

Saithe (*Pollachius virens*) in subareas 4 and 6, and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2018 should be no more than 118 460 tonnes.

Stock development over time

Recruitment (R) has fluctuated over time and has generally been below the long-term average since 2003. Fishing mortality (F) has been below F_{MSY} since 2013. Spawning-stock biomass (SSB) has fluctuated without trend and has been above $MSY B_{trigger}$ since 1996.

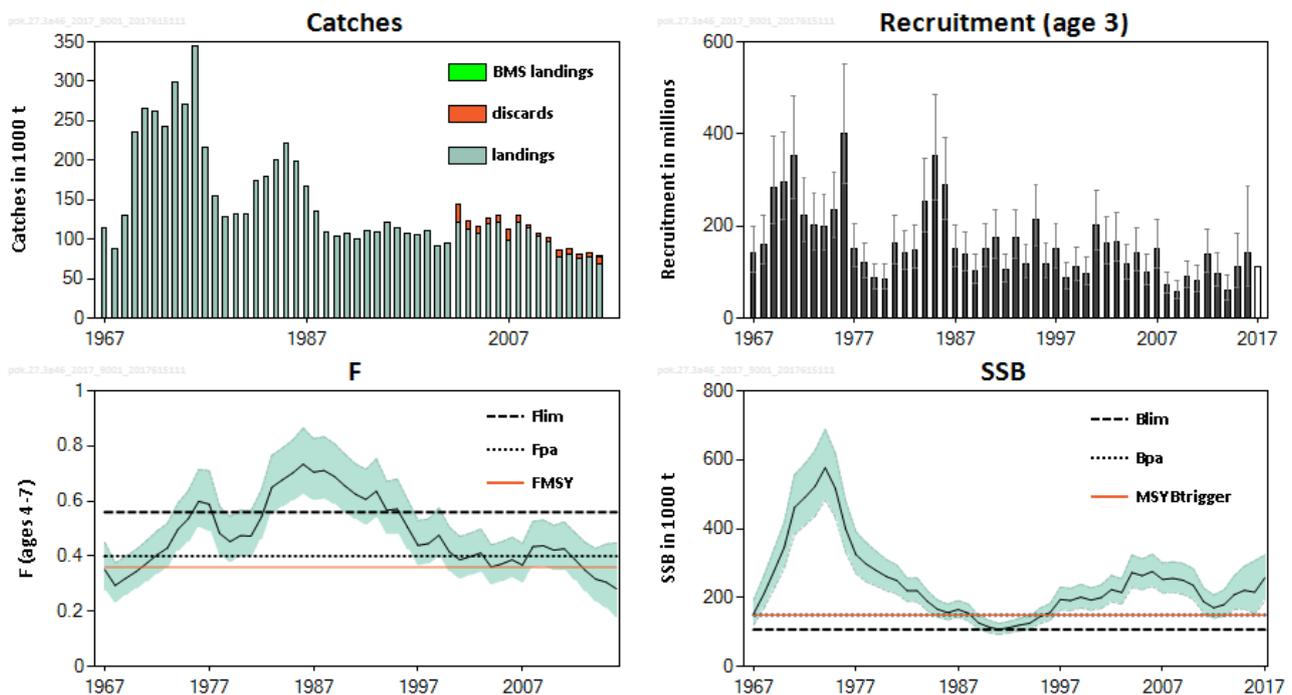


Figure 1 Saithe in subareas 4 and 6, and in Division 3.a. Summary of the stock assessment. Predicted recruitment values are not shaded. Shaded areas (F, SSB) and error bars (R) indicate point-wise 95% confidence intervals.

Stock and exploitation status

Table 1 Saithe in subareas 4 and 6, and in Division 3.a. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2015	2016	2017
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓ Below	$MSY B_{Trigger}$	✓	✓ Above trigger
Precautionary Approach	F_{pa} F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa} B_{lim}	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	—	—	— Not applicable	B_{MGT}	—	— Not applicable

Catch options

Table 2 Saithe in subareas 4 and 6, and in Division 3.a. The basis for the catch options.

Variable	Value	Source	Notes
$F_{\text{ages 4-7}} (2017)$	$F = 0.381$	ICES (2017a)	TAC constraint for wanted catch based on TAC for 2017 (106 331 tonnes). * The F corresponds to the total catch.
SSB (2018)	272061	ICES (2017a)	SSB at the beginning of the TAC year; tonnes.
$R_{\text{age 3}} (2017-2018)$	110334	ICES (2017a)	Median recruitment re-sampled from the years 2003–2016; thousands.
Total catch (2017)	123135	ICES (2017a)	Sum of catch components, assuming 2016 landings fraction by age; tonnes.
Wanted catch (2017)	106331	ICES (2017a)	TAC 2017; tonnes*.
Unwanted catch (2017)	16804	ICES (2017a)	Assuming 2016 discard fraction by age; tonnes.

* 2017 TAC minus top-up for fleets under landing obligation in 2017.

Table 3 Saithe in subareas 4 and 6, and in Division 3.a. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	Wanted catch* (2018)	Unwanted catch* (2018)	Wanted catch* 3a4	Wanted catch* 6	F_{total} (2018)	F_{wanted} (2018)	F_{unwanted} (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis											
MSY approach: F_{MSY}	118460	103731	14729	93980	9751	0.36	0.32	0.040	279689	2.8	-2.4
Other options											
$F = 0$	0	0	0	0	0	0.000	0.000	0.000	394153	45	-100
F_{pa}	130786	114463	16323	103704	10759	0.40	0.36	0.045	267945	-1.5	7.6
F_{lim}	171024	149404	21620	135360	14044	0.56	0.50	0.063	229853	-15.5	41
$\text{SSB (2019)} = B_{\text{lim}}$	310073	267552	42521	242402	25150	1.40	1.25	0.157	107000	-61	152
$\text{SSB (2019)} = B_{\text{pa}}$	259758	225247	34511	204073	21174	1.03	0.91	0.115	150000	-45	112
$\text{SSB (2019)} =$	259758	225247	34511	204073	21174	1.03	0.91	0.115	150000	-45	112
$F = F_{2017}$	124816	109286	15530	99013	10273	0.38	0.34	0.043	273559	0.55	2.8
TAC_{2017}	121516	106331	15185	96336	9995	0.37	0.33	0.041	276208	1.52	0.00
$F = F_{\text{MSY lower}}$	75093	65865	9228	59673	6192	0.21	0.189	0.024	321353	18.1	-38
$F = F_{\text{MSY upper}}$ with AR	153765	134418	19347	121783	12635	0.49	0.44	0.055	246136	-9.5	26
Mixed fisheries options											
A: Max.	188427					0.61			226078	-17	
B: Min.	66271					0.18			341644	26	
C: HAD	79769					0.20			362988	33	
D: POK	114358					0.36			267781	-2	
E: SQ effort	99571					0.27			316163	16	
F: Value	100212					0.28			309074	14	
G: Range	77317					0.22			319205	17	

* "Wanted" and "unwanted" catch are used to describe fish that would be landed and discarded in the absence of the EU landing obligation, based on discard rate estimates for 2016.

** SSB 2019 relative to SSB 2018.

*** Wanted catch in 2018 relative to TAC, minus top-up for fleets under landing obligation in 2017 (106 331 t).

Mixed-fisheries assumptions (note: "fleet's stock share" is used to describe the share of the fishing opportunities for each particular fleet, which has been calculated based on the single-stock advice for 2018 and the historical proportion of the stock landings taken by the fleet):

A. Maximum scenario: Each fleet stops fishing when its last stock share is exhausted.

B. Minimum scenario: Each fleet stops fishing when its first stock share is exhausted.

C. HAD: Each fleet stops fishing when its individual haddock share is exhausted.

D. POK: Each fleet stops fishing when its individual saithe share is exhausted.

E. SQ (*status quo*) effort scenario: The effort of each fleet in 2017 and 2018 is as in 2016.

F. Value scenario: The effort of each fleet is equal to the weighted average of the efforts required to catch the fleet's quota share of each of the stocks, where the weights are the relative catch values of each stock in the fleet's portfolio.

G. Range scenario: where the potential for TAC mismatches in 2018 are minimized within the F_{MSY} range, for the demersal fish stocks for which such a range is available (cod.27.47d20; had.27.46a20; pok.27.3a46; ple.27.420; ple.27.7d; sol.27.4; sol.27.7d).

Basis of the advice

Table 4 Saithe in subareas 4 and 6, and in Division 3.a. The basis of the advice.

Advice basis	MSY approach
Management plan	Changes to the stock assessment and reference points in 2016 imply a need to re-evaluate the EU–Norway management strategy. Until such an evaluation is conducted, the ICES advice is based on the MSY approach.

Quality of the assessment

The saithe assessment went through an ICES benchmark process in 2016 (ICES, 2016a). The scientific survey used in the assessment does not cover the whole stock distribution; however, it is considered generally representative. The survey index is uncertain because it is influenced by occasional large catches. This occurred for example in 2016.

Commercial catch per unit of effort information for French, German, and Norwegian trawlers was combined into a single index of biomass of fishable saithe. Factors such as vessel experience and fishing behaviour likely contribute to the variability in cpue for all fleets, but these are not captured in the cpue model. Conflicting signals between the survey and fishable biomass index contributes to the assessment uncertainty.

The uncertainty for age 3 saithe in 2016 is estimated to be large. The fraction of age 3 saithe migrating into the survey area (and the fishery) is low and varying between years with no obvious trend. Observations of saithe at age 3 are not suitable for predicting year-class strength. This means that assumed recruitment values are highly uncertain; 27% of the advised total catch in 2018 is based on the recruitment assumptions for 2017 and 2018.

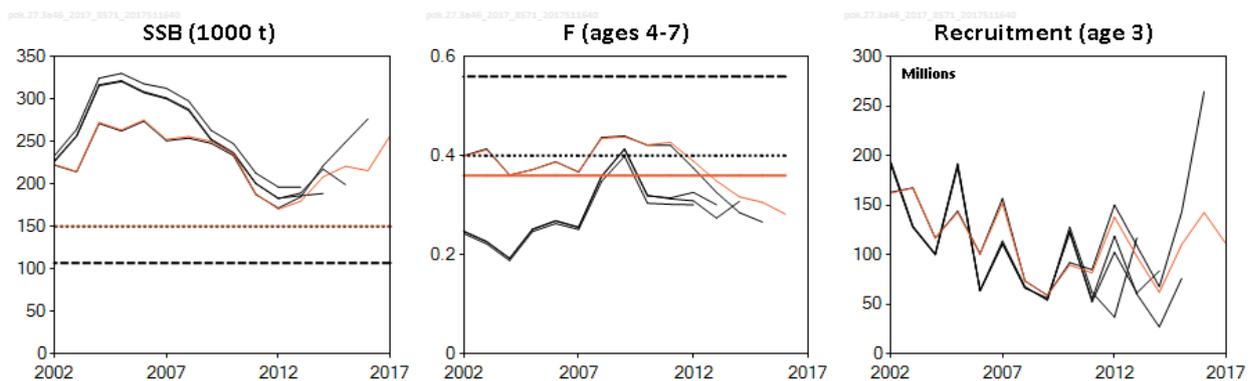


Figure 2 Saithe in subareas 4 and 6, and in Division 3.a. Historical assessment results.

Issues relevant for the advice

The advice based on the MSY approach gives a small decrease in TAC compared to the TAC in 2017. The 2016 SSB estimate has been revised downwards. Estimates of recruitment for a given year class tend to be revised considerably with successive assessments (Figure 2) and therefore the associated short-term forecast is uncertain for this stock (see under “Quality of assessment”).

It is expected that under the EU landing obligation, below minimum size fish that would formerly have been discarded would now be reported as below minimum size (BMS) landings in logbooks. However, BMS landings reported to ICES may be lower than expected for several reasons: fish caught below minimum size could either not have been landed and not recorded in logbooks, or landed but not recorded as BMS; additionally, BMS landings recorded in logbooks may not be reported to ICES.

In the case of saithe, there is no indication that fish that would formerly have been discarded are being reported as BMS, based on the observation that BMS landings reported to ICES are currently much lower than the estimates of discards from observer programmes, which estimate discards at 13% of the total catch.

Results from a North Sea mixed-fisheries analysis are presented in ICES (2017b). For 2018, assuming a strictly implemented discard ban (corresponding to the “Minimum” scenario), whiting would be the most limiting stock, being estimated to constrain 24 out of 42 fleet segments. Haddock is the second most limiting stock, constraining eight fleet segments. Additionally, if Norway lobster was managed by separate TACs for the individual functional units (FUs), Norway lobster in FU 6 would be considered the most limiting stock for ten fleet segments. Conversely, in the “Maximum” scenario, saithe and Eastern Channel plaice would be the least limiting for 20 and 11 fleet segments, respectively. Finally, if Norway lobster was managed by separate TACs, Norway lobster in FUs 7, 5, 33, and 4.non-FU would be the least limiting for nine, two, one, and two fleet segments, respectively. For those demersal fish stocks for which the F_{MSY} range is available, a “range” scenario is presented that minimizes the potential for TAC mismatches in 2018 within the F_{MSY} range. This scenario returns a fishing mortality by stock which, if used for setting single-stock fishing opportunities for 2018, may reduce the gap between the most and the least restrictive TACs, thus reducing the potential for quota over- and undershoot. This “range” scenario suggests that the potential for mixed-fisheries mismatch would be lowered with a 2018 TAC in the lower part of the F_{MSY} range for Eastern English Channel plaice and saithe, and in the upper part of the range for cod and North Sea plaice.

Reference points

Table 5 Saithe in subareas 4 and 6, and in Division 3.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	150000 t	B_{pa}	ICES (2016a)
	F_{MSY}	0.36	EQsim analysis based on the recruitment period 2003–2015.	ICES (2016a)
Precautionary approach	B_{lim}	107000 t	B_{loss}	ICES (2016a)
	B_{pa}	150000 t	$B_{lim} \times \exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$	ICES (2016a)
	F_{lim}	0.56	EQsim analysis based on the recruitment period 2003–2015.	ICES (2016a)
	F_{pa}	0.40	$F_{lim} \times \exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$	ICES (2016a)
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

Basis of the assessment

Table 6 Saithe in subareas 4 and 6, and in Division 3.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016c).
Assessment type	Age-based analytical assessment SAM, (ICES, 2017a) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, BMS landings, and discards, age and length frequencies from catch sampling); survey index (IBTS Q3, ages 3–8); combined commercial index scaled to the exploitable biomass (French, German, Norwegian trawler fleets). Maturity-at-age and natural mortality are assumed to be constant. Stock weights are catch weights.
Discards, BMS landings, and bycatch	Discards were included (96% reported, 4% raised); dataserries in 2016 covered 43% of the landings by weight. BMS landings, where reported, are included with discards as unwanted catch in the assessment from 2016. Logbook registered discards, where reported, were 0 kg.
Indicators	None.
Other information	Benchmarked in 2016 (ICES, 2016a) with additional review (ICES, 2016b).
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Information from stakeholders

No additional information was provided.

History of the advice, catch, and management

Table 7 Saithe in subareas 4 and 6, and in Division 3.a. ICES advice and official landings. All weights are in tonnes. Values of official and ICES landings for the period 1987 to 2001 are presented to the nearest thousand tonnes in Subarea 4 and Division 3.a and the nearest hundred tonnes in Subarea 6.

Subarea 4 and Division 3.a

Year	ICES advice	Predicted landings corresp. to advice	Predicted catches corresp. to advice	Agreed TAC	Official landings	ICES landings	ICES discards	BMS reported to ICES
1987	Reduce F	< 198000		173000	154000	149000		
1988	60% of F(86); TAC	156000		165000	113000	107000		
1989	No increase in F; TAC	170000		170000	92000	92000		
1990	No increase in F; TAC	120000		120000	85000	88000		
1991	No increase in F; TAC	125000		125000	93000	99000		
1992	No increase in F; TAC	102000		110000	92000	92000		
1993	70% of F(91) ~ 93000 t	93000		93000	99000	105000		
1994	Reduce F by 30%	72000		97000	90000	102000		
1995	No increase in F	107000		107000	97000	113000		
1996	No increase in F	111000		111000	96000	110000		
1997	No increase in F	113000		115000	86000	103000		
1998	Reduce F by 20%	97000		97000	88000	100000		
1999	Reduce F to F_{pa}	104000		110000	108000	107000		
2000	Reduce F by 30%	75000		85000	85000	87000		
2001	Reduce F by 20%	87000		87000	88000	90000		
2002	$F < F_{pa}$	< 135000		135000	115000	105632	18394	
2003	$F < F_{pa}$	< 176000		165000	107470	106257	9916	
2004	$F < F_{pa}^*$	< 211000		190000	103610	102746	7464	
2005	F according to man. plan*	< 137000		145000	110580	113388	6558	
2006	F according to man. plan ($< F_{pa}$)*	< 123000		123000	109800	111845	6909	
2007	F according to man. plan ($< F_{pa}$)*	< 124000		123000	87380	92602	11828	
2008	F according to man. plan ($< F_{pa}$)*	< 137000		136000	114520	115471	6712	
2009	F according to man. plan ($< F_{pa}$)*	< 126000		126000	100680	105973	3774	
2010	F according to man. plan ($< F_{pa}$)*	< 107000		107000	91070	96767	4071	
2011	See scenarios	-		93000	89280	91528	3837	
2012**	F according to man. plan ($< F_{pa}$)*	< 79320		79000	68930	70864	6396	
2013	Management plan (TAC +15%)*	< 91219		91220	71600	71406	6392	
2014	Management plan (TAC -15%)*	< 77536		77536	68318	69372	5824	
2015	Management plan	< 66006	< 72211	66006	69879	69403	4603	
2016	EU-Norway management strategy	≤ 62153	≤ 67995	65696	62526	60655	10087	176
2017**	MSY approach	≤ 122122	≤ 127432	100287 †				
2018	MSY approach	≤ 93980	≤ 107325					

* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries.

** The June advice was updated in November.

† Includes top-up of 4.1%.

Subarea 6

Year	ICES advice	Predicted landings corresp. to advice	Predicted catches corresp. to advice	Agreed TAC ^{^^}	Official landings	ICES landings	ICES discards	BMS reported to ICES
1987	F reduced towards F_{max}	19000		27800	32500	31400		
1988	80% of F(86); TAC	35000		35000	32800	34200		
1989	$F < 0.3$; TAC	20000		30000	22400	25600		
1990	80% of F(88); TAC	24000		29000	18000	19900		
1991	Stop SSB decline; TAC	21000		22000	17900	17000		
1992	Avoid further reduction in SSB	< 19000		17000	10800	11800		
1993	$F = 0.21$	6300		14000	14500	13900		
1994	Lowest possible F			14000	13000**	12800		
1995	Significant reduction in effort	-		16000	10600**	11800		
1996	No increase in F	10200*		13000	9400**	9400		
1997	Significant reduction in F			12000	8600**	9400		
1998	60% reduction in F	4800		10900	7400**	8400		
1999	60% reduction in F	4800		7500	6800	7300		
2000	Reduce F by 30%	6000		7000	6400	5900		
2001	Reduce F by 20%	9000		9000	8700	8400		
2002	$F < F_{pa}$	< 13000		14000	5600	5519	3150	
2003	$F < F_{pa}$	< 17000		17100	5220	5789	2242	
2004	$F < F_{pa}^{\wedge}$	< 21000		20000	4810	4982	620	
2005	F according to man. plan ($< F_{pa}$) [^]	< 14000		15000	8700	6456	1637	
2006	F according to man. plan ($< F_{pa}$) [^]	< 12000		13000	9420	9474	1675	
2007	F according to man. plan ($< F_{pa}$) [^]	< 12000		13000	6690	6602	584	
2008	F according to man. plan ($< F_{pa}$) [^]	< 14000		14000	6010	6712	981	
2009	F according to man. plan ($< F_{pa}$) [^]	< 13000		13000	6170	6294	521	
2010	F according to man. plan ($< F_{pa}$) [^]	< 11000		11000	6220	6263	412	
2011	See scenarios	-		10000	7310	6917	502	
2012***	F according to man. plan ($< F_{pa}$) [^]	< 8230		8000	7560	7549	2887	
2013	Management plan (TAC+15%) [^]	< 9464		9464	8470	8653	1397	
2014	Management plan (TAC-15%) [^]	< 8045		8045	6842	7020	512	
2015	Management plan	< 6848	< 7492	6848	7577	7534	405	
2016	EU-Norway management strategy	≤ 6448	≤ 7054	6816	5849	7458	335	6
2017***	MSY approach	≤ 12670	≤ 13221	10404 †				
2018	MSY approach	≤ 9751	≤ 11135					

* Status quo catch.

** Incomplete data.

*** The June advice was updated in November.

[^] Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries.

^{^^} Since 1999, this area has been assessed together with the North Sea/Skagerrak. The TACs for each area are derived from a split based on historical landings.

† Includes top-up of 4.1%.

History of the catch and landings

Table 8 Saithe in subareas 4 and 6, and in Division 3.a. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Wanted catch		Unwanted catch	
	Bottom trawl 89.7%	Gillnet 4.9%	Discards	BMS landings
78715 tonnes	68113 tonnes		10421 tonnes	182 tonnes

Table 9 Saithe in subareas 4 and 6, and in Division 3.a. History of commercial landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Subarea 4 and Division 3.a

COUNTRY	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Belgium	22	28	15	18	7	27	15	2	1	3	4	6	16
Denmark	7991	7498	7470	5443	8066	8802	8018	6331	5171	5691	5056	4508	3109
Faroe Isl.	558	463	60	15	108	841	146	2	8	3	0	0	0
France	13628	11830	16953	15083	15881	7203	4582*	13856*	14093*	8475	7906	11612	10842
Germany	9589	12401	14397	12791	14140	13410	11193	10234	8052	9687	8562	7954	6196
Greenland	403	1042	924	564	888	927	0	0	0	0	0	0	0
Ireland	1	0	0	0	0	1	0	0	0	0	0	0	0
Lithuania	0	149	0	0	0	0	0	0	0	0	0	0	0
Netherlands	3	40	28	5	3	16	3	24	34	168	0	64	87
Norway	62783	68122	61318	45396	61464	57708	52712	46809	33288	35701	37463	35691	30951
Poland	0	1100	1084	1384	1407	988	654	584	0	0	0	0	0
Russia	0	35	2	5	5	13	0	0	0	0	0	0	0
Sweden	2249	2132	1745	1381	1639	1363	1545	1335	1306	1401	1272	1157	980
UK (E/W/Ni)	457	960	9128**	9625**	11804**	12584**	11887**	10250**	7287**	10379**	687	8888**	1707
UK (Scotland)	5924	6170									7686		6769
Total reported	103608	111970	113124	91710	115412	103883	90755	89427	69240	71508	68318	69879*	62526*
Unallocated	-3646	-427	3988	1908	-3979	1646	4345	277	645	317	319	726	1871
ICES estimate	99962	11154	117112	93618	111433	105529	95100	89704	70510	71825	68662	69153	60655
TAC	19000	14500	123250	135900	135900	125934	107000	93600	79320	91220	77536	66006	65696

*Preliminary.

**Scotland+E/W/Ni combined.

† does not include BMS landings.

Subarea 6

COUNTRY	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Denmark	0	0	0	0	0	0	0	0	0	0	20	0	1035
Faroe Islands	34	25	76	32	23	60	24	5	6	25	0	3	0
France	3053	3954	6092	4327	4170	2102	2008	2357	2612	3814	2904	3484	2298
Germany	4	373	532	580	148	298	257	0	9	0	0	0	91
Ireland	95	168	267	322	288	407	520	359	364	313	128	105	185
Netherlands	0	0	3	36	1	0	0	0	0	0	0	6	12
Norway	16	20	28	377	78	68	121	240	5	715	442	677	968
Russia	6	25	7	2	50	4	2	0	0	0	0	1	0
Spain	2	3	6	3	4	8	18	31	13	21	0	15	60
Sweden	0	0	0	0	0	0	0	0	0	0	0	0	240
UK (E/W/Ni)	37	133	2748**	1424**	2955**	3491**	3168**	4500**	4549**	3646**	97	3286**	123
UK (Scotland)	1563	2922									3191		2493
Total reported	4810	7623	9759	7103	7717	6438	6118	7492	7558	8534	6842	7577*	5849*
Unallocated	-296	-1884	-1191	-317	-483	525	722	-92	-351	-472	-60	-1578	-1609
ICES estimate	4514	5739	8568	6786	7234	6963	6840	7400	7162	8062	6831	9155	7458†
TAC	20000	15044	12787	14100	14100	13066	11000	9570	8230	9464	8045	6848	6816

*Preliminary.

**Scotland+E/W/Ni combined.

† does not include BMS landings.

Subarea 4, 6, and Division 3.a

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ICES estimate	108418	119593	125680	100404	118667	112492	101940	97104	77672	79887	75419	78307	68113†
TAC	210000	160044	136037	150000	150000	139000	118000	103170	87550	100684	85581	72854	72512

† does not include BMS landings.

Summary of the assessment

Table 10 Saithe in subareas 4 and 6, and in Division 3.a. Assessment summary. Weights are in tonnes. 'High' and 'Low' indicate point-wise 95% confidence intervals.

Year	Recruitment Age 3	High	Low	Stock size (SSB)	High	Low	Wanted catch	Unwanted catch*	Fishing pressure (F) Ages 4–7 Year–1	High	Low
	thousands			tonnes			tonnes	tonnes			
1967	141514	198745	100764	152767	193033	120900	113751		0.35	0.45	0.27
1968	160859	222336	116381	210990	262593	169528	88326		0.29	0.38	0.23
1969	284822	394129	205830	277160	340517	225592	130588		0.32	0.40	0.26
1970	294503	405303	213994	346166	418512	286326	234962		0.34	0.42	0.28
1971	354127	482458	259932	461470	556353	382769	265381		0.37	0.46	0.31
1972	224106	303169	165662	490295	587477	409188	261877		0.41	0.49	0.33
1973	200845	271614	148515	522480	625953	436111	242499		0.43	0.52	0.36
1974	199013	269673	146867	576888	687561	484030	298351		0.50	0.59	0.42
1975	234919	316460	174388	516750	617248	432615	271584		0.54	0.64	0.45
1976	401972	551750	292854	399015	479462	332067	343967		0.60	0.71	0.50
1977	150280	203969	110722	324937	391182	269910	216395		0.59	0.71	0.49
1978	120225	162612	88887	297584	359712	246186	155141		0.48	0.58	0.40
1979	87717	119074	64617	278836	333293	233277	128360		0.45	0.54	0.38
1980	85814	116486	63218	260862	309522	219852	131908		0.48	0.57	0.40
1981	162770	222713	118960	249513	294608	211321	132278		0.47	0.57	0.40
1982	141141	190783	104416	220136	256407	188996	174351		0.54	0.64	0.46
1983	149021	201668	110118	219742	256639	188151	180044		0.65	0.77	0.55
1984	254611	345686	187531	188748	219530	162282	200834		0.68	0.79	0.58
1985	353772	485949	257547	166053	192182	143476	220869		0.70	0.82	0.60
1986	289914	393146	213789	156590	180923	135529	198596		0.73	0.87	0.62
1987	149682	202813	110471	165598	191333	143324	167514		0.71	0.83	0.60
1988	138104	186308	102372	154921	180925	132654	135172		0.71	0.83	0.61
1989	102737	138815	76036	126668	147400	108851	108877		0.69	0.81	0.59
1990	150580	203858	111226	114889	133984	98515	103800		0.66	0.77	0.56
1991	174149	235106	128996	107824	125078	92950	108048		0.63	0.74	0.53
1992	104585	140415	77898	113356	130830	98216	99742		0.61	0.72	0.51
1993	175575	236012	130614	120263	139763	103483	111491		0.64	0.75	0.54
1994	118405	159033	88157	125595	145928	108095	109622		0.57	0.67	0.48
1995	213393	290523	156740	144868	169090	124116	121810		0.57	0.68	0.48
1996	119173	161808	87772	156723	182531	134565	114997		0.51	0.60	0.42
1997	149745	204844	109467	194687	230395	164514	107327		0.44	0.53	0.37
1998	88800	121858	64710	191555	226214	162206	106123		0.45	0.54	0.37
1999	112273	154020	81842	201484	238751	170034	110716		0.48	0.58	0.40
2000	97570	133136	71506	192931	227648	163508	91322		0.42	0.51	0.34
2001	202590	277932	147672	199793	236632	168689	95042		0.39	0.47	0.32
2002	162163	221595	118670	223121	264616	188132	122036	21544	0.40	0.48	0.33
2003	167325	228525	122515	214702	254273	181289	112383	11438	0.41	0.50	0.34
2004	117047	159181	86065	272663	323587	229753	107384	8088	0.36	0.44	0.30
2005	142683	195446	104164	263677	311712	223045	118873	8196	0.37	0.45	0.31
2006	100788	140095	72510	275577	325883	233037	121650	8585	0.39	0.47	0.32
2007	152005	214355	107791	252610	299803	212846	99470	12413	0.37	0.45	0.30
2008	73322	99813	53862	255923	303698	215663	121848	8359	0.44	0.53	0.36
2009	58977	80288	43322	250254	299114	209375	113756	4296	0.44	0.53	0.36
2010	89587	122353	65596	235448	283805	195330	103004	4484	0.42	0.51	0.35
2011	81755	114282	58486	188553	227947	155967	97598	4362	0.43	0.52	0.35
2012	138077	193631	98461	170443	207556	139967	77865	9278	0.39	0.49	0.31
2013	98200	141052	68366	179628	221604	145603	80447	7777	0.35	0.45	0.27

Year	Recruitment Age 3	High	Low	Stock size (SSB)	High	Low	Wanted catch	Unwanted catch*	Fishing pressure (F) Ages 4–7 Year–1	High	Low
	thousands			tonnes			tonnes	tonnes			
2014	62041	94667	40659	208448	263156	165114	75493	6337	0.32	0.43	0.23
2015	110334	184412	66013	220918	290888	167778	78307	5003	0.31	0.44	0.21
2016	142625	286779	70933	215697	306967	151563	68375	10603	0.28	0.45	0.18
2017	110334**			257329	323890	190767					

* Unwanted catch values include discards and BMS landings from 2016.

** Preliminary.

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