

6. ICELANDIC SAITHE (Division Va)

6.1 Landings

Landings of saithe from Division Va are given in Table 6.1 and are shown in Figure 6.1.A. From a peak value in 1971 there was a trend of decreasing landings until 1978 when this trend was reversed. Reported landings in 1981 were 59 000 tonnes. Preliminary figures for 1982 show an increase to 69 000 tonnes.

6.2 Age Composition

No revision was required to the provisional age composition for 1981 used last year. A preliminary age composition for landings by Iceland in 1982 (representing 97% of the total landings) was raised to give an age composition of total landings which was used as input for VPA (Table 6.2).

6.3 Weight at Age (Table 6.3)

Data for weight at age in the Icelandic catch in 1982 were added to the data base. For the predictions an average of the three most recent years catch weight-at-age data were used for both catch and biomass calculations.

6.4 Fishing Mortality and Stock Values from VPA

6.4.1 Estimates of fishing mortality

A limited time series of catch-per-unit-effort (CPUE) data (1978-82) were available for those Icelandic trawlers whose catches consisted predominantly of saithe. These were used to calculate total fishing effort. A plot of $\bar{F}_{(4-8)}$ from a preliminary VPA against effort (Figure 6.2) showed no clear relationship. The plot of CPUE against stock biomass of age-groups 4-8 gave a somewhat better relationship but the Working Group could only conclude that there had been little change in the mortality rates in recent years. The input F-values for 1982 used to initiate the VPA were therefore based on an

exploitation pattern given by the 1977-79 average scaled to the average level of fishing mortality in that period. These values and the calculated F-values for earlier years are given in Table 6.4, and the trend in F with time is plotted in Figure 6.1.D.

6.4.2 Spawning stock biomass and recruitment

Estimates of numbers at each age in the stock calculated by VPA are given in Table 6.5. Back calculated estimates of recruitment at age 1 are plotted in Figure 6.1.C. In recent years recruitment has fluctuated with no clear trend. No information is available on year-classes recruiting to the fishery. For the predictions year-classes 1980-82 have been taken to be equal to the average abundance of 3-year-olds in the period 1971-1980 ($\bar{R}_3=35$ million).

Spawning stock biomass (Table 6.5, Figure 6.1.B) appears to have stabilized in recent years after a declining trend from 1969 to 1978.

6.5 Yield per Recruit

Yield and spawning stock biomass per recruit (Figure 6.3) have been calculated using the exploitation pattern and weight-at-age data given in Table 6.6. The current value of $\bar{F}_{(4-9)}=0.29$ can be compared with $\bar{F}_{\max}=0.37$ and $\bar{F}_{0.1}=0.14$.

6.6 Catch Predictions

Catch predictions for 1984 have been made using the data given in Table 6.6. It has been assumed that fishing mortality in 1983 will be unchanged at the 1982 level. The range of catch options for 1984 and spawning stock biomass at 1 January 1985 are given in Table 6.7 and are shown graphically in Figure 6.4.

Table 6.1. Nominal catch (tonnes) of SAITHE in Division Va, 1973-1982.
(Data for 1973 to 1981 from Bulletin Statistique)

Country	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982 ^{*)}
Belgium	2 131	2 371	1 638	1 615	1 448	1 092	980	980	532	203
Faroe Islands	1 467	1 712	1 366	3 267	3 013	4 250	5 457	4 930	3 545	5 ² 3 685
France	-	94	32	51	-	-	-	-	-	* 23
Germany, Fed. Rep.	38 565	18 627	13 820	13 785	10 575	-	-	-	921	65 124
Iceland	56 567	65 169	61 430	56 811	46 973	44 327	57 066	52 436	54 880	64 908
Norway	-	-	6	5	4	3	1	1	3	1
U.K. (England & Wales)	11 874	8 845	8 643	6 024	13	-	-	-	-	-
U.K. (Scotland)	509	731	1 021	443	-	-	-	-	-	-
Total	111 113	97 549	87 956	82 001	62 026	49 672	63 504	58 347	58 960	68 797
									59 001	68 933

*) Preliminary

SUM OF PRODUCTS

60 159 69 051

Table 6.3. SUM OF PRODUCTS CHECK

ICELANDIC SAITHE
CATEGORY: TOTAL

MEAN WEIGHT AT AGE IN THE CATCH	UNIT: KILOGRAM									
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.445	1.477	1.540
4	1.960	1.760	1.760	1.760	1.760	1.760	1.760	1.893	2.004	2.148
5	3.050	2.730	2.730	2.730	2.730	2.730	2.730	2.682	2.574	2.951
6	4.340	4.290	4.290	4.290	4.290	4.290	4.290	3.871	3.457	3.044
7	5.380	5.540	5.540	5.540	5.540	5.540	5.540	5.324	4.431	5.013
8	6.550	7.270	7.270	7.270	7.270	7.270	7.270	6.143	6.156	6.031
9	7.640	8.420	8.420	8.420	8.420	8.420	8.420	6.848	6.820	7.249
10	8.630	9.410	9.410	9.410	9.410	9.410	9.410	8.227	8.047	8.070
11	9.520	10.000	10.000	10.000	10.000	10.000	10.000	9.062	9.409	8.920
12	10.290	10.560	10.560	10.560	10.560	10.560	10.560	9.299	9.205	10.581
13	10.970	11.870	11.870	11.870	11.870	11.870	11.870	10.502	9.439	10.144
14	11.550	13.120	13.120	13.120	13.120	13.120	13.120	11.373	10.146	11.093
15+	12.800	14.000	14.000	14.000	14.000	14.000	13.120	11.672	10.756	10.146

Table 6.4. VIRTUAL POPULATION ANALYSIS
ICELANDIC SAITHE

FISHING MORTALITY COEFFICIENT		UNIT: Year-1										NATURAL MORTALITY COEFFICIENT = 0.20	
-----		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1977-79	
2		0.001	0.004	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3		0.011	0.064	0.021	0.010	0.003	0.010	0.010	0.005	0.013	0.010	0.008	
4		0.096	0.230	0.209	0.176	0.080	0.066	0.090	0.063	0.076	0.080	0.079	
5		0.211	0.179	0.262	0.340	0.233	0.126	0.156	0.153	0.160	0.170	0.172	
6		0.320	0.193	0.206	0.465	0.346	0.192	0.277	0.306	0.270	0.270	0.272	
7		0.512	0.254	0.339	0.398	0.352	0.442	0.300	0.302	0.299	0.360	0.365	
8		0.445	0.470	0.366	0.405	0.351	0.646	0.482	0.577	0.304	0.490	0.493	
9		0.466	0.418	0.373	0.323	0.499	0.299	0.413	0.705	0.429	0.400	0.404	
10		0.654	0.456	0.423	0.525	0.344	0.354	0.747	0.736	0.689	0.480	0.482	
11		0.464	0.607	0.326	0.311	0.556	0.287	0.752	0.314	0.454	0.530	0.531	
12		0.726	0.284	0.715	0.325	0.289	0.635	0.536	0.273	0.897	0.490	0.487	
13		0.973	0.280	0.335	1.128	0.192	0.419	0.869	0.111	0.665	0.490	0.493	
14		0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	
15+		0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	
(4- 9)U		0.342	0.291	0.292	0.351	0.310	0.295	0.280	0.351	0.256	0.295	0.400	

Table 6.5.

VIRTUAL POPULATION ANALYSIS

ICELANDIC SAITHE

STOCK SIZE IN NUMBERS AT 1 JANUARY

UNIT: TONNES

BIOMASS TOTALS AT 1 JANUARY

UNIT: THOUSANDS

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1977-79
2	27756	33688	45297	29605	72585	62840	35121	26451	65811	53881	0*****	56849
3	22444	22702	27481	37072	24212	59423	51449	28755	21657	17499	43675	45028
4	21215	18177	17442	22025	30055	19770	48156	41689	23421	17777	13225	32660
5	29835	15775	11819	11582	15120	22713	15153	36032	32054	22361	12279	17662
6	26396	19787	10801	7447	6748	9807	16401	10612	25325	15821	13975	10985
7	20127	16889	13351	7196	3829	3907	10176	4019	6396	3885	9037	4788
8	7974	9875	10723	7790	3959	2205	6028	1039	6158	3720	1948	2740
9	4802	4183	5052	6091	4254	2282	513	537	1848	985	2042	2494
10	1980	2466	2256	2849	3612	2114	1386	469	421	173	499	2371
11	1216	842	1280	1210	1379	2097	1215	617	321	105	83	1563
12	488	626	376	756	725	648	281	90	292	107	52	887
13	140	193	386	151	448	445	239	76	452	123	54	391
14	73	43	120	226	40	303	0	0	239	249	204	194
15+	76	60	203	60	163	183	0	0	239	249	204	115
TOTAL NO	160521	145314	146585	134059	167128	188735	180319	161084	184596	136685		
SPS NO	65271	54971	44546	33775	25157	23989	30440	28156	40943	45270		
TOT. BIOM	515190	427981	381516	344117	299609	321821	359001	366092	345982	372553		
SPS BIOM	357474	327497	287773	232213	178319	158465	175255	148985	170732	195881		

TOTAL NO
SPS NO
TOT. BIOM
SPS BIOM

T. L. K.

LIST OF INPUT VARIABLES FOR THE ICES PREDICTION PROGRAM Table 6.6.

SAITHE AT ICELAND ICES SUB-DIVISION VA

FIRST YEAR: 1983
LAST YEAR: 1985

YEAR RECRUITMENT
thousands

1983 35000.
1984 35000.
1985 35000.

AGE	STOCK SIZE thousands	F AT AGE	M	MATURITY OGIVE	WEIGHT IN THE CATCH kilogram	WEIGHT IN THE STOCK kilogram
3	25000.0	0.010	0.20	0.000	1.490	1.490
4	43075.0	0.030	0.20	0.090	2.010	2.010
5	13225.0	0.170	0.20	0.360	2.730	2.730
6	12279.0	0.270	0.20	0.560	3.460	3.460
7	13975.0	0.360	0.20	0.980	4.920	4.920
8	9037.0	0.490	0.20	0.980	6.110	6.110
9	1943.0	0.400	0.20	1.000	6.970	6.970
10	2042.0	0.430	0.20	1.000	8.120	8.120
11	492.0	0.530	0.20	1.000	9.130	9.130
12	83.0	0.490	0.20	1.000	9.690	9.690
13	52.0	0.490	0.20	1.000	10.030	10.030
14	54.0	0.400	0.20	1.000	10.870	10.870
15+	204.0	0.400	0.20	1.000	10.860	10.860

taken

Table 6.7 Catch predictions and management options.

AREA: ICELAND

SPECIES: SAITHE

1982		1983				Management option for 1984	1984				1985	
Total land-ings	$\bar{F}(4-9)$	Stock biomass	Spawn. stock biom.	$\bar{F}(4-9)$	Total land-ings		Stock biom.	Spawn. stock biom.	$\bar{F}(4-9)$	Total land-ings	Stock biomass	Spawn. stock biom.
69	0.29	381	205	0.29	72	$\bar{F}_{0.1}$	372	194	0.14	37	397	215
						$\bar{F}_{max}$			0.37	85	344	170
						$\bar{F}_{84} = \bar{F}_{82}$			0.29	69	362	184
						$\bar{F}_{84} = 0$			0	0	437	250
						$\bar{F}_{84} = 0.2\bar{F}_{82}$			0.06	16	420	235
						$\bar{F}_{84} = 0.5\bar{F}_{82}$			0.15	38	396	214
						$\bar{F}_{84} = 1.5\bar{F}_{82}$			0.44	96	332	160
						$\bar{F}_{84} = 2.0\bar{F}_{82}$			0.58	119	307	139

Weights in thousands of tonnes.
 Recruitment 1983-85 $R_3 = 35$ millions.
 Stock biomass: fish at age 3 and older.
 Spawning stock biomass based on maturity ogive.
 Exploitation pattern 1983-84 based on 1977-79 average.

Figure 6.1.

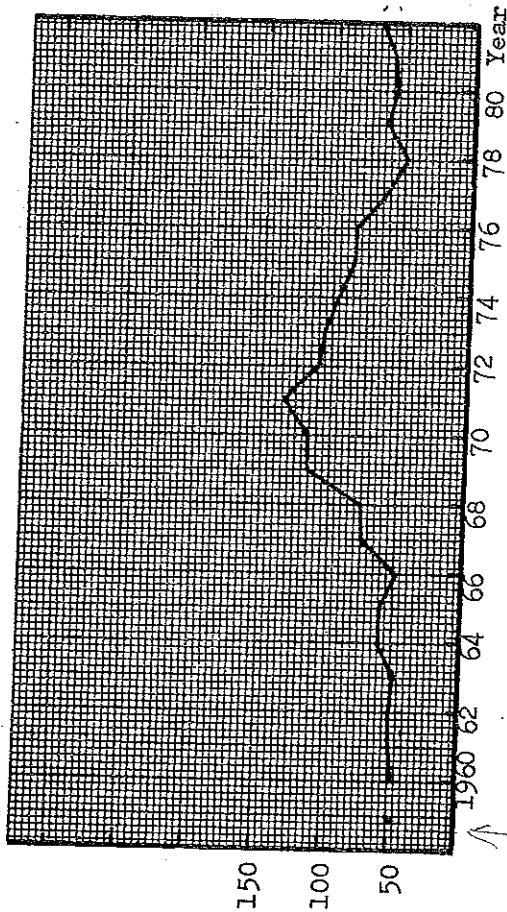
FISH STOCK SUMMARY

Icelandic SAITHE

(stock)

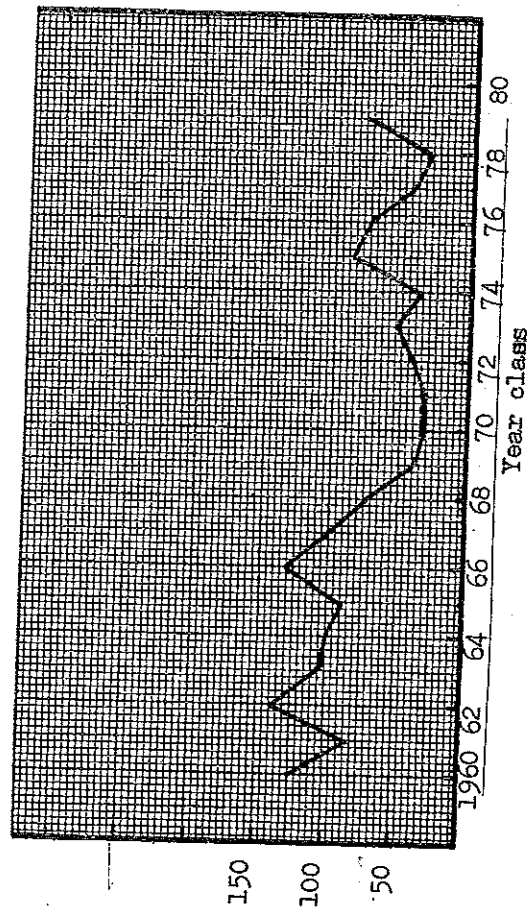
A Landings

'000 t



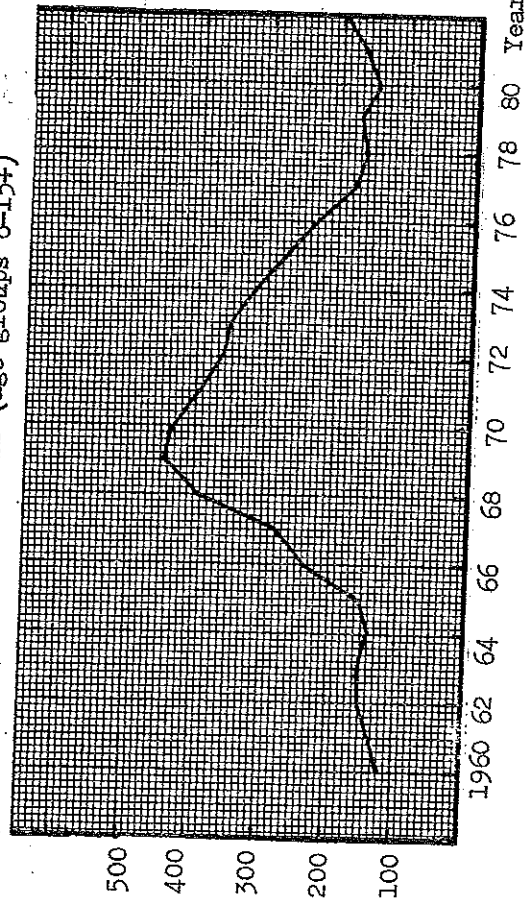
C Recruits at age 1

Millions



B Spawning stock biomass (age groups 6-15+)

'000 t



D Fishing mortality

F_{4-9}

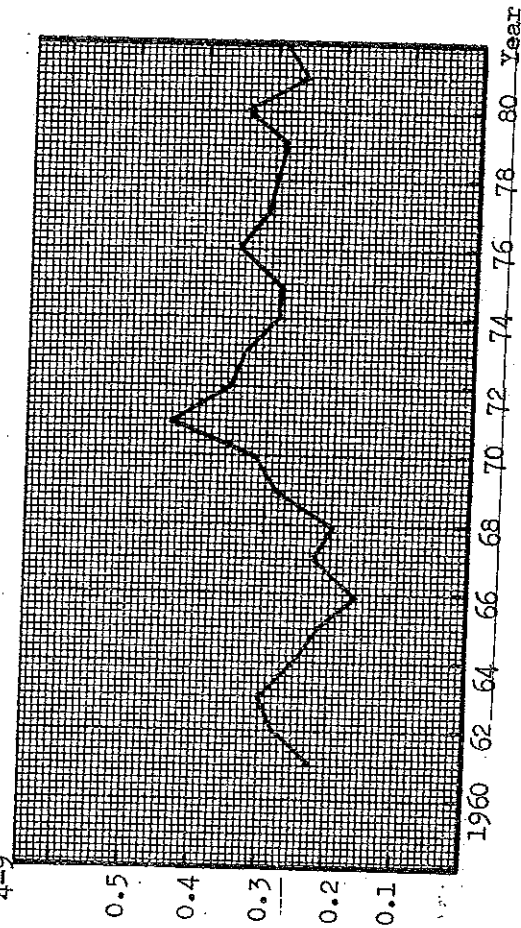


Figure 5.2. Icelandic SAITHA.
1. C_{4-8} versus biomass (ages 4-8).
2. F_{4-8} versus fishing effort.

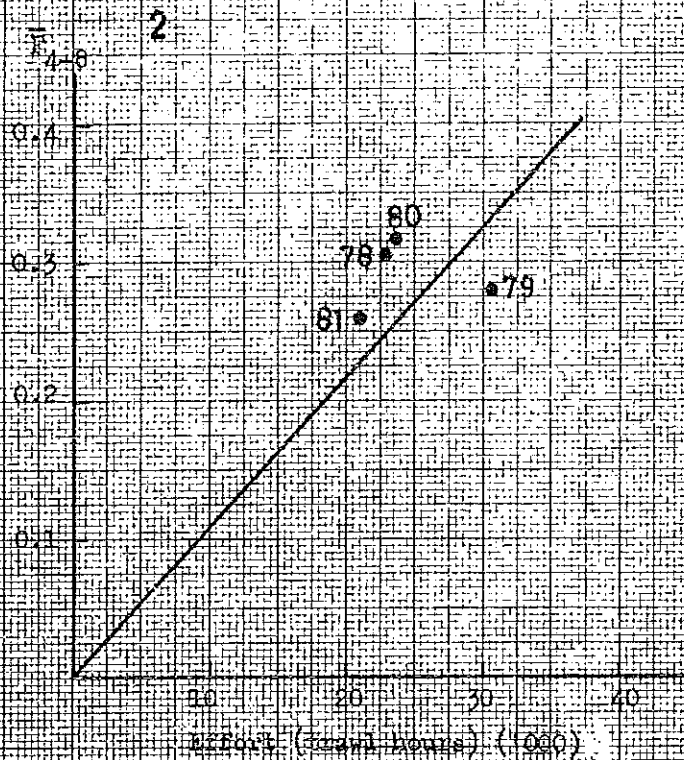
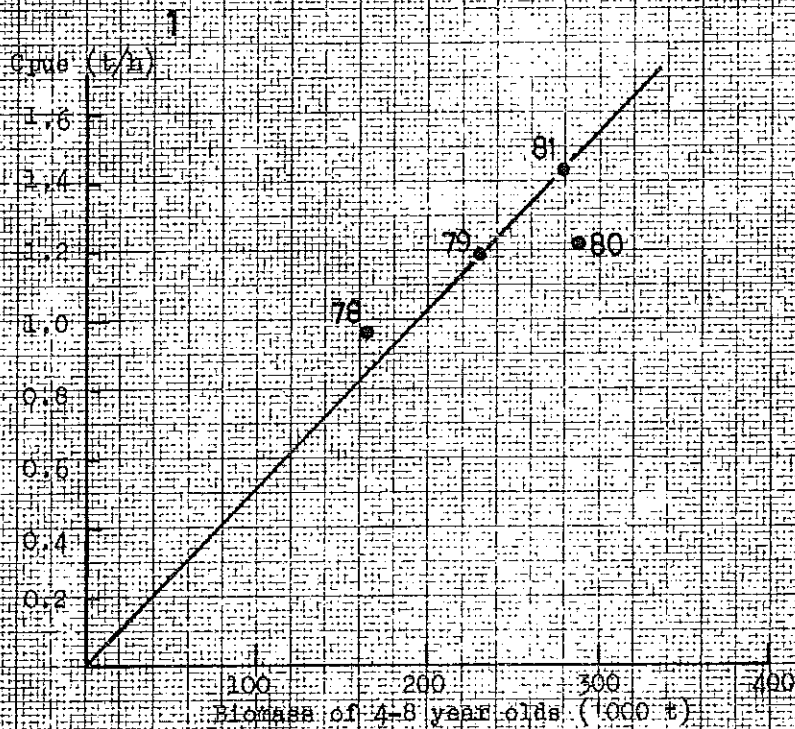


Figure 6.3. Icelandic SAUPE.
Yield and spawning stock biomass per recruit.

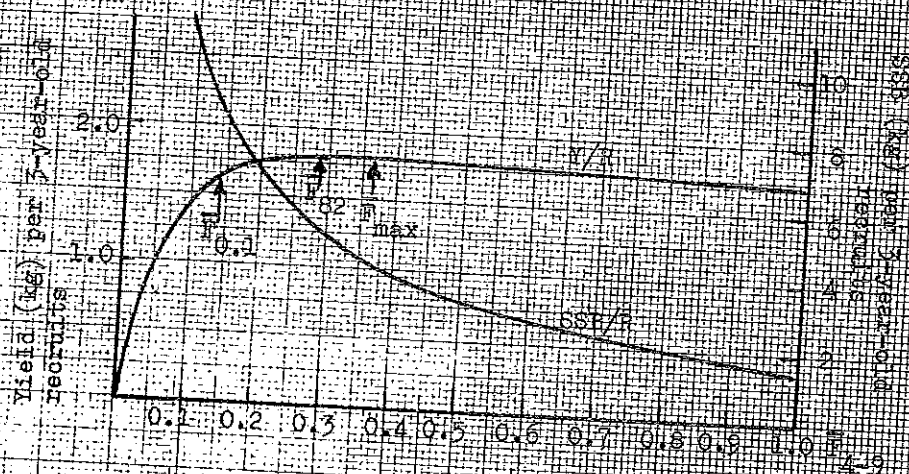


Figure 6.4. Icelandic SAUPE.
Predictions for landings in 1984 and spawning stock biomass at 1 January 1985.

