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**International Council for the
Exploration of the Sea**

C.M. 1994/Assess:19

REPORT OF THE NORTH-WESTERN WORKING GROUP

Copenhagen, 2 - 10 May 1994

PART 2

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Table 3.3.1 Nominal catch (tonnes) of COD in Division Va, 1979-1993, as officially reported to ICES.

Country	1979	1980	1981	1982	1983	1984	1985
Belgium	1,485	840	1,321	236	188	254	207
Faroe Is.	6,163	4,802	6,183	5,297	5,626	2,041	2,203
Iceland	360,077	429,044	461,038	382,297	293,890	281,481	322,810
Norway	288	358	559	557	109	90	46
UK (Engl. & Wales)	-	-	-	-	-	2	1
Total	368,013	435,044	469,101	388,387	299,813	283,868	325,267

Country	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Belgium	226	597	365	309	260	548	222	137
Faroe Islands	2,554	1,848	1,966	2,012	1,782	1,323	883	-
Iceland	365,852	389,808	375,741	353,985	333,348	306,697	266,662	236,561
Norway	1	4	4	3	-	-	-	-
UK (Engl. & Wales)	-	-	-	-	-	-	-	-
Total	368,633	392,257	378,076	356,309	335,390	308,568	267,767	236,561
Working Group estimate								251,867 ²

¹Preliminary.

²Additional catch by Iceland of 14,505 t and by the Faroes 664 t included.

Table 3.3.2

Icelandic cod: Catch in numbers (millions).

Age	1974	1975	1976	1977	1978	1979	1980
3	14.846	29.301	23.578	2.614	5.999	7.186	4.348
4	61.826	29.489	39.790	42.659	16.287	28.427	28.530
5	21.824	44.138	21.092	32.465	43.931	13.772	32.500
6	14.413	12.088	24.395	12.162	17.626	34.443	15.119
7	8.974	9.628	5.803	13.017	8.729	14.130	27.090
8	6.216	3.691	5.343	2.809	4.119	4.426	7.847
9	1.647	2.051	1.297	1.773	0.978	1.432	2.228
10	2.530	0.752	0.633	0.421	0.348	0.350	0.646
11	1.765	0.891	0.205	0.086	0.119	0.168	0.246
12	0.334	0.416	0.155	0.024	0.048	0.043	0.099
13	0.062	0.060	0.065	0.006	0.015	0.024	0.025
14	0.028	0.046	0.029	0.002	0.027	0.004	0.004
Juvenile	93.135	94.505	84.607	77.549	66.317	66.657	74.804
Adult	41.330	38.046	37.778	30.489	31.909	37.748	43.878
Sum 3- 3	14.846	29.301	23.578	2.614	5.999	7.186	4.348
Sum 4-14	119.619	103.250	98.807	105.424	92.227	97.219	114.334
Total	134.465	132.551	122.385	108.038	98.226	104.405	118.682

Age	1981	1982	1983	1984	1985	1986	1987
3	2.118	3.285	3.554	6.750	6.457	20.642	11.002
4	13.297	20.812	10.910	31.553	24.552	20.330	62.130
5	39.195	24.462	24.305	19.420	35.392	26.644	27.192
6	23.247	28.351	18.944	15.326	18.267	30.839	15.127
7	12.710	14.012	17.382	8.082	8.711	11.413	15.695
8	26.455	7.666	8.381	7.336	4.201	4.441	4.159
9	4.804	11.517	2.054	2.680	2.264	1.771	1.463
10	1.677	1.912	2.733	0.512	1.063	0.805	0.592
11	0.582	0.327	0.514	0.538	0.217	0.392	0.253
12	0.228	0.094	0.215	0.195	0.233	0.103	0.142
13	0.053	0.043	0.064	0.090	0.102	0.076	0.046
14	0.068	0.011	0.037	0.036	0.038	0.040	0.058
Juvenile	79.027	73.043	58.426	65.651	69.001	80.654	107.928
Adult	45.407	39.449	30.667	26.867	32.496	36.842	29.931
Sum 3- 3	2.118	3.285	3.554	6.750	6.457	20.642	11.002
Sum 4-14	122.316	109.207	85.539	85.768	95.040	96.854	126.857
Total	124.434	112.492	89.093	92.518	101.497	117.496	137.859

Age	1988	1989	1990	1991	1992	1993
3	6.713	2.605	5.785	8.554	12.217	20.491
4	39.323	27.983	12.313	25.131	21.708	33.063
5	55.895	50.059	27.179	15.491	26.524	15.188
6	18.663	31.455	44.534	21.514	11.413	13.275
7	6.399	6.010	17.037	25.038	10.073	3.581
8	5.877	1.915	2.573	6.364	8.304	2.784
9	1.345	0.881	0.609	0.903	2.006	2.706
10	0.455	0.225	0.322	0.243	0.257	1.180
11	0.305	0.107	0.118	0.125	0.046	0.180
12	0.157	0.086	0.050	0.063	0.032	0.034
13	0.114	0.038	0.015	0.011	0.012	0.011
14	0.025	0.005	0.020	0.012	0.008	0.013
Juvenile	103.170	82.565	65.114	60.283	48.743	45.893
Adult	32.101	38.804	45.441	43.166	43.857	46.613
Sum 3- 3	6.713	2.605	5.785	8.554	12.217	20.491
Sum 4-14	128.558	118.764	104.770	94.895	80.383	72.015
Total	135.271	121.369	110.555	103.449	92.600	92.506

Table 3.3.3

Icelandic cod: Proportion of fishing- and natural mortality before spawning.

Age	PropF	PropM
3	0.085	0.250
4	0.180	0.250
5	0.248	0.250
6	0.296	0.250
7	0.382	0.250
8	0.437	0.250
9	0.477	0.250
10	0.477	0.250
11	0.477	0.250
12	0.477	0.250
13	0.477	0.250
14	0.477	0.250

Table 3.3.4
Icelandic cod: mean weight at age in the landings (gr.)

Age	1974	1975	1976	1977	1978	1979	1980
3	1050	1100	1350	1259	1289	1408	1392
4	1710	1770	1780	1911	1833	1956	1862
5	2430	2780	2650	2856	2929	2642	2733
6	3820	3760	4100	4069	3955	3999	3768
7	5240	5450	5070	5777	5726	5548	5259
8	6660	6690	6730	6636	6806	6754	6981
9	7150	7570	8250	7685	9041	8299	8037
10	7760	8580	9610	9730	10865	9312	10731
11	8190	8810	11540	11703	13068	13130	12301
12	9780	9780	11430	14394	11982	13418	17281
13	12380	10090	14060	17456	19062	13540	14893
14	14700	11000	16180	24116	21284	20072	19069
Age	1981	1982	1983	1984	1985	1986	1987
3	1180	1006	1095	1288	1407	1459	1316
4	1651	1550	1599	1725	1971	1961	1956
5	2260	2246	2275	2596	2576	2844	2686
6	3293	3104	3021	3581	3650	3593	3894
7	4483	4258	4096	4371	4976	4635	4716
8	5821	5386	5481	5798	6372	6155	6257
9	7739	6682	7049	7456	8207	7503	7368
10	9422	9141	8128	9851	10320	9084	9243
11	11374	11963	11009	11052	12197	10356	10697
12	12784	14226	13972	14338	14683	15283	10622
13	12514	17287	15882	15273	16175	14540	15894
14	19069	16590	18498	16660	19050	15017	12592
Age	1988	1989	1990	1991	1992	1993	1994
3	1438	1186	1290	1309	1289	1392	1320
4	1805	1813	1704	1899	1768	1887	1906
5	2576	2590	2383	2475	2469	2772	2656
6	3519	3915	3034	3159	3292	3762	3771
7	4930	5210	4624	3792	4394	4930	5013
8	6001	6892	6521	5680	5582	6054	6386
9	7144	8035	8888	7242	6830	7450	7603
10	8822	9831	10592	9804	8127	8641	9291
11	9977	11986	10993	9754	12679	10901	11082
12	11732	10003	14570	14344	13410	12517	13710
13	14156	12611	15732	14172	15715	14742	15090
14	13042	16045	17290	20200	11267	16874	16408

Table 3.3.5
Icelandic cod: mean weight at age in the spawning stock (gr.)

Age	1974	1975	1976	1977	1978	1979	1980
3	1046	978	1217	960	1031	1141	1333
4	1850	1855	1604	1723	1671	1647	1680
5	2772	3292	2516	2729	2863	2532	2708
6	4596	4165	4380	4108	3920	4027	3875
7	5859	5893	5407	5957	5976	5664	5446
8	7209	7153	6985	6696	6946	6951	7106
9	7820	7905	8752	7618	9204	8234	8120
10	7874	8753	10143	9669	10833	9500	10737
11	8301	8745	11829	12578	12920	12921	12628
12	9886	9788	11518	13884	12863	13028	17528
13	11221	10081	13916	17026	19104	13308	15939
14	14363	9876	15367	24652	21183	18930	25212
Age	1981	1982	1983	1984	1985	1986	1987
3	967	996	891	1002	1131	1182	1289
4	1513	1626	1472	1479	1597	1762	1811
5	2101	2095	2139	2257	2285	2681	2735
6	3225	3006	2918	3476	3524	3562	4202
7	4520	4339	4130	4480	5010	4824	5110
8	5851	5571	5553	5887	6195	6457	6497
9	7661	6801	7007	7660	7800	7843	7802
10	9084	9259	7770	9920	9225	9419	10220
11	10833	11550	10817	11035	11336	10674	11197
12	12401	13445	13176	14531	13277	13660	10620
13	11724	17138	14175	15378	15325	13812	15893
14	14326	16554	18543	16394	18932	18479	16514
Age	1988	1989	1990	1991	1992	1993	1994
3	1218	1012	813	1122	876	1037	962
4	1604	1542	1330	1776	1389	1570	1516
5	2499	2423	2132	2233	2174	2518	2458
6	3566	3743	3187	3044	3185	3611	3713
7	5161	5298	4691	3891	4481	4872	4973
8	6238	6910	6627	5897	5587	6150	6413
9	7302	7725	8915	7657	6775	7538	7721
10	8647	9397	10362	10573	8225	8840	9500
11	10184	11953	12093	11230	11702	11088	11528
12	11504	9529	15453	14340	13474	12002	13817
13	14159	12195	15337	14172	15436	14402	14837
14	10952	14270	17257	20200	11267	18383	16777

Table 3.3.6
Icelandic cod: sexual maturity at age (proportion).

Age	1974	1975	1976	1977	1978	1979	1980
3	0.014	0.007	0.049	0.000	0.049	0.000	0.056
4	0.090	0.112	0.058	0.047	0.050	0.019	0.023
5	0.277	0.342	0.281	0.213	0.185	0.189	0.165
6	0.584	0.536	0.505	0.611	0.443	0.531	0.478
7	0.794	0.857	0.629	0.881	0.877	0.793	0.807
8	0.929	0.950	0.936	0.960	0.962	0.929	0.915
9	0.961	0.986	0.988	0.990	0.982	0.982	0.979
10	0.989	1.000	1.000	1.000	1.000	0.919	0.977
11	1.000	1.000	1.000	1.000	1.000	1.000	1.000
12	1.000	1.000	1.000	1.000	1.000	1.000	0.964
13	1.000	1.000	1.000	1.000	1.000	1.000	1.000
14	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age	1981	1982	1983	1984	1985	1986	1987
3	0.000	0.023	0.000	0.000	0.027	0.005	0.020
4	0.029	0.051	0.087	0.043	0.058	0.054	0.046
5	0.085	0.129	0.167	0.189	0.202	0.244	0.238
6	0.289	0.226	0.338	0.416	0.548	0.543	0.585
7	0.659	0.544	0.515	0.656	0.774	0.762	0.808
8	0.890	0.849	0.717	0.782	0.903	0.891	0.942
9	0.952	0.956	0.857	0.858	0.938	0.981	0.952
10	0.962	0.967	0.979	0.949	1.000	0.962	1.000
11	0.988	1.000	0.985	0.969	1.000	0.988	0.979
12	1.000	1.000	1.000	0.948	1.000	1.000	1.000
13	1.000	1.000	1.000	1.000	1.000	1.000	1.000
14	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Age	1988	1989	1990	1991	1992	1993	1994
3	0.039	0.000	0.000	0.000	0.072	0.078	0.060
4	0.020	0.048	0.075	0.063	0.225	0.246	0.193
5	0.206	0.226	0.303	0.214	0.562	0.470	0.408
6	0.477	0.550	0.633	0.543	0.706	0.714	0.667
7	0.690	0.820	0.819	0.781	0.906	0.939	0.891
8	0.831	0.858	0.912	0.887	0.961	0.984	0.954
9	0.929	0.887	0.953	0.945	0.977	0.973	0.962
10	0.946	0.991	0.986	0.842	1.000	0.968	0.967
11	0.974	1.000	1.000	1.000	1.000	1.000	0.997
12	0.821	0.903	1.000	1.000	1.000	1.000	0.989
13	1.000	0.859	1.000	1.000	1.000	1.000	0.995
14	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 3.3.7
Icelandic cod: CPUE abundance indices at age

The North region, Jan-May:

	1988	1989	1990	1991	1992	1993
4	1041	1021	70	398	530	966
5	2198	2852	837	455	953	561
6	447	977	1866	1004	527	522
7	148	68	731	625	183	44

The South-west region, Jan-May:

	1988	1989	1990	1991	1992	1993
4	632	75	29	213	120	981
5	1001	1759	351	231	309	910
6	472	1796	848	463	259	430
7	246	37	494	1016	344	80
8	131	75	90	235	408	55

The South-east region, Jan-May:

	1988	1989	1990	1991	1992	1993
6	477	805	413	95	226	137
7	196	124	340	211	165	29
8	90	20	18	95	108	32

The North region, Jun-Dec:

	1988	1989	1990	1991	1992	1993
3	141	105	263	220	409	525
4	941	1246	428	841	586	1143
5	1538	1934	697	498	706	442
6	680	572	1121	556	256	220
7	108	65	159	333	181	78

The South-west region, Jun-Dec:

	1988	1989	1990	1991	1992	1993
3	198	62	72	68	283	599
4	893	787	191	675	860	1228
5	1270	1228	664	536	735	590
6	520	504	1161	765	428	337
7	143	91	287	856	352	58
8	18	14	27	161	129	25

The South-east region, Jun-Dec:

	1988	1989	1990	1991	1992	1993
3	93	28	30	268	314	381
4	526	167	76	115	211	277
5	914	704	294	163	266	228
6	443	777	585	325	187	288
7	129	171	359	398	266	153
8	89	38	50	213	272	88
9	26	26	17	60	64	94
10	12	10	11	13	12	57

Table 3.3.8
Icelandic cod: Survey indices from the Icelandic groundfish survey.

The North region (December):

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	54825.2	22073.3	79754.4	90561.8	69563.7	8066.6	21715.9	16062.8	33629.9	17995.9
4	51526.4	18257.2	17747.3	50340.7	56151.9	16026.4	7589.5	10385.7	10065.3	12778.6
5	14296.1	18298.0	10332.9	6908.3	19588.6	20228.3	9237.2	3736.7	6815.4	3094.2
6	6291.8	4876.5	8510.0	3024.9	1695.3	6612.5	9392.9	2368.8	1145.4	1544.3
7	1831.8	1420.3	1592.2	2534.9	571.5	462.9	1075.9	1365.9	702.9	229.4
8	783.2	389.4	364.3	274.2	325.9	140.1	98.8	161.3	349.1	100.4

The South-west region (December):

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
5	3030.6	3099.6	1360.7	1391.6	6640.8	9373.9	5039.6	1396.1	1967.8	1093.3
6	1910.0	1224.7	1586.7	853.0	786.5	4406.3	7488.4	1674.2	420.4	594.2
7	814.6	511.4	425.8	853.1	294.4	433.0	1676.2	1955.1	369.6	124.4
8	455.5	210.2	117.6	104.6	222.6	118.6	330.4	429.2	253.9	63.8

The South-east region (December):

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
5	1122.2	2003.5	1072.6	1323.3	9937.1	4049.4	930.2	716.6	1094.8	749.5
6	951.3	1010.1	1608.0	834.9	1414.1	3648.0	2460.7	1280.6	313.9	563.2
7	595.2	510.6	497.8	992.5	546.6	469.0	925.4	1750.3	380.6	146.5
8	512.5	245.1	174.0	143.4	448.0	140.6	205.4	379.2	287.8	84.5

The North region; Age group 2 index on age group 3 the year after (December):

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3		34532.1	82614.4	91879.5	65639.5	16734.8	18147.0	15943.3	34874.1	26850.6

The North region; Age group 1 index on age group 3 two years after (December):

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3			36309.8	53926.4	25221.5	5466.0	15071.6	11626.9	14536.9	20685.4

Table 3.3.9
Icelandic cod: XSA diagnostic output.

VPA Version 3.1 (MSDOS)

9/05/1994 8:03

Extended Survivors Analysis

ICELANDIC COD (Div. Va); data from 1955-93 (4/94)

CPUE data from file codva_ts.dat

Data for 11 fleets over 39 years
 Age range from 3 to 14

Fleet,	Alpha,	Beta
CPUE - N; Jun-Dec	, .420	, 1.000
CPUE - SW; Jun-Dec	, .420	, 1.000
CPUE - SE; Jun-Dec	, .420	, 1.000
CPUE - N; Jan-May	, .000	, .420
CPUE - SW; Jan-May	, .000	, .420
CPUE - SE; Jan-May	, .000	, .420
RVS - SE	, .990	, 1.000
RVS - SW	, .990	, 1.000
RVS - N	, .990	, 1.000
RVS - N (A2 on A3)	, .990	, 1.000
RVS - N (A1 on A3)	, .990	, 1.000

Time series weights :

Tapered time weighting applied
 Power = 3 over 20 years

Catchability analysis :

Catchability dependent on stock size for ages < 5

Regression type = C
 Minimum of 5 points used for regression
 Survivor estimates shrunk to the population mean for ages < 5

Catchability independent of age for ages >= 12

Terminal population estimation :

Survivor estimates shrunk towards the mean F
 of the final 5 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = .500

Minimum standard error for population
 estimates derived from each fleet = .300

Prior weighting not applied

Tuning converged after 31 iterations

1

Regression weights
 , .751, .820, .877, .921, .954, .975, .990, .997, 1.000, 1.000

Continued..

Fishing mortalities

Age,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993
3,	.055,	.050,	.069,	.043,	.044,	.036,	.049,	.089,	.076,	.123
4,	.210,	.287,	.221,	.307,	.214,	.263,	.236,	.313,	.341,	.302
5,	.321,	.385,	.580,	.517,	.502,	.133,	.441,	.527,	.642,	.427
6,	.537,	.570,	.894,	.787,	.838,	.594,	.618,	.768,	.978,	.800
7,	.597,	.681,	.883,	.975,	.962,	.725,	.770,	.885,	1.082,	1.010
8,	.902,	.730,	.936,	.996,	1.406,	.894,	.813,	.753,	.858,	1.075
9,	.745,	.803,	.807,	.978,	1.124,	.830,	.824,	.772,	.566,	.778
10,	.634,	.768,	.766,	.707,	.994,	.552,	.860,	.978,	.518,	.792
11,	.640,	.612,	.735,	.583,	1.041,	.670,	.639,	1.040,	.484,	.870
12,	.566,	.643,	.673,	.655,	.916,	.997,	.788,	.875,	.848,	.825
13,	.684,	.667,	.445,	.741,	2.371,	.586,	.453,	.389,	.280,	.821
14,	.660,	.705,	.692,	.740,	1.305,	.734,	.718,	.820,	.548,	.842

1

XSA population numbers

YEAR ,	AGE											
	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,		
1984 ,	1.40E+05,	1.84E+05,	7.82E+04,	4.07E+04,	1.99E+04,	1.36E+04,	5.64E+03,	1.21E+03,	1.26E+03,	4.98E+02,		
1985 ,	1.46E+05,	1.09E+05,	1.22E+05,	4.65E+04,	1.95E+04,	8.96E+03,	4.53E+03,	2.19E+03,	5.24E+02,	5.43E+02,		
1986 ,	3.40E+05,	1.13E+05,	6.69E+04,	6.81E+04,	2.15E+04,	8.07E+03,	3.53E+03,	1.66E+03,	8.32E+02,	2.32E+02,		
1987 ,	2.88E+05,	2.60E+05,	7.45E+04,	3.07E+04,	2.79E+04,	7.29E+03,	2.59E+03,	1.29E+03,	6.33E+02,	3.27E+02,		
1988 ,	1.71E+05,	2.25E+05,	1.57E+05,	3.64E+04,	1.14E+04,	8.60E+03,	2.20E+03,	7.98E+02,	5.21E+02,	2.39E+02,		
1989 ,	8.19E+04,	1.34E+05,	1.49E+05,	7.76E+04,	1.29E+04,	3.58E+03,	1.73E+03,	5.86E+02,	2.42E+02,	1.51E+02,		
1990 ,	1.33E+05,	6.47E+04,	8.42E+04,	1.07E+05,	3.51E+04,	5.11E+03,	1.20E+03,	6.17E+02,	2.76E+02,	1.01E+02,		
1991 ,	1.11E+05,	1.03E+05,	4.18E+04,	4.43E+04,	4.71E+04,	1.33E+04,	1.86E+03,	4.30E+02,	2.14E+02,	1.19E+02,		
1992 ,	1.85E+05,	8.30E+04,	6.18E+04,	2.02E+04,	1.68E+04,	1.59E+04,	5.13E+03,	7.02E+02,	1.33E+02,	6.19E+01,		
1993 ,	1.95E+05,	1.40E+05,	4.83E+04,	2.66E+04,	6.22E+03,	4.67E+03,	5.53E+03,	2.38E+03,	3.42E+02,	6.69E+01,		

Estimated population abundance at 1st Jan 1993

, 0.00E+00, 1.55E+05, 8.78E+04, 2.44E+04, 9.79E+03, 1.81E+03, 1.31E+03, 2.10E+03, 9.89E+02, 1.17E+02,

Taper weighted geometric mean of the VPA populations:

, 1.64E+05, 1.29E+05, 8.00E+04, 4.41E+04, 1.89E+04, 7.93E+03, 2.92E+03, 9.92E+02, 3.86E+02, 1.74E+02,

Standard error of the weighted Log(VPA populations) :

, .4257, .4403, .4571, .5243, .6015, .5020, .5589, .5980, .6755, .7778,

YEAR ,	AGE	
	13,	14,
1984 ,	2.01E+02,	8.24E+01,
1985 ,	2.32E+02,	8.30E+01,
1986 ,	2.34E+02,	9.74E+01,
1987 ,	9.71E+01,	1.23E+02,
1988 ,	1.39E+02,	3.79E+01,
1989 ,	9.47E+01,	1.06E+01,
1990 ,	4.55E+01,	4.32E+01,
1991 ,	3.77E+01,	2.37E+01,
1992 ,	4.08E+01,	2.09E+01,
1993 ,	2.17E+01,	2.52E+01,

Estimated population abundance at 1st Jan 1993

, 2.40E+01, 7.82E+00,

Taper weighted geometric mean of the VPA populations:

, 8.08E+01, 4.02E+01,

Standard error of the weighted Log(VPA populations) :

, .8479, .9002,

1

Continued..

Continued..

Log catchability residuals.

Fleet : CPUE - N; Jun-Dec

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	99.99	99.99	99.99	99.99	-0.75	-0.32	.13	.16	.26	.49
4	99.99	99.99	99.99	99.99	-0.57	.27	-0.09	.17	.04	.16
5	99.99	99.99	99.99	99.99	-0.02	.00	-0.24	.19	.22	-0.15
6	99.99	99.99	99.99	99.99	.57	-0.53	-0.16	.12	.28	-0.27
7	99.99	99.99	99.99	99.99	.24	-0.54	-0.62	-0.10	.45	.56
8	No data for this fleet at this age									
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Mean log catchability and standard error of ages with catchability independent of year class strength

Age	5	6	7
Mean Log q	-4.1072	-3.8278	-4.0999
S.E(Log q)	.1815	.3961	.5056

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e.	Mean Log q
3	.73	.591	7.73	.54	6	.35	-6.18
4	1.41	-.926	1.73	.56	6	.43	-4.62

Ages with q constant w.r.t. time

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e.	Mean Q
5	1.09	-.541	3.44	.90	6	.21	-4.11
6	1.44	-1.124	.78	.62	6	.56	-3.83
7	1.61	-1.352	.65	.56	6	.75	-4.10

Fleet : CPUE - SW; Jun-Dec

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	99.99	99.99	99.99	99.99	.07	-0.36	-0.68	-0.53	.38	1.10
4	99.99	99.99	99.99	99.99	-0.44	-0.01	-0.72	.13	.61	.41
5	99.99	99.99	99.99	99.99	-0.17	-0.41	-0.24	.30	.31	.19
6	99.99	99.99	99.99	99.99	.15	-0.81	-0.28	.29	.64	.00
7	99.99	99.99	99.99	99.99	.10	-0.63	-0.45	.42	.70	-0.16
8	99.99	99.99	99.99	99.99	-0.64	-0.36	-0.12	.67	.34	.07
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Mean log catchability and standard error of ages with catchability independent of year class strength

Age	5	6	7	8
Mean Log q	-4.1531	-3.6734	-3.6789	-4.4214
S.E(Log q)	.3099	.4983	.5124	.4748

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e.	Mean Log q
3	.40	2.198	9.75	.79	6	.20	-6.66

Continued..

4, 1.01, -.010, 4.76, .42, 6, .57, -4.80,

Ages with q constant w.r.t. time

Age, Slope, t-value, Intercept, RSquare, No Pts, Reg s.e, Mean Q

5, 1.92, -3.444, -2.39, .78, 6, .33, -4.15,
 6, 2.56, -2.443, -7.28, .38, 6, .90, -3.67,
 7, .88, .417, 4.43, .75, 6, .49, -3.68,
 8, .69, 1.420, 5.82, .84, 6, .30, -4.42,

1

Fleet : CPUE - SE; Jun-Dec

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	99.99	99.99	99.99	99.99	-.45	-.92	-1.33	1.07	.71	.88
4	99.99	99.99	99.99	99.99	.31	-.28	-.36	-.36	.49	.21
5	99.99	99.99	99.99	99.99	.32	-.15	-.24	-.07	.11	.05
6	99.99	99.99	99.99	99.99	.37	.00	-.58	-.19	.19	.22
7	99.99	99.99	99.99	99.99	-.11	-.11	-.34	-.45	.31	.70
8	99.99	99.99	99.99	99.99	.04	-.28	-.41	.04	.18	.42
9	99.99	99.99	99.99	99.99	-.10	-.06	-.12	.67	-.43	.03
10	99.99	99.99	99.99	99.99	-.12	-.30	-.04	.56	-.32	.20

Mean log catchability and standard error
 of ages with catchability independent of year class strength

Age	5	6	7	8	9	10
Mean Log q,	-4.9673,	-4.0532,	-3.5664,	-3.5100,	-3.4230,	-3.2477,
S.E(Log q),	.1986,	.3447,	.4343,	.3038,	.3646,	.3387,

Regression statistics :

Ages with q dependent on year class strength

Age, Slope, t-value, Intercept, RSquare, No Pts, Reg s.e, Mean Log q

3, .44, .901, 9.65, .40, 6, .46, -6.89,
 4, .77, .738, 7.37, .72, 6, .31, -6.08,

Ages with q constant w.r.t. time

Age, Slope, t-value, Intercept, RSquare, No Pts, Reg s.e, Mean Q

5, .95, .330, 5.31, .90, 6, .21, -4.97,
 6, 1.73, -2.426, -.76, .74, 6, .42, -4.05,
 7, 1.92, -2.973, -2.14, .73, 6, .52, -3.57,
 8, .85, .736, 4.31, .86, 6, .27, -3.51,
 9, 1.23, -.672, 2.41, .68, 6, .48, -3.42,
 10, .99, .034, 3.28, .76, 6, .38, -3.25,

1

Fleet : CPUE - N; Jan-May

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	No data for this fleet at this age									
4	99.99	99.99	99.99	99.99	.05	.57	-1.39	-.11	.40	.47
5	99.99	99.99	99.99	99.99	.08	.31	-.28	-.17	.20	-.13
6	99.99	99.99	99.99	99.99	-.36	-.38	-.05	.24	.42	.10
7	99.99	99.99	99.99	99.99	.21	-.74	.65	.22	.06	-.39
8	No data for this fleet at this age									
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Mean log catchability and standard error
 of ages with catchability independent of year class strength

Age	5	6	7
Mean Log q,	-4.1993,	-3.8312,	-4.3201,
S.E(Log q),	.2317,	.3226,	.4906,

Continued..

Continued..

Regression statistics :

Ages with q dependent on year class strength

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Log q

4, .51, 1.346, 8.40, .66, 6, .35, -5.35,

Ages with q constant w.r.t. time

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Q

5, .82, 1.294, 5.50, .93, 6, .18, -4.20,
 6, 1.40, -1.344, 1.09, .74, 6, .42, -3.83,
 7, .70, 1.726, 5.95, .89, 6, .29, -4.32,

1

Fleet : CPUE - SW; Jan-May

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	No data for this fleet at this age									
4	99.99	99.99	99.99	99.99	.57	-1.03	-1.26	.28	-.07	1.50
5	99.99	99.99	99.99	99.99	-.13	.40	-.57	-.28	-.35	.93
6	99.99	99.99	99.99	99.99	.00	.53	-.53	-.23	.02	.21
7	99.99	99.99	99.99	99.99	.51	-1.55	.05	.50	.48	.00
8	99.99	99.99	99.99	99.99	-.06	.16	-.03	-.04	.35	-.38
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Mean log catchability and standard error
 of ages with catchability independent of year class strength

Age	5	6	7	8
Mean Log q,	-4.7740,	-4.1371,	-4.1146,	-3.8041,
S.E(Log q),	.5652,	.3651,	.7906,	.2476,

Regression statistics :

Ages with q dependent on year class strength

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Log q

4, .44, 1.299, 9.35, .57, 6, .42, -6.36,

Ages with q constant w.r.t. time

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Q

5, 1.05, -.089, 4.46, .47, 6, .66, -4.77,
 6, 1.17, -.528, 3.00, .70, 6, .46, -4.14,
 7, .79, .531, 5.32, .61, 6, .67, -4.11,
 8, .85, .926, 4.55, .91, 6, .21, -3.80,

1

Fleet : CPUE - SE; Jan-May

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	No data for this fleet at this age									
4	No data for this fleet at this age									
5	No data for this fleet at this age									
6	99.99	99.99	99.99	99.99	.75	.47	-.52	-1.08	.62	-.20
7	99.99	99.99	99.99	99.99	.74	.12	.14	-.61	.21	-.55
8	99.99	99.99	99.99	99.99	.53	-.15	-.62	.07	.04	.09
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Continued..

Continued..

Mean log catchability and standard error
of ages with catchability independent of year class strength

Age ,	6,	7,	8
Mean Log q,	-4.8714,	-4.5747,	-4.8207,
S.E(Log q),	.7249,	.5101,	.3879,

Regression statistics :

Ages with q constant w.r.t. time

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Q
6,	1.57,	-.664,	1.56,	.26,	6,	1.21,	-4.87,
7,	1.12,	-.306,	3.98,	.64,	6,	.63,	-4.57,
8,	.80,	.825,	5.63,	.82,	6,	.32,	-4.82,

1

Fleet : RVS - SE

Age ,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993
3 ,	No data for this fleet at this age									
4 ,	No data for this fleet at this age									
5 ,	-.41,	-.22,	-.05,	-.01,	1.25,	.04,	-.56,	-.03,	.12,	-.23
6 ,	-.29,	-.33,	-.12,	.11,	.52,	.47,	-.22,	.15,	-.26,	-.13
7 ,	-.27,	-.32,	-.24,	.28,	.56,	.05,	-.23,	.23,	-.07,	-.10
8 ,	.25,	-.24,	-.27,	-.30,	1.08,	.29,	.23,	-.17,	-.53,	-.31
9 ,	No data for this fleet at this age									
10 ,	No data for this fleet at this age									

Mean log catchability and standard error
of ages with catchability independent of year class strength

Age ,	5,	6,	7,	8
Mean Log q,	-7.9167,	-7.3385,	-7.0500,	-7.0401,
S.E(Log q),	.4964,	.3110,	.2870,	.4768,

Regression statistics :

Ages with q constant w.r.t. time

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Q
5,	.67,	1.354,	9.02,	.70,	10,	.32,	-7.92,
6,	.94,	.308,	7.55,	.77,	10,	.31,	-7.34,
7,	1.01,	-.079,	7.01,	.81,	10,	.31,	-7.05,
8,	1.26,	-.605,	6.53,	.42,	10,	.63,	-7.04,

1

Fleet : RVS - SW

Age ,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993
3 ,	No data for this fleet at this age									
4 ,	No data for this fleet at this age									
5 ,	.03,	-.33,	-.36,	-.50,	.30,	.33,	.59,	.09,	.15,	-.40
6 ,	.19,	-.35,	-.35,	-.09,	-.29,	.44,	.67,	.20,	-.19,	-.29
7 ,	.06,	-.30,	-.38,	.15,	-.04,	-.01,	.39,	.36,	-.08,	-.24
8 ,	.29,	-.23,	-.50,	-.46,	.54,	.29,	.87,	.11,	-.49,	-.43
9 ,	No data for this fleet at this age									
10 ,	No data for this fleet at this age									

Mean log catchability and standard error
of ages with catchability independent of year class strength

Continued..

Continued..

Age ,	5,	6,	7,	8
Mean Log q,	-7.3681,	-7.1201,	-7.0718,	-7.2010,
S.E(Log q),	.3739,	.3674,	.2623,	.4975,

Regression statistics :

Ages with q constant w.r.t. time

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Q
5,	.77,	1.025,	8.25,	.74,	10,	.29,	-7.37,
6,	.69,	2.326,	8.24,	.88,	10,	.20,	-7.12,
7,	.77,	2.422,	7.70,	.94,	10,	.16,	-7.07,
8,	1.30,	-.648,	6.67,	.39,	10,	.67,	-7.20,

1

Fleet : RVS - N

Age ,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993
3 ,	.72,	-.23,	.22,	.49,	.75,	-.68,	-.15,	-.24,	-.02,	-.65
4 ,	.59,	.15,	.02,	.32,	.48,	-.21,	-.25,	-.33,	-.12,	-.44
5 ,	.34,	.21,	.43,	-.14,	.14,	-.14,	-.05,	-.17,	.16,	-.60
6 ,	.48,	.13,	.43,	.28,	-.41,	-.05,	.00,	-.35,	-.08,	-.23
7 ,	.36,	.21,	.43,	.73,	.11,	-.45,	-.57,	-.51,	.05,	-.14
8 ,	.63,	.18,	.42,	.30,	.71,	.24,	-.55,	-1.07,	-.38,	-.18
9 ,	No data for this fleet at this age									
10 ,	No data for this fleet at this age									

Mean log catchability and standard error
of ages with catchability independent of year class strength

Age ,	5,	6,	7,	8
Mean Log q,	-6.1274,	-6.2237,	-6.5590,	-6.9943,
S.E(Log q),	.3027,	.3054,	.4380,	.5738,

Regression statistics :

Ages with q dependent on year class strength

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Log q
3,	.64,	1.395,	8.15,	.68,	10,	.31,	-6.01,
4,	.65,	2.402,	8.03,	.87,	10,	.18,	-6.06,

Ages with q constant w.r.t. time

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Q
5,	.82,	.957,	7.06,	.79,	10,	.25,	-6.13,
6,	.89,	.565,	6.70,	.79,	10,	.28,	-6.22,
7,	1.08,	-.267,	6.31,	.62,	10,	.50,	-6.56,
8,	1.20,	-.405,	6.59,	.35,	10,	.73,	-6.99,

1

Fleet : RVS - N (A2 on A3)

Age ,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993
3 ,	99.99,	.13,	.17,	.42,	.60,	-.04,	-.42,	-.33,	-.08,	-.35
4 ,	No data for this fleet at this age									
5 ,	No data for this fleet at this age									
6 ,	No data for this fleet at this age									
7 ,	No data for this fleet at this age									
8 ,	No data for this fleet at this age									
9 ,	No data for this fleet at this age									
10 ,	No data for this fleet at this age									

Continued..

Regression statistics :

Ages with q dependent on year class strength

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Log q

3, .74, 1.211, 7.49, .77, 9, .26, -5.92,
1

Fleet : RVS - N (A1 on A3)

Age	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
3	99.99	99.99	-.01	.53	.29	-.51	.03	-.01	-.31	.04
4	No data for this fleet at this age									
5	No data for this fleet at this age									
6	No data for this fleet at this age									
7	No data for this fleet at this age									
8	No data for this fleet at this age									
9	No data for this fleet at this age									
10	No data for this fleet at this age									

Regression statistics :

Ages with q dependent on year class strength

Age, Slope , t-value , Intercept, RSquare, No Pts, Reg s.e, Mean Log q

3, .71, 1.734, 8.13, .96, 8, .20, -6.56,
1

Continued..

Terminal year survivor and F summaries :

Age 3 Catchability dependent on age and year class strength

Year class = 1990

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	229421.,	.513,	.000,	.00,	1,	.118,	.078
CPUE - SW; Jun-Dec	425874.,	.774,	.000,	.00,	1,	.052,	.043
CPUE - SE; Jun-Dec	340000.,	1.181,	.000,	.00,	1,	.022,	.053
CPUE - N; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SW; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SE; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SE	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SW	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - N	73410.,	.576,	.000,	.00,	1,	.094,	.225
RVS - N (A2 on A3)	99976.,	.402,	.000,	.00,	1,	.193,	.170
RVS - N (A1 on A3)	146378.,	.363,	.000,	.00,	1,	.237,	.119
P shrinkage mean	128525.,	.44, , , ,				.160,	.135
F shrinkage mean	304551.,	.50, , , ,				.124,	.059

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
155334.,	.18,	.19,	8,	1.057,	.123

1

Age 4 Catchability dependent on age and year class strength

Year class = 1989

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	102578.,	.317,	.044,	.14,	2,	.208,	.256
CPUE - SW; Jun-Dec	126561.,	.515,	.018,	.03,	2,	.079,	.212
CPUE - SE; Jun-Dec	110265.,	.449,	.158,	.35,	2,	.104,	.240
CPUE - N; Jan-May	136136.,	.920,	.000,	.00,	1,	.025,	.199
CPUE - SW; Jan-May	380488.,	1.300,	.000,	.00,	1,	.012,	.076
CPUE - SE; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SE	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SW	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - N	61945.,	.358,	.192,	.53,	2,	.163,	.394
RVS - N (A2 on A3)	78607.,	.456,	.000,	.00,	1,	.101,	.323
RVS - N (A1 on A3)	62273.,	.412,	.000,	.00,	1,	.124,	.392
P shrinkage mean	79983.,	.46, , , ,				.100,	.318
F shrinkage mean	94508.,	.50, , , ,				.084,	.275

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
87825.,	.14,	.09,	14,	.601,	.302

1

Age 5 Catchability constant w.r.t. time and dependent on age

Year class = 1988

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	24710.,	.273,	.083,	.30,	3,	.191,	.442
CPUE - SW; Jun-Dec	31432.,	.350,	.205,	.59,	3,	.116,	.363
CPUE - SE; Jun-Dec	31541.,	.311,	.176,	.57,	3,	.147,	.362
CPUE - N; Jan-May	23865.,	.354,	.154,	.44,	2,	.113,	.455
CPUE - SW; Jan-May	54954.,	.687,	.380,	.55,	2,	.030,	.223
CPUE - SE; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SE	20494.,	.647,	.000,	.00,	1,	.034,	.513
RVS - SW	17270.,	.487,	.000,	.00,	1,	.060,	.585
RVS - N	17165.,	.297,	.160,	.54,	3,	.160,	.588
RVS - N (A2 on A3)	18462.,	.581,	.000,	.00,	1,	.042,	.556
RVS - N (A1 on A3)	25588.,	.524,	.000,	.00,	1,	.052,	.430
F shrinkage mean	24024.,	.50, , , ,				.057,	.452

Continued..

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
24357.,	.12,	.07,	21,	.609,	.427

1
Age 6 Catchability constant w.r.t. time and dependent on age

Year class = 1987

Fleet, ,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, ,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	10173.,	.368,	.127,	.35,	4,	.136,	.780
CPUE - SW; Jun-Dec	10968.,	.470,	.147,	.31,	4,	.083,	.740
CPUE - SE; Jun-Dec	10448.,	.377,	.158,	.42,	4,	.129,	.765
CPUE - N; Jan-May	11169.,	.389,	.048,	.12,	3,	.121,	.730
CPUE - SW; Jan-May	11021.,	.523,	.153,	.29,	3,	.067,	.737
CPUE - SE; Jan-May	8053.,	1.169,	.000,	.00,	1,	.013,	.913
RVS - SE	8987.,	.445,	.092,	.21,	2,	.093,	.849
RVS - SW	8495.,	.470,	.211,	.45,	2,	.083,	.881
RVS - N	8544.,	.343,	.106,	.31,	4,	.156,	.878
RVS - N (A2 on A3)	6408.,	.936,	.000,	.00,	1,	.021,	1.056
RVS - N (A1 on A3)	10114.,	.845,	.000,	.00,	1,	.026,	.783
F shrinkage mean	10420.,	.50,,,,				.073,	.767

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
9789.,	.14,	.04,	30,	.306,	.800

1
Age 7 Catchability constant w.r.t. time and dependent on age

Year class = 1986

Fleet, ,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, ,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	2374.,	.519,	.136,	.26,	5,	.100,	.861
CPUE - SW; Jun-Dec	1953.,	.608,	.193,	.32,	5,	.072,	.978
CPUE - SE; Jun-Dec	2447.,	.503,	.200,	.40,	5,	.106,	.843
CPUE - N; Jan-May	1688.,	.541,	.239,	.44,	4,	.091,	1.072
CPUE - SW; Jan-May	1739.,	.780,	.135,	.17,	4,	.044,	1.052
CPUE - SE; Jan-May	1284.,	.839,	.424,	.51,	2,	.038,	1.259
RVS - SE	1625.,	.424,	.050,	.12,	3,	.149,	1.097
RVS - SW	1517.,	.427,	.067,	.16,	3,	.147,	1.143
RVS - N	1574.,	.471,	.061,	.13,	5,	.121,	1.118
RVS - N (A2 on A3)	1788.,	1.540,	.000,	.00,	1,	.011,	1.034
RVS - N (A1 on A3)	1110.,	1.390,	.000,	.00,	1,	.014,	1.366
F shrinkage mean	2242.,	.50,,,,				.107,	.394

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
1811.,	.16,	.05,	39,	.320,	1.010

1
Age 8 Catchability constant w.r.t. time and dependent on age

Year class = 1985

Fleet, ,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, ,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	1410.,	.843,	.176,	.21,	5,	.047,	1.025
CPUE - SW; Jun-Dec	1514.,	.661,	.123,	.19,	6,	.077,	.980
CPUE - SE; Jun-Dec	1719.,	.465,	.116,	.25,	6,	.156,	.902
CPUE - N; Jan-May	1352.,	.887,	.134,	.15,	4,	.043,	1.052
CPUE - SW; Jan-May	923.,	.475,	.097,	.18,	5,	.148,	1.316
CPUE - SE; Jan-May	1398.,	.645,	.160,	.25,	3,	.081,	1.030
RVS - SE	1119.,	.555,	.106,	.19,	4,	.109,	1.179
RVS - SW	1136.,	.567,	.169,	.30,	4,	.104,	1.169
RVS - N	1156.,	.613,	.093,	.15,	6,	.088,	1.156
RVS - N (A2 on A3)	2385.,	2.423,	.000,	.00,	1,	.006,	.721
RVS - N (A1 on A3)	1742.,	2.191,	.000,	.00,	1,	.007,	.895

Continued..

Continued..

F shrinkage mean , 1575., .50,,,, .134, .955

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
1308.,	.18,	.05,	46,	.251,	1.075

1

Age 9 Catchability constant w.r.t. time and dependent on age

Year class = 1984

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	1725.,	.917,	.126,	.14,	4,	.048,	.883
CPUE - SW; Jun-Dec	2276.,	.797,	.181,	.23,	5,	.064,	.730
CPUE - SE; Jun-Dec	2096.,	.408,	.094,	.23,	6,	.243,	.774
CPUE - N; Jan-May	2440.,	.956,	.090,	.09,	4,	.044,	.695
CPUE - SW; Jan-May	2728.,	.612,	.137,	.22,	5,	.108,	.641
CPUE - SE; Jan-May	1869.,	.834,	.190,	.23,	3,	.058,	.837
RVS - SE	1822.,	.676,	.192,	.28,	4,	.088,	.852
RVS - SW	2334.,	.686,	.255,	.37,	4,	.086,	.717
RVS - N	1792.,	.707,	.145,	.20,	6,	.081,	.861
RVS - N (A2 on A3)	3156.,	2.298,	.000,	.00,	1,	.008,	.574
RVS - N (A1 on A3)	3520.,	2.074,	.000,	.00,	1,	.009,	.528

F shrinkage mean , 1888., .50,,,, .162, .832

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
2095.,	.20,	.05,	44,	.230,	.778

1

Age 10 Catchability constant w.r.t. time and dependent on age

Year class = 1983

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	607.,	1.349,	.190,	.14,	3,	.028,	1.015
CPUE - SW; Jun-Dec	1004.,	1.052,	.334,	.32,	4,	.046,	.724
CPUE - SE; Jun-Dec	886.,	.383,	.120,	.31,	6,	.347,	.791
CPUE - N; Jan-May	953.,	1.245,	.300,	.24,	3,	.033,	.752
CPUE - SW; Jan-May	911.,	.776,	.107,	.14,	4,	.084,	.776
CPUE - SE; Jan-May	983.,	1.043,	.063,	.06,	3,	.047,	.735
RVS - SE	880.,	.834,	.221,	.26,	4,	.073,	.794
RVS - SW	1194.,	.853,	.077,	.09,	4,	.070,	.633
RVS - N	604.,	.915,	.227,	.25,	6,	.061,	1.018
RVS - N (A2 on A3)	1047.,	3.554,	.000,	.00,	1,	.004,	.703
RVS - N (A1 on A3)	875.,	3.208,	.000,	.00,	1,	.005,	.798

F shrinkage mean , 890., .50,,,, .203, .788

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
889.,	.23,	.05,	40,	.224,	.792

1

Age 11 Catchability constant w.r.t. time and dependent on age

Year class = 1982

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
CPUE - N; Jun-Dec	107.,	2.704,	.548,	.20,	2,	.013,	.923
CPUE - SW; Jun-Dec	94.,	1.807,	.181,	.10,	3,	.029,	1.002
CPUE - SE; Jun-Dec	108.,	.554,	.212,	.38,	5,	.309,	.920
CPUE - N; Jan-May	68.,	2.424,	.189,	.08,	2,	.016,	1.224
CPUE - SW; Jan-May	106.,	1.222,	.235,	.19,	3,	.063,	.931
CPUE - SE; Jan-May	78.,	1.613,	.274,	.17,	3,	.036,	1.127
RVS - SE	142.,	1.309,	.097,	.07,	4,	.055,	.765
RVS - SW	145.,	1.336,	.276,	.21,	4,	.053,	.751

Continued..

RVS - N	,	79.,	1.479,	.077,	.05,	6,	.043,	1.116
RVS - N (A2 on A3)	,	133.,	5.970,	.000,	.00,	1,	.003,	.798
RVS - N (A1 on A3)	,	1.,	.000,	.000,	.00,	0,	.000,	.000

F shrinkage mean , 137., .50,,,,, .379, .782

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
117.,	.31,	.06,	34,	.207,	.870

1

Age 12 Catchability constant w.r.t. time and dependent on age

Year class = 1981

Fleet,	Estimated,	Int,	Ext,	Var,	N,	Scaled,	Estimated
,	Survivors,	s.e,	s.e,	Ratio,	,	Weights,	F
CPUE - N; Jun-Dec	, 31.,	6.709,	.000,	.00,	1,	.004,	.696
CPUE - SW; Jun-Dec	, 19.,	3.350,	.199,	.06,	2,	.014,	.973
CPUE - SE; Jun-Dec	, 32.,	.900,	.209,	.23,	4,	.200,	.678
CPUE - N; Jan-May	, 29.,	6.510,	.000,	.00,	1,	.004,	.715
CPUE - SW; Jan-May	, 29.,	2.200,	.072,	.03,	2,	.033,	.731
CPUE - SE; Jan-May	, 24.,	2.852,	.339,	.12,	2,	.020,	.818
RVS - SE	, 34.,	2.381,	.106,	.04,	4,	.029,	.638
RVS - SW	, 25.,	2.438,	.108,	.04,	4,	.027,	.792
RVS - N	, 31.,	2.723,	.053,	.02,	6,	.022,	.694
RVS - N (A2 on A3)	, 1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - N (A1 on A3)	, 1.,	.000,	.000,	.00,	0,	.000,	.000

F shrinkage mean , 21., .50,,,,, .647, .894

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
24.,	.40,	.07,	27,	.163,	.825

1

Age 13 Catchability constant w.r.t. time and age (fixed at the value for age) 12

Year class = 1980

Fleet,	Estimated,	Int,	Ext,	Var,	N,	Scaled,	Estimated
,	Survivors,	s.e,	s.e,	Ratio,	,	Weights,	F
CPUE - N; Jun-Dec	, 1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SW; Jun-Dec	, 4.,	9.568,	.000,	.00,	1,	.002,	1.231
CPUE - SE; Jun-Dec	, 8.,	1.790,	.018,	.01,	3,	.070,	.843
CPUE - N; Jan-May	, 1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SW; Jan-May	, 7.,	5.592,	.000,	.00,	1,	.007,	.856
CPUE - SE; Jan-May	, 14.,	7.818,	.000,	.00,	1,	.004,	.539
RVS - SE	, 13.,	5.899,	.280,	.05,	4,	.006,	.567
RVS - SW	, 10.,	6.027,	.185,	.03,	4,	.006,	.713
RVS - N	, 14.,	6.664,	.094,	.01,	5,	.005,	.540
RVS - N (A2 on A3)	, 1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - N (A1 on A3)	, 1.,	.000,	.000,	.00,	0,	.000,	.000

F shrinkage mean , 8., .50,,,,, .899, .824

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
3.,	.47,	.02,	20,	.050,	.821

1

Age 14 Catchability constant w.r.t. time and age (fixed at the value for age) 12

Year class = 1979

Fleet,	Estimated,	Int,	Ext,	Var,	N,	Scaled,	Estimated
,	Survivors,	s.e,	s.e,	Ratio,	,	Weights,	F
CPUE - N; Jun-Dec	, 1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SW; Jun-Dec	, 1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SE; Jun-Dec	, 7.,	1.616,	.081,	.05,	2,	.085,	.995
CPUE - N; Jan-May	, 1.,	.000,	.000,	.00,	0,	.000,	.000
CPUE - SW; Jan-May	, 1.,	.000,	.000,	.00,	0,	.000,	.000

Continued..

Continued..

CPUE - SE; Jan-May	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - SE	7.,	4.518,	.025,	.01,	4,	.011,	1.017
RVS - SW	6.,	4.611,	.074,	.02,	4,	.010,	1.068
RVS - N	12.,	5.243,	.061,	.01,	4,	.008,	.686
RVS - N (A2 on A3)	1.,	.000,	.000,	.00,	0,	.000,	.000
RVS - N (A1 on A3)	1.,	.000,	.000,	.00,	0,	.000,	.000
F shrinkage mean	9.,	.50,,,,				.886,	.826

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
9.,	.47,	.07,	15,	.142,	.842

1

Table 3.3.10
Icelandic cod: fishing mortality

Age	1974	1975	1976	1977	1978	1979	1980
3	0.102	0.131	0.083	0.020	0.030	0.033	0.034
4	0.383	0.299	0.263	0.212	0.169	0.195	0.176
5	0.496	0.521	0.363	0.355	0.351	0.211	0.358
6	0.459	0.569	0.617	0.368	0.333	0.513	0.378
7	0.744	0.643	0.596	0.810	0.494	0.487	0.442
8	0.968	0.808	0.938	0.657	0.660	0.503	0.554
9	0.810	1.069	0.764	0.995	0.505	0.507	0.514
10	1.004	1.176	1.270	0.608	0.530	0.339	0.453
11	1.360	1.348	1.363	0.562	0.343	0.531	0.425
12	1.262	1.767	0.940	0.547	0.719	0.200	0.700
13	0.583	0.821	2.490	0.078	0.806	1.020	0.171
14	1.004	1.236	1.365	0.558	0.580	0.519	0.453
W.Av 5-10	0.577	0.569	0.521	0.438	0.372	0.403	0.404
Ave 5-10	0.747	0.798	0.758	0.632	0.479	0.427	0.450

Age	1981	1982	1983	1984	1985	1986	1987
3	0.016	0.027	0.017	0.055	0.051	0.070	0.044
4	0.137	0.221	0.120	0.211	0.288	0.222	0.308
5	0.388	0.400	0.433	0.323	0.388	0.582	0.519
6	0.470	0.541	0.622	0.539	0.572	0.697	0.788
7	0.635	0.581	0.767	0.598	0.683	0.883	0.977
8	0.839	1.046	0.852	0.901	0.731	0.936	0.994
9	0.802	1.187	0.930	0.746	0.802	0.807	0.977
10	0.951	0.910	1.082	0.634	0.770	0.765	0.709
11	0.982	0.479	0.671	0.639	0.613	0.740	0.584
12	0.904	0.404	0.678	0.587	0.641	0.673	0.665
13	1.076	0.417	0.533	0.685	0.711	0.445	0.740
14	0.943	0.679	0.779	0.658	0.708	0.686	0.735
W.Av 5-10	0.529	0.582	0.609	0.479	0.487	0.689	0.698
Ave 5-10	0.681	0.778	0.781	0.623	0.658	0.778	0.827

Age	1988	1989	1990	1991	1992	1993	1990-1993
3	0.045	0.036	0.050	0.090	0.076	0.123	0.085
4	0.218	0.265	0.238	0.315	0.342	0.302	0.299
5	0.503	0.473	0.444	0.530	0.643	0.428	0.511
6	0.837	0.596	0.620	0.771	0.978	0.798	0.792
7	0.961	0.725	0.771	0.886	1.083	1.010	0.937
8	1.400	0.894	0.812	0.755	0.861	1.076	0.876
9	1.111	0.830	0.825	0.771	0.571	0.786	0.738
10	0.991	0.545	0.861	0.977	0.521	0.802	0.790
11	1.037	0.672	0.622	1.037	0.487	0.870	0.754
12	0.911	0.987	0.789	0.822	0.847	0.830	0.822
13	2.341	0.583	0.449	0.393	0.355	0.821	0.505
14	1.278	0.723	0.709	0.800	0.556	0.822	0.722
W.Av 5-10	0.627	0.534	0.585	0.739	0.785	0.634	0.628
Ave 5-10	0.967	0.677	0.722	0.782	0.776	0.817	0.774

Table 3.3.11
Icelandic cod: Stock in numbers (millions)

Age	1974	1975	1976	1977	1978	1979	1980
3	169.264	263.224	326.295	143.292	221.657	245.513	144.025
4	213.035	125.194	189.099	245.878	114.957	176.061	194.521
5	61.074	118.922	75.994	119.034	162.908	79.448	118.551
6	42.846	30.450	57.836	43.280	68.303	93.924	52.649
7	18.637	22.158	14.113	25.539	24.515	40.087	83.048
8	10.886	7.251	9.536	6.364	9.306	12.250	20.159
9	3.231	3.386	2.646	3.055	2.700	3.939	6.065
10	4.334	1.177	0.951	1.009	0.925	1.335	1.942
11	2.563	1.300	0.297	0.219	0.450	0.446	0.778
12	0.504	0.538	0.276	0.062	0.102	0.261	0.214
13	0.153	0.117	0.075	0.088	0.030	0.041	0.175
14	0.048	0.070	0.042	0.005	0.067	0.011	0.012
Juvenile	418.018	476.848	563.479	499.600	491.740	526.230	477.605
Adult	108.556	96.939	113.682	88.225	114.179	127.085	144.535
Sum 3- 3	169.264	263.225	326.295	143.292	221.657	245.513	144.025
Sum 4-14	357.310	310.563	350.866	444.533	384.262	407.802	478.115
Total	526.574	573.787	677.161	587.825	605.919	653.315	622.140
Age	1981	1982	1983	1984	1985	1986	1987
3	143.264	133.579	226.273	138.871	144.070	336.791	281.947
4	113.993	115.382	106.399	182.047	107.606	112.127	257.116
5	133.564	81.345	75.736	77.277	120.645	66.028	73.505
6	67.877	74.174	44.648	40.209	45.820	67.010	30.221
7	29.533	34.736	35.346	19.617	19.198	21.168	27.323
8	50.701	12.818	15.903	13.434	8.832	7.938	7.169
9	9.481	17.939	3.687	5.554	4.469	3.482	2.548
10	2.970	3.480	4.482	1.191	2.156	1.641	1.272
11	1.011	0.940	1.147	1.244	0.517	0.817	0.625
12	0.417	0.310	0.476	0.480	0.537	0.230	0.319
13	0.087	0.138	0.170	0.198	0.219	0.232	0.096
14	0.121	0.024	0.074	0.081	0.082	0.088	0.121
Juvenile	450.083	383.299	444.486	405.791	361.183	532.368	613.015
Adult	102.935	91.567	69.855	74.412	92.969	85.182	69.247
Sum 3- 3	143.264	133.579	226.273	138.871	144.070	336.791	281.947
Sum 4-14	409.754	341.286	288.068	341.332	310.081	280.759	400.315
Total	553.018	474.865	514.341	480.203	454.152	617.550	682.263
Age	1988	1989	1990	1991	1992	1993	1994
3	168.814	80.862	131.178	109.802	150.000	155.000	60.000
4	220.908	132.154	63.852	102.178	82.183	113.802	112.216
5	154.672	145.471	83.031	41.199	61.073	47.787	68.886
6	35.827	76.561	105.234	43.609	19.859	26.295	25.502
7	11.254	12.704	34.547	46.339	16.514	6.113	9.693
8	8.417	3.523	5.036	13.088	15.647	4.580	1.823
9	2.173	1.700	1.180	1.830	5.038	5.415	1.279
10	0.785	0.586	0.607	0.423	0.693	2.330	2.020
11	0.513	0.239	0.278	0.210	0.130	0.337	0.855
12	0.285	0.149	0.100	0.122	0.061	0.066	0.116
13	0.134	0.094	0.045	0.037	0.044	0.021	0.023
14	0.037	0.011	0.043	0.024	0.020	0.025	0.008
Juvenile	520.284	345.889	310.875	253.860	242.945	210.967	149.967
Adult	83.535	108.163	114.256	105.001	108.318	150.803	132.454
Sum 3- 3	168.814	80.862	131.178	109.802	150.000	155.000	60.000
Sum 4-14	435.005	373.190	293.953	249.058	201.262	206.770	222.420
Total	603.819	454.052	425.131	358.861	351.262	361.770	282.420

Table 3.3.12
Icelandic cod: spawning stock ('000 tonnes)

Age	1974	1975	1976	1977	1978	1979	1980
3	2.304	1.744	18.341	0.000	10.689	0.000	10.270
4	31.423	23.444	16.043	18.155	8.826	5.033	6.867
5	39.502	111.993	46.707	60.349	75.077	34.390	46.055
6	95.517	54.649	101.363	92.719	102.240	164.295	82.993
7	62.098	83.233	36.343	93.538	101.231	142.176	293.389
8	45.423	32.934	39.358	29.197	44.333	60.423	97.900
9	15.690	15.076	15.111	13.639	18.244	23.793	35.895
10	19.881	5.594	5.008	6.946	7.402	9.431	15.614
11	10.577	5.684	1.747	2.002	4.695	4.251	7.633
12	2.593	2.158	1.935	0.634	0.887	2.945	2.469
13	1.240	0.756	0.304	1.381	0.365	0.317	2.450
14	0.406	0.365	0.320	0.092	1.024	0.152	0.233
Total	326.653	337.630	282.582	318.651	375.013	447.208	601.767
Age	1981	1982	1983	1984	1985	1986	1987
3	0.000	2.917	0.000	0.000	4.167	1.882	6.888
4	4.673	8.747	12.670	10.552	9.001	9.750	19.275
5	20.607	18.923	23.099	28.991	48.111	35.568	40.020
6	52.345	40.892	34.830	47.181	71.055	100.301	55.966
7	65.635	62.439	53.312	43.614	54.549	52.831	73.872
8	174.041	36.501	41.483	39.704	34.148	28.852	27.036
9	44.873	62.990	13.515	24.328	21.214	17.339	11.297
10	15.690	19.196	19.363	7.880	13.100	9.818	8.818
11	6.445	8.215	8.438	9.323	4.165	5.757	4.933
12	3.193	3.271	4.321	4.753	4.997	2.164	2.347
13	0.582	1.845	1.773	2.089	2.270	2.461	1.018
14	1.052	0.277	0.906	0.928	1.050	1.114	1.344
Total	389.136	266.211	213.711	219.344	267.827	267.836	252.815
Age	1988	1989	1990	1991	1992	1993	
3	7.599	0.000	0.000	0.000	8.941	11.802	
4	6.482	8.871	5.804	10.276	22.972	39.597	
5	66.855	67.391	45.702	16.422	60.521	48.379	
6	45.250	125.687	168.073	54.574	31.799	50.921	
7	26.405	39.794	94.059	95.500	42.175	18.086	
8	22.515	13.444	20.301	46.825	54.850	16.474	
9	8.255	7.458	6.433	8.717	24.154	25.965	
10	3.809	4.003	3.911	2.249	4.228	12.934	
11	2.950	1.969	2.379	1.368	1.151	2.347	
12	1.660	0.761	1.006	1.127	0.521	0.504	
13	0.592	0.709	0.535	0.415	0.545	0.198	
14	0.212	0.102	0.502	0.311	0.168	0.298	
Total	192.583	270.189	348.706	237.784	252.025	227.506	

Table 3.3.13
Icelandic cod: recruitment (millions) and spawning stock ('000 tonnes).

year	recr.	SSB
1952	147	-
1953	202	-
1954	176	-
1955	258	1380
1956	305	1313
1957	152	1231
1958	189	1100
1959	142	977
1960	162	851
1961	289	783
1962	253	748
1963	271	699
1964	326	578
1965	172	452
1966	252	408
1967	185	470
1968	177	587
1969	135	686
1970	300	675
1971	169	607
1972	263	470
1973	428	432
1974	143	327
1975	222	338
1976	245	283
1977	144	319
1978	143	375
1979	134	447
1980	226	602
1981	139	389
1982	144	266
1983	337	214
1984	334	219
1985	169	269
1986	81	268
1987	131	253
1988	110	193
1989	150	270
1990	155	349
1991	60	238
1992	130	252
1993	180	228

Table 3.3.14**Icelandic cod: capelin biomass ('000 tonnes) used for prediction of cod mean weights.**

year	weight
1979	2386
1980	1482
1981	998
1982	549
1983	1000
1984	1950
1985	2380
1986	2473
1987	2358
1988	2076
1989	1732
1990	1195
1991	1045
1992	1593
1993	1789
1994	2086
ave:	1693

Table 3.3.15**Icelandic cod: input file for the RCT3 program.**

Cod in the Icelandic Grounds; Indices from the Research Vessel Survey.

2 18 2	'Ycl '	'VPA'	'SUR3'	'SUR2'
75	222	-11	-11	
76	245	-11	-11	
77	144	-11	-11	
78	143	-11	-11	
79	133	-11	-11	
80	228	-11	-11	
81	140	-11	-11	
82	146	34532	-11	
83	340	82614	36309	
84	286	91879	53926	
85	171	65639	25221	
86	81	16734		5466
87	131	18146	15071	
88	110	15943	11626	
89	-11	34874	14536	
90	-11	26850	20685	
91	-11	5781	2329	
92	-11	-11	10967	

Table 3.3.16
Icelandic cod: output from the RCT3 program.

Analysis by RCT3 ver3.1 of data from file :

g:\nwwg94\gardar\rctinput.nr4

Cod in the Icelandic Grounds; Indices from the Research Vessel Survey.

Data for 2 surveys over 18 years : 75 - 92

Regression type = C
 Tapered time weighting applied
 power = 0 over 20 years
 Survey weighting not applied

Final estimates shrunk towards mean
 Minimum S.E. for any survey taken as .30
 Minimum of 3 points used for regression

Forecast/Hindcast variance correction used.

Yearclass = 85

Survey/ Series	I-----Regression-----I				No. Pts	I-----Prediction-----I			
	Slope	Inter- cept	Std Error	Rsquare		Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.87	-4.08	.19	.916	3	11.09	5.52	.381	.448
SUR2									
VPA Mean =						5.26		.344	.552

Yearclass = 86

Survey/ Series	I-----Regression-----I				No. Pts	I-----Prediction-----I			
	Slope	Inter- cept	Std Error	Rsquare		Index Value	Predicted Value	Std Error	WAP Weights
SUR3	1.08	-6.52	.30	.724	4	9.73	3.96	.902	.116
SUR2	1.33	-8.47	.51	.494	3	8.61	3.01	3.291	.009
VPA Mean =						5.25		.328	.876

Yearclass = 87

Survey/ Series	I-----Regression-----I				No. Pts	I-----Prediction-----I			
	Slope	Inter- cept	Std Error	Rsquare		Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.84	-3.88	.22	.895	5	9.81	4.37	.376	.378
SUR2	.68	-1.52	.27	.895	4	9.62	4.98	.435	.283
VPA Mean =						5.18		.397	.339

Yearclass = 88

Survey/ Series	I-----Regression-----I				No. Pts	I-----Prediction-----I			
	Slope	Inter- cept	Std Error	Rsquare		Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.76	-2.97	.27	.824	6	9.68	4.42	.405	.285

Table 3.3.16 Cont'd

SUR2 .69 -1.69 .23 .894 5 9.36 4.78 .340 .405
 VPA Mean = 5.16 .389 .310

Yearclass = 89

I-----Regression-----I					I-----Prediction-----I				
Survey/ Series	Slope	Inter- cept	Std Error	Rsquare	No. Pts	Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.71	-2.40	.25	.832	7	10.46	5.06	.316	.362
SUR2	.70	-1.82	.20	.901	6	9.58	4.92	.274	.402
VPA Mean =							5.13	.392	.235

Yearclass = 90

I-----Regression-----I					I-----Prediction-----I				
Survey/ Series	Slope	Inter- cept	Std Error	Rsquare	No. Pts	Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.71	-2.40	.25	.832	7	10.20	4.87	.319	.358
SUR2	.70	-1.82	.20	.901	6	9.94	5.17	.271	.405
VPA Mean =							5.13	.392	.237

Yearclass = 91

I-----Regression-----I					I-----Prediction-----I				
Survey/ Series	Slope	Inter- cept	Std Error	Rsquare	No. Pts	Index Value	Predicted Value	Std Error	WAP Weights
SUR3	.71	-2.40	.25	.832	7	8.66	3.78	.425	.299
SUR2	.70	-1.82	.20	.901	6	7.75	3.63	.393	.350
VPA Mean =							5.13	.392	.351

Yearclass = 92

I-----Regression-----I					I-----Prediction-----I				
Survey/ Series	Slope	Inter- cept	Std Error	Rsquare	No. Pts	Index Value	Predicted Value	Std Error	WAP Weights
SUR3									
SUR2	.70	-1.82	.20	.901	6	9.30	4.72	.281	.631
VPA Mean =							5.13	.392	.369

Year Class	Weighted Average Prediction	Log WAP	Int Std Error	Ext Std Error	Var Ratio	VPA	Log VPA
85	216	5.38	.26	.13	.24	171	5.15
86	161	5.08	.31	.32	1.11	81	4.41
87	123	4.82	.23	.25	1.21	132	4.88

Continued....

Table 3.3.16 Cont'd

88	120	4.79	.22	.20	.87	111	4.71
89	151	5.02	.19	.06	.10		
90	156	5.05	.19	.09	.24		
91	66	4.20	.23	.48	4.33		
92	130	4.87	.24	.20	.68		

Table 3.3.17

Icelandic cod: average fishing pattern for three seasons, two regions and three gears.

season:	Jan - Apr					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
age:						
3	0.0233	0.0001	0.0025	0.0022	0.0000	0.0048
4	0.3251	0.0112	0.0733	0.4698	0.0011	0.2886
5	0.6198	0.0761	0.5047	1.2815	0.0157	0.9186
6	0.8658	0.2973	0.9689	0.9298	0.1732	1.0508
7	1.0043	0.6716	1.1942	0.6669	0.5551	1.0605
8	0.7544	1.0655	0.9755	0.6026	1.2453	0.7450
9	0.6752	1.2377	0.5302	1.0613	1.0866	0.3455
10	0.6324	1.3970	0.4255	0.0000	1.4639	0.5422
11	0.6159	1.2235	0.5733	0.0000	0.8915	0.1912

season:	May - Aug					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
age:						
3	0.0751	0.0001	0.0446	0.1024	0.0000	0.1168
4	0.1786	0.0065	0.1915	1.6667	0.0213	0.6386
5	0.1622	0.0838	0.4706	1.7569	0.1141	0.9605
6	0.2852	0.4243	0.6974	1.0844	0.5324	1.3441
7	0.4662	1.1331	1.0176	0.6402	0.7249	1.0627
8	0.9514	1.4049	0.9080	0.3708	0.5299	0.4928
9	1.1070	0.6192	0.8289	0.7012	0.9169	0.4272
10	1.5621	0.8811	0.7009	0.0063	1.1817	0.3605
11	0.5144	0.8819	0.6548	1.5283	0.2698	0.1749

season:	Sep - Dec					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
age:						
3	0.5403	0.0158	0.0610	1.8875	0.0000	0.2639
4	1.5703	0.1256	0.1145	3.8729	0.0000	1.0611
5	1.4302	1.0623	0.3387	2.1512	0.0000	1.5941
6	1.3114	1.4082	0.6502	1.1743	0.0000	1.3812
7	0.7138	0.9395	0.6800	0.5909	0.0000	0.7778
8	0.9022	0.6011	0.5845	0.0946	0.0000	0.4390
9	0.1619	0.0003	1.2311	0.0000	0.0000	0.1774
10	0.0000	0.0007	1.0354	0.0000	0.0000	0.1854
11	0.1493	0.0000	3.1350	0.0000	0.0000	0.5628

Table 3.3.18

Icelandic cod: Trends in fishing mortality, F(5-10), for different seasons, regions and gears.

season:	Jan - Apr					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
year:						
1989	0.0227	0.1933	0.0215	0.0283	0.0862	0.0512
1990	0.0463	0.1904	0.0635	0.0173	0.0497	0.0968
1991	0.0399	0.1249	0.0655	0.0182	0.0456	0.1057
1992	0.0346	0.1634	0.0660	0.0281	0.0265	0.1084

season:	May - Aug					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
year:						
1989	0.0322	0.0322	0.0409	0.0138	0.0209	0.0705
1990	0.0424	0.0256	0.0466	0.0132	0.0000	0.0536
1991	0.0241	0.0112	0.0815	0.0280	0.0137	0.1076
1992	0.0228	0.0309	0.0822	0.0399	0.0000	0.0986

season:	Sep - Dec					
regions:	South			North		
gears:	hooks	gillnets	trawl	hooks	gillnets	trawl
year:						
1989	0.0053	0.0000	0.0272	0.0050	0.0000	0.0259
1990	0.0117	0.0029	0.0227	0.0000	0.0000	0.0395
1991	0.0116	0.0029	0.0174	0.0068	0.0000	0.0770
1992	0.0130	0.0061	0.0134	0.0055	0.0000	0.0366

Table 3.3.19

Cod in the Iceland Grounds (Fishing Area Va)

Yield per recruit: Input data

Age	Recruitment	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
3	1.000	0.2000	0.0200	0.0850	0.2500	1.054	0.0600	1.255
4	.	0.2000	0.0680	0.1800	0.2500	1.620	0.3300	1.783
5	.	0.2000	0.2490	0.2480	0.2500	2.529	0.6100	2.579
6	.	0.2000	0.5130	0.2960	0.2500	3.698	0.8600	3.623
7	.	0.2000	0.7690	0.3820	0.2500	5.075	1.0500	4.898
8	.	0.2000	0.9010	0.4370	0.2500	6.450	1.1600	6.302
9	.	0.2000	0.9520	0.4770	0.2500	7.785	1.1600	7.685
10	.	0.2000	0.9940	0.4770	0.2500	9.343	1.1600	9.346
11	.	0.2000	0.9830	0.4770	0.2500	11.132	1.1600	10.923
12	.	0.2000	0.9930	0.4770	0.2500	12.629	1.1600	12.767
13	.	0.2000	0.9930	0.4770	0.2500	14.457	1.1600	14.520
14	.	0.2000	1.0000	0.4770	0.2500	16.839	1.1600	17.235
Unit	Numbers	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : YIELD_94_1
Date and time: 07MAY94:09:59

Table 3.3.20

Cod in the Iceland Grounds (Fishing Area Va)

Yield per recruit: Summary table

F Factor	Reference F	Catch in numbers	Catch in weight	Stock size	Stock biomass	1 January		Spawning time	
						Sp.stock size	Sp.stock biomass	Sp.stock size	Sp.stock biomass
0.0000	0.0000	0.000	0.000	5.016	23564.436	2.341	18079.310	2.227	17197.572
0.0500	0.0500	0.131	806.611	4.574	19254.448	1.942	13968.187	1.809	12963.852
0.1000	0.1000	0.225	1267.207	4.232	16114.368	1.641	11005.116	1.498	9977.533
0.1500	0.1500	0.293	1526.056	3.962	13786.512	1.409	8836.199	1.263	7836.295
0.2000	0.2000	0.345	1667.327	3.746	12029.633	1.227	7223.118	1.083	6274.850
0.2500	0.2500	0.386	1740.192	3.568	10679.493	1.082	6003.938	0.941	5116.543
0.3000	0.3000	0.419	1773.415	3.421	9623.161	0.965	5067.558	0.828	4242.492
0.3500	0.3500	0.446	1783.841	3.296	8782.149	0.869	4336.968	0.736	3571.790
0.4000	0.4000	0.468	1781.344	3.189	8101.288	0.790	3758.204	0.661	3048.722
0.4500	0.4500	0.488	1771.709	3.096	7541.336	0.723	3293.019	0.599	2634.440
0.5000	0.5000	0.505	1758.322	3.014	7074.032	0.666	2913.987	0.547	2301.511
0.5500	0.5500	0.520	1743.159	2.942	6678.767	0.617	2601.201	0.502	2030.307
0.6000	0.6000	0.533	1727.361	2.877	6340.315	0.574	2340.030	0.464	1806.597
0.6500	0.6500	0.545	1711.580	2.818	6047.281	0.537	2119.594	0.430	1619.927
0.7000	0.7000	0.556	1696.177	2.765	5791.025	0.504	1931.698	0.401	1462.517
0.7500	0.7500	0.566	1681.342	2.717	5564.914	0.475	1770.094	0.375	1328.499
0.8000	0.8000	0.575	1667.167	2.672	5363.794	0.449	1629.966	0.353	1213.398
0.8500	0.8500	0.584	1653.681	2.631	5183.609	0.425	1507.556	0.332	1113.753
0.9000	0.9000	0.592	1640.884	2.593	5021.131	0.404	1399.901	0.314	1026.863
0.9500	0.9500	0.599	1628.754	2.557	4873.766	0.385	1304.640	0.298	950.594
1.0000	1.0000	0.606	1617.262	2.524	4739.405	0.368	1219.873	0.283	883.242
1.0500	1.0500	0.613	1606.371	2.492	4616.318	0.352	1144.059	0.269	823.437
1.1000	1.1000	0.619	1596.046	2.463	4503.072	0.337	1075.932	0.257	770.062
1.1500	1.1500	0.625	1586.250	2.435	4398.471	0.323	1014.450	0.246	722.204
1.2000	1.2000	0.630	1576.948	2.409	4301.509	0.311	958.744	0.236	679.107
1.2500	1.2500	0.635	1568.108	2.384	4211.332	0.300	908.085	0.226	640.144
-	-	Numbers	Grams	Numbers	Grams	Numbers	Grams	Numbers	Grams

Notes: Run name : YIELD_94_1
Date and time : 07MAY94:09:59
Computation of ref. F: Simple mean, age 5 - 10
F-0.1 factor : 0.1970
F-max factor : 0.3616
F-0.1 reference F : 0.1970
F-max reference F : 0.3616
Recruitment : Single recruit

Table 3.3.21 *Input data to start medium-term prediction.*

M	Prop. mature in 1994	Catch weight at age in 1994	Stock weight at age in 1994	Sel.	Prop. F before spawn.	Prop. M before spawn.	Stock in 1994	
3	0.2	0.08	1.32	0.96	0.06	0.09	0.25	60.0
4	0.2	0.25	1.91	1.52	0.33	0.18	0.25	112.2
5	0.2	0.47	2.66	2.46	0.61	0.25	0.25	68.9
6	0.2	0.71	3.77	3.71	0.86	0.30	0.25	25.5
7	0.2	0.94	5.01	4.97	1.05	0.38	0.25	9.7
8	0.2	0.98	6.39	6.41	1.16	0.44	0.25	1.8
9	0.2	0.97	7.60	7.72	1.16	0.48	0.25	1.3
10	0.2	0.97	9.29	9.50	1.16	0.48	0.25	2.0
11	0.2	1.00	11.08	11.53	1.16	0.48	0.25	0.9
12	0.2	1.00	13.71	13.82	1.16	0.48	0.25	0.1
13	0.2	1.00	15.09	14.84	1.16	0.48	0.25	0.0
14	0.2	1.00	16.41	16.78	1.16	0.48	0.25	0.0

Table 3.3.22

Cod in the Iceland Grounds (Fishing Area Va)

Prediction with management option table: Input data

Year: 1994								
Age	Stock size	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
3	60.000	0.2000	0.0780	0.0850	0.2500	0.962	0.1230	1.320
4	112.216	0.2000	0.2460	0.1800	0.2500	1.516	0.3020	1.906
5	68.886	0.2000	0.4700	0.2480	0.2500	2.458	0.4280	2.656
6	25.502	0.2000	0.7140	0.2960	0.2500	3.713	0.7980	3.771
7	9.693	0.2000	0.9390	0.3820	0.2500	4.973	1.0100	5.013
8	1.823	0.2000	0.9840	0.4370	0.2500	6.413	1.0760	6.386
9	1.279	0.2000	0.9730	0.4770	0.2500	7.721	0.7860	7.603
10	2.020	0.2000	0.9680	0.4770	0.2500	9.500	0.8020	9.291
11	0.855	0.2000	1.0000	0.4770	0.2500	11.528	0.8700	11.082
12	0.116	0.2000	1.0000	0.4770	0.2500	13.817	0.8300	13.710
13	0.023	0.2000	1.0000	0.4770	0.2500	14.837	0.8210	15.090
14	0.008	0.2000	1.0000	0.4770	0.2500	16.777	0.8220	16.408
Unit	Millions	-	-	-	-	Kilograms	-	Kilograms

Year: 1995								
Age	Recruitment	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
3	130.000	0.2000	0.0590	0.0850	0.2500	0.962	0.1230	1.320
4	.	0.2000	0.1870	0.1800	0.2500	1.516	0.3020	1.822
5	.	0.2000	0.3960	0.2480	0.2500	2.347	0.4280	2.574
6	.	0.2000	0.6470	0.2960	0.2500	3.541	0.7980	3.596
7	.	0.2000	0.8820	0.3820	0.2500	4.885	1.0100	4.896
8	.	0.2000	0.9560	0.4370	0.2500	6.378	1.0760	6.300
9	.	0.2000	0.9660	0.4770	0.2500	7.721	0.7860	7.603
10	.	0.2000	0.9770	0.4770	0.2500	9.500	0.8020	9.291
11	.	0.2000	0.9940	0.4770	0.2500	11.528	0.8700	11.082
12	.	0.2000	0.9980	0.4770	0.2500	13.817	0.8300	13.710
13	.	0.2000	0.9980	0.4770	0.2500	14.837	0.8210	15.090
14	.	0.2000	1.0000	0.4770	0.2500	16.777	0.8220	16.408
Unit	Millions	-	-	-	-	Kilograms	-	Kilograms

Year: 1996								
Age	Recruitment	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
3	180.000	0.2000	0.0390	0.0850	0.2500	0.962	0.1230	1.320
4	.	0.2000	0.1270	0.1800	0.2500	1.516	0.3020	1.822
5	.	0.2000	0.3230	0.2480	0.2500	2.347	0.4280	2.553
6	.	0.2000	0.5800	0.2960	0.2500	3.462	0.7980	3.551
7	.	0.2000	0.8260	0.3820	0.2500	4.786	1.0100	4.753
8	.	0.2000	0.9290	0.4370	0.2500	6.309	1.0760	6.227
9	.	0.2000	0.9590	0.4770	0.2500	7.721	0.7860	7.603
10	.	0.2000	0.9850	0.4770	0.2500	9.500	0.8020	9.291
11	.	0.2000	0.9890	0.4770	0.2500	11.528	0.8700	11.082
12	.	0.2000	0.9950	0.4770	0.2500	13.817	0.8300	13.710
13	.	0.2000	0.9950	0.4770	0.2500	14.837	0.8210	15.090
14	.	0.2000	1.0000	0.4770	0.2500	16.777	0.8220	16.408
Unit	Millions	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : PRED 94_1
Date and time: 08MAY94:17:51

Table 3.3.23

Cod in the Iceland Grounds (Fishing Area Va)

Prediction with management option table

Year: 1994					Year: 1995					Year: 1996	
F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	Stock biomass	Sp.stock biomass
0.8168	0.6671	592744	231403	190000	0.0000	0.0000	602574	257847	0	881930	379732
.	0.0500	0.0408	.	254666	15014	864339	361997
.	0.1000	0.0817	.	251535	29540	847341	345232
.	0.1500	0.1225	.	248454	43597	830912	329379
.	0.2000	0.1633	.	245421	57202	815030	314385
.	0.2500	0.2042	.	242436	70373	799674	300199
.	0.3000	0.2450	.	239498	83127	784823	286775
.	0.3500	0.2858	.	236605	95478	770458	274067
.	0.4000	0.3267	.	233758	107444	756560	262034
.	0.4500	0.3675	.	230955	119037	743112	250637
.	0.5000	0.4083	.	228195	130272	730096	239839
.	0.5500	0.4492	.	225479	141162	717496	229607
.	0.6000	0.4900	.	222804	151721	705296	219906
.	0.6500	0.5308	.	220170	161961	693481	210708
.	0.7000	0.5717	.	217577	171892	682037	201983
.	0.7500	0.6125	.	215024	181527	670949	193704
.	0.8000	0.6533	.	212510	190877	660205	185847
.	0.8500	0.6942	.	210035	199952	649791	178387
.	0.9000	0.7350	.	207597	208762	639696	171302
.	0.9500	0.7758	.	205196	217316	629907	164571
.	1.0000	0.8167	.	202832	225625	620414	158175
.	1.0500	0.8575	.	200504	233695	611205	152095
.	1.1000	0.8983	.	198211	241537	602271	146313
.	1.1500	0.9392	.	195952	249158	593601	140813
.	1.2000	0.9800	.	193728	256566	585186	135580
.	1.2500	1.0208	.	191536	263769	577016	130598
.	1.3000	1.0617	.	189378	270774	569083	125855
.	1.3500	1.1025	.	187252	277587	561379	121337
.	1.4000	1.1433	.	185158	284216	553894	117033
.	1.4500	1.1842	.	183094	290666	546622	112930
.	1.5000	1.2250	.	181062	296944	539555	109019
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : PRED_94_1
 Date and time : 08MAY94:17:51
 Computation of ref. F: Simple mean, age 5 - 10
 Basis for 1994 : TAC constraints

Table 3.3.24 Icelandic cod: XSA - assessment with natural mortality as 0.1 on all ages.

Fishing mortality

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	0.133	0.172	0.087	0.028	0.040	0.043	0.045	0.021	0.037	0.023
4	0.454	0.375	0.331	0.200	0.216	0.243	0.216	0.169	0.268	0.148
5	0.585	0.604	0.446	0.436	0.290	0.256	0.426	0.455	0.469	0.506
6	0.529	0.668	0.707	0.443	0.397	0.345	0.436	0.545	0.616	0.717
7	0.847	0.722	0.701	0.932	0.583	0.566	0.444	0.709	0.659	0.861
8	1.062	0.931	1.048	0.783	0.774	0.587	0.630	0.923	1.165	0.959
9	0.888	1.171	0.909	1.138	0.610	0.596	0.587	0.900	1.306	1.058
10	1.099	1.281	1.424	0.758	0.616	0.405	0.521	1.091	1.028	1.225
11	1.445	1.511	1.529	0.641	0.437	0.606	0.490	1.139	0.555	0.762
12	1.387	1.858	1.137	0.630	0.808	0.247	0.782	1.043	0.477	0.775
13	0.644	0.907	2.717	0.095	0.933	1.161	0.199	1.208	0.483	0.615
14	1.099	1.354	1.553	0.655	0.684	0.605	0.517	1.082	0.773	0.891
F(5-10)	0.835	0.896	0.872	0.748	0.545	0.459	0.507	0.770	0.874	0.888

YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
AGE										
3	0.069	0.065	0.089	0.048	0.057	0.046	0.062	0.114	0.095	0.153
4	0.254	0.338	0.264	0.368	0.216	0.314	0.279	0.367	0.413	0.355
5	0.376	0.444	0.658	0.591	0.584	0.413	0.504	0.594	0.729	0.502
6	0.615	0.644	0.772	0.877	0.945	0.680	0.699	0.851	1.079	0.899
7	0.682	0.763	0.977	1.063	1.069	0.820	0.874	0.990	1.187	1.119
8	1.012	0.824	1.037	1.101	1.535	1.000	0.919	0.858	0.967	1.190
9	0.842	0.909	0.908	1.086	1.262	0.925	0.926	0.877	0.642	0.884
10	0.730	0.865	0.874	0.790	1.122	0.632	0.954	1.116	0.583	0.879
11	0.741	0.699	0.821	0.664	1.155	0.773	0.714	1.153	0.561	0.947
12	0.652	0.745	0.757	0.712	1.039	1.131	0.923	0.954	0.950	0.954
13	0.779	0.758	0.508	0.819	2.537	0.670	0.518	0.460	0.410	0.923
14	0.752	0.799	0.777	0.818	1.432	0.830	0.810	0.917	0.634	0.932
F(5-10)	0.709	0.742	0.871	0.918	1.086	0.745	0.813	0.881	0.864	0.912

Stock in number ('000)

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	125185	194998	298227	100057	159578	178498	103957	104953	95688	167200
4	178064	99150	148569	247419	88049	138685	154676	89928	92951	83458
5	51782	102308	61664	96582	183295	64177	98447	112818	68722	64308
6	36901	26094	50587	35733	56509	124064	44970	58164	64798	38913
7	16512	19680	12113	22568	20764	34365	79495	26309	30515	31664
8	9988	6404	8648	5440	8038	10484	17654	46161	11715	14283
9	2941	3125	2284	2743	2250	3355	5276	8510	16603	3308
10	3988	1095	877	833	795	1106	1674	2655	3130	4068
11	2428	1202	275	191	353	389	668	900	807	1013
12	468	518	240	54	91	206	192	370	261	419
13	137	106	73	70	26	37	146	79	118	146
14	44	65	39	4	57	9	10	108	21	66
TOTAL	428440	454745	583596	511694	519806	555376	507164	450954	385330	408847

Continued....

Table 3.3.24 Cont'd

YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AGE											
3	106586	108654	256156	247223	127730	61470	101096	83600	141344	151676	0
4	147908	90022	92173	212144	213231	109189	53142	85973	67508	116272	117751
5	65138	103819	58101	64063	132856	155534	72180	36373	53886	40434	73757
6	35069	40466	60273	27227	32101	67044	93115	39458	18176	23527	22139
7	17190	17153	19239	25202	10247	11293	30743	41892	15238	5590	8661
8	12116	7866	7235	6552	7875	3185	4501	11612	14089	4206	1652
9	4951	3985	3121	2322	1972	1535	1060	1626	4453	4849	1158
10	1039	1931	1452	1140	709	505	551	380	612	2121	1814
11	1081	453	736	548	468	209	243	192	113	309	797
12	428	467	204	293	255	134	87	108	55	58	109
13	175	202	201	87	130	82	39	31	38	19	20
14	72	73	86	109	35	9	38	21	18	23	7
TOTAL	391753	375091	498976	586910	527609	410189	356796	301264	315528	349085	227863

	RECRUITS Age 3	TOTALBIO	TOTSPBIO	LANDINGS	F(5-10)
1974	125185	1023608	285088	374987	0.8352
1975	194998	1033473	291677	370991	0.8962
1976	298227	1140379	242255	348363	0.8723
1977	100057	1136977	270359	340053	0.7483
1978	159578	1274633	336491	328220	0.5452
1979	178498	1408210	472855	368013	0.4589
1980	103957	1472855	551148	435044	0.5072
1981	104953	1157291	343015	469101	0.7703
1982	95688	939977	232585	388387	0.8738
1983	167200	807585	185458	299813	0.8877
1984	106586	813062	190311	283822	0.7093
1985	108655	845849	234608	325267	0.7415
1986	256156	1028322	238332	368633	0.8709
1987	247223	1206027	225796	392257	0.918
1988	127730	1076542	169515	378076	1.0861
1989	61470	961723	252213	356309	0.7448
1990	101096	798261	306809	335390	0.8125
1991	83600	700326	210747	307759	0.8811
1992	141344	577659	223612	264881	0.8643
1993	151676	639828	207520	250589	0.9123
Arith. Mean Units	147152 (Thousands)	1028228 (Tonnes)	301046 (Tonnes)	357279 (Tonnes)	0.7917

Table 3.3.25

Icelandic cod: XSA - assessment with natural mortality as 0.2 on all ages.

Fishing mortality

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	0.101	0.130	0.062	0.020	0.030	0.033	0.034	0.016	0.027	0.017
4	0.382	0.299	0.262	0.153	0.168	0.195	0.175	0.137	0.220	0.119
5	0.496	0.520	0.362	0.354	0.233	0.210	0.356	0.387	0.399	0.432
6	0.458	0.569	0.617	0.367	0.331	0.289	0.376	0.468	0.540	0.622
7	0.744	0.641	0.597	0.811	0.493	0.486	0.389	0.632	0.580	0.767
8	0.967	0.810	0.939	0.658	0.660	0.502	0.552	0.837	1.049	0.852
9	0.807	1.069	0.766	0.999	0.505	0.506	0.512	0.799	1.190	0.933
10	1.003	1.176	1.277	0.610	0.529	0.338	0.451	0.954	0.904	1.087
11	1.355	1.356	1.373	0.561	0.343	0.530	0.424	0.986	0.478	0.659
12	1.268	1.761	0.948	0.547	0.719	0.199	0.699	0.909	0.403	0.677
13	0.581	0.822	2.523	0.078	0.812	1.028	0.170	1.084	0.417	0.532
14	1.014	1.252	1.395	0.564	0.586	0.524	0.455	0.957	0.685	0.786
F(5-10)	0.746	0.798	0.760	0.633	0.459	0.388	0.439	0.680	0.777	0.782
YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
AGE										
3	0.055	0.050	0.069	0.036	0.044	0.036	0.049	0.090	0.075	0.121
4	0.210	0.287	0.221	0.307	0.175	0.263	0.236	0.313	0.347	0.299
5	0.321	0.385	0.580	0.517	0.502	0.354	0.441	0.527	0.642	0.437
6	0.537	0.570	0.694	0.787	0.838	0.594	0.619	0.768	0.978	0.800
7	0.597	0.681	0.882	0.975	0.962	0.725	0.769	0.887	1.082	1.011
8	0.902	0.730	0.937	0.994	1.406	0.894	0.813	0.752	0.863	1.073
9	0.745	0.803	0.807	0.978	1.117	0.830	0.824	0.771	0.565	0.789
10	0.634	0.768	0.766	0.707	0.996	0.545	0.861	0.976	0.517	0.788
11	0.640	0.612	0.735	0.583	1.040	0.674	0.623	1.043	0.482	0.867
12	0.566	0.643	0.673	0.655	0.916	0.994	0.796	0.831	0.855	0.819
13	0.684	0.667	0.445	0.741	2.370	0.585	0.451	0.396	0.359	0.838
14	0.660	0.705	0.692	0.740	1.304	0.733	0.716	0.812	0.565	0.845
F(5-10)	0.623	0.656	0.778	0.826	0.970	0.657	0.721	0.780	0.775	0.816

Stock in number ('000)

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	170648	265467	432275	144743	223761	248008	145467	144738	135063	228965
4	215305	126282	190834	332582	116141	177772	196550	115164	116585	107607
5	61732	120334	76708	120238	233696	80351	119826	135106	82257	76620
6	43388	30795	58584	43718	69067	151584	53324	68698	75151	45212
7	18895	22481	14275	25891	24789	40598	92941	29978	35210	35875
8	11085	7350	9694	6436	9419	12397	20454	51581	13043	16149
9	3288	3452	2678	3103	2728	3985	6145	9646	18294	3743
10	4416	1202	970	1019	936	1349	1967	3015	3551	4557
11	2629	1326	303	221	453	451	787	1026	951	1177
12	514	555	280	63	104	263	218	422	313	483
13	155	118	78	89	30	41	177	89	139	171
14	49	71	43	5	67	11	12	122	25	75
TOTAL	532103	579433	786721	678109	681190	716811	637867	559585	480581	520635

Continued....

Table 3.3.25 Cont'd

YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AGE											
3	140466	145670	340261	342186	170812	81871	132605	109517	186394	199321	0
4	184245	108896	113422	259905	270203	133775	64673	103334	81925	141552	144649
5	78230	122297	66941	74467	156574	185643	84206	41809	61863	47432	85977
6	40739	46477	68104	30698	36364	77616	106696	44349	20213	26649	25092
7	19875	19487	21524	27854	11446	12885	35085	47060	16843	6222	9807
8	13644	8959	8073	7295	8604	3581	5112	13310	15874	4676	1854
9	5638	4533	3534	2591	2210	1727	1199	1857	5139	5483	1309
10	1206	2191	1663	1291	797	592	616	431	703	2392	2040
11	1258	524	832	633	521	241	281	213	133	343	891
12	499	543	233	327	289	151	101	123	62	67	118
13	201	232	234	97	139	95	46	37	44	21	24
14	82	83	97	123	38	11	43	24	20	25	8
TOTAL	486083	459892	624918	747467	657999	498188	430664	362064	389213	434184	271769

	RECRUITS Age 3	TOTALBIO	TOTSPBIO	LANDINGS	F(5-10)
1974	170648	1227787	331058	374987	0.7456
1975	265467	1260067	341800	370991	0.7975
1976	432275	1468495	291427	348363	0.7597
1977	144743	1455829	328599	340053	0.6333
1978	223761	1622574	414012	328220	0.4585
1979	248008	1761406	570305	368013	0.3884
1980	145467	1794624	647633	435044	0.4393
1981	144738	1377337	394867	469101	0.6795
1982	135063	1123044	269919	388387	0.7767
1983	228965	980611	216578	299813	0.7821
1984	140466	981495	222538	283822	0.6226
1985	145670	1008869	271632	325267	0.6563
1986	340261	1240517	271883	368633	0.7775
1987	342186	1481695	258293	392257	0.8263
1988	170812	1309205	196856	378076	0.97
1989	81871	1147009	294100	356309	0.6568
1990	132605	935332	353501	335390	0.7211
1991	109517	820300	241472	307759	0.7801
1992	186394	683999	257417	264881	0.7745
1993	199321	771525	241905	250589	0.8161
Arith. Mean Units	200289 (Thousands)	1249413 (Tonnes)	352345 (Tonnes)	357279 (Tonnes)	0.6994

Table 3.2.26
Icelandic cod: XSA - assessment with natural mortality as 0.3 on all ages.

Fishing mortality

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	0.073	0.094	0.043	0.014	0.022	0.024	0.024	0.012	0.020	0.013
4	0.313	0.228	0.200	0.113	0.128	0.152	0.139	0.108	0.176	0.094
5	0.406	0.437	0.285	0.280	0.183	0.169	0.291	0.323	0.332	0.361
6	0.389	0.469	0.525	0.296	0.270	0.238	0.319	0.395	0.465	0.529
7	0.636	0.560	0.491	0.687	0.406	0.408	0.337	0.556	0.501	0.672
8	0.871	0.679	0.827	0.535	0.548	0.420	0.475	0.750	0.929	0.746
9	0.725	0.964	0.619	0.858	0.405	0.419	0.438	0.697	1.068	0.807
10	0.901	1.067	1.127	0.470	0.446	0.276	0.382	0.816	0.779	0.946
11	1.266	1.188	1.210	0.482	0.260	0.456	0.358	0.833	0.403	0.559
12	1.146	1.662	0.766	0.465	0.628	0.157	0.616	0.775	0.333	0.581
13	0.519	0.735	2.310	0.062	0.692	0.892	0.143	0.956	0.354	0.452
14	0.927	1.144	1.230	0.473	0.492	0.445	0.392	0.829	0.596	0.679
F(5-10)	0.655	0.696	0.645	0.521	0.376	0.322	0.373	0.589	0.679	0.677
YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
AGE										
3	0.042	0.038	0.053	0.027	0.034	0.028	0.039	0.070	0.058	0.093
4	0.171	0.239	0.181	0.250	0.140	0.217	0.197	0.262	0.286	0.247
5	0.269	0.331	0.503	0.444	0.422	0.298	0.381	0.462	0.557	0.375
6	0.463	0.498	0.618	0.696	0.730	0.510	0.540	0.685	0.875	0.700
7	0.514	0.600	0.785	0.886	0.853	0.630	0.665	0.784	0.973	0.898
8	0.790	0.637	0.835	0.884	1.274	0.784	0.708	0.647	0.761	0.951
9	0.650	0.695	0.707	0.867	0.969	0.736	0.716	0.669	0.490	0.696
10	0.541	0.675	0.658	0.624	0.866	0.461	0.769	0.829	0.456	0.696
11	0.542	0.528	0.653	0.503	0.921	0.575	0.535	0.932	0.400	0.790
12	0.483	0.545	0.590	0.599	0.792	0.858	0.673	0.712	0.759	0.676
13	0.590	0.577	0.385	0.663	2.191	0.501	0.385	0.336	0.311	0.748
14	0.569	0.613	0.607	0.660	1.169	0.635	0.621	0.708	0.497	0.761
F(5-10)	0.538	0.573	0.684	0.733	0.852	0.570	0.630	0.679	0.685	0.719

Stock in number ('000)

YEAR	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AGE										
3	243810	378195	651324	215955	323870	354088	209430	204812	195158	319699
4	267551	167840	254954	462219	157734	234765	256130	151407	149905	141749
5	75962	144992	98958	154627	305703	102834	149451	165190	100720	93139
6	51953	37490	69423	55156	86608	188659	64327	82743	88640	53561
7	22168	26082	17369	30433	30392	48990	110116	34642	41289	41264
8	12421	8698	11035	7872	11341	15002	24131	58260	14724	18527
9	3711	3852	3267	3576	3414	4857	7304	11122	20390	4309
10	4950	1332	1088	1304	1123	1688	2365	3494	4105	5192
11	2856	1489	339	261	604	533	949	1196	1145	1395
12	569	596	336	75	120	345	250	491	385	567
13	178	134	84	116	35	47	218	100	168	205
14	54	78	48	6	81	13	14	140	28	87
TOTAL	686181	770780	1108225	931601	921025	951819	824687	713597	616657	679694

Continued

Table 3.2.26 Cont'd

YEAR	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AGE											
3	189007	199872	464916	485453	233187	111057	177645	146877	251517	268777	0
4	233780	134210	142511	326652	350163	166971	80031	126623	101447	175813	181489
5	95620	146030	78293	88077	188514	225562	99610	48690	72174	56469	101798
6	48080	54122	77720	35068	41844	91545	124014	50400	22737	30639	28768
7	23374	22427	24372	31033	12959	14936	40745	53541	18820	7021	11273
8	15608	10359	9117	8232	9481	4093	5892	15521	18114	5272	2120
9	6512	5249	4059	2932	2519	1965	1384	2150	6020	6272	1509
10	1425	2517	1940	1482	913	708	698	501	816	2733	2317
11	1494	615	950	744	589	284	331	240	162	383	1009
12	591	644	269	366	334	174	119	144	70	80	129
13	235	270	276	110	149	112	55	45	52	24	30
14	96	96	112	139	42	12	50	27	24	28	9
TOTAL	615821	576412	804535	980289	840693	617419	530572	444759	491953	553513	330451

	RECRUITS Age 3	TOTALBIO	TOTSPBIO	LANDINGS	F(5-10)
1974	243810	1518857	392477	374987	0.6546
1975	378195	1593692	410836	370991	0.6961
1976	651324	1975070	362039	348363	0.6454
1977	215955	1932583	411512	340053	0.521
1978	323870	2127921	522768	328220	0.3762
1979	354088	2260802	701172	368013	0.3217
1980	209430	2239532	773478	435044	0.3734
1981	204812	1677677	461508	469101	0.5893
1982	195158	1375186	318757	388387	0.6788
1983	319699	1219939	257444	299813	0.6768
1984	189007	1208966	264485	283822	0.5377
1985	199872	1226975	319023	325267	0.5726
1986	464917	1533621	314109	368633	0.6844
1987	485453	1871923	300068	392257	0.7334
1988	233187	1630707	232834	378076	0.8522
1989	111057	1394890	348973	356309	0.5698
1990	177645	1115750	413451	335390	0.6298
1991	146877	979376	280494	307759	0.6793
1992	251517	827505	300914	264881	0.6851
1993	268777	951727	286793	250589	0.7192
Arith. Mean Units	281064 (Thousands)	1559701 (Tonnes)	420118 (Tonnes)	357279 (Tonnes)	0.6078

Table 4.1.1 Abundance indices of 0-group cod from the International and Icelandic 0-group Survey in the East Greenland/Iceland area, 1971-1992 (except 1972).

Year Class	Dohrn Bank East Greenland	SE Iceland	SW Iceland	W Iceland	N Iceland	E Iceland	Total
1971	+	-	-	60	214	-	283
1973	135	10	107	96	757	86	1,191
1974	2	-	-	22	30	+	54
1975	+	-	2	50	73	5	130
1976	5	9	30	102	2,015	584	2,743
1977	7	2	+	26	305	94	435
1978	2	-	+	169	335	47	552
1979	2	+	1	22	345	+	370
1980	1	2	+	38	507	10	557
1981	19	-	-	41	19	-	78
1982	+	-	+	7	4	-	11
1983	+	-	+	85	66	2	153
1984	372	5	+	200	826	369	1,772
1985	32	+	+	581	197	2	812
1986	+	1	2	15	32	+	50
1987	7	-	1	2	61	10	81
1988	0	-	1	7	12	+	20
1989	1	-	3	7	30	+	41
1990	3	-	+	2	30	2	37
1991	+	-	-	+	5	+	6
1992	0	-	+	15	21	5	42
1993	1	-	+	36	116	2	155

Table 5.1.1 Specification of the strata.

stratum	geographic boundaries				depth (m)	area (nm ²)
	south	north	east	w		
1.1	64°15'N	67°00'N	50°00'W	57°00'W	1-200	6,805
1.2	64°15'N	67°00'N	50°00'W	57°00'W	201-400	1,881
2.1	62°30'N	64°15'N	50°00'W	55°00'W	1-200	2,350
2.2	62°30'N	64°15'N	50°00'W	55°00'W	201-400	1,018
3.1	60°45'N	62°30'N	48°00'W	53°00'W	1-200	1,938
3.2	60°45'N	62°30'N	48°00'W	53°00'W	201-400	742
4.1	59°00'N	60°45'N	44°00'W	50°00'W	1-200	2,568
4.2	59°00'N	60°45'N	44°00'W	50°00'W	201-400	971
5.1	59°00'N	63°00'N	40°00'W	44°00'W	1-200	2,468
5.2	59°00'N	63°00'N	40°00'W	44°00'W	201-400	3,126
6.1	63°00'N	66°00'N	35°00'W	41°00'W	1-200	1,120
6.2	63°00'N	66°00'N	35°00'W	41°00'W	201-400	7,795
7.1	64°45'N	66°00'N	29°00'W	35°00'W	1-200	92
7.2	64°45'N	66°00'N	29°00'W	35°00'W	201-400	4,589
Summe						37,463

Table 5.1.2 Trawl parameters of the survey.

Gear	140-foot bottom trawl
Horizontal net opening	22 m
Standard trawling speed	4.5 kn
Towing time	30 minutes
Coefficient of catchability	1.0

Table 5.1.3 Numbers of valid hauls by stratum and total, 1982-93.

STRATA: YEAR	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7.1	7.2	SUM
1982	20	11	16	7	9	6	13	2	1	10	3	12	1	25	136
1983	26	11	25	11	17	5	18	4	3	19	10	36	0	18	203
1984	25	13	26	8	18	6	21	4	5	4	2	8	0	5	145
1985	10	8	26	10	17	5	21	4	5	21	14	50	0	28	219
1986	27	9	21	9	16	7	18	3	3	15	14	37	1	34	214
1987	25	11	21	4	18	3	21	3	19	16	13	40	0	18	212
1988	34	21	28	5	18	5	18	2	21	8	13	39	0	26	238
1989	26	14	30	9	8	3	25	3	17	18	12	29	0	11	205
1990	19	7	23	8	16	3	21	6	18	19	6	15	0	13	174
1991	19	11	23	7	12	6	14	5	8	11	10	28	0	16	170
1992	6	6	6	5	6	6	7	5	0	0	0	0	0	6	53
1993	9	6	9	6	10	8	7	0	9	6	6	18	0	14	108

Table 5.1.4 Abundance indices (n*1,000) for West, East Greenland and total by stratum, 1982-93. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance. () incorrect due to incomplete sampling.

Year	Strata: 1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	West Greenland
1982	5,092.1	729.4	47,956.6	1,888.1	15,114.0	3,706.1	17,789.5		92,275.8
1983	430.9	467.0	16,012.6	5,169.5	14,881.3	2,326.4	10,915.7		50,203.4
1984	376.8	178.6	4,714.0	171.4	5,200.5	689.4	5,353.0		16,683.7
1985	19,629.9	2,428.0	13,222.3	4,395.3	10,530.8	1,637.9	7,498.8		59,343.0
1986	32,438.3	1,235.5	50,907.6	228.5	37,446.2	1,320.6	22,103.6		145,680.3
1987	330,943.5	1,650.6	248,002.1		154,681.0		51,114.3		786,391.5
1988	92,024.1	2,422.9	338,740.0	84,935.3	47,336.0	88.8	60,946.4		626,493.5
1989	2,497.1	919.9	27,930.3	672.9	261,502.3		65,203.4		358,725.9
1990	964.8	512.7	4,155.3	361.8	6,013.7		10,303.4	12,212.6	34,524.3
1991	268.0	204.7	179.7	152.4	1,027.2	610.7	1,839.2	523.1	4,805.0
1992	551.6	621.7	117.2	137.1	120.8	74.0	151.0	268.8	2,042.2
1993	565.8	457.4	175.8	127.0	79.8	31.2	0.0		1,437.0

Tab. 5.1.4 cont'd

Year	Strata: 5.1	5.2	6.1	6.2	7.1	7.2	East Greenland	Greenland	CI
1982		467.8		6,173.1		1,449.1	8,090.0	100,365.8	28.2
1983		2,228.3	1,273.9	2,276.4		2,212.9	7,991.5	58,194.9	25.2
1984	4,062.9			1,749.9		789.8	6,602.6	23,286.3	31.6
1985	3,564.3	373.1	3,977.9	3,348.1		1,140.5	12,403.9	71,746.9	32.5
1986		779.7	6,950.1	6,676.3		828.2	15,234.3	160,914.6	31.7
1987	18,317.0	9,831.7	6,527.3	6,080.8		877.5	41,634.3	828,025.8	58.9
1988	7,985.0	8,084.6	2,059.7	4,374.6		1,083.0	23,586.9	650,080.4	47.7
1989	30,906.1	38,407.2	11,600.4	9,382.9		1,436.0	91,732.6	450,458.5	58.9
1990	4,955.5	2,523.8	4,532.6	9,040.9		4,199.9	25,252.7	59,777.0	42.9
1991	2,343.1	1,786.2	779.4	1,958.2		3,541.2	10,408.1	15,213.1	28.5
1992						658.2	(658.2)	(2,700.4)	49.9
1993	1,251.7	97.5	921.9	502.3		527.3	3,300.7	4,737.7	36.0

Table 5.1.5 Biomass indices (tonnes) for West, East Greenland and total by stratum, 1982-93. Confidence intervals (CI) are given in per cent of the stratified mean at 95% level of significance. () incorrect due to incomplete sampling.

Year	Strata: 1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	West Greenland
1982	2,378.0	306.8	63,683.9	2,631.9	20,318.5	8,744.8	30,425.8		128,489.7
1983	353.4	205.4	20,215.0	7,827.3	22,806.1	9,594.3	21,373.6		82,375.1
1984	824.1	233.9	7,508.0	233.8	7,218.0	1,054.7	8,492.6		25,565.1
1985	2,528.2	250.7	12,869.4	2,351.0	10,730.5	989.7	5,952.1		35,671.6
1986	10,640.6	484.0	26,098.1	79.6	28,509.5	1,423.0	19,482.5		86,717.3
1987	283,591.2	544.9	200,632.4		116,610.0		37,210.2		638,588.7
1988	94,174.7	1,367.0	333,848.3	77,966.8	44,592.8	93.3	55,945.0		607,987.9
1989	727.4	227.5	25,829.2	440.5	231,239.0		75,386.3		333,849.9
1990	224.3	113.5	3,552.3	190.3	5,778.4		13,185.4	11,387.8	34,432.0
1991	90.8	71.6	72.9	45.4	1,208.3	589.3	2,620.8	451.0	5,150.1
1992	134.5	194.7	23.4	36.0	21.1	14.3	81.3	101.8	607.1
1993	134.7	88.0	49.2	33.3	43.9	10.0	0.0		359.1

Tab. 5.1.5 cont'd

Year	Strata: 5.1	5.2	6.1	6.2	7.1	7.2	East Greenland	Greenland	CI
1982		1,927.4		14,562.7		7,127.3	23,617.4	152,107.1	24.8
1983		6,146.7	3,511.5	11,344.3		13,153.6	34,156.1	116,531.2	25.2
1984	10,397.3			4,109.6		5,236.7	19,743.6	45,308.7	33.7
1985	7,073.1	1,355.6	9,955.2	9,436.7		5,744.1	33,564.7	69,236.3	39.2
1986		2,645.2	18,630.9	16,542.8		3,365.7	41,184.6	127,901.9	26.1
1987	10,315.1	9,053.9	9,291.4	17,616.0		5,315.8	51,592.2	690,180.9	63.1
1988	8,750.1	18,204.3	6,162.4	16,258.0		3,571.9	52,946.7	660,934.6	46.0
1989	40,614.2	127,864.8	34,957.0	31,323.9		4,785.6	239,545.5	573,395.4	45.5
1990	9,229.2	6,812.7	12,953.7	24,407.6		12,560.0	65,963.2	100,395.2	33.7
1991	4,236.0	5,778.9	1,263.2	7,467.1		14,005.5	32,750.7	37,900.8	35.5
1992						1,215.8	(1,215.8)	(1,822.9)	68.7
1993	861.8	60.0	1,742.0	1,075.5		1,860.1	5,599.4	5,958.5	41.2

Table 5.1.6 West Greenland. Age disaggregate abundance indices (n*1,000), 1982-93. *) calculated proportionally using age compositions reported by ICES Working Group on Cod Stocks off East Greenland (Anon. 1984).

AGE	1982	1983*	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
0	0	0	186	890	0	0	434	12	158	0	0	0
1	176	0	5	39,277	10,575	317	254	204	47	245	189	10
2	884	1,469	38	1,531	114,823	45,474	3,290	2,583	1,014	208	1,473	832
3	33,472	2,815	2,094	898	4,374	692,566	101,820	7,618	2,900	435	227	546
4	11,368	26,619	1,541	5,958	1,033	24,230	511,473	170,469	1,272	1,260	48	20
5	32,504	4,960	9,648	2,616	7,837	5,929	5,435	174,532	22,120	160	89	28
6	9,525	10,969	850	7,184	2,250	11,813	616	2,868	6,964	2,102	0	6
7	2,610	1,882	1,983	375	4,167	1,637	1,134	0	47	356	28	0
8	574	992	90	600	107	4,006	662	259	0	6	0	0
9	928	317	201	18	449	0	1,310	40	0	0	0	0
10	91	168	29	19	23	366	34	141	0	0	0	0
11	90	0	0	0	24	30	39	0	5	0	0	0
12	27	0	0	0	0	0	0	5	0	0	0	0
13	0	13	0	0	11	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	7	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
SUM	92,256	50,204	16,665	59,366	145,673	786,368	626,501	358,731	34,527	4,772	2,054	1,442

Table 5.1.7 East Greenland. Age disaggregate abundance indices (n*1,000), 1982-93. *) calculated proportionally using age compositions reported by ICES Working Group on Cod Stocks off East Greenland (Anon. 1984). () incorrect due to incomplete sampling.

AGE	1982	1983*	1984	1985	1986	1987	1988	1989	1990	1991	(1992)	1993
0	0	0	0	232	0	0	12	0	0	0	29	0
1	0	0	18	1,932	1,398	13	25	8	37	101	29	17
2	236	411	73	559	3,346	13,785	160	177	79	374	73	45
3	837	605	1,339	117	1,693	17,789	6,975	494	552	388	69	1,860
4	1,758	1,008	659	2,496	550	3,890	11,092	17,396	463	697	59	370
5	1,993	1,187	1,403	2,035	2,419	1,027	2,011	63,169	5,132	148	54	279
6	1,222	2,125	853	1,853	1,121	1,767	478	2,990	17,998	3,524	47	278
7	377	1,287	1,619	779	2,187	452	1,410	294	265	5,046	143	88
8	130	302	408	1,989	566	1,562	150	4,746	71	82	52	263
9	1,370	265	102	284	1,594	180	653	396	238	37	0	95
10	73	703	36	53	116	1,023	94	1,560	0	12	0	0
11	62	69	95	34	104	35	425	39	278	9	6	0
12	7	32	0	45	13	83	41	415	24	0	19	9
13	0	0	0	0	84	8	19	0	100	0	0	0
14	4	0	0	0	0	5	0	44	0	11	0	0
15	0	0	0	0	0	0	9	0	9	0	0	0
16	4	0	0	0	0	0	7	0	0	0	0	0
SUM	8,073	7,994	6,605	12,408	15,191	41,619	23,561	91,728	25,246	10,429	580	3,304

Table 5.1.8 Greenland (total). Age disaggregate abundance indices (n*1,000), 1982-93. *) calculated proportionally using age compositions reported by ICES Working Group on Cod Stocks off East Greenland (Anon. 1984). () incorrect due to incomplete sampling.

AGE	1982	1983*	1984	1985	1986	1987	1988	1989	1990	1991	(1992)	1993
0	0	0	186	1,122	0	0	446	12	158	0	29	0
1	176	0	23	41,209	11,973	330	279	212	84	346	218	27
2	1,120	1,880	111	2,090	118,169	59,259	3,450	2,760	1,093	582	1,546	877
3	34,309	3,420	3,433	1,015	6,067	710,355	108,795	8,112	3,452	823	296	2,406
4	13,126	27,627	2,200	8,454	1,583	28,120	522,565	187,865	1,735	1,957	107	390
5	34,497	6,147	11,051	4,651	10,256	6,956	7,446	237,701	27,252	308	143	307
6	10,747	13,094	1,703	9,037	3,371	13,580	1,094	5,858	24,962	5,626	47	284
7	2,987	3,169	3,602	1,154	6,354	2,089	2,544	294	312	5,402	171	88
8	704	1,294	498	2,589	673	5,568	812	5,005	71	88	52	263
9	2,298	582	303	302	2,043	180	1,963	436	238	37	0	95
10	164	871	65	72	139	1,389	128	1,701	0	12	0	0
11	152	69	95	34	128	65	464	39	283	9	6	0
12	34	32	0	45	13	83	41	420	24	0	19	9
13	0	13	0	0	95	8	19	0	100	0	0	0
14	4	0	0	0	0	5	0	44	0	11	0	0
15	7	0	0	0	0	0	9	0	9	0	0	0
16	4	0	0	0	0	0	7	0	0	0	0	0
SUM	100,329	58,198	23,270	71,774	160,864	827,987	650,062	450,459	59,773	15,201	2,634	4,746

Table 5.1.9 Greenland (total). Coefficients of total mortality Z for age disaggregate abundance indices, 1982-1993. () incorrect due to incomplete sampling in 1992 and disregarded in calculation of means over years.

AGE	1982 -83	1983 -84	1984 -85	1985 -86	1986 -87	1987 -88	1988 -89	1989 -90	1990 -91	(1991 -92)	(1992 -93)	MEAN
2	-1.11	-0.60	-2.21	-1.06	-1.79	-0.60	-0.85	-0.22	0.28	0.67	-0.44	-0.88
3	0.21	0.44	-0.90	-0.44	-1.53	0.30	-0.54	1.54	0.56	2.04	-0.27	-0.21
4	0.75	0.91	-0.74	-0.19	-1.48	1.32	0.78	1.93	1.72	2.61	-1.05	0.34
5	0.96	1.28	0.20	0.32	-0.28	1.84	0.23	2.25	1.57	1.87	-0.68	0.68
6	1.22	1.29	0.38	0.35	0.47	1.67	1.31	2.93	1.53	3.49	-0.62	0.91
7	0.83	1.85	0.33	0.53	0.13	0.94	-0.67	1.42	1.26	4.64	-0.43	0.58
8	0.19	1.45	0.50	0.23	1.31	1.04	0.62	3.04	0.65		-0.60	0.66
9	0.97	2.19	1.43	0.77	0.38	0.34	0.14		2.98			1.15

Table 5.1.10 Swept area abundance ('000) and biomass (tonnes) by stratum as observed from the Greenland trawl survey, 1993.

Abundance of cod by depth strata and subarea in Greenland offshore areas in Greenland trawl survey 1993.

AREA/DEPTH	0-200 m	201-400 m	401-600 m	TOTAL
1AN	-	-	-	0
1AS	0	0	0	0
1BN	0	0	0	0
1BS	0	0	0	0
1C	0	7555	46431	53986
1D	0	26302	10130	36432
1E	15437	189819	0	205257
1F	0	12801	0	12801
EAST1	0	23964	0	23964
EAST2	0	118666	0	118666
EAST3	0	0	0	0
EAST4	0	0	0	0
TOTAL				451106

Biomass estimates of cod (tons) by depth strata and subareas in Greenland offshore areas from Greenland trawl survey 1993.

AREA/DEPTH	0-200 m	201-400 m	401-600 m	TOTAL
1AN	-	-	-	0
1AS	0	0	0	0
1BN	0	0	0	0
1BS	0	0	0	0
1C	0	2	22	24
1D	0	7	1	8
1E	3	84	0	87
1F	0	4	0	4
EAST1	0	96	0	96
EAST2	0	455	0	455
EAST3	0	0	0	0
EAST4	0	0	0	0
TOTAL				674

Table 5.1.11 CPUE of age 2 cod by area as observed in the Greenland gill net survey in inshore areas off West Greenland, 1985-1993.

Year	Year class	A r e a			Average
		Sisimiut (Div. 1B)	Nuuk (Div. 1D)	Qaqortoq (Div. 1F)	
1985	83	0.00	0.03	0.00	0.01
1986	84	5.37	2.01	2.30	3.24
1987	85	1.24	0.20	1.52	0.99
1988	86	0.38	0.19	0.01	0.20
1989	87	0.98	0.82	0.06	0.62
1990	88	1.11	0.16	0.01	0.42
1991	89	0.03	0.02	0.02	0.02
1992	90	0.43	0.57	0.03	0.34
1993	91	0.22	0.06	0.05	0.11

Table 5.2.1 Nominal catches of NAFO Sub-area 1 cod by fleet ('000 t) for 1982-1993.

Category	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Trawlers	29	42	18	7	1	1	40	73	39	2	0	0
Other	26	16	12	8	4	12	22	39	29	18	6	2
Total	55	58	30	15	5	13	62	112	68	20	6	2
TAC	62	62	68	28.5	12.5	12.5	53	90	110	90 ¹	83 ¹	82 ¹

¹Combined TAC for East and West Greenland.

Table 5.2.2 Nominal catch of COD in NAFO Sub-area 1, 1981-1993 as officially reported to NAFO.

Country	1981	1982	1983	1984	1985	1986
Faroe Islands	-	-	1,339	-	-	-
Germany, Fed. Rep.	417	8,139	10,158	8,941	2,170	41
Greenland	53,039	47,693	44,970	24,457	12,651	6,549
Japan	-	-	-	13	54	11
Norway	-	-	-	5	1	2
United Kingdom	-	-	1,174	-	-	-
Total	53,456	55,832	57,641	33,416	14,876	6,603

Country	1987	1988	1989	1990 ¹	1991 ²	1992 ³	1993
Faroe Islands	-	-	-	-	-	-	-
Germany, Fed. Rep.	55	6,574	12,892	7,515	82	-	-
Greenland	12,283	52,166	92,152	59,043	20,238	5,665	1,924
Japan	33	10	-	-	-	-	-
Norway	1	7	2	57	-	-	-
United Kingdom	-	927	3,780	1,632	-	-	-
Total	12,372	59,684	108,826	68,247	20,320	-	1,924
Working Group estimate ³	-	62,684	111,642	-	-	5,665	1,924

¹Provisional data (NAFO SCS 91/17 (except for Greenland)).

²Reported to Greenland authorities. (NAFO SCS 92/25).

³Only Greenland available.

⁴Includes 3,000 t in 1988 and 2,741 t in 1989 reported to be from ICES Sub-area XIV.

Table 5.2.3 Nominal catch (tonnes) of COD in ICES Sub-area XIV, 1981-1993 as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986
Faroe Islands	292	-	368	-	-	86
Germany, Fed. Rep.	7,367	8,940	8,238	7,035	2,006	4,063
Greenland	890	898	438	1,051	106	606
Iceland	1	-	-	-	-	-
Norway	-	-	-	794	-	-
UK(England & Wales)	-	-	-	-	-	-
UK(Scotland)	-	-	-	-	-	-
Total	8,550	9,838	9,044	8,880	2,112	4,755
Working Group estimate	16,000	27,000	13,377	8,914	2,112	4,755

Country	1987	1988	1989	1990	1991	1992 ¹	1993 ¹
Faroe Islands	-	12	40	-	-	-	-
Germany, Fed. Rep.	5,358	12,049	10,613	26,419	8,434	5,895	164
Greenland	1,476	345	3,715	4,442	6,677	1,283	198
Iceland	1	9	-	-	-	22	-
Norway	-	-	-	17	828 ¹	1,030	597 ¹
UK(England & Wales)	-	-	1,158	2,365	5,832	2,532	163
UK(Scotland)	-	-	135	93	29	463	13
Total	6,835	12,415	15,661	33,336	21,800	11,225	1,135
Working Group estimate	6,658	9,415²	14,504³	33,465⁴	22,219⁴	11,500	

¹Preliminary.

²Excluding 3,000 t assumed to be from NAFO Division 1F.

³Excluding 2,741 t assumed to be from NAFO Division 1F and including 1,500 t reported from other areas assumed to be from Sub-area XIV and including 94 tonnes by Japan.

⁴Includes additional catches by Japan.

⁵Includes additional catches reported to Greenland authorities.

Table 5.3.1 Cod off West Greenland, NAFO Sub-area 1. Catch at age and mean weight-at-age by division, 1993.

Catch at age by div.(000)

Div.	1A	1B	1C	1D	1E	1F
Age						
3	1	1	1	9	0	1
4	9	9	55	405	8	2
5	249	241	81	363	7	12
6	70	68	33	178	3	49
7	4	4	2	9	0	20
8	0	0	1	5	0	11
9	0	0	0	0	0	7
10+	0	0	0	0	0	4
Sum	333	323	173	968	18	109

Mean weight at age (Kg) by Div.

Div.	1A	1B	1C	1D	1E	1F
Age						
3	-	0.6	0.6	0.59	0.35	0.71
4	-	0.77	0.77	0.89	0.53	0.77
5	0.78	1.05	1.05	1.61	0.70	1.54
6	0.82	1.62	1.62	2.07	-	1.70
7	1.28	2.21	2.21	2.36	-	2.12
8	1.91	2.85	2.85	2.66	2.10	3.31
9	2.32	-	-	-	-	3.34
10+	2.55	-	-	-	-	6.39

Table 5.3.2 Cod off West Greenland, NAFO Sub-area 1. Catch at age from 1966 to 1993.

Cod off West Greenland (NAFO Sub Area 1)													
Catch in Numbers (Thousands)													
(CANUM)													
Year	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15
1966	1530	7872	62130	26941	5915	4955	6912	1289	283	130	981	139	247
1967	1727	15091	30457	61848	24562	2700	1996	5237	352	93	166	453	85
1968	3764	7976	36670	29824	34591	10005	1725	833	2348	187	37	42	303
1969	662	12399	8709	27433	14664	12411	4784	513	237	704	41	62	8
1970	49	2768	10342	6465	13985	4365	2810	1280	149	85	201	27	41
1971	272	2519	10172	9283	5237	9158	2077	1841	953	78	51	134	56
1972	51	10039	9786	12020	4081	2550	2660	624	954	709	130	57	122
1973	131	2302	16378	3065	2605	1406	1203	552	165	237	93	37	44
1974	343	1079	2384	6938	1135	1806	800	194	177	152	272	147	11
1975	275	3595	2677	1803	5855	1388	619	291	84	38	9	12	10
1976	10760	4026	2243	1216	302	1594	139	148	53	27	17	14	26
1977	634	46649	6053	1515	618	425	446	168	79	88	22	1	1
1978	287	5494	30039	1004	509	83	41	13	7	7	7	1	1
1979	286	10656	12505	18970	709	400	78	52	55	80	5	5	16
1980	2999	4513	4580	1978	8014	125	60	24	1	16	3	1	2
1981	12	16864	6374	2391	1053	3382	45	65	1	1	0	0	7
1982	1204	1210	17960	2965	2078	807	610	45	88	9	4	1	13
1983	77	12356	2011	17228	1581	995	344	343	3	22	0	2	19
1984	595	2018	10384	688	3656	106	365	97	69	0	3	0	0
1985	456	1266	1303	4915	161	750	42	140	15	8	0	0	14
1986	12	113	706	318	1193	12	332	80	13	35	0	0	0
1987	5705	1636	274	662	424	686	7	30	1	14	0	0	0
1988	839	50214	1070	501	652	524	751	21	85	0	0	0	0
1989	31	8300	74318	570	84	161	253	525	0	72	0	0	0
1990	77	3355	24493	30316	68	0	8	2	41	12	0	0	0
1991	101	5395	4744	7126	689	0	0	0	0	0	0	0	0
1992	40	3763	1694	196	116	13	1	0	0	0	0	0	0
1993	22	615	683	228	17	56	19	6	0	0	0	0	0

Table 5.3.3 Cod off East Greenland, ICES Sub-area XIV. Catch at age from 1965 to 1993.

Cod off East Greenland (Fishing Area XIV)													
Catch in Numbers (Thousands)													
(CANUM)													
Year	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14
1965	0	0	131	35	91	879	661	1484	59	27	139	29	178
1966	0	28	21	470	89	137	1071	359	418	23	3	27	36
1967	0	0	145	302	2346	564	210	1292	492	371	37	17	81
1968	0	0	104	630	502	2505	238	62	144	69	27	5	25
1969	0	0	31	252	849	770	2103	170	38	82	68	24	86
1970	0	0	66	76	500	1539	1060	1715	237	32	63	48	27
1971	0	0	25	171	159	1051	3785	1580	1326	171	19	4	14
1972	0	0	27	85	254	295	1299	3184	818	470	136	26	53
1973	0	4	25	197	126	250	82	710	959	222	72	19	7
1974	0	4	63	22	488	176	185	52	329	259	65	11	2
1975	0	57	57	339	86	783	155	82	21	66	52	16	4
1976	0	257	175	162	590	228	1546	158	116	53	13	30	2
1977	0	0	4635	1205	513	652	208	424	164	77	29	9	1
1978	0	0	427	6808	1828	188	205	111	278	130	93	56	19
1979	0	5	145	1184	4700	2755	797	121	51	18	11	1	1
1980	0	14	78	235	223	2330	695	77	9	2	5	1	6
1981	0	0	5	72	252	378	2898	231	22	9	5	5	3
1982	0	0	0	458	1335	2012	1605	2123	146	18	6	3	0
1983	0	0	104	593	2376	962	321	116	229	10	2	2	0
1984	0	14	107	368	481	1638	320	103	43	61	1	1	0
1985	0	0	34	111	242	105	196	19	12	4	4	0	0
1986	0	68	50	432	287	738	66	122	5	4	0	0	0
1987	32	737	145	59	303	148	651	56	294	12	26	0	0
1988	0	413	3851	173	41	387	50	233	10	117	23	0	0
1989	0	19	1851	6480	151	34	236	56	163	2	41	0	0
1990	0	6	32	2217	10827	121	9	106	3	42	11	0	0
1991	0	0	328	298	4545	5426	51	22	17	7	27	0	0
1992	0	2	124	258	158	2515	1188	28	4	0	1	0	0
1993	0	2	16	18	61	10	125	81	2	0	1	0	0

Table 5.3.4 Cod off Greenland, NAFO Sub-area 1 and ICES Sub-area XIV (combined). Catch at age from 1975-1993.

Cod of East and West Greenland (combined)										
Catch in Numbers (Thousands)										
(CANUM)										
Year	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12
1975	332	3652	3016	1889	6638	1543	701	312	150	181
1976	11017	5201	2405	1806	530	3140	297	264	106	129
1977	634	51284	7258	2028	1270	633	870	332	156	151
1978	287	5921	36847	2832	697	288	152	291	137	184
1979	291	10801	13689	23670	3464	1197	199	103	73	119
1980	3013	4591	4815	2201	10344	820	137	33	3	34
1981	12	16869	6446	2643	1431	6280	276	87	10	21
1982	1204	1210	18418	4300	4090	2412	2733	191	106	15
1983	77	12460	2604	19604	2543	1316	460	572	13	24
1984	609	2125	10752	1169	5294	426	468	140	130	1
1985	456	1300	1414	5157	266	946	61	152	19	12
1986	80	163	1138	605	1931	78	454	85	17	35
1987	6442	1781	333	965	572	1337	63	324	13	40
1988	1252	54065	1243	542	1039	574	984	31	202	23
1989	50	10151	80798	721	118	397	309	688	2	113
1990	83	3387	26710	41143	189	9	114	5	83	23
1991	101	5723	5042	11671	6115	51	22	17	7	27
1992	42	3887	1952	354	2631	1201	29	4	0	1
1993	24	631	701	289	27	181	100	8	0	1

Table 5.3.5 Cod off West Greenland, NAFO Sub-area 1. Mean weight at age in the catch from 1966 to 1993.

Cod off West Greenland (NAFO Sub Area 1)

Mean Weight of Catch (Kilograms)

(WECA)

Year	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15
1966	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1967	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1968	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1969	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1970	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1971	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1972	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1973	0.580	1.280	1.720	2.510	3.520	4.660	5.070	5.680	5.370	8.650	9.580	9.600	9.600
1974	0.650	0.990	1.680	2.770	3.840	4.720	5.340	5.340	5.480	5.390	8.700	10.190	10.740
1975	0.710	1.300	1.850	2.670	3.990	4.430	5.060	5.600	7.920	5.160	6.110	8.510	10.110
1976	0.850	1.210	2.030	2.710	3.420	4.580	4.490	5.880	7.020	6.460	5.140	9.030	12.870
1977	0.740	1.238	1.714	2.118	3.614	4.580	4.812	5.600	6.000	6.600	7.700	9.900	10.500
1978	0.650	1.150	2.180	2.890	3.690	4.580	5.060	5.600	6.000	6.600	7.700	9.000	10.500
1979	0.720	1.230	2.020	2.710	3.780	4.900	6.400	7.800	9.000	9.700	10.200	10.400	10.500
1980	0.870	1.330	2.060	3.000	4.280	5.840	6.400	7.800	9.000	9.700	10.200	10.400	10.500
1981	0.830	1.110	1.700	2.350	3.200	4.300	6.500	9.020	9.320	9.320	9.320	9.320	9.320
1982	0.830	1.110	1.700	2.350	3.200	4.300	6.500	9.020	9.320	9.320	9.320	9.320	9.320
1983	0.780	0.980	1.380	2.080	2.950	3.850	4.780	5.580	6.000	6.000	6.000	6.000	6.000
1984	0.780	0.980	1.380	2.080	2.950	3.850	4.780	5.580	6.000	6.000	6.000	6.000	6.000
1985	0.780	0.980	1.380	2.080	2.950	3.850	4.780	5.580	6.000	6.000	6.000	6.000	6.000
1986	0.660	0.980	1.790	2.240	2.430	3.080	3.620	3.170	3.170	3.170	3.170	3.170	3.170
1987	0.900	1.070	1.800	2.120	2.610	3.240	4.300	4.700	4.700	4.700	4.700	4.700	4.700
1988	0.550	1.080	1.370	2.000	2.750	3.500	3.940	4.920	4.920	4.920	-1.000	-1.000	-1.000
1989	0.520	0.720	1.270	1.670	2.310	3.710	4.210	4.670	4.070	3.120	-1.000	-1.000	-1.000
1990	0.960	0.910	1.020	1.360	2.040	2.120	2.200	2.890	3.790	7.950	-1.000	-1.000	-1.000
1991	0.780	1.030	1.120	1.160	1.610	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000
1992	0.630	0.820	1.160	1.710	1.790	2.260	3.500	-1.000	-1.000	-1.000	-1.000	-1.000	-1.000
1993	0.532	0.812	1.164	1.650	1.990	2.924	3.640	6.390	-1.000	-1.000	-1.000	-1.000	-1.000

Table 5.3.6 Cod off East Greenland, ICES Sub-area XIV. Mean weight at age in the catch from 1965 to 1993.

Cod off East Greenland (Fishing Area XIV)

Mean Weight of Catch (Kilograms)

(WECA)

Year	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14
1965	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1966	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1967	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1968	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1969	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1970	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1971	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1972	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1973	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1974	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1975	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1976	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1977	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1978	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1979	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1980	0.400	1.130	1.390	2.260	3.210	4.380	5.520	7.090	8.200	8.700	9.300	9.700
1981	0.316	0.776	1.455	1.823	2.890	4.246	5.948	8.698	9.787	12.483	13.426	13.728
1982	0.359	0.727	1.258	1.968	2.874	3.990	5.328	6.901	8.721	10.799	13.145	15.769
1983	0.352	0.700	1.273	2.158	3.071	3.713	4.680	6.234	5.350	6.806	7.555	8.304
1984	0.352	0.700	1.273	2.158	3.071	3.713	4.680	6.234	5.350	6.806	7.555	8.304
1985	0.290	0.810	1.520	2.330	3.150	3.940	4.670	5.330	5.890	6.380	6.790	-1.000
1986	0.250	0.780	1.580	2.600	3.730	4.910	6.090	7.210	8.270	9.230	10.110	11.000
1987	0.300	0.930	1.790	2.750	3.700	4.580	5.360	6.030	6.590	7.050	7.420	-1.000
1988	0.320	0.900	1.740	2.760	3.880	5.020	6.140	7.200	8.170	9.450	-1.000	-1.000
1989	0.240	0.780	1.730	3.030	3.580	4.970	5.240	6.590	7.080	9.480	-1.000	-1.000
1990	0.600	1.060	1.660	2.400	3.270	4.270	5.410	6.690	8.100	10.500	-1.000	-1.000
1991	-1.000	1.040	1.240	1.610	2.570	3.330	5.410	7.480	8.340	10.810	-1.000	-1.000
1992	1.326	1.770	1.807	2.071	2.217	3.586	4.143	7.660	-1.000	10.198	7.758	-1.000
1993	0.790	1.470	1.160	2.380	2.770	3.870	5.660	8.080	-1.000	-1.000	-1.000	-1.000

Table 5.3.7 Cod off Greenland, NAFO Sub-area 1 and ICES Sub-area XIV (combined). Mean weight at age in the catch from 1975-1993.

Cod of East and West Greenland (combined)										
Mean Weight of Catch (Kilograms)										
(WECA)										
Year	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12
1975	0.830	1.110	1.693	2.312	3.195	4.258	6.216	9.059	9.383	12.371
1976	0.830	1.110	1.693	2.312	3.195	4.258	6.216	9.059	9.383	12.371
1977	0.830	1.110	1.693	2.290	3.137	3.909	5.086	6.890	8.646	8.314
1978	0.780	0.977	1.324	2.139	3.121	4.106	4.914	6.127	8.288	6.725
1979	0.770	0.905	1.375	2.128	2.866	3.822	4.088	5.038	5.840	6.380
1980	0.830	1.110	1.693	2.312	3.195	4.258	6.216	9.059	9.383	12.371
1981	0.830	1.110	1.693	2.312	3.195	4.258	6.216	9.059	9.383	12.371
1982	0.830	1.110	1.693	2.290	3.137	3.909	5.086	6.890	8.646	8.314
1983	0.780	0.977	1.324	2.139	3.121	4.106	4.914	6.127	8.288	6.725
1984	0.770	0.905	1.375	2.128	2.866	3.822	4.088	5.038	5.840	6.380
1985	0.500	0.819	1.119	1.666	2.834	3.396	4.644	4.594	6.320	7.410
1986	0.353	1.006	1.833	2.403	3.088	4.362	4.797	4.788	5.152	4.710
1987	0.834	1.056	1.789	2.321	2.939	4.107	5.936	6.969	7.903	7.534
1988	0.470	1.070	1.420	2.060	3.170	3.630	4.460	5.660	6.800	9.450
1989	0.410	0.730	1.310	1.950	2.680	4.460	4.400	5.120	7.080	5.430
1990	0.840	0.910	1.070	1.640	2.830	4.270	5.180	5.170	5.970	9.170
1991	0.780	1.030	1.130	1.340	2.460	3.330	5.410	7.480	8.340	10.810
1992	0.663	0.850	1.246	1.871	2.198	3.572	4.121	7.660	-1.000	10.198
1993	0.554	0.829	1.164	1.804	2.279	3.577	5.276	6.813	-1.000	-1.000

Table 5.3.8 Greenland cod stocks, NAFO Sub-area 1 and ICES Sub-area XIV, XSA Tuning Diagnostics for the offshore component.

VPA Version 3.1 (MSDOS)

6-May-94 18:01

Extended Survivors Analysis

Cod of East and West Greenland (combined) (run name: OFFSHORE923)

CPUE data from file /users/ifad/ifapwork/wg_109/cod_ewgr/FLEET.923

Data for 1 fleets over 10 years

Age range from 4 to 11

Fleet,	Alpha,	Beta
FLT01: GERMAN SURVEY	, .790	, .800

Time series weights :

Tapered time weighting applied
Power = 3 over 20 years

Catchability analysis :

Catchability independent of stock size for all ages

Catchability independent of age for ages >= 10

Terminal population estimation :

Survivor estimates shrunk towards the mean F
of the final 5 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = .500

Minimum standard error for population
estimates derived from each fleet = .300

Prior weighting not applied

Tuning converged after 22 iterations

Regression weights
, .751, .820, .877, .921, .954, .976, .990, .997, 1.000, 1.000

Fishing mortalities										
Age,	1982,	1983,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991
4,	.000,	.196,	.000,	.000,	.052,	.119,	.215,	.130,	.000,	.126
5,	.281,	.639,	.315,	.000,	.184,	.286,	.556,	.625,	.793,	.575
6,	.537,	.902,	1.026,	.353,	.145,	.160,	1.120,	.716,	1.186,	.710
7,	.780,	1.155,	.942,	.750,	.248,	.366,	.806,	.867,	.563,	.686
8,	1.181,	.814,	.833,	.281,	.000,	.365,	.739,	1.027,	.000,	.434
9,	1.209,	.933,	1.108,	.227,	.324,	.283,	.535,	2.158,	1.262,	.903
10,	1.810,	1.115,	1.254,	.976,	.860,	.410,	.584,	1.188,	.252,	.731
11,	1.038,	.787,	1.121,	.620,	.267,	.345,	.752,	.000,	.588,	.780

Table 5.3.8 cont'd

XSA population numbers

YEAR ,	AGE							
	4,	5,	6,	7,	8,	9,		
1982 ,	5.98E+03	5.81E+04	8.60E+03	7.17E+03	3.41E+03	3.95E+03	2.11E+02	1.15E+02
1983 ,	3.60E+04	4.90E+03	3.25E+04	3.72E+03	2.44E+03	7.76E+02	8.73E+02	2.56E+01
1984 ,	4.31E+03	2.42E+04	1.91E+03	9.77E+03	8.69E+02	8.00E+02	2.26E+02	2.12E+02
1985 ,	6.49E+03	3.53E+03	1.31E+04	5.09E+02	2.32E+03	2.80E+02	1.96E+02	4.78E+01
1986 ,	1.78E+03	5.31E+03	2.61E+03	6.82E+03	1.78E+02	1.58E+03	1.65E+02	5.46E+01
1987 ,	3.57E+03	1.39E+03	3.27E+03	1.68E+03	3.94E+03	1.32E+02	8.46E+02	5.18E+01
1988 ,	2.14E+05	2.59E+03	7.71E+02	2.07E+03	8.61E+02	2.03E+03	7.36E+01	4.16E+02
1989 ,	4.31E+04	1.42E+05	1.10E+03	1.86E+02	6.84E+02	3.05E+02	8.79E+02	3.04E+01
1990 ,	9.67E+02	3.10E+04	5.62E+04	3.99E+02	5.80E+01	1.82E+02	2.61E+01	1.99E+02
1991 ,	3.05E+03	7.92E+02	1.04E+04	1.27E+04	1.68E+02	4.30E+01	3.81E+01	1.50E+01

Estimated population abundance at 1st Jan 1992

, .00E+00, 2.20E+03, 3.30E+02, 3.79E+03, 4.74E+03, 8.08E+01, 1.29E+01, 1.36E+01,
--

Taper weighted geometric mean of the VPA populations:

, 7.93E+03, 7.99E+03, 5.42E+03, 2.11E+03, 7.26E+02, 4.49E+02, 1.87E+02, 7.05E+01,

Standard error of the weighted Log(VPA populations) :

, 1.7021, 1.7257, 1.4490, 1.4960, 1.4721, 1.3890, 1.2948, 1.0800,

Log catchability residuals.

Fleet : FLT01: GERMAN SURVEY

Age ,	1982,	1983,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991
4 ,	.24,	-.65,	-1.22,	-.28,	-.62,	1.62,	.52,	1.03,	.04,	-.89
5 ,	-.86,	.17,	-1.10,	-.29,	.24,	1.28,	.93,	.45,	-.06,	-1.05
6 ,	-.03,	-.87,	.02,	-.77,	-.31,	.87,	.57,	1.56,	-.54,	-.72
7 ,	-.69,	.33,	-.68,	.98,	-.31,	.08,	.42,	.71,	-.23,	-.74
8 ,	-1.16,	-.51,	-.42,	-.39,	.81,	.11,	.01,	2.28,	-.32,	-.83
9 ,	-.24,	-.21,	-.75,	-.41,	-.15,	-.13,	-.27,	1.41,	.61,	-.10
10 ,	.64,	.34,	-.79,	-.77,	-.03,	.28,	.47,	1.06,	99.99,	-1.12
11 ,	.56,	1.07,	-.46,	-.39,	.52,	-.04,	.16,	-.30,	.28,	-.44

Mean log catchability and standard error of ages with catchability independent of year class strength and constant w.r.t. time

Age ,	4,	5,	6,	7,	8,	9,	10,	11
Mean Log q,	-4.5954,	-4.4959,	-4.3850,	-4.6284,	-4.5365,	-4.3964,	-4.5149,	-4.5149,
S.E(Log q),	.9054,	.8174,	.8199,	.6133,	.9908,	.6219,	.7563,	.5083,

Regression statistics :

Ages with q independent of year class strength and constant w.r.t. time.

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean Q
4,	.87,	.808,	5.18,	.84,	10,	.80,	-4.60,
5,	1.08,	-.441,	4.12,	.80,	10,	.93,	-4.50,
6,	1.75,	-3.135,	1.22,	.71,	10,	1.00,	-4.38,
7,	1.45,	-3.091,	3.28,	.87,	10,	.62,	-4.63,
8,	1.09,	-.318,	4.36,	.66,	10,	1.14,	-4.54,
9,	1.14,	-.784,	4.15,	.81,	10,	.73,	-4.40,
10,	.72,	1.826,	4.78,	.87,	9,	.47,	-4.51,
11,	.96,	.240,	4.43,	.83,	10,	.51,	-4.44,

Table 5.3.8 cont'd

Terminal year survivor and F summaries :

Age 4 Catchability constant w.r.t. time and dependent on age

Year class = 1987

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	906.,	1.015,	.000,	.00,	1,	.195,	.283
F shrinkage mean ,	2730.,	.50,,,,				.805,	.103

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
2201.,	.45,	.99,	2,	2.205,	.126

Age 5 Catchability constant w.r.t. time and dependent on age

Year class = 1986

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	188.,	.851,	.543,	.64,	2,	.256,	.859
F shrinkage mean ,	401.,	.50,,,,				.744,	.495

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
330.,	.43,	.50,	3,	1.158,	.575

Age 6 Catchability constant w.r.t. time and dependent on age

Year class = 1985

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	2995.,	.922,	.466,	.51,	3,	.227,	.836
F shrinkage mean ,	4057.,	.50,,,,				.773,	.675

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
3787.,	.44,	.24,	4,	.542,	.710

Age 7 Catchability constant w.r.t. time and dependent on age

Year class = 1984

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	2665.,	.791,	.222,	.28,	4,	.286,	1.012
F shrinkage mean ,	5970.,	.50,,,,				.714,	.578

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
4742.,	.42,	.36,	5,	.842,	.686

Table 5.3.8 cont'd

Age 8 Catchability constant w.r.t. time and dependent on age

Year class = 1983

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	80.,	.714,	.426,	.60,	5,	.329,	.439
F shrinkage mean ,	81.,	.50,,,,				.671,	.431

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
81.,	.41,	.22,	6,	.534,	.434

Age 9 Catchability constant w.r.t. time and dependent on age

Year class = 1982

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	14.,	.726,	.197,	.27,	6,	.322,	.852
F shrinkage mean ,	12.,	.50,,,,				.678,	.928

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
13.,	.41,	.11,	7,	.270,	.903

Age 10 Catchability constant w.r.t. time and dependent on age

Year class = 1981

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	9.,	.903,	.390,	.43,	7,	.235,	.964
F shrinkage mean ,	15.,	.50,,,,				.765,	.668

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
14.,	.44,	.25,	8,	.567,	.731

Age 11 Catchability constant w.r.t. time and age (fixed at the value for age) 10

Year class = 1980

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	4.,	.748,	.174,	.23,	7,	.309,	.970
F shrinkage mean ,	6.,	.50,,,,				.691,	.703

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
5.,	.42,	.17,	8,	.418,	.780

Table 5.3.9 Greenland cod stocks, NAFO Sub-area 1 and ICES Sub-area XIV, XSA Tuning Diagnostics for total Greenland stock.

VPA Version 3.1 (MSDOS)
 7-May-94 12:53
 Extended Survivors Analysis
 Cod of East and West Greenland (combined) (run name: INOFFSHORE30)
 CPUE data from file /users/ifad/ifapwork/Wg_109/cod_ewgr/FLEET.930

Data for 1 fleets over 10 years
 Age range from 4 to 11

Fleet, Alpha, Beta
 FLT01: GERMAN SURVEY , .790 , .800

Time series weights :
 Tapered time weighting applied
 Power = 3 over 20 years

Catchability analysis :
 Catchability independent of stock size for all ages
 Catchability independent of age for ages >= 10

Terminal population estimation :
 Survivor estimates shrunk towards the mean F
 of the final 5 years or the 5 oldest ages.
 S.E. of the mean to which the estimates are shrunk = .500
 Minimum standard error for population
 estimates derived from each fleet = .300
 Prior weighting not applied

Tuning converged after 12 iterations

Regression weights
 , .751, .820, .877, .921, .954, .976, .990, .997, 1.000, 1.000

Fishing mortalities

Age	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
4	.168	.267	.250	.161	.086	.397	.237	.137	.204	.250
5	.357	.702	.412	.279	.218	.270	.574	.723	.679	.572
6	.646	.958	.399	.402	.206	.328	1.139	.935	1.288	.861
7	.834	1.292	.842	.627	.288	.345	.829	.978	.787	.755
8	1.256	.834	.810	.397	.423	.373	.818	1.098	.187	.577
9	1.243	1.041	.947	.300	.380	.855	.597	2.523	1.488	1.138
10	2.030	1.192	1.313	1.224	1.076	.589	2.272	1.470	.288	1.170
11	1.233	.936	1.113	.718	.452	.509	1.125	1.419	.788	.998

Table 5.3.9 cont'd

XSA population numbers

YEAR ,	AGE							
	4,	5,	6,	7,	8,	9,		
1982 ,	3.66E+03	7.13E+04	1.05E+04	8.40E+03	3.92E+03	4.46E+03	2.55E+02	1.74E+02
1983 ,	5.88E+04	6.00E+03	3.69E+04	4.07E+03	2.70E+03	8.26E+02	9.54E+02	2.48E+01
1984 ,	1.06E+04	3.69E+04	2.20E+03	1.05E+04	8.29E+02	8.69E+02	2.16E+02	2.15E+02
1985 ,	9.67E+03	6.74E+03	1.81E+04	6.64E+02	3.35E+03	2.73E+02	2.50E+02	4.31E+01
1986 ,	2.18E+03	6.74E+03	3.78E+03	8.98E+03	2.63E+02	1.67E+03	1.50E+02	5.43E+01
1987 ,	6.01E+03	1.64E+03	4.01E+03	2.28E+03	4.99E+03	1.27E+02	8.46E+02	3.79E+01
1988 ,	2.82E+05	3.31E+03	9.26E+02	2.14E+03	1.19E+03	2.54E+03	4.02E+01	3.48E+02
1989 ,	8.76E+04	1.82E+05	1.38E+03	2.20E+02	6.92E+02	3.90E+02	1.04E+03	3.07E+00
1990 ,	2.01E+04	6.25E+04	6.56E+04	4.01E+02	6.12E+01	1.71E+02	2.32E+01	1.77E+02
1991 ,	2.86E+04	1.34E+04	2.35E+04	1.34E+04	1.35E+02	3.76E+01	2.86E+01	1.29E+01

Estimated population abundance at 1st Jan 1992

, .00E+00, 1.82E+04, 5.62E+03, 7.35E+03, 4.67E+03, 5.62E+01, 8.94E+00, 6.58E+00,
--

Taper weighted geometric mean of the VPA populations:

, 2.04E+04, 1.48E+04, 7.17E+03, 2.43E+03, 8.15E+02, 4.74E+02, 1.76E+02, 5.19E-01,

Standard error of the weighted Log(VPA populations) :

, 1.4599, 1.5438, 1.4825, 1.4892, 1.5300, 1.4788, 1.4629, 1.4920,

Log catchability residuals.

Fleet : FLT01: GERMAN SURVEY

Age ,	1982,	1983,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991
4 ,	99.99,	-.60,	99.99,	99.99,	-.31,	1.81,	.75,	.82,	99.99,	-2.54
5 ,	-.45,	.58,	-.38,	99.99,	.59,	1.66,	1.26,	.83,	-.30,	-3.33
6 ,	.08,	-.74,	.00,	-.84,	-.41,	1.02,	.61,	1.73,	-.40,	-1.21
7 ,	-.69,	.45,	-.72,	.73,	-.44,	-.13,	.51,	.74,	.05,	-.63
8 ,	-1.14,	-.50,	-.29,	-.37,	99.99,	-.02,	-.16,	2.43,	99.99,	-.39
9 ,	-.42,	-.26,	-1.04,	-.40,	-.24,	.28,	-.53,	1.37,	.77,	.15
10 ,	.26,	-.05,	-1.07,	-1.18,	-.13,	.06,	2.06,	.75,	99.99,	-.85
11 ,	-.06,	.86,	-.84,	-.58,	.31,	.04,	.27,	99.99,	.19,	-.47

Mean log catchability and standard error of ages with catchability independent of year class strength and constant w.r.t. time

Age ,	4,	5,	6,	7,	8,	9,	10,	11
Mean Log q,	-5.0851,	-5.0545,	-4.5985,	-4.7364,	-4.6366,	-4.3182,	-4.1506,	-4.1506,
S.E(Log q),	1.5397,	1.5436,	.9344,	.5909,	1.0834,	.7118,	1.0363,	.5177,

Regression statistics :

Ages with q independent of year class strength and constant w.r.t. time.

Age,	Slope ,	t-value ,	Intercept,	RSquare,	No Pts,	Reg s.e,	Mean q
4,	.98,	.038,	5.17,	.59,	6,	1.71,	-5.09,
5,	1.41,	-.803,	3.16,	.38,	9,	2.23,	-5.05,
6,	1.86,	-2.905,	.93,	.61,	10,	1.26,	-4.60,
7,	1.46,	-3.573,	3.32,	.89,	10,	.56,	-4.74,
8,	1.28,	-.589,	3.93,	.46,	8,	1.46,	-4.66,
9,	1.29,	-1.447,	3.78,	.77,	10,	.87,	-4.32,
10,	1.05,	-.150,	4.09,	.61,	9,	1.17,	-4.15,
11,	1.00,	-.006,	4.19,	.83,	9,	.56,	-4.19,

Table 5.3.9 cont'd

Terminal year survivor and F summaries :

Age 4 Catchability constant w.r.t. time and dependent on age

Year class = 1987

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	.1442.,	1.890,	.000,	.00,	1,	.065,	1.524
F shrinkage mean ,	21792.,	.50,,,				.935,	.213

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
18247.,	.48,	2.63,	2,	5.431,	.250

Age 5 Catchability constant w.r.t. time and dependent on age

Year class = 1986

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	202.,	2.174,	.000,	.00,	1,	.050,	3.113
F shrinkage mean ,	6707.,	.50,,,				.950,	.499

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
5624.,	.49,	3.41,	2,	7.007,	.572

Age 6 Catchability constant w.r.t. time and dependent on age

Year class = 1985

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	3147.,	1.308,	.477,	.36,	3,	.127,	1.433
F shrinkage mean ,	8323.,	.50,,,				.873,	.792

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
7353.,	.47,	.54,	4,	1.162,	.861

Age 7 Catchability constant w.r.t. time and dependent on age

Year class = 1984

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	2646.,	.848,	.143,	.17,	4,	.258,	1.095
F shrinkage mean ,	5691.,	.50,,,				.742,	.655

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
4671.,	.43,	.34,	5,	.780,	.755

Table 5.3.9 cont'd

Age 8 Catchability constant w.r.t. time and dependent on age

Year class = 1983

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	61.,	.906,	.302,	.33,	5,	.234,	.543
F shrinkage mean ,	55.,	.50,,,,				.766,	.588

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
56.,	.44,	.14,	6,	.313,	.577

Age 9 Catchability constant w.r.t. time and dependent on age

Year class = 1982

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	13.,	1.067,	.155,	.15,	5,	.180,	.913
F shrinkage mean ,	8.,	.50,,,,				.820,	1.190

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
9.,	.45,	.18,	6,	.404,	1.138

Age 10 Catchability constant w.r.t. time and dependent on age

Year class = 1981

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	6.,	1.515,	.412,	.27,	6,	.098,	1.264
F shrinkage mean ,	7.,	.50,,,,				.902,	1.160

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
7.,	.47,	.13,	7,	.276,	1.170

Age 11 Catchability constant w.r.t. time and age (fixed at the value for age) 10

Year class = 1980

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: GERMAN SURVEY,	2.,	.878,	.160,	.18,	5,	.245,	1.277
F shrinkage mean ,	4.,	.50,,,,				.755,	.916

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
4.,	.43,	.22,	6,	.514,	.998

Table 5.3.10 Greenland cod stocks, NAFO Sub-area 1 and ICES Sub-area XIV, traditional VPA, fishing mortalities.

Run title : Cod of East and West Greenland (combined) (run name: VPA41)

At 8-May-94 16:46

Traditional vpa using screen input for terminal F with backwards extension

Table 8		Fishing mortality (F) at age	
YEAR,	1982,	1983,	
AGE			
3,	.0185,	.0067,	
4,	.1688,	.2681,	
5,	.3596,	.6930,	
6,	.6485,	.9491,	
7,	.8393,	1.2664,	
8,	1.2480,	.8461,	
9,	1.2256,	1.0288,	
10,	2.0476,	1.1430,	
11,	1.5071,	1.0060,	
+gp,	1.5071,	1.0060,	
FBAR 5- 9,	.8642,	.9567,	

Table 8		Fishing mortality (F) at age									
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	FBAR 91-93
AGE											
3,	.0564,	.1773,	.0122,	.0216,	.0146,	.0040,	.0079,	.0171,	.0396,	.0399,	.0322,
4,	.2550,	.1636,	.0886,	.4032,	.2517,	.1567,	.4028,	1.0595,	1.5684,	1.2982,	1.3087,
5,	.4126,	.2836,	.2217,	.2761,	.5810,	.7763,	.8254,	2.3376,	1.6408,	1.9656,	1.9813,
6,	.9226,	.4016,	.2104,	.3331,	1.1520,	.9456,	1.5703,	1.3745,	2.1991,	1.7664,	1.7800,
7,	.8635,	.6326,	.2883,	.3535,	.8380,	1.0164,	.8182,	1.4522,	2.1547,	1.7857,	1.7975,
8,	.8711,	.4072,	.4324,	.3735,	.8384,	1.1152,	.2047,	.6225,	1.9547,	1.2779,	1.2850,
9,	1.0113,	.3177,	.3940,	.8759,	.5931,	2.5295,	1.5468,	1.3097,	1.0670,	1.1803,	1.1857,
10,	1.3229,	1.4258,	1.1689,	.6212,	2.3239,	1.3863,	.3076,	1.3739,	1.1000,	1.2287,	1.2342,
11,	1.0684,	.7169,	.6651,	.6235,	1.2518,	1.6770,	.6864,	1.1021,	.0000,	.0000,	.3674,
+gp,	1.0684,	.7169,	.6651,	.6235,	1.2518,	1.6770,	.6864,	1.1021,	.0000,	.0000,	
FBAR 5- 9,	.8162,	.4085,	.3094,	.4424,	.8005,	1.2766,	.9931,	1.4193,	1.8033,	1.5952,	

Table 5.3.11 Greenland cod stocks, NAFO Sub-area 1 and ICES Sub-area XIV, traditional VPA, stock in numbers.

Run title : Cod of East and West Greenland (combined) (run name: VPA41)

At 8-May-94 16:46

Traditional vpa using screen input for terminal F with backwards extension

Table 10	Stock number at age (start of year)		Numbers*10**-3
YEAR,	1982,	1983,	
AGE			
3,	72408,	12756,	
4,	8570,	58195,	
5,	69960,	5927,	
6,	10265,	36175,	
7,	8165,	3975,	
8,	3800,	2613,	
9,	4347,	808,	
10,	242,	945,	
11,	152,	23,	
+gp,	22,	43,	
TOTAL,	177931,	121461,	

Table 10	Stock number at age (start of year)						Numbers*10**-3					GMST
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	
AGE												
3,	12248,	3088,	7273,	333198,	95458,	13730,	11694,	6566,	1192,	677,	0,	196
4,	10374,	9478,	2118,	5883,	266982,	77023,	11196,	9499,	5284,	938,	532,	163
5,	36441,	6582,	6589,	1587,	3218,	169952,	53915,	6127,	2696,	902,	210,	134
6,	2196,	17870,	3672,	3911,	892,	1333,	57929,	17497,	438,	387,	94,	69
7,	10374,	647,	8860,	2204,	2076,	209,	384,	8926,	3279,	36,	49,	23
8,	830,	3241,	254,	4920,	1147,	665,	56,	125,	1548,	282,	4,	3
9,	831,	257,	1598,	122,	2509,	367,	162,	34,	50,	162,	58,	4
10,	214,	224,	139,	798,	38,	1027,	22,	25,	7,	13,	37,	1
11,	223,	42,	40,	32,	318,	3,	190,	12,	5,	2,	3,	
+gp,	2,	27,	82,	98,	36,	155,	53,	46,	0,	0,	1,	
TOTAL,	73732,	41456,	30625,	352753,	372673,	264465,	135601,	48858,	14498,	3397,	988,	

Table 5.3.12 Icelandic and Greenland cod stocks combined, NAFO Sub-area 1, ICES Sub-area XIV and Va, traditional VPA, fishing mortalities.

Run title : Cod in Iceland and Greenland waters (combined) (run name: CODRUN7)

At 8-May-94 12:06

Traditional vpa using screen input for terminal F with backwards extension

Table 8 Fishing mortality (F) at age			
YEAR,	1971,	1972,	1973,
AGE			
3,	.0575,	.0685,	.1370,
4,	.2803,	.2411,	.3100,
5,	.4789,	.5411,	.4590,
6,	.6232,	.6352,	.5706,
7,	.5153,	.7621,	.6548,
8,	.5049,	.6427,	.6304,
9,	.6730,	.7943,	.7648,
10,	.9056,	1.0479,	1.0759,
11,	.6613,	1.0467,	1.0208,
12,	.4199,	1.6054,	.6995,
13,	.6623,	1.2333,	.9321,
+gp,	.6623,	1.2333,	.9321,
FBAR 5-10,	.6168,	.7372,	.6926,
FBARC,	.4199,	.4617,	.4008,

Table 8 Fishing mortality (F) at age										
YEAR,	1974,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,
AGE										
3,	.0925,	.1154,	.0583,	.0188,	.0264,	.0300,	.0319,	.0155,	.0257,	.0170,
4,	.3665,	.2975,	.2501,	.2216,	.1725,	.2268,	.1796,	.1763,	.2191,	.1804,
5,	.4859,	.5173,	.3563,	.3750,	.3013,	.3334,	.3498,	.4005,	.4056,	.4529,
6,	.4362,	.5800,	.6145,	.3792,	.3374,	.3691,	.3634,	.4375,	.5608,	.7892,
7,	.6481,	.6841,	.5711,	.8287,	.4678,	.5449,	.4321,	.5718,	.6297,	.9169,
8,	.8984,	.8328,	.9745,	.7136,	.6682,	.5690,	.5721,	.8520,	1.0964,	.8482,
9,	.7287,	.9066,	.6632,	.9879,	.5425,	.5630,	.5012,	.7998,	1.2395,	.9386,
10,	1.0306,	.8141,	.8862,	.7808,	.6934,	.4358,	.4860,	.8894,	.9620,	1.1896,
11,	1.2312,	1.3739,	.5985,	.6382,	.6776,	.6189,	.4567,	1.0790,	.5658,	.6872,
12,	1.5126,	1.1453,	1.1319,	.6045,	1.0859,	.9592,	.7343,	1.0725,	.5801,	.7168,
13,	1.2581,	1.1111,	.8722,	.6745,	.8190,	.6713,	.5590,	1.0136,	.7026,	.8646,
+gp,	1.2581,	1.1111,	.8722,	.6745,	.8190,	.6713,	.5590,	1.0136,	.7026,	.8646,
FBAR 5-10,	.7047,	.7225,	.6776,	.6775,	.5018,	.4692,	.4508,	.6585,	.8156,	.8392,
FBARC,	.4258,	.4296,	.4201,	.4332,	.3417,	.3485,	.3306,	.4194,	.4603,	.5304,

Table 8 Fishing mortality (F) at age											
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	FBAR 91-93
AGE											
3,	.0559,	.0533,	.0687,	.0299,	.0342,	.0312,	.0474,	.1046,	.0963,	.0920,	.0976,
4,	.2157,	.2821,	.2200,	.3106,	.2204,	.2269,	.2587,	.3788,	.4923,	.4119,	.4277,
5,	.3718,	.3864,	.5548,	.5138,	.5049,	.5444,	.5719,	.6488,	.7088,	.6558,	.6711,
6,	.5568,	.5554,	.6732,	.7404,	.8426,	.5998,	.8536,	.8855,	.9821,	.9118,	.9264,
7,	.7015,	.6845,	.7243,	.9273,	.9597,	.7263,	.7675,	.9374,	1.0648,	.9819,	.9947,
8,	.9112,	.6610,	.9212,	.7648,	1.3296,	.9461,	.7957,	.7578,	.8473,	.7855,	.7969,
9,	.7522,	.7924,	.6821,	.9760,	.8993,	.9930,	.9214,	.7748,	.5717,	.6583,	.6683,
10,	.6773,	.7559,	.8319,	.6770,	1.0294,	1.1873,	.8477,	1.0941,	.5105,	.7860,	.7969,
11,	.8264,	.5651,	.6261,	.6447,	1.0511,	.6845,	.9541,	1.0944,	.5644,	.8172,	.8253,
12,	.5971,	.8688,	.7778,	.6404,	1.3476,	2.1083,	1.5749,	1.5098,	.9150,	1.1963,	1.2071,
13,	.7003,	.7299,	.7453,	.6540,	1.1427,	1.3267,	1.1256,	1.2328,	.6633,	.9395,	.9452,
+gp,	.7003,	.7299,	.7453,	.6540,	1.1427,	1.3267,	1.1256,	1.2328,	.6633,	.9395,	.9452,
FBAR 5-10,	.6618,	.6393,	.7312,	.7666,	.9276,	.8328,	.7930,	.8497,	.7809,	.7966,	.7966,
FBARC,	.4191,	.4107,	.4765,	.5159,	.5611,	.4916,	.5300,	.5349,	.5938,	.5530,	.5530,

Table 5.3.13 Icelandic and Greenland cod stocks combined, NAFO Sub-area 1, ICES Sub-area XIV and Va, traditional VPA, stock in numbers.

Run title : Cod in Iceland and Greenland waters (combined) (run name: CODRUN7)

At 8-May-94 12:06

Traditional vpa using screen input for terminal F with backwards extension

Table 10	Stock number at age (start of year)			Numbers*10**3
YEAR,	1971,	1972,	1973,	
AGE				
3,	263022,	150109,	315239,	
4,	172534,	203313,	114756,	
5,	160848,	106732,	130794,	
6,	72003,	81576,	50867,	
7,	64188,	31612,	35386,	
8,	65871,	31390,	12079,	
9,	21515,	32550,	13515,	
10,	13463,	8987,	12043,	
11,	3070,	4456,	2580,	
12,	530,	1297,	1281,	
13,	210,	285,	213,	
+gp,	505,	356,	160,	
TOTAL,	837759,	652664,	688912,	

Table 10	Stock number at age (start of year)					Numbers*10**3					
YEAR,	1974,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	
AGE											
3,	189444,	299469,	672776,	191971,	266484,	278893,	258922,	152623,	195142,	237021,	
4,	225043,	141400,	218467,	519602,	154240,	212503,	221587,	205341,	123033,	155715,	
5,	68909,	127714,	85979,	139292,	340865,	106277,	138680,	151590,	140949,	80910,	
6,	67670,	34705,	62330,	49293,	78382,	206471,	62343,	80029,	83155,	76924,	
7,	23538,	35817,	15909,	27602,	27620,	45797,	116869,	35490,	42304,	38859,	
8,	15053,	10079,	14796,	7358,	9867,	14164,	21744,	62110,	16403,	18452,	
9,	5265,	5019,	3588,	4572,	2951,	4141,	6565,	10047,	21691,	4487,	
10,	5150,	2080,	1659,	1513,	1394,	1405,	1931,	3256,	3697,	5142,	
11,	3362,	1504,	754,	560,	568,	570,	744,	972,	1095,	1157,	
12,	761,	804,	312,	340,	242,	236,	251,	386,	271,	509,	
13,	521,	137,	209,	82,	152,	67,	74,	99,	108,	124,	
+gp,	284,	116,	133,	11,	93,	58,	33,	133,	54,	109,	
TOTAL,	604999,	658845,	1076913,	942197,	882857,	870582,	829744,	702077,	627902,	619410,	

Table 10	Stock number at age (start of year)					Numbers*10**3					GMST	
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	
AGE												
3,	149199,	146936,	343786,	653062,	260948,	95171,	139722,	97702,	147083,	257128,	0,	2230
4,	190778,	115513,	114062,	262771,	518932,	206455,	75522,	109099,	72051,	109365,	192015,	1804
5,	106441,	125891,	71330,	74941,	157702,	340814,	134713,	47736,	61158,	36057,	59311,	1205
6,	42118,	60090,	70035,	33533,	36703,	77930,	161886,	62254,	20427,	24647,	15322,	665
7,	28607,	19759,	28231,	29249,	13094,	12939,	35025,	56445,	21025,	6264,	8108,	318
8,	14056,	11614,	8159,	11202,	9474,	4106,	5124,	13311,	18099,	5935,	1921,	138
9,	6469,	4627,	4909,	2659,	4269,	2052,	1305,	1893,	5108,	6350,	2215,	54
10,	1437,	2496,	1715,	2032,	820,	1422,	622,	425,	714,	2361,	2692,	22
11,	1281,	598,	960,	611,	845,	240,	355,	218,	117,	351,	881,	9
12,	476,	459,	278,	420,	263,	242,	99,	112,	60,	54,	127,	3
13,	204,	215,	158,	105,	181,	56,	24,	17,	20,	20,	13,	1
+gp,	78,	109,	91,	132,	40,	7,	32,	26,	18,	23,	14,	
TOTAL,	541143,	488306,	643714,	1070717,	1003272,	741435,	554431,	389239,	345881,	448556,	282619,	

Table 5.3.14 Icelandic and Greenland cod stocks combined, Icelandic cod stock and Greenland cod stock, stock in numbers.

STOCK IN NUMBERS (000')

Iceland - Greenland combined

	1974	1975	1976	1977	1978	1979	1980	1981
3	189444	299469	672776	191971	266484	278893	258922	152623
4	225043	141400	218467	519602	154240	212503	221587	205341
5	68909	127714	85979	139292	340865	106277	138680	151590
6	67670	34705	62330	49293	78382	206471	62343	80029
7	23538	35817	15909	27602	27620	45797	116869	35490
8	15053	10079	14796	7358	9867	14164	21744	62110
9	5265	5019	3588	4572	2951	4141	6565	10047
Tot	594922	654203	1073845	939690	880409	868246	826710	697230

Iceland

	1974	1975	1976	1977	1978	1979	1980	1981
3	169264	263244	326295	143292	221657	245513	144025	143264
4	213035	125194	189099	245878	114957	176061	194521	113993
5	61074	118922	75994	119034	162908	79448	118554	133564
6	42846	30450	57836	43280	68303	93924	52649	67877
7	18637	22158	14133	25539	24514	40087	83048	29533
8	10886	7251	9536	6364	9306	12250	20159	50701
9	3231	3386	2646	3055	2700	3939	6065	9481
	518973	570605	675539	586442	604345	651222	619021	548413

Greenland

	1974	1975	1976	1977	1978	1979	1980	1981
3	20180	36225	346481	48679	44827	33380	114897	9359
4	12008	16206	29368	273724	39283	36442	27066	91348
5	7835	8792	9985	20258	177957	26829	20126	18026
6	24824	4255	4494	6013	10079	112547	9694	12152
7	4901	13659	1776	2063	3106	5710	33821	5957
8	4167	2828	5260	994	561	1914	1585	11409
9	2034	1633	942	1517	251	202	500	566
	75949	83598	398306	353248	276064	217024	207689	148817

Table 5.3.14 cont'd

Iceland - Greenland combined

	1982	1983	1984	1985	1986	1987	1988	1989
3	195142	237021	149199	146936	343786	653062	260948	95171
4	123033	155715	190778	115513	114062	262771	518932	206455
5	140949	80910	106441	125891	71330	74941	157702	340814
6	83155	76924	42118	60090	70035	33533	36703	77930
7	42304	38859	28607	19759	28231	29249	13094	12939
8	16403	18452	14056	11614	8159	11202	9474	4106
9	21691	4487	6469	4627	4909	2659	4269	2052
Tot	622677	612368	537668	484430	640512	1067417	1001122	739467

Iceland

	1982	1983	1984	1985	1986	1987	1988	1989
3	133579	226277	138871	144070	336791	281947	168814	80862
4	115382	106399	182047	107606	112127	257116	220908	132154
5	81345	75736	77277	120645	66028	73505	154672	145471
6	74174	44648	40209	45820	67010	30221	35827	76561
7	34736	35346	19617	19198	21168	27323	11254	12704
8	12818	15903	13434	8832	7938	7169	8417	3523
9	17939	3687	5554	4469	3482	2548	2173	1700
Tot	469973	507996	477009	450640	614544	679829	602065	452975

Greenland

	1982	1983	1984	1985	1986	1987	1988	1989
3	61563	10743.7	10328	2866	6995	371115	92134	14309
4	7651	49316	8731	7907	1935	5655	298024	74301
5	59604	5174	29164	5246	5302	1436	3030	195343
6	8981	32276	1909	14270	3025	3312	876	1369
7	7568	3513	8990	561	7063	1926	1840	235
8	3585	2549	622	2782	221	4033	1057	583
9	3752	800	915	158	1427	111	2096	352
Tot	152704	104372	60659	33790	25968	387588	399057	286492

Table 6.1 GREENLAND HALIBUT. Nominal catches (tonnes) in Sub-areas V and XIV, 1980-1993, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	-
Faroe Islands	1,042	767	1,532	1,146	2,502	1,052	853
France	51	8	27	236	489	845	52
Germany, Fed. Rep.	2,318	3,007	2,581	1,142	936	863	858
Greenland	-	+	1	5	15	81	177
Iceland	27,838	15,4552	28,300	28,360	30,080	29,231	31,044
Norway	3	-	+	2	2	3	+
UK (Engl. & Wales)	-	-	-	-	-	-	-
Total	31,252	19,239	32,441	30,888	34,024	32,075	32,984
Working Group estimate	-	-	-	-	-	-	-

Country	1987	1988	1989	1990	1991	1992 ¹	1993
Denmark	6	+	-	-	-	-	-
Faroe islands	1,096	1,378	2,319	1,803	1,566	2,128	4,233
France	19	25	-	-	-	3	-
Germany, Fed. Rep.	565	637	493	336	303	382	415
Greenland	154	37	11	40	66	437	289
Iceland	44,780	49,040	58,330	36,557	34,883	31,955	34,506
Norway	2	1	3	50	34	273	642
Russia	-	-	-	-	-	5	-
UK (Engl. & Wales)	-	-	-	27	38	127	809
Total	46,622	51,118	61,396	38,813	36,890	35,310	40,894
Working Group estimate	-	-	61,936	39,326	37,950	35,487	41,247

¹Preliminary data.

Table 6.2 GREENLAND HALIBUT. Nominal catches (tonnes) in Division Vb, 1980-1993, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	-
Faroe Islands	951	442	863	1,112	2,456	1,052	775
France	51	8	27	236	489	845	52
Germany, Fed. Rep.	172	114	142	86	118	227	113
Norway	3	2	+	2	2	2	+
UK (Engl.& Wales)	-	-	-	-	-	-	-
Uk (Scotland)	-	-	-	-	-	-	-
Total	1,177	566	1,032	1,436	3,065	2,126	940
Working Group estimate	-	-	-	-	-	-	-

Country	1987	1988	1989	1990	1991	1992	1993 ¹
Denmark	6	+	-	-	-	-	-
Faroe Islands	907	901	1,513	1,064	1,293	2,105	4,058
France	19	25	-	-	-	3	-
Germany, Fed. Rep.	109	42	73	43	24	71	24
Norway	2	1	3	42	16 ¹	25 ¹	371
UK (Engl.& Wales)	-	-	-	-	-	1	13
UK (Scotland)	-	-	-	-	-	1	-
Total	1,043	969	-	-	1,333	2,206	4,466
Working Group estimate	-	-	-	-	1,662 ⁴	2,269 ⁵	-

¹Preliminary.

²Includes 17 t taken by France.

³Includes 133 t taken in Division IIa (Faroes waters)

⁴Includes 317 t taken in Division IIa (Faroes waters) + France 12 t.

⁵Includes 63 t taken in Division IIa (Faroes waters).

Table 6.3 GREENLAND HALIBUT. Nominal catches (tonnes) in Division Va, 1980-1993, as reported officially to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Faroe Islands	91	325	669	33	46	-	-	15	379	719	739	273	23	166
Iceland	27,836	15,455	28,300	28,359	30,078	29,195	31,027	44,644	49,000	58,330	36,557	34,883	31,955	34,340
Norway	-	+	-	+	+	2	-	-	-	-	-	-	-	-
Total	27,927	15,780	28,969	28,392	30,124	29,196	31,027	44,659	49,379	59,049	37,296	35,156	31,978	
Working Group estimate	-	-	-	-	-	-	-	-	-	59,272 ²	37,308 ³	35,413 ⁴	31,978	34,506

¹Preliminary.

²Includes 223 t by Norway.

³Includes 12 t by Norway.

⁴Includes additional catches by Iceland. 257 t in 1991.

Table 6.4 GREENLAND HALIBUT. Nominal catches (tonnes) in Sub-area XIV, 1980-1993, as reported officially to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Faroe Islands	-	-	-	-	-	-	78	74	98	87	-	-	-	9
Germany, Fed. Rep.	2,146	2,893	2,439	1,054	818	636	745	456	595	420	293	279	311	391
Greenland	-	+	1	5	15	81	177	154	37	11	40	66	437	289
Iceland	2	-	-	1	2	36	17	136	40	+	-	-	-	-
Norway	-	-	-	-	+	-	-	-	-	-	8	18 ¹	248 ¹	271
Russia	-	-	-	-	-	-	-	-	-	-	-	-	5	-
UK (Engl. & Wales)	-	-	-	-	-	-	-	-	-	+	27	38	108	796
	-	-	-	-	-	-	-	-	-	-	-	-	18	-
Total	2,148	2,893	2,440	1,060	835	753	1,017	820	770	518	368	401	1,127	1,756
Working Group estimate ²	-	-	-	-	-	-	-	-	-	-	736 ²	875 ³	1,240 ⁴	2,275 ⁵

¹Preliminary.

²Includes 370 t catches by Japan.

³Includes 315 t catch by Japan and 159 t by other countries as reported to Greenland.

⁴Indicates additional catches taken by Germany (96 t) and UK (17 t) as reported to Greenland.

⁵Indicates additional catches taken by Germany (37 t), Norway (238 t), UK (182 t) and Japan (62 t) as reported to Greenland.

Table 6.5 Greenland Halibut. Cpue and effort data for Icelandic trawlers.

Year	Total Catch (t)	Cpue (t/hr)	Total Effort (hr)
1977	16,578	1.00	16,578
1978	14,349	0.90	15,943
1979	23,616	1.03	22,928
1980	31,252	1.34	23,322
1981	19,239	1.37	14,043
1982	32,441	1.58	20,532
1983	30,888	1.17	26,400
1984	34,024	1.06	32,092
1985	32,075	1.03	31,141
1986	32,984	1.01	31,657
1987	46,622	0.93	50,131
1988	51,118	1.06	48,225
1989	61,396	0.95	64,627
1990	39,326	0.73	53,871
1991	37,950	0.85	44,699
1992	35,424	0.71	49,892
1993	41,247	0.63	65,471

Tuning data used in the XSA (Table 6.9)

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Greenland halibut in the Iceland and Faroes Grounds and East Green

Greenland halibut, Icelandic series. (code: FLT01)

Year	Effort	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8	Catch, age 9	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15	Catch, age 16
1977	16578	1	34	671	1727	2289	834	420	423	174	120	28	141
1978	15943	23	91	347	1037	1214	848	567	312	232	218	114	204
1979	22928	29	197	1605	2253	3090	1693	880	394	246	189	147	125
1980	23322	47	502	1536	2630	3126	2324	1739	849	578	306	143	116
1981	14043	26	158	580	1160	1430	1764	1299	664	435	252	176	159
1982	20532	8	300	1140	2451	2646	2456	1803	963	609	331	195	132
1983	26400	10	240	1611	2651	3060	2443	1693	978	424	174	37	47
1984	32098	83	277	891	2139	3568	2800	1825	1134	588	363	92	20
1985	31141	125	441	1018	2295	3454	2749	1452	627	423	137	36	46
1986	32657	245	612	1033	1942	2983	3097	1683	820	550	202	59	34
1987	50131	182	3123	4863	2586	2156	3476	1847	1829	886	243	31	5
1988	48225	129	742	2068	2985	3166	2966	1848	1761	1851	701	216	246
1989	64627	499	1657	4485	5961	5763	3246	1601	1458	1237	506	362	145
1990	53871	188	463	1513	3515	4186	3143	1224	959	568	358	137	61
1991	44699	289	1225	1797	2866	2935	2074	1130	1072	924	554	342	82
1992	49715	17	421	2023	3262	2646	3019	1962	1278	509	144	36	56
1993	65308	70	336	1939	5385	3435	4156	1538	1119	417	62	158	0

Table 6.6

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS)

At 8-May-94 14:43

Table 1	Catch numbers at age			Numbers*10**-3					
YEAR,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	
AGE									
5,	43,	0,	23,	29,	47,	26,	8,	10,	
6,	296,	34,	91,	197,	502,	158,	300,	240,	
7,	584,	671,	347,	1605,	1536,	580,	1140,	1611,	
8,	621,	1727,	1037,	2253,	2630,	1160,	2451,	2651,	
9,	431,	2289,	1214,	3090,	3126,	1430,	2646,	3060,	
10,	240,	834,	848,	1693,	2324,	1764,	2456,	2443,	
11,	121,	420,	567,	880,	1739,	1299,	1803,	1693,	
12,	86,	423,	312,	394,	849,	664,	963,	978,	
13,	37,	174,	232,	246,	578,	435,	609,	424,	
14,	32,	120,	218,	189,	306,	252,	331,	174,	
15,	14,	28,	114,	147,	143,	176,	195,	37,	
+gp,	9,	141,	204,	125,	116,	159,	132,	47,	
TOTALNUM,	2514,	6861,	5207,	10848,	13896,	8103,	13034,	13368,	
TONSLAND,	6045,	16578,	14349,	23616,	31252,	19239,	32441,	30888,	
SOPCOF %,	100,	100,	100,	101,	99,	100,	100,	101,	

Table 1	Catch numbers at age			Numbers*10**-3						
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,
AGE										
5,	83,	125,	245,	182,	129,	499,	188,	289,	17,	70,
6,	277,	441,	612,	3123,	742,	1657,	463,	1225,	421,	336,
7,	891,	1018,	1033,	4863,	2068,	4485,	1513,	1797,	2023,	1939,
8,	2139,	2295,	1942,	2586,	2985,	5961,	3515,	2866,	3262,	5385,
9,	3568,	3454,	2983,	2156,	3166,	5763,	4186,	2935,	2646,	3435,
10,	2800,	2749,	3097,	3476,	2966,	3246,	3143,	2074,	3019,	4156,
11,	1825,	1452,	1683,	1847,	1848,	1601,	1224,	1130,	1962,	1538,
12,	1134,	627,	820,	1829,	1761,	1458,	959,	1072,	1278,	1119,
13,	588,	423,	550,	886,	1851,	1237,	568,	924,	509,	417,
14,	363,	137,	202,	243,	701,	506,	358,	554,	144,	62,
15,	92,	36,	59,	31,	216,	362,	137,	342,	36,	158,
+gp,	20,	46,	34,	5,	246,	145,	61,	82,	56,	0,
TOTALNUM,	13780,	12803,	13260,	21227,	18679,	26920,	16315,	15290,	15373,	18615,
TONSLAND,	34024,	32075,	32984,	46622,	51118,	61396,	39326,	37950,	35487,	41247,
SOPCOF %,	99,	103,	101,	98,	101,	100,	100,	101,	101,	101,

Table 6.7

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS

At 8-May-94 14:43

Table 2	Catch weights at age (kg)							
YEAR,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,
AGE								
5,	1.1570,	1.1570,	.9680,	.9110,	1.1250,	1.0710,	1.0100,	.9840,
6,	1.5850,	1.0460,	1.1990,	.9420,	1.2830,	1.2570,	1.3680,	1.3380,
7,	1.7680,	1.4290,	1.4230,	1.2780,	1.4870,	1.4400,	1.6180,	1.5770,
8,	2.1800,	1.7940,	1.8540,	1.6760,	1.7560,	1.6600,	1.9050,	1.8480,
9,	2.5700,	2.2280,	2.2560,	2.0720,	2.1530,	1.9670,	2.1870,	2.1590,
10,	3.0180,	2.6870,	2.6070,	2.3330,	2.2790,	2.2580,	2.5160,	2.4340,
11,	3.7300,	3.0170,	3.0810,	2.7230,	2.4980,	2.5150,	2.7610,	2.6030,
12,	4.0520,	3.9140,	3.5910,	3.2970,	3.0590,	2.9500,	3.1290,	3.0340,
13,	4.8150,	4.0400,	4.6040,	3.9850,	3.7830,	3.4500,	3.7850,	3.7840,
14,	5.3480,	4.7140,	4.6950,	4.6680,	4.5070,	4.0330,	4.4750,	4.4460,
15,	5.7520,	5.4010,	5.1510,	4.7920,	5.1390,	4.6520,	4.9850,	4.7510,
+gp,	7.0940,	5.5970,	6.4500,	5.3870,	5.9830,	5.3300,	6.0880,	6.3850,
SOPCOFAC,	1.0024,	1.0008,	.9993,	1.0124,	.9902,	1.0024,	.9997,	1.0110,

Table 2	Catch weights at age (kg)									
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,
AGE										
5,	.9420,	.9950,	1.0300,	1.0300,	1.1290,	.8420,	1.0290,	1.0010,	1.0160,	1.0010,
6,	1.2750,	1.2300,	1.2380,	1.2180,	1.3040,	1.0470,	1.2100,	1.2470,	1.2560,	1.2890,
7,	1.5920,	1.6300,	1.4990,	1.5330,	1.5410,	1.4250,	1.5720,	1.4720,	1.4010,	1.4700,
8,	1.8170,	1.9510,	1.9370,	1.8240,	1.7700,	1.7270,	1.7900,	1.8100,	1.7180,	1.6740,
9,	2.2400,	2.3670,	2.3630,	2.1870,	2.2360,	2.1250,	2.1260,	2.0880,	2.0490,	2.0130,
10,	2.4610,	2.6370,	2.6310,	2.6660,	2.6830,	2.6370,	2.5360,	2.4400,	2.4360,	2.2780,
11,	2.8350,	2.8290,	2.8480,	2.9960,	3.0820,	3.2200,	3.2140,	2.9350,	2.8680,	3.2660,
12,	3.2620,	3.3530,	3.3350,	3.5950,	3.6240,	3.7330,	3.6930,	3.7370,	3.4780,	3.5230,
13,	3.9620,	4.0060,	4.0390,	4.4310,	4.3120,	4.1350,	4.4480,	4.4010,	4.5100,	4.1780,
14,	4.9360,	4.7920,	4.9250,	5.1400,	5.0980,	5.3800,	5.1970,	5.0220,	4.6810,	6.7570,
15,	5.2300,	5.2310,	5.4660,	5.7640,	5.2130,	6.5690,	5.8910,	5.9910,	6.0100,	6.1550,
+gp,	7.1920,	6.3230,	5.9850,	7.2670,	5.7640,	6.4970,	6.0490,	6.4120,	5.1280,	5.8370,
SOPCOFAC,	.9937,	1.0258,	1.0060,	.9785,	1.0063,	.9999,	.9998,	1.0097,	1.0051,	1.0097,

Table 6.8

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS

At 8-May-94 14:43

Table 5	Proportion mature at age								
YEAR,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	
AGE									
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0400,	
6,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0500,	.0700,	
7,	.1000,	.1000,	.1000,	.1000,	.1000,	.1000,	.2000,	.1500,	
8,	.3500,	.3500,	.3500,	.3500,	.3500,	.3500,	.3300,	.2800,	
9,	.7700,	.7700,	.7700,	.7700,	.7700,	.7700,	.5000,	.3800,	
10,	.9600,	.9600,	.9600,	.9600,	.9600,	.9600,	.7000,	.6000,	
11,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.8500,	.8500,	
12,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.9400,	.9800,	
13,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	
14,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	
15,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	
+9p,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	

Table 5	Proportion mature at age									
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,
AGE										
5,	.0000,	.0100,	.0100,	.0100,	.0100,	.0100,	.0100,	.0100,	.0200,	.0300,
6,	.0800,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0400,	.1200,
7,	.1900,	.2100,	.2100,	.2100,	.2100,	.2100,	.2100,	.2900,	.1100,	.2700,
8,	.3200,	.3500,	.3500,	.3500,	.3500,	.3500,	.3500,	.4800,	.2500,	.4000,
9,	.4200,	.4600,	.4600,	.4600,	.4600,	.4600,	.4600,	.5600,	.4700,	.4500,
10,	.6400,	.6400,	.6400,	.6400,	.6400,	.6400,	.6400,	.6200,	.6800,	.5400,
11,	.7500,	.8200,	.8200,	.8200,	.8200,	.8200,	.8200,	.8500,	.8500,	.6500,
12,	.9300,	.9600,	.9600,	.9600,	.9600,	.9600,	.9600,	1.0000,	.9600,	.7800,
13,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.8300,
14,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.9700,
15,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,
+9p,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,

Table 6.9

VPA Version 3.1 (MSDOS)

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Extended Survivors Analysis

Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS)

CPUE data from file /users/ifad/ifapwork/wg_109/ghl_grn/FLEET.RE2

Data for 1 fleets over 18 years
Age range from 5 to 15

Fleet, Alpha, Beta
FLT01: Greenland hal , .000 , 1.000

Time series weights :

Tapered time weighting applied
Power = 3 over 20 years

Catchability analysis :

Catchability dependent on stock size for ages < 6
Regression type = C
Minimum of 5 points used for regression
Survivor estimates shrunk to the population mean for ages < 6

Catchability independent of age for ages >= 14

Terminal population estimation :

Survivor estimates shrunk towards the mean F
of the final 5 years or the 5 oldest ages.
S.E. of the mean to which the estimates are shrunk = .500
Minimum standard error for population
estimates derived from each fleet = .300
Prior weighting not applied

Tuning converged after 20 iterations

Regression weights
, .820, .877, .921, .954, .976, .990, .997, 1.000, 1.000

Fishing mortalities

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993
5	.003	.006	.005	.004	.017	.005	.010	.002	.004
6	.019	.019	.096	.025	.063	.018	.039	.018	.039
7	.054	.055	.194	.081	.199	.072	.087	.079	.099
8	.130	.131	.178	.166	.332	.224	.179	.213	.295
9	.231	.236	.199	.324	.520	.387	.280	.237	.343
10	.270	.315	.448	.435	.610	.565	.318	.487	.669
11	.284	.249	.297	.429	.418	.459	.382	.530	.464
12	.323	.243	.442	.482	.675	.448	.898	.945	.622
13	.817	.492	.424	1.061	.704	.573	1.002	1.623	.906
14	.571	1.206	.395	.663	.916	.421	2.087	.374	.857
15	.457	.486	.540	.695	.832	.638	.868	.761	.865

Continued..

Table 6.9 (Cont'd)

XSA population numbers

YEAR ,	AGE										
	5,	6,	7,	8,	9,	10,	11,	12,			
1985 ,	4.09E+04,	2.48E+04,	2.09E+04,	2.02E+04,	1.81E+04,	1.25E+04,	6.33E+03,	2.45E+03,	8.17E+02,	3.40E+02,	
1986 ,	4.29E+04,	3.51E+04,	2.10E+04,	1.70E+04,	1.53E+04,	1.24E+04,	8.22E+03,	4.10E+03,	1.52E+03,	3.11E+02,	
1987 ,	3.72E+04,	3.67E+04,	2.97E+04,	1.71E+04,	1.29E+04,	1.04E+04,	7.76E+03,	5.52E+03,	2.77E+03,	8.02E+02,	
1988 ,	3.39E+04,	3.19E+04,	2.87E+04,	2.10E+04,	1.23E+04,	9.07E+03,	5.71E+03,	4.96E+03,	3.05E+03,	1.56E+03,	
1989 ,	3.25E+04,	2.91E+04,	2.67E+04,	2.27E+04,	1.53E+04,	7.66E+03,	5.05E+03,	3.20E+03,	2.64E+03,	9.09E+02,	
1990 ,	4.03E+04,	2.75E+04,	2.35E+04,	1.89E+04,	1.40E+04,	7.85E+03,	3.58E+03,	2.86E+03,	1.40E+03,	1.12E+03,	
1991 ,	3.07E+04,	3.46E+04,	2.32E+04,	1.88E+04,	1.30E+04,	8.21E+03,	3.84E+03,	1.95E+03,	1.57E+03,	6.82E+02,	
1992 ,	1.09E+04,	2.61E+04,	2.86E+04,	1.83E+04,	1.35E+04,	8.44E+03,	5.14E+03,	2.25E+03,	6.84E+02,	4.97E+02,	
1993 ,	1.96E+04,	9.36E+03,	2.21E+04,	2.27E+04,	1.28E+04,	9.18E+03,	4.46E+03,	2.61E+03,	7.54E+02,	1.16E+02,	

Estimated population abundance at 1st Jan 1994

, .00E+00, 1.68E+04, 7.75E+03, 1.72E+04, 1.46E+04, 7.79E+03, 4.05E+03, 2.42E+03, 1.20E+03, 2.62E+02,

Taper weighted geometric mean of the VPA populations:

, 3.02E+04, 2.69E+04, 2.46E+04, 1.94E+04, 1.37E+04, 8.76E+03, 4.92E+03, 2.78E+03, 1.35E+03, 5.64E+02,

Standard error of the weighted Log(VPA populations) :

, .3846, .3632, .1516, .1569, .1777, .2200, .2829, .3529, .5015, .6880,

YEAR ,	AGE
	15,

1985 ,	1.06E+02,
1986 ,	1.65E+02,
1987 ,	8.01E+01,
1988 ,	4.65E+02,
1989 ,	6.91E+02,
1990 ,	3.13E+02,
1991 ,	6.35E+02,
1992 ,	7.28E+01,
1993 ,	2.94E+02,

Estimated population abundance at 1st Jan 1994

, 4.24E+01,

Taper weighted geometric mean of the VPA populations:

, 2.44E+02,

Standard error of the weighted Log(VPA populations) :

, .8159,

Continued..

Table 6.9 (Cont'd)

Log catchability residuals.

Fleet : FLT01: Greenland hal

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993
5	-.17	.09	-.13	-.18	.38	-.23	.35	-.06	-.08
6	-.05	-.12	1.08	-.21	.41	-.65	.29	-.62	-.08
7	-.10	-.14	.70	-.14	.47	-.36	.01	-.19	-.23
8	.02	-.03	-.15	-.18	.22	.01	-.03	.04	.09
9	.19	.16	-.43	.09	.27	.16	.02	-.25	-.16
10	-.06	.05	-.03	-.02	.02	.13	-.26	.06	.10
11	.14	-.04	-.30	.11	-.21	.06	.07	.29	-.12
12	-.05	-.39	-.22	-.09	-.05	-.28	.60	.54	-.14
13	-.47	-.08	-.66	.29	-.41	-.43	.31	.68	-.17
14	.22	.91	-.62	-.07	-.04	-.63	1.13	-.67	-.12
15	.00	.01	-.31	-.03	-.14	-.22	.27	.03	-.11

Mean log catchability and standard error of ages with catchability independent of year class strength and constant w.r.t. time

Age	6	7	8	9	10	11	12	13	14	15
Mean Log q	-14.2443	-13.1638	-12.4017	-12.0039	-11.6013	-11.7445	-11.4269	-11.0315	-11.1319	-11.1319
S.E(Log q)	.5381	.3519	.1200	.2351	.1171	.1851	.3528	.4605	.6594	.1809

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e.	Mean Log q
5	.49	2.550	13.11	.79	9	.25	-16.05

Ages with q independent of year class strength and constant w.r.t. time.

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e.	Mean Q
6	.76	.669	13.26	.54	9	.42	-14.24
7	.44	1.502	11.45	.52	9	.14	-13.16
8	.63	1.626	11.47	.75	9	.07	-12.40
9	.47	1.801	10.69	.64	9	.10	-12.00
10	1.02	-.096	11.66	.69	9	.13	-11.60
11	1.24	-.801	12.50	.63	9	.23	-11.74
12	2.91	-2.327	17.90	.18	9	.82	-11.43
13	1.66	-1.483	13.51	.43	9	.71	-11.03
14	1.20	-.523	12.08	.52	9	.83	-11.13
15	.95	.686	10.91	.97	9	.17	-11.19

Terminal year survivor and F summaries :

Age 5 Catchability dependent on age and year class strength

Year class = 1988

Fleet	Estimated Survivors	Int, s.e.	Ext, s.e.	Var, Ratio	N, Weights	Scaled, Weights	Estimated F
FLT01: Greenland hal	15451.	.301	.000	.00	1	.489	.004
P shrinkage mean	26936.	.36				.335	.002
F shrinkage mean	8564.	.50				.177	.008

Weighted prediction :

Survivors, at end of year	Int, s.e.	Ext, s.e.	N	Var, Ratio	F
16769.	.21	.29	3	1.367	.004

Continued..

Table 6.9 (Cont'd)

Age 6 Catchability constant w.r.t. time and dependent on age

Year class = 1987

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	7281.,	.286,	.008,	.03,	2,	.753,	.042
F shrinkage mean	9357.,	.50,,,,				.247,	.033

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
7746.,	.25,	.09,	3,	.355,	.039

Age 7 Catchability constant w.r.t. time and dependent on age

Year class = 1986

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	17398.,	.229,	.261,	1.14,	3,	.826,	.098
F shrinkage mean	16420.,	.50,,,,				.174,	.104

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
17224.,	.21,	.19,	4,	.933,	.099

Age 8 Catchability constant w.r.t. time and dependent on age

Year class = 1985

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	13791.,	.211,	.103,	.49,	4,	.849,	.309
F shrinkage mean	19929.,	.50,,,,				.151,	.224

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
14578.,	.19,	.11,	5,	.560,	.295

Age 9 Catchability constant w.r.t. time and dependent on age

Year class = 1984

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	7823.,	.199,	.129,	.65,	5,	.863,	.342
F shrinkage mean	7575.,	.50,,,,				.137,	.351

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
7789.,	.19,	.11,	6,	.580,	.343

Continued..

Table 6.9 (Cont'd,

Age 10 Catchability constant w.r.t. time and dependent on age

Year class = 1983

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	3726.,	.223,	.087,	.39,	6,	.835,	.710
F shrinkage mean ,	6167.,	.50,,,,				.165,	.486

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
4050.,	.20,	.11,	7,	.545,	.669

Age 11 Catchability constant w.r.t. time and dependent on age

Year class = 1982

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	2393.,	.219,	.061,	.28,	7,	.839,	.468
F shrinkage mean ,	2540.,	.50,,,,				.161,	.446

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
2416.,	.20,	.05,	8,	.262,	.464

Age 12 Catchability constant w.r.t. time and dependent on age

Year class = 1981

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	1254.,	.260,	.096,	.37,	8,	.787,	.603
F shrinkage mean ,	1036.,	.50,,,,				.213,	.694

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
1204.,	.23,	.09,	9,	.369,	.622

Age 13 Catchability constant w.r.t. time and dependent on age

Year class = 1980

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	291.,	.413,	.099,	.24,	9,	.595,	.845
F shrinkage mean ,	225.,	.50,,,,				.405,	1.001

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
262.,	.32,	.09,	10,	.285,	.906

Continued..

Table 6.9 (Cont'd)

Age 14 Catchability constant w.r.t. time and dependent on age

Year class = 1979

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	49.,	.697,	.118,	.17,	9,	.340,	.778
F shrinkage mean ,	39.,	.50,,,,				.660,	.899

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
42.,	.41,	.09,	10,	.214,	.857

Age 15 Catchability constant w.r.t. time and age (fixed at the value for age) 14

Year class = 1978

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT01: Greenland hal,	92.,	.364,	.071,	.19,	9,	.654,	.955
F shrinkage mean ,	142.,	.50,,,,				.346,	.708

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
107.,	.29,	.10,	10,	.345,	.865

Table 6.10

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: X5

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Terminal Fs derived using XSA (With F shrinkage)

Table 8	Fishing mortality (F) at age							
YEAR,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,
AGE								
5,	.0018,	.0000,	.0009,	.0009,	.0013,	.0007,	.0003,	.0004,
6,	.0153,	.0017,	.0044,	.0092,	.0189,	.0050,	.0096,	.0091,
7,	.0426,	.0415,	.0199,	.0945,	.0871,	.0260,	.0427,	.0622,
8,	.0688,	.1620,	.0792,	.1640,	.2092,	.0832,	.1382,	.1255,
9,	.0857,	.3642,	.1551,	.3357,	.3387,	.1590,	.2613,	.2420,
10,	.0804,	.2247,	.2096,	.3172,	.4286,	.3069,	.4214,	.3860,
11,	.0671,	.1865,	.2219,	.3301,	.5895,	.4269,	.5560,	.5442,
12,	.0597,	.3313,	.1948,	.2239,	.5769,	.4405,	.6138,	.6325,
13,	.0421,	.1562,	.2881,	.2194,	.5582,	.6249,	.8912,	.5682,
14,	.1748,	.1769,	.2824,	.3799,	.4378,	.4759,	1.4583,	.6489,
15,	.0850,	.2158,	.2402,	.2953,	.5212,	.4574,	.7940,	.5593,
+gp,	.0850,	.2158,	.2402,	.2953,	.5212,	.4574,	.7940,	.5593,
FBAR 8-12,	.0724,	.2538,	.1721,	.2742,	.4286,	.2833,	.3981,	.3861,

Table 8	Fishing mortality (F) at age									FBAR 91-93	
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	
AGE											
5,	.0031,	.0033,	.0062,	.0053,	.0041,	.0167,	.0050,	.0102,	.0017,	.0039,	.0053,
6,	.0122,	.0193,	.0190,	.0963,	.0254,	.0634,	.0183,	.0390,	.0175,	.0395,	.0320,
7,	.0401,	.0540,	.0545,	.1944,	.0810,	.1994,	.0720,	.0870,	.0793,	.0993,	.0886,
8,	.1042,	.1304,	.1312,	.1780,	.1661,	.3319,	.2243,	.1795,	.2130,	.2947,	.2290,
9,	.2346,	.2306,	.2363,	.1994,	.3245,	.5197,	.3874,	.2796,	.2369,	.3430,	.2865,
10,	.3441,	.2701,	.3150,	.4475,	.4349,	.6098,	.5653,	.3179,	.4869,	.6689,	.4912,
11,	.5258,	.2843,	.2492,	.2965,	.4287,	.4181,	.4590,	.3820,	.5299,	.4641,	.4586,
12,	.8275,	.3232,	.2430,	.4422,	.4818,	.6746,	.4482,	.8981,	.9447,	.6217,	.8215,
13,	.9579,	.8166,	.4924,	.4236,	1.0608,	.7037,	.5726,	1.0023,	1.6226,	.9062,	1.1770,
14,	1.4315,	.5706,	1.2059,	.3954,	.6633,	.9158,	.4206,	2.0867,	.3743,	.8568,	1.1059,
15,	.8235,	.4572,	.4860,	.5398,	.6947,	.8318,	.6377,	.8683,	.7612,	.8646,	.8313,
+gp,	.8235,	.4572,	.4860,	.5398,	.6947,	.8318,	.6377,	.8683,	.7612,	.8646,	
FBAR 8-12,	.4072,	.2477,	.2349,	.3127,	.3672,	.5108,	.4168,	.4114,	.4823,	.4785,	

Table 6.11

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS

At 8-May-94 14:43

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)				Numbers*10**-3						
	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,			
AGE											
5,	25774,	26002,	27071,	33603,	39896,	39297,	33329,	28547,			
6,	20986,	22144,	22380,	23279,	28896,	34296,	33800,	28679,			
7,	15088,	17788,	19028,	19178,	19853,	24405,	29372,	28813,			
8,	10061,	12445,	14688,	16056,	15018,	15663,	20468,	24223,			
9,	5654,	8083,	9109,	11680,	11729,	10486,	12405,	15343,			
10,	3349,	4466,	4834,	6714,	7186,	7195,	7699,	8222,			
11,	2009,	2660,	3070,	3374,	4208,	4029,	4556,	4348,			
12,	1600,	1617,	1900,	2117,	2087,	2009,	2263,	2249,			
13,	967,	1297,	999,	1346,	1456,	1009,	1113,	1054,			
14,	215,	798,	955,	645,	930,	717,	465,	393,			
15,	185,	155,	575,	620,	379,	517,	384,	93,			
+gp,	119,	780,	1026,	525,	306,	464,	257,	117,			
TOTAL,	86008,	98237,	105636,	119136,	131946,	140087,	146109,	142081,			

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10**-3						GMST
	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	
AGE												
5,	28958,	40950,	42861,	37228,	33902,	32482,	40346,	30673,	10895,	19556,	0,	333
6,	24561,	24847,	35130,	36663,	31874,	29060,	27494,	34551,	26132,	9361,	16769,	282
7,	24461,	20883,	20977,	29669,	28659,	26745,	23475,	23235,	28602,	22102,	7746,	228
8,	23305,	20227,	17030,	17097,	21025,	22749,	18859,	18801,	18331,	22741,	17224,	175
9,	18390,	18074,	15281,	12856,	12316,	15327,	14050,	12971,	13523,	12752,	14578,	122
10,	10367,	12518,	12352,	10385,	9065,	7663,	7845,	8209,	8441,	9185,	7789,	75
11,	4810,	6325,	8224,	7759,	5713,	5051,	3585,	3837,	5142,	4465,	4050,	43
12,	2172,	2447,	4097,	5517,	4964,	3203,	2862,	1950,	2254,	2605,	2416,	25
13,	1028,	817,	1525,	2766,	3052,	2639,	1404,	1574,	684,	754,	1204,	13
14,	514,	340,	311,	802,	1558,	909,	1124,	682,	497,	116,	262,	6
15,	177,	106,	165,	80,	465,	691,	313,	635,	73,	294,	42,	2
+gp,	38,	134,	95,	13,	524,	274,	138,	151,	112,	0,	107,	
TOTAL,	138781,	147669,	158047,	160834,	153117,	146792,	141495,	137268,	114686,	103932,	72188,	

Table 6.12

Run title : Greenland halibut in the Iceland and Faroes Grounds and East Green (run name: XS)

At 8-May-94 14:43

Terminal Fs derived using XSA (With F shrinkage)

Table 13	Spawning stock biomass at age (spawning time)							Tonnes
YEAR,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,
AGE								
5,	0,	0,	0,	0,	0,	0,	0,	1124,
6,	998,	695,	805,	658,	1112,	1293,	2312,	2686,
7,	2668,	2542,	2708,	2451,	2952,	3514,	9505,	6816,
8,	7677,	7814,	9531,	9418,	9230,	9100,	12867,	12534,
9,	11188,	13868,	15824,	18635,	19444,	15882,	13565,	12588,
10,	9704,	11521,	12098,	15038,	15723,	15597,	13559,	12008,
11,	7492,	8026,	9460,	9187,	10512,	10134,	10693,	9620,
12,	6482,	6327,	6823,	6979,	6386,	5926,	6656,	6687,
13,	4656,	5240,	4599,	5364,	5510,	3481,	4212,	3990,
14,	1150,	3761,	4484,	3009,	4193,	2893,	2081,	1747,
15,	1065,	840,	2964,	2970,	1950,	2404,	1912,	442,
+gp,	843,	4366,	6616,	2826,	1828,	2472,	1564,	749,
TOTSPBIO,	53924,	65001,	75912,	76534,	78840,	72696,	78926,	70989,

Table 13	Spawning stock biomass at age (spawning time)							Tonnes		
YEAR,	1984,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,
AGE										
5,	0,	407,	441,	383,	383,	273,	415,	307,	221,	587,
6,	2505,	1834,	2609,	2679,	2494,	1826,	1996,	2585,	1313,	1448,
7,	7399,	7148,	6603,	9551,	9274,	8004,	7749,	9919,	4408,	8772,
8,	13551,	13812,	11545,	10915,	13025,	13750,	11815,	16334,	7873,	15228,
9,	17301,	19680,	16610,	12933,	12668,	14982,	13740,	15167,	13023,	11551,
10,	16328,	21126,	20800,	17719,	15566,	12933,	12733,	12419,	13983,	11298,
11,	10228,	14673,	19206,	19061,	14439,	13336,	9447,	9571,	12534,	9478,
12,	6588,	7878,	13117,	19040,	17271,	11479,	10146,	7286,	7525,	7159,
13,	4074,	3273,	6158,	12254,	13159,	10913,	6246,	6925,	3083,	2615,
14,	2538,	1628,	1531,	4123,	7944,	4892,	5841,	3424,	2327,	761,
15,	924,	553,	903,	462,	2424,	4539,	1845,	3805,	438,	1811,
+gp,	273,	849,	566,	93,	3023,	1778,	836,	965,	575,	0,
TOTSPBIO,	81710,	92860,	100089,	109213,	111669,	98704,	82810,	88708,	67303,	70709,

Table 16 Summary (without SOP correction)

Terminal Fs derived using XSA (With F shrinkage)

	RECRUITS,	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	FBAR	8-12,
	Age 5						
1976,	25774,	158021,	53924,	6045,	.1121,		.0724,
1977,	26002,	159565,	65001,	16578,	.2550,		.2538,
1978,	27071,	175446,	75912,	14349,	.1890,		.1721,
1979,	33603,	174160,	76534,	23616,	.3086,		.2742,
1980,	39896,	209859,	78840,	31252,	.3964,		.4286,
1981,	39297,	210524,	72696,	19239,	.2646,		.2833,
1982,	33329,	242344,	78926,	32441,	.4110,		.3981,
1983,	28547,	234872,	70989,	30888,	.4351,		.3861,
1984,	28958,	235118,	81710,	34024,	.4164,		.4072,
1985,	40950,	253004,	92860,	32075,	.3454,		.2477,
1986,	42861,	266920,	100089,	32984,	.3295,		.2349,
1987,	37228,	275479,	109213,	46622,	.4269,		.3127,
1988,	33902,	275225,	111669,	51118,	.4578,		.3672,
1989,	32482,	238294,	98705,	61396,	.6220,		.5108,
1990,	40346,	232067,	82810,	39326,	.4749,		.4168,
1991,	30673,	222801,	88708,	37950,	.4278,		.4114,
1992,	10895,	192736,	67303,	35487,	.5273,		.4823,
1993,	19556,	178300,	70709,	41247,	.5833,		.4785,
Arith.							
Mean	31743,	218596,	82033,	32591,	.3880,		.3410,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),			

Table 6.13

Greenland halibut in the Iceland and Faroes Grounds and East Green
 Greenland halibut in the Iceland and Faroes Grounds and East Green

14:11 Sunday, May 8, 1994 1

Prediction with management option table: Input data

Year: 1994								
Age	Stock size	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
5	34000.000	0.1500	0.0200	0.0000	0.0000	1.006	0.0055	1.006
6	29150.000	0.1500	0.0733	0.0000	0.0000	1.264	0.0335	1.264
7	24171.000	0.1500	0.2233	0.0000	0.0000	1.448	0.0924	1.448
8	17224.000	0.1500	0.3767	0.0000	0.0000	1.734	0.2396	1.734
9	14578.000	0.1500	0.4933	0.0000	0.0000	2.050	0.2999	2.050
10	7789.000	0.1500	0.6133	0.0000	0.0000	2.385	0.5140	2.385
11	4050.000	0.1500	0.7833	0.0000	0.0000	3.023	0.4799	3.023
12	2416.000	0.1500	0.9133	0.0000	0.0000	3.579	0.8597	3.579
13	1204.000	0.1500	0.9433	0.0000	0.0000	4.363	1.2314	4.363
14	262.000	0.1500	0.9900	0.0000	0.0000	5.487	1.1571	5.487
15	42.000	0.1500	1.0000	0.0000	0.0000	6.052	0.8697	6.052
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1995								
Age	Recruit-ment	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
5	34000.000	0.1500	0.0200	0.0000	0.0000	1.006	0.0045	1.006
6	.	0.1500	0.0733	0.0000	0.0000	1.264	0.0242	1.264
7	.	0.1500	0.2233	0.0000	0.0000	1.448	0.0894	1.448
8	.	0.1500	0.3767	0.0000	0.0000	1.734	0.2341	1.734
9	.	0.1500	0.4933	0.0000	0.0000	2.050	0.2930	2.050
10	.	0.1500	0.6133	0.0000	0.0000	2.385	0.4995	2.385
11	.	0.1500	0.7833	0.0000	0.0000	3.023	0.4754	3.023
12	.	0.1500	0.9133	0.0000	0.0000	3.579	0.8559	3.579
13	.	0.1500	0.9433	0.0000	0.0000	4.363	1.2206	4.363
14	.	0.1500	0.9900	0.0000	0.0000	5.487	1.1469	5.487
15	.	0.1500	1.0000	0.0000	0.0000	6.052	0.8613	6.052
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1996								
Age	Recruit-ment	Natural mortality	Maturity ogive	Prop.of F bef.spaw.	Prop.of M bef.spaw.	Weight in stock	Exploit. pattern	Weight in catch
5	34000.000	0.1500	0.0200	0.0000	0.0000	1.006	0.0045	1.006
6	.	0.1500	0.0733	0.0000	0.0000	1.264	0.0242	1.264
7	.	0.1500	0.2233	0.0000	0.0000	1.448	0.0894	1.448
8	.	0.1500	0.3767	0.0000	0.0000	1.734	0.2341	1.734
9	.	0.1500	0.4933	0.0000	0.0000	2.050	0.2930	2.050
10	.	0.1500	0.6133	0.0000	0.0000	2.385	0.4995	2.385
11	.	0.1500	0.7833	0.0000	0.0000	3.023	0.4754	3.023
12	.	0.1500	0.9133	0.0000	0.0000	3.579	0.8559	3.579
13	.	0.1500	0.9433	0.0000	0.0000	4.363	1.2206	4.363
14	.	0.1500	0.9900	0.0000	0.0000	5.487	1.1469	5.487
15	.	0.1500	1.0000	0.0000	0.0000	6.052	0.8613	6.052
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : VIDAR4
 Date and time: 08MAY94:15:00

Table 6.14

Greenland halibut in the Iceland and Faroes Grounds and East Green

Prediction with management option table

Year: 1994					Year: 1995					Year: 1996	
F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	Stock biomass	Sp.stock biomass
1.1064	0.5296	212202	72707	41000	0.0000	0.0000	207476	68952	0	247998	97181
.	0.1000	0.0472	.	68952	4288	243231	93680
.	0.2000	0.0943	.	68952	8368	238702	90383
.	0.3000	0.1415	.	68952	12252	234396	87273
.	0.4000	0.1886	.	68952	15954	230298	84338
.	0.5000	0.2358	.	68952	19487	226392	81564
.	0.6000	0.2829	.	68952	22862	222668	78939
.	0.7000	0.3301	.	68952	26088	219112	76454
.	0.8000	0.3773	.	68952	29174	215714	74098
.	0.9000	0.4244	.	68952	32131	212465	71863
.	1.0000	0.4716	.	68952	34965	209354	69741
.	1.1000	0.5187	.	68952	37683	206374	67723
.	1.2000	0.5659	.	68952	40294	203517	65804
.	1.3000	0.6131	.	68952	42802	200775	63976
.	1.4000	0.6602	.	68952	45214	198142	62235
.	1.5000	0.7074	.	68952	47535	195612	60574
.	1.6000	0.7545	.	68952	49770	193179	58989
.	1.7000	0.8017	.	68952	51923	190837	57474
.	1.8000	0.8488	.	68952	54000	188583	56027
.	1.9000	0.8960	.	68952	56003	186410	54643
.	2.0000	0.9432	.	68952	57938	184315	53318
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : VIDAR4
 Date and time : 09MAY94:17:02
 Computation of ref. F: Simple mean, age 8 - 12
 Basis for 1994 : TAC constraints

Table 7.2.1 Splitting of redfish catches into *S. marinus* and deep sea *S. mentella* in Division Va in percentages for the years 1985–1993.

Year	<i>As used earlier (by ICES)</i>		<i>New values</i>	
	<i>S. marinus</i>	<i>S. mentalla</i>	<i>S. marinus</i>	<i>S. mentella</i>
1985	73.10	26.90		
1986	78.20	21.80		
1987	78.20	21.80		
1988	84.92	15.08		
1989	65.12	34.88	56.01	43.99
1990	74.20	25.80	68.72	31.28
1991			50.76	49.24
1992			58.50	41.50
			48.69	51.31

Table 7.2.2. Proportions used for splitting the 1992 REDFISH landings between *S. marinus* and *S. mentella* stocks.

Area Species/stock	Va			Vb		VI		XII	XIV		
	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic
Belgium	1.00	0.00									
Estonia								1.00			
Faroes	1.00	0.00		0.22	0.78	0.00	1.00		0.00	0.00	1.00
France				0.00	1.00	0.00	1.00	1.00			
Germany				0.00	1.00			1.00	279 t	2513 t	5167 t
Greenland								1.00	0.10	0.90	0.00
Iceland	0.58	0.41	0.01					1.00	0.00	0.00	1.00
Ireland						0.00	1.00				
Japan											
Latvia								1.00			
Lithuania				0.00	1.00						
Norway				1.00	0.00	1.00	0.00	1.00	37 t		14285 t
Russia				0.00	1.00			1.00	0.00	0.00	1.00
UK				1.00	0.00	1.00	0.00		0.10	0.90	0.00

Table 7.2.3. Proportions used for splitting the 1993 REDFISH landings between *S. marinus* and *S. mentella* stocks.

Area Species/stock	Va			Vb		VI		XII	XIV		
	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic	<i>S.mar.</i>	<i>S.ment.</i> deep-sea	<i>S.ment.</i> oceanic
Belgium	1.00	0.00									
Estonia											
Faroes	1.00	0.00		2083 t	7607 t	0.00	1.00		0.00	0.00	1.00
France											
Germany				0.00	1.00	0.00	1.00	1.00	1526 t	13734 t	11709 t
Greenland								1.00	0.10	0.90	0.00
Iceland	0.49	0.51	0.00					1.00	0.00	0.00	1.00
Ireland						0.00	1.00				
Japan									0.10	0.90	0.00
Latvia								1.00			
Norway				1.00	0.00	1.00	0.00	1.00	9 t	57 t	8957 t
Russia								1.00	0.00	0.00	1.00
UK				1.00	0.00	1.00	0.00		0.10	0.90	0.00

In Sub-area XIV the landings for Germany, Greenland, Japan and UK have been splitted between *S. marinus* and deep-sea *S. mentella* according to the German surveys. For Faroe Islands, Germany, Iceland, Norway and Russia the splirring in most areas has been based on biological information presented to the Working Group and/or log-books.

Table 7.3.1 Nominal catch of REDFISH (in tonnes) by countries in Division Va (Iceland) as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Belgium	1,549	1,385	1,381	924	283	389	291
Faroe Is.	242	629	1,055	1,212	1,046	1,357	686
Iceland	33,318	62,253	69,780	93,349	115,051	122,749	108,270
Norway	93	43	33	32	11	32	12
Total	35,202	64,310	72,249	95,517	116,391	124,527	109,259

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Belgium	400	423	398	372	190	70	146	107	91
Faroe Is.	291	144	332	372	394	624	412	389	-
Iceland	91,381	85,992	87,768	93,995	91,536	90,891	96,770	94,382	90,387
Norway	8	2	7	7	1	-	-	-	-
Total	92,080	86,561	88,505	94,746	92,121	91,585	97,328	94,878	90,478

¹Provisional data.

Table 7.3.2. Landings of REDFISH (in tonnes) by countries in Division Va as used by the Working Group.

Year	Belgium	Faroese	Iceland	Norway	Total
1978	1,549	242	33,318	93	35,202
1979	1,385	629	62,253	43	64,310
1980	1,381	1,055	69,780	33	72,249
1981	924	1,212	93,349	32	95,517
1982	283	1,046	115,051	11	116,391
1983	389	1,357	122,749	32	124,527
1984	291	686	108,270	12	109,259
1985	400	291	91,381	8	92,080
1986	423	253	85,992	2	86,670
1987	398	332	87,768	7	88,505
1988	372	372	94,011	7	94,762
1989	190	394	91,488	1	92,073
1990	70	624	90,891	0	91,585
1991	146	412	96,772	0	97,330
1992	107	389	94,478 ²	0	94,974
1993 ¹	91	438	96,578	0	97,107

¹ Provisional data

² Including 614 tonnes oceanic *S. mentella*.

Table 7.3.3 Nominal catch of REDFISH (in tonnes) by countries in Division Vb (Faroe Islands) as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Denmark	-	-	-	-	-	-	-
Faroe Islands	1,525	5,693	5,509	3,232	3,999	4,642	8,770
France	448	862	627	59	204	439	559
Germany, Fed. Rep.	7,767	6,108	3,891	3,841	4,660	4,300	4,460
Iceland	-	-	-	-	1	-	-
Netherlands	+	-	-	-	-	-	-
Norway	9	11	12	13	7	3	1
UK	57	+	-	-	-	-	-
USSR	-	-	-	-	-	-	142
Total	9,806	12,674	10,039	7,145	8,871	9,384	13,932

Country	1985	1986	1987	1988	1989	1990	1991	1992 ¹	1993 ¹
Denmark	-	36	176	8	-	+	-	-	-
Faroe Islands	12,634	15,224	13,477	12,966	12,636	10,017	14,090	15,279	-
France	1,157	752	819	582	996 ¹	909 ¹	473 ¹	114	-
Germany, Fed. Rep. ²	5,091	5,142	3,060	1,595	1,191	441	447	450	239
Iceland	-	-	-	-	-	-	-	-	-
Netherlands	4	2	5	5	21	21	20	35 ¹	22
Norway	-	-	-	-	-	+	3	29	8
UK	-	-	-	-	-	-	-	15	-
USSR/Russia ³	-	-	-	-	-	-	-	-	-
Total	18,886	21,156	17,537	15,156	14,844	10,476	15,033	15,922	

¹Provisional data.

²Includes former GDR.

³As from 1991

Table 7.3.4 Landings of REDFISH (in tonnes) by countries in Division Vb as used by the Working Group.

Year	Denmark	Faroes	France	Germany	Iceland	Lithuania	Norway	UK	Russia ¹	Total
1978	0	1,525	448	7,767	0		9	57	0	9,806
1979	0	5,693	862	6,108	0		11	0	0	12,674
1980	0	5,509	627	3,891	0		12	0	0	10,039
1981	0	3,232	59	3,841	0		13	0	0	7,145
1982	0	3,999	204	5,230	1		7	0	0	9,441
1983	0	4,642	439	4,300	0		3	0	0	9,384
1984	0	8,770	559	4,460	0		1	0	142	13,932
1985	0	12,634	1,157	5,091	0		4	0	868	19,754
1986	36	15,224	752	5,142	0		2	0	320	21,476
1987	176	13,478	819	3,060	0		5	0	0	17,538
1988	8	13,318	582	1,595	0		5	0	0	15,508
1989	0	12,860	996	1,191	0		21	0	0	15,068
1990	0	10,364	909	441	0		21	0	2	11,737
1991	0	14,090	473	447	0		20	3	4	15,037
1992	0	15,279	114	450	0	4	35	39	47	15,968
1993 ²	0	9,690		239	0	0	22	8	0	9,959

¹USSR 1978-1991, Russia 1992-1993.

²Provisional data.

Table 7.3.5 Nominal catch of REDFISH (in tonnes) by countries in Sub-area VI as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Faroe Islands	-	1	-	-	-	-	19
France	307	215	202	24	44	93	102
Germany, Fed. Rep.	18	604	907	983	604	359	563
Norway	4	4	2	3	4	2	9
Spain	-	-	-	1	-	2	-
UK (Engl. & Wales)	1	-	-	-	2	-	1
UK (Scotland)	1	1	-	-	-	-	1
Total	331	825	1,111	1,011	654	456	695

Country	1985	1986	1987	1988	1989	1990	1991	1992 ²	1993 ¹
Faroe Islands	18	-	-	1	61	-	22	6	
France	397	480	1,032	1,024	726	684 ¹	483 ¹	127	
Germany, Fed. Rep.	76	24	-	16	1	6	8	1	77
Ireland	-	-	-	-	-	-	-	-	1
Norway	-	14	2	1	2	5	-	4	3
Spain	-	-	-	-	-	-	-	-	-
UK (Engl. & Wales)	1	2	3	75	-	29	11	4	-
UK (Scotland)	-	10	17	6	4	6	39	32	83
Total	492	530	1,054	1,123	798	730	563	174	164

¹Preliminary.

Table 7.3.6 Landings of REDFISH (in tonnes) by countries in Sub-area VI as used by the Working Group.

Year	Faroes	France	Germany	Ireland	Norway	Spain	UK	Total
1978	0	307	18	0	4	0	2	331
1979	1	215	604	0	4	0	1	825
1980	0	202	907	0	2	0	0	1,111
1981	0	24	983	0	3	1	0	1,011
1982	0	44	604	0	4	0	2	654
1983	0	93	359	0	2	2	0	456
1984	19	102	563	0	9	0	2	695
1985	18	397	76	0	0	0	1	492
1986	0	480	24	0	14	0	12	530
1987	0	1,032	0	0	2	0	20	1,054
1988	1	1,024	16	0	1	0	81	1,123
1989	61	726	1	0	2	0	8	798
1990	0	684	6	0	5	0	35	730
1991	22	483	8	0	+	0	50	563
1992	9	127	0	1	4	0	36	177
1993 ¹	6		77	1	3	0	83	170

¹Provisional data.

Table 7.3.7 Nominal catch of REDFISH (in tonnes) by country in Sub-area XII as reported officially to ICES.

Country	1982	1983	1984	1985	1986
Bulgaria	-	-	-	-	-
German Dem. Rep.	-	-	-	-	-
Germany, Fed. Rep.	5,696	2,209	-	-	-
Greenland	-	-	-	-	-
Iceland	-	-	-	-	-
Norway	-	-	-	-	-
Poland	-	-	-	-	-
USSR	39,783	60,079	60,643	17,300	24,131
Total	45,479	62,288	60,643	17,300	24,131

Country	1987	1988	1989	1990	1991	1992	1993 ¹
Bulgaria	-	-	-	1,617	-	-	-
German Dem. Rep.	-	-	352	-	62	-	-
Germany, Fed. Rep.	-	-	1	7	-	1,084	6,459
Greenland	-	-	-	-	-	9	-
Iceland	-	-	567	185	95	361	8,098
Latvia	-	-	-	-	-	780	2,700
Norway	-	-	-	249	4,122	10,560 ¹	7,260
Poland	-	-	112	-	-	-	-
USSR/Russia ²	2,948	9,772	15,543	4,274	6,624	2,485	-
Total	2,948	9,772	16,575	6,332	7,507	16,731	24,517

¹Provisional.

²As from 1991

³As reported to FAO.

Table 7.3.8 Landings of REDFISH (in tonnes) by countries in Sub-area XII as used by the Working Group.

Year	Bulgaria	Estonia	France	Germany 4	Greenland	Iceland	Latvia	Norway	Poland	Russia 3	Total
1981	0	0	0	0	0	0		0	0	0	0
1982	0	0	0	0	0	0		0	0	39,783	39,783
1983	0	0	0	0	0	0		0	0	60,079	60,079
1984	0	0	0	0	0	0		0	0	60,643	60,643
1985	0	0	0	0	0	0		0	0	17,300	17,300
1986	0	0	0	0	0	0		0	0	24,131	24,131
1987	0	0	0	0	0	0		0	0	2,948	2,948
1988	0	0	0	0	0	0		0	0	9,772	9,772
1989	0	0	0	353	0	658 1		0	112	15,543	16,666
1990	1,617	0	0	7	0	215 1		926 2	0	4,274	7,039
1991	0	0	0	62	0	110 1		764 2	0	6,624	7,560
1992	0	1,452	2	1,084	9	419 1	780	369 2	0	11,266	15,381
1993 5	0	0	0	6,459	703	8,707 1	2,700	5,620 2	0	18,669	42,858

1 Raised by 16% to account for discarding.

2 According to official log-books and raised by 5% to account for discarding.

3 USSR 1981-1991, Russia 1992-1993.

4 Includes former GDR.

5 Provisional data.

Table 7.3.9 Nominal catch of REDFISH (in tonnes) by countries in Sub-area XIV (East Greenland) as reported officially to ICES.

Country	1982	1983	1984	1985	1986
Bulgaria ⁴	-	-	2,961	5,825	11,385
Denmark	11	-	-	-	-
Faroe Islands	-	27	-	-	5
German Dem. Rep.	-	155	989	5,438	8,574
Germany, Fed. Rep.	37,119	28,878	14,141	5,974	5,584
Greenland	+	1	10	5,519 ²	9,542 ²
Iceland	17	-	-	+	-
Norway	-	-	17	-	-
Poland	581	-	239	135	149
UK (Engl. & Wales)	-	-	-	-	-
UK (Scotland)	-	-	-	-	-
USSR	20,217	-	-	42,973	60,863
Total	57,945	29,061	18,357	65,864	96,102

Country	1987	1988	1989	1990	1991	1992	1993 ¹
Bulgaria	12,270	8,455	4,546	1,073	-	-	
Denmark	-	-	-	-	-	-	
Faroe Islands	382	1,634	226	-	115	3,765	
German Dem. Rep.	7,023	16,848	6,444	7,950	-	-	
Germany, Fed. Rep.	4,691	5,734	2,372	3,268	9,122	7,959	26,969
Greenland	670	42	3	24	42	962	+
Iceland	-	-	814	3,726	7,477	12,982	11,649
Norway	-	-	-	6,070	4,954	636 ¹	3,000
Poland	25	-	-	-	-	-	-
UK (Engl. & Wales)	-	-	5	39	219	178	241
UK (Scotland)				3	+	28	-
USSR/Russia ³	68,521	55,254	7,177	3,040	2,665	1,844	
Total	93,582	87,967	21,587	25,193	24,594	28,354	41,859

¹Provisional.

²Fished mainly by the Japanese fleet.

³As from 1991.

⁴As reported to FAO.

Table 7.3.10 Landings on REDFISH (in tonnes) by country in Sub-area XIV, as used by the Working Group.

Year	Bulgaria	Faroës	France	GDR	FRG	Greenland	Iceland	Japan	Norway	Poland	UK	Russia 3	Total
1978	0	0	0	0	20,711	3	151	0	2	0	13	0	20,880
1979	0	0	490	0	20,428	0	0	0	0	0	0	0	20,918
1980	0	0	0	0	32,520	0	89	0	0	0	0	0	32,609
1981	0	18	0	0	42,980	1	0	0	0	0	0	0	42,999
1982	0	0	0	0	42,815	0	17	0	0	581	0	20,217	63,630
1983	0	27	0	155	30,815	1	0	0	0	0	0	0	30,998
1984	2,961	0	0	989	14,141	10	0	0	15	239	0	0	18,355
1985	5,825	0	0	5,438	5,974	5,519	0	0	0	135	0	42,973	65,864
1986	11,385	5	0	8,574	5,584	9,542	0	0	0	149	0	60,683	95,922
1987	12,270	382	0	7,023	4,691	2,912	0	0	0	25	0	68,521	95,824
1988	8,455	1,634	0	16,848	5,734	3,751	0	0	0	0	0	55,254	91,676
1989	4,546	226	0	6,444	2,372	285	3,158 1	307	0	0	5	7,177	24,520
1990	1,073	0	0	7,950	3,268	24	4,322 1	3,450	6,159 2	0	42	4,973	31,261
1991	0	115	0		9,122	42	8,781 1	1,224	5,434 2	0	219	2,665	27,602
1992	0	3,765	0		7,959	3,769	16,059 1	0	14,322 2	0	206	4,467	50,547
1993 4	0	4,026	0		26,969	200	14,200 1	938	9,023 2	0	241	5,496	61,093

1 Raised by 16% to account for discarding.

2 According to official log-books and raised by 5% to account for discards in the oceanic *S. mentella* fishery.

3 USSR 1978-1991; Russia 1992-1993.

4 Provisional data.

Table 7.3.11 *S. marinus*. Landings (in tonnes) by area used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	31,300	2,039	313	0	15,477	49,129
1979	56,616	4,805	6	0	15,787	77,214
1980	62,052	4,920	2	0	22,203	89,177
1981	75,828	2,538	3	0	23,608	101,977
1982	97,899	1,810	28	0	30,692	130,429
1983	87,412	3,394	60	0	15,636	106,502
1984	84,766	6,228	86	0	5,040	96,120
1985	67,312	9,194	245	0	2,117	78,868
1986	67,772	6,300	288	0	2,988	77,348
1987	69,212	6,143	576	0	1,196	77,127
1988	80,472	5,020	533	0	3,964	89,989
1989	51,825	4,140	373	0	685	57,023
1990	63,156	2,407	382	0	687	66,632
1991	49,678	2,140	292	0	3,911	56,021
1992	55,403	3,435	40	0	714	59,592
1993 1	47,552	2,113	86	0	1,673	51,424

1 Provisional data.

Table 7.3.12 Deep-sea *S. mentella*. Landings (in tonnes) by area used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	3,902	7,767	18	0	5,403	17,090
1979	7,694	7,869	819	0	5,131	21,513
1980	10,197	5,119	1,109	0	10,406	26,831
1981	19,689	4,607	1,008	0	19,391	44,695
1982	18,492	7,631	626	0	12,140	38,889
1983	37,115	5,990	395	0	15,207	58,707
1984	24,493	7,704	609	0	9,126	41,932
1985	24,768	10,560	247	0	9,376	44,951
1986	18,898	15,176	242	0	12,138	46,454
1987	19,293	11,395	478	0	6,407	37,573
1988	14,290	10,488	590	0	6,065	31,433
1989	40,248	10,928	425	0	2,284	53,885
1990	28,429	9,330	348	0	6,097	44,204
1991	47,652	12,897	271	0	6,514	67,334
1992	38,957	12,533	137	0	6,090	57,717
1993 ¹	49,555	7,846	84	0	15,032	72,517

¹ Provisional data.

Table 7.3.13 Oceanic *S. mentella*. Landings (in tonnes) by area as used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	0	0	0	0	0	0
1979	0	0	0	0	0	0
1980	0	0	0	0	0	0
1981	0	0	0	0	0	0
1982	0	0	0	39,783	20,798	60,581
1983	0	0	0	60,079	155	60,234
1984	0	0	0	60,643	4,189	64,832
1985	0	0	0	17,300	54,371	71,671
1986	0	0	0	24,131	80,976	105,107
1987	0	0	0	2,948	88,221	91,169
1988	0	0	0	9,772	81,647	91,419
1989	0	0	0	16,666	21,551	38,217
1990	0	0	0	7,039	24,477	31,516
1991	0	0	0	7,560	17,177	24,737
1992	614	0	0	15,381	43,743	59,738
1993 ¹	0	0	0	42,858	44,388	87,246

¹ Provisional data.

Table 7.3.14 Oceanic *S. mentella*. Landings (in tonnes) by countries used by the Working Group.

Year	Bulgaria	Estonia	Faroese	France	GDR	Germany	Greenland	Iceland	Latvia	Norway	Poland	Russia 2	Total
1981	0	0	0	0	0	0	0	0		0	0	0	0
1982	0	0	0	0	0	0	0	0		0	581	60,000	60,581
1983	0	0	0	0	155	0	0	0		0	0	60,079	60,234
1984	2,961	0	0	0	989	0	0	0		0	239	60,643	64,832
1985	5,825	0	0	0	5,438	0	0	0		0	135	60,273	71,671
1986	11,385	0	5	0	8,574	0	0	0		0	149	84,994	105,107
1987	12,270	0	382	0	7,023	0	0	0		0	25	71,469	91,169
1988	8,455	0	1,090	0	16,848	0	0	0		0	0	65,026	91,419
1989	4,546	0	226	0	6,796	1	0	3,816		0	112	22,720	38,217
1990	2,690	0	0	0	7,950	7	0	4,537		7,085	0	9,247	31,516
1991	0	0	115	0		244	0	8,891		6,198	0	9,289	24,737
1992	0	1,452 ³	3,765	2		6,251	9	17,092	780	14,654	0	15,733	59,738
1993 ¹	0	0	4,026	0		18,168	703	22,907	2,700	14,577	0	24,165	87,246

1 Provisional data.

2 USSR 1981-1991; Russia 1992-1993.

3 Officially reported to ICES in 1993 but not in 1994.

Table 7.3.15 Length frequencies of *S. Marinus*
1993 Landings in Division Va.

Length	Male		Female		Both Sexes	
	Freq.	%	Freq.	%	Freq.	%
17	0	0.0	0	0.0	1	0.0
19	0	0.0	0	0.0	1	0.0
21	0	0.0	1	0.0	4	0.0
22	0	0.0	0	0.0	1	0.0
23	0	0.0	0	0.0	4	0.0
24	0	0.0	0	0.0	6	0.1
25	0	0.0	1	0.0	9	0.1
26	5	0.1	2	0.1	25	0.2
27	8	0.2	5	0.1	58	0.5
28	19	0.5	18	0.5	101	0.9
29	49	1.4	47	1.3	188	1.7
30	73	2.0	85	2.4	266	2.4
31	100	2.8	105	3.0	305	2.7
32	131	3.6	148	4.2	438	3.9
33	209	5.8	176	5.0	582	5.2
34	259	7.2	249	7.0	714	6.3
35	330	9.1	248	7.0	847	7.5
36	404	11.2	300	8.5	1025	9.1
37	368	10.2	329	9.3	1062	9.4
38	336	9.3	318	9.0	1013	9.0
39	307	8.5	293	8.3	946	8.4
40	281	7.8	279	7.9	839	7.4
41	209	5.8	235	6.6	721	6.4
42	197	5.4	187	5.3	575	5.1
43	117	3.2	178	5.0	441	3.9
44	84	2.3	118	3.3	337	3.0
45	51	1.4	64	1.8	236	2.1
46	23	0.6	55	1.6	179	1.6
47	21	0.6	32	0.9	130	1.2
48	14	0.4	23	0.6	79	0.7
49	6	0.2	15	0.4	54	0.5
50	4	0.1	8	0.2	32	0.3
51	5	0.1	6	0.2	23	0.2
52	1	0.0	5	0.1	15	0.1
53	2	0.1	1	0.0	6	0.1
54	0	0.0	1	0.0	5	0.0
55	0	0.0	2	0.1	6	0.1
56	1	0.0	3	0.1	5	0.0
57	0	0.0	0	0.0	1	0.0
58	1	0.0	1	0.0	4	0.0
59	0	0.0	0	0.0	1	0.0
60	0	0.0	1	0.0	1	0.0
62	1	0.0	1	0.0	2	0.0
63	0	0.0	0	0.0	2	0.0
67	1	0.0	0	0.0	1	0.0
68	0	0.0	1	0.0	1	0.0
82	0	0.0	1	0.0	1	0.0
Σ	3617	100.0	3542	100.0	11293	100.0
Mean Length		37.30		37.83		37.66

Table 7.3.16 Length frequencies of deep-sea *S. Mentella*.
1993 Icelandic landings in Division Va.

Length	Male		Females		Both Sexes	
	Freq.	%	Freq.	%	Freq.	%
21	0	0.0	0	0.0	1	0.0
25	0	0.0	0	0.0	1	0.0
27	0	0.0	2	0.1	2	0.0
28	2	0.1	1	0.1	3	0.1
29	2	0.1	1	0.1	3	0.1
30	5	0.3	3	0.2	12	0.3
31	6	0.4	9	0.6	27	0.6
32	8	0.5	12	0.8	44	1.0
33	16	1.1	20	1.3	74	1.7
34	39	2.7	28	1.8	118	2.8
35	47	3.2	32	2.1	143	3.3
36	79	5.4	62	4.0	227	5.3
37	73	5.0	90	5.9	274	6.4
38	103	7.0	81	5.3	315	7.4
39	123	8.4	94	6.1	329	7.7
40	145	9.9	132	8.6	392	9.2
41	135	9.2	137	8.9	368	8.6
42	141	9.6	141	9.2	372	8.7
43	122	8.3	126	8.2	333	7.8
44	107	7.3	133	8.7	306	7.2
45	89	6.1	120	7.8	257	6.0
46	67	4.6	91	5.9	201	4.7
47	52	3.5	79	5.2	178	4.2
48	45	3.1	52	3.4	114	2.7
49	28	1.9	32	2.1	76	1.8
50	13	0.9	30	2.0	51	1.2
51	8	0.5	10	0.7	20	0.5
52	4	0.3	6	0.4	11	0.3
53	6	0.4	1	0.1	8	0.2
54	1	0.1	4	0.3	6	0.1
55	2	0.1	1	0.1	3	0.1
56	0	0.0	2	0.1	2	0.0
62	0	0.0	1	0.1	1	0.0
Σ	1468	100.0	1533	100.0	4272	100.0
Mean Length	41.20		41.86		41.02	

Table 7.3.17 Faroese catches of redfish by length group in Division Vb 1993. S. Marinus.

Length distribution S. marinus

CM	Females		Males	
	No	%	No	%
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	1	0.23	0	0
36	0	0	2	0.31
37	2	0.45	3	0.46
38	2	0.45	3	0.46
39	3	0.68	2	0.31
40	5	1.13	7	1.08
41	8	1.81	9	1.38
42	10	2.26	26	4
43	20	4.51	41	6.31
44	18	4.06	49	7.54
45	25	5.64	52	8
46	32	7.22	84	12.92
47	36	8.13	87	13.38
48	35	7.9	88	13.54
49	28	6.32	63	9.69
50	33	7.45	52	8
51	29	6.55	29	4.46
52	29	6.55	28	4.31
53	24	5.42	6	0.92
54	17	3.84	3	0.46
55	20	4.51	2	0.31
56	18	4.06	2	0.31
57	15	3.39	1	0.15
58	15	3.39	3	0.46
59	9	2.03	1	0.15
60	7	1.58	0	0
61	0	0	0	0
62	1	0.23	1	0.15
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	1	0.15
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	1	0.23	2	0.31
71	0	0	1	0.15
72	0	0	1	0.15
73	0	0	1	0.15
Total	443	100.02	650	99.97
Meanlength	49.6		47.2	

Table 7.3.18 Faroese catches of redfish by length group in Division Vb 1993. S. Mentella.

Length distribution S. mentella

CM	Females		Males	
	No	%	No	%
30	1	0.02	0	0
31	5	0.12	3	0.06
32	4	0.1	8	0.15
33	19	0.46	12	0.23
34	16	0.39	36	0.69
35	36	0.88	102	1.96
36	45	1.1	215	4.13
37	85	2.07	350	6.73
38	146	3.56	582	11.19
39	221	5.38	625	12.02
40	498	12.13	852	16.38
41	481	11.72	681	13.09
42	603	14.69	566	10.88
43	462	11.25	370	7.11
44	398	9.7	268	5.15
45	393	9.57	199	3.83
46	216	5.26	124	2.38
47	183	4.46	88	1.69
48	121	2.95	52	1
49	57	1.39	35	0.67
50	71	1.73	25	0.48
51	11	0.27	4	0.08
52	9	0.22	1	0.02
53	3	0.07	0	0
54	4	0.1	0	0
55	3	0.07	0	0
56	0	0	1	0.02
57	2	0.05	1	0.02
58	4	0.1	1	0.02
59	3	0.07	0	0
60	3	0.07	0	0
61	1	0.02	0	0
62	0	0	0	0
63	1	0.02	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
Total	4105	99.99	5201	99.98
Meanlength	42.6		40.5	

Table 7.3.19 Oceanic Sebastes Mentella. 1993 Norwegian landings from ICES Subareas XII and XIVb.

Catch 14,577 tonnes
 Nos. aged 400 specimens.

Age (years)	Numbers in thousands
10	257
11	105
12	419
13	126
14	105
15	232
16	1355
17	1248
18	2942
19	1895
20	2177
21	2027
22	1689
23	1834
24	2140
25	1467
26	1433
27	242
28	1698
29+	698
Σ	<hr/> 24089 <hr/>

Nos. and weight by length group.

Length (cm)	Min-Max weight	Mean weight	Sample size
29	336-357	344	3
30	381-441	408	9
31	354-509	443	30
32	401-536	472	73
33	411-608	508	78
34	471-666	550	79
35	465-710	598	55
36	548-810	652	35
37	572-830	718	18
38	685-934	753	10
39	764-968	847	9
40	900	900	1
41	836-948	891	3
42	1100-1187	1149	3
43	1074-1165	1107	3
44	1056-1069	1063	2
45	1240	1240	<hr/> 1 <hr/>
Σ			<hr/> 412 <hr/>

Table 7.4.1 Number of 0-group REDFISH millions (nautical mile)² from the Icelandic 0-group survey.

Year	Number
1970	8.6
1971	12.6
1972	31.1
1973	74.0
1974	23.6
1975	12.6
1976	5.8
1977	13.0
1978	6.5
1979	1.3
1980	3.0
1981	9.0
1982	2.7
1983	0.7
1984	4.3 ¹
1985	22.6 ¹
1986	12.1 ¹
1987	22.9 ¹
1988	17.0 ¹
1989	14.3 ¹
1990	23.5 ¹
1991	26.4 ¹
1992	11.6
1993	4.0

¹Reduced area.

Table 7.4.2 Discards of redfish as reported in log books to Greenland authorities 1992 and 1993.

Discard of redfish as reported in logbooks to Greenland				
AREA XIV				
1992				
Country	shrimp fishery		Redfish fishery	
	tonnes		tonnes	
DK	3			
UK			13	
FA	17			
GR	29		11	
NR	32			
GER			12	
total	81		36	
1993				
DK	3			
UK			6	
FA	17			
GR	64			
NR	78			
GER			133	
total	162		139	

Table 7.5.1 Icelandic groundfish survey indices, catch and effort for *S. marinus* in 1985-1994.

Year	Survey index (U)	Landings (Y)	Effort (Y/U)
85	3857	67312	17.5
86	4424	67772	15.3
87	4335	68212	15.7
88	3083	80547	26.1
89	3512	51597	14.7
90	3268	62896	19.2
91	2004	49405	24.7
92	1795	55201	30.8
93	1508	47024	31.2
		50797	
94	1629	38098	
		25399	

Effort 94 = Effort 93
Effort 94 = 0.75*Effort 93
Effort 94 = 0.5*Effort 93

Table 7.5.2 Catch per unit effort for oceanic *S. mentella* in Sub-areas XII and XIV.

Year	CPUE (t/h)				
	Bulgaria	GDR (FVSIV)	Iceland	Norway	USSR-Russia (BMRT)
1982	-	-	-	-	1.99
1983	-	-	-	-	1.60
1984	1.25	-	-	-	1.48
1985	1.85	-	-	-	1.68
1986	2.04	-	-	-	1.35
1987	1.22	0.79	-	-	1.10
1988	1.22	1.28	-	-	1.00
1989	0.82	0.70	1.18	-	1.00
1990	-	0.89	1.12	1.09	0.99
1991	-	-	1.42	1.42	0.80
1992	-	-	1.62	1.79	0.63
1993 ¹	-	-	2.91	2.02	0.63

¹Preliminary.

Table 7.5.3

Numbers of larvae Sebastes mentella in April-May 1993

Indices	:Northern : Southern	
Abundance of larvae as estimated by the survey, ($\times 10^{11}$)	12,13	62,11
Mean density of larvae, (per sq. m)	5,30	26,40
Numbers of larvae extruded by the time of survey, ($\times 10^{12}$)	6,25	32,01

Table 7.5.4

Abundance and biomass of S. mentella in the Irminger Sea as estimated by the ichthyoplankton survey in 1993

Indices	: Offshore part of the Irminger Sea		: Whole reproduction area
	: Northern	: Southern	:
Survey area, (thou. sq. miles)	61,4	64,1	125,5
Numbers of females, (x 10 ⁸)	2,8	10,6	13,4
Numbers of males, (x 10 ⁸)	1,3	29,8	31,1
Females biomass, (thou.t)	201,4	799,2	1000,6
Males biomass, (thou. t)	75,3	2043,5	2118,8
Total biomass, (thou.t)	276,7	2848,7	3119,4

Table 7.5.5

Biological parameters of S.mentella used in commercial
stock assessment

Parameter	: Northern	: Southern
Percentage of females extruded larvae, (%)	61,3	84,5
Percentage of females in catch, (%)	69,2	26,2
Mean weight of females, (g)	706,6	755,2
Mean weight of males, (g)	593,8	685,5
Mean fecundity of females, (thou. larvae)	35,8	35,8

Table 7.5.6

Irminger Sea redfish (oceanic type) length distribution in 1993
(Russian data).

Length, cm	Males, %	Females, %	Total, %
24	-	+	+
25	+	+	+
26	+	0.1	0.1
27	0.1	0.1	0.2
28	0.2	0.1	0.2
29	0.1	+	0.2
30	0.3	0.3	0.6
31	1.4	0.2	1.6
32	3.7	0.5	4.2
33	8.1	2.2	10.2
34	9.3	4.6	13.9
35	9.2	6.7	15.9
36	7.5	6.1	13.6
37	9.2	7.6	16.8
38	5.3	4.4	9.6
39	3.4	4.0	7.4
40	1.2	2.1	3.2
41	0.2	0.8	1.0
42	0.1	0.4	0.5
43	0.1	0.2	0.3
44	+	0.1	0.1
45	+	+	+
46	-	0.1	0.1
47	-	+	+
No	4387	2995	7382
Average length, cm	35.28	36.38	35.73

Table 7.5.7

Results of the Russian trawl-acoustic survey of Irminger Sea
S. mentella in June-July 1993.

Areas of: survey	Mean length	Mean weight, g	Abundance : x10 ⁹	Biomass, : thou. t
Off shore	35.5	610.4	1693.8	999.3
200-mile zone of Greenland	35.9	624.7	2493.5	1557.7

Table 7.5.8

Irminger Sea redfish (oceanic type) age composition in 1993
(Russian data, scale reading).

Age, years	Males, %	Females, %	Total, %
6	+	+	+
7	0.1	0.3	0.4
8	0.1	0.1	0.2
9	0.1	0.1	0.2
10	0.8	0.3	1.1
11	3.7	0.5	4.1
12	8.9	2.3	11.4
13	13.1	6.2	19.0
14	12.3	10.4	22.9
15	12.8	10.2	22.9
16	4.1	5.1	9.2
17	3.0	3.7	6.8
18	0.2	0.9	1.1
19	0.1	0.3	0.4
20	0.1	0.1	0.2
21	+	0.1	0.1
22		+	+
23		+	+
No	4387	2995	7382
Average age, years	13.73	14.56	14.06
No of aged fishes	477	511	988

Table 7.5.9

Biomass of oceanic S. mentella using the results of Russian trawl-acoustic surveys conducted in 1982-1993

Years : Survey square, thou. sq. m: Redfish biomass, thou. t						

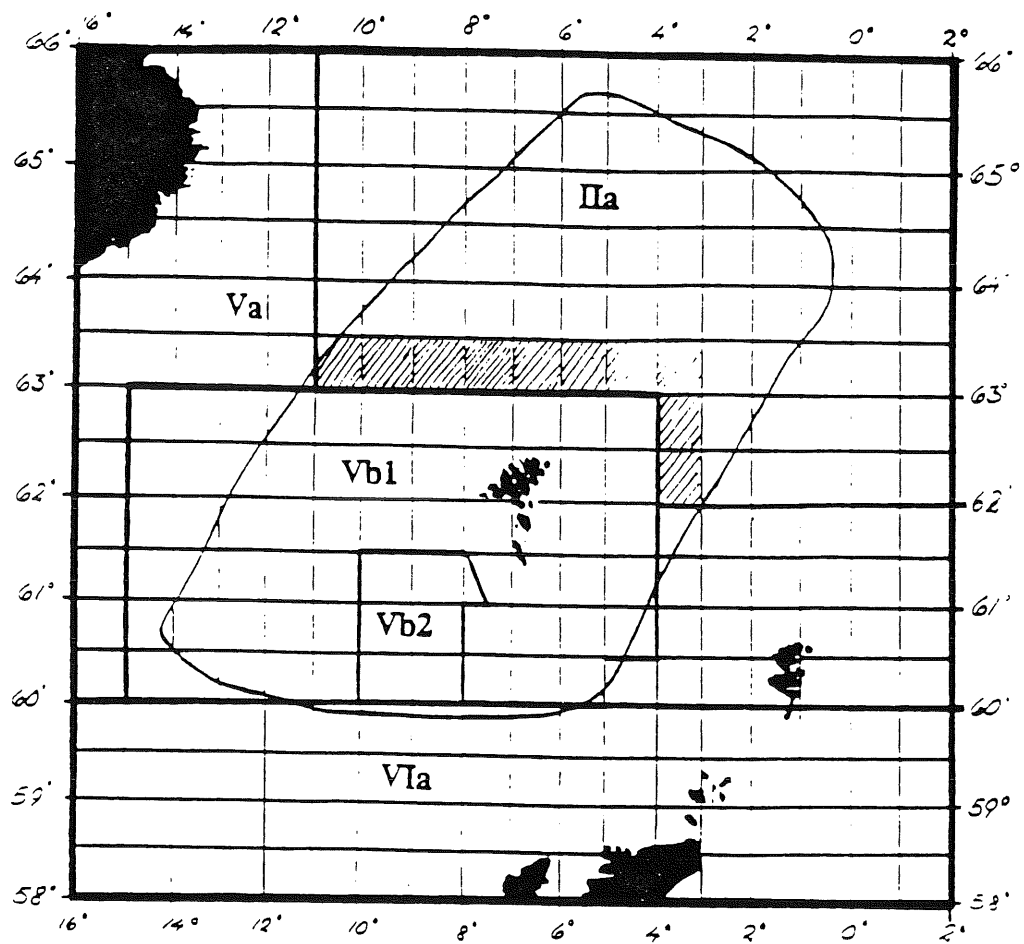
	: Open part:	East Gr.:	Total	: Open part:	East Gr.:	Total
:	: Zone	:	:	: Zone	:	:

1982	40.0	-	40.0	560	-	560
1983	50.0	-	50.0	700	-	700
1984	55.0	-	55.0	526	-	526
1985	71.0	-	71.0	700	-	700
1986	43.0	74.0	117.0	570	610	1180
1987	156.0	59.0	215.0	783	437	1220
1988	91.0	72.0	163.0	452	504	956
1989	78.5	69.6	148.1	582	335.8	917.8
1990	73.2	-	73.2	847.5	-	847.5
1991	59.9	44.6	104.5	169.0	226.8	395.8
1992	150.0	40.0	190.0	1000.0	600.0	1600.0
1993	65.4	55.3	120.7	999.0	1557.0	2556.0

Table 7.5.10 Some projections of the oceanic *S.mentella* stock using the fixed selection pattern showed in Figure 7.5.10.

Acoustic estimated biomass (mill. t.)	Catch-level (t)	Stock in year 2001/Virgin stock (in percentage)		
		M = 0.03	M = 0.05	M = 0.1
1.5	50		62	72
	100	42	47	59
	150	27	32	46
	200		18	33
1.9	50	64	68	77
	100	52	56	66
	150	39	43	55
	200	26	31	44
2.5	50		75	82
	100		65	73
	150		55	64
	200		45	55
3	50		78	84
	100		70	77
	150		61	69
	200		52	62

Figure 2.1.1 The Faroe area and adjacent areas divided into ICES divisions. The Faroese 200 miles economic zone is indicated.



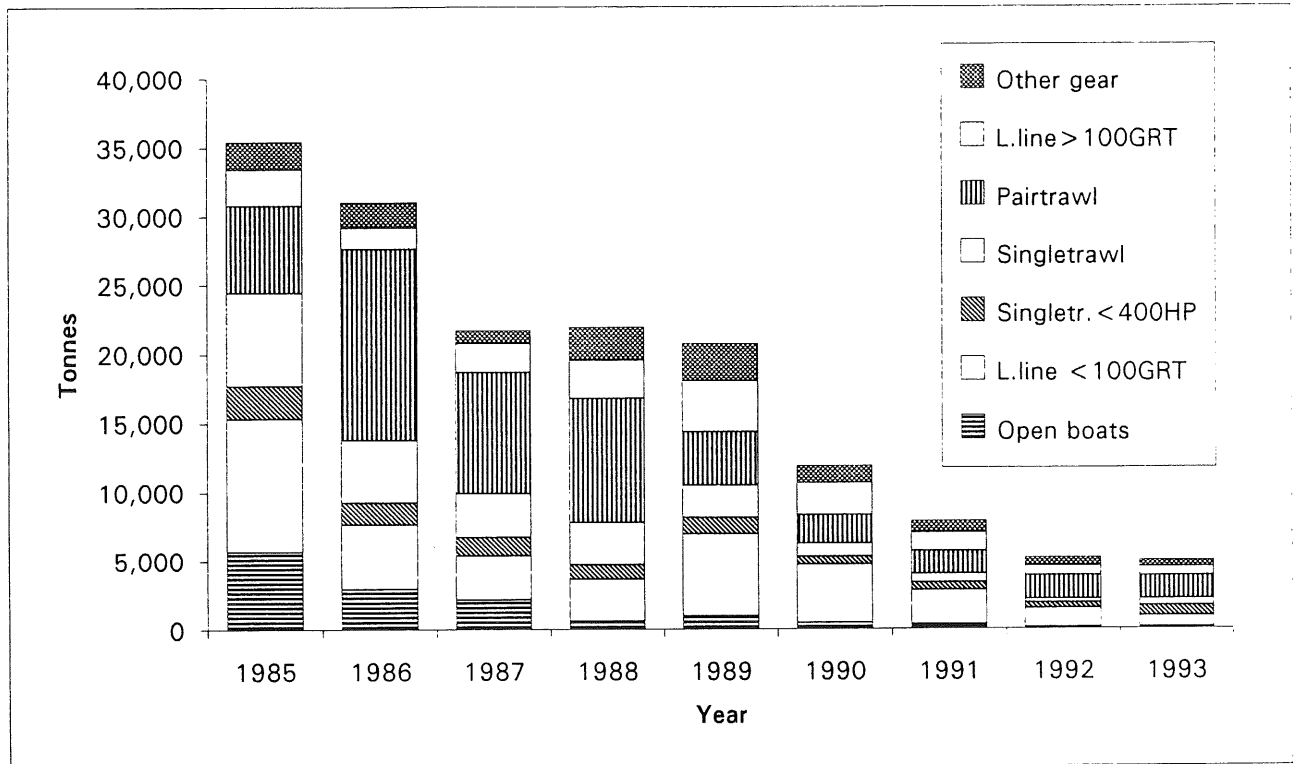


Figure 2.2.1 Catches of Faroe Plateau cod by fleet categories. (Gutted weight).

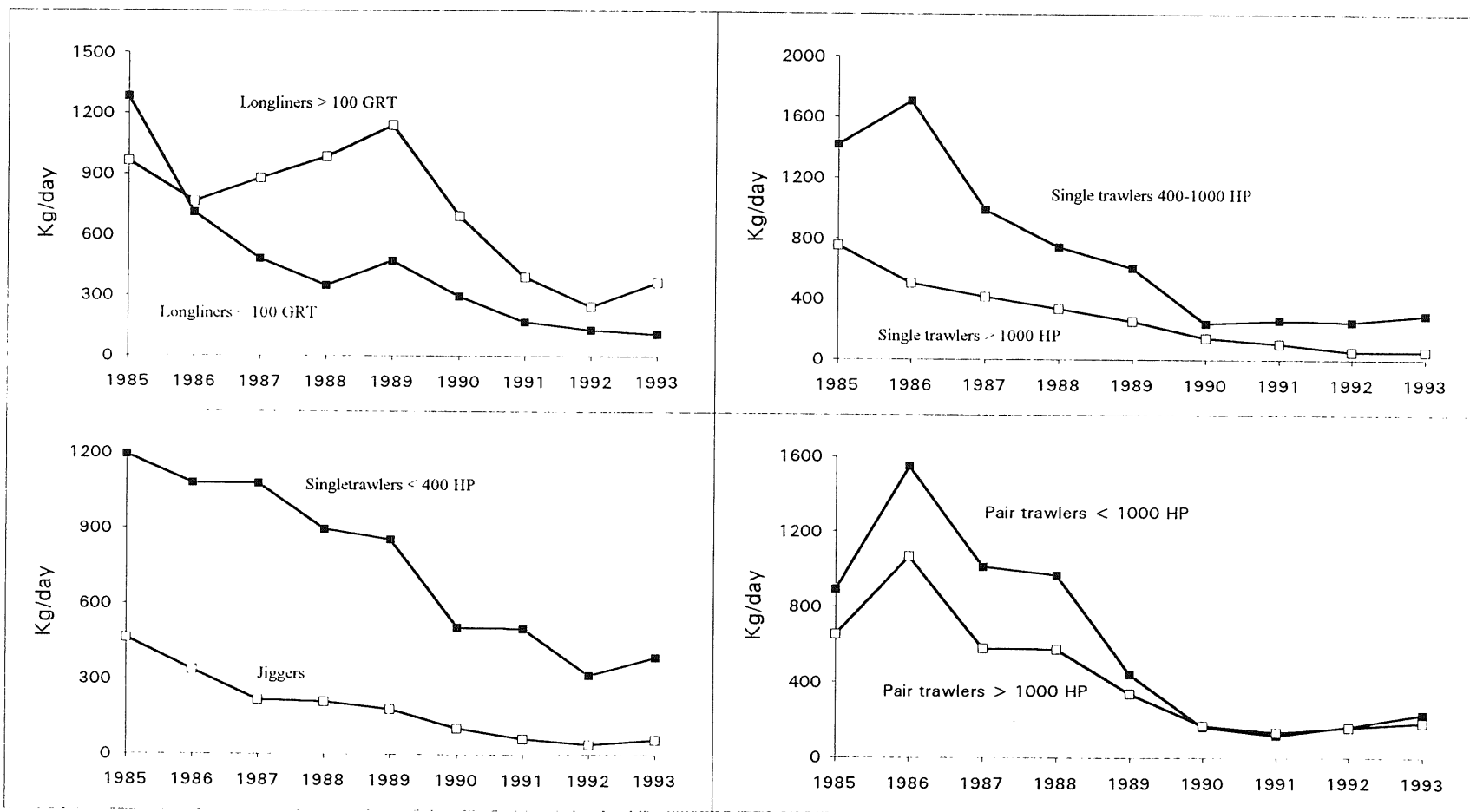


Figure 2.2.2 Catches (kg) of Faroe Plateau cod per unit effort for various fleet categories.

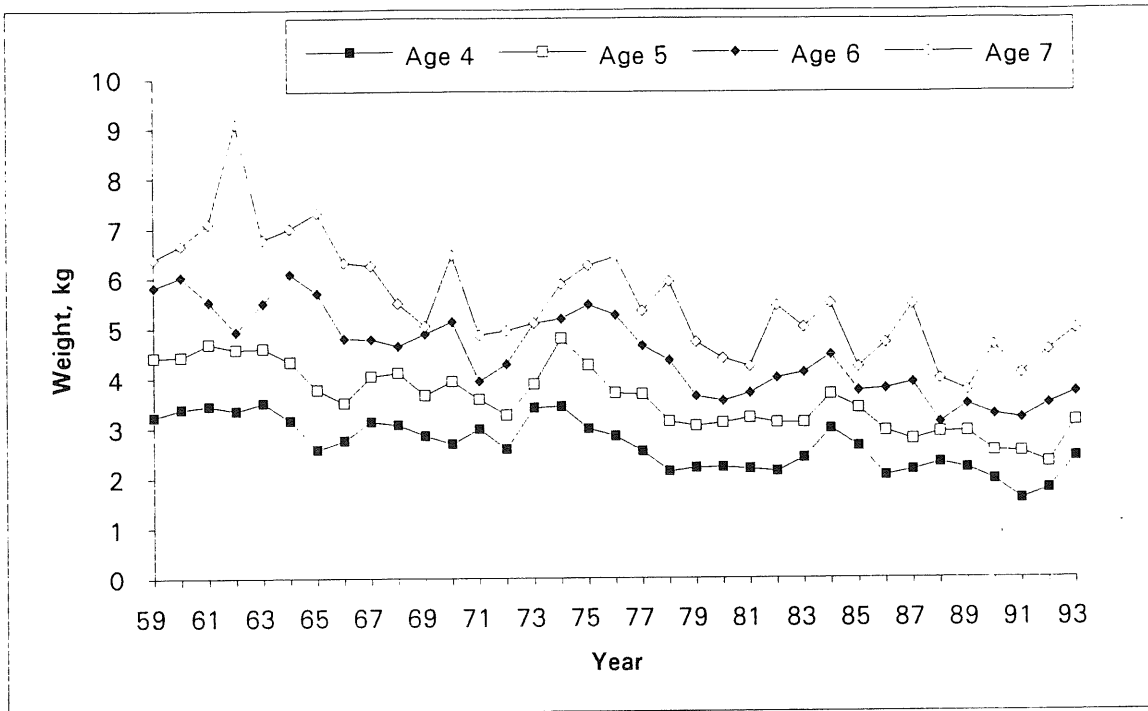


Figure 2.2.3 Mean weight at age of Faroe Plateau cod.

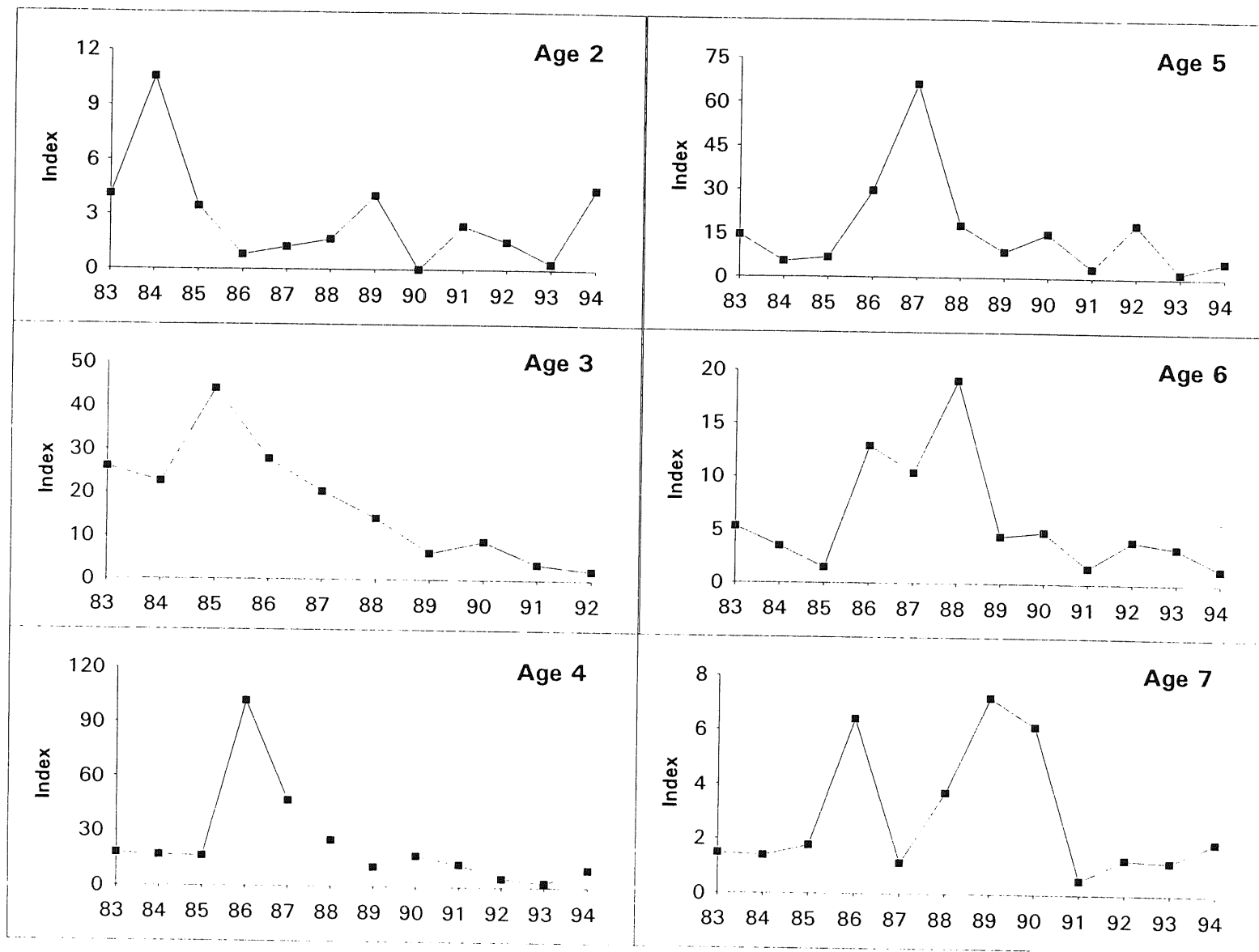


Figure 2.2.4 Stratified mean catch (numbers) of cod in the Farøese groundfish surveys 1983-1994.

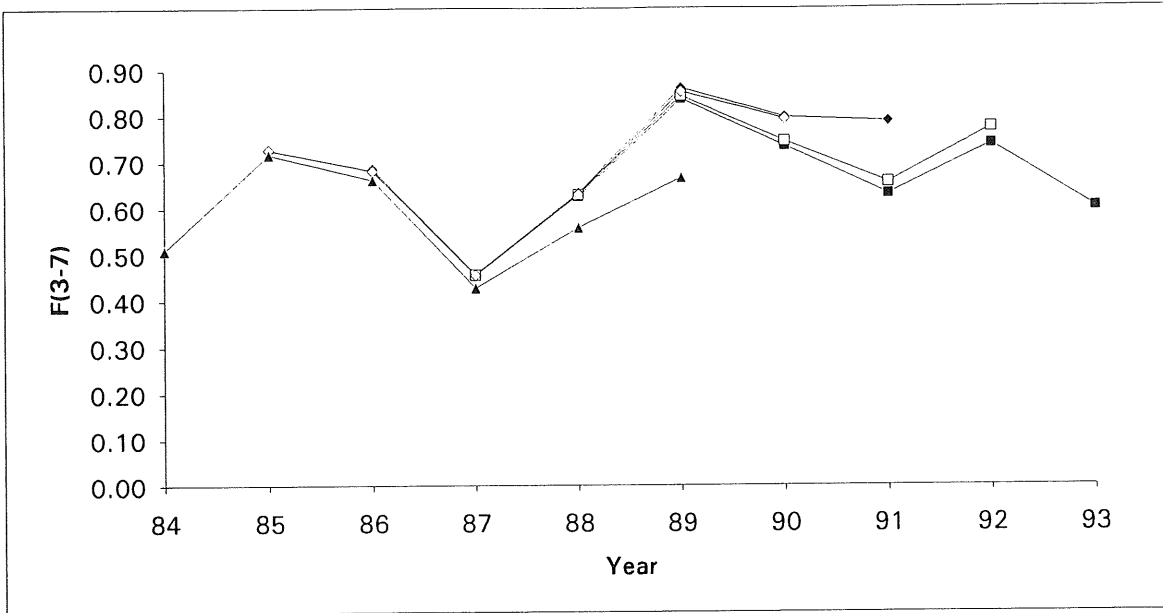


Figure 2.2.5. Retrospective analysis of Faroe Plateau cod.

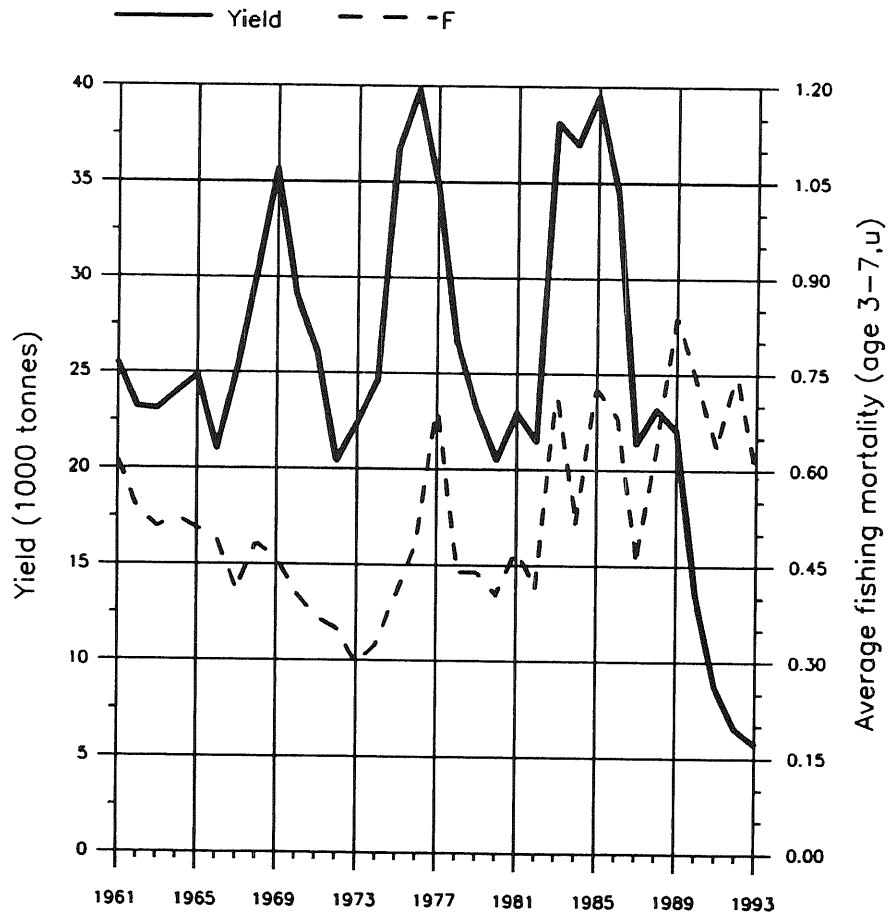
Figure 2.2.6

FISH STOCK SUMMARY

STOCK: Cod in the Faroe Plateau (Fishing Area Vb1)

6-5-1994

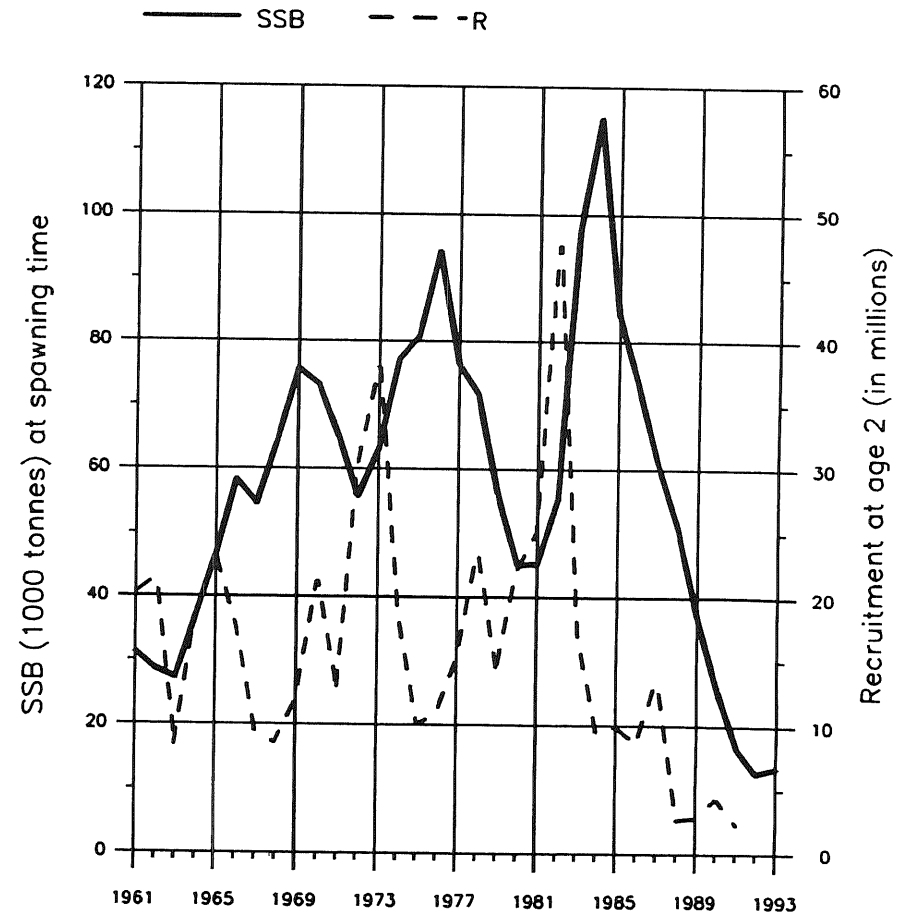
Trends in yield and fishing mortality (F)



(run: CODR41)

Year
A

Trends in spawning stock biomass (SSB) and recruitment (R)



(run: CODR41)

B

Figure 2.2.7

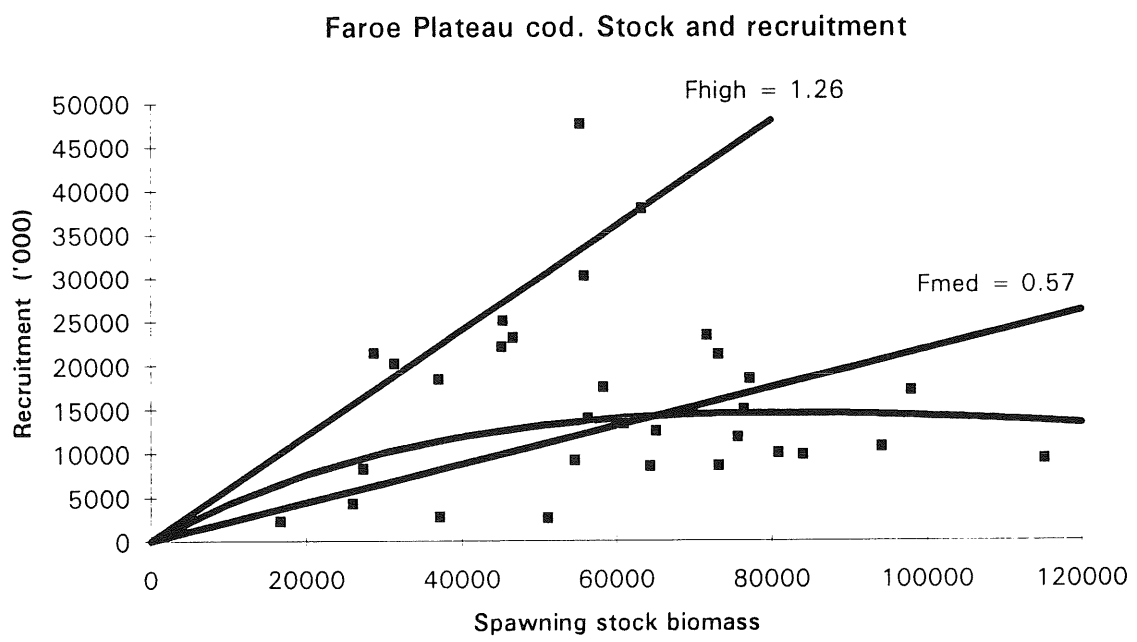


Figure 2.2.8

FISH STOCK SUMMARY

STOCK: Cod in the Faroe Plateau (Fishing Area Vb1)

9-5-1994

Long term yield and spawning stock biomass

Short-term yield and spawning stock biomass

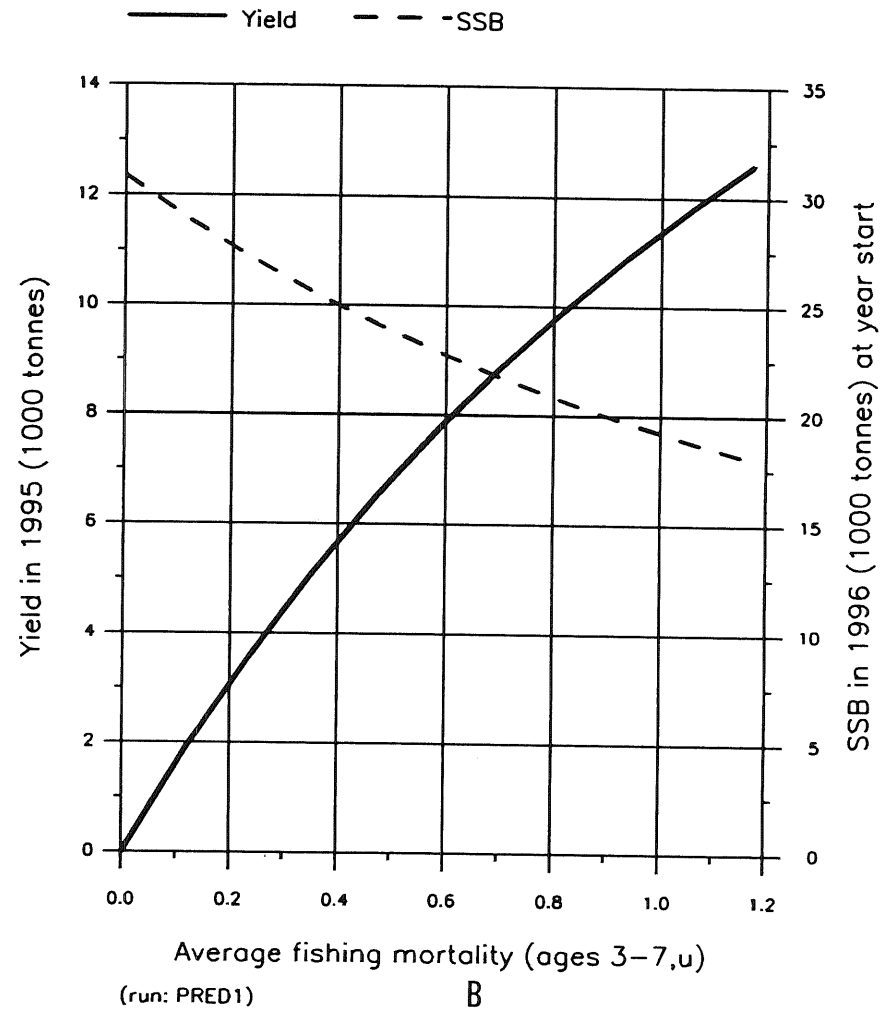
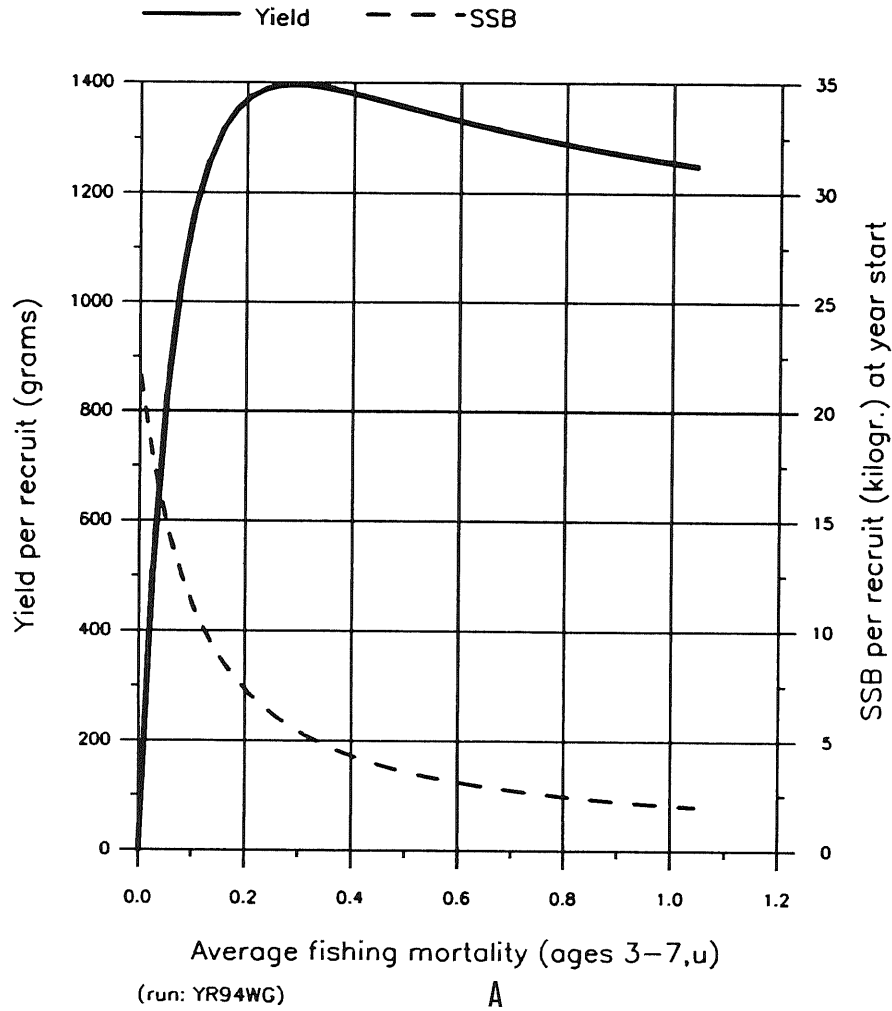
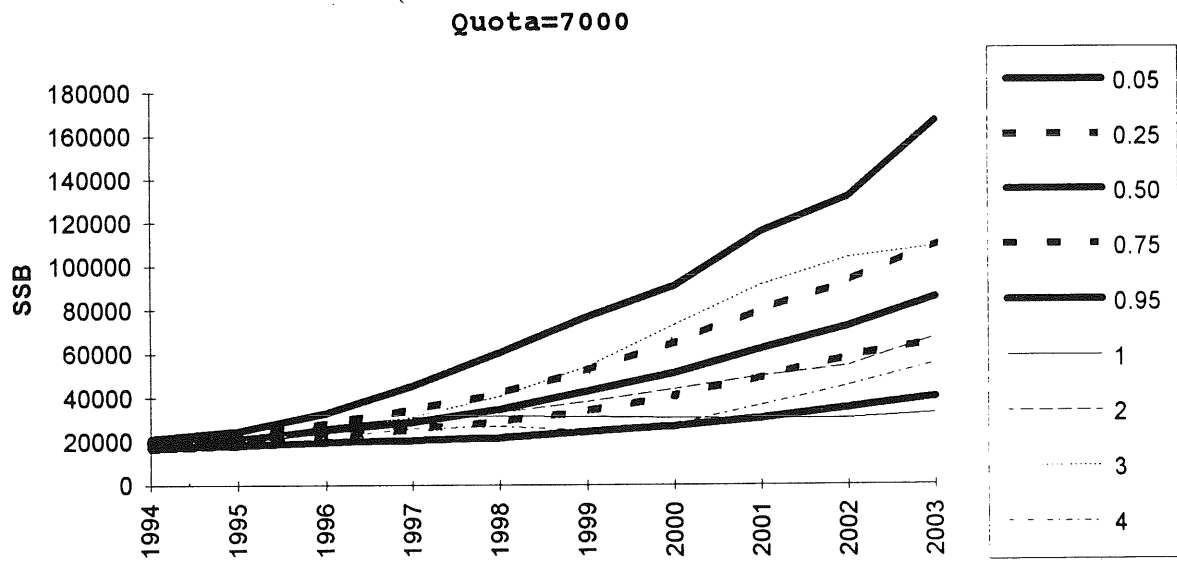


Figure 2.2.9 Faroe Plateau Cod. RISK analysis with a Ricker stock-recruitment and a fixed annual catch of 7,000 t.



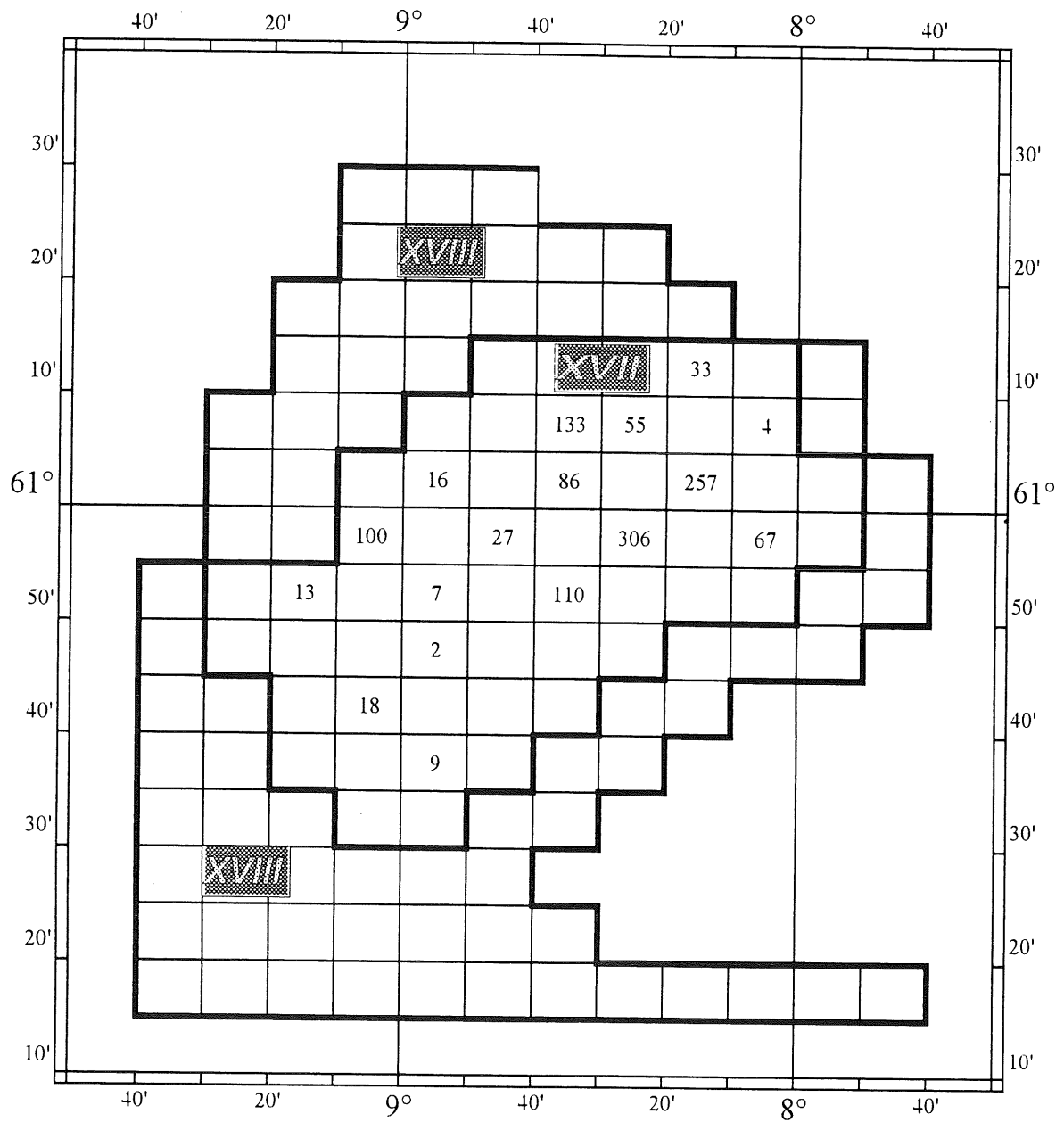


Figure 2.3.1 Catches of cod (kg/haul) in the groundfish surveys on Faroe Bank in April 1994. Area XVII is shallower than 200 m and area XVIII is deeper than 200 m. Stations with zero catches are not included.

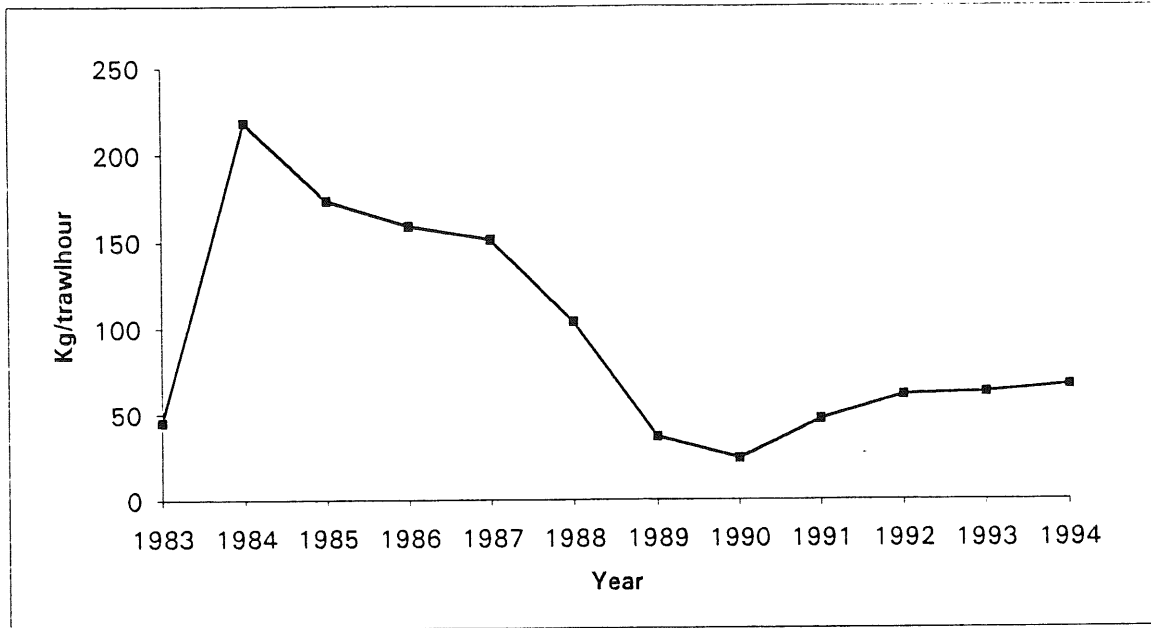


Figure 2.3.2 Catches of cod in areas lesser than 200 meter during the groundfish surveys on Faroe Bank 1983-1994.

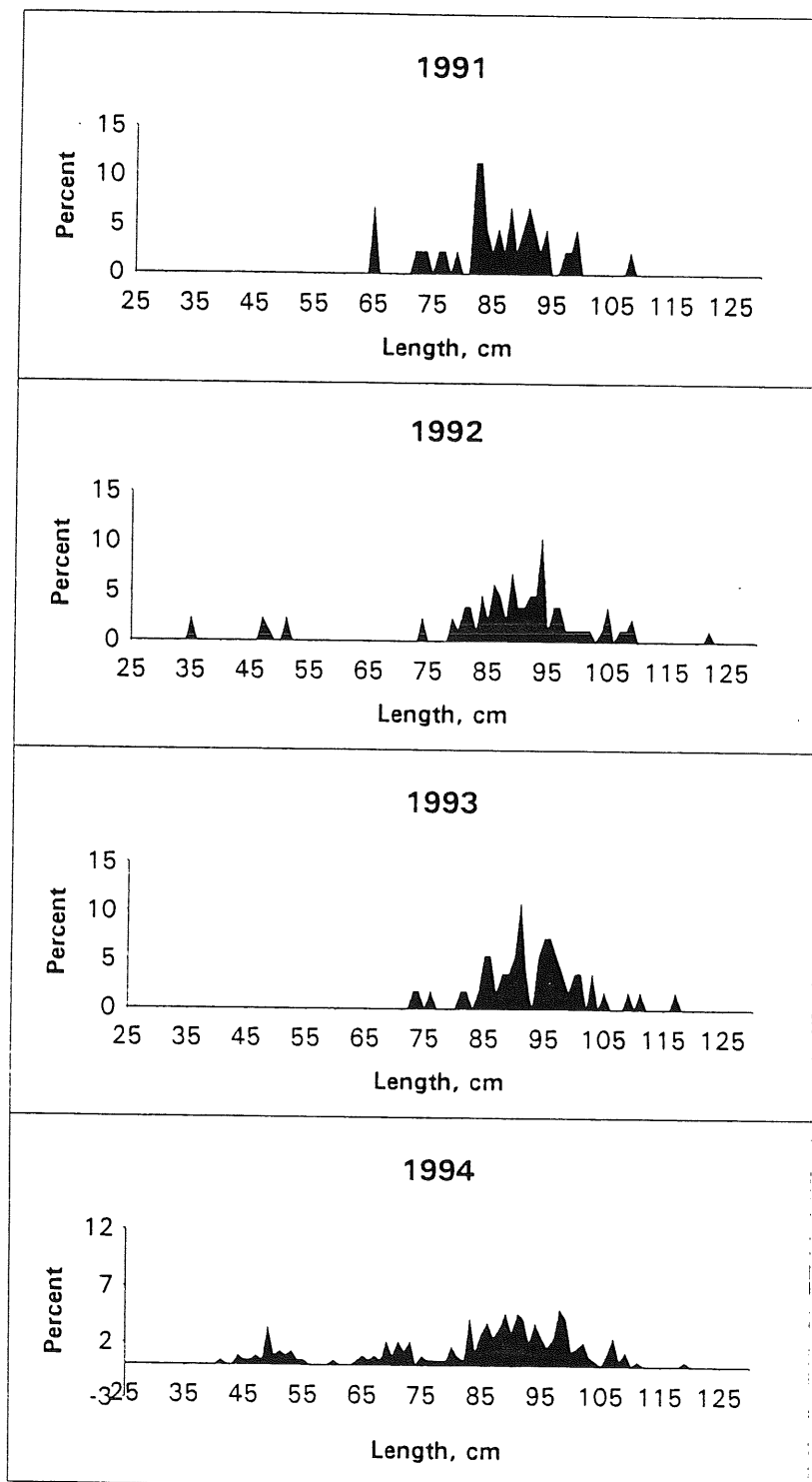


Figure 2.3.3 Length distribution of Faroe Bank cod in the groundfish surveys 1991-1994.

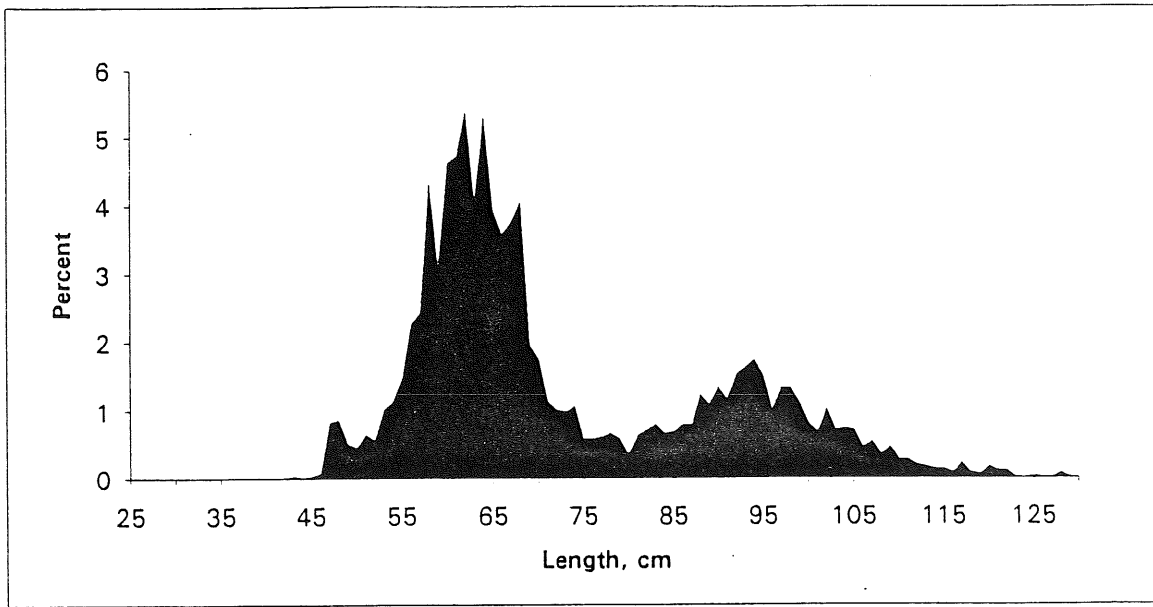


Figure 2.3.4 Length distribution of cod in the longline fishery on Faroe Bank 1993.

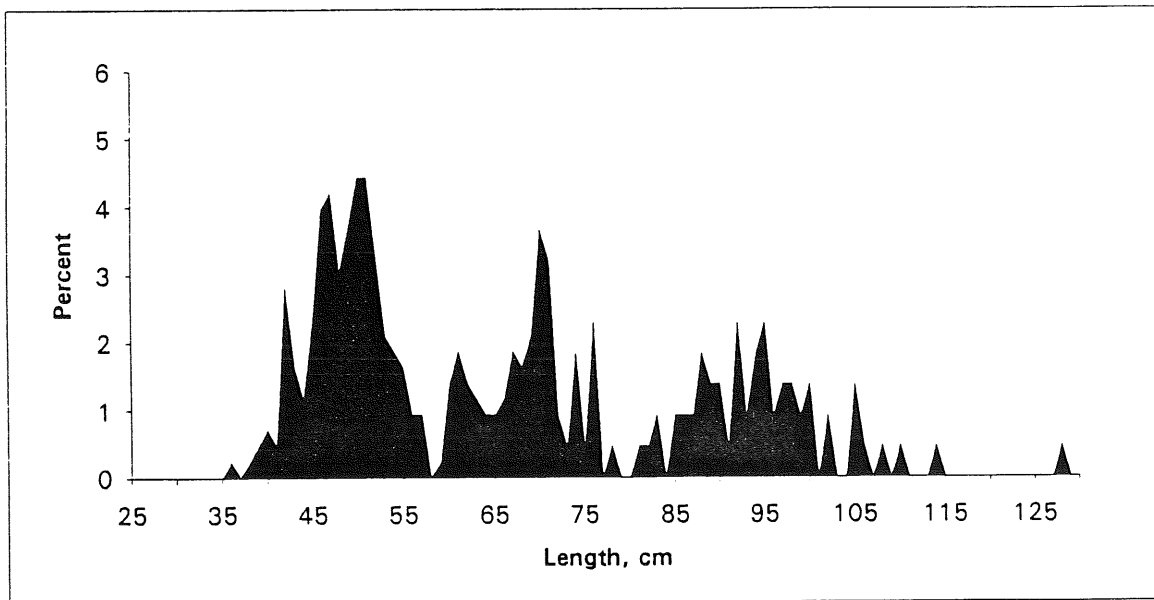
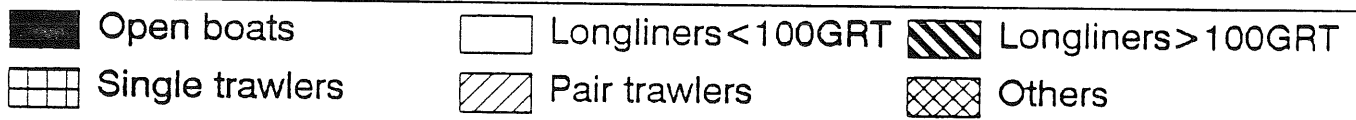
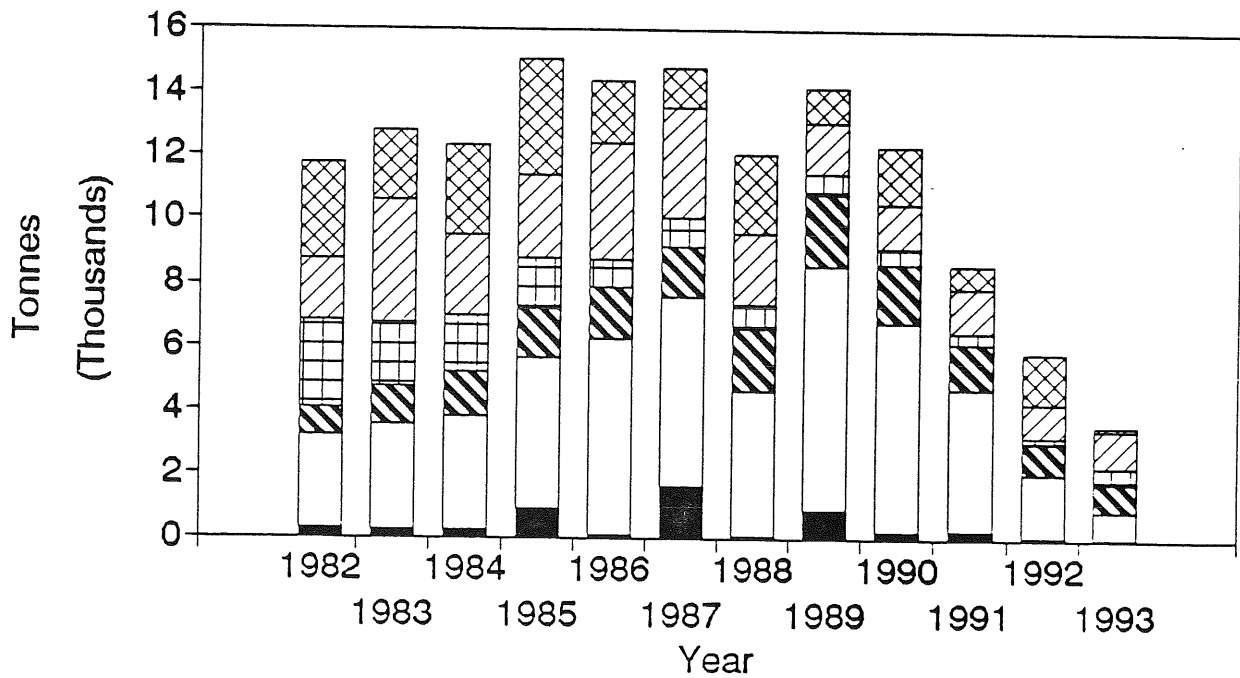


Figure 2.3.5 Length distribution in the longline fishery on Faroe Bank during April 1994.

Figure 2.4.1

Haddock in ICES Division Vb Catches by fleet category, nom. weight



Haddock in Vb 1985-1993

Catch per day for selected fleets

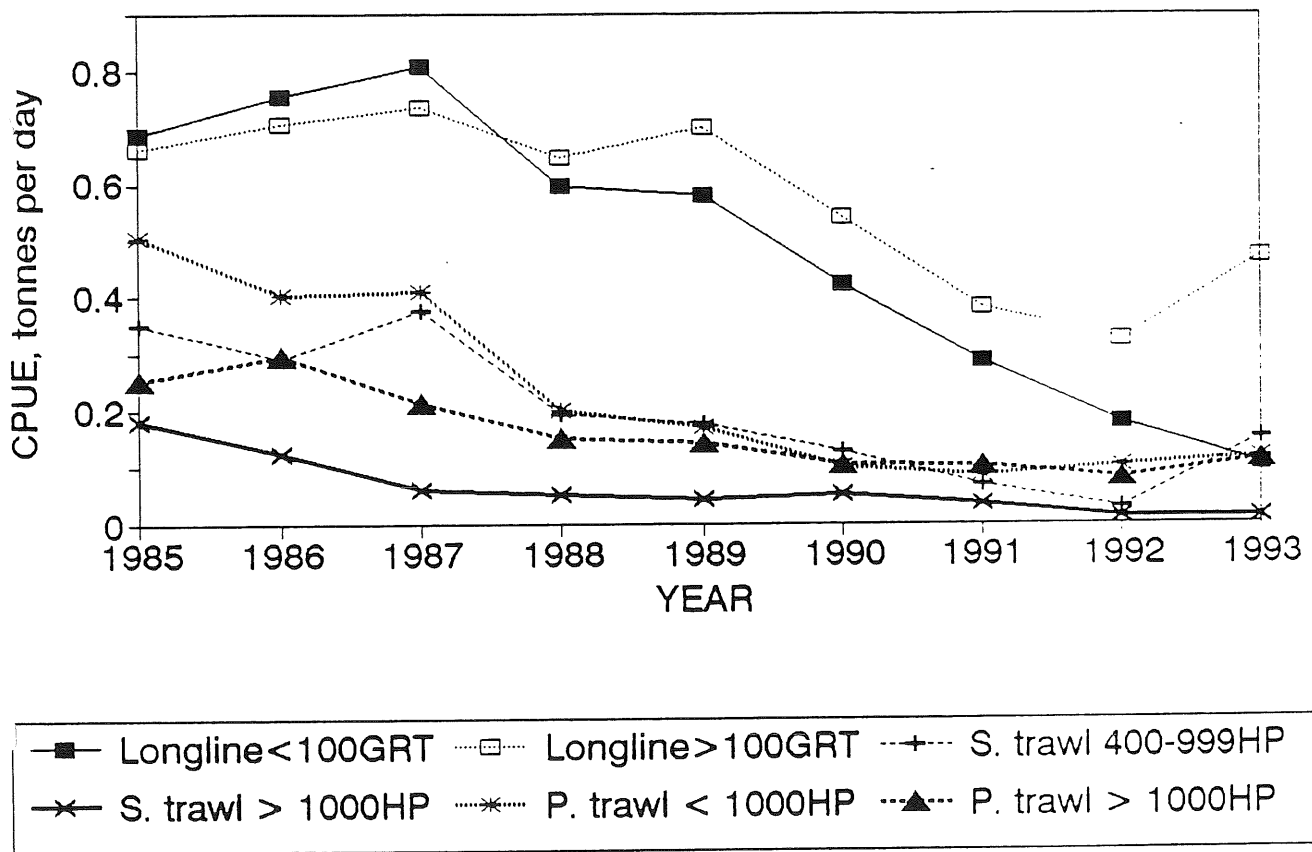


Figure 2.4.2

Haddock in Vb 1985-1993

Catch per day for selected fleets

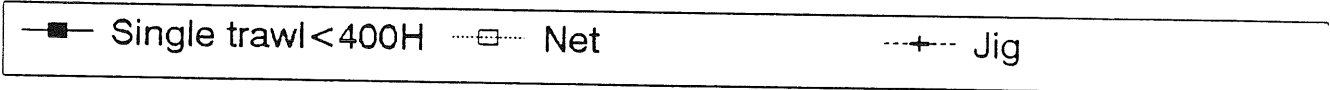
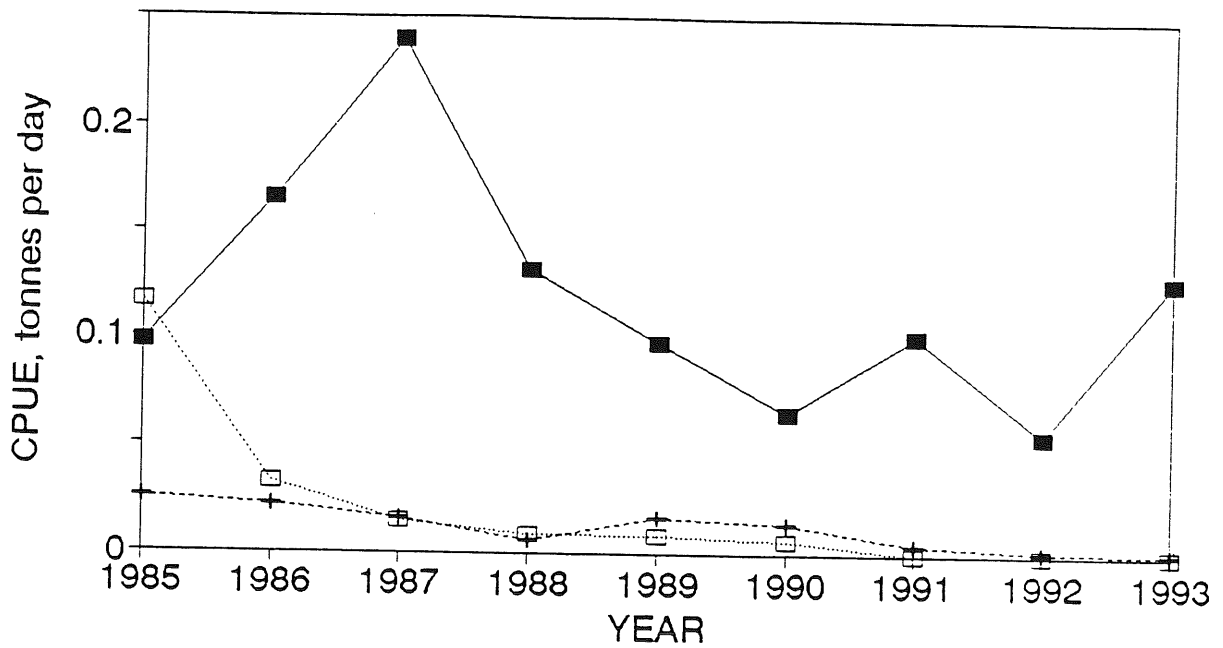


Figure 2.4.3

Assessment 1993 of Faroe haddock

Catch weight at age (kg) 1976-1993

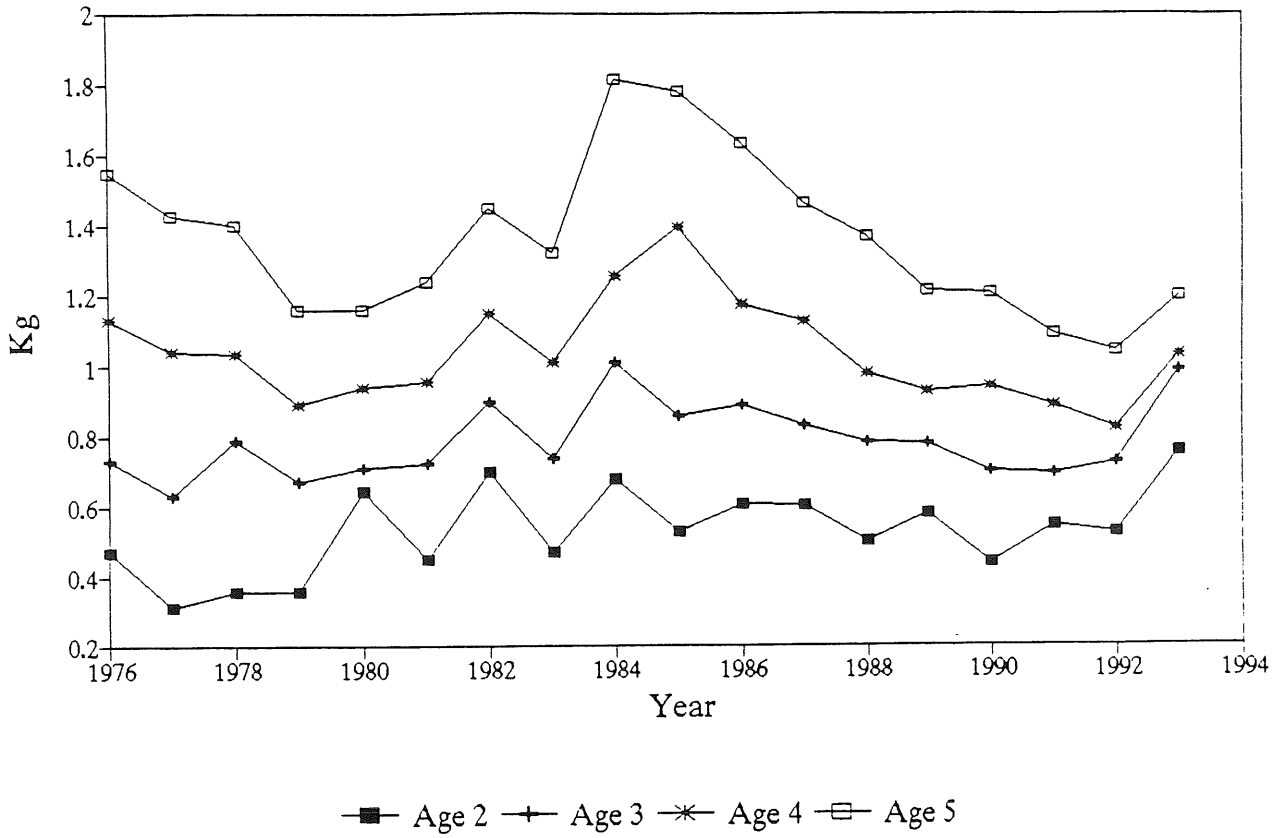


Figure 2.4.4

Assessment 1993 of Faroe haddock

Catch weight at age (kg) 1976-1993

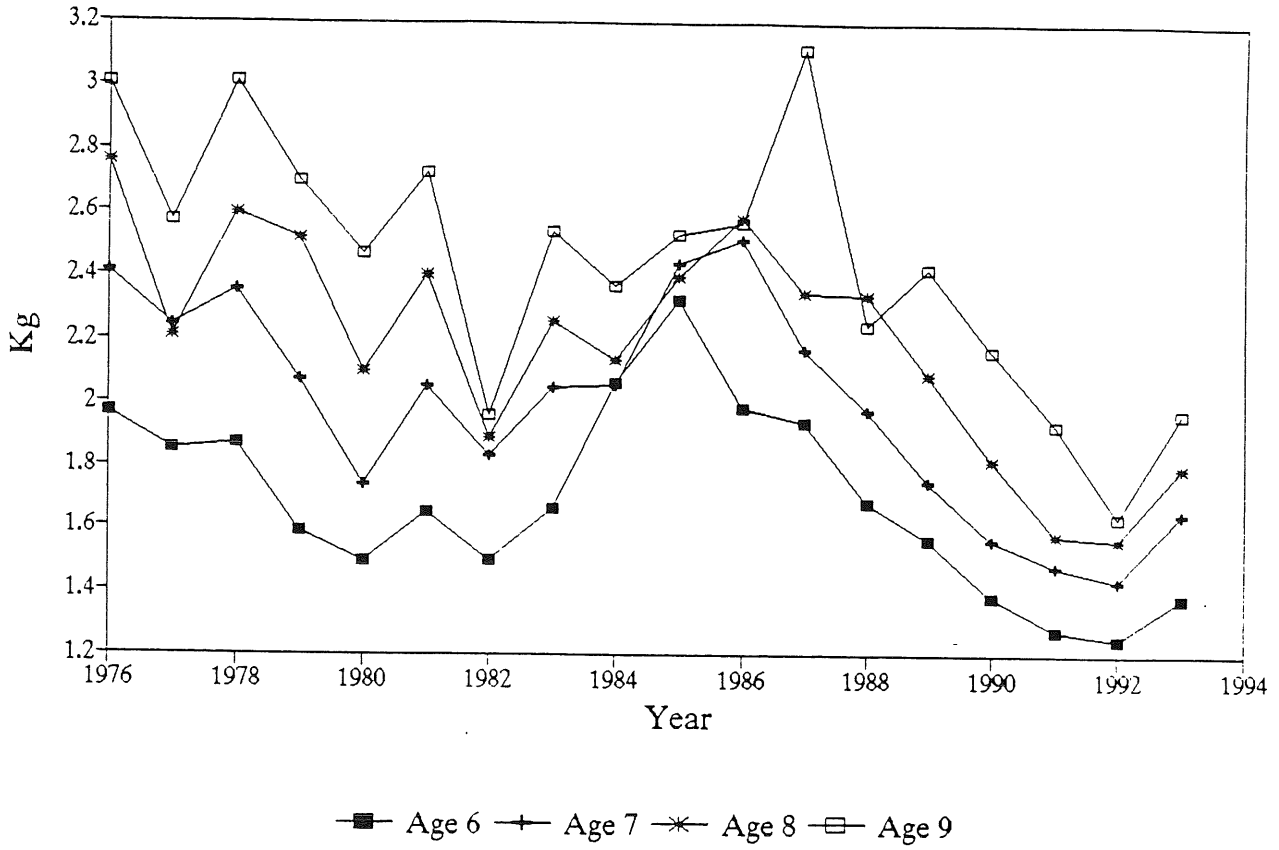


Figure 2.4.5

Faroese landings of Vb haddock

Mean weight at age for the 1. quarter

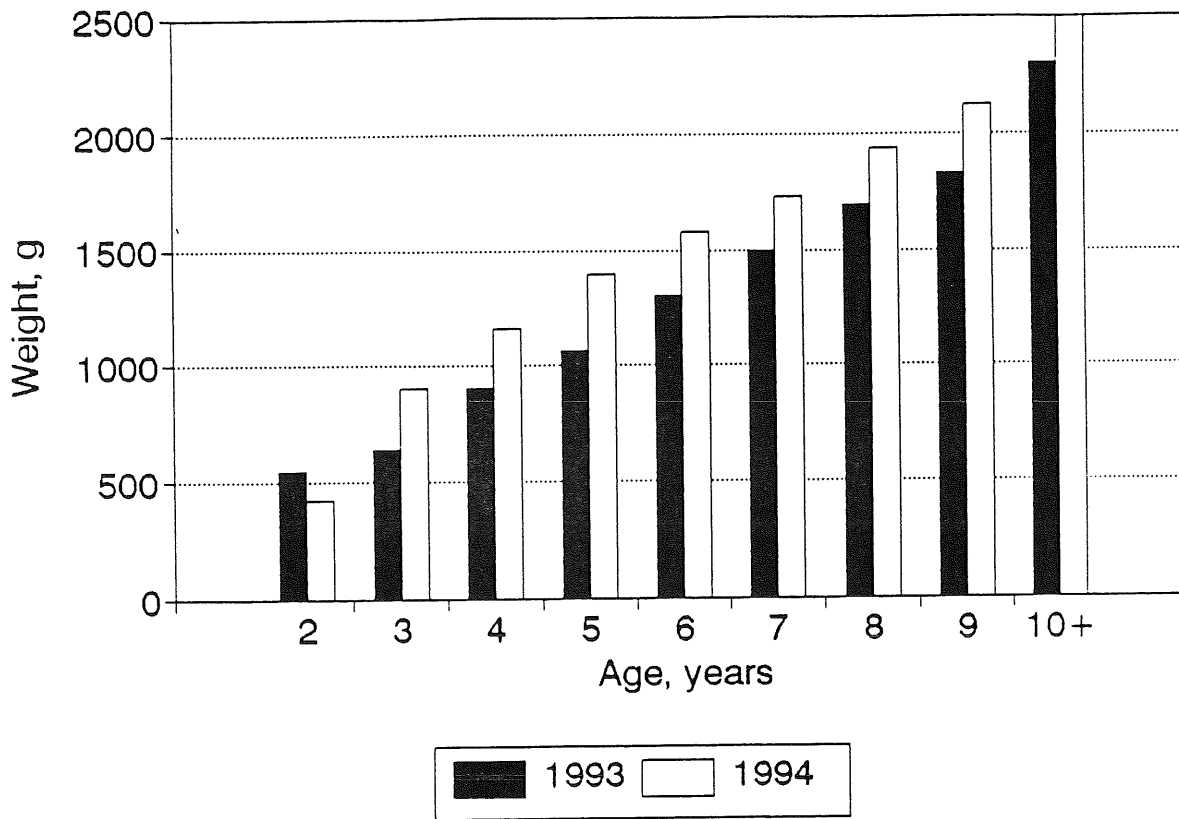


Figure 2.4.6

Retrospective analysis: Faroe Haddock XSA with shrinkage 0.1

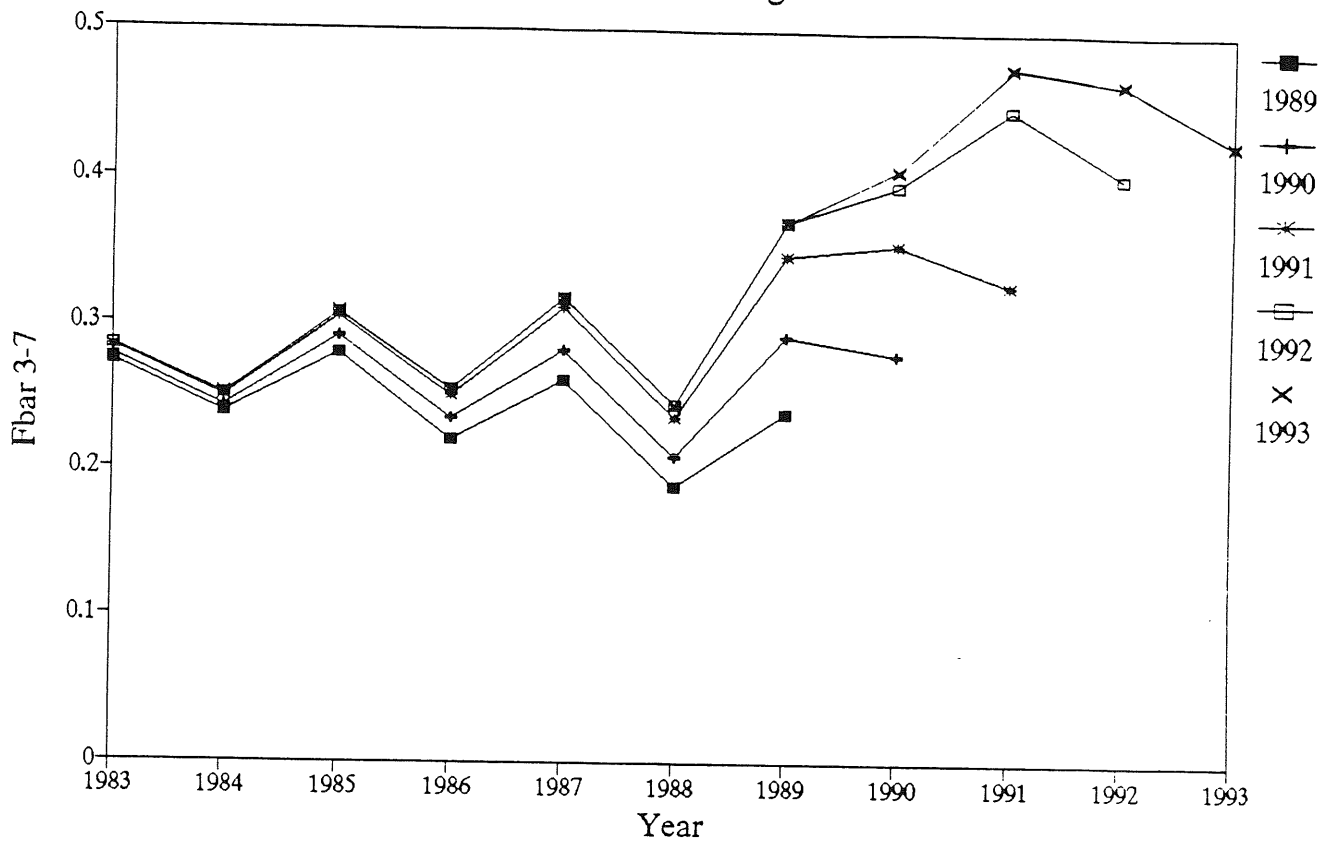


Figure 2.4.7

Retrospective analysis: Faroe Haddock XSA with shrinkage 0.2

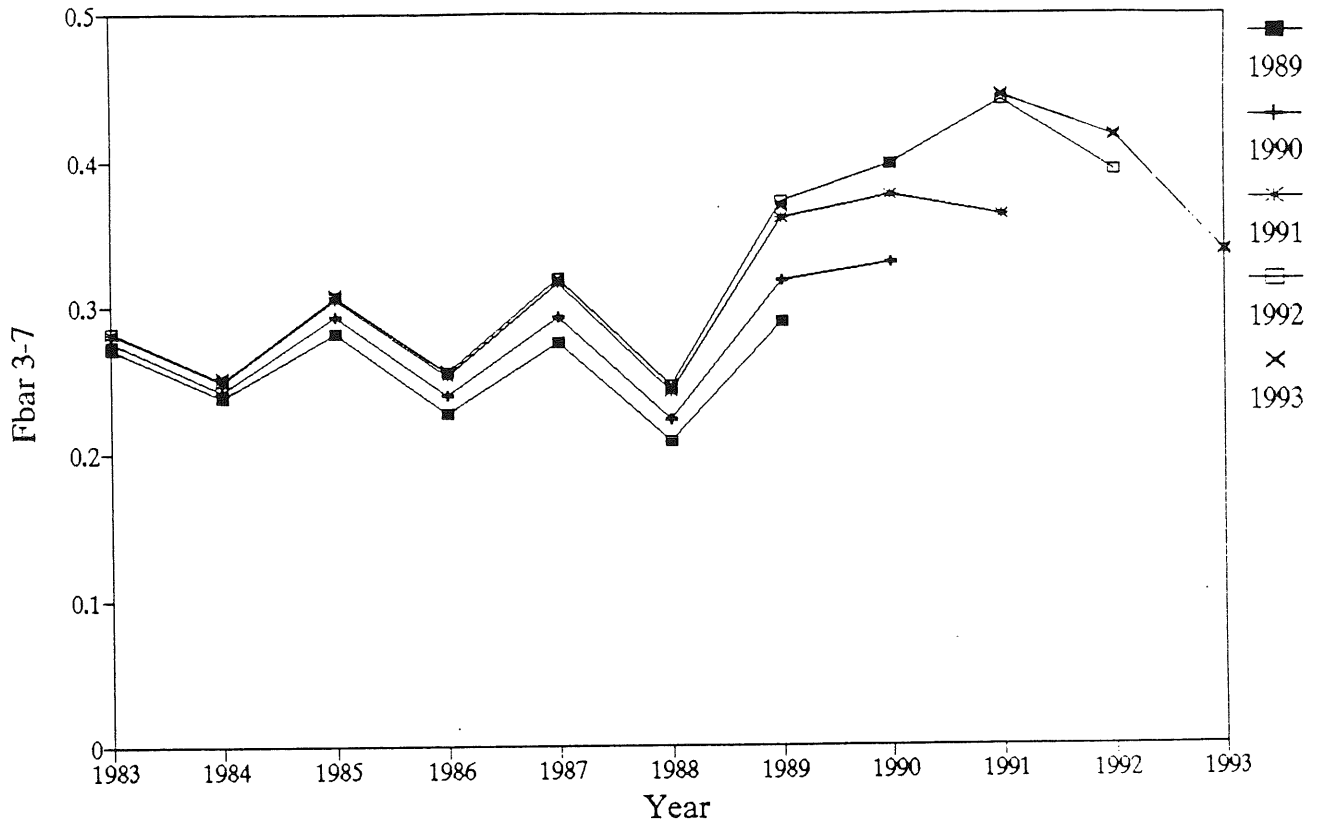


Figure 2.4.8

Retrospective analysis: Faroe Haddock

XSA with shrinkage 0.3

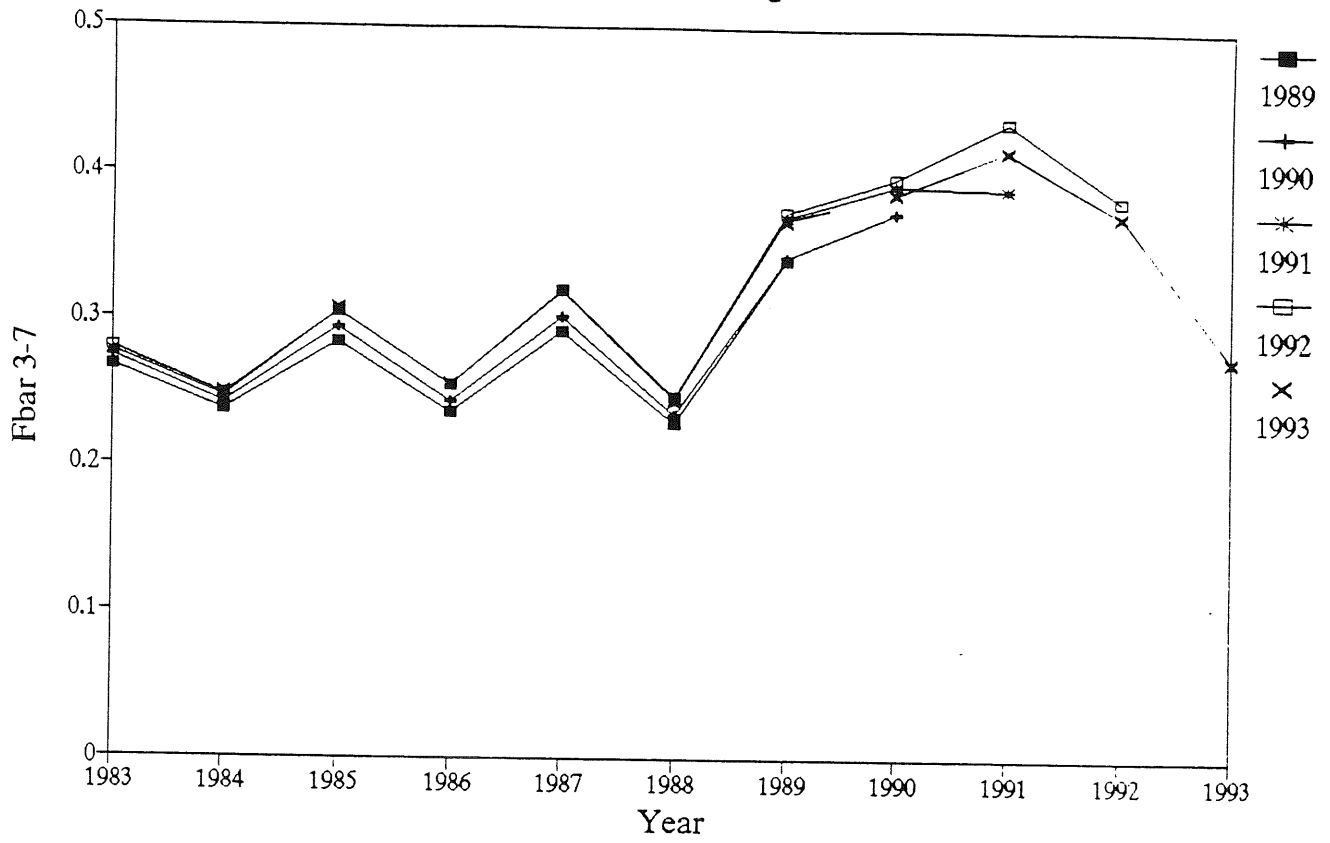


Figure 2.4.9

Retrospective analysis: Faroe Haddock XSA with shrinkage 0.5

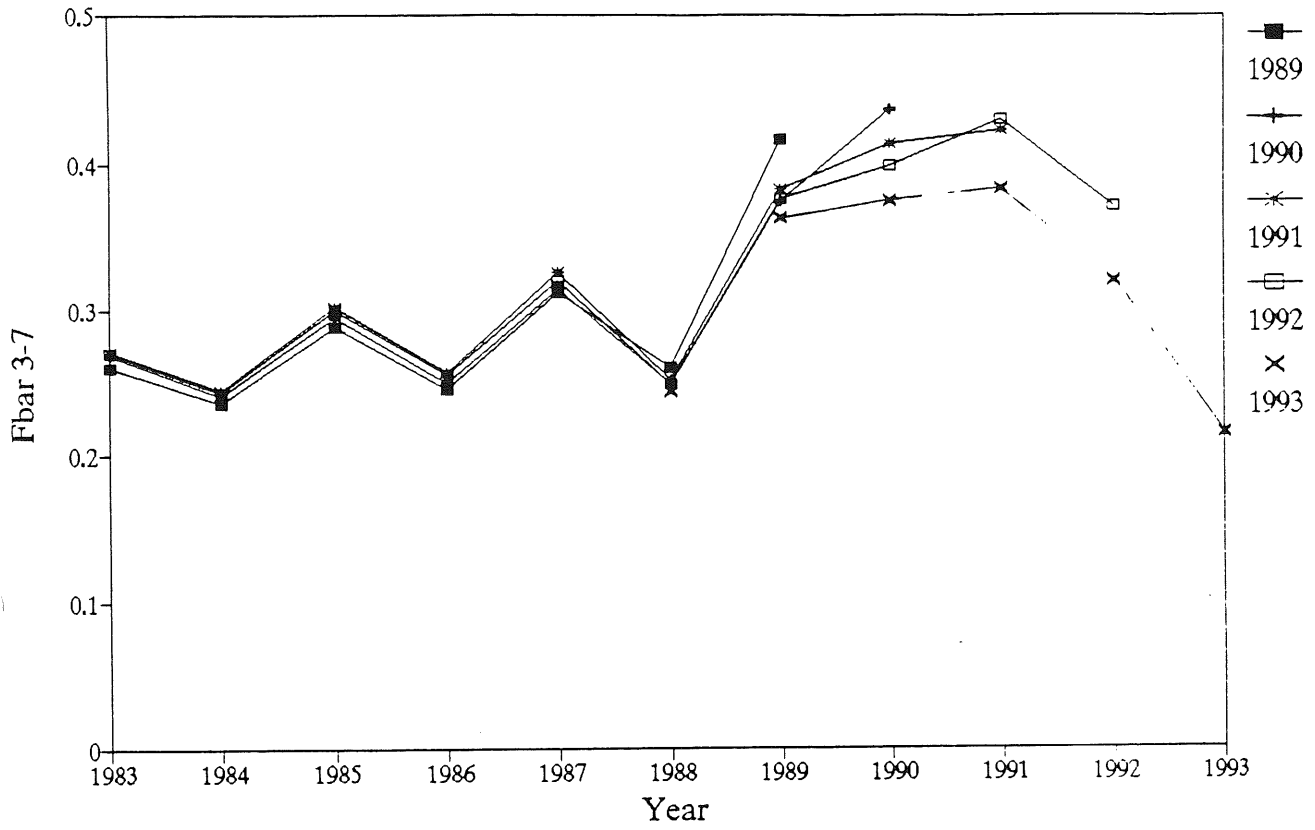


Figure 2.4.10

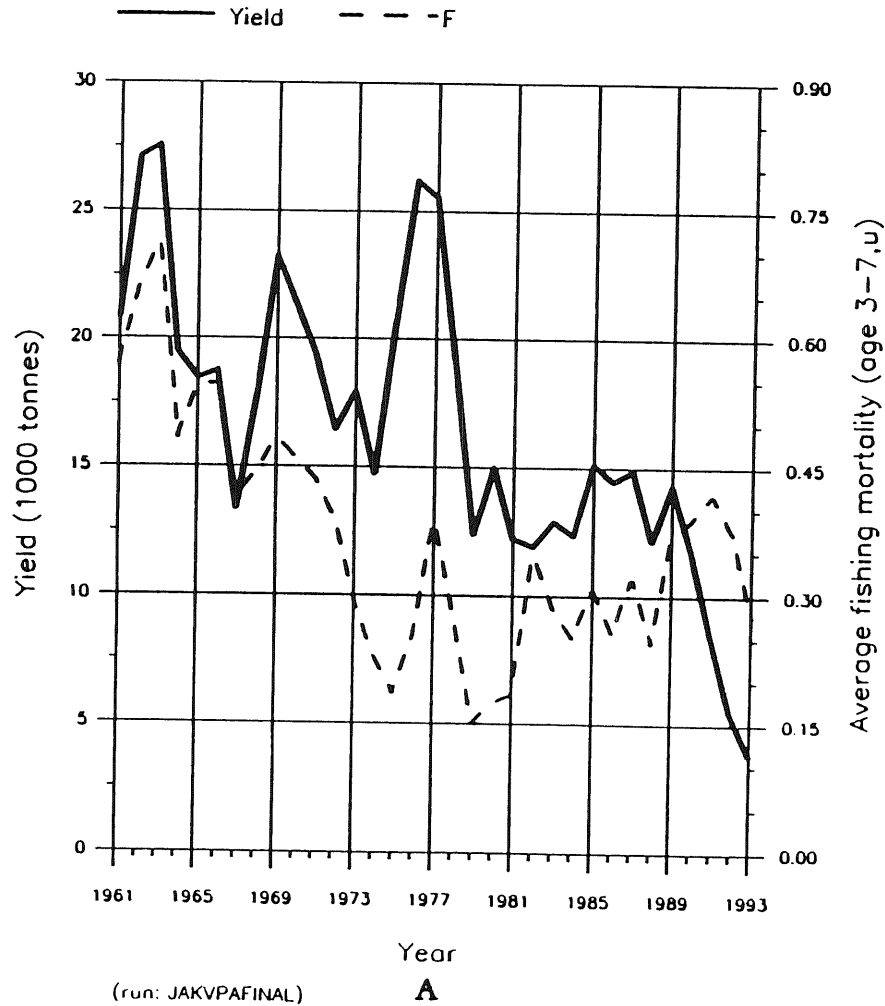
Figure 2.4.11

FISH STOCK SUMMARY

STOCK: Haddock in the Faroe Grounds (Fishing Area Vb)

6-5-1994

Trends in yield and fishing mortality (F)



Trends in spawning stock biomass (SSB) and recruitment (R)

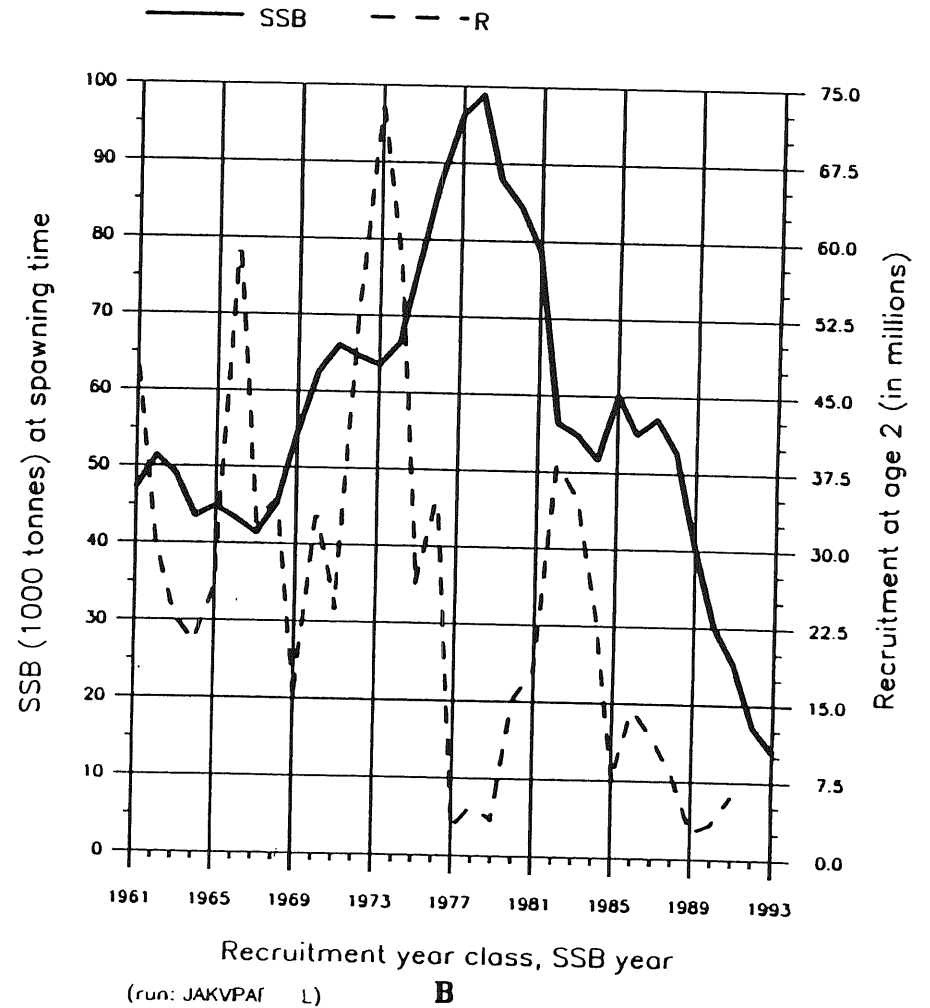


Figure 2.4.12

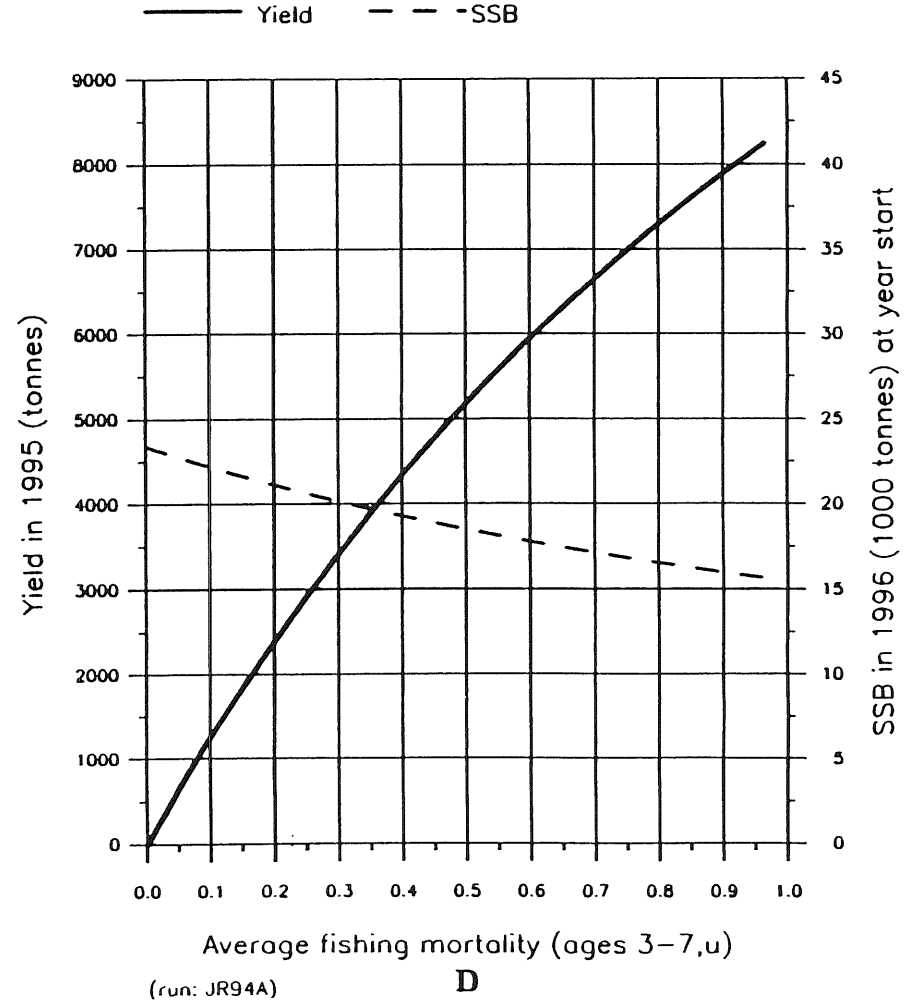
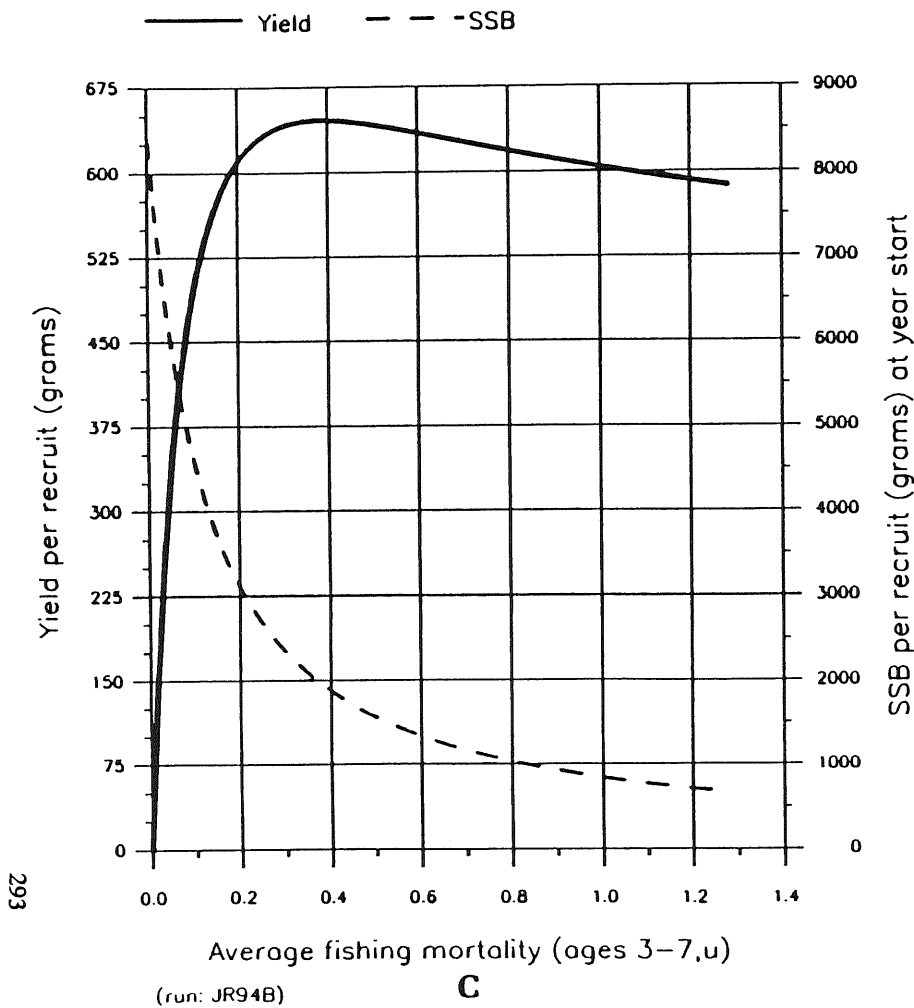
FISH STOCK SUMMARY

STOCK: Haddock in the Farøe Grounds (Fishing Area Vb)

9-5-1994

Long term yield and spawning stock biomass

Short-term yield and spawning stock biomass



Faroe Haddock Stock-recruitment relationship

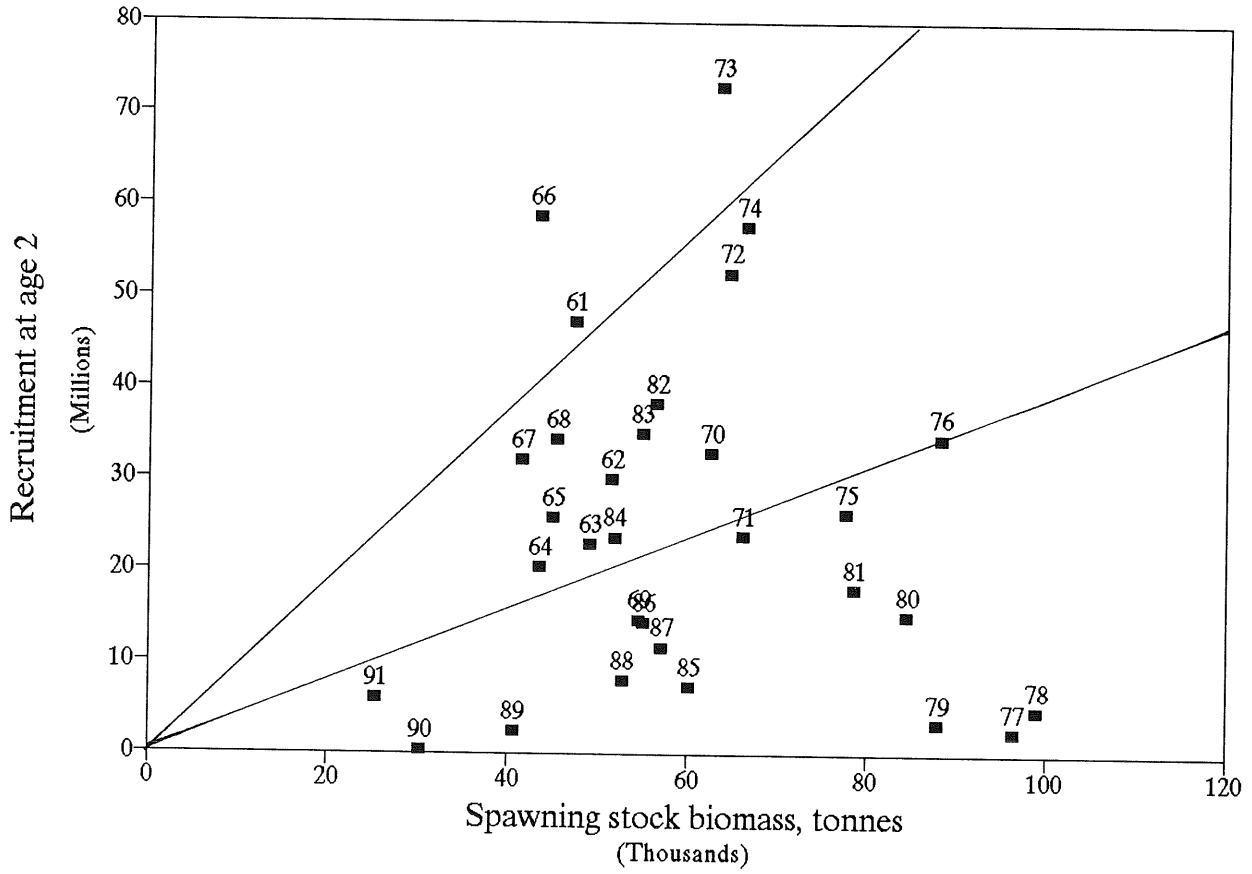


Figure 2.4.13

$F_{med} = 0.2$

$F_{high} = 0.9$

Faroe Plateau haddock. Stock-recruitment curve used in simulations.

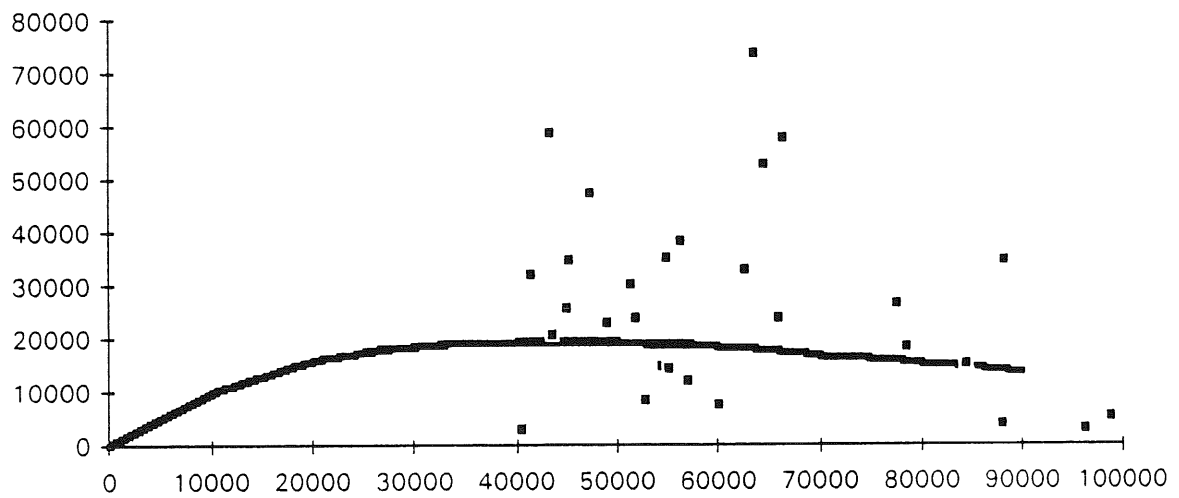


Figure 2.4.14

Figure 2.4.15

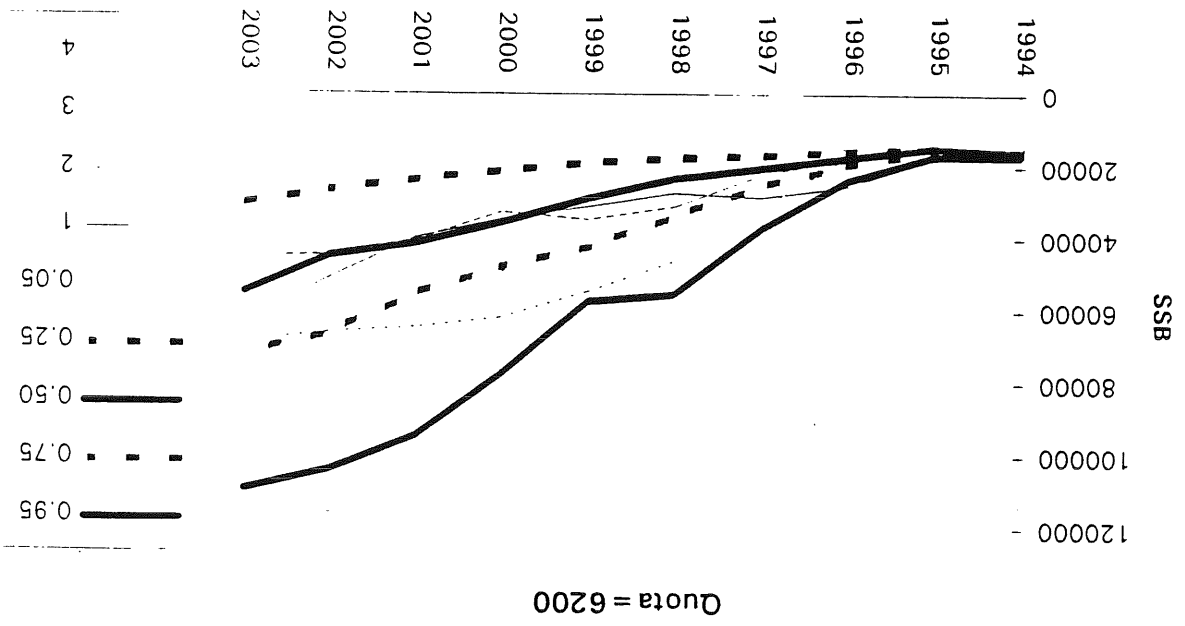
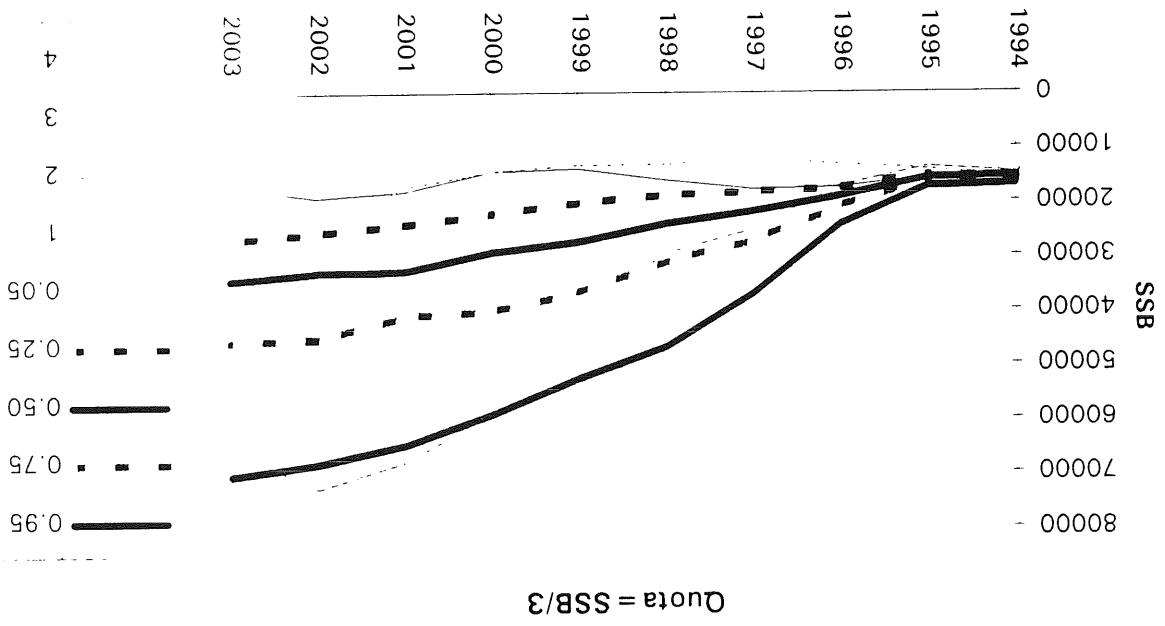


Figure 2.4.16



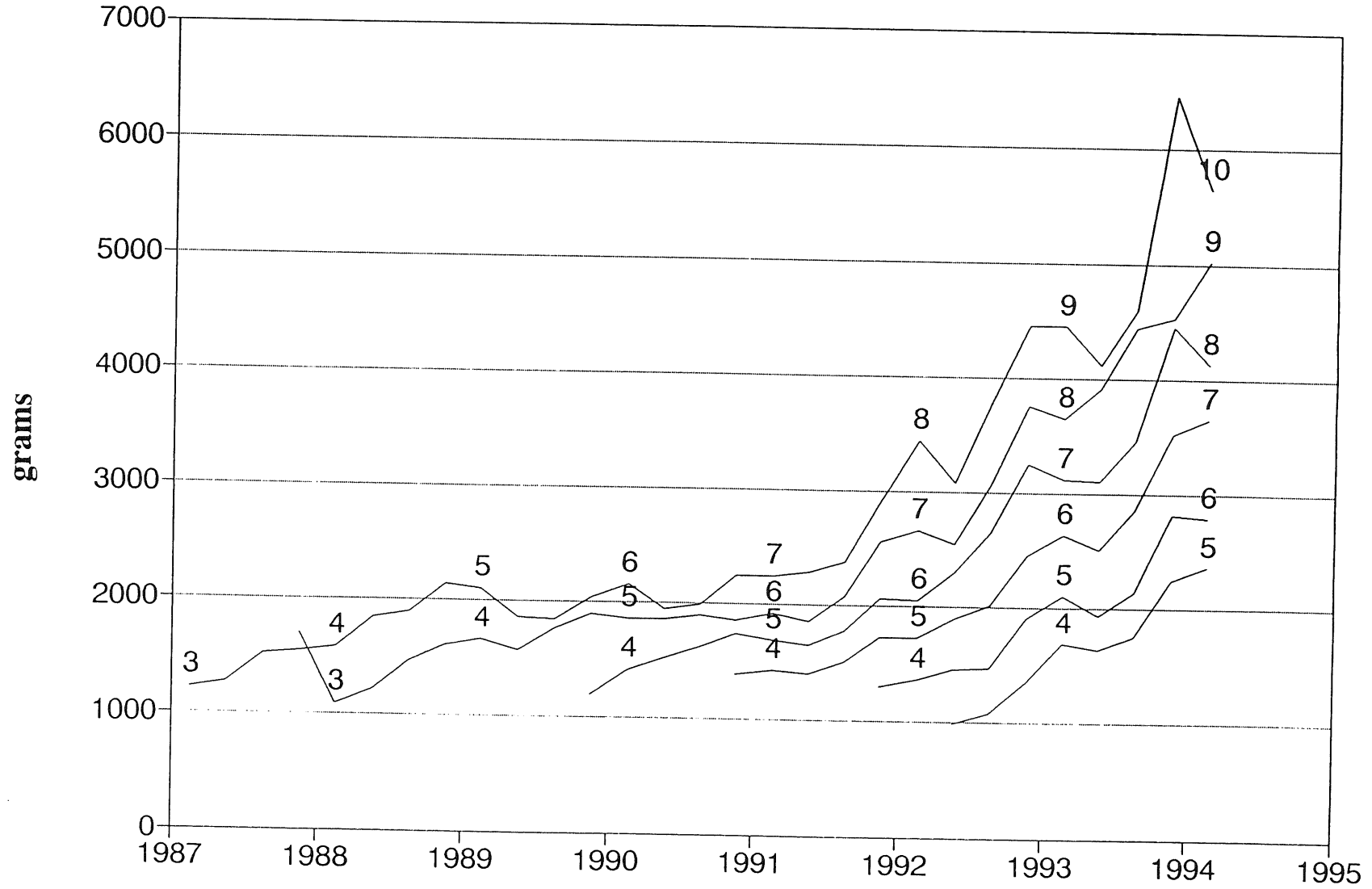


Figure 2.5.1 Gutted weight (grams) at age per quarter for SAITHE in Division Vb for year classes 1984-1989. Number (at the point of the first quarter) indicate age.

Figure 2.5.2 SAITHE in Division Vb. Retrospective analysis with XSA using shrinkage 0.5 for age 3-12 years. Data from 8 Faroese pair trawlers greater than 1000 HP (Cuba trawlers) for the period 1982-1993.

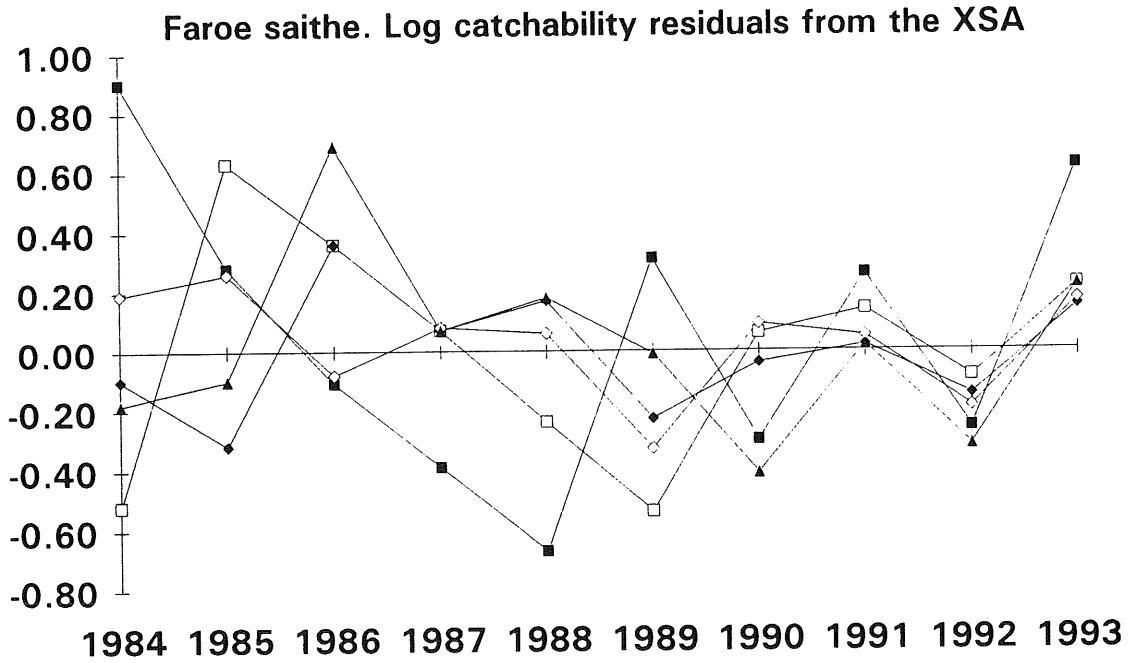


Figure 2.5.3 SAITHE in Division Vb. Log catchability residuals from the analysis presented in Figure 2.5.2.

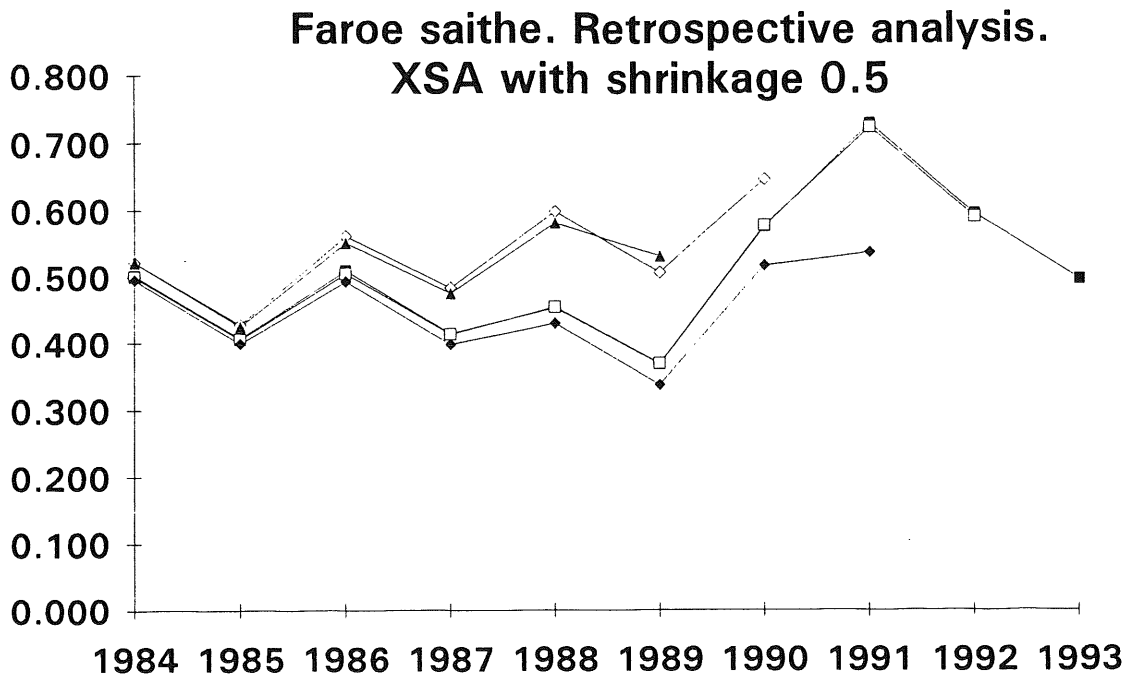


Figure 2.5.4 SAITHE in Division Vb. Fish stock summary. A: Trends in yields and fishing mortality. B: Trends in spawning stock biomass and recruitment.

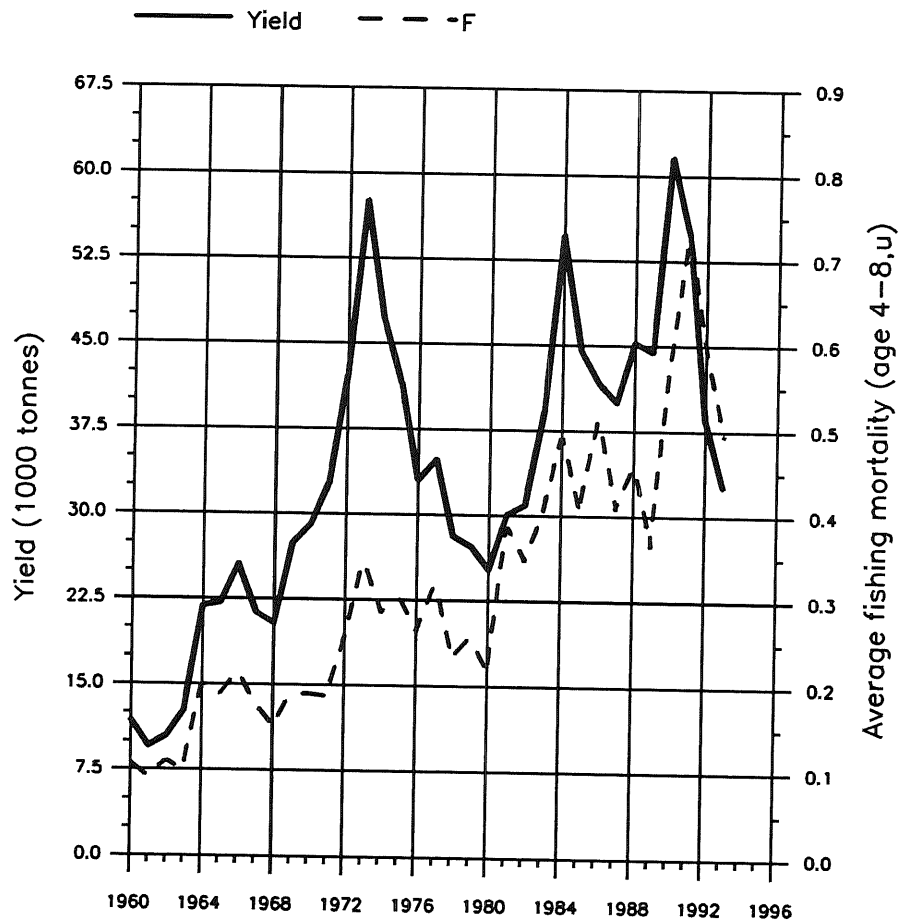
300

FISH STOCK SUMMARY

STOCK: Saithe in the Faroes Grounds (Fishing Area Vb)

7-5-1994

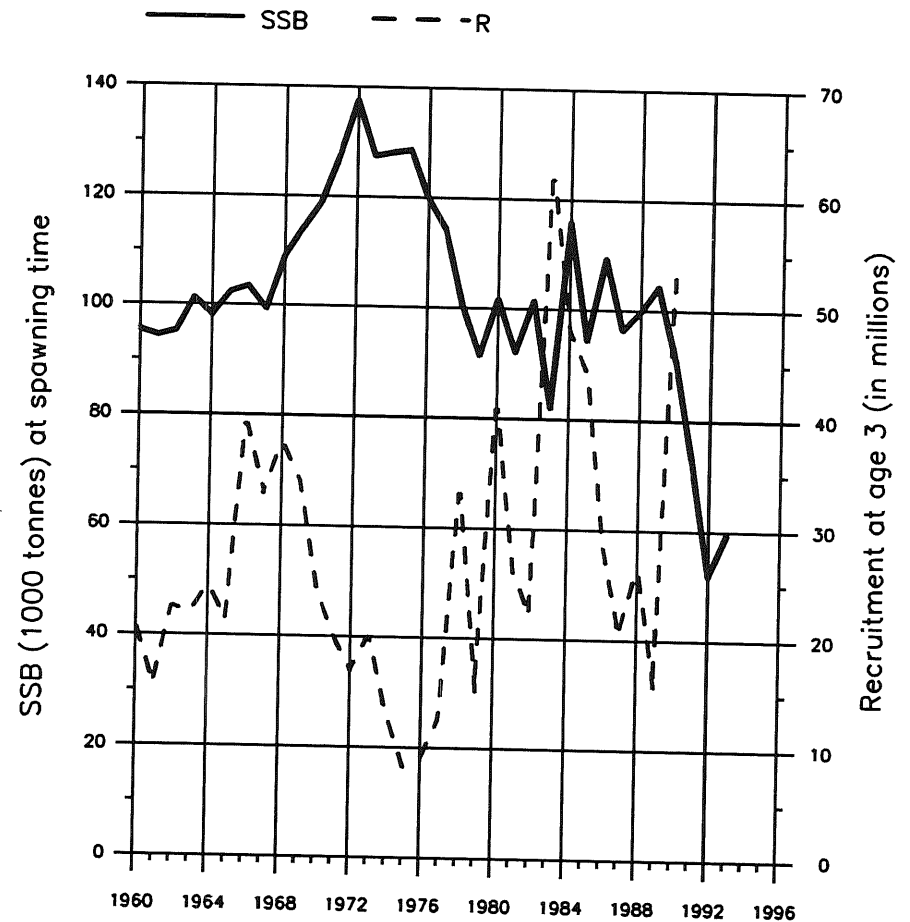
Trends in yield and fishing mortality (F)



(run: SAIFRXSA021)

A

Trends in spawning stock biomass (SSB) and recruitment (R)



(run: SAIFRXS 21)

B

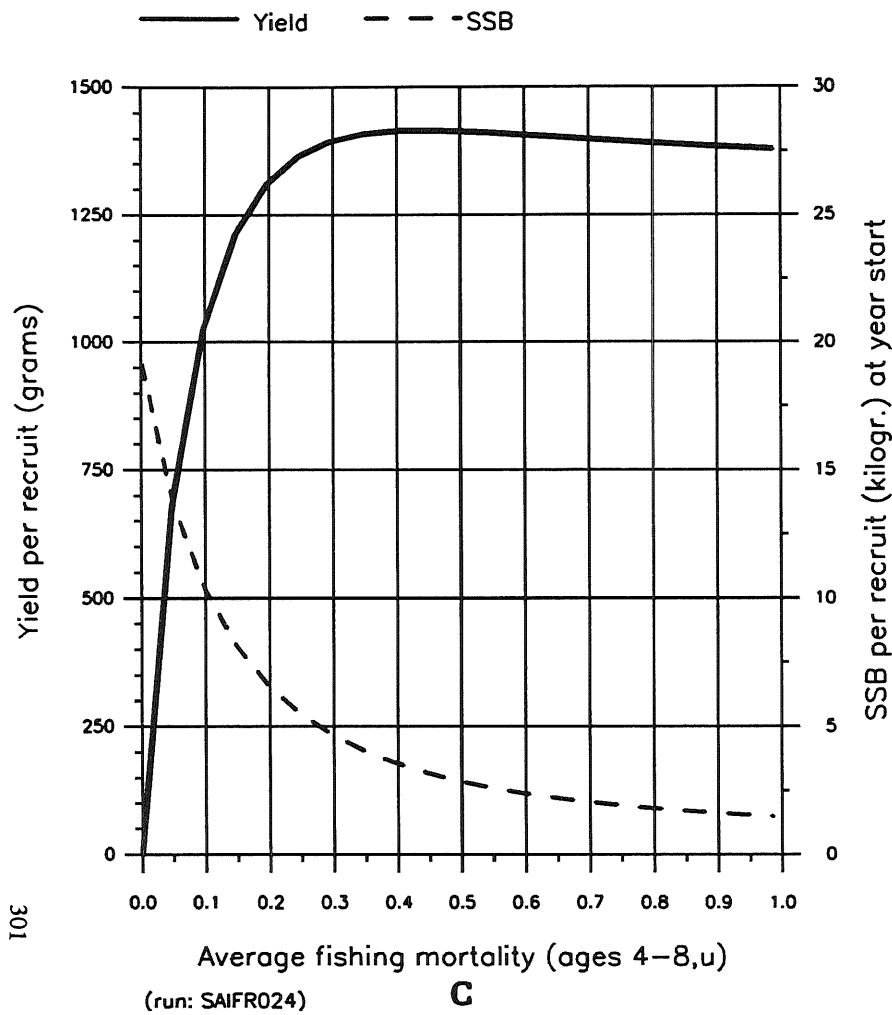
Figure 2.5.5 Saithe in Division Vb. Fish stock summary. C: Long-term yield and spawning stock biomass. D: Short-term yield and spawning stock biomass.

FISH STOCK SUMMARY

STOCK: Saithe in the Faroes Grounds (Fishing Area Vb)

10 - 5 - 1994

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

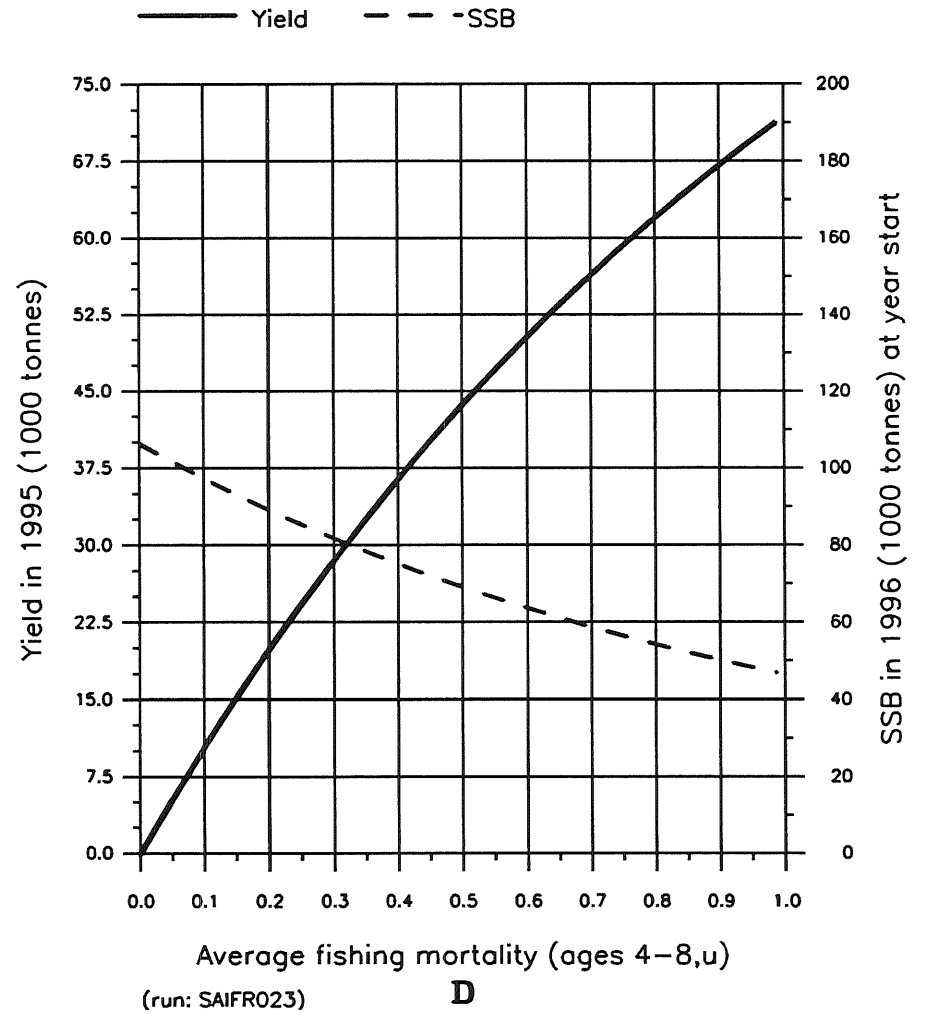


Figure 2.5.6 SAITHE in Division Vb. Spawning stock biomass and recruitment relationship.

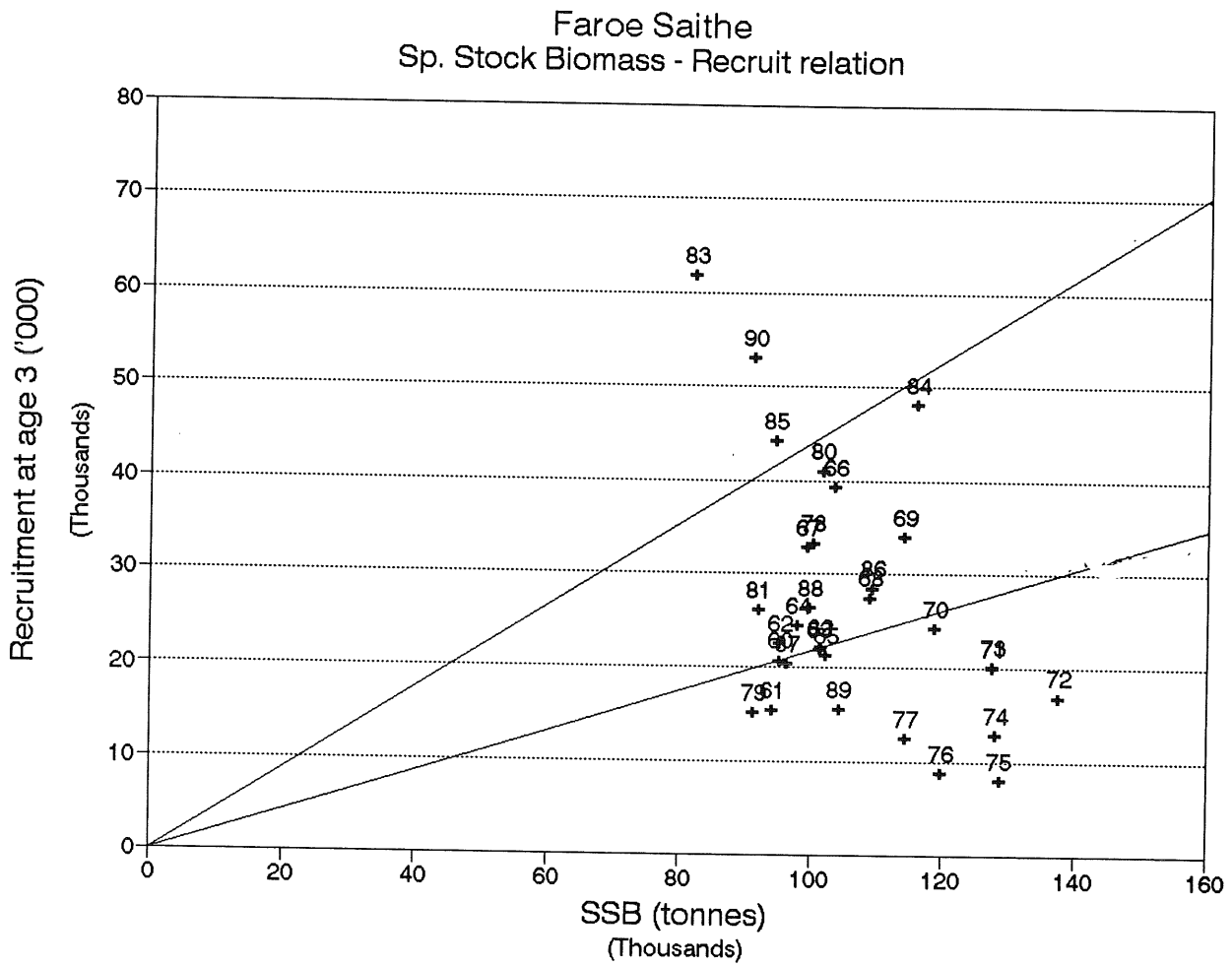


Figure 2.5.7

SAITHE in Division Vb. Observations of recruitment and spawning stock biomass for the period 1960-1990 with a SCHNUTE model of R-SSB.

Faroe saithe. Stock-recruitment curve used in simulations.

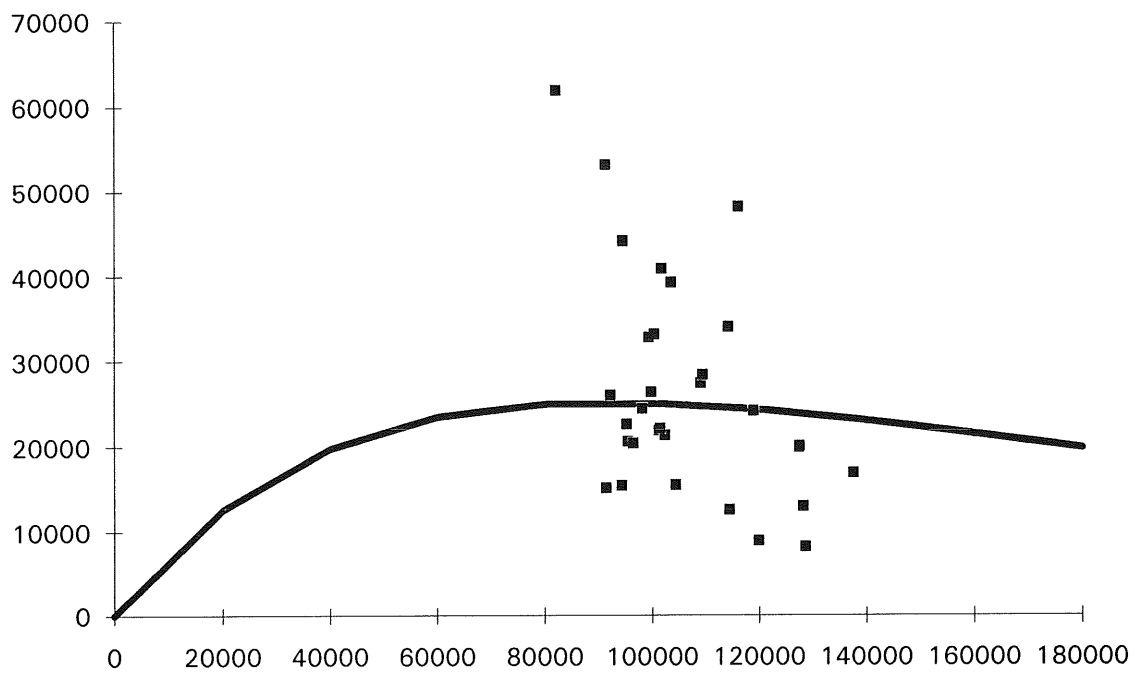


Figure 2.5.8

SAITHE in Division Vb. RISK analysis with constant recruitment and a yearly 42,000 t quota.

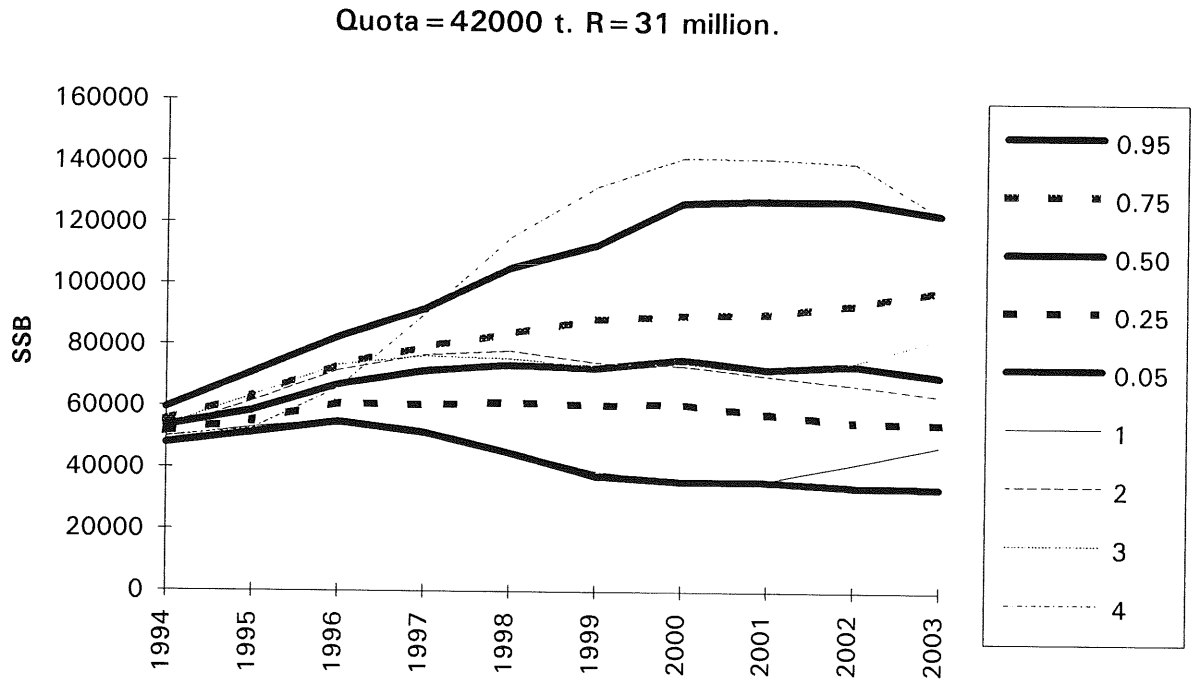


Figure 2.5.9

SAITHE in Division Vb. RISK analysis with a recruitment-spawning stock relation model and a yearly 42,000 t quota.

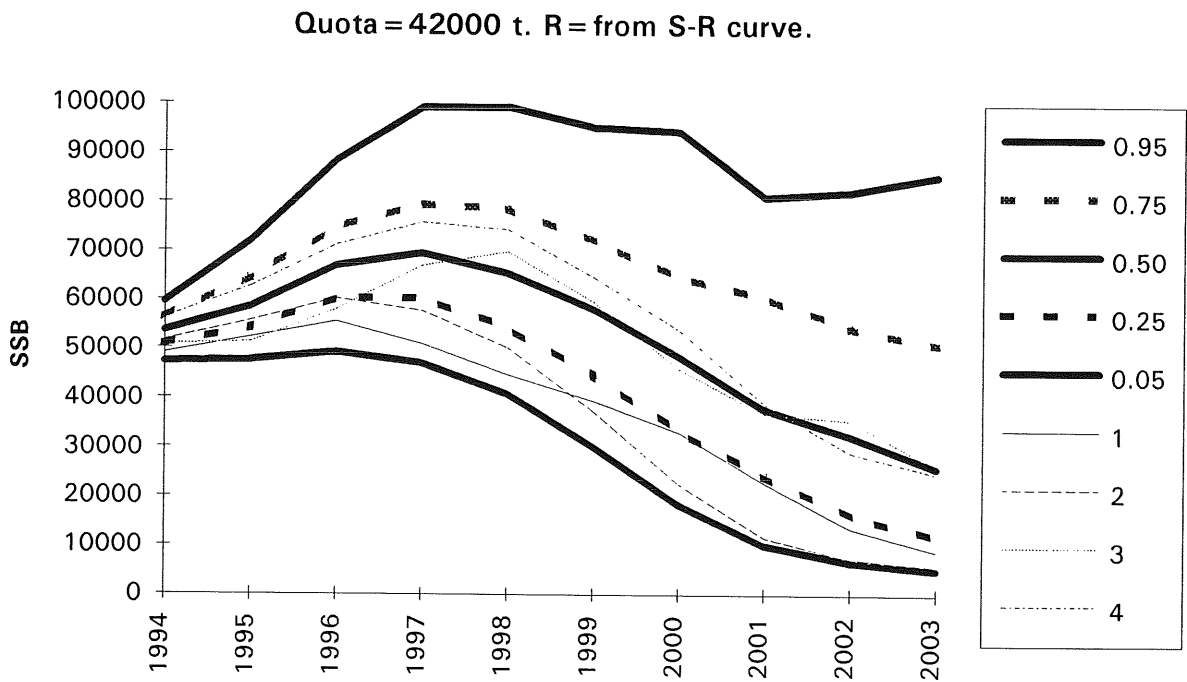


Figure 3.2.2

FISH STOCK SUMMARY
STOCK: Saithe in the Iceland Grounds (Fishing Area Va)
5-5-1994

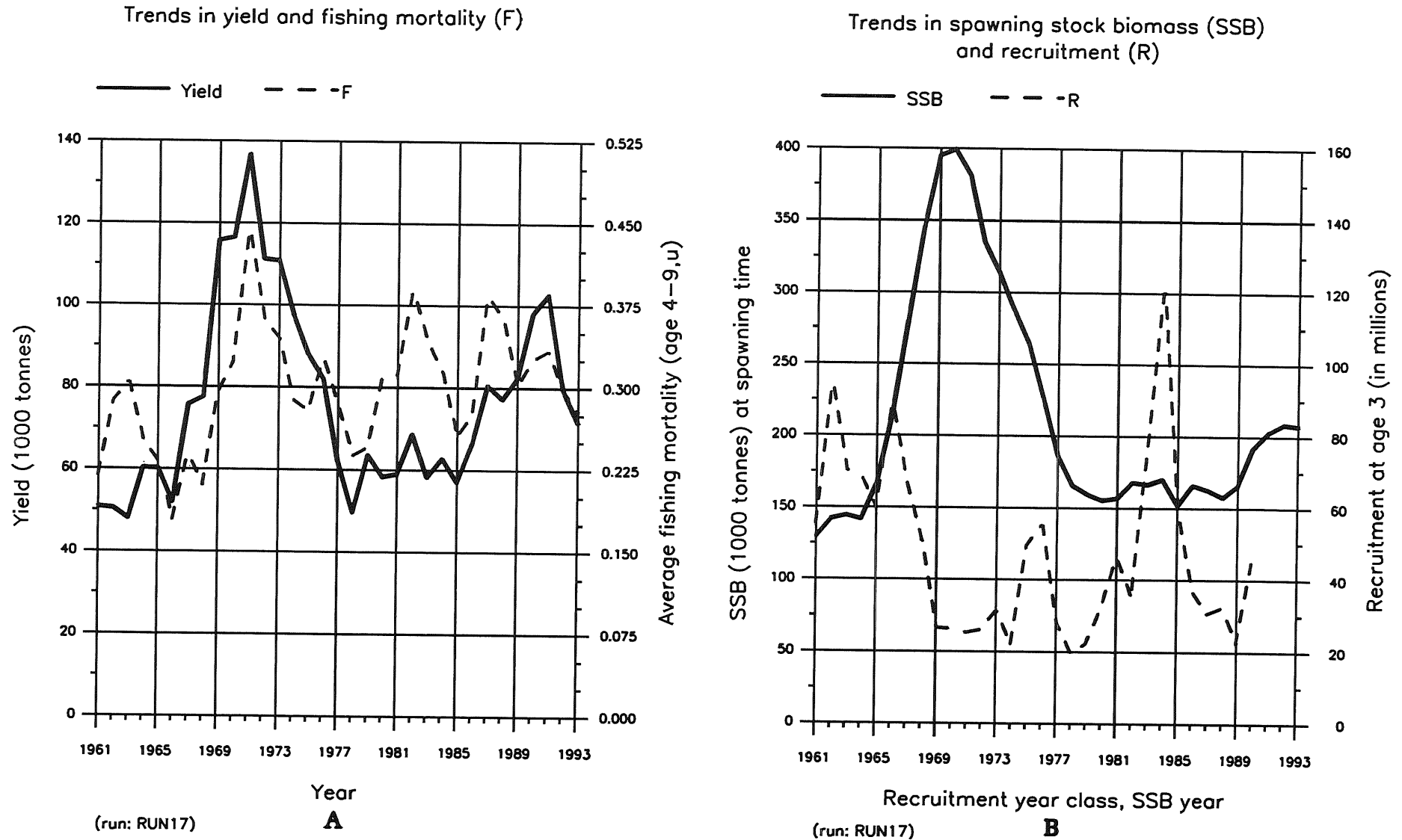


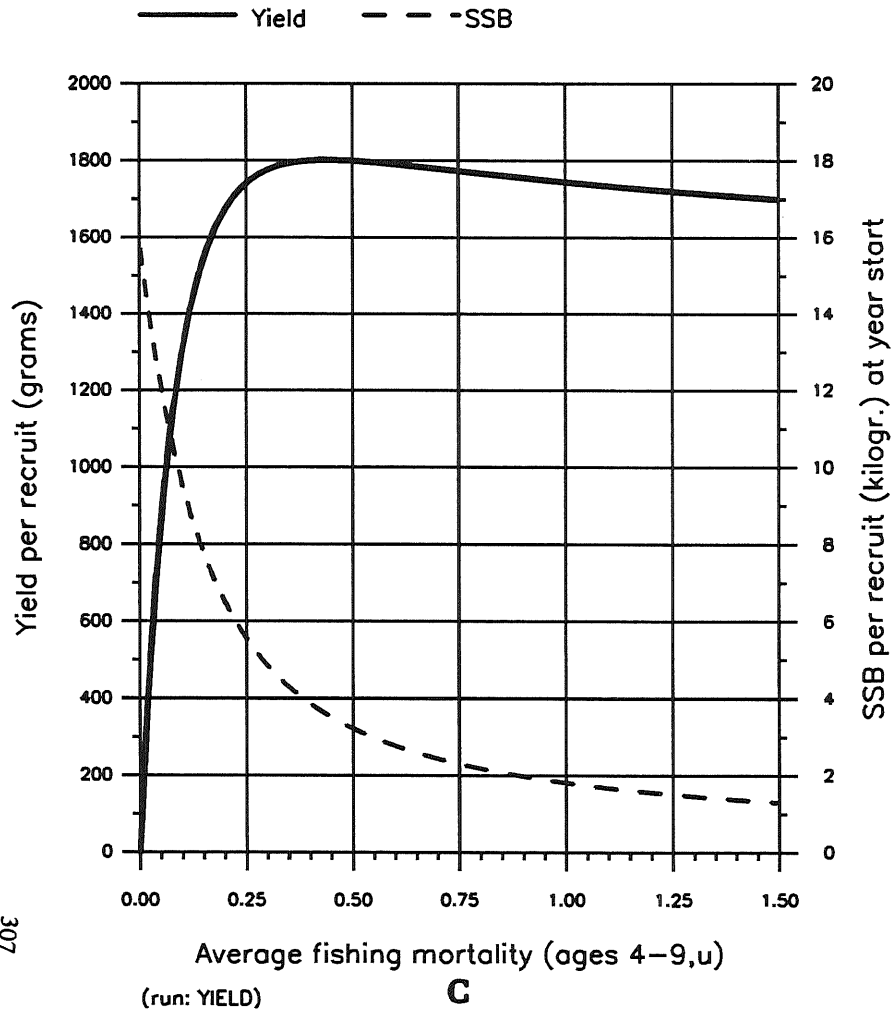
Figure 3.2.3

FISH STOCK SUMMARY

STOCK: Saithe in the Iceland Grounds (Fishing Area Va)

5-5-1994

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

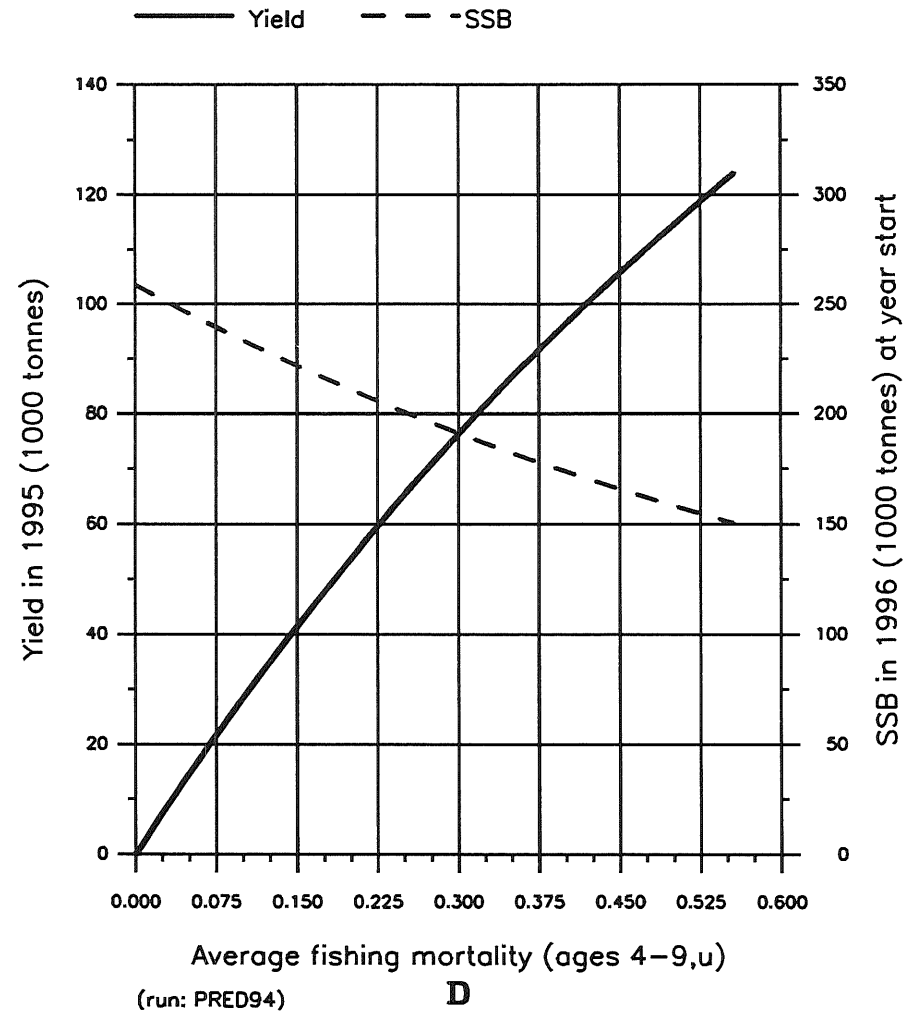


Figure 3.2.4

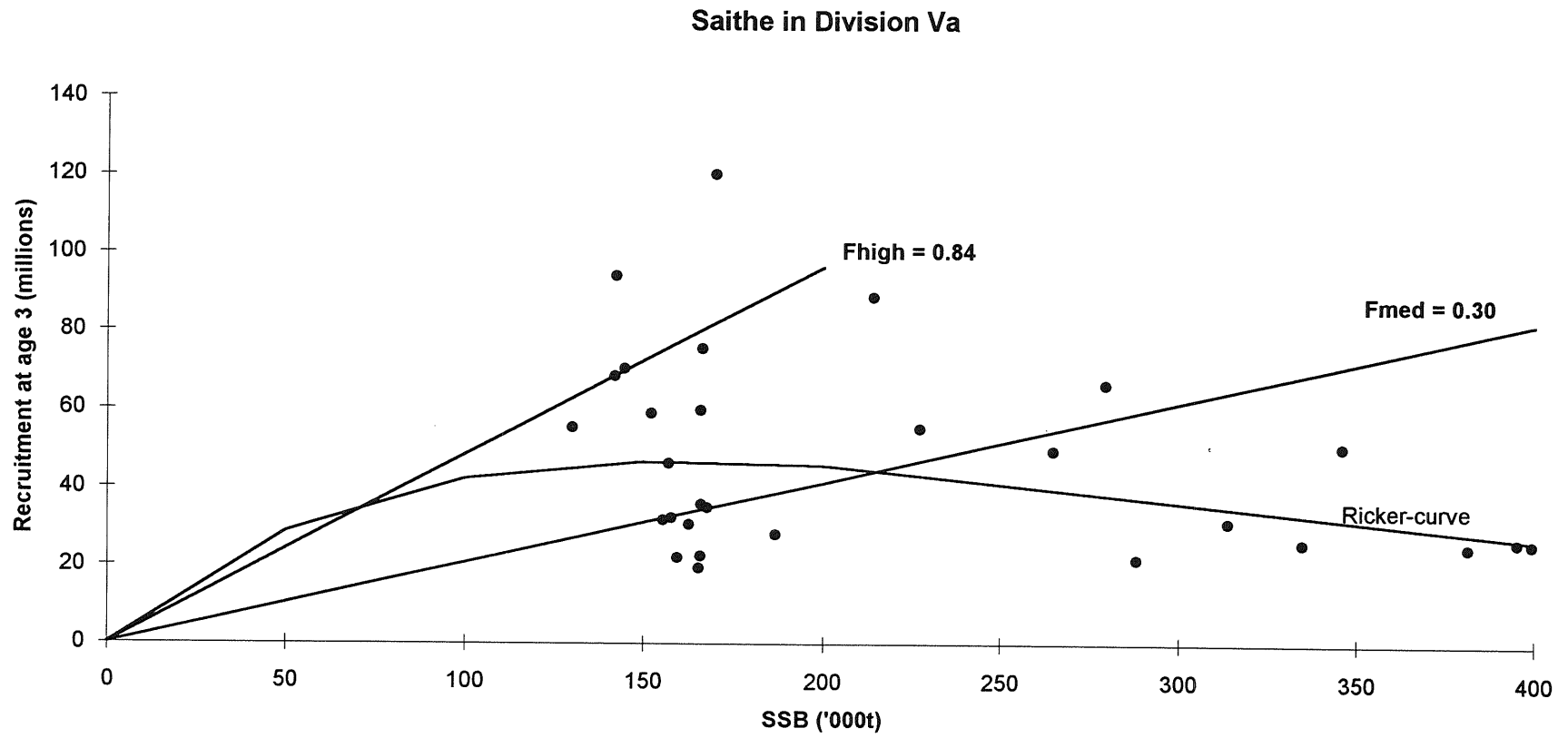


Fig. 3.3.1

Icelandic cod: retrospective analysis of the final XSA run



Figure 3.3.2

Icelandic cod: average fishing pattern (1989-92) for different seasons, regions and gears,

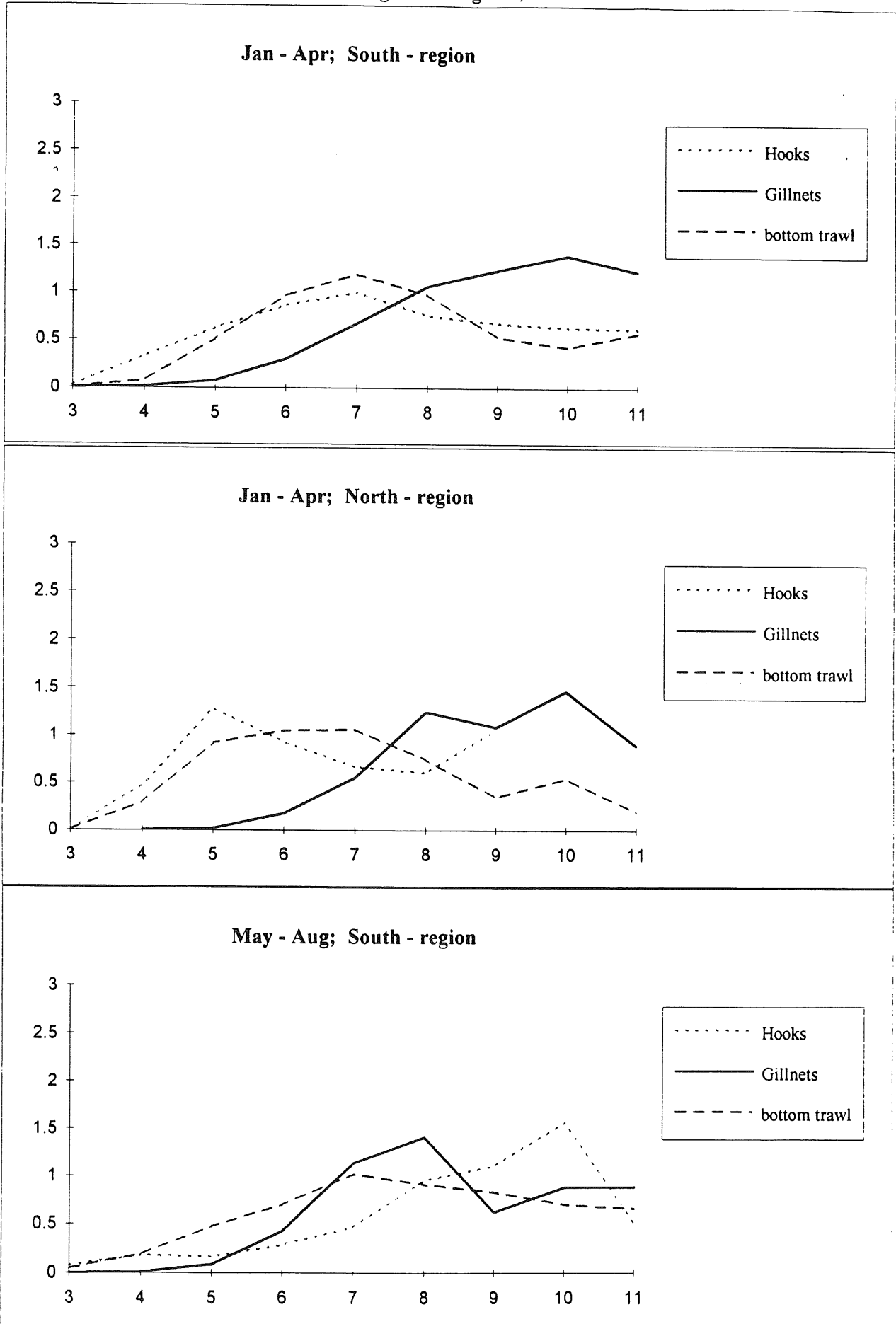


Figure 3.3.2 Cont'd

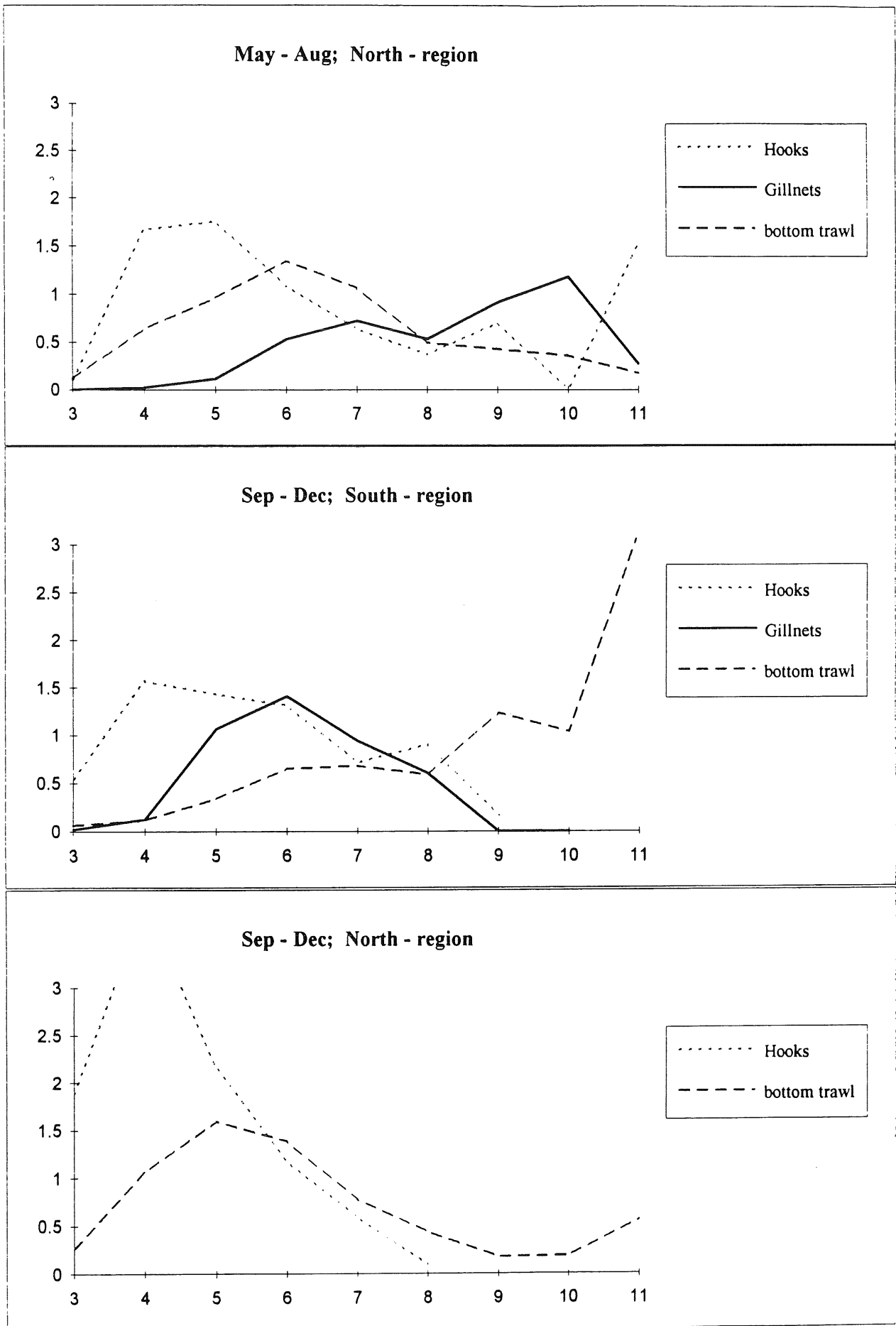


Figure 3.3.3

Icelandic cod: trends in fishing mortality of age groups 3-5 for different seasons, regions and gears.

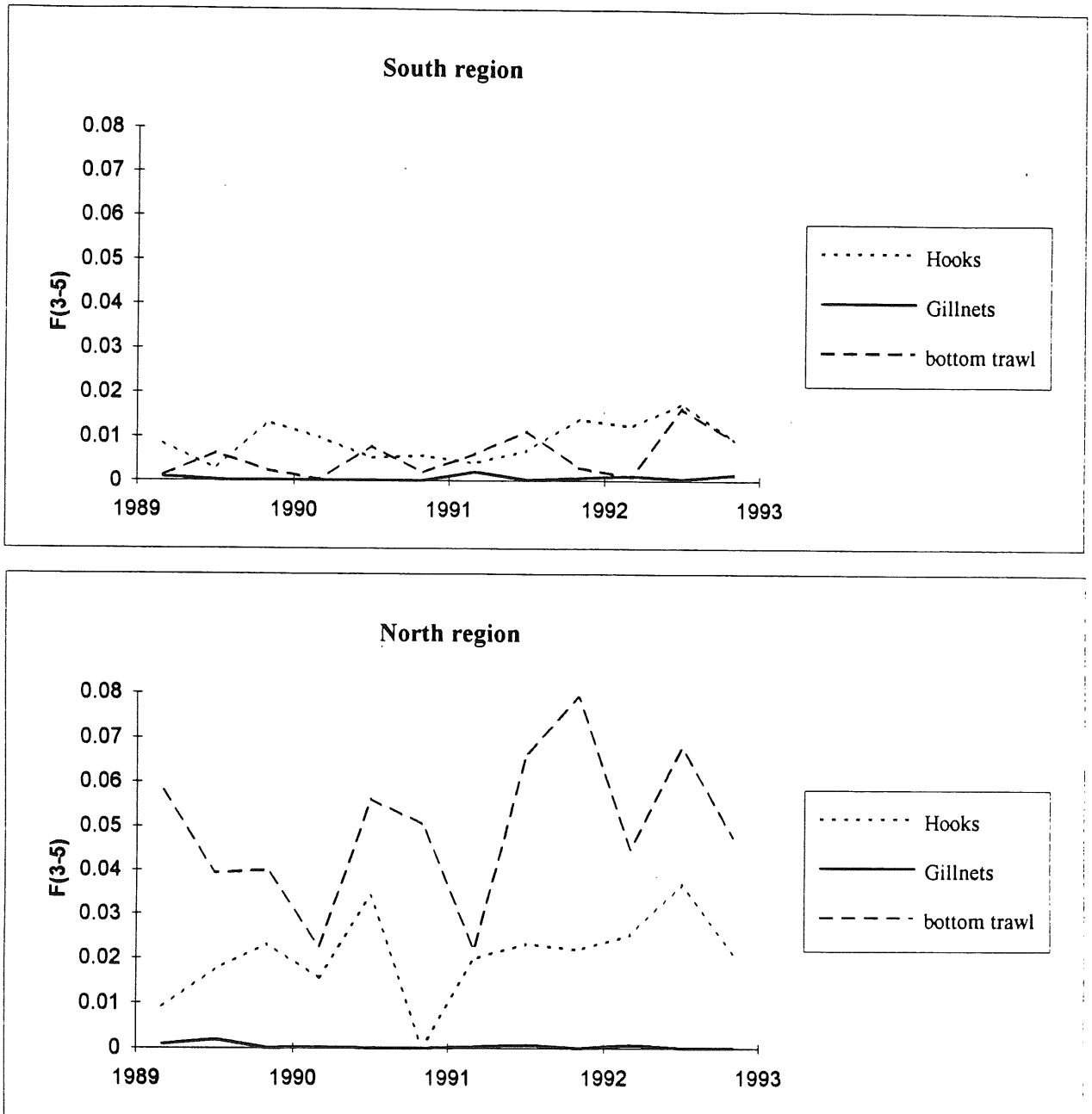


Figure 3.3.4

Icelandic cod: trends in fishing mortality of age groups 5-10 for different seasons, regions and gears.

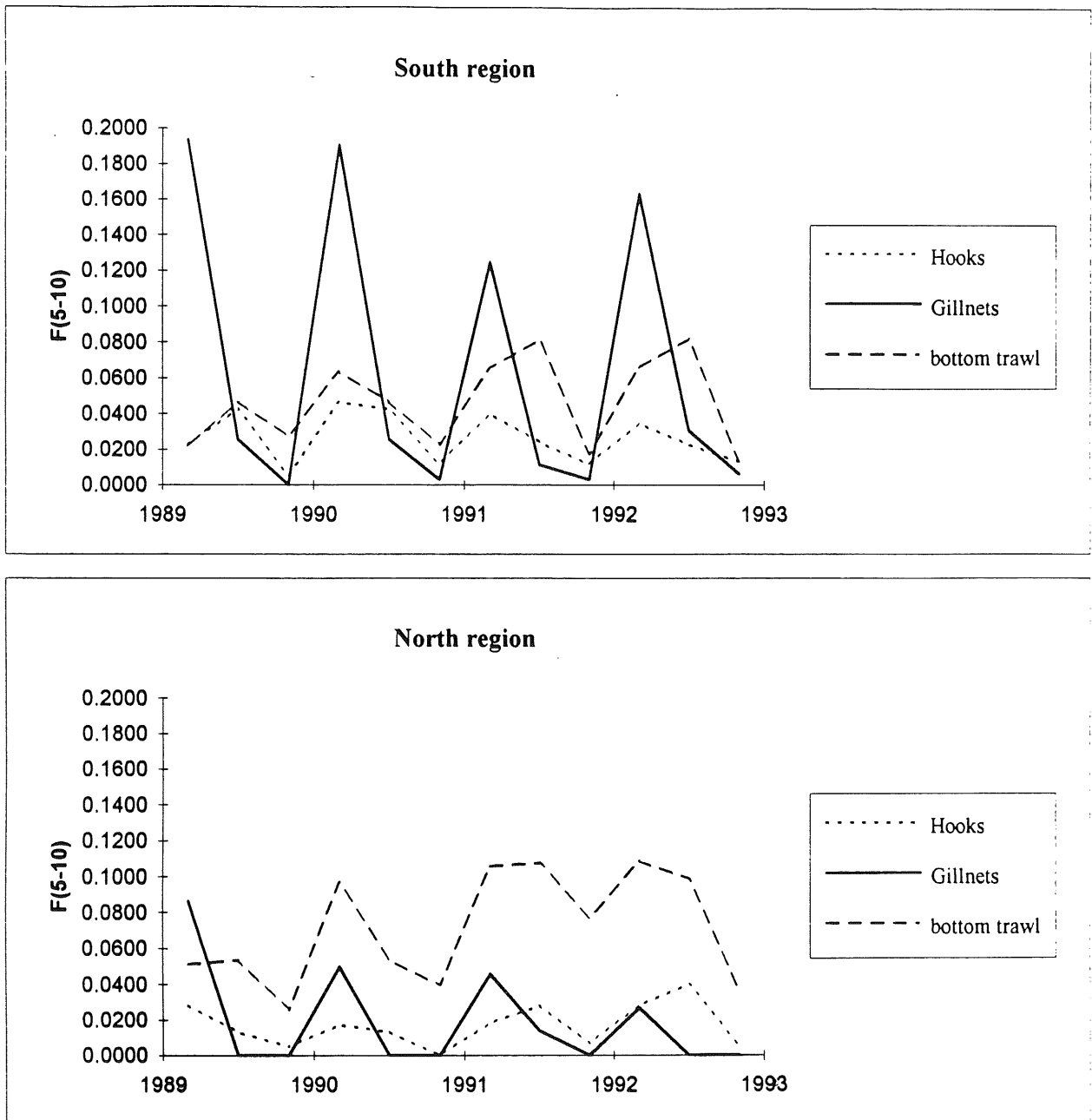


Fig. 3.3.5 Stock-recruitment relationship. Based on Ricker curve and cannibalism by immature fish.

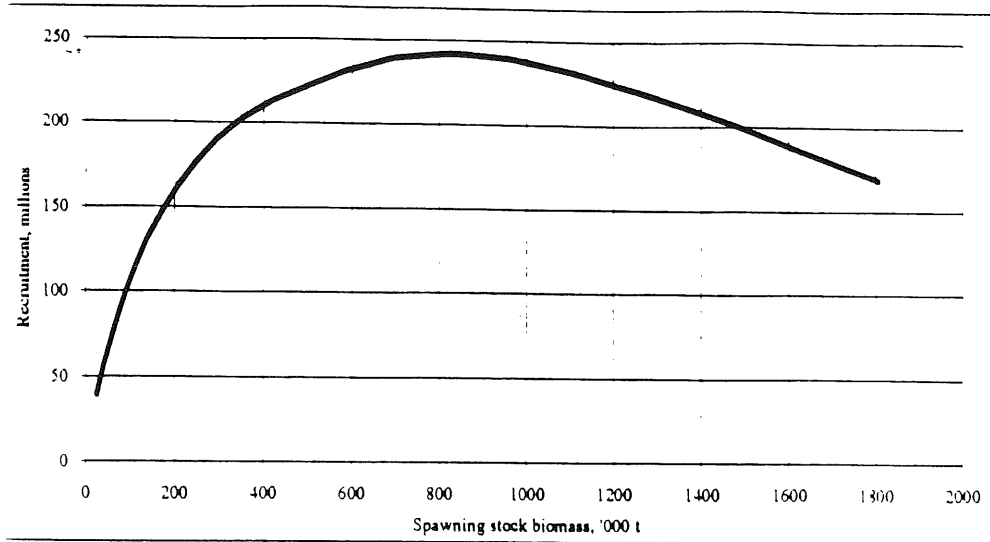


Fig. 3.3.6 Steady-state (average) catch and catch according to a catch-control law, both as a function of the 4+ biomass.

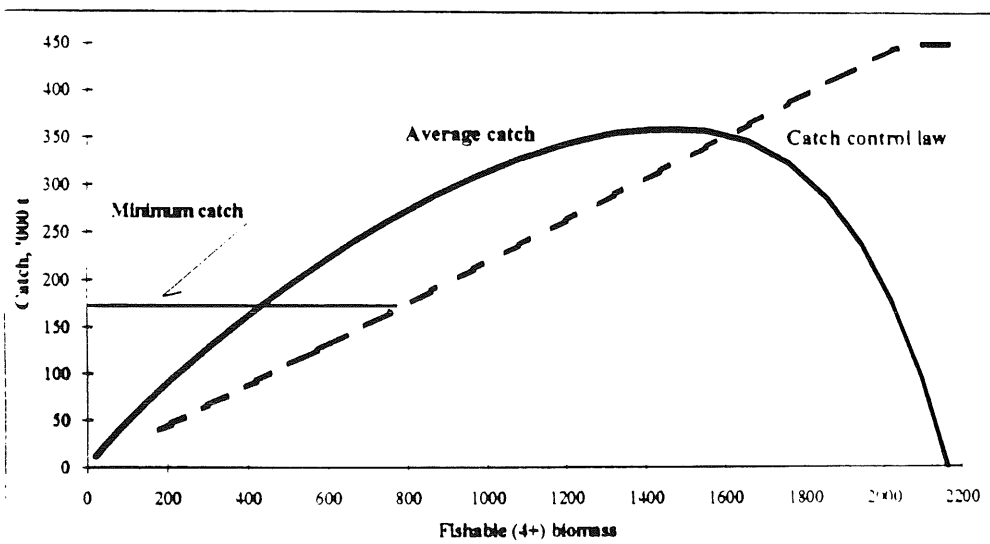


Fig. 3.3.7 Trends in cod catches: 5%, 25%, 50%, 75%, 95% percentiles and 5 sample trajectories. $Q_{min}=0$ and $Q_{slop}=.22$.

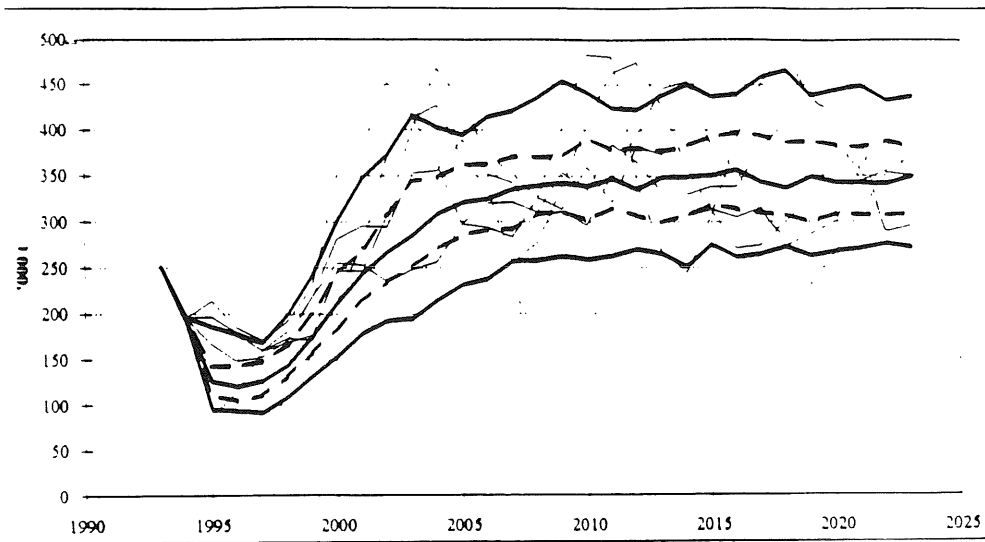


Fig. 3.3.8 SSB-trends: 5%, 25%, 50%, 75%, 95% percentiles and 5 sample trajectories. $Q_{min}=0$ and $Q_{slop}=.22$.

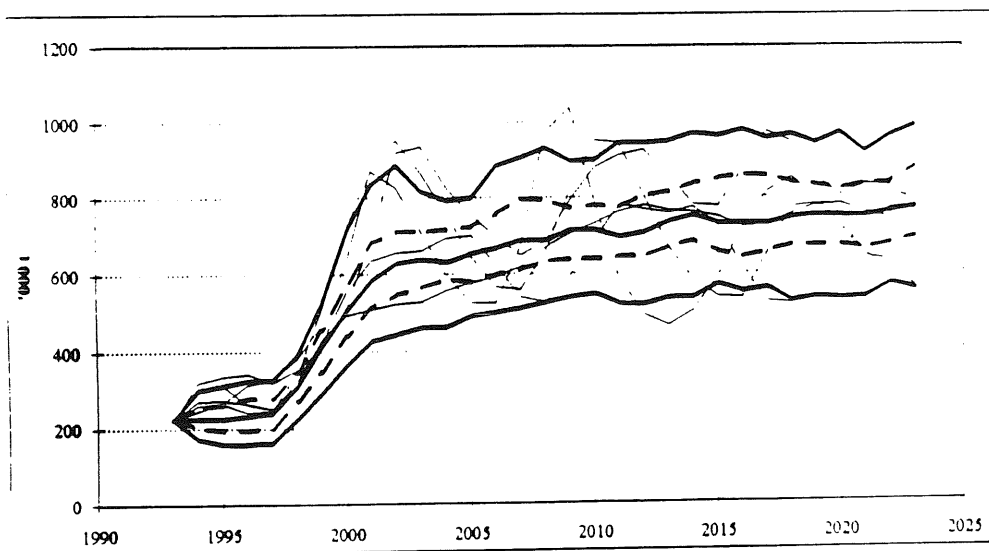


Fig. 3.3.9 Trends in cod catches: 5%, 25%, 50%, 75%, 95% percentiles and 5 sample trajectories. $Q_{min}=190$ and $Q_{slop}=.22$.

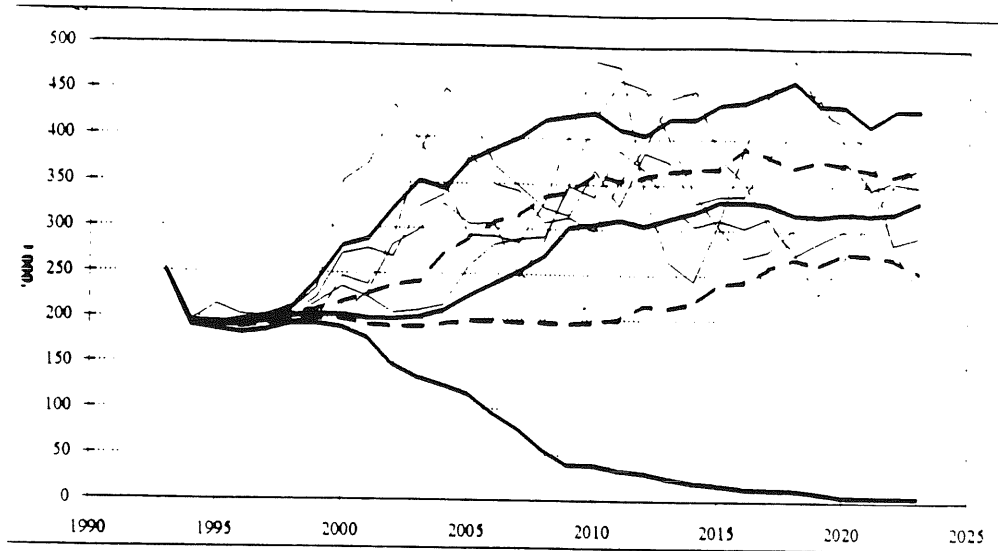


Fig. 3.3.10 SSB-trends: 5%, 25%, 50%, 75%, 95% percentiles and 5 sample trajectories. $Q_{min}=190$ and $Q_{slop}=.22$.

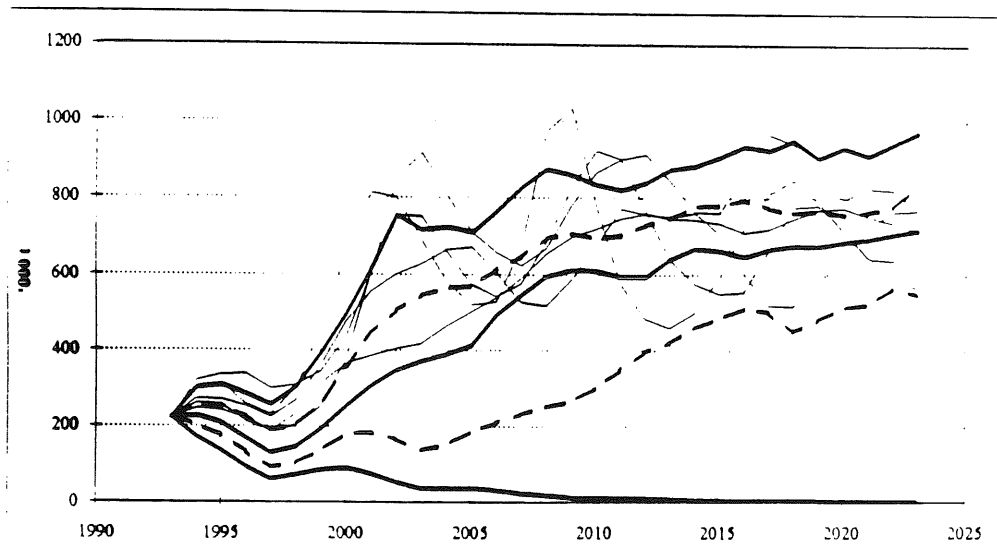
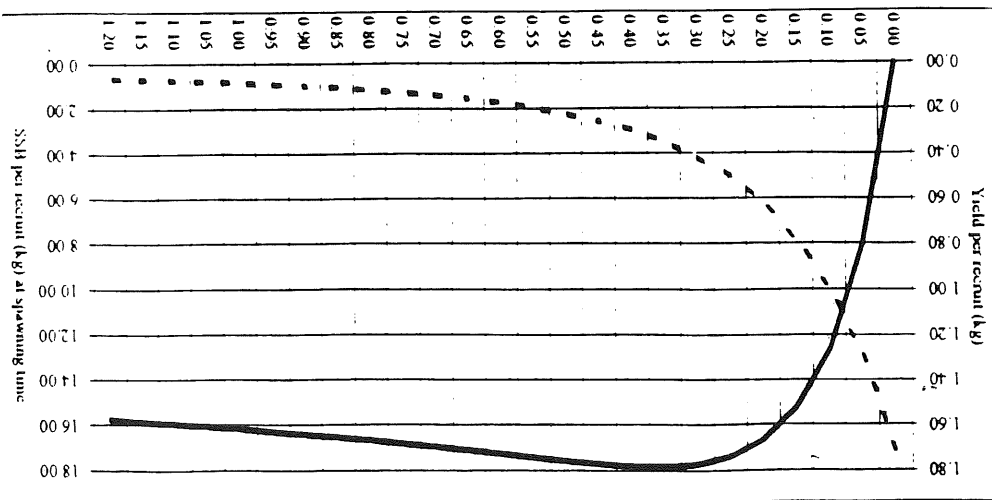


Fig. 3.3.11 Icelandic cod (Division Va). Long term yield and spawning stock biomass per recruit



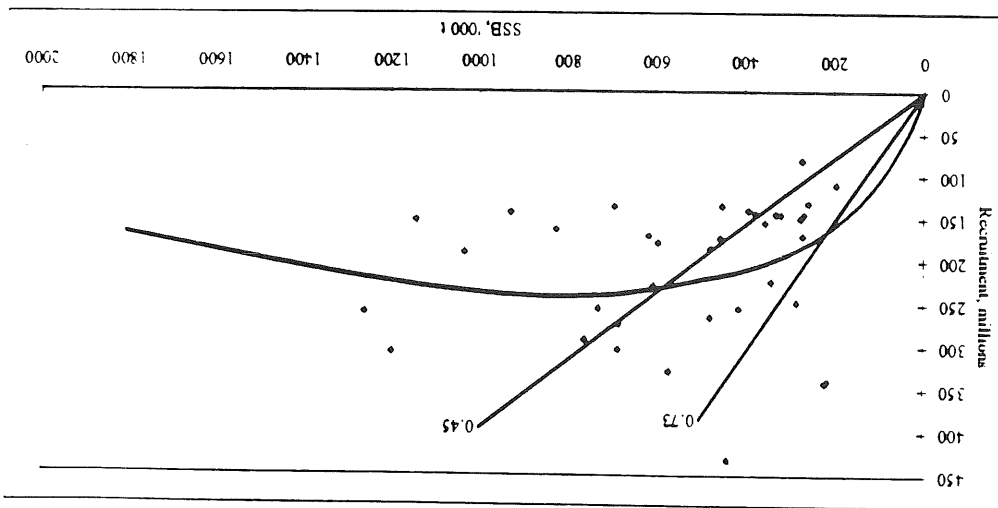


Fig. 3.3.13 . Icelandic cod. S-R data, fitted curve and replacement lines for Fmed and Fhigh

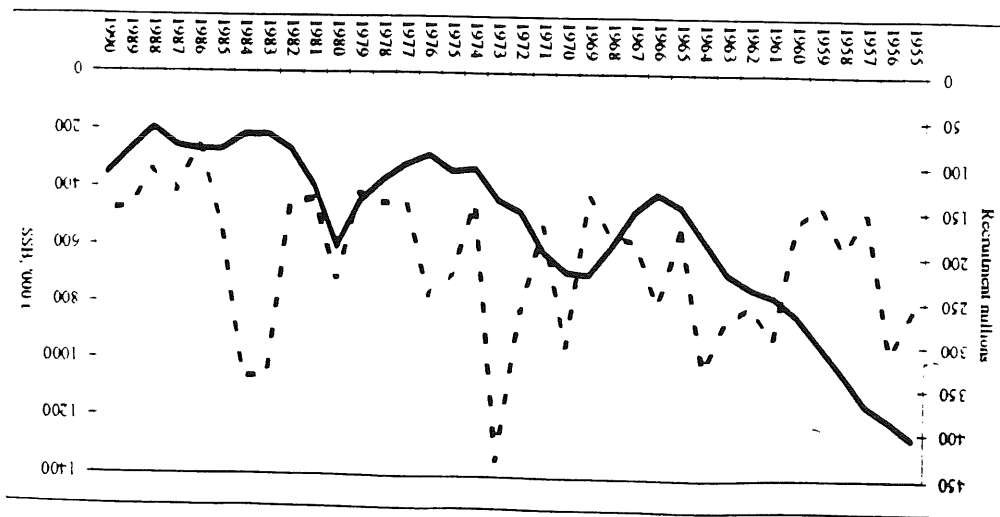


Fig. 3.3.12 Icelandic cod. Trend in SSB and recruitment

Fig. 3.3.14 Comparisons of stock assessment, medium-term prediction and long-term predictions. Assessment data shown are the time trajectory of stock biomass and yield (thin marked line). Medium-term prediction input is the catch control law (dashed line) and steady-state catch (thick solid curve). Medium-term prediction output is the continued catch from present to steady-state (thin dashed curve). Long-term results shown are based on yield-per recruit computations and a recent average recruitment values (solid curve).

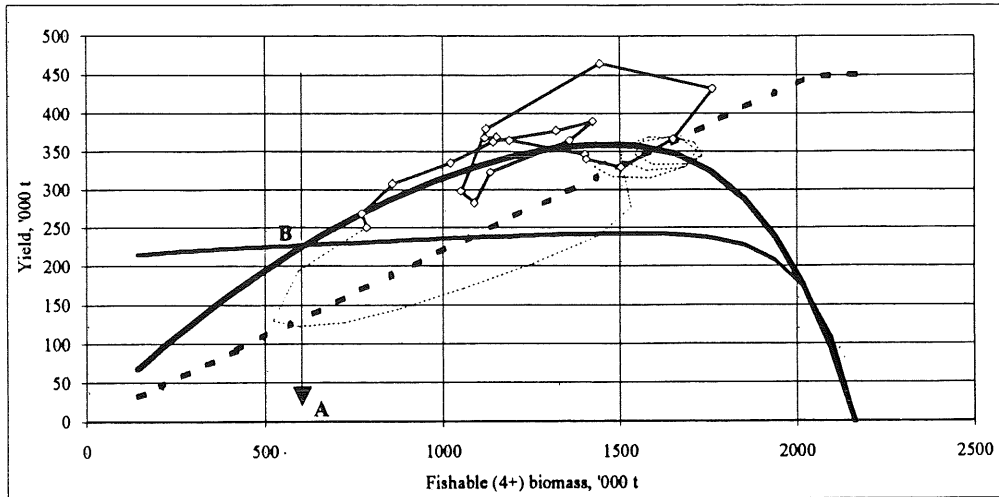
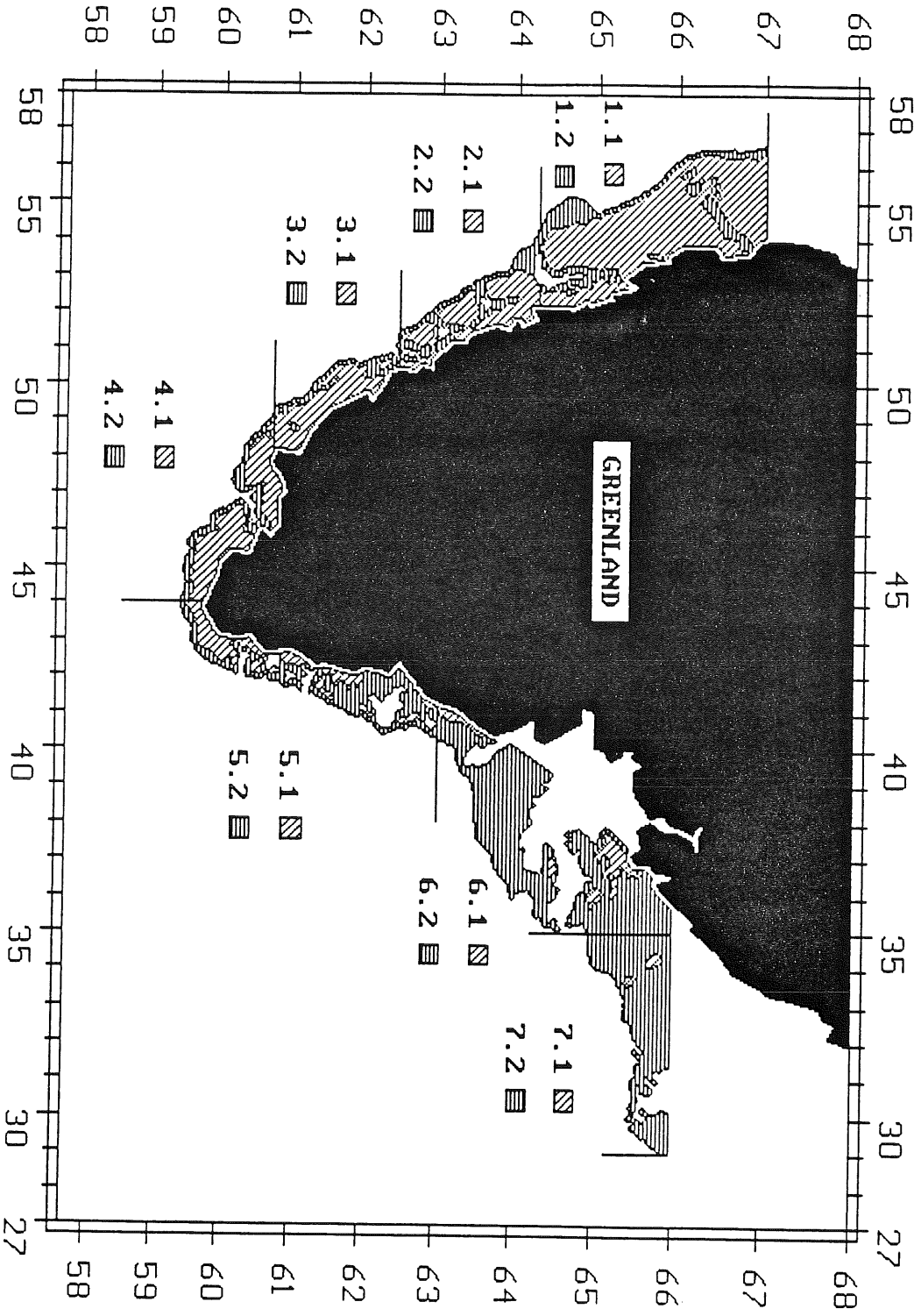


Fig. 5.1.1 Survey area. Geographic stratification scheme as specified in Table 1.



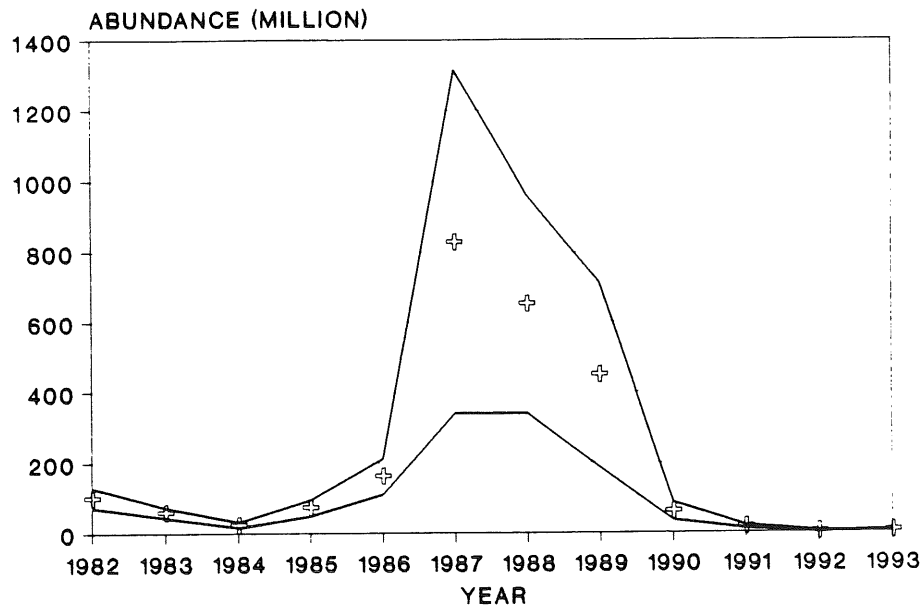


Fig. 5.1.2 Abundance indices (+) and respective confidence intervals (-) at 95% level of significance as listed in Table 5.1.4, 1982-93.

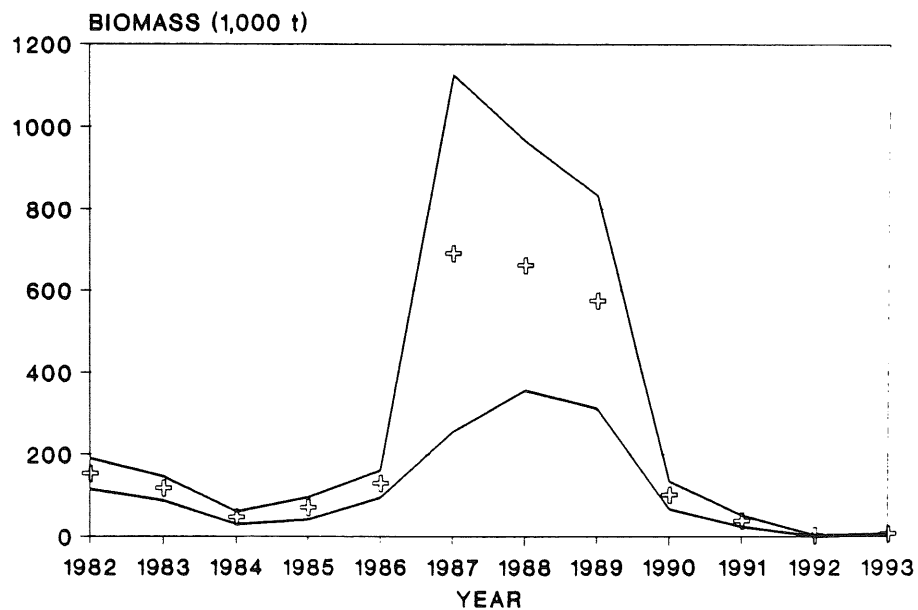


Fig. 5.1.3 Biomass indices (+) and respective confidence intervals (-) at 95% level of significance as listed in Table 5.1.5, 1982-93.

Fig. 5.1.4 Aggregate length composition for West and East Greenland, 1990-93.

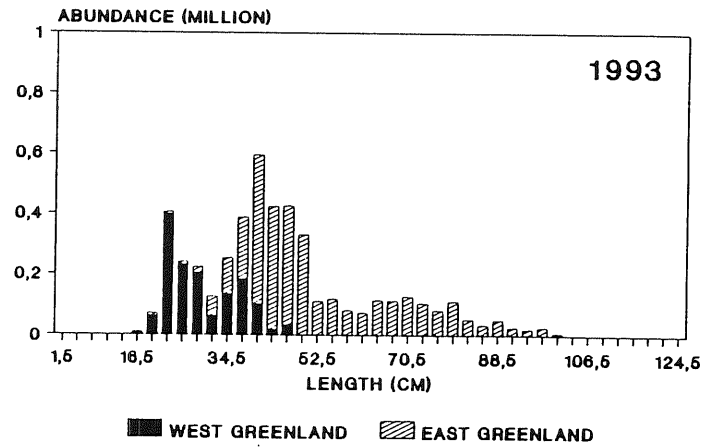
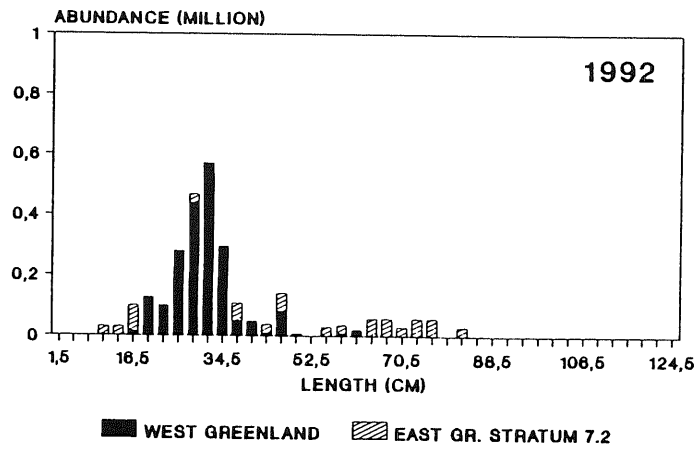
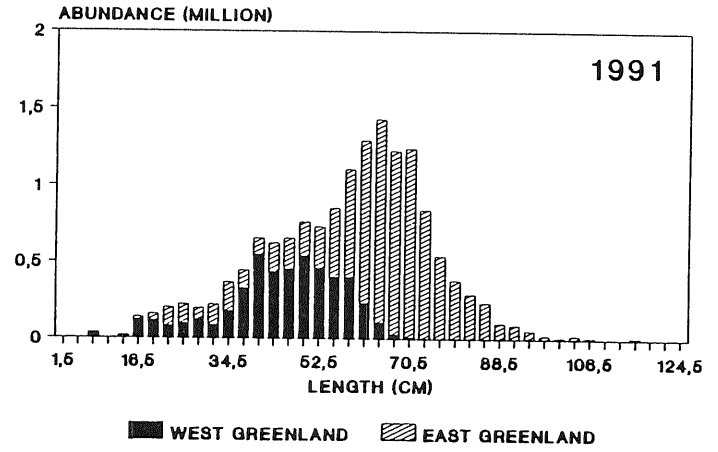
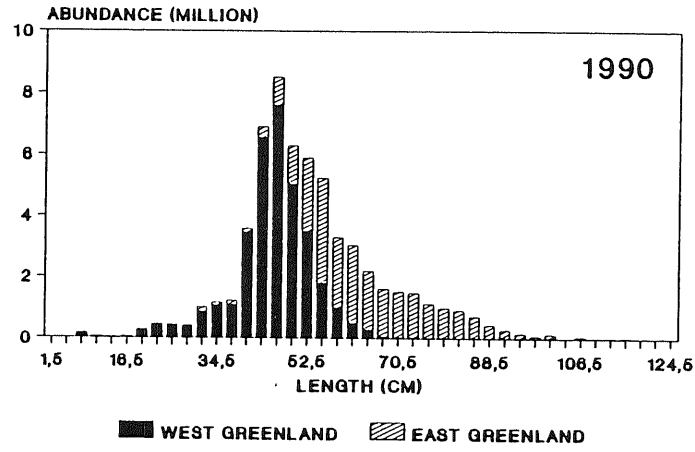
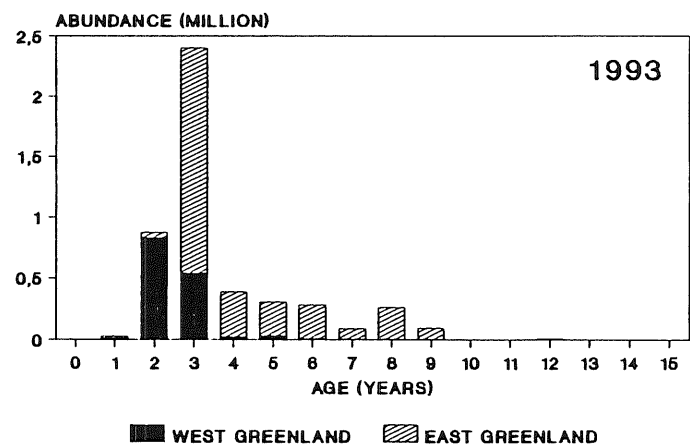
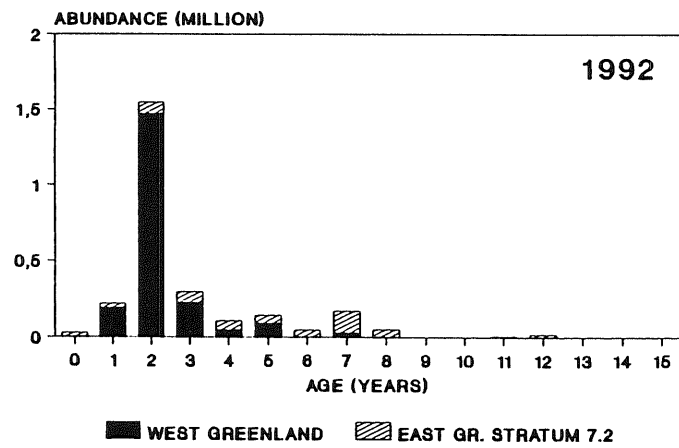
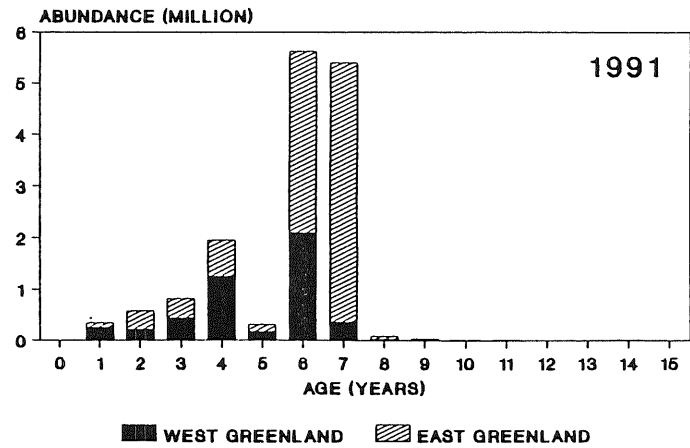
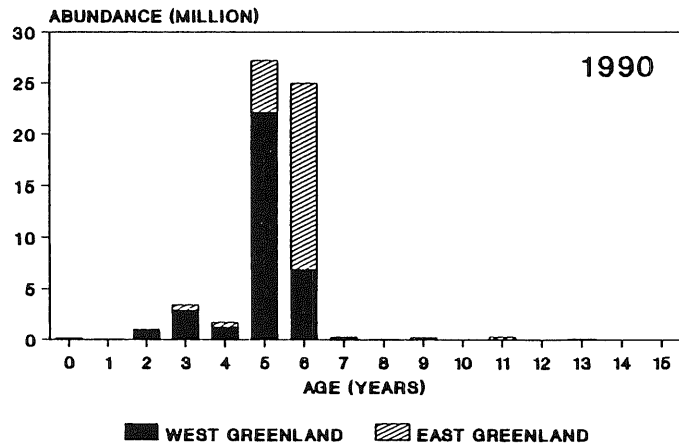


Fig. 5.1.5 Aggregate age composition for West and East Greenland as listed in Tables 5.1.6, 5.1.7 and 5.1.8, 1990-93.



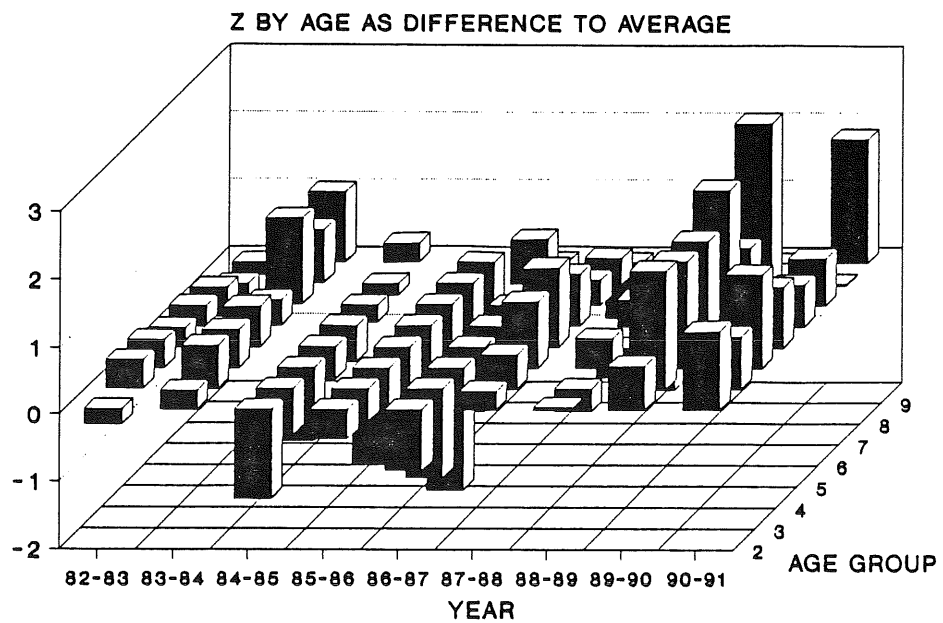


Fig. 5.1.6 Coefficients of total mortality Z as difference to average as listed in Table 5.1.9 for age groups 2-9, 1982-91.

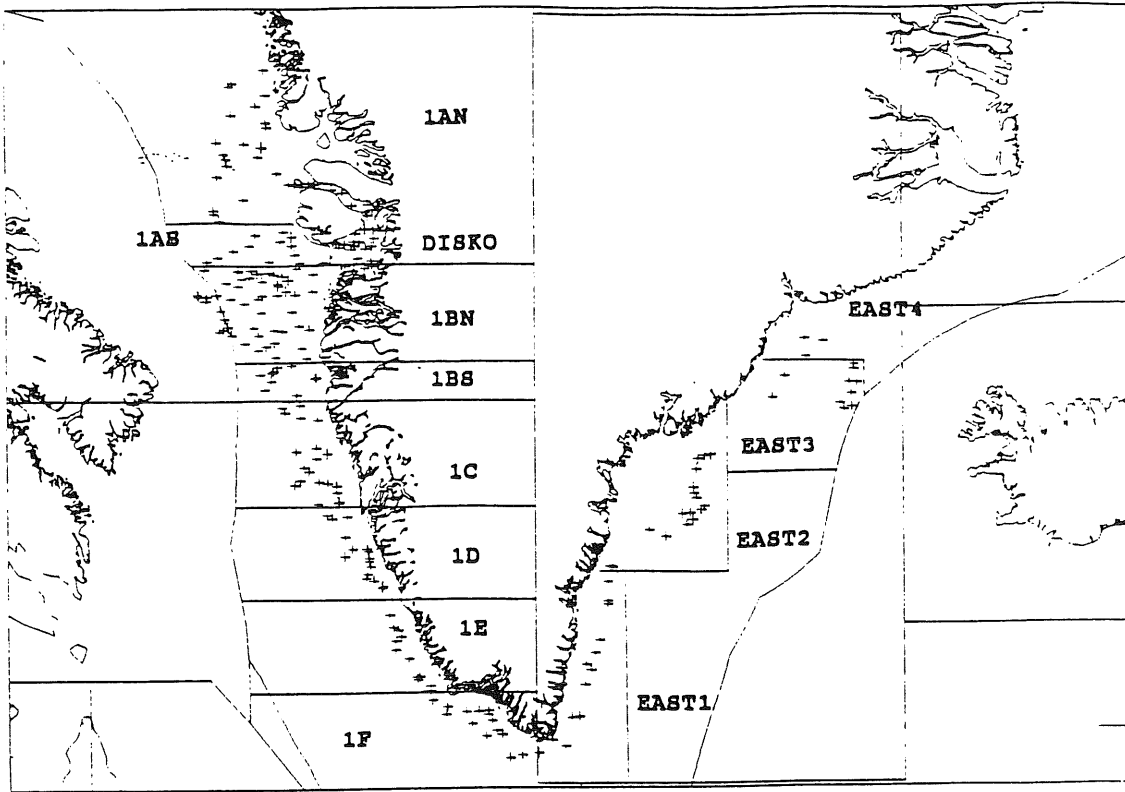


Fig. 5.1.7 Location of sub-areas and hauls in Greenland trawl survey, 1993.

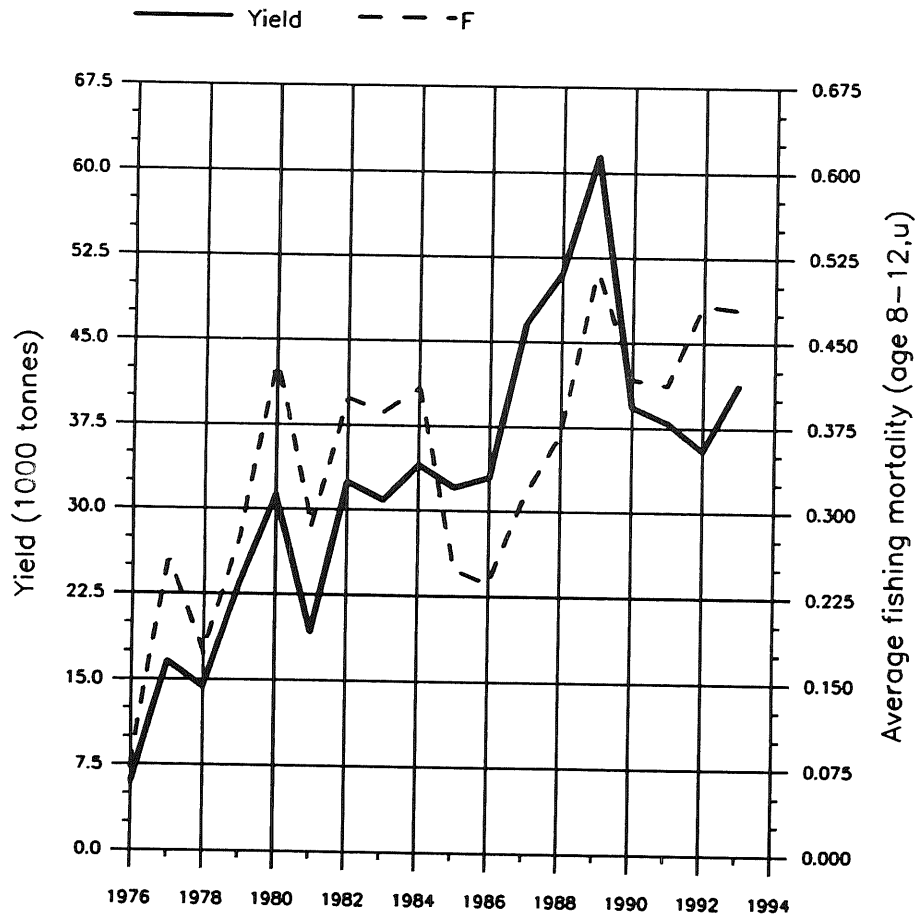
Figure 6.1

FISH STOCK SUMMARY

STOCK: Greenland halibut in the Iceland and Faroes Grounds and East Green

8-5-1994

Trends in yield and fishing mortality (F)

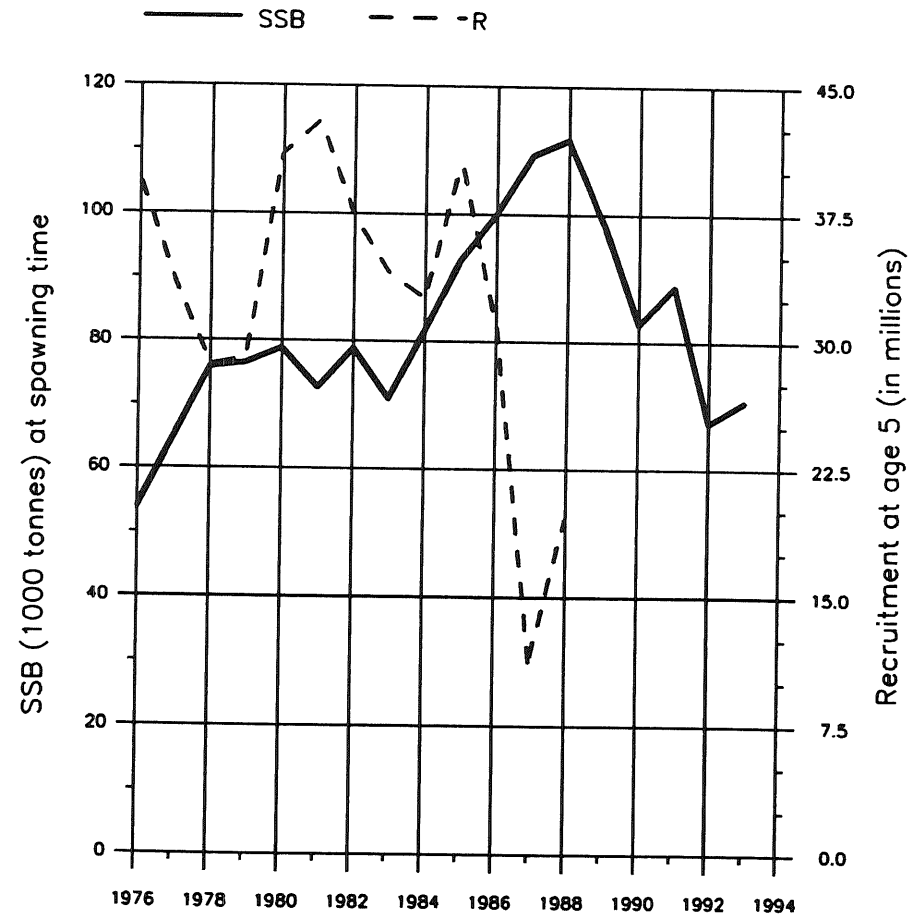


(run: XSA94.FN)

Year

A

Trends in spawning stock biomass (SSB) and recruitment (R)



(run: XSA94.FN)

Recruitment year class, SSB year

B

Figure 6.2

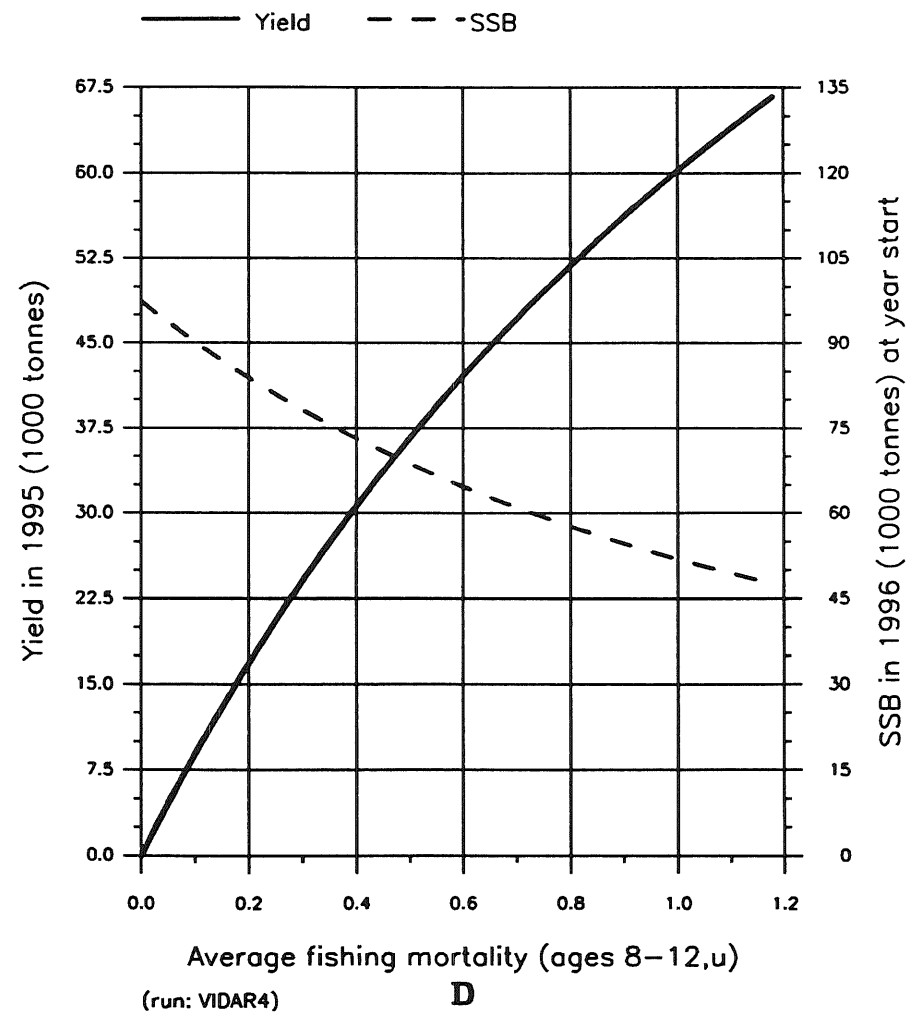
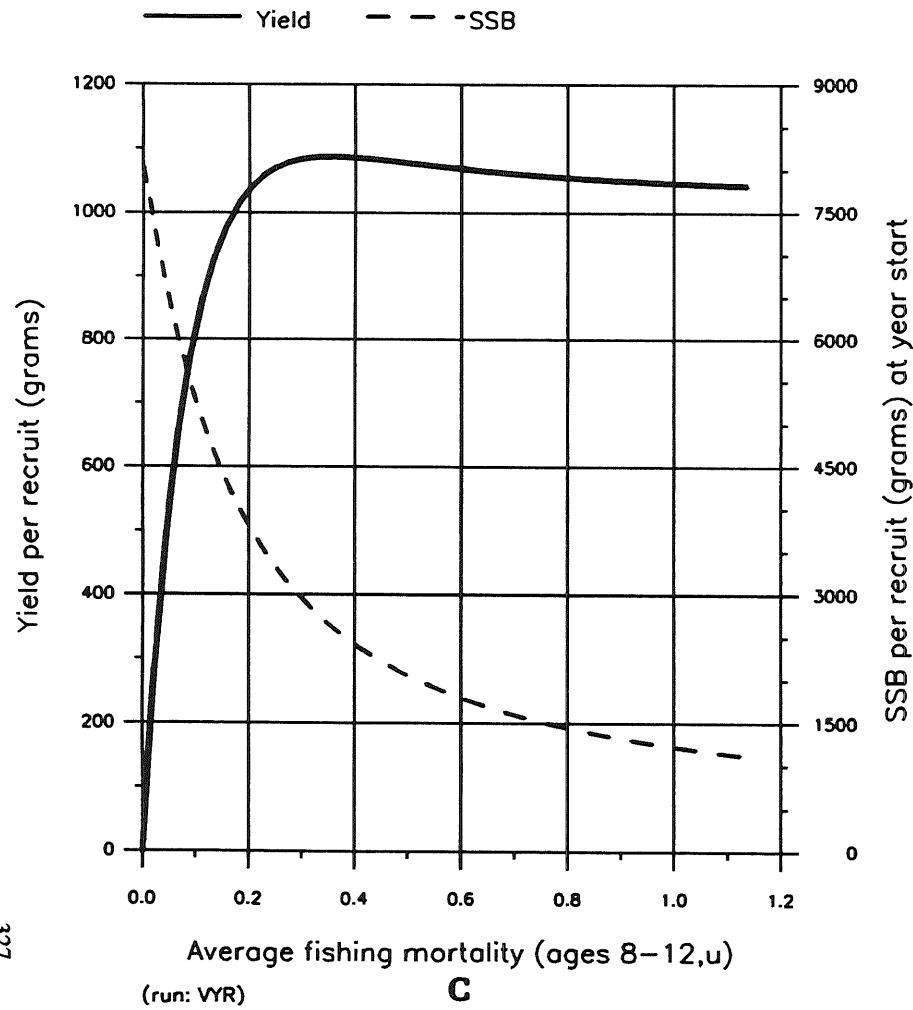
FISH STOCK SUMMARY

STOCK: Greenland halibut in the Iceland and Faroes Grounds and East Green

8-5-1994

Long term yield and spawning stock biomass

Short-term yield and spawning stock biomass



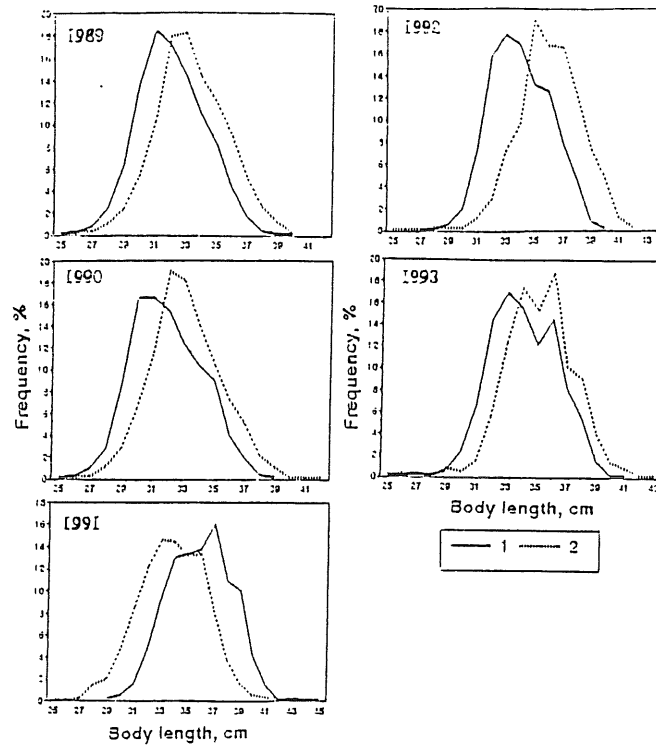


Fig. 7.1.1 Size composition of oceanic *S. mentella* during Russian trawl-acoustic surveys 1989-1993.

1 - males; 2 - females.

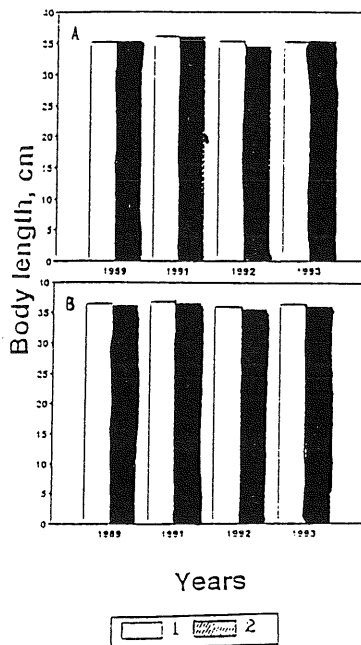


Fig. 7.1.2 Mean length of males (A) and females (B) of oceanic *S. mentella* in 1989-1993.

1 - the Irminger Sea offshore;
2 - 200-mile zone of East Greenland.

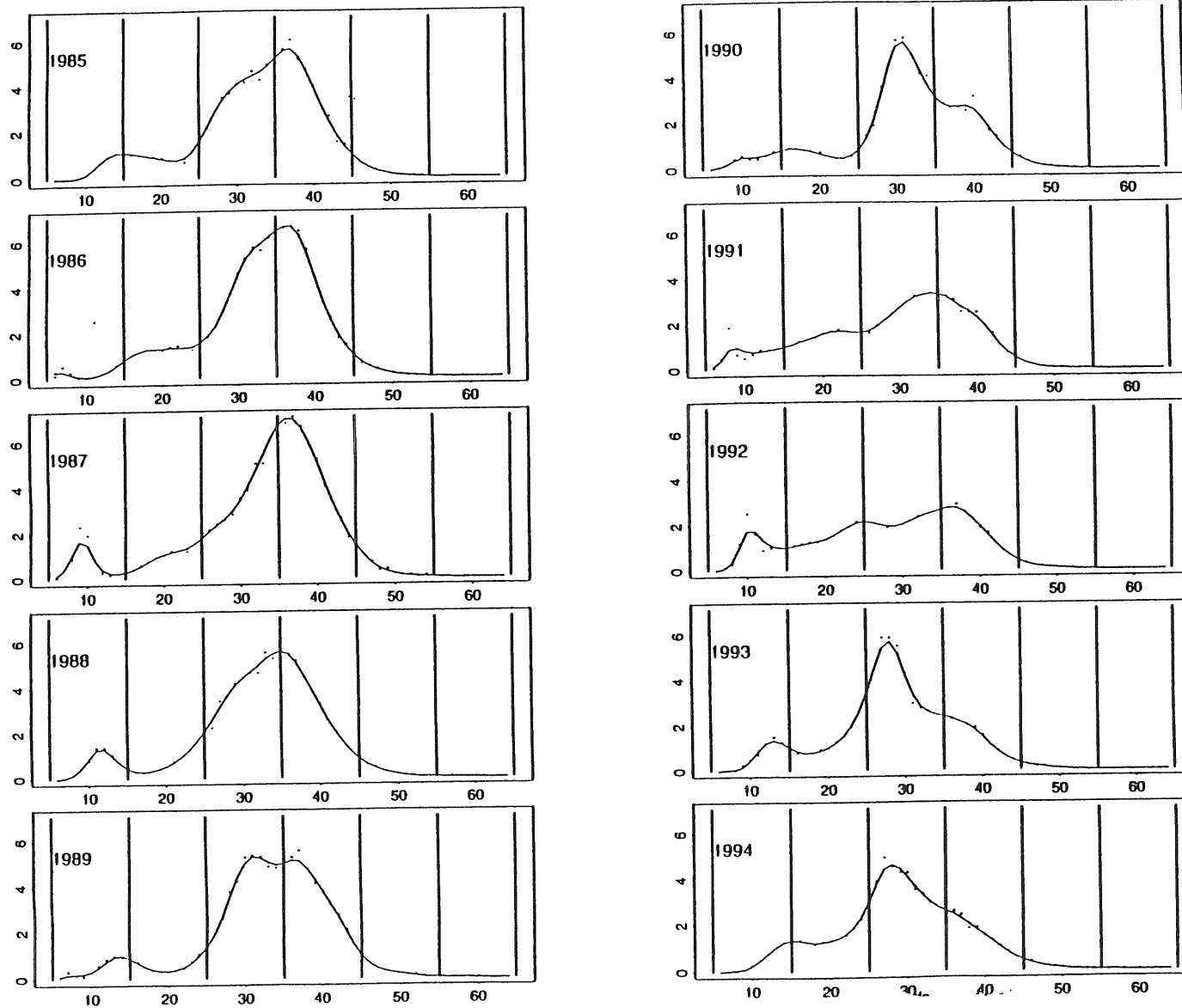


Figure 7.4.1

S. marinus: Length distributions from survey of 0-500 m depth range.
Number of fish per towing mile by cm-group

Figure 7.5.1

CPUE; Data are all tows reported from 1980-93
 Different lines show different tows selection critieria

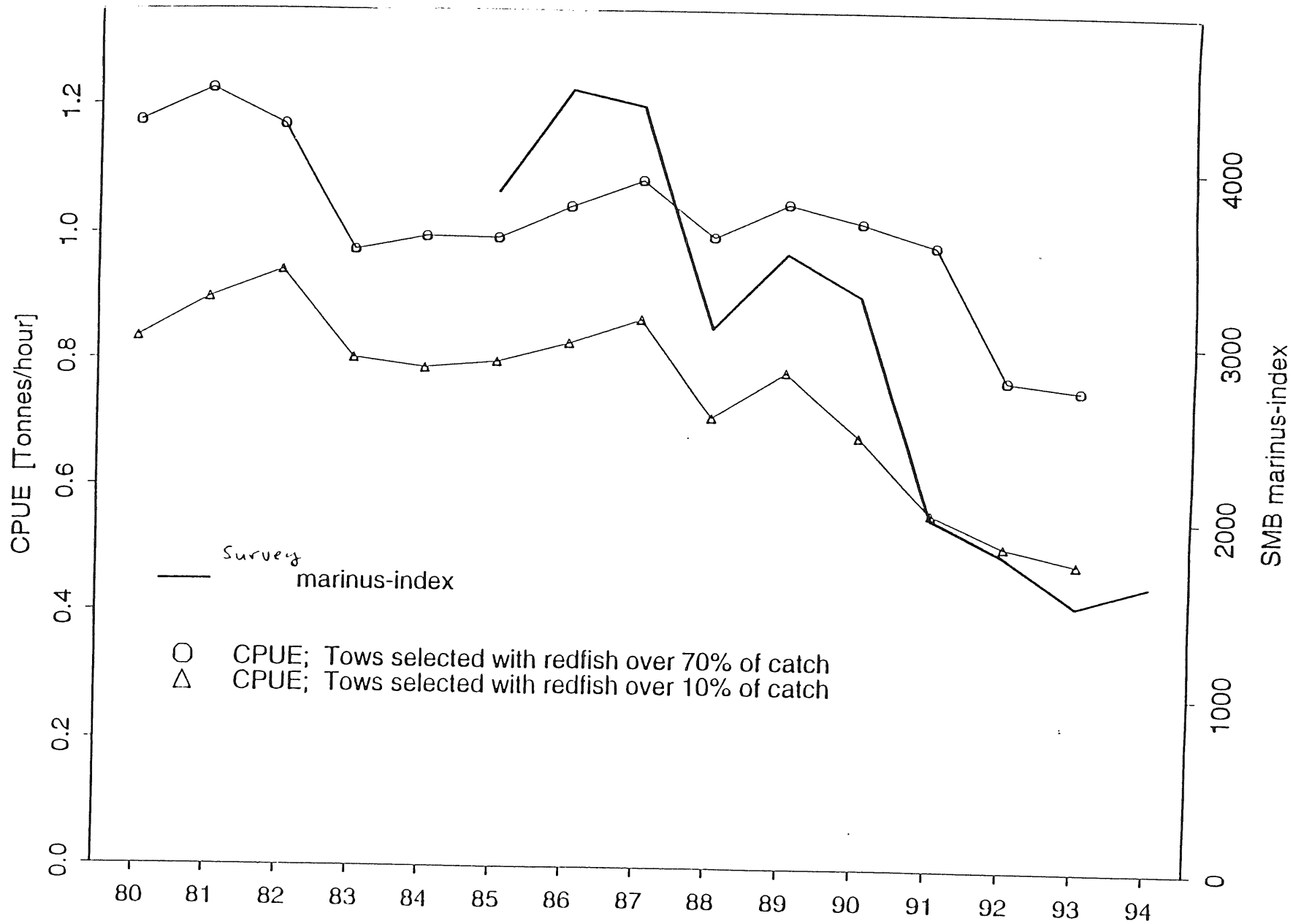
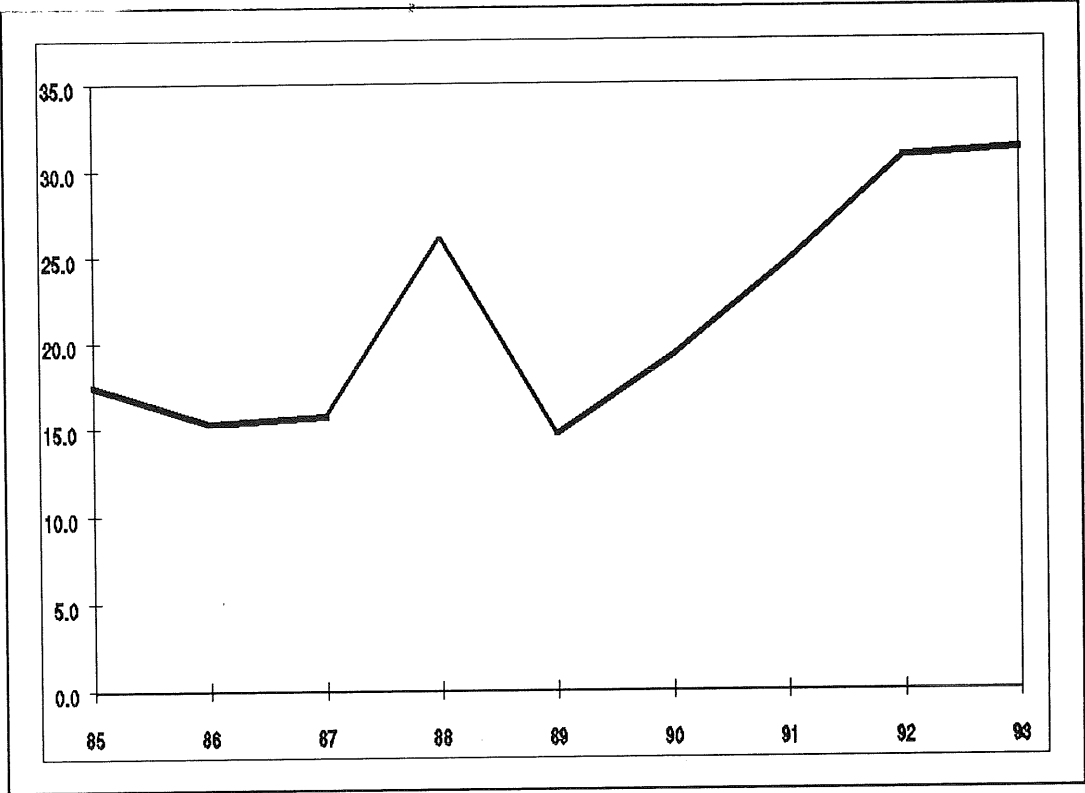


Figure 7.5.2

Trend in *S. Marinus* effort based on Icelandic groundfish survey data



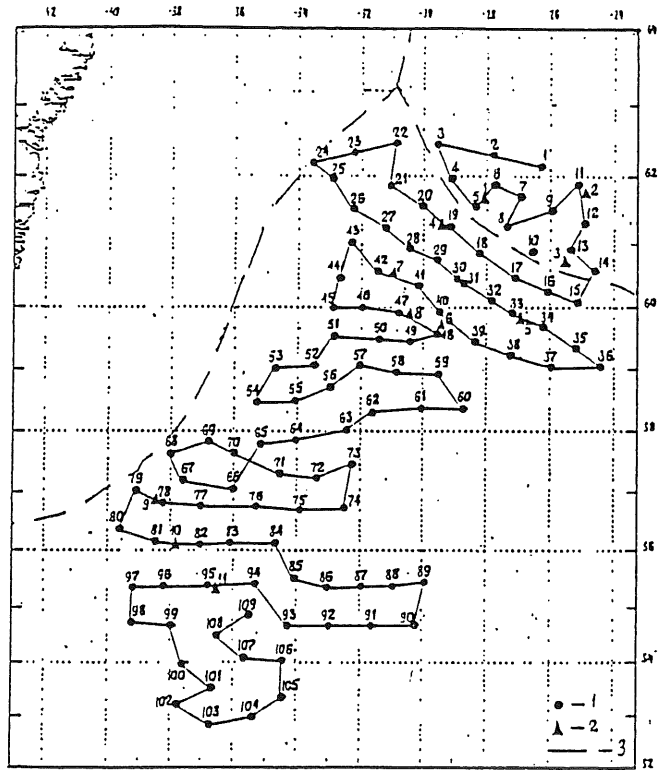


Fig. 7.5.3. Ichthyoplankton survey track in 1993.

1 - ichthyoplankton stations;
 2 - trawl hauls; 3 - acoustic transects.

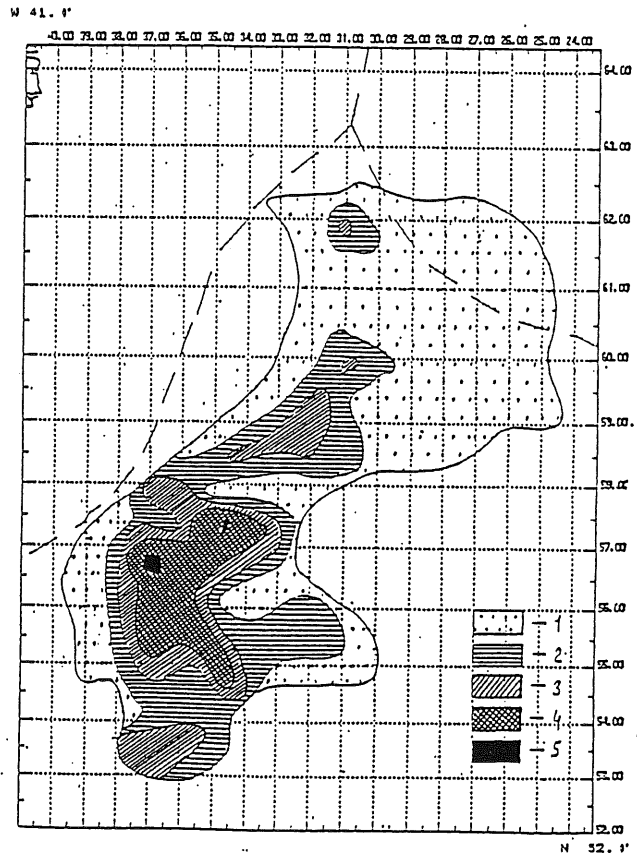


Fig. 7.5.4. Distribution of larval *S. mentella* during the ichthyoplankton survey 1993, larvae per sq.m.

1 - 0-10; 2 - 10-25; 3 - 25-50; 4 - 50-100;
 5 - more than 100.

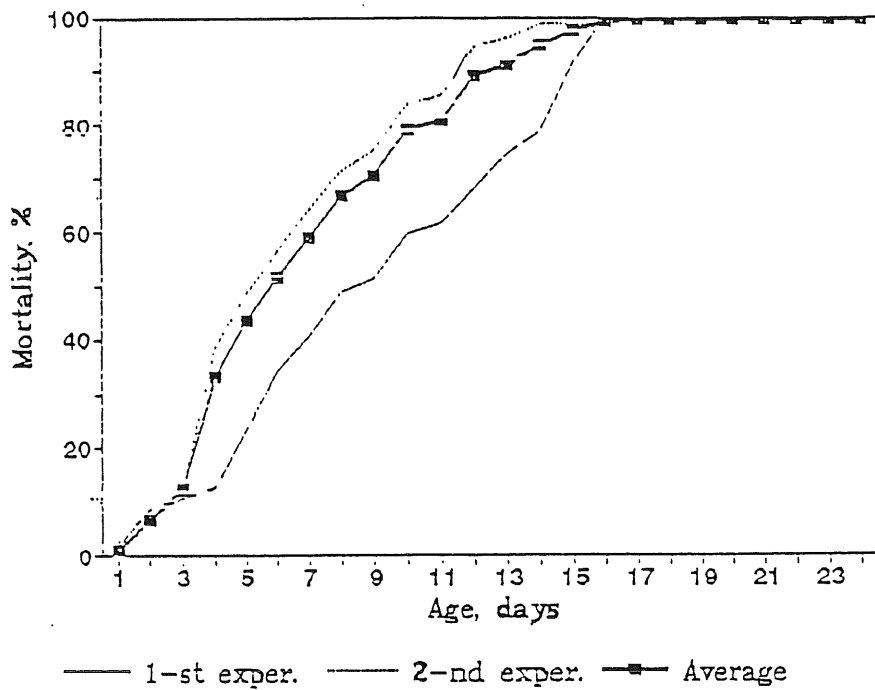


Fig. 7.5.5. Variation in larval *S. mentella* mortality rate (Russian experimental data).

1 - 1st experiment; 2 - 2nd experiment;
3 - mean rate.

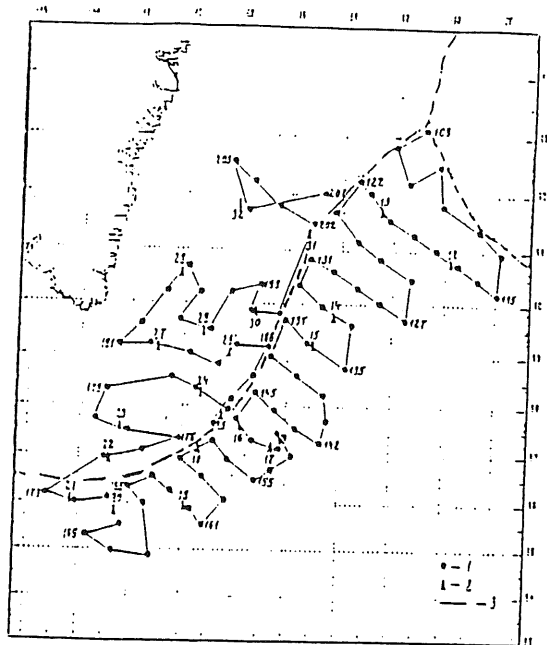


Fig. 7.5.6. The route of Russian trawl-acoustic survey in 1993.

- 1 - hydrographical stations;
- 2 - hauls; 3 - acoustic tracks.

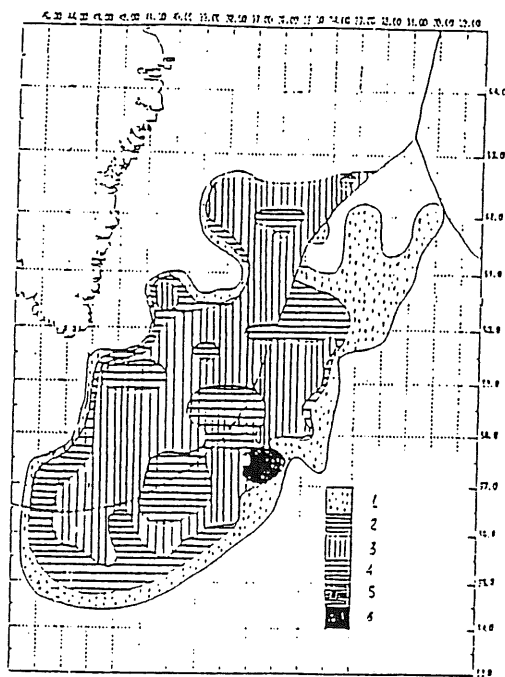


Fig. 7.5.7. Distribution and density of Redfish concentrations from data collected during the Russian trawl-acoustic survey in 1993.

- Density of concentrations, t/sq. mile:
- 1 - less than 5; 2 - 5-10; 3 - 10-30;
 - 4 - 30-100; 5 - 100-300; 6 - over 300.

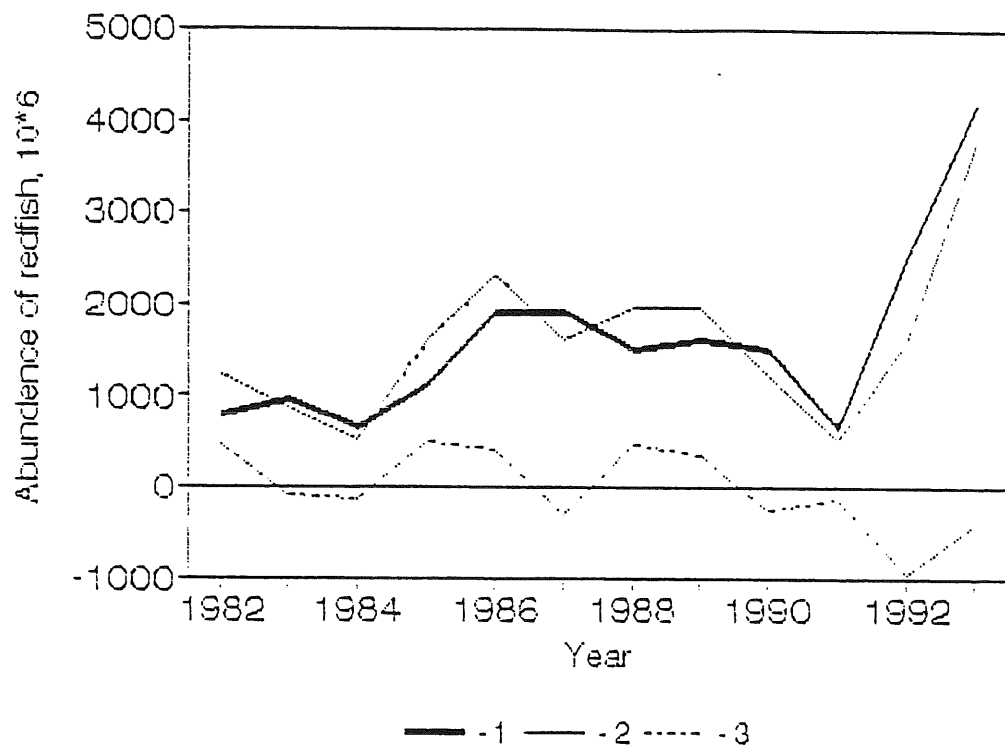


Fig. 7.5.8. Forecast and error of variation in biomass of oceanic redfish during TAS in 1983-1993.
 1 - redfish biomass; 2 - forecast for biomass;
 3 - error of forecasting.

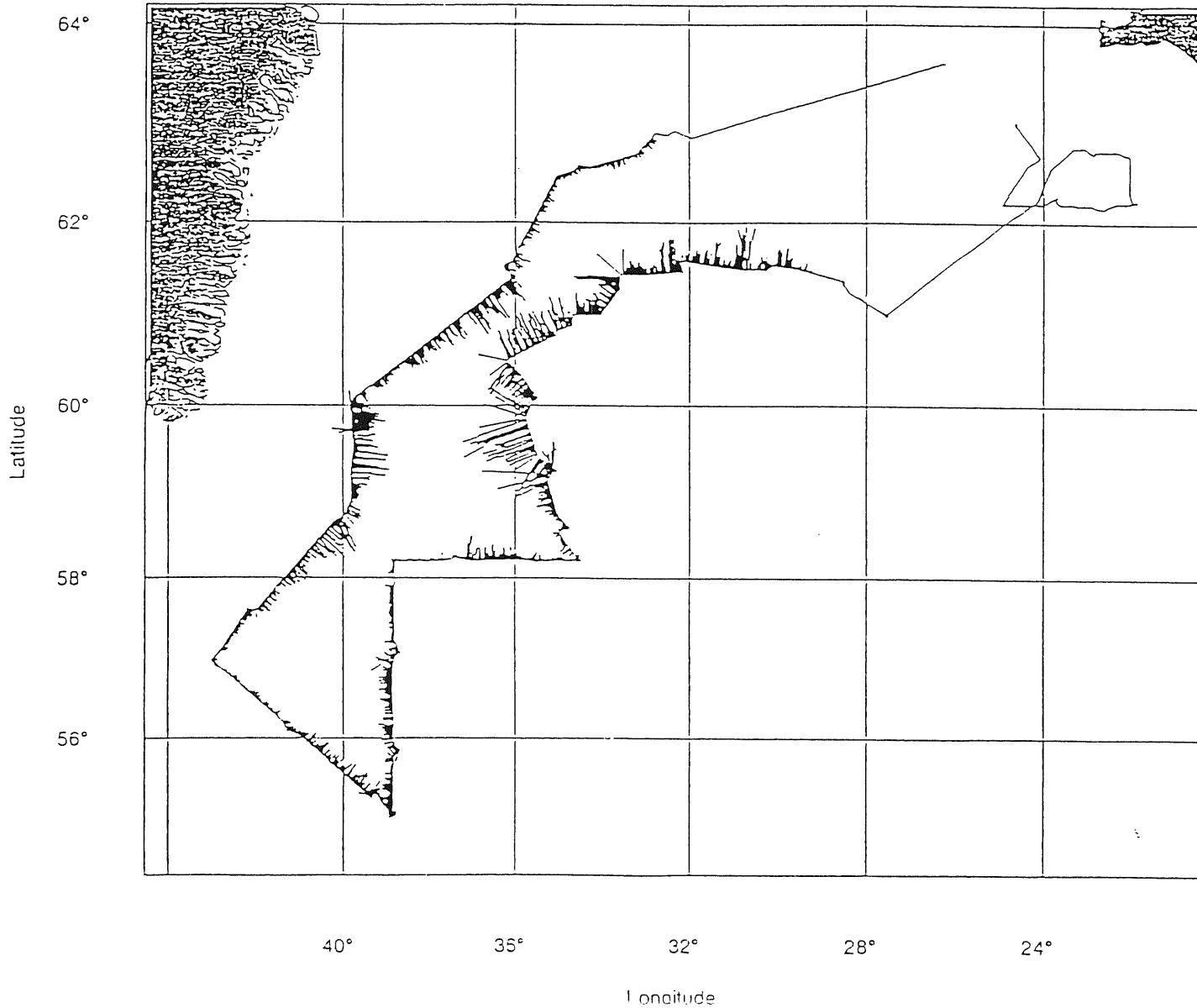


Figure 7.5.9 Cruise tracks from the Icelandic survey in September 1992 and relative abundance of oceanic redfish based on echo values

Figure 7.5.10 Oceanic *Sebastes mentella*. Fixed selection pattern.

