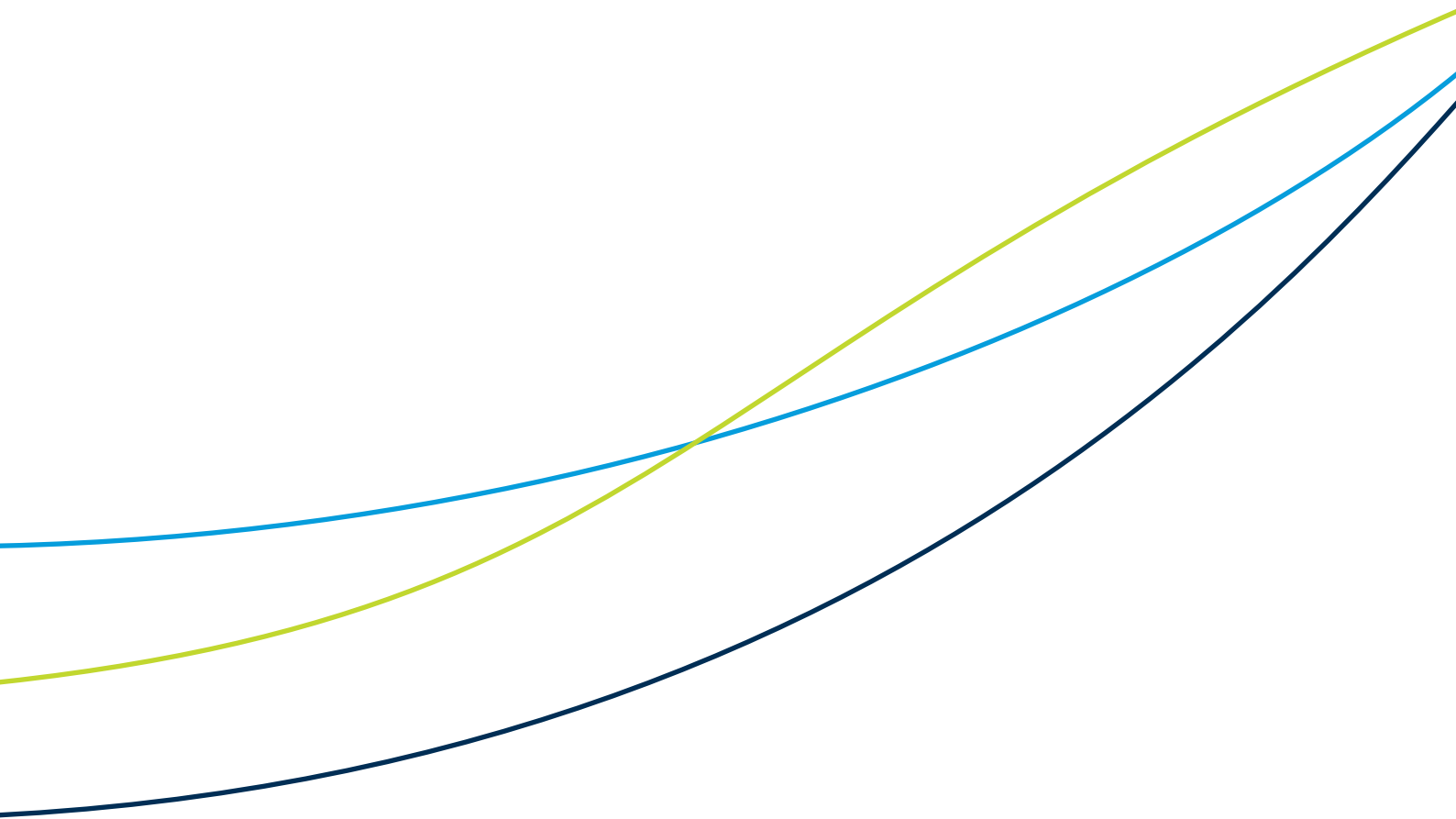


# Skjal 2.

The Faroe Plateau Ecosystem. ICES 2016





### 4.3.1 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 2017 should be no more than 0.16. 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 remained around  $B_{lim}$  since 2005. Fishing mortality (F) decreased from 2010 to 2013, but increased in 2014–2015 and is now above  $F_{pa}$ . The 2009–2014 year classes are estimated to be below average size.

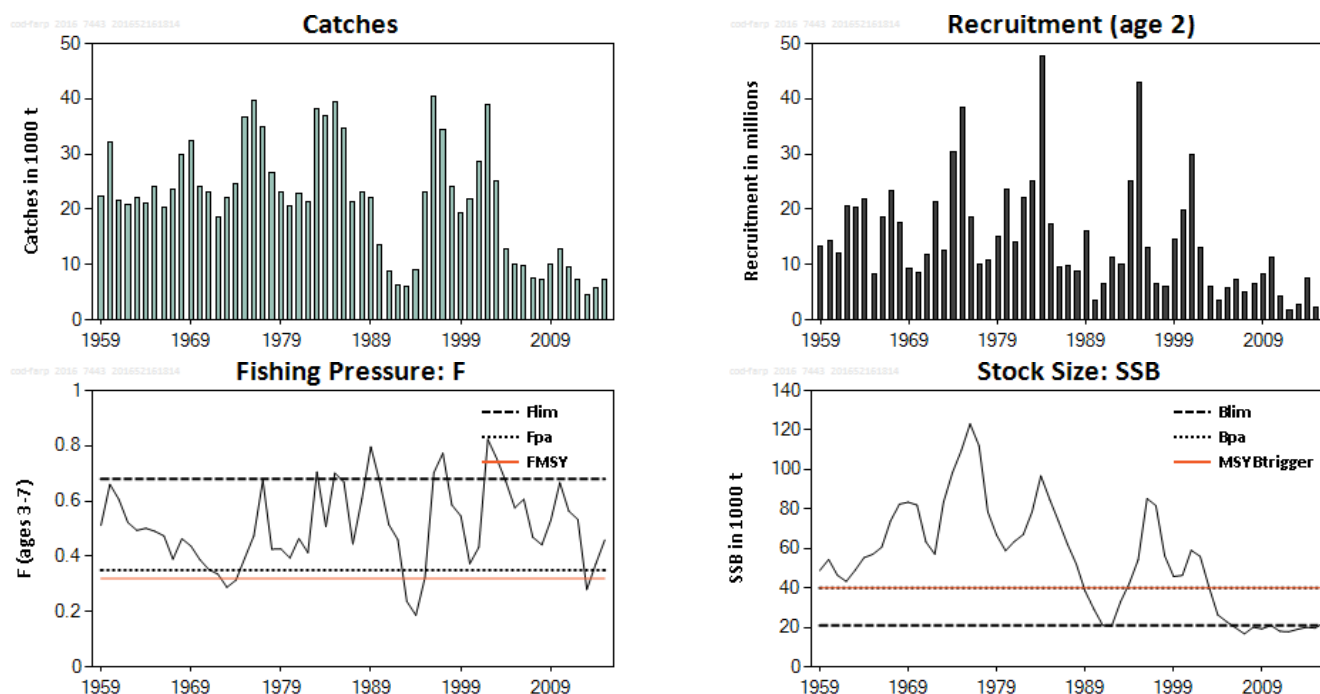


Figure 4.3.1.1 Cod in Subdivision 5.b.1 (Faroe Plateau). Summary of stock assessment (weights in thousand tonnes).

#### Stock and exploitation status

Table 4.3.1.1 Cod in Subdivision 5.b.1 (Faroe Plateau). State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	$F_{MSY}$	✓	✗	✗ Above $F_{MSY}$	✗	✗	✗ Below trigger
Precautionary approach	$F_{pa}$ , $F_{lim}$	✓	⊙	⊙ Increased risk	✗	✗	⊙ Increased risk
Management plan	$F_{MGT}$	-	-	- Not applicable	-	-	- Not applicable

**Catch options**

**Table 4.3.1.2** Cod in Subdivision 5.b.1 (Faroe Plateau). The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–7 (2016)	0.46	ICES (2016a)	F <sub>2015</sub>
SSB (2017)	20 kt	ICES (2016a)	
R <sub>age2</sub> (2017)	4.3 millions	ICES (2016a)	Average of the recruitment in 2013–2015
R <sub>age2</sub> (2018)	4.3 millions	ICES (2016a)	Average of the recruitment in 2013–2015
Total catch (2016)	7.5 kt	ICES (2016a)	Resulting from the assumption of F <sub>2016</sub> = F <sub>2015</sub> .
Landings (2016)	7.5 kt	ICES (2016a)	Discarding is considered negligible.

**Table 4.3.1.3** Cod in Subdivision 5.b.1 (Faroe Plateau). The catch options.

Rationale	F (2017)	Catch (2017)	Basis	SSB (2018)	%SSB change *
MSY approach	0.16	2.8	$F_{MSY} \times SSB_{2017} / MSY B_{trigger}$	23.6	17
Zero catch	0	0	F = 0	26.7	33
Other options	0.46	7.1	$F_{sq} = F_{2016}$	18.9	-6
	0.23	3.9	$F_{sq} \times 0.50$	22.4	11
	0.35	5.6	$F_{pa} (= F_{sq} \times 0.75)$	20.5	2
	0.32	5.2	$F_{MSY}$	20.9	4
	0.41	6.5	$F_{sq} \times 0.90$	19.5	-3
	0.51	7.6	$F_{sq} \times 1.1$	18.3	-9

Weights in thousand tonnes.

\* SSB 2018 relative to SSB 2017.

**Basis of the advice**

**Table 4.3.1.4** Cod in Subdivision 5.b.1 (Faroe Plateau). 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 landings data are considered accurate. There are no strong incentives to discard fish under the effort management system. The sampling of the landings is believed to be adequate.



**Figure 4.3.1.2** Cod in Subdivision 5.b.1 (Faroe Plateau). Historical assessment results (final-year recruitment estimates included).

**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, current effort control 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.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery. In the current state of both stocks (around  $B_{lim}$ ), and with effort control not limiting fishing pressure, further development of management measures that includes the mixed-fishery issue would be useful.

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 4.3.1.5** Cod in Subdivision 5.b.1 (Faroe Plateau). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	40 000 t	$B_{pa}$ .	ICES (2011)
	$F_{MSY}$	0.32	Provisional maximum sustainable yield, FLR stochastic simulations.	ICES (2011)
Precautionary approach	$B_{lim}$	21 000 t	Lowest observed SSB (1998 assessment).	ICES (1998)
	$B_{pa}$	40 000 t	$B_{lim} \times e^{1.645\sigma}$ , assuming $\sigma = 0.40$ to account for the relatively large uncertainties in the assessment.	ICES (1998)
	$F_{lim}$	0.68	$F_{pa} \times e^{1.645\sigma}$ , assuming $\sigma = 0.40$ to account for the relatively large uncertainties in the assessment.	ICES (1998)
	$F_{pa}$	0.35	Close to $F_{max}$ (0.34) and $F_{med}$ (0.38) (1998 assessment).	ICES (1998)
Management plan	$SSB_{MGT}$	Not applicable		
	$F_{MGT}$	Not applicable		

**Basis of the assessment**

**Table 4.3.1.6** Cod in Subdivision 5.b.1 (Faroe Plateau). The basis of the assessment.

ICES stock data category	1 ( <a href="#">ICES, 2016b</a> )
Assessment type	XSA 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 assessment was last benchmarked by NWWG in 2004. A benchmark is planned for 2017.
Working group	North-Western Working Group ( <a href="#">NWWG</a> )

**Information from stakeholders**

There is no available information.

## History of the advice, catch, and management

**Table 4.3.1.7** Cod in Subdivision 5.b.1 (Faroe Plateau). History of ICES advice, the agreed TAC, and ICES estimates of landings.

Fishing Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC***	ICES landings
1987	No increase in F	< 31		21.4
1988	No increase in F (Revised estimate)	< 29 (23)		23.2
1989	No increase in F	< 19		22.1
1990	No increase in F	< 20		13.7
1991	TAC	< 16		8.8
1992	No increase in F	< 20		6.4
1993	No fishing	0		6.1
1994	No fishing	0	8.5/12.5*,**	9.0
1995	No fishing	0	12.5*	23.0
1996	F at lowest possible level	-	20**	40.4
1997	80% of F(95)	< 24		34.3
1998	30% reduction in effort from 1996/97	-		24.0
1999	F less than proposed $F_{pa}$ (0.35)	< 19		19.2
2000	F less than proposed $F_{pa}$ (0.35)	< 20		21.8
2001	F less than proposed $F_{pa}$ (0.35)	< 16		28.6
2002	75% of F(2000)	< 22		38.8
2003	75% of F(2001)	< 32		25.2
2004	25% reduction in effort	-		12.8
2005	Rebuilding plan involving large reduction	-		10.1
2006	Rebuilding plan involving large reduction	-		9.8
2007	Rebuilding plan involving large reduction in effort	-		7.5
2008	No fishing. Development of a rebuilding plan.	0		7.3
2009	No fishing. Development of a rebuilding plan.	0		10.0
2010	No fishing. Development of a rebuilding plan.	0		12.8
2011	Reduce F to below $F_{pa}$	< 16		9.7
2012	MSY framework, reduce F by 30%	< 10		7.2
2013	MSY approach, $F < 0.20$	< 4.8		4.5
2014	MSY approach, reduce F by 69 %	< 3.6		5.7
2015	MSY approach, reduce F by 23 %	< 4.5		7.4
2016	Lowest possible level (LPL) and develop a mixed-fishery management plan	LPL		
2017	MSY approach ( $F \leq 0.16$ )	$\leq 2.8$		

Weights in thousand tonnes.

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

\*\* The TAC was increased during the quota year.

\*\*\* Not applicable since 1997.

## History of catch and landings

**Table 4.3.1.8** Cod in Subdivision 5.b.1 (Faroe Plateau). Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings			Discards
	62% longlines	29% trawlers	9% jigging 0.1% other gear types	
7.394 kt	7.394 kt			Negligible

**Table 4.3.1.9** Cod in Subdivision 5.b.1 (Faroe Plateau). History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Denmark	Faroe Islands	France	Germany	Iceland	Norway	Greenland	Portugal	UK (E/W/NI)	UK (Scotland)	United Kingdom	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		14201.28
2011		11348	-			0			0	0		11348

Year	Denmark	Faroe Islands	France	Germany	Iceland	Norway	Greenland	Portugal	UK (E/W/NI)	UK (Scotland)	United Kingdom	Total
2012		8437	0		28	0			0	0		8465
2013		5331	0		20	0	2		0	0		5333.01
2014		6655				6			0	226		6887.414
2015*		7812				33	14		0	382		8241

\* Preliminary

\*\* Included in 5.b.2

\*\*\* Reported as 5.b

**Table 4.3.1.10** Cod in Subdivision 5.b.1 (Faroe Plateau). ICES estimated catch (tonnes) used in the assessment.

Year	Officially reported	Faroese catches				Catches reported as 5.b.2			Foreign catches				Used in the assessment
		In 5.b.1	Corrections in 5.b.1	On Faroe-Iceland ridge	in 2.a within Faroe area jurisdiction	UK (E/W/NI)	UK (Scotland)	UK	French**	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



Year	Officially reported	Faroese catches				Catches reported as 5.b.2			Foreign catches				Used in the assessment
		In 5.b.1	Corrections in 5.b.1	On Faroe-Iceland ridge	in 2.a within Faroe area jurisdiction	UK (E/W/NI)	UK (Scotland)	UK	French**	Greenland**	Russia**	UK**	
2005	13781		-804	-3987			1129	-				-	10119
2006	11691		-690	-1435			278						9844
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

\* Preliminary

\*\* Reported to Faroese Coastal Guard.

\*\*\* Expected misreporting/discard.

### Summary of the assessment

**Table 4.3.1.11** Cod in Subdivision 5.b.1 (Faroe Plateau). Assessment summary (weights in tonnes).

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year <sup>-1</sup>
1959	13238	48869	22415	0.512
1960	14245	54447	32255	0.661
1961	12019	46439	21598	0.606
1962	20654	43326	20967	0.523
1963	20290	49054	22215	0.494
1964	21834	55362	21078	0.502
1965	8269	57057	24212	0.491
1966	18566	60629	20418	0.474
1967	23451	73934	23562	0.39
1968	17582	82484	29930	0.464
1969	9325	83487	32371	0.438
1970	8608	82035	24183	0.388
1971	11928	63308	23010	0.353
1972	21320	57180	18727	0.336
1973	12573	83547	22228	0.289
1974	30480	98434	24581	0.314
1975	38319	109566	36775	0.395
1976	18575	123077	39799	0.475
1977	9995	112057	34927	0.676
1978	10748	78497	26585	0.426
1979	14998	66723	23112	0.427
1980	23582	58887	20513	0.395
1981	14000	63562	22963	0.465
1982	22128	67033	21489	0.414
1983	25161	78542	38133	0.706
1984	47766	96773	36979	0.508
1985	17322	84786	39484	0.701
1986	9511	73693	34595	0.669
1987	9913	62241	21391	0.445
1988	8729	52125	23182	0.608
1989	16169	38406	22068	0.796
1990	3636	29270	13692	0.668
1991	6658	21069	8750	0.515
1992	11380	20755	6396	0.461
1993	10087	33068	6107	0.237
1994	25220	42475	9046	0.187
1995	42867	54320	23045	0.322
1996	13092	85321	40422	0.703
1997	6590	81714	34304	0.773
1998	6064	56284	24005	0.586
1999	14629	45830	19245	0.546
2000	19972	46396	21833	0.374
2001	29888	59118	28577	0.433
2002	13160	56006	38834	0.823
2003	6112	40542	25167	0.753
2004	3527	26435	12840	0.671
2005	5880	22942	10119	0.576
2006	7393	19879	9844	0.607

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year <sup>-1</sup>
2007	5030	16786	7511	0.47
2008	6465	20129	7315	0.442
2009	8237	19359	9979	0.531
2010	11303	21047	12757	0.667
2011	4294	18135	9692	0.564
2012	1884	17848	7204	0.534
2013	2890	19083	4473	0.28
2014	7654	20087	5715	0.373
2015	2389	19729	7394	0.46
2016	3374	22408		
<b>Average</b>	<b>14327</b>	<b>54165</b>	<b>21579</b>	<b>0.507</b>

### Sources and references

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

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

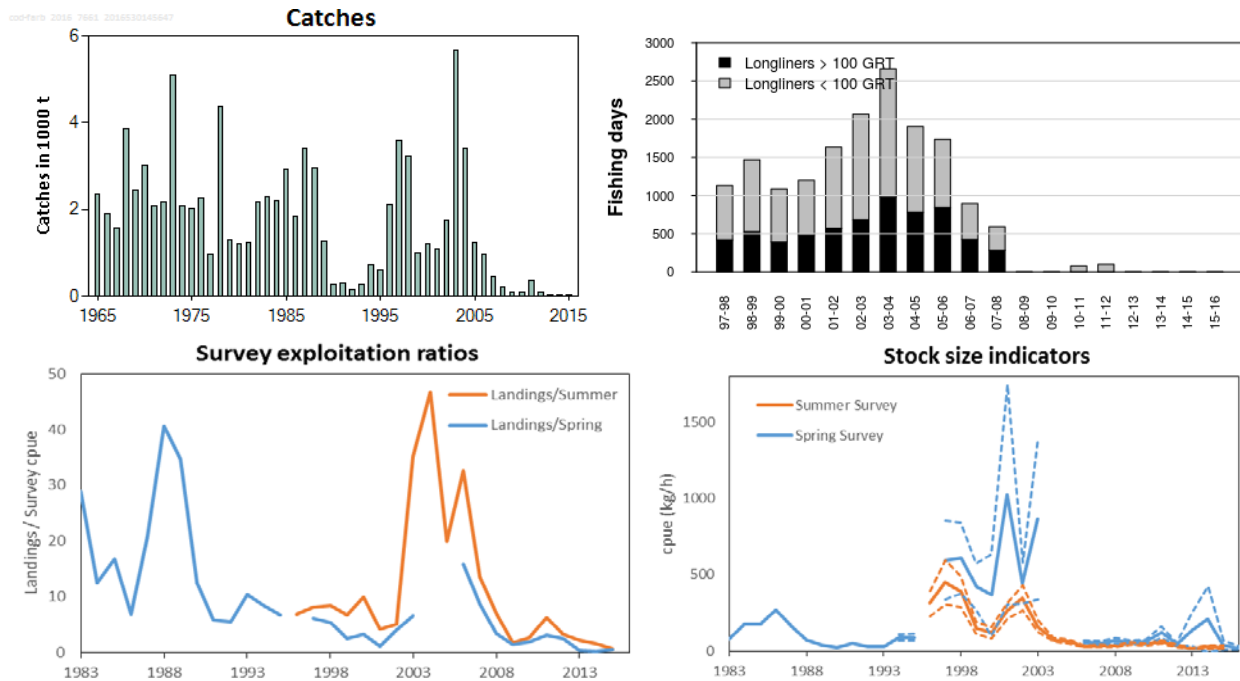
### 4.3.2 Cod (*Gadus morhua*) in Subdivision 5.b.2 (Faroe Bank)

#### 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 ( <a href="#">ICES, 2016</a> )
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 ( <a href="#">NWWG</a> )

### 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 <sup>-1</sup> )	low (-1 × SE)	high (+1 × SE)	Exploitation ratio (Landings/ Spring survey)	Summer survey (kg h <sup>-1</sup> )	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.

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

#### ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2017 should be no more than 0.17. 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. The fishing mortality (F) has decreased in recent years and is now slightly above  $F_{MSY}$ . Recruitment (age 2) from 2005 onwards has been well below the long-term average. However, the 2015 year class is estimated to be above average.

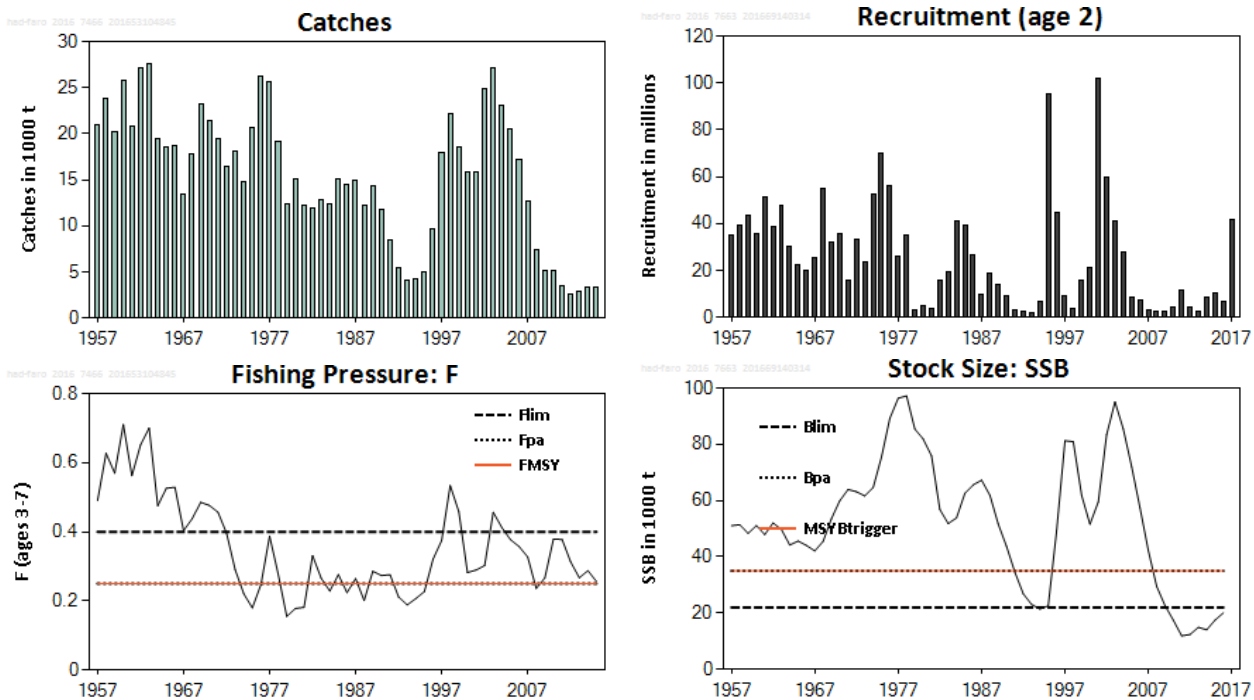


Figure 4.3.3.1 Haddock in Division 5.b (Faroes grounds). Summary of the stock assessment (weights in thousand tonnes).

#### Stock and exploitation status

Table 4.3.3.1 Haddock in Division 5.b (Faroes grounds). State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size					
		2013	2014	2015	2014	2015	2016			
Maximum sustainable yield	$F_{MSY}$	✘	✘	✘	Above	MSY	✘	✘	✘	Below trigger
Precautionary approach	$F_{pa}$ , $F_{lim}$	○	○	○	Increased risk	$B_{pa}$ , $B_{lim}$	✘	✘	✘	Reduced reproductive capacity
Management plan	$F_{MGT}$	-	-	-	Not applicable	$SSB_{MGT}$	-	-	-	Not applicable

**Catch options**

**Table 4.3.3.2** Haddock in Division 5.b (Faroes grounds). The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–7 (2016)	0.27	ICES (2016a)	Unscaled averages for 2013–2015.
SSB (2017)	23.8 kt	ICES (2016a)	
R <sub>age2</sub> (2017)	41.9 mill.	ICES (2016a)	Derived from age 1 estimate in the 2016 assessment.
R <sub>age2</sub> (2018)	5.9 mill.	ICES (2016a)	Geometric mean since 2005.
Total catch (2016)	4.3 kt	ICES (2016a)	

**Table 4.3.3.3** Haddock in Division 5.b (Faroes grounds). The catch options.

Rationale	F (2017)	Catch (2017)	Basis	SSB (2018)	%SSB change *
MSY approach	0.17	3.5	$F_{MSY} \times SSB_{2017} / B_{trigger}$	42.5	78
$F_{MSY}$ and $F_{pa}$	0.25	5	$F_{MSY} (F_{sq} \times 0.93)$	41	72
Zero catch	0	0	$F = 0$	46.6	96
Other options	0.14	2.8	$F_{sq} \times 0.50$	43.5	83
	0.27	5.3	$F_{sq}$	40.8	71
	0.32	6.2	$F_{sq} \times 1.20$	39.8	67

Weights in thousand tonnes.

\* SSB 2018 relative to SSB 2017.

**Basis of the advice**

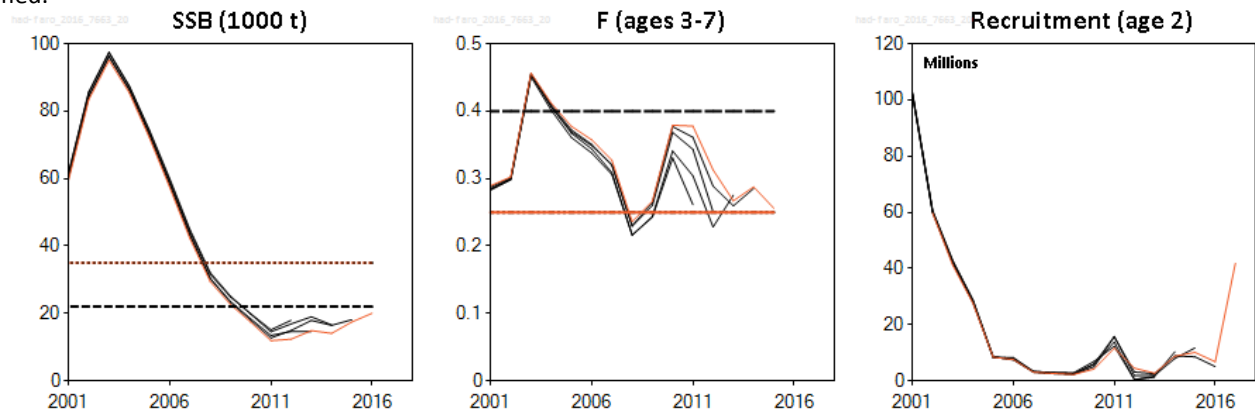
**Table 4.3.3.4** Haddock in Division 5.b (Faroes grounds). The basis of the advice.

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

The growth in SSB forecasted for 2018 assumes a strong recruitment-at-age 2 in 2017 (42 mil.), based on the number of 1-year-olds from this year’s spring survey. When new data becomes available next year the strength of this year class can be verified.



**Figure 4.3.3.2** Haddock in Division 5.b (Faroes grounds). Historical assessment results (final-year recruitment estimates included).

### 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 haddock (longliners) only amounts to around half of the allocated days. With surplus allocated fishing days, current effort control 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.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery. In the current state of both stocks (around  $B_{lim}$ ), and with effort control not limiting fishing pressure, further development of management measures that includes the mixed-fishery issue would be useful.

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

Since the stock is predicted to be above  $B_{lim}$  in 2017, the advice this year is based on the MSY approach and F in 2017 should be no more than  $0.17 (F_{MSY} \times B_{2017} / MSY B_{trigger})$ .

### Reference points

**Table 4.3.3.5** Haddock in Division 5.b (Faroes grounds). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	$MSY B_{trigger}$	35 000 t	$B_{pa}$	ICES (2011)
	$F_{MSY}$	0.25	Stochastic simulations.	ICES (2011)
Precautionary approach	$B_{lim}$	22 000 t	Lowest observed SSB.	ICES (1998)
	$B_{pa}$	35 000 t	$B_{lim} \times e^{1.645\sigma}$ , with $\sigma = 0.3$ .	ICES (1998)
	$F_{lim}$	0.40	$F_{pa} \times e^{1.645\sigma}$ , with $\sigma = 0.3$ .	ICES (1998)
Management plan	$F_{pa}$	0.25	$F_{med} (1998) = 0.25$ .	ICES (1998)
	$SSB_{MGT}$	Not defined		
	$F_{MGT}$	Not defined		

### Basis of the assessment

**Table 4.3.3.6** Haddock in Division 5.b (Faroes grounds). The basis of the assessment.

ICES stock data category	1 ( <a href="#">ICES, 2016b</a> )
Assessment type	XSA 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&3); 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	A benchmark for this stock is planned for 2017.
Working group report	North-Western Working Group ( <a href="#">NWWG</a> )

### Information from stakeholders

There is no information available.

### History of the advice, catch, and management

**Table 4.3.3.7** Haddock in Division 5.b (Faroes grounds). History of ICES advice, the agreed TAC, and ICES estimates of landings.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987	No increase in F	17		14.9
1988	No increase in F	18		12.2
1989	No increase in F	11		14.3
1990	No increase in F	11		11.7
1991	TAC	11		8.4
1992	TAC	13–15		5.5
1993	Reduction in F	8		4.0
1994	No fishing	0	6.2	4.3
1995	No fishing	0	6.2	4.9
1996	TAC	8.3	12.6	9.6
1997	F = F(95)	9.3		17.9
1998	F = F(96)	16		22.2
1999	F < proposed $F_{pa}$ (0.25)	9		18.5
2000	F < proposed $F_{pa}$ (0.25)	22		15.8
2001	F < proposed $F_{pa}$ (0.25)	20		15.9
2002	No fishing	0		24.9
2003	F < proposed $F_{pa}$ (0.25)	12		26.9
2004	F < proposed $F_{pa}$ (0.25)	21		23.1
2005	F < proposed $F_{pa}$ (0.25)	19		20.3
2006	F < proposed $F_{pa}$ (0.25)	18		17.2
2007	F < 0.20	16		12.6
2008	$F_{pa}$	14		7.3
2009	No fishing and recovery plan	0		5.2
2010	No fishing and recovery plan	0		5.2
2011	No direct fishing; minimize bycatch, implement recovery plan	0		3.5
2012	No direct fishing; minimize bycatch, implement recovery plan	0		2.6
2013	No direct fishing; minimize bycatch, implement recovery plan	0		3.0
2014	No direct fishing; minimize bycatch, implement recovery plan	0		3.2
2015	No direct fishing; minimize bycatch, implement recovery plan	0		3.4
2016	No direct fishing; minimize bycatch, implement recovery plan	0		
2017	MSY approach (F ≤ 0.17)	≤ 3.5		

Weights in thousand tonnes.

\* Not applicable since 1997.

### History of catch and landings

**Table 4.3.3.8** Haddock in Division 5.b (Faroes grounds). Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings		Discards
3.395 kt	81% longliners	19% trawlers	Negligible
	3.395 kt		

**Table 4.3.3.9** Haddock in Division 5b. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1902	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1903	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8
1904	0	0	0	0	0	0	0	6	0	0	1046	0	0	0	0	1052
1905	23	0	0	0	0	0	0	66	0	0	851	0	0	0	0	940
1906	23	0	9713	0	0	0	0	155	0	0	1118	0	0	0	0	11009
1907	11	0	8653	0	0	0	0	279	0	0	1192	0	0	0	0	10135
1908	0	0	5494	0	0	0	0	190	0	0	767	0	0	0	0	6451
1909	14	0	7397	0	0	0	0	242	0	0	559	0	0	0	0	8212
1910	0	0	6697	0	0	0	0	40	0	0	635	0	0	0	0	7372
1911	24	0	5990	0	0	0	0	18	0	0	529	0	0	0	0	6561
1912	0	0	7500	0	0	0	0	0	0	0	1334	0	0	0	0	8834
1913	0	0	7935	0	0	0	0	36	0	0	1675	0	0	0	0	9646
1914	0	0	5301	0	0	0	0	2	0	0	2282	0	0	0	0	7585
1915	0	0	2359	0	0	0	0	0	0	0	1796	0	0	0	0	4155
1916	0	0	0	0	0	0	0	0	0	0	1447	0	0	0	0	1447
1917	0	0	0	0	0	0	0	0	0	0	557	0	0	0	0	557
1918	0	0	0	0	0	0	0	0	0	0	217	0	0	0	0	217
1919	0	0	6040	0	0	0	0	0	0	0	3519	0	0	0	0	9559
1920	0	0	2657	0	0	0	0	0	0	0	1010	0	0	0	0	3667
1921	0	0	1812	0	0	0	0	0	0	0	380	0	0	0	0	2192
1922	0	0	3808	0	0	0	0	6	0	0	1900	0	0	0	0	5714
1923	0	0	5688	0	0	37	0	0	0	0	1982	0	0	0	0	7707
1924	0	0	7639	0	0	0	0	0	0	0	1547	0	0	0	0	9186
1925	0	0	6289	0	0	0	0	0	0	0	1251	0	0	0	0	7540
1926	0	0	6567	0	0	0	0	17	0	0	2057	0	0	0	0	8641
1927	0	0	7515	0	0	0	0	0	0	0	2025	0	0	0	0	9540
1928	1	0	8240	0	4	8	0	17	0	0	1438	0	0	0	0	9708
1929	0	0	6662	0	0	3	0	0	0	0	905	0	0	0	0	7570
1930	0	3	7294	0	0	0	0	1	0	0	1718	0	0	0	0	9016
1931	0	2	9188	3	0	0	0	0	0	0	2382	0	0	0	0	11575

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1932	0	0	12065	10	0	0	0	86	0	0	2437	0	0	0	0	14598
1933	0	15	8595	1	0	0	0	0	0	0	2050	0	0	0	0	10661
1934	3	0	8591	2	0	0	0	0	0	0	1938	0	0	0	0	10534
1935	0	0	9796	1	0	0	0	0	0	0	2745	0	0	0	0	12542
1936	0	0	10422	21	0	0	5	0	0	0	3574	0	0	0	0	14022
1937	0	2	9539	81	0	0	0	0	0	0	3495	0	0	0	0	13117
1938	0	1	10885	145	0	0	0	0	0	0	3708	0	0	0	0	14739
1939	0	0	0	145	0	0	0	0	0	0	1807	0	0	0	0	1952
1940	0	0	0	0	0	0	0	0	0	0	3799	0	0	0	0	3799
1941	0	0	0	0	0	0	0	0	0	0	2353	0	0	0	0	2353
1942	0	0	0	0	0	0	0	0	0	0	3267	0	0	0	0	3267
1943	0	0	0	0	0	0	0	0	0	0	5099	0	0	0	0	5099
1944	0	0	0	0	0	0	0	0	0	0	3770	0	0	0	0	3770
1945	0	0	0	0	0	0	0	0	0	0	2546	0	0	0	0	2546
1946	0	0	8533	0	0	0	0	0	0	0	5277	0	0	0	0	13810
1947	0	0	6009	0	0	0	0	0	0	0	6522	0	0	0	0	12531
1948	0	0	3568	0	0	0	0	0	0	0	6511	0	0	0	0	10079
1949	0	0	3126	0	0	0	0	0	0	0	6679	0	0	0	0	9805
1950	0	0	3935	0	0	0	0	0	0	0	8048	0	0	0	0	11983
1951	0	0	6465	0	0	0	0	0	0	0	7944	0	0	0	0	14409
1952	0	0	7535	83	0	0	0	0	0	0	6653	0	0	0	0	14271
1953	0	0	5820	2788	0	0	0	0	0	0	6404	0	0	0	0	15012
1954	0	0	5925	2654	0	1	0	0	0	0	6832	0	0	0	0	15412
1955	0	0	5008	3865	0	33	0	0	0	0	7667	0	0	0	0	16573
1956	0	0	5762	4221	0	20	0	0	0	0	7512	0	0	0	0	17515
1957	0	0	6902	4453	0	38	0	0	0	0	9602	0	0	0	0	20995
1958	0	0	7429	6850	0	19	0	0	0	0	9573	0	0	0	0	23871
1959	0	0	5339	5670	0	10	0	0	0	0	9220	0	0	0	0	20239
1960	0	0	7006	7772	0	6	0	0	0	0	10943	0	0	0	0	25727
1961	0	0	2643	8454	0	22	0	0	0	0	9590	0	0	0	0	20709
1962	0	0	3766	7042	166	18	0	0	0	0	16159	0	0	0	0	27151
1963	0	0	4655	6336	792	20	0	0	0	0	15766	0	0	0	0	27569
1964	0	0	3442	6952	1866	33	0	0	111	0	7087	0	0	0	0	19491
1965	0	0	3385	6673	1939	15	0	0	40	0	6355	0	0	0	0	18407

Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
1966	0	0	2867	6902	2717	36	0	0	0	0	6240	0	0	0	0	18762
1967	0	8	2347	5246	1091	24	0	0	0	0	4656	0	0	0	0	13372
1968	0	0	2445	6751	2286	36	0	0	0	0	6339	0	0	0	0	17857
1969	0	0	1976	11122	3387	0	0	0	0	0	6815	0	0	0	0	23300
1970	0	0	1137	11791	2006	14	0	0	0	0	6421	0	0	0	0	21369
1971	0	0	2323	10488	790	19	0	29	0	0	5762	0	0	0	0	19411
1972	0	0	3369	8314	2666	25	0	0	844	0	1267	0	0	0	0	16485
1973	0	0	2426	6018	3508	46	0	0	0	1190	4788	0	1236	0	0	19212
1974	0	0	1617	4811	1451	70	0	0	5	685	6072	52	807	0	0	15570
1975	0	0	2426	8757	2298	173	0	383	56	544	6078	0	1100	0	0	21815
1976	6	0	2284	12714	2542	22	0	175	20	448	8000	0	651	0	0	26862
1977	0	0	709	20079	700	49	0	26	57	5	3928	0	80	0	0	25633
1978	0	0	48	18182	71	8	0	0	130	0	761	0	0	0	0	19200
1979	0	0	35	11975	50	2	0	0	45	0	317	0	0	0	0	12424
1980	0	6	158	14323	31	4	0	0	17	0	477	0	0	0	0	15016
1981	0	0	0	11994	113	0	0	0	27	0	99	0	0	0	0	12233
1982	0	0	0	11852	2	1	0	0	13	0	48	0	0	0	0	11916
1983	0	0	0	12865	2	0	0	0	14	0	13	0	0	0	0	12894
1984	0	0	0	12343	20	0	0	0	15	0	0	0	0	0	0	12378
1985	0	0	0	15071	23	0	0	0	24	0	25	0	0	0	0	15143
1986	0	1	0	14409	8	1	0	0	32	0	26	0	0	0	0	14477
1987	0	8	2	14786	22	1	0	0	18	0	45	0	0	0	0	14882
1988	0	4	0	12027	14	0	0	0	97	0	15	0	0	0	0	12157
1989	0	0	0	14165	0	0	0	0	127	0	30	0	0	0	0	14322
1990	0	0	7	11431	0	0	0	0	191	0	0	0	0	0	0	11629
1991	0	0	0	8291	0	0	0	0	129	0	0	0	0	0	0	8420
1992	0	0	54	4993	164	0	0	0	94	0	149	0	0	0	0	5454
1993	0	0	81	3807	0	0	0	0	36	0	102	0	0	0	0	4026
1994	0	0	31	4028	0	0	0	0	23	0	170	0	0	0	0	4252
1995	0	0	23	4852	0	5	0	0	29	0	39	0	0	0	0	4948
1996	0	0	5	9490	0	0	0	0	85	0	62	0	0	0	0	9642
1997	0	0	22	17718	0	0	0	0	49	0	135	0	0	0	0	17924
1998	0	0	30	21945	2	0	0	0	131	0	102	0	0	0	0	22210
1999	0	0	59	17753	0	33	0	0	414	0	193	0	0	0	30	18482



Year	Belgium	Denmark	England	Faroe Islands	France	Germany	Iceland	Netherlands	Norway	Portugal	Scotland	Spain	Poland	Russia	Greenland	Total
2000	0	0	19	15185	6	1	0	0	403	0	185	0	0	0	22	15821
2001	0	0	4	15405	6	1	0	0	323	0	148	0	0	0	0	15887
2002	0	0	11	24474	2	6	4	0	255	0	177	0	0	0	4	24933
2003	0	0	14	26549	4	1	0	0	282	0	185	0	0	0	0	27035
2004	0	0	8	22589	1	6	0	0	246	0	186	49	0	16	0	23101
2005	0	0	1	20616	0	0	0	0	257	0	126	0	0	0	0	21000
2006	0	0	1	16975	12	1	0	0	58	0	106	0	0	0	1	17154
2007	0	0	35	12499	4	0	0	0	69	0	15	0	0	0	4	12626
2008	0	0	60	7284	3	0	0	0	26	0	5	0	0	10	0	7388
2009	0	0	64	5451	2	0	0	0	8	0	5	0	0	0	6	5536
2010	0	0	73	5110	1	0	0	0	5	0	0	0	0	0	12	5201
2011	0	0	0	3544	3	0	0	0	0	0	0	0	0	0	0	3547
2012	0	0	0	2634	0	0	3	0	0	0	0	0	0	0	1	2638
2013	0	0	0	2924	0	0	26	0	0	0	0	0	0	0	0	2950
2014	0	0	350	2827	0	0	0	0	3	0	74	0	0	0	0	3254
2015	0	0	449	2940	0	0	0	0	6	0	0	0	0	0	0	3395

**Summary of the assessment**

**Table 4.3.3.10** Haddock in Division 5.b (Faroes grounds). Assessment summary.

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year <sup>-1</sup>
1957	35106	51049	20995	0.49
1958	39212	51409	23871	0.627
1959	43417	48340	20239	0.57
1960	35763	51101	25727	0.71
1961	51279	47901	20831	0.562
1962	38537	52039	27151	0.651
1963	47362	49706	27571	0.7
1964	30110	44185	19490	0.475
1965	22644	45605	18479	0.526
1966	20203	44027	18766	0.529
1967	25356	42086	13381	0.403
1968	54851	45495	17852	0.438
1969	31975	53583	23272	0.485
1970	35600	59957	21361	0.476
1971	15457	63920	19393	0.456
1972	33213	63133	16485	0.396
1973	23702	61620	18035	0.29
1974	52333	64629	14773	0.221
1975	70052	75403	20715	0.18
1976	55970	89217	26211	0.248
1977	26192	96371	25555	0.387
1978	35098	97225	19200	0.278
1979	2784	85392	12424	0.155
1980	4944	81895	15016	0.178
1981	3491	75838	12233	0.181
1982	15833	56797	11937	0.331
1983	19610	51803	12894	0.265
1984	40750	53808	12378	0.229
1985	39398	62576	15143	0.276
1986	26461	65563	14477	0.224
1987	9425	67247	14882	0.265
1988	18742	61842	12178	0.201
1989	14057	51668	14325	0.286
1990	9363	43617	11726	0.274
1991	2979	34532	8429	0.276
1992	2671	26835	5476	0.212
1993	1825	23072	4026	0.188
1994	6409	21444	4252	0.207
1995	94985	22571	4948	0.227
1996	44662	49203	9642	0.321
1997	8928	81257	17924	0.375
1998	3731	80936	22210	0.534

Year	Recruitment Age 2 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 3–7 Year <sup>-1</sup>
1999	15448	61819	18482	0.458
2000	21180	51599	15821	0.282
2001	101770	59520	15890	0.289
2002	59738	83361	24933	0.302
2003	41119	95070	27072	0.456
2004	27641	85459	23101	0.412
2005	8439	72052	20455	0.377
2006	7585	57336	17154	0.357
2007	3085	42218	12631	0.327
2008	2659	29458	7388	0.236
2009	2295	22676	5197	0.267
2010	4224	17439	5202	0.379
2011	11657	11917	3540	0.378
2012	4512	12376	2634	0.313
2013	2746	14903	2950	0.267
2014	8801	14082	3276	0.288
2015	10125	17455	3395	0.256
2016	6828	20056		
2017	41852			
Average	25572	52745	15339	0.355

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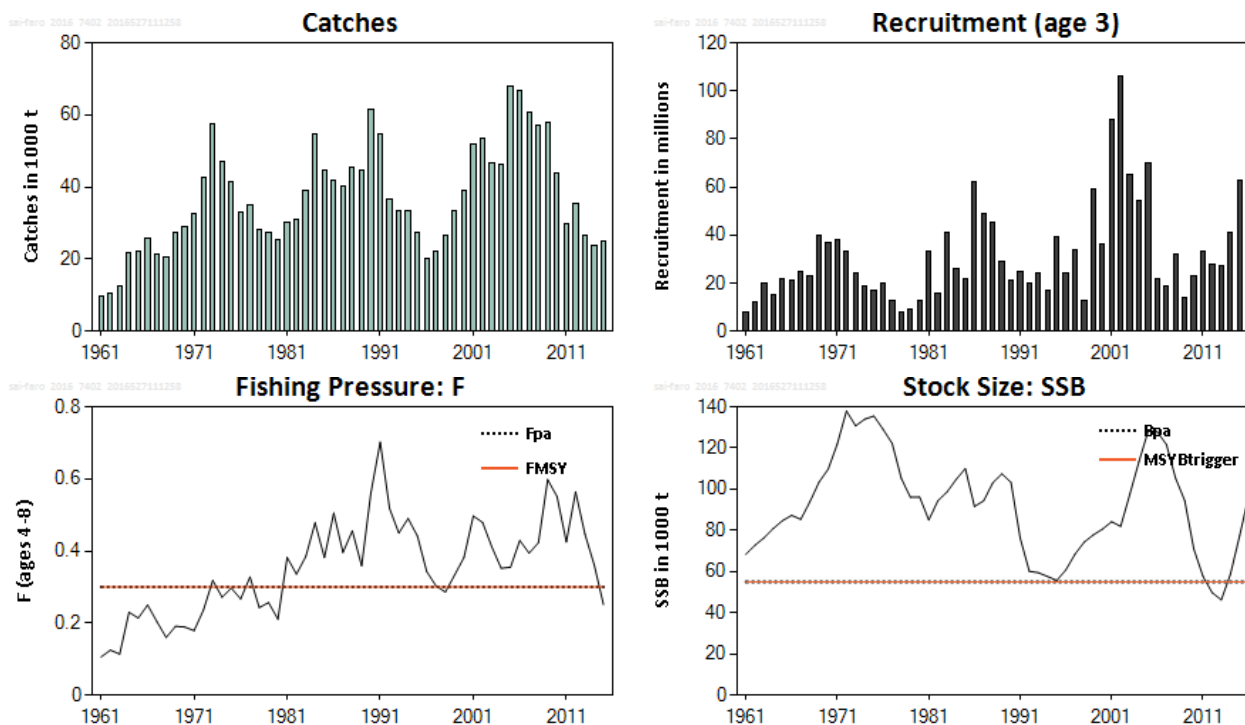
### 4.3.4 Saithe (*Pollachius virens*) in Division 5.b (Faroes grounds)

#### ICES stock advice

ICES advises that when the MSY approach is applied, fishing mortality in 2017 should be no more than 0.30. 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 above  $MSY B_{trigger}$ , apart from in 2012 and 2013. Estimated recruitment in 2015 was well above the long-term average. Fishing mortality (F) has been mostly above  $F_{MSY}$  from 1981 but has dropped below  $F_{MSY}$  in 2015.



**Figure 4.3.4.1** Saithe in Division 5.b (Faroes grounds). Summary of the stock assessment (weights in thousand tonnes). Assumed recruitment values are unshaded.

#### Stock and exploitation status

**Table 4.3.4.1** Saithe in Division 5.b (Faroes grounds). 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	✔	✔
Precautionary approach	$F_{lim}, F_{pa}$	?	?	✔	$B_{trigger}$	✔	✔
Management plan	$F_{MGT}$	-	-	-	$B_{lim}, B_{pa}$	✔	✔
					$SSB_{MGT}$	-	-
				✔			✔
							✔
							-

**Catch options**

**Table 4.3.4.2** Saithe in Division 5.b (Faroes grounds). The basis for the catch options.

Variable	Value	Source	Notes
F ages 4–8 (2016)	0.25	ICES (2016a)	Average of last three years, scaled to the last year ( <i>F status quo</i> ).
SSB (2017)	126 000 t	ICES (2016a)	
R <sub>age3</sub> (2017)	30 mill.	ICES (2016a)	Geometric mean of 2010–2014.
R <sub>age3</sub> (2018)	30 mill.	ICES (2016a)	Geometric mean of 2010–2014.
Total catch (2016)	32 000 t	ICES (2016a)	Based on <i>F status quo</i> .

**Table 4.3.4.3** Saithe in Division 5.b (Faroes grounds). The catch options.

Rationale	F (2017)	Catch (2017)	Basis	SSB (2018)	% SSB change *
MSY approach	0.30	46	$F_{MSY} (= F_{sq} \times 1.2)$	138	10%
Zero catch	0	0	$F = 0$	185	47%
<i>Other options</i>	0.25	40	$F_{sq}$	144	14%
	0.13	22	$F_{sq} \times 0.50$	164	30%
	0.19	31	$F_{sq} \times 0.75$	154	21%
	0.23	37	$F_{sq} \times 0.90$	148	17%
	0.28	44	$F_{sq} \times 1.1$	141	12%

Weights in thousand tonnes.

\* SSB 2018 relative to SSB 2017.

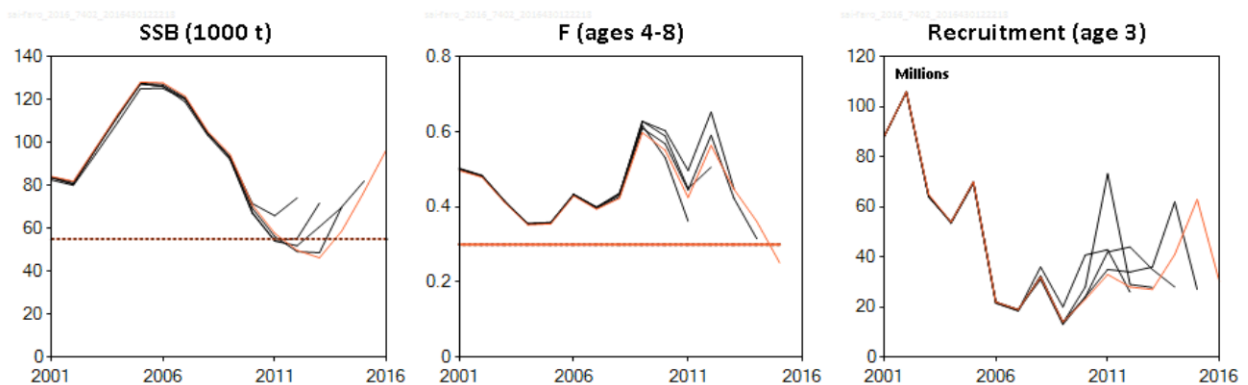
**Basis of the advice**

**Table 4.3.4.4** Saithe in Division 5.b (Faroes grounds). 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 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 4.3.4.2** Saithe in Division 5.b (Faroes grounds). Historical assessment results (final-year recruitment estimates included). Left panel: horizontal line shows MSY  $B_{trigger} = B_{pa} = 55\ 000\ t$ . Middle panel: horizontal line represents  $F_{MSY} = F_{pa} = 0.30$ .

**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 2014/2015 fishing year 29% of the allocated days for the main fleet catching saithe (pair-trawl) were not used. With surplus allocated fishing days, current effort control 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 advice is given by calendar year, though the fishing year runs from 1 September to 31 August of the following year.

**Reference points**

**Table 4.3.4.5** Saithe in Division 5.b (Faroes grounds). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	55 000 t	Breakpoint in segmented regression.	ICES (2011)
	$F_{MSY}$	0.30	Stochastic simulations (ICES, 2014b). Consistent with 2014 estimate of $F_{med} = 0.31$ .	ICES (2014a, 2014b)
Precautionary approach	$B_{lim}$	Not defined.		
	$B_{pa}$	55 000 t	$B_{loss}$ in 2011.	ICES (1998)
	$F_{lim}$	Not defined.		
	$F_{pa}$	0.30	Consistent with 2013 estimate of $F_{med}$ .	ICES (2014c)
Management plan	$SSB_{MGT}$	Not defined.		
	$F_{MGT}$	Not defined.		

**Basis of the assessment**

**Table 4.3.4.6** Saithe in Division 5.b (Faroes grounds). The basis of the assessment.

ICES stock data category	1 (ICES, 2016b)
Assessment type	XSA, using catches in the model and in the forecast.
Input data	Commercial catches (mainly Faroese catches, ages and length frequencies from catch sampling); commercial indices: pair-trawler fleet; annual maturity data from FO-GFS-Q1; survey distribution from FO-GFS-Q1 and FO-GFS-Q3; natural mortalities set at $M = 0.2$ .
Discards and bycatch	Discarding is considered negligible. Bycatch included.
Indicators	None
Other information	A benchmark assessment was performed in 2010. A benchmark for this stock is planned for 2017.
Working group	North-Western Working Group (NWWG)

**Information from stakeholders**

There is no information available.

**History of the advice, catch, and management**

**Table 4.3.4.7** Saithe in Division 5.b (Faroes grounds). History of ICES advice, the agreed TAC, and ICES estimates of landings.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES landings
1987	No increase in F	< 32		40
1988	No increase in F	< 32		45
1989	Reduction in F	< 40		44
1990	Reduction in F	< 41		62
1991	TAC	< 30		55
1992	Reduction in F	< 27		36

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES landings
1993	Reduction in F	< 37		34
1994	TAC	< 26	42**	33
1995	TAC	< 22	39**	27
1996	TAC	< 39	-	20
1997	20% reduction in F from 1995 level	< 21	-	22
1998	30% reduction in effort from 1996/97 level	-	-	26
1999	F below $F_{pa}$ (0.28)	< 14		33
2000	F below than $F_{pa}$ (0.28)	< 15		39
2001	Reduce fishing effort to generate F well below $F_{pa}$ (0.28)	< 17		52
2002	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 28		54
2003	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 47		47
2004	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 48		46
2005	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 32		68
2006	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 24		67
2007	Average catch considerations	40		61
2008	Do not increase effort	-		57
2009	Reduce fishing effort by around 20%	-		58
2010	Reduce fishing effort by around 20%	-		44
2011	Reduce fishing effort to generate F below $F_{pa}$ (0.28)	< 38		29
2012	Reduce fishing effort to generate F below $F_{MSY}$ (0.28)	< 40		35
2013	$F < 0.28$	< 29.1		26
2014	Reduce fishing effort to generate F below $F_{MSY}$ (0.30)	< 29		24
2015	Reduce fishing effort to generate F below $F_{MSY}$ (0.30)	< 26		25
2016	Reduce fishing effort to generate F below $F_{MSY}$ (0.30)	< 36		
2017	MSY approach ( $F \leq 0.30$ )	$\leq 46$		

Weights in thousand tonnes.

\* Not applicable since 1997.

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

### History of catch and landings

**Table 4.3.4.8** Saithe in Division 5.b (Faroes grounds). Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings			Discards
25 kt	93% pair trawler	2% single trawler	5% jiggers and others	Negligible
	25 kt			

**Table 4.3.4.9** Saithe in Division 5.b (Faroes grounds). History of commercial catch and landings; both the official and ICES estimated values are presented for each country participating in the fishery.

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Denmark	94	-	2	-	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	16	-	-	-	-
Faroe Islands	44402	43624	59821	53321	35979	32719	32406	26918	19267	21721	25995	32439	^^	49676
France	313	***	***	***	120	75	19	10	12	9	17	-	273	934
Germany	-	-	-	32	5	2	1	41	3	5	-	100	230	667
German Dem. Rep.	-	9	-	-	-	-	-	-	-	-	-	-	-	-
German Fed. Rep.	74	20	15	-	-	-	-	-	-	-	-	-	-	5
Greenland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Netherlands	-	22	67	65	-	-	-	-	-	-	-	160	72	60
Norway	52	51	46	103	85	32	156	10	16	67	53	-	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	-	-	20	1
UK (Eng. & W.)	-	-	-	5	74	279	151	21	53	-	19	67	32	80
UK (Scotland)	92	9	33	79	98	425	438	200	580	460	337	441	534	708
USSR/Russian Fed. **	-	-	30	-	12	-	-	-	18	28	-	-	-	-
Total	45027	43735	60 014	53605	36373	33532	33171	27200	19949	22306	26065	33207	1161	52131
ICES estimate ^^^	45285	44477	61628	54858	36487	33543	33182	27209	20029	22306	26421	33207	39020	51786
Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Denmark	-	-	-	-	34	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Faroe Islands >>	55165	47933	48222	71496	70696	64552	61117	61889	46686	32056	38175	28609	25474	26796
France	607	370	147	123	315	108	97	68	46	135	40	31	0	122
Germany	422	281	186	1	49	3	3	0						
Greenland	125	-			73	239	0	1			1			
Ireland	-	-	-	-	-	-	-	-						
Iceland	-	-	-	-	-	-	-	148	-					
Netherlands	0	0	0	0	0	3	0	0	0					
Norway	77	62	82	82	35	81	38	23	28				165	40
Portugal	-	-	5	-	-	-	-	-	-					
Russian Federation	10	32	71	210	104	159	38	44	3			1		
UK (E/W/NI)	58	89	85	32	88	4	-	-						
UK (Scotland)	540	610	748	4322	1011	408	400	685						
United Kingdom	-	-	-	-	-	-	-	-	706	19		1	340	304
Total	57004	49377	49546	76266	72405	65557	61693	62858	47469	32210	38216	28642	25979	27262
ICES estimate ^^^>	53546	46555	46355	67967	66902	60785	57044	57949	43885	29658	35314	26463	23885	25128

\* 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 4.3.4.10** Saithe in Division 5.b (Faroes grounds). Assessment summary.

Year	Recruitment Age 3 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 4–8
1961	7827	68467	9592	0.106
1962	12256	72862	10454	0.125
1963	19837	76441	12693	0.114
1964	14811	80928	21893	0.23
1965	22362	84690	22181	0.214
1966	21229	87313	25563	0.25
1967	24897	85361	21319	0.204
1968	22879	93938	20387	0.16
1969	39798	103452	27437	0.191
1970	37092	109688	29110	0.189
1971	38446	121970	32706	0.179
1972	33424	137957	42663	0.236
1973	23621	130735	57431	0.318
1974	19420	134010	47188	0.272
1975	17327	135485	41576	0.297
1976	19709	129100	33065	0.267
1977	13106	122228	34835	0.328
1978	8333	105218	28138	0.243
1979	8686	96038	27246	0.257
1980	13076	96219	25230	0.211
1981	33145	85058	30103	0.382
1982	15680	94394	30964	0.336
1983	40831	98647	39176	0.385
1984	26079	104718	54665	0.478
1985	22341	110024	44605	0.382
1986	61871	91607	41716	0.505
1987	48649	94334	40020	0.396
1988	44899	103062	45285	0.456
1989	28604	107481	44477	0.359
1990	20720	103321	61628	0.561
1991	24974	76297	54858	0.702
1992	19604	60153	36487	0.518
1993	23784	59452	33543	0.45
1994	16884	57615	33182	0.49
1995	38977	55735	27209	0.441
1996	24412	60797	20029	0.343
1997	33577	68468	22306	0.303
1998	12772	74278	26421	0.286
1999	58856	77828	33207	0.334
2000	35923	80608	39020	0.382
2001	88189	84237	51786	0.497
2002	106023	81993	53546	0.479
2003	64513	97592	46555	0.411

Year	Recruitment Age 3 thousands	Stock size: SSB tonnes	Catches tonnes	Fishing pressure: F Ages 4–8
2004	54075	113454	46355	0.352
2005	70045	128179	67967	0.355
2006	22264	127839	66902	0.429
2007	19344	121636	60785	0.394
2008	31700	105278	57044	0.423
2009	14067	94514	57949	0.598
2010	22829	70921	43885	0.551
2011	33044	57701	29658	0.425
2012	27787	49796	35314	0.564
2013	26799	46255	26463	0.447
2014	40621	58803	23885	0.361
2015	62836	77216	25128	0.251
2016	29626*	96770		
<b>Average</b>	<b>31542</b>	<b>91931</b>	<b>36779</b>	<b>0.353</b>

\* Geometric mean of 2010–2014.

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