1.4.4   Faroe saithe in Division Vb

State of the stock

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to highest yield	Fishing mortality in relation to agreed target	Comment
Increased risk	Harvested unsustainably	Overexploited	Below agreed target	

Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as being at risk of reduced reproductive capacity and to be harvested unsustainably.

The estimate of fishing mortality has been above the proposed F_{lim} since 2000. The spawning stock biomass has been below B_{pa} since 2001. Recruitment of the 1996 to 2000 year classes was above average, including the strong 1998 year class. The estimation of the 2001 year class is uncertain but is presently estimated to be record low.

Management objectives

The management objective is to achieve sustainable fisheries. An effort management system was implemented in the Faroese demersal fisheries (Division Vb) in 1996 and aims at harvesting, on average, 33% of the saithe stock in numbers. This translates into an average F of 0.45, above the F_{pa} of 0.28. ICES considers this F level to be inconsistent with the Precautionary Approach.

Reference points

	ICES considers that:	ICES proposed that:
Precautionary Approach reference points	B_{lim} is 60 000 t	B_{pa} be set at 85 000 t
	F_{lim} is 0.40	F_{pa} be set at 0.28

Technical basis

B_{lim}: lowest observed SSB established in 1999 and corresponding to SSB in 1992	B_{pa}: former MBAL
F_{lim}: consistent with B_{lim} of 60 000 t	F_{pa}: consistent with F_{lim} and previous estimate of F_{med}

Yield and spawning biomass per Recruit
F-reference points:

	Fish Mort Ages 4-8	Yield/R	SSB/R
Average last 3 years	0.459	1.530	3.088
$F_{0.1}$	0.119	1.323	7.773
F_{med}	0.363	1.529	3.684

Single-stock exploitation boundaries

Exploitation boundaries in relation to existing management plans

The current F is estimated to be around the management target of F=0.45. The average fishing mortality for the period when this effort regulation scheme has been operative (1997–2004) is estimated at 0.40 per year. The agreed management plan implies no change in fishing mortality for 2006.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

The current fishing mortality estimated as 0.44 is above rates that would support optimal long-term yield and low risk of stock depletion ($F_{01}= 0.119$).

Exploitation boundaries in relation to precautionary limits

Fishing effort in 2006 should be reduced to correspond to a fishing mortality below $F_{pa} = 0.28$, corresponding to an effort reduction of about 40% if the relationship between fishing effort and fishing mortality is linear.

Short-term implications

Outlook for 2006

Basis: F(2005) =0.4585; SSB(2006) = 65; catch (2005) = 45.

The fishing mortality applied according to the agreed management plan (F(management plan)) is 0.45.
The maximum fishing mortality which would be in accordance with precautionary limits (F (precautionary limits)) is 0.28.

Rationale	F (2006	Basis	SSB (2006)	Landings (2006)	SSB (2007)	%SSB change [1]
Zero catch	0	F=0	65	0	92	41
Target reference point	0.45	F(man. plan) F_{target}	65	35	57	-13
Status quo	0.46	Fsq	65	36	56	-14
High long-term yield	0.12	$F_{0.1}$(long-term yield)	65	11	80	23
Agreed management plan	0.05	F(man. plan) * 0.1	65	4	87	34
	0.11	F(man. plan) * 0.25	65	11	81	24
	0.23	F(man. plan) * 0.50	65	20	72	9
	0.34	F(man. plan) * 0.75	65	28	64	-3
	0.41	F(man. plan) * 0.90	65	33	59	-9
	0.45	F(man. plan)	65	35	57	-13
	0.50	F(man. plan) * 1.1	65	38	54	-17
	0.56	F(man. plan) * 1.25	65	41	51	-22
Precautionary limits	0.03	F_{pa} * 0.1	65	3	89	36
	0.07	F_{pa} * 0.25	65	7	85	30
	0.14	F_{pa} * 0.5	65	13	78	20
	0.21	F_{pa} * 0.75	65	19	73	12
	0.25	F_{pa} * 0.90	65	22	69	6
	0.28	F_{pa} (=F_{sq} *0.61)	65	24	67	3
	0.31	F_{pa} * 1.1	65	26	66	1
	0.35	F_{pa} * 1.25	65	29	63	-4
Mixed fisheries	0.18	Coupling with cod; F_{sq} * 0.4	65	16	75	16

Weights in '000 t.
Shaded scenarios are not considered consistent with the Precautionary Approach.
[1] SSB 2007 relative to SSB 2006.

Management considerations

Maintaining the *status quo* fishing mortality implies that SSB is forecasted to be below B_{lim} in 2007.

Saithe is mainly taken in a targeted pair trawl fishery in the deeper parts of the plateau. Due to the higher prices of cod there are incentives to increase cod bycatches.

Given the high fishing mortality and low stock size, the present spawning closures should be maintained.

Management plan evaluations

The effort management system translates to an average F of 0.45. The management plan has not been fully evaluated by ICES in relation to the defined B_{lim}. A full evaluation should take into account the relationship between fishing mortality and fishing days.

Ecosystem considerations

Blue whiting is a forage species for saithe. A proportion of the saithe stock is far off the shelf, probably preying on blue whiting. The blue whiting fishery thus also affects saithe by removing blue whiting.

Factors affecting the fisheries and the stock

Regulations and their effects

Limited measurements in the blue whiting fishery in Faroe waters indicate that bycatch of saithe may be significant. In order to get a reasonable estimate sampling is required on the blue whiting fishery.

Changes in fishing technology and fishing patterns

Development in gear technology and optimizing fishing operations has resulted in an increase in the catchability since the early 1990s, preliminarily estimated in the order of 20% in the last decade.

Scientific basis

Data and methods

The stock assessment is an analytical assessment using commercial catch-at-age data and commercial (pair trawler) catch and standardized effort data from logbooks. In the present assessment the commercial CPUE that has been used for tuning has been standardized, taking into account season, fishing area, and boat factors.

There are no recruitment indices available for ages younger than 3 in the terminal year. Existing research surveys may be of use in tuning, but this has not been fully evaluated.

Comparison with previous assessment and advice

Due to revised assessment data, the present estimate of fishing mortality in 2003 is 13% higher than estimated last year. SSB for 2004 is 36% lower than estimated in last year's assessment. This decline in SSB estimates is largely attributed to the observation of maturity-at-age and weight-at-age being lower than predicted last year.
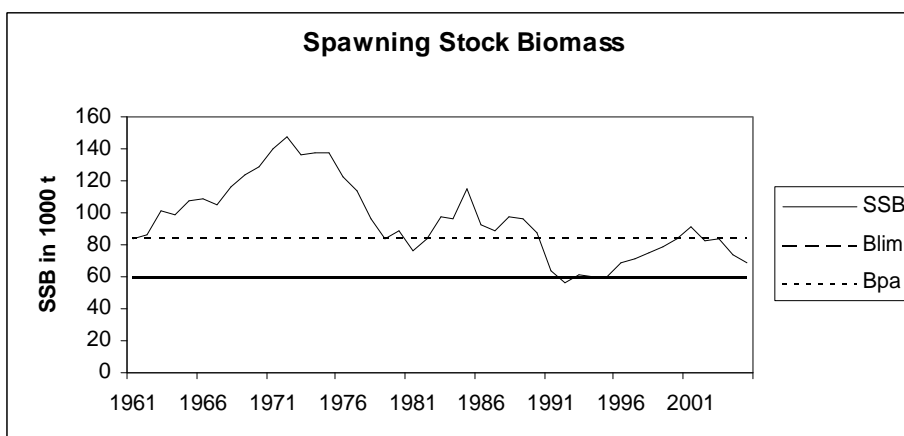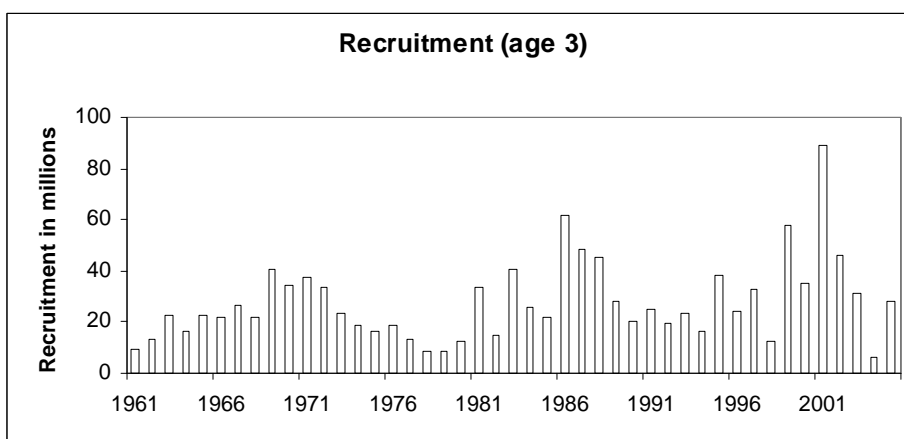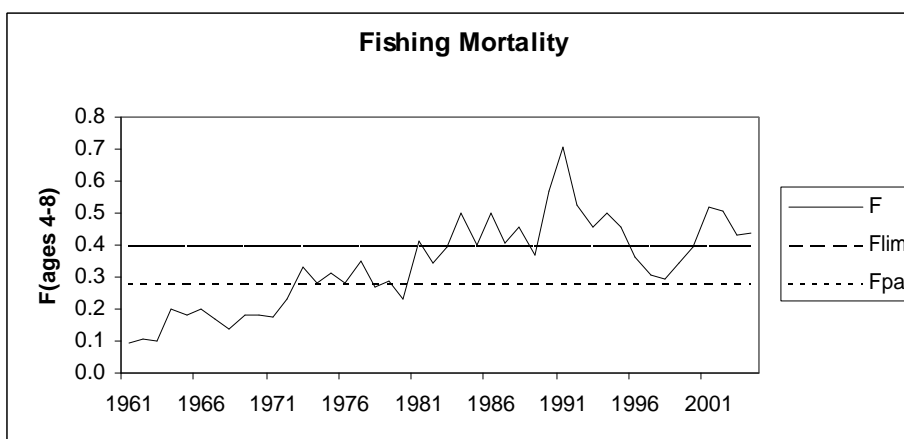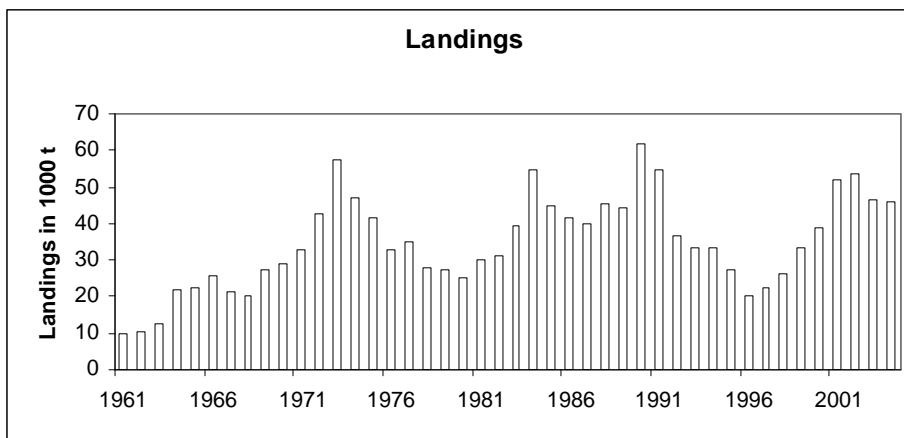
Source of information

Report of the North-Western Working Group, 26 April–5 May 2005 (ICES CM 2005/ACFM:21).

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	ACFM 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
1993	Reduction in F	<37		34
1994	TAC	<26	42[1]	33
1995	TAC	<22	39[1]	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 $\mathbf{F}_{pa}$ (0.28)	<14		33
2000	F below than $\mathbf{F}_{pa}$ (0.28)	<15		39
2001	Reduce fishing effort to generate F well below $\mathbf{F}_{pa}$ (0.28)	<17		52
2002	Reduce fishing effort to generate F below $\mathbf{F}_{pa}$ (0.28)	<28		54
2003	Reduce fishing effort to generate F below $\mathbf{F}_{pa}$ (0.28)	<47		47
2004	Reduce fishing effort to generate F below Fpa (0.28)	<48		46
2005	Reduce fishing effort to generate F below $\mathbf{F}_{pa}$ (0.28)	<32		
2006	Reduce fishing effort to generate F below $\mathbf{F}_{pa}$ (0.28)	<24		

Weights in '000 t.

[1] In the quota year 1 September−31 August the following year.

Faroe saithe (Division Vb)

Landings

Fishing Mortality

Recruitment (age 3)

Spawning Stock Biomass

Stock - Recruitment

Yield and Spawning Stock Biomass per Recruit

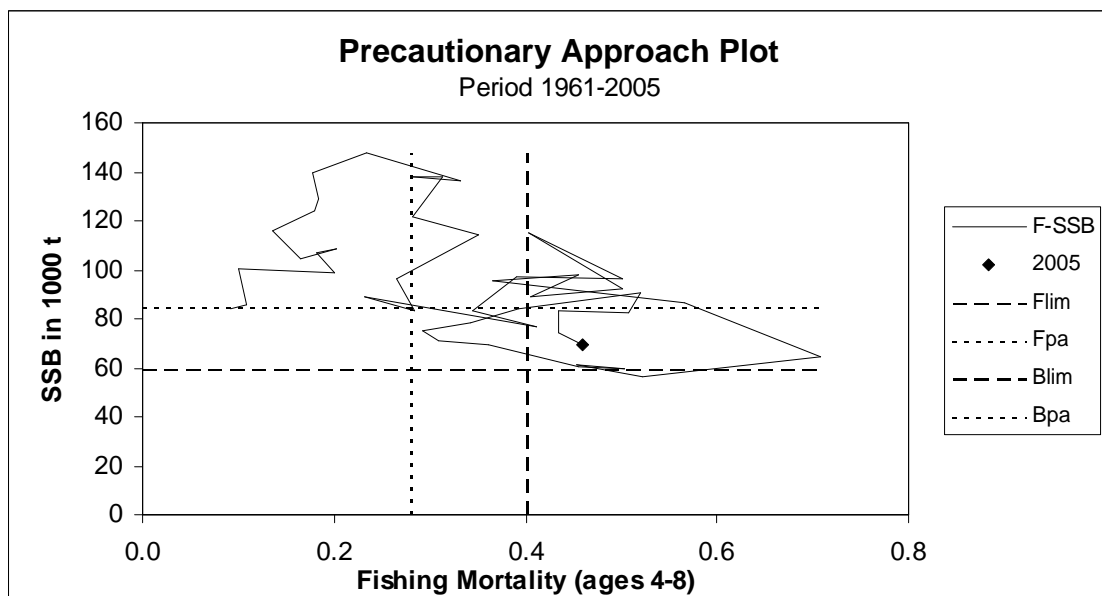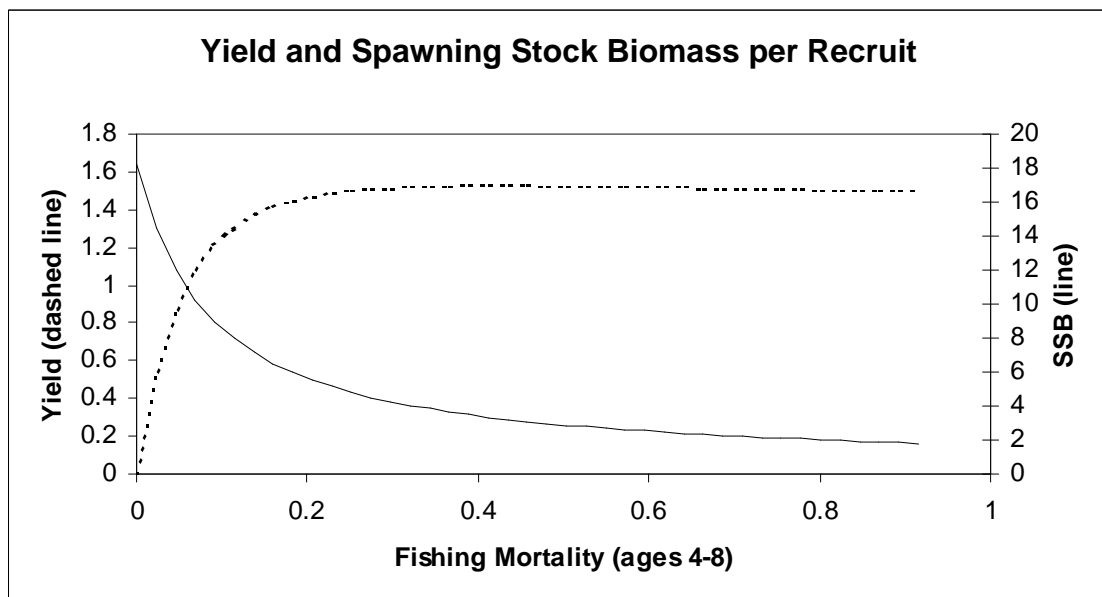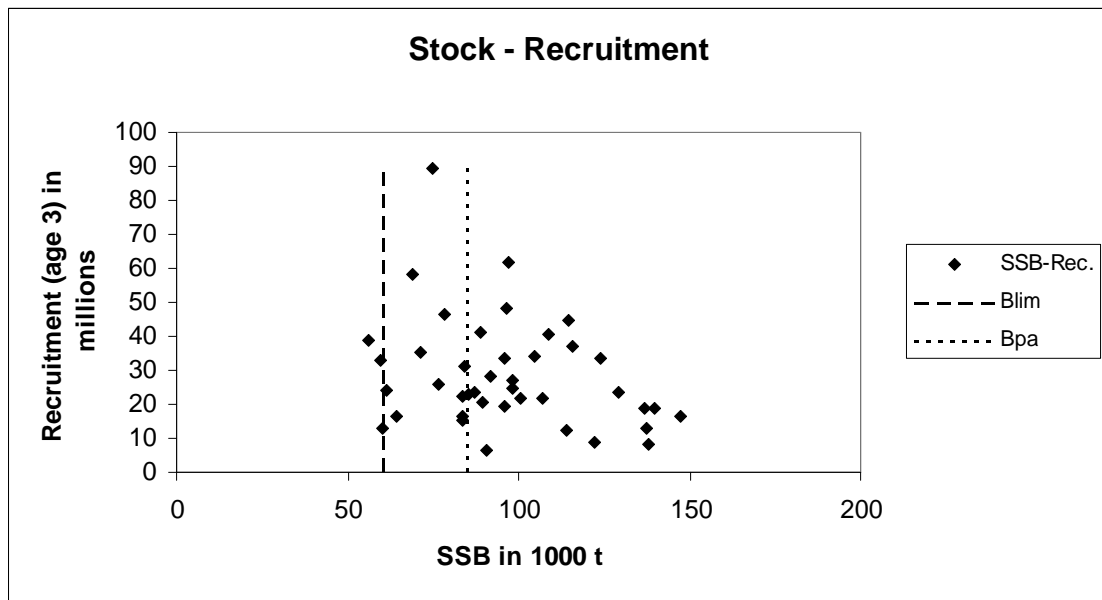
Precautionary Approach Plot
Period 1961-2005

Table 1.4.4.1   Saithe in the Faroes (Division Vb). Nominal catches (tonnes) by countries, 1989-2004, as officially reported to ICES.

Country	1989	1990	1991	1992	1993	1994	1995	1996
Denmark	-	2	-	-	-	-	-	-
Faroe Islands	43,624	59,821	53,321	35,979	32,719	32,406	26,918	19,267
France [3]	-	-	-	120	75	19	10	12
Germany	-	-	32	5	2	1	41	3
German Dem.Rep.	9	-	-	-	-	-	-	-
German Fed. Rep.	20	15	-	-	-	-	-	-
Netherlands	22	67	65	-	32	-	-	-
Norway	51	46	103	85	279	156	10	16
UK (Eng. & W.)	-	-	5	74	425	151	21	53
UK (Scotland)	9	33	79	98		438	200	580
USSR/Russia [2]	-	30	-	12	-	-	-	18
Total	43,735	60,014	53,605	36,373	33,532	33,171	27,200	19,949
Working Group estimate [4,5]	44,477	61,628	54,858	36,487	33,543	33,182	27,209	20,029

Country	1997	1998	1999	2000	2001	2002	2003	2004 [1]
Estonia	16	-	-	-	-	-	-	-
Faroe Islands	21,721	25,995	32,439		49,676	55,165	47,933	47,866
France	9	17	-	273	934	607	370	
Germany	5	-	100	230	667	422	281	186
Greenland	-	-	-	-		442		426
Irland	-	-	-	-	5	-	-	-
Norway	67	53	160	72	60	77	94	82
Portugal	-	-	-	-	-	-	-	3
Russia	28	-	-	20	1	10	32	
UK (E/W/NI)	-	19	67	32	80	58	89	
UK (Scotland)	460	337	441	534	708	540	610	
United Kingdom								829
Total	22,306	26,421	33,207	1,161	52,131	57,321	49,409	49,392
Working Group estimate [4,5,6,7]	22,306	26,421	33,207	39,020	51,786	53,546	46,555	46,115

[1] Preliminary.

[2] As from 1991.

[3] Quantity unknown 1989-91.

[4] Includes catches from Sub-division Vb2 and Division IIa in Faroese waters.

[5] Includes French, Greenlandic, Russian catches from Division Vb, as reported to the Faroese coastal guard service.

[6] Includes Faroese, French, Greenlandic catches from Division Vb, as reported to the Faroese coastal guard service.

[7] The 2001-2004 catches from Faroe Islands, as stated from Faroese coastal guard service, are recalculeted

because of discrepancy in converting gutted weight to round weight (factor 1.2 agains 1.11).

Table 1.4.4.2   Faroe Saithe (Division Vb).

Year	Recruitment Age 3 thousands	SSB tonnes	Landings tonnes	Mean F Ages 4-8
1961	9047	83798	9592	0.0911
1962	13663	85635	10454	0.1083
1963	22431	100631	12693	0.0996
1964	16192	98383	21893	0.2007
1965	22803	107215	22181	0.1827
1966	21830	108779	25563	0.2029
1967	26879	104635	21319	0.1660
1968	21514	115962	20387	0.1350
1969	40798	123795	27437	0.1790
1970	34135	129143	29110	0.1832
1971	37285	139500	32706	0.1769
1972	33607	147569	42663	0.2329
1973	23282	136682	57431	0.3328
1974	18897	137611	47188	0.2811
1975	16306	137886	41576	0.3127
1976	18910	122017	33065	0.2821
1977	12940	114098	34835	0.3514
1978	8414	96026	28138	0.2657
1979	8632	83557	27246	0.2846
1980	12450	88942	25230	0.2325
1981	33326	76327	30103	0.4125
1982	15215	83368	30964	0.3453
1983	40976	97192	39176	0.3915
1984	25961	96330	54665	0.5020
1985	22191	114869	44605	0.4023
1986	61704	91983	41716	0.5023
1987	48481	89315	40020	0.4045
1988	44973	97994	45285	0.4549
1989	28502	95873	44477	0.3662
1990	20654	86893	61628	0.5670
1991	24789	64327	54858	0.7076
1992	19528	56259	36487	0.5232
1993	23677	61393	33543	0.4542
1994	16747	59606	33182	0.5029
1995	38600	60285	27209	0.4548
1996	24047	69064	20029	0.3610
1997	32802	71294	22306	0.3081
1998	12747	75003	26421	0.2926
1999	58032	78443	33207	0.3428
2000	35036	84144	39020	0.3935
2001	89219	90737	51786	0.5193
2002	46268	82146	53546	0.5070
2003	31316	83524	46555	0.4335
2004	6463	73978	46115	0.4351
2005	27988[*]	69180		
Average	27761	94920	34718	0.3410

[*]Recruitment age 3 in 2005 is based on the geometric mean 1980–2004.