

**ECOREGION** North Sea  
**STOCK** Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall)

**Advice for 2013**

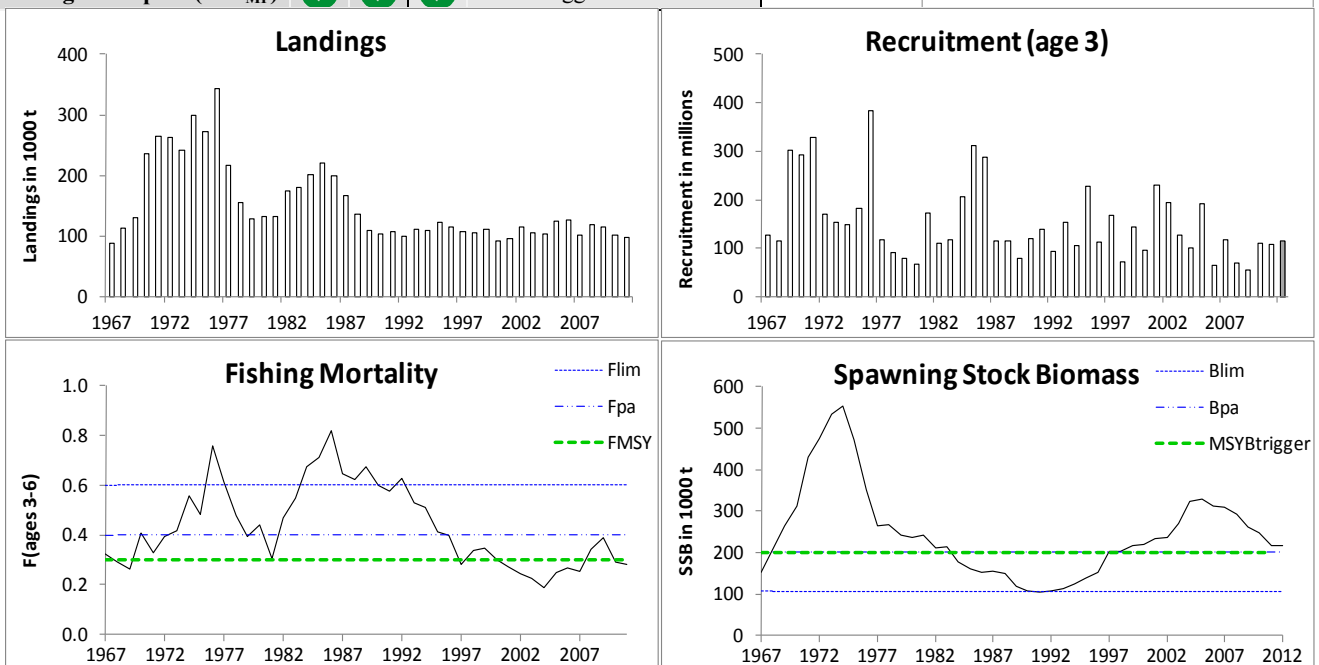
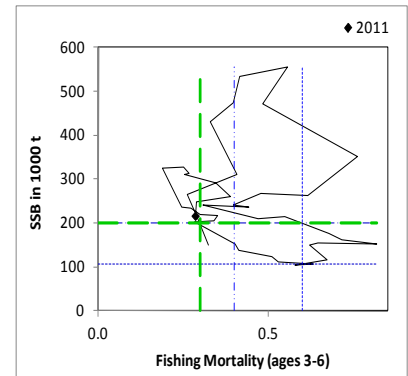
ICES advises on the basis of the EU–Norway management plan that landings in 2013 should be no more than 100 684 tonnes for the whole assessment area.

**Stock status**

F (Fishing Mortality)			
	2009	2010	2011
MSY ( $F_{MSY}$ )	✗	✓	✓ Appropriate
Precautionary approach ( $F_{pa}, F_{lim}$ )	✓	✓	✓ Harvested sustainably
Management plan ( $F_{MP}$ )	✗	✓	✓ Below limit

SSB (Spawning-Stock Biomass)			
	2010	2011	2012
MSY ( $B_{trigger}$ )	✓	✓	✓ Above trigger
Precautionary approach ( $B_{pa}, B_{lim}$ )	✓	✓	✓ Full reproductive capacity
Management plan ( $SSB_{MP}$ )	✓	✓	✓ Above trigger



**Figure 6.4.12.1** Saithe in Subareas IV and VI, and Division IIIa. Summary of stock assessment in May 2012 (weights in thousand tonnes). Top right: SSB and F for the time series used in the assessment. Predicted values are shaded.

SSB has been above  $B_{pa}$  since 1997 but has declined since 2005 towards  $B_{pa}$ . Fishing mortality has fluctuated around  $F_{MSY}$  since 1997. Recruitment has been below average since 2006.

**Management plans**

The EU–Norway agreed management plan as updated in December 2008 (Annex 6.4.12) was evaluated by ICES (ICES, 2008), and considered to be consistent with the precautionary approach in the short term (< 5 years).

## Biology

The juveniles (ages 0–2 years) generally occur in shallow coastal areas where they are protected from large fisheries. The fish are long-lived (20+ years) and tend to form large aggregations to a higher extent than for instance cod. Saithe starts to mature at age 4 (15% mature) and at age 7 all fish can be regarded as being mature.

## Environmental influence on the stock

A decrease in the mean weight-at-age has been observed since the mid-1980s, but this trend has now been reversed. Current information is insufficient to establish whether these reductions are linked to changes in the environment. There is no indication that the observed decline in weight-at-age is density dependent.

## The fisheries

Saithe in the North Sea are mainly taken in a directed trawl fishery in deep water along the Northern Shelf edge and the Norwegian Trench. Analyses show a substantial shift in the Norwegian and German trawlers' fishing pattern after 2008, both in time and spatial distribution. The importance of the fisheries on the spawning aggregations in the first quarter of the year has declined.

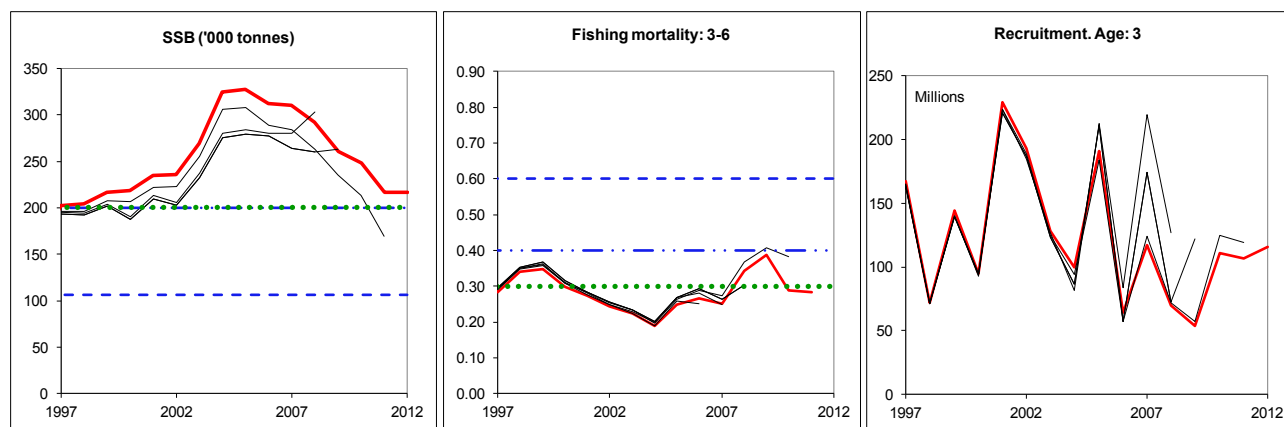
**Catch distribution** Catch 2011 = 97 kt, of which approximately 95% are taken by bottom trawl and 5% by other gears. Discards are low.

## Effects of the fisheries on the ecosystem

Hiddink *et al.* (2006) estimates that in areas of bottom trawl activity in the North Sea, benthic biomass and production is reduced by 56% and 21%, respectively, compared with an unfished situation. North Sea saithe fisheries are known to have less impact on the seafloor than most other bottom trawl fisheries.

## Quality considerations

Age distribution of Norwegian catch data has been revised substantially for 2010, which influences the biomass estimate in the whole assessment. Conflicting signals between the scientific surveys have become more apparent. All scientific surveys on adults have shortcomings in depth range (IBTS-Q3) or coverage (NORACU). Catches from older age classes in the surveys are not representative and therefore commercial cpue indices are used for tuning. Catch sampling data from the Norwegian fishing industry should be improved.



**Figure 6.4.12.2** Saithe in Subareas IV and VI, and Division IIIa. Historical assessment results (final-year recruitment estimates included). The 2010 assessment is not included since this was only a forecast based on the 2009 assessment.

## Scientific basis

<b>Assessment type</b>	Age-based assessment model (XSA).
<b>Input data</b>	Three survey indices (NORACU, IBTS-Q3, NORASS); three commercial indices (FRATRB_VI, GER-OTB_IV, NORTR_VI2).
<b>Discards and bycatch</b>	Not included in the assessment.
<b>Indicators</b>	None.
<b>Other information</b>	Benchmarked in January 2011 (revised in October 2011).
<b>Working group report</b>	<a href="#">WGNSSK</a>

**ECOREGION** North Sea  
**STOCK** Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall)

**Reference points**

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
Management Plan	SSB <sub>MP</sub>	200 000 t	B <sub>pa</sub>
	F <sub>MP</sub>	0.3	Or lower depending on SSB in relation to SSB target.
MSY Approach	MSY B <sub>trigger</sub>	200 000 t	Default value B <sub>pa</sub>
	F <sub>MSY</sub>	0.3	Stochastic simulation using hockey-stick stock–recruitment.
Precautionary approach	B <sub>lim</sub>	106 000 t	B <sub>loss</sub> = 106 000 t (estimated in 1998).
	B <sub>pa</sub>	200 000 t	Affords a high probability of maintaining SSB above B <sub>lim</sub> .
	F <sub>lim</sub>	0.6	F <sub>loss</sub> the fishing mortality estimated to lead to stock falling below B <sub>lim</sub> in the long term.
	F <sub>pa</sub>	0.4	Implies that B <sub>eq</sub> > B <sub>pa</sub> and P(SSB <sub>MT</sub> < B <sub>pa</sub> ) < 10%.

(unchanged since: 2011)

**Outlook for 2013**

Basis: F (2012) = 0.24 [TAC constraint]; R (2011–2013) = GM (1988–2011) = 115 970; SSB (2013) = 235; landings (2012) = 87.55.

<b>Rationale</b>	<b>landings 2013</b>	<b>landings IIIa&amp;IV 2013<sup>1)</sup></b>	<b>landings VI 2013<sup>1)</sup></b>	<b>Basis</b>	<b>F 2013</b>	<b>SSB 2014</b>	<b>% SSB change 2)</b>	<b>% TAC change 3)</b>
Management plan	100.684	91.219	9.464	15% TAC constraint	0.26	252	+7%	+15%
MSY approach	113	102	11	F <sub>MSY</sub>	0.3	241	+3%	+29%
Precautionary approach	143	130	14	F <sub>pa</sub>	0.4	214	−9%	+63%
Zero catch	0	0	0	F = 0	0	344	+46%	−100%
Other option	94	85	8.8	F <sub>2012</sub>	0.24	258	+10%	+7%
<i>Mixed fisheries options – minor differences with calculation above can occur due to different methodology used (ICES, 2012b) □</i>								
<i>Maximum</i>	131	118	12	A	0.39	200	−15%	+49%
<i>Minimum</i>	55	50	5.2	B	0.12	316	+35%	−37%
<i>Cod MP</i>	59	53	5.5	C	0.14	286	+22%	−33%
<i>SQ Effort</i>	104	94	9.8	D	0.28	236	0%	+19%
<i>Effor. Mgt</i>	86	78	8.1	E	0.22	261	+11%	−1%

Weights in thousand tonnes.

<sup>1)</sup> Landings split according to the average in 1993–1998, i.e. 90.6% in Subarea IV and Division IIIa West and 9.4% in Subarea VI.

<sup>2)</sup> SSB 2014 relative to SSB 2013.

<sup>3)</sup> Landings 2013 relative to TAC 2012.

Mixed Fisheries assumptions:

A. Maximum scenario: Fleets stop fishing when last quota exhausted.

B. Minimum scenario: Fleets stop fishing when first quota exhausted.

C. Cod management plan scenario: Fleets stop fishing when cod quota exhausted.

D. *Status quo* (SQ) effort scenario: Effort in 2012 and 2013 as in 2011.

E. Effort management scenario: Effort reductions according to cod and flatfish management plans.

**Management plan**

The EU–Norway agreement management plan does not clearly state whether the SSB in the intermediate year or the SSB at the beginning or end of the TAC year should be used to determine the status of the stock. ICES interprets this as being the SSB at the beginning of the intermediate year (2012). Since SSB at the beginning of 2012 is above B<sub>pa</sub>, and a F = 0.3 will give a larger change than 15%, paragraph 5 of the harvest control rule applies, resulting in a TAC of 100 684 t and an SSB in 2014 of 252 000 t.

### ***MSY approach***

Following the ICES MSY framework implies a fishing mortality of  $F_{MSY} = 0.3$ . This would result in landings of no more than 113 000 t in 2013 and an SSB in 2014 of 241 000 t.

### ***PA approach***

Fishing at  $F_{pa} = 0.4$  results in landings of less than 143 000 t in 2013 and a SSB of 214 000 in 2014.

### ***Mixed fisheries***

In 2012, ICES puts forward mixed-fisheries advice for the first time (ICES, 2012c). In contrast to single-species advice there is no single recommendation but a range of plausible options, assuming fishing patterns and catchability in 2012 and 2013 similar to those in 2011. Major differences between the outcomes of the various scenarios indicate potential unbalance between single-species fishing opportunities. The consequences of this unbalance in terms of changes in fleet dynamics cannot be ascertained.

Cod is the limiting species for the North Sea demersal fisheries in 2013. Following the 'cod' scenario (full implementation of the cod management plan), the saithe management plan catch options could not be fully utilized.

### **Additional considerations**

#### *Management considerations*

The stock biomass is estimated to be close to  $B_{pa}$  and recruitment estimates for the terminal year are uncertain. The forecast and resulting advice are highly sensitive to the recruitment estimate.

ICES has developed a generic approach to evaluate whether new survey information that becomes available in September forms a basis to update the advice. If this is the case, ICES will publish new advice in November 2012.

The reported landings have been lower than the TACs during the past nine years, but the reduction of the TAC in recent years has gradually lessened the difference between landings and TAC.

#### *Regulations and their effects*

Since 2009 the EU fleets fishing for saithe have fallen under the effort regime of the EU cod management plan (1342/2008). This may have contributed to a southern shift in geographical distribution and thereby a change in fishing pattern for the German fleet.

Overall nominal effort (kW-days) by European demersal trawls, seines, beam trawls, and gillnets in the North Sea, Skagerrak, and Eastern Channel have been substantially reduced (–20% between 2003 and 2011). Following the introduction of days-at-sea regulations in 2003, there was a substantial switch from the larger mesh (>100 mm, TR1) gear to the smaller mesh (70–99 mm, TR2) gear. Subsequently, effort by TR1 has been relatively stable, whereas effort in TR2, beam trawl (80–120 mm, BT2), and gillnet has shown a continuous decline (–12%, –39%, and –35%, respectively, between 2004 and 2011) (ICES, 2012b). Nominal effort reported by Norway has increased in 2011 due to the generalization of electronic logbooks.

#### *Information from the fishing industry*

Saithe has had growing importance for both the Danish and Scottish fleets. The fishers' survey (Napier, 2011) shows a perception of an increasing stock which is not in accordance with the latest assessment. Reports from Norwegian fishers show concerns about increased landings from pelagic trawling and a possible change in exploitation pattern towards younger year classes. According to a RAC-meeting between scientists and fishers in Hanstholm in April 2012, the industry was worried about the decline in mean weight-at-age after 2000 which, using a constant length–weight relationship, implies decline in mean length-at-age. French and German industry representatives confirmed changes in fishing pattern due to effort management and competition over fishing grounds between trawlers and gillnetters in Division Via, especially in 2009 and 2010. This has not led to large changes in the age distribution of the catch.

The fishing industry representatives see improved stock status in the last two years, after a period of low recruitment. The fishing industry commented on conflicting data sources and suggested that fishers' knowledge should be used for the interpretation of the data (i.e. commercial cpue indices). Survey data, especially those for young year classes before age 3, should be improved.

### *Uncertainties in assessment and forecast*

Estimates of recruitment are considered very uncertain due to strong year effects in the surveys in the last three years.

During the benchmark assessment (ICES, 2011) and the June 2011 assessment, the influence of the commercial cpue indices was reduced by using these indices to tune only the older ages (6–9) instead of using them for all ages (3–9). The latest information indicates strong year effects in the scientific surveys in the most recent years. The option to include the commercial cpue tuning fleets again at ages 3–5 was considered appropriate in the November 2011 update, and also in the 2012 assessment. However, the potential for bias in commercial cpue (for example hyper-stability) is a general concern for shoaling species such as saithe. A reliable survey is needed to redress this issue.

In May 2012 the age distribution data in the Norwegian catches in 2010 were revised and this accounted for a great part of the difference.

### *Comparison with previous assessment and advice*

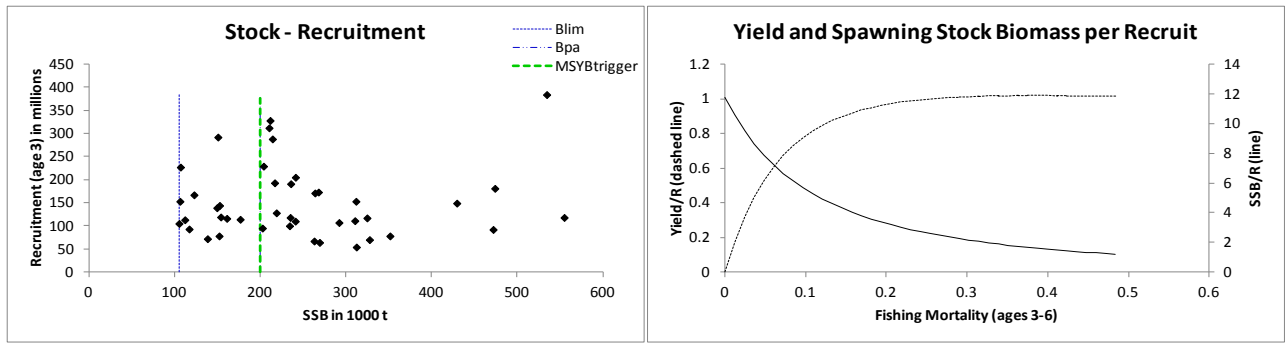
The current assessment estimates SSB in 2012 to be 30% higher than estimated in November 2011, and fishing mortality in 2010 is estimated to be 25% lower. The change was caused mainly by the revision of age distribution in the Norwegian catches. The basis for the advice is the same as last year: the management plan.

### **Assessment and management area**

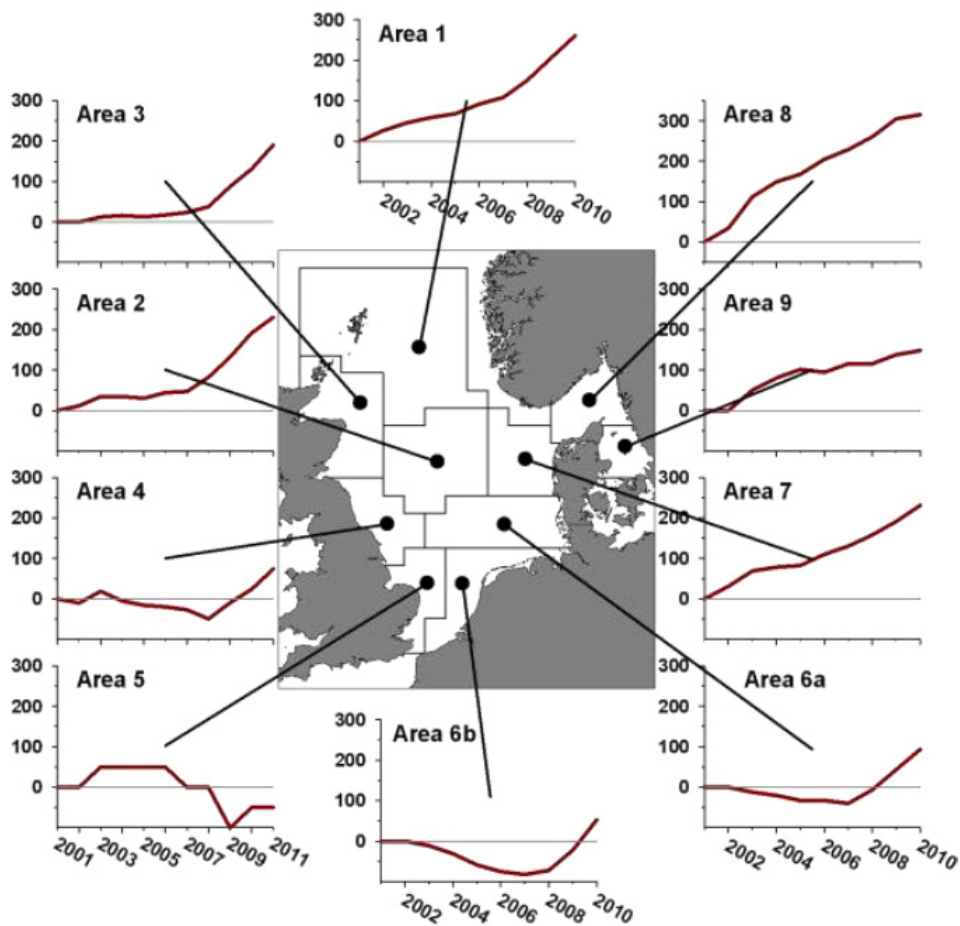
The ICES advice applies to saithe in Division IIIa and in Subareas IV and VI. For these areas, two TACs are set: one for Division IIIa and Subarea IV, and one for Subarea VI.

### **Sources**

- Hiddink, J. G., Jennings, S., Kaiser, M. J., Queirós, A. M., Duplisea, D. E., and Piet, G. J. 2006. Cumulative impacts of seabed trawl disturbance on benthic biomass, production, and species richness in different habitats. *Canadian Journal of Fisheries and Aquatic Sciences*, 63: 721–736.
- ICES. 2008. Norway and EC request on management plan for saithe in the North Sea and West of Scotland. ICES Advice 2008, Book 6, Section 6.3.3.3.
- ICES. 2011. Report of the Benchmark Workshop on Roundfish and Pelagic Stocks (WKBENCH 2011), 24–31 January 2011, Lisbon, Portugal. ICES CM 2011/ACOM:38.
- ICES. 2012a. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 27 April–3 May 2012. ICES CM 2012/ACOM:13.
- ICES. 2012b. Report of the Working Group on Mixed Fisheries Advice for the North Sea (WGMIXFISH), 21–25 May 2012. ICES CM 2012/ACOM:22.
- ICES. 2012c. Mixed-fisheries advice. *In* Report of the ICES Advisory Committee. ICES Advice 2012. Book 6, Section 6.4.25.
- Napier, I. R. 2012. Fishers' North Sea stock survey 2011. NAFC Marine Centre, Shetland, Scotland.



**Figure 6.4.12.3** Saithe in Subareas IV and VI and in Division IIIa. Stock–recruitment plot and yield-per-recruit analysis.



**Figure 6.4.12.4** Saithe in Subareas IV and VI and in Division IIIa. Results of the North Sea Commission fishers' survey 2010 on abundance of saithe (Napier, 2011).

**Table 6.4.12.1** Saithe in **Subarea IV and Division IIIa**. ICES advice, management, and landings.

Year	ICES Advice	Predicted landings corresp. to advice	Agreed TAC	Official landings	ICES landings
1987	Reduce F	<198	173	154	149
1988	60% of F(86); TAC	156	165	113	107
1989	No increase in F; TAC	170	170	92	92
1990	No increase in F; TAC	120	120	85	88
1991	No increase in F; TAC	125	125	93	99
1992	No increase in F; TAC	102	110	92	92
1993	70% of F(91) ~ 93 000 t	93	93	99	105
1994	Reduce F by 30%	72	97	90	102
1995	No increase in F	107	107	97	113
1996	No increase in F	111	111	96	110
1997	No increase in F	113	115	86	103
1998	Reduce F by 20%	97	97	88	100
1999	Reduce F to $F_{pa}$	104	110	108	107
2000	Reduce F by 30 %	75	85	85	87
2001	Reduce F by 20 %	87	87	88	90
2002	$F < F_{pa}$	<135	135	113	117
2003	$F < F_{pa}$	<176	165	105	102
2004	$F < F_{pa}^*$	<211	190	87	100
2005	F according to man. plan*	<137	145	111	112
2006	F according to man. plan ( $< F_{pa}$ ) *	<123	123	110	117
2007	F according to man. plan ( $< F_{pa}$ ) *	<124	123	87	94
2008	F according to man. plan ( $< F_{pa}$ ) *	<137	136	115	112
2009	F according to man. plan ( $< F_{pa}$ ) *	<126	126	101**	106
2010	F according to man. plan ( $< F_{pa}$ ) *	<107	107	91**	96
2011	See scenarios	-	93	89	90
2012 <sup>1</sup>	F according to man. plan ( $< F_{pa}$ ) *	< 79.320	79		
2013	Management plan (TAC + 15%)	< 91.219			

Weights in thousand tonnes.

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

\*\* French data are preliminary.

<sup>1</sup>The June advice in 2011 was updated in November 2011.

**Table 6.4.12.2** Saithe in **Subarea VI**. ICES advice, management, and landings.

Year	ICES Advice	Predicted landings corresp. to advice	Agreed TAC**	Official landings	ICES landings
1987	F reduced towards $F_{max}$	19	27.8	32.5	31.4
1988	80% of F(86); TAC	35	35	32.8	34.2
1989	$F < 0.3$ ; TAC	20	30	22.4	25.6
1990	80% of F(88); TAC	24	29	18.0	19.9
1991	Stop SSB decline; TAC	21	22	17.9	17.0
1992	Avoid further reduction in SSB	<19	17	10.8	11.8
1993	$F = 0.21$	6.3	14	14.5	13.9
1994	Lowest possible F		14	13.0 <sup>2</sup>	12.8
1995	Significant reduction in effort	-	16	10.6 <sup>2</sup>	11.8
1996	No increase in F	10.2 <sup>1</sup>	13	9.4 <sup>2</sup>	9.4
1997	Significant reduction in F		12	8.6 <sup>2</sup>	9.4
1998	60% Reduction in F	4.8	10.9	7.4 <sup>2</sup>	8.4
1999	60% reduction in F	4.8	7.5	6.8	7.3
2000	Reduce F by 30%	6.0	7	6.4	5.9
2001	Reduce F by 20%	9.0	9	8.7	8.4
2002	$F < F_{pa}$	< 13	14	5.6	5.2
2003	$F < F_{pa}$	< 17	17.1	5.0	5.3
2004	$F < F_{pa}^*$	< 21	20	1.6	4.4
2005	F according to man. plan ( $< F_{pa}$ ) *	< 14	15	8.7	5.7
2006	F according to man. plan ( $< F_{pa}$ ) *	< 12	13	9.4	8.6
2007	F according to man. plan ( $< F_{pa}$ ) *	< 12	13	6.7	6.8
2008	F according to man. plan ( $< F_{pa}$ ) *	< 14	14	6.0	7.2
2009	F according to man. plan ( $< F_{pa}$ ) *	< 13	13	6.2	7.0
2010	F according to man. plan ( $< F_{pa}$ ) *	< 11	11	6.2	6.9
2011	See scenarios	-	10	7.3	7.4
2012 <sup>3</sup>	F according to man. plan ( $< F_{pa}$ ) *	< 8.230	8		
2013	Management plan (TAC + 15%)	< 9.464			

Weights in thousand tonnes.

<sup>1</sup> *Status quo* catch.

<sup>2</sup> Incomplete data.

<sup>3</sup> The June advice in 2011 was updated in November 2011.

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

\*\* Since 1996, the saithe in this area has been assessed together with North Sea/Skagerrak saithe, with allocation of TAC based on historical landings. In recent years TACs in Subarea VI have been included in a total TAC for Divisions VIIb and VIIc, but it is unclear if anything is added. The areas were combined shortly after the Saithe Study Group meeting in 1995. Presumably the assessment was merged in 1996, and used in the advice for 1997.



**Table 6.4.12.3** Saithe in Subarea IV, Division IIIa (Skagerrak), and Subarea VI. Officially reported landings and ICES estimates (in tonnes).

SAITHE IV and IIIa												
Country	2000	2001	2002	2003	2004*	2005*	2006	2007*	2008*	2009	2010	2011
Belgium	122	24	107	45	22	28	16	18	7	27	15	2
Denmark	3529	3575	5668	6954	7991	7498	7471	5458	8069	8802	8019	6325
Faroe Islands		289	872	495	558	184	62	15	108	-	146	0
France	19200	20472	25441	18001	13628	10768	15739	13043	15302	5445*	4582*	13856
Germany	9273	9479	10999	8956	9589	12401	14390	12790	14141	13689	11192	10234
Greenland	60	1521	62	1616	403		-	-	-	-	-	0
Ireland	1				1		0	-	81	81	-	0
Netherlands	11	20	6		3	40	28	5	3	17	3	24
Norway	43665	44397	60013	61735	62783	67365	61268	45395	62055	57708	53031	46778
Poland	747	727	752	734*	0	1100	-	-	1407	988	654	584
Russia	67					35	2	5	5	13	-	0
Sweden	1468	1627	1863	1876	2249	2114	1695	1380	1639	1363	1545	1331
UK (E/W/Nl)	1227	1186	2521	1215	457	1190						
UK (Scotland)	5484	5219	6596	5829	5924	7703	9129**	9628**	11701**	12545**	11887**	10148**
Total reported	85395	88541	114900	107467	103608	110575	109800	87377	114517	100678	91074	89282
Unallocated	2281	1030	1291	-5809	-3646	968	7312	6241	-3084	4851	4026	422
W.G. Estimate	87676	89571	116191	101658	99962	111543	117112	93618	111433	105529	95100	89704
TAC	85000	87000	135000	165000	190000	145000	123250	135900	135900	125934	107000	93600

\*Preliminary, <sup>2</sup>Preliminary data reported in IVa

\*\*Scotland+E/W/Nl combined

**Table 11.2.1 continued**

SAITHE VI												
Country	2000	2001	2002	2003	2004*	2005*	2006	2007*	2008*	2009	2010	2011
Faroe Islands				2	34	21	76	32	23	-	24	5
France	3310	5157	3062	3499	3053	3452	5782	3956	2617	2093	2003	2382
Germany	305	466	467	54	4	373	532	580	147	298	257	0
Ireland	410	399	91	170	95	168	243	322	208	208	519	359
Netherlands	-	-	-	-	-	-	-	-	1	-	-	0
Norway	58	31	12	28	16	20	28	377	78	68	249	160
Russia	25	1	1	6	6	25	7	2	50	4	2	0
Spain	3	15	4	6	2	3	-	-	-	-	-	0
UK (E/W/Nl)	276	273	307	263	37	203						
UK (Scotland)	2463	2246	1567	1189	1563	4433	2748**	1419**	2887**	3501**	3168**	4399**
Total reported	6850	8588	5513	5215	4810	8699	9416	6688	6011	6172	6222	7305
Unallocated	-960	-1770	-327	35	-296	-2960	848	98	1223	791	666	95
W.G. Estimate	5890	6818	5186	5250	4514	5739	8568	6786	7234	6963	6840	7400
TAC	7000	9000	14000	17119	20000	15044	12787	14100	14100	13066	11000	9570

\*Preliminary

\*\*Scotland+E/W/Nl combined

SAITHE IV, IIIa and VI												
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
WG estimate	93566	96389	121377	106908	104476	117282	125680	100404	118667	112492	101940	97104
TAC	92000	96000	149000	182119	210000	160044	136037	150000	150000	139000	118000	103170

**Table 6.4.12.4** Saithe in Subarea IV, Division IIIa (Skagerrak), and Subarea VI. Summary of stock assessment.

Year	Recruitment Age 3 thousands	SSB tonnes	Landings tonnes	Mean F Ages 3-6
1967	127000	150800	88300	0.322
1968	114000	211700	113800	0.291
1969	301000	264000	130600	0.262
1970	292000	311900	235000	0.408
1971	328000	429600	265400	0.329
1972	171000	474000	261900	0.395
1973	153000	534500	242500	0.416
1974	149000	554900	298400	0.556
1975	181000	472000	271600	0.482
1976	384000	351600	344000	0.760
1977	118000	263100	216400	0.615
1978	92000	268100	155100	0.477
1979	78000	241100	128400	0.396
1980	67000	235200	131900	0.443
1981	173000	241300	132300	0.306
1982	110000	210500	174400	0.469
1983	118000	214400	180000	0.548
1984	205000	176800	200800	0.677
1985	312000	161100	220900	0.714
1986	288000	152200	198600	0.819
1987	114000	154100	167500	0.645
1988	116000	149600	135200	0.621
1989	78000	117200	108900	0.673
1990	119000	106500	103800	0.598
1991	139000	105400	108000	0.576
1992	93000	107100	99700	0.630
1993	153000	112200	111500	0.529
1994	105000	122900	109600	0.509
1995	227000	138600	121800	0.411
1996	113000	152700	115000	0.401
1997	167000	202700	107300	0.283
1998	72000	204000	106100	0.340
1999	144000	217000	110700	0.349
2000	95000	219000	91300	0.299
2001	229000	234400	95000	0.273
2002	193000	235800	115400	0.244
2003	128000	269400	105600	0.224
2004	100000	324800	104200	0.189
2005	191000	327700	124500	0.250
2006	64000	312400	125700	0.266
2007	117000	310600	101200	0.252
2008	70000	292100	119300	0.344
2009	54000	260800	115700	0.388
2010	111000	248300	101900	0.289
2011	107000	217000	97100	0.284
2012	115970*	216941		
Average	151652	245175	150940	0.434

\* Geometric mean recruitment 1988–2011.

#### **Annex 6.4.12 EU–Norway Management plan**

In 2008 EU and Norway renewed the existing agreement on “a long-term plan for the saithe stock in the Skagerrak, the North Sea and west of Scotland, which is consistent with a precautionary approach and designed to provide for sustainable fisheries and high yields. The plan shall consist of the following elements.

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 106,000 tonnes (Blim).
2. Where the SSB is estimated to be above 200,000 tonnes the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of no more than 0.30 for appropriate age groups.
3. Where the SSB is estimated to be below 200,000 tonnes but above 106,000 tonnes, the TAC shall not exceed a level which, on the basis of a scientific evaluation by ICES, will result in a fishing mortality rate equal to  $0.30 - 0.20 * (200,000 - SSB) / 94,000$ .
4. Where the SSB is estimated by the ICES to be below the minimum level of SSB of 106,000 tonnes the TAC shall be set at a level corresponding to a fishing mortality rate of no more than 0.1.
5. Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15 % from the TAC of the preceding year the Parties shall fix a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.
6. Notwithstanding paragraph 5 the Parties may where considered appropriate reduce the TAC by more than 15 % compared to the TAC of the preceding year.
7. A review of this arrangement shall take place no later than 31 December 2012.
8. This arrangement enters into force on 1 January 2009.”