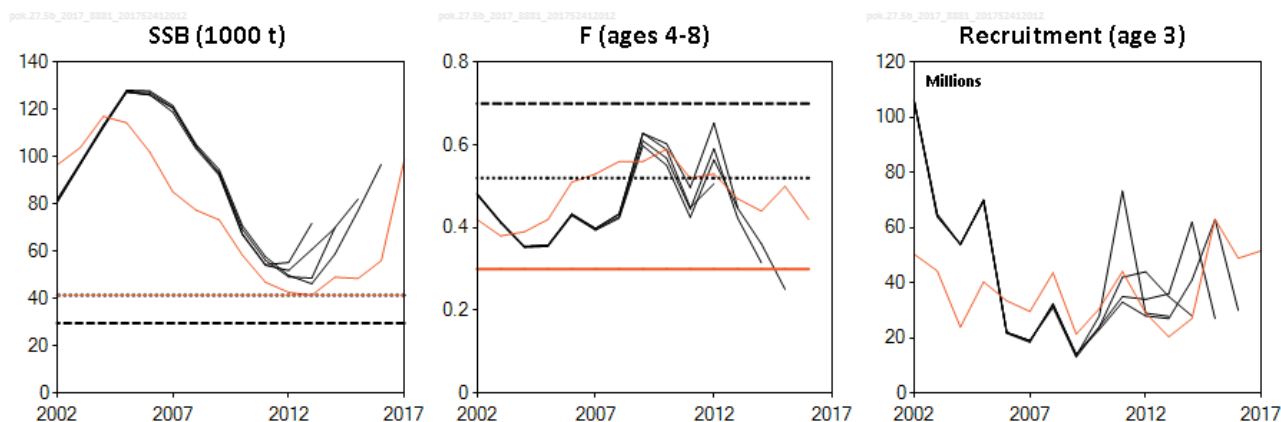


Figure 2 Saithe in Division 5.b. Historical assessment results.

Issues relevant for the advice

An effort management system has been used since 1996. The Faroese parliament decides the number of allocated fishing days for each new fishing season. In the 2015/2016 fishing year 20% of the allocated days for the trawl fleet were not used. With surplus allocated fishing days, current effort control is not limiting fishing pressure.

The Faroese parliament decided in 2007 to cancel all fishing licences for Faroese vessels in Faroese waters by 31 December 2017. A proposal for a new fisheries management system was delivered by the government to the Faroese parliament in May 2017. The new fisheries management system is supposed to be implemented on 1st of January 2018.

ICES has not quantified the relationship between effort and F for this stock, since there is no apparent relationship between effort and F in the available data.

The advice is given by calendar year, though the fishing year runs from 1 September to 31 August of the following year.

Reference points

Table 5 Saithe in Division 5.b. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	41 400 t	B_{loss} .	ICES (2017a)
	F_{MSY}	0.30	Stochastic simulations	ICES (2017a)
Precautionary approach	B_{lim}	29 571 t	$B_{pa}/1.4$.	ICES (2017a)
	B_{pa}	41 400 t	B_{loss} .	ICES (2017a)
	F_{lim}	0.7	Stochastic simulations; F that gives a 50% probability of $SSB > B_{lim}$.	ICES (2017a)
	F_{pa}	0.52	$F_{lim} \times \exp(-1.645 \times \sigma)$, where $\sigma = 0.18$.	ICES (2017a)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Saithe in Division 5.b. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016b).
Assessment type	State-space model (SAM) using catches in the model and in the forecast.
Input data	Commercial catches (mainly Faroese catches, ages and length frequencies from catch sampling); Faroese bottom-trawl surveys FO-GFS-Q1 and FO-GFS-Q3; annual maturity data from FO-GFS-Q1; natural mortalities set at $M = 0.2$.
Discards and bycatch	Discarding is considered negligible. Bycatch is included.
Indicators	None.
Other information	A benchmark assessment was performed in 2017 (WKFAROE; ICES, 2017b).
Working group	North-Western Working Group (NWWG)

Information from stakeholders

No information is available.

History of the advice, catch, and management

Table 7 Saithe in Division 5.b. ICES advice and official catch. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987	No increase in F	< 32000		40020
1988	No increase in F	< 32000		45285
1989	Reduction in F	< 40000		44477
1990	Reduction in F	< 41000		61628
1991	TAC	< 30000		54858
1992	Reduction in F	< 27000		36487
1993	Reduction in F	< 37000		33543
1994	TAC	< 26000	42000**	33182
1995	TAC	< 22000	39000**	27209
1996	TAC	< 39000	-	20029
1997	20% reduction in F from 1995 level	< 21000	-	22306
1998	30% reduction in effort from 1996/1997 level	-	-	26421
1999	F below F_{pa} (0.28)	< 14000		33207
2000	F below than F_{pa} (0.28)	< 15000		39020
2001	Reduce fishing effort to generate F well below F_{pa} (0.28)	< 17000		51786
2002	Reduce fishing effort to generate F below F_{pa} (0.28)	< 28000		53546
2003	Reduce fishing effort to generate F below F_{pa} (0.28)	< 47000		46555
2004	Reduce fishing effort to generate F below F_{pa} (0.28)	< 48000		46355
2005	Reduce fishing effort to generate F below F_{pa} (0.28)	< 32000		67967
2006	Reduce fishing effort to generate F below F_{pa} (0.28)	< 24000		66902
2007	Average catch considerations	40000		60785
2008	Do not increase effort	-		57044
2009	Reduce fishing effort by around 20%	-		57949
2010	Reduce fishing effort by around 20%	-		43885
2011	Reduce fishing effort to generate F below F_{pa} (0.28)	< 38000		29658
2012	Reduce fishing effort to generate F below F_{MSY} (0.28)	< 40000		35314
2013	$F < 0.28$	< 29100		26463
2014	Reduce fishing effort to generate F below F_{MSY} (0.30)	< 29000		23885
2015	Reduce fishing effort to generate F below F_{MSY} (0.30)	< 26000		25128
2016	Reduce fishing effort to generate F below F_{MSY} (0.30)	< 36000		29450
2017	MSY approach ($F \leq 0.30$)	≤ 46000		
2018	MSY approach ($F \leq 0.30$)	≤ 35000		

* Not applicable since 1997.

** In the quota year 1 September–31 August the following year.

History of the catch and landings

Table 8 Saithe in Division 5.b. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Landings		Discards
	96% pair trawler	4% Others	
29 450 tonnes	29 450 tonnes		Negligible

Table 9 Saithe in Division 5.b. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Denmark	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	16	-	-	-	-	-
Faroe Islands	43624	59821	53321	35979	32719	32406	26918	19267	21721	25995	32439	^^^	49676	55165
France	***	***	***	120	75	19	10	12	9	17	-	273	934	607
Germany	-	-	32	5	2	1	41	3	5	-	100	230	667	422
German Dem. Rep.	9	-	-	-	-	-	-	-	-	-	-	-	-	125
German Fed. Rep.	20	15	-	-	-	-	-	-	-	-	-	-	5	-
Greenland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	-	-	-	0	0	0	0
Netherlands	22	67	65	-	-	-	-	-	-	-	160	72	60	77
Norway	51	46	103	85	32	156	10	16	67	53	-	-	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	-	20	1	10
UK (Eng. & W.)	-	-	5	74	279	151	21	53	-	19	67	32	80	58
UK (Scotland)	9	33	79	98	425	438	200	580	460	337	441	534	708	540
USSR/Russian Fed. **	-	30	-	12	-	-	-	18	28	-	-	-	-	-
Total	43735	60014	53605	36373	33532	33171	27200	19949	22306	26065	33207	1161	52131	57004
ICES estimate ^^^	44477	61628	54858	36487	33543	33182	27209	20029	22306	26421	33207	39020	51786	53546

pok.27.5b

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Denmark	-	-	-	34	-	-	-	-	-	-	-			
Estonia	-	-	-	-	-	-	-	-	-	-	-			
Faroe Islands ##	47933	48222	71496	70696	64552	61117	61889	46686	32056	38175	28609	25474	26796	30837
France	370	147	123	315	108	97	68	46	135	40	31	0	122	336
Germany	281	186	1	49	3	3	0							
Greenland	-			73	239	0	1			1				
Ireland	-	-	-	-	-	-	-							
Iceland	-	-	-	-	-	-	148	-						19
Netherlands	0	0	0	0	3	0	0	0						1
Norway	62	82	82	35	81	38	23	28				165	40	198
Portugal	-	5	-	-	-	-	-							
Russian Federation	32	71	210	104	159	38	44	3			1			
UK (E/W/Nl)	89	85	32	88	4	-	-							
UK (Scotland)	610	748	4322	1011	408	400	685							
United Kingdom	-	-	-	-	-	-	-	706	19		1	340	304	601
Total	49377	49546	76266	72405	65557	61693	62858	47469	32210	38216	28642	25979	27262	31992
ICES estimate ^^^#	46555	46355	67967	66902	60785	57044	57949	43885	29658	35314	26463	23885	25128	29450

* Preliminary.

** As from 1991.

*** Quantity unknown 1989–1991.

^ Includes catches from Subdivision 5.b.2 and Division 2.a in Faroese waters.

^^ Includes French, Greenlandic, and Russian catches from Division 5.b, as reported to the Faroese coast guard.

^^^ No official catches reported.

Includes Faroese, French, and Greenlandic catches from Division 5.b, as reported to the Faroese coast guard.

The 2001–2008 catches from Faroe Islands, as stated from the Faroese coast guard, have been corrected to be consistent with procedures used in previous years.

Summary of the assessment

Table 10 Saithe in Division 5.b. Assessment summary. Weights are in tonnes.*

Year	Recruitment (Age 3)	Recruit. 97.5 percentile	Recruit. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 4–8)	Mean F 97.5 percentile	Mean F 2.5 percentile
	thousands			tonnes				tonnes	per year	
1961	9177	16621	5067	64187	85139	48391	9592	0.11	0.16	0.07
1962	13633	23340	7963	68581	89804	52374	10454	0.12	0.17	0.08
1963	19085	32411	11238	77255	99598	59925	12693	0.13	0.19	0.09
1964	16987	28527	10115	88050	112686	68800	21893	0.16	0.23	0.12
1965	19533	32777	11640	98159	126212	76342	22181	0.19	0.26	0.14
1966	15728	26469	9345	102611	133240	79023	25563	0.19	0.27	0.14
1967	18999	31799	11351	97372	127520	74351	21319	0.17	0.23	0.12
1968	20467	34022	12313	98458	128401	75498	20387	0.17	0.24	0.12
1969	30773	50898	18605	104398	135763	80280	27437	0.2	0.28	0.15
1970	29881	48838	18282	109182	142040	83926	29110	0.2	0.28	0.14
1971	32953	53515	20291	120998	157023	93238	32706	0.19	0.27	0.14
1972	33356	53973	20614	139214	178701	108452	42663	0.25	0.35	0.19
1973	27643	44703	17094	158701	202969	124089	57431	0.29	0.39	0.21
1974	24930	40683	15277	150301	192105	117594	47188	0.29	0.39	0.21
1975	21118	34572	12900	153389	196044	120015	41576	0.27	0.37	0.2
1976	21977	36212	13338	134904	171271	106260	33065	0.26	0.36	0.19
1977	15562	25506	9495	127312	159751	101460	34835	0.27	0.37	0.2
1978	10008	16411	6103	114899	142178	92854	28138	0.25	0.34	0.19
1979	8721	14354	5298	102702	126325	83496	27246	0.26	0.35	0.19
1980	14406	23375	8878	100869	122980	82734	25230	0.27	0.37	0.21
1981	16977	27613	10438	81927	99116	67720	30103	0.34	0.44	0.26
1982	15202	24839	9304	76474	92234	63407	30964	0.35	0.46	0.27
1983	33557	55455	20306	78536	96719	63771	39176	0.43	0.55	0.33
1984	21488	34921	13223	86756	108911	69107	54665	0.43	0.56	0.34
1985	26325	42491	16309	97099	121709	77465	44605	0.43	0.56	0.34
1986	37796	61516	23223	87688	109057	70505	41716	0.49	0.63	0.38
1987	38941	63245	23977	84457	104962	67958	40020	0.47	0.61	0.37
1988	35160	57153	21630	92989	117601	73527	45285	0.42	0.54	0.32
1989	23896	38662	14770	102112	129849	80300	44477	0.39	0.51	0.3
1990	18530	29987	11450	99192	124616	78955	61628	0.47	0.61	0.37
1991	22840	36663	14229	81502	100388	66169	54858	0.63	0.8	0.49
1992	19263	30834	12035	65266	79420	53635	36487	0.56	0.72	0.44
1993	23782	38181	14813	63803	77560	52486	33543	0.48	0.61	0.38
1994	15380	24341	9718	61408	73488	51314	33182	0.44	0.56	0.34
1995	15426	24407	9750	59729	71844	49657	27209	0.44	0.57	0.35
1996	13385	21148	8472	47695	57420	39617	20029	0.36	0.46	0.28
1997	18244	28663	11613	49700	59821	41291	22306	0.35	0.44	0.27
1998	13878	21972	8766	61146	73925	50576	26421	0.34	0.44	0.27
1999	27472	44313	17032	71033	85975	58688	33207	0.37	0.46	0.29
2000	36497	57543	23148	80544	96756	67049	39020	0.37	0.47	0.29
2001	66997	106402	42186	92231	110745	76812	51786	0.48	0.62	0.38
2002	50405	80454	31580	96505	117356	79358	53546	0.42	0.54	0.33
2003	44313	70210	27968	103900	126900	85069	46555	0.38	0.49	0.3
2004	23904	39015	14645	117073	143996	95184	46355	0.39	0.5	0.3

* Version 2: Recruitment age and mean F ages corrected

Year	Recruitment (Age 3)	Recruit. 97.5 percentile	Recruit. 2.5 percentile	SSB	SSB 97.5 percentile	SSB 2.5 percentile	Catch	Mean F (Ages 4–8)	Mean F 97.5 percentile	Mean F 2.5 percentile
	thousands			tonnes			tonnes	per year		
2005	40340	62900	25871	114394	140379	93219	67967	0.42	0.53	0.32
2006	33478	51996	21555	102030	123198	84498	66902	0.51	0.65	0.4
2007	29571	45451	19239	85134	101893	71131	60785	0.53	0.66	0.42
2008	43606	70528	26960	77408	92387	64858	57044	0.56	0.7	0.44
2009	21348	33731	13510	73308	86855	61873	57949	0.56	0.7	0.44
2010	30629	47446	19772	58407	68686	49667	43885	0.59	0.75	0.46
2011	44110	69774	27885	46897	54884	40072	29658	0.52	0.65	0.41
2012	29029	45138	18669	42630	50195	36206	35314	0.53	0.67	0.42
2013	20413	32015	13015	41400	49805	34414	26463	0.47	0.61	0.37
2014	27040	43221	16917	49035	59209	40609	23885	0.44	0.58	0.33
2015	63047	105250	37766	48507	58887	39957	25128	0.5	0.67	0.37
2016	48906	91455	26152	56022	73550	42670	29450	0.42	0.6	0.3
2017	51644*	135814	19638	98930	155798	62820				

* Estimated in SAM.

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