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**REPORT OF THE  
ARCTIC FISHERIES WORKING GROUP**

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**PART 2**

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International Council for the Exploration of the Sea  
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**Table 6.1** *Sebastes mentella* in Sub-areas I and Divisions IIa and IIb combined.

Year	Canada	Denmark	Faroe Islands	France	Germany <sup>3</sup>	Greenland	Ireland	Norway	Portugal	Spain	UK England and Wales	UK Scotland	Russia <sup>4</sup>	Total
1986	-	-	-	-	1,252	-	-	1,274	1,273	-	84	-	17,815	23,112 <sup>2</sup>
1987	-	-	200	63	1,321	-	-	1,488	1,175	25	49	1	6,196	10,518
1988	No species specific data presently available													15,586
1989	-	-	335	1,093	3,833	-	-	4,633	340	5	166	9	13,080	23,494
1990	-	-	108	142	6,354	36	-	10,173	830	-	72	-	17,355	35,070
1991	-	-	492	85	-	23	-	33,592	166	1	57	17	14,302	48,735
1992	-	-	23	12	-	-	-	10,751	972	14	222	16	3,577	15,587
1993 <sup>1</sup>	8	4	13	39	35	1	-	4,982	963	57	293	-	4,386	10,781
1994 <sup>1</sup>	-	28	4	74	12	1	3	5,910	895	30	124	12	5,021	12,114

<sup>1</sup> Provisional figures. .

<sup>2</sup> Including 1,414 tonnes in IIb not splitted on countries.

<sup>3</sup> Includes former GDR prior to 1991.

<sup>4</sup> USSR prior to 1991.

**Table 6.2** *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area 1.

Year	Faroe Islands	Germany <sup>4</sup>	Norway	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	-	-	1,274	-	-	911	2,185
1987 <sup>3</sup>	-	2	1,166	3	-	234	1,405
1988	no species specific data presently available						
1989	13	-	60	8 <sup>2</sup>	1 <sup>2</sup>	484	566
1990	2	-	-	-	-	100	102
1991	-	-	8	-	-	420	428
1992	-	-	561	-	-	408	969
1993 <sup>1</sup>	2 <sup>2</sup>	-	17	-	-	422	441
1994 <sup>1</sup>	2 <sup>2</sup>	-	30	-	-	308	340

<sup>1</sup>Provisional figures.

<sup>2</sup> Split on species according to the reports to Norwegian authorities.

<sup>3</sup>Based on preliminary estimates of species breakdown by area.

<sup>4</sup>Includes former GDR prior to 1991.

<sup>5</sup>USSR prior to 1991.

**Table 6.3** *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Division IIa.

Year	Faroe Islands	France	Germany <sup>4</sup>	Green-land	Ire-land	Norway	Portugal	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>			1,252		-		1,273	84		16,904	19,513
1987 <sup>3</sup>	200	63	970		-	149	1,156	34	1	4,469	7,042
1988	No species specific data presently available										
1989	312 <sup>2</sup>	1,065 <sup>2</sup>	3,200		-	4,573	251	151 <sup>2</sup>	6 <sup>2</sup>	9,749	19,307
1990	98 <sup>2</sup>	137 <sup>2</sup>	1,673		-	8,842	824	9		6,492	18,075
1991	487 <sup>2</sup>	72 <sup>2</sup>	-	-	-	32,810	159 <sup>2</sup>	19 <sup>2</sup>	4 <sup>2</sup>	7,596	41,147
1992	23 <sup>2</sup>	7 <sup>2</sup>	-		-	9,816	824 <sup>2</sup>	25 <sup>2</sup>	-	1,096	11,791
1993 <sup>1</sup>	11 <sup>2</sup>	4 <sup>2</sup>	35	1 <sup>2</sup>	-	4,857	648 <sup>2</sup>	2 <sup>2</sup>	-	3,705	9,261
1994 <sup>1</sup>	2 <sup>2</sup>	33 <sup>2</sup>	12 <sup>2</sup>	1 <sup>2</sup>	2 <sup>2</sup>	5,554	687 <sup>2</sup>	4 <sup>2</sup>	-	4,692	10,987

<sup>1</sup> Provisional figures.

<sup>2</sup> Split on species according the reports to Norwegian authorities.

<sup>3</sup> Based on preliminary estimates of species breakdown by area.

<sup>4</sup> Includes former GDR prior to 1991.

<sup>5</sup> USSR prior to 1991.

**Table 6.4** *Sebastes mentella* in Sub-areas I and II. Nominal catch (t) by countries in Division IIa

Year	Canada	Denmark	Faroe Islands	France	Germany <sup>5</sup>	Greenland and	Ireland	Norway	Portugal	Spain	UK England and Wales	UK Scotland	Russia <sup>6</sup>	Total
1986 <sup>4</sup>	-	-	-	-	Data not available on countries									1,414
1987 <sup>4</sup>	-	-	-	-	349	-	-	173	19	25	12	-	1,493	2,071
1988	No species specific data presently available													
1989	-	-	10	28	633	-	-	-	89	5	7 <sup>2</sup>	2 <sup>2</sup>	2,847	3,621
1990	-	-	8 <sup>2</sup>	5 <sup>2</sup>	4,681	36 <sup>2</sup>	-	1,331	6	-	63 <sup>2</sup>	-	10,763	16,893
1991	-	-	5 <sup>1</sup>	13 <sup>2</sup>	-	23	-	774	7	1	38 <sup>2</sup>	13 <sup>2</sup>	6,286	7,160
1992	-	-	-	5 <sup>2</sup>	-	-	-	374	148 <sup>2</sup>	14	197 <sup>2</sup>	16 <sup>2</sup>	2,073	2,827
1993 <sup>1</sup>	8 <sup>2</sup>	4 <sup>2</sup>	-	35 <sup>2</sup>	-	-	-	108	315 <sup>2</sup>	57 <sup>3</sup>	291 <sup>2</sup>	-	259	1,077
1994	-	28 <sup>2</sup>	-	41 <sup>2</sup>	-	-	1 <sup>2</sup>	326	208 <sup>2</sup>	30 <sup>3</sup>	120 <sup>2</sup>	12 <sup>2</sup>	21	787

<sup>1</sup> Provisional figures. .

<sup>2</sup> Split on species according the reports to Norwegian authorities.

<sup>3</sup> Split on species according to the 1992 catches.

<sup>4</sup> Based on preliminary estimates of species breakdown by area.

<sup>5</sup> Includes former GDR prior to 1991.

<sup>6</sup> USSR prior to 1991.

*Stichtheisbibliothek*  
*Bibliothek*

**Table 6.5** *Sebastes mentella* in Divisions IIa and IIb. Catch per unit effort and calculated total international effort.

Year	USSR/Russia		German Dem.Rep.		Total effort	
	catch/hour trawling (t/hr)		catch/day (t/day)		(USSR units)	
	RT <sup>1</sup>	PST <sup>2</sup>	Freezer trawler	Factory trawler FVS IV (FAO code 090)	RT <sup>1</sup>	PST <sup>2</sup>
1965	0.38	-	-	-	41,216	-
1966	0.39	-	-	-	26,008	-
1967	0.37	-	-	-	16,862	-
1968	0.45	-	-	-	12,029	-
1969	0.48	-	-	-	14,242	-
1970	0.46	-	-	-	49,817	-
1971	0.38	-	-	-	118,587	-
1972	0.38	-	-	-	75,953	-
1973	0.45	-	-	-	85,289	-
1974	0.69	-	-	-	100,539	-
1975	0.95	1.01	-	-	251,653	-
1976	0.99	1.26	-	-	271,653	-
1977	0.77	1.00	-	-	190,084	-
1978	0.63	0.86	-	-	147,002	-
1979	0.56	0.93	-	-	155,616	-
1980	0.70	0.91	-	-	113,363	87,202
1981	0.63	0.95	8.71	-	129,438	85,338
1982	0.63	1.05	9.58	-	183,148	109,889
1983	0.80	1.09	17.12	-	131,591	96,581
1984	0.70	1.30	13.62	-	104,191	56,103
1985	0.60	1.00	9.89	-	105,113	63,068
1986	0.43	0.68	7.90	-	53,749	33,988
1987	-	0.70	-	7.30	-	15,026
1988	-	0.70	-	11.78	-	22,266
1989	-	0.90	-	12.96	-	26,104
1990	-	1.00	-	14.77	-	35,070
1991	-	0.80	-	-	-	60,919
1992	-	0.60	-	-	-	25,978
1993	-	1.00	-	-	-	10,781
1994 <sup>3</sup>	-	0.74	-	-	-	16,370

<sup>1</sup>Side trawlers, 800-1000 HP.

<sup>2</sup>Stern trawlers.

<sup>3</sup>Provisional figure.

**Table 6.6** *Sebastes mentella*. Catch per trawl-hour (tonnes), and effort (trawl-hours) for one Norwegian factory trawler (ISSCFV-code 09, 1000-2000 GRT) in a directed fishery for this species. Preliminary results.

Year	January-April		October-December		Average CPUE
	CPUE	Effort	CPUE	Effort	
1989	-	-	1.19	1,088	1.19
1990	1.36	770	0.83	1,317	1.09
1991	1.28	1,360	0.74	554	1.01
1992	1.29	964	0.81	428	1.05
1993	0.57	438	1.05	269	0.81

Table 6.7

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 1	Catch numbers at age					Numbers*10**-3				
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	48,	0,	0,	7,	31,	0,	0,	466,	172,	606,
7,	285,	0,	0,	0,	94,	0,	0,	792,	1660,	4847,
8,	1592,	27,	7,	15,	409,	33,	114,	5728,	4865,	15451,
9,	2163,	279,	15,	89,	524,	131,	284,	3586,	9729,	28781,
10,	1141,	532,	182,	192,	838,	620,	681,	2049,	4636,	30144,
11,	1545,	465,	285,	355,	933,	2122,	1590,	1770,	2633,	19843,
12,	1972,	731,	343,	436,	954,	3428,	4429,	3865,	3148,	10603,
13,	2471,	1223,	394,	554,	849,	3983,	4884,	4564,	5208,	8634,
14,	2804,	1927,	489,	864,	618,	3526,	5451,	4704,	5666,	8634,
15,	1996,	2007,	496,	768,	482,	2808,	4940,	4098,	4578,	6514,
16,	2067,	1741,	628,	931,	807,	3983,	7496,	4704,	5380,	5908,
17,	1592,	1422,	613,	694,	451,	2743,	4486,	3632,	3777,	3332,
18,	1473,	944,	540,	665,	849,	3559,	7382,	3167,	2747,	2878,
+gp,	2589,	1980,	3254,	1802,	2536,	5714,	14934,	3447,	3053,	5300,
TOTALNUM,	23738,	13278,	7246,	7372,	10375,	32650,	56671,	46572,	57252,	151475,
TONSLAND,	15662,	10143,	6239,	5413,	6836,	22916,	45063,	28862,	38380,	69372,
SOPCOF %,	104,	102,	100,	94,	95,	94,	98,	101,	118,	99,

Table 1	Catch numbers at age					Numbers*10**-3				
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	5834,	18891,	0,	2905,	3633,	1065,	932,	5,	20,	0,
7,	19417,	29815,	2418,	30158,	20497,	7412,	3000,	854,	86,	34,
8,	42425,	59395,	17175,	65162,	43553,	26296,	8620,	4775,	1987,	525,
9,	82480,	78241,	33454,	53391,	46996,	44131,	26716,	12554,	4576,	2106,
10,	108462,	110712,	52102,	33569,	37469,	40441,	48290,	47348,	16695,	7969,
11,	119075,	112524,	49617,	19909,	26298,	27089,	39206,	57134,	31310,	22092,
12,	57231,	93144,	53938,	17242,	20717,	19950,	33394,	46529,	51099,	36763,
13,	29651,	49550,	33287,	9270,	16341,	11172,	21178,	37731,	48307,	47096,
14,	20894,	26134,	19095,	7410,	6059,	6400,	11853,	15506,	29973,	25468,
15,	16499,	13881,	12605,	5456,	3589,	5607,	6038,	9492,	17132,	12002,
16,	13465,	9839,	5796,	4134,	3465,	6801,	2697,	5780,	8347,	4336,
17,	13668,	6300,	4874,	2134,	2465,	3441,	2172,	3368,	5238,	1499,
18,	12207,	7233,	5499,	1545,	1964,	3001,	1344,	2160,	2055,	517,
+gp,	22366,	11439,	13906,	2917,	6579,	2546,	1910,	4184,	673,	472,
TOTALNUM,	563674,	627098,	303766,	255202,	239625,	205352,	207350,	247420,	217498,	160879,
TONSLAND,	239070,	269022,	146365,	92611,	87145,	79354,	81546,	115383,	105273,	72934,
SOPCOF %,	91,	98,	95,	101,	100,	97,	95,	100,	99,	104,

Continued



Table 6.7 Continued

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 1	Catch numbers at age			Numbers*10**-3						
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	1108,	394,	57,
5,	0,	0,	0,	0,	0,	0,	2044,	957,	207,	83,
6,	98,	29,	0,	0,	48,	1,	1653,	1873,	114,	648,
7,	571,	117,	0,	0,	475,	748,	5453,	2498,	145,	659,
8,	2009,	215,	109,	0,	1933,	4036,	7994,	1898,	125,	709,
9,	4949,	1049,	1055,	379,	3972,	6797,	6781,	1622,	358,	924,
10,	17096,	3079,	3145,	1838,	4432,	7297,	8226,	1780,	1529,	2440,
11,	31564,	5921,	2679,	3512,	4303,	6038,	5344,	1531,	2245,	3599,
12,	41511,	10701,	3580,	4084,	4667,	8568,	6227,	2108,	1905,	2928,
13,	33190,	15930,	6213,	6958,	7062,	11600,	9880,	2288,	1753,	1460,
14,	10519,	7051,	3702,	7313,	6068,	7499,	10824,	2258,	2466,	2158,
15,	4243,	2495,	1459,	4022,	4412,	3174,	4049,	2506,	1420,	2074,
16,	1971,	704,	656,	1960,	3282,	1698,	2105,	2137,	1238,	3243,
17,	658,	390,	210,	983,	2399,	1419,	9603,	1512,	890,	1223,
18,	343,	81,	66,	328,	1733,	1093,	6522,	677,	449,	684,
+gp,	52,	67,	0,	106,	2220,	15595,	19299,	9258,	6116,	3104,
TOTALNUM,	148774,	47829,	22874,	31483,	47006,	75563,	106004,	36011,	21354,	25993,
TONSLAND,	63068,	23112,	10518,	15586,	23494,	35070,	48735,	15587,	10781,	12114,
SOPCOF %,	101,	100,	100,	100,	99,	97,	100,	103,	100,	101,

Table 6.8

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 2	Catch weights at age (kg)									
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.1680,	.1680,	.1680,	.1680,	.1680,	.1680,	.1680,	.1680,	.1680,	.1680,
7,	.1830,	.1830,	.1830,	.1830,	.1830,	.1830,	.1830,	.1830,	.1830,	.1830,
8,	.2250,	.2250,	.2250,	.2250,	.2250,	.2250,	.2250,	.2250,	.2250,	.2250,
9,	.3110,	.3110,	.3110,	.3110,	.3110,	.3110,	.3110,	.3110,	.3110,	.3110,
10,	.3670,	.3670,	.3670,	.3670,	.3670,	.3670,	.3670,	.3670,	.3670,	.3670,
11,	.4320,	.4320,	.4320,	.4320,	.4320,	.4320,	.4320,	.4320,	.4320,	.4320,
12,	.5080,	.5080,	.5080,	.5080,	.5080,	.5080,	.5080,	.5080,	.5080,	.5080,
13,	.6110,	.6110,	.6110,	.6110,	.6110,	.6110,	.6110,	.6110,	.6110,	.6110,
14,	.6790,	.6790,	.6790,	.6790,	.6790,	.6790,	.6790,	.6790,	.6790,	.6790,
15,	.7530,	.7530,	.7530,	.7530,	.7530,	.7530,	.7530,	.7530,	.7530,	.7530,
16,	.8210,	.8210,	.8210,	.8210,	.8210,	.8210,	.8210,	.8210,	.8210,	.8210,
17,	.8720,	.8720,	.8720,	.8720,	.8720,	.8720,	.8720,	.8720,	.8720,	.8720,
18,	.9100,	.9100,	.9100,	.9100,	.9100,	.9100,	.9100,	.9100,	.9100,	.9100,
+gp,	.9990,	.9930,	1.0320,	1.0100,	1.0260,	1.0000,	1.0220,	.9770,	.9800,	1.0000,
SOPCOFAC,	1.0367,	1.0223,	1.0037,	.9372,	.9489,	.9357,	.9849,	1.0143,	1.1784,	.9888,

Table 2	Catch weights at age (kg)									
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.1680,	.1680,	.1680,	.1680,	.1070,	.1070,	.1020,	.1020,	.1020,	.1020,
7,	.1830,	.1830,	.1830,	.1830,	.1550,	.1550,	.1380,	.1380,	.1380,	.1050,
8,	.2250,	.2250,	.2250,	.2250,	.2000,	.2000,	.1880,	.1880,	.1880,	.1650,
9,	.3110,	.3110,	.3110,	.3110,	.2520,	.2520,	.2520,	.2520,	.2520,	.2120,
10,	.3670,	.3670,	.3670,	.3670,	.3100,	.3100,	.3100,	.3100,	.3100,	.2830,
11,	.4320,	.4320,	.4320,	.4320,	.3740,	.3740,	.3640,	.3640,	.3200,	.3380,
12,	.5080,	.5080,	.5080,	.5080,	.4720,	.4720,	.4400,	.4400,	.4000,	.3830,
13,	.6110,	.6110,	.6110,	.6110,	.5680,	.5680,	.5600,	.5600,	.4660,	.4380,
14,	.6790,	.6790,	.6790,	.6790,	.7150,	.7150,	.6800,	.6800,	.5630,	.5020,
15,	.7530,	.7530,	.7530,	.7530,	.8980,	.8980,	.8280,	.8280,	.7300,	.5660,
16,	.8210,	.8210,	.8210,	.8210,	.9340,	.9340,	.9060,	.9060,	.9920,	.7110,
17,	.8720,	.8720,	.8720,	.8720,	1.0240,	1.0240,	.9700,	.9700,	1.1260,	.8610,
18,	.9100,	.9100,	.9100,	.9100,	1.0500,	1.0500,	1.0500,	1.0500,	1.1490,	.9660,
+gp,	1.0070,	1.0210,	1.0320,	1.0300,	1.1300,	1.1050,	1.1180,	1.1220,	1.2280,	1.2910,
SOPCOFAC,	.9146,	.9847,	.9515,	1.0130,	.9966,	.9734,	.9503,	1.0022,	.9891,	1.0415,

Continued

Table 6.8 Continued

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 2	Catch weights at age (kg)									
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.1020,	.1020,	.1440,	.1440,	.1980,	.1400,	.1300,	.1900,	.1700,	.1600,
7,	.1350,	.1200,	.1800,	.1800,	.2020,	.1460,	.1800,	.2200,	.2400,	.2200,
8,	.1670,	.1370,	.1950,	.1950,	.2420,	.1580,	.2100,	.2600,	.2500,	.2400,
9,	.2150,	.2180,	.2190,	.2090,	.2820,	.2060,	.2700,	.2800,	.2800,	.3000,
10,	.3030,	.3010,	.2880,	.2800,	.3310,	.2800,	.3400,	.3100,	.3300,	.3400,
11,	.3520,	.3530,	.3300,	.3330,	.3780,	.3550,	.3500,	.3300,	.3800,	.3700,
12,	.4200,	.4480,	.4390,	.3970,	.4560,	.4710,	.4200,	.3800,	.4300,	.3900,
13,	.4810,	.5100,	.5110,	.4680,	.5140,	.5430,	.4600,	.4600,	.4700,	.4400,
14,	.5640,	.5810,	.5640,	.5370,	.5680,	.6110,	.5100,	.4300,	.4900,	.4500,
15,	.6730,	.6480,	.6360,	.5850,	.5890,	.6250,	.5800,	.4300,	.5600,	.4900,
16,	.8090,	.8450,	.7720,	.7470,	.6720,	.7220,	.5900,	.4500,	.5600,	.5500,
17,	1.0140,	.9480,	.8090,	.8080,	.7080,	.5760,	.5800,	.5200,	.6000,	.5800,
18,	1.0690,	1.0560,	.9540,	.9010,	.7740,	.6590,	.5900,	.5700,	.6200,	.6700,
+gp,	1.1600,	1.2610,	1.1800,	1.0470,	.8380,	.6590,	.7000,	.6700,	.6600,	.7900,
SOPCOFAC,	1.0066,	1.0023,	.9976,	1.0000,	.9915,	.9668,	1.0034,	1.0289,	1.0046,	1.0068,

Table 6.9

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 5	Proportion mature at age									
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
7,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
8,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,
9,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,	.0600,
10,	.0800,	.0800,	.0800,	.0800,	.0800,	.0800,	.0800,	.0800,	.0800,	.0800,
11,	.2200,	.2200,	.2200,	.2200,	.2200,	.2200,	.2200,	.2200,	.2200,	.2200,
12,	.3600,	.3600,	.3600,	.3600,	.3600,	.3600,	.3600,	.3600,	.3600,	.3600,
13,	.5500,	.5500,	.5500,	.5500,	.5500,	.5500,	.5500,	.5500,	.5500,	.5500,
14,	.7200,	.7200,	.7200,	.7200,	.7200,	.7200,	.7200,	.7200,	.7200,	.7200,
15,	.8500,	.8500,	.8500,	.8500,	.8500,	.8500,	.8500,	.8500,	.8500,	.8500,
16,	.8800,	.8800,	.8800,	.8800,	.8800,	.8800,	.8800,	.8800,	.8800,	.8800,
17,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,
18,	.9700,	.9700,	.9700,	.9700,	.9700,	.9700,	.9700,	.9700,	.9700,	.9700,
+gp,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,

Table 5	Proportion mature at age									
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
7,	.0000,	.0090,	.0090,	.0090,	.0090,	.0090,	.0090,	.0090,	.0090,	.0050,
8,	.0300,	.0160,	.0160,	.0160,	.0160,	.0160,	.0160,	.0160,	.0160,	.0080,
9,	.0600,	.1010,	.1010,	.1010,	.1010,	.1010,	.1010,	.1010,	.1010,	.0570,
10,	.0800,	.1950,	.1950,	.1950,	.1950,	.1950,	.1950,	.1950,	.1950,	.1680,
11,	.2200,	.3000,	.3000,	.3000,	.3000,	.3000,	.3000,	.3000,	.3000,	.3020,
12,	.3600,	.5400,	.5400,	.5400,	.5400,	.5400,	.5400,	.5400,	.5400,	.5340,
13,	.5500,	.7020,	.7020,	.7020,	.7020,	.7020,	.7020,	.7020,	.7020,	.7210,
14,	.7200,	.8620,	.8620,	.8620,	.8620,	.8620,	.8620,	.8620,	.8620,	.8790,
15,	.8500,	.9660,	.9660,	.9660,	.9660,	.9660,	.9660,	.9660,	.9660,	.9520,
16,	.8800,	.9940,	.9940,	.9940,	.9940,	.9940,	.9940,	.9940,	.9940,	.9850,
17,	.9500,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,
18,	.9700,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,
+gp,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,

Continued

**Table 6.9 Continued**

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Table 5	Proportion mature at age									
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
7,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
8,	.0000,	.0000,	.0000,	.0000,	.0000,	.0150,	.0150,	.0150,	.0000,	.0000,
9,	.0100,	.0340,	.0450,	.0830,	.0040,	.0500,	.0550,	.0620,	.0230,	.0230,
10,	.0790,	.1130,	.0760,	.0950,	.0780,	.1260,	.1320,	.1330,	.1130,	.1130,
11,	.2180,	.2380,	.1780,	.1940,	.2010,	.2050,	.2020,	.2240,	.2670,	.2670,
12,	.4530,	.5070,	.4300,	.4620,	.4860,	.5060,	.4810,	.4110,	.4380,	.4380,
13,	.7810,	.7940,	.7350,	.6890,	.6530,	.6230,	.5450,	.5390,	.5740,	.5740,
14,	.8460,	.8720,	.8270,	.8010,	.7670,	.7260,	.7410,	.7740,	.8430,	.8430,
15,	.9000,	.9120,	.8850,	.8620,	.8320,	.8010,	.8500,	.8880,	.9510,	.9510,
16,	.9250,	.9500,	.9580,	1.0000,	1.0000,	1.0000,	.9620,	.9460,	.9200,	.9200,
17,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.9920,	.9890,	.9890,
18,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,
+gp,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,

Table 6.10

15:57 Tuesday, August 29, 1995

## Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

A

## RUSSIAN PST-TRAWLERS. S.mentella, effort and catch-in-numbers (code: FLT04)

Year	Effort	Catch, age 9	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15	Catch, age 16	Catch, age 17	Catch, age 18
1982	107438	12274	46292	55860	45491	36890	15160	9280	5651	3293	2112
1983	93578	4434	16176	30337	49510	46805	29041	16599	8087	5075	1991
1984	51171	1823	7253	20429	34813	43613	23884	11197	3898	1383	418
1985	56802	3699	14997	28079	37598	30822	9769	3967	1826	617	318
1986	26976	587	2315	4522	8434	13164	5747	2010	522	309	52
1987	9093	637	1898	1618	2161	3751	2235	880	396	126	40
1988	11241	191	928	1773	2062	3513	3692	2031	990	496	166
1989	14533	2827	3274	2899	2891	5310	4882	2041	1250	730	320
1990	17355	4590	5031	4261	6224	8590	5580	1910	811	165	17
1991	17878	3998	4055	3694	3653	4949	4612	2030	724	178	150
1992	5962	983	850	654	596	614	572	488	306	194	80
1993	4386	301	1114	1756	1432	1110	1081	908	567	344	168
1994	6341	399	1343	1406	1728	600	1132	948	1519	663	231

15:57 Tuesday, August 29, 1995

## Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

B

## RUSSIAN SURVEY. Effort and catch rates. S.mentella (code: FLT10) (Catch: Number)

Year	Effort	Catch, age 1	Catch, age 2	Catch, age 3	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8	Catch, age 9	Catch, age 10
1978	1	2.0	81.0	17.0	49.0	43.0	67.0	195.0	198.0	87.0	15.0
1979	1	0.0	2.0	12.0	64.0	228.0	373.0	576.0	519.0	349.0	122.0
1980	1	19.0	9.0	2.0	25.0	24.0	48.0	86.0	123.0	180.0	119.0
1981	1	4.0	14.0	10.0	9.0	68.0	35.0	48.0	56.0	67.0	57.0
1982	1	22.0	20.0	36.0	50.0	51.0	49.0	50.0	0.0	0.0	0.0
1983	1	132.0	39.0	25.0	23.0	38.0	37.0	50.0	0.0	0.0	0.0
1984	1	30.0	130.0	200.0	160.0	90.0	20.0	10.0	10.0	0.0	0.0
1985	1	100.0	50.0	150.0	60.0	60.0	110.0	200.0	190.0	130.0	40.0
1986	1	70.0	20.0	60.0	340.0	120.0	110.0	160.0	60.0	20.0	0.0
1987	1	0.0	0.0	0.0	310.0	440.0	470.0	250.0	10.0	0.0	0.0
1988	1	30.0	10.0	10.0	50.0	340.0	390.0	180.0	20.0	0.0	0.0
1989	1	581.0	379.0	18.0	52.0	183.0	323.0	326.0	63.0	0.0	0.0
1990	1	90.0	43.0	13.0	84.0	162.0	190.0	133.0	43.0	16.0	15.0
1991	1	63.0	170.0	133.0	80.0	36.0	17.0	22.0	40.0	31.0	5.0
1992	1	10.0	61.0	234.0	258.0	41.0	21.0	17.0	24.0	42.0	49.0
1993	1	1.0	5.0	10.0	46.0	39.0	20.0	12.0	6.0	2.0	6.0
1994	1	1.0	2.0	15.0	43.0	54.0	86.0	106.0	56.0	28.0	17.0

15:57 Tuesday, August 29, 1995

## Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

C

## NORWAY TRAWL (09). Effort and catch-in-numbers. S.mentella (code: FLT11) (Catch: Thousands)

Year	Effort	Catch, age 8	Catch, age 9	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15
1989	3885	173	359	305	179	139	330	244	1166
1990	9333	0	0	0	0	86	142	76	506
1991	33259	142	2053	3333	1043	1905	3919	5151	1605
1992	10239	35	293	631	647	1302	1458	1485	1846
1993	6151	12	10	215	195	223	413	1062	326

Year	Catch, age 16	Catch, age 17	Catch, age 18
1989	963	839	903
1990	385	962	787
1991	1184	8714	5887
1992	1723	1250	569
1993	509	429	222

**Table 6.11**

Lowestoft VPA Version 3.1

29-Aug-95 10:03:19

Extended Survivors Analysis

Arctic S. mentella (run: FINAL02/VP2)

CPUE data from file /users/fish/ifad/ifapwork/afwg/smn\_arct/FLEET.VP2

Catch data for 30 years. 1965 to 1994. Ages 1 to 19.

Fleet,	First,	Last,	First,	Last,	Alpha,	Beta
	year,	year,	age,	age		
FLT04: RUSSIAN PST-T,	1982,	1994,	9,	18,	.000,	1.000
FLT10: RUSSIAN SURVE,	1978,	1994,	1,	10,	.850,	.950
FLT11: NORWAY TRAWL ,	1989,	1994,	8,	18,	.000,	1.000

Time series weights :

Tapered time weighting applied  
Power = 3 over 20 years

Catchability analysis :

Catchability dependent on stock size for ages < 7

Regression type = C  
Minimum of 3 points used for regression  
Survivor estimates shrunk to the population mean for ages < 7

Catchability independent of age for ages >= 17

Terminal population estimation :

Survivor estimates shrunk towards the mean F  
of the final 2 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = 2.000

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

Prior weighting not applied

Tuning had not converged after 150 iterations

Total absolute residual between iterations

49 and 150 = .00539

Final year F values

Age	1,	2,	3,	4,	5,	6,	7,	8,	9,	10
Iteration **,	.0000,	.0000,	.0000,	.0004,	.0006,	.0052,	.0069,	.0100,	.0144,	.0374
Iteration **,	.0000,	.0000,	.0000,	.0004,	.0006,	.0052,	.0069,	.0099,	.0142,	.0370

Age	11,	12,	13,	14,	15,	16,	17,	18
Iteration **,	.0527,	.0424,	.0355,	.0758,	.1047,	.2520,	.2041,	.1741
Iteration **,	.0525,	.0423,	.0353,	.0754,	.1038,	.2506,	.2030,	.1734

Continued

Table 6.11 Continued

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

Fishing mortalities

Age,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994
1,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000
2,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000
3,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.000
4,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	.007,	.003,	.000
5,	.000,	.000,	.000,	.000,	.000,	.000,	.020,	.008,	.001,	.001
6,	.001,	.000,	.000,	.000,	.000,	.000,	.018,	.021,	.001,	.005
7,	.007,	.001,	.000,	.000,	.004,	.006,	.057,	.031,	.002,	.007
8,	.025,	.003,	.001,	.000,	.021,	.034,	.078,	.023,	.002,	.010
9,	.080,	.015,	.015,	.006,	.056,	.085,	.066,	.018,	.005,	.014
10,	.302,	.059,	.050,	.030,	.077,	.124,	.127,	.020,	.019,	.037
11,	.421,	.145,	.060,	.066,	.081,	.128,	.113,	.028,	.028,	.052
12,	.614,	.219,	.110,	.111,	.105,	.206,	.168,	.054,	.040,	.042
13,	.965,	.446,	.170,	.288,	.253,	.362,	.345,	.077,	.052,	.035
14,	.644,	.480,	.156,	.277,	.387,	.412,	.597,	.110,	.101,	.075
15,	.785,	.271,	.152,	.226,	.239,	.320,	.363,	.234,	.084,	.104
16,	.753,	.247,	.095,	.279,	.260,	.122,	.323,	.295,	.156,	.251
17,	.921,	.282,	.097,	.180,	.573,	.153,	1.665,	.361,	.172,	.203
18,	.538,	.230,	.063,	.193,	.484,	.493,	1.835,	.406,	.154,	.173

Continued



Table 6.11 Continued

XSA population numbers (Thousands)

YEAR ,	1,	AGE 2,	3,	4,	5,	6,	7,	8,		
1985 ,	1.89E+05	2.06E+05	2.12E+05	1.47E+05	1.15E+05	9.53E+04	9.13E+04	8.59E+04	6.76E+04	6.89E+04
1986 ,	1.61E+05	1.71E+05	1.86E+05	1.92E+05	1.33E+05	1.04E+05	8.61E+04	8.20E+04	7.58E+04	5.64E+04
1987 ,	1.59E+05	1.46E+05	1.55E+05	1.68E+05	1.74E+05	1.20E+05	9.37E+04	7.78E+04	7.40E+04	6.76E+04
1988 ,	1.85E+05	1.43E+05	1.32E+05	1.40E+05	1.52E+05	1.57E+05	1.09E+05	8.48E+04	7.03E+04	6.60E+04
1989 ,	2.20E+05	1.67E+05	1.30E+05	1.19E+05	1.27E+05	1.38E+05	1.42E+05	9.86E+04	7.68E+04	6.32E+04
1990 ,	2.05E+05	1.99E+05	1.51E+05	1.17E+05	1.08E+05	1.14E+05	1.25E+05	1.28E+05	8.74E+04	6.57E+04
1991 ,	1.83E+05	1.86E+05	1.80E+05	1.37E+05	1.06E+05	9.77E+04	1.04E+05	1.12E+05	1.12E+05	7.26E+04
1992 ,	1.73E+05	1.65E+05	1.68E+05	1.63E+05	1.24E+05	9.42E+04	8.69E+04	8.86E+04	9.39E+04	9.51E+04
1993 ,	1.63E+05	1.56E+05	1.50E+05	1.52E+05	1.46E+05	1.11E+05	8.35E+04	7.62E+04	7.83E+04	8.34E+04
1994 ,	1.73E+05	1.48E+05	1.41E+05	1.35E+05	1.37E+05	1.32E+05	1.00E+05	7.54E+04	6.89E+04	7.05E+04

Estimated population abundance at 1st Jan 1995

, .00E+00, 1.58E+05, 1.35E+05, 1.29E+05, 1.23E+05, 1.24E+05, 1.19E+05, 9.06E+04, 6.78E+04, 6.19E+04,

Taper weighted geometric mean of the VPA populations:

, 1.85E+05, 1.69E+05, 1.54E+05, 1.41E+05, 1.29E+05, 1.18E+05, 1.09E+05, 1.01E+05, 9.54E+04, 8.82E+04,

Standard error of the weighted Log(VPA populations) :

, .1388, .1470, .1566, .1813, .2238, .2842, .3538, .4194, .4528, .4697,

YEAR ,	11,	AGE 12,	13,	14,	15,	16,	17,	18,
1985 ,	9.65E+04	9.51E+04	5.64E+04	2.33E+04	8.20E+03	3.91E+03	1.15E+03	8.67E+02
1986 ,	4.61E+04	5.73E+04	4.65E+04	1.94E+04	1.11E+04	3.39E+03	1.67E+03	4.14E+02
1987 ,	4.81E+04	3.61E+04	4.17E+04	2.70E+04	1.09E+04	7.63E+03	2.39E+03	1.14E+03
1988 ,	5.82E+04	4.10E+04	2.93E+04	3.18E+04	2.09E+04	8.45E+03	6.28E+03	1.97E+03
1989 ,	5.80E+04	4.93E+04	3.32E+04	1.99E+04	2.18E+04	1.51E+04	5.78E+03	4.75E+03
1990 ,	5.30E+04	4.83E+04	4.02E+04	2.33E+04	1.22E+04	1.55E+04	1.05E+04	2.95E+03
1991 ,	5.25E+04	4.22E+04	3.56E+04	2.53E+04	1.40E+04	8.02E+03	1.25E+04	8.16E+03
1992 ,	5.79E+04	4.24E+04	3.23E+04	2.28E+04	1.26E+04	8.80E+03	5.25E+03	2.13E+03
1993 ,	8.44E+04	5.09E+04	3.64E+04	2.70E+04	1.85E+04	9.04E+03	5.93E+03	3.31E+03
1994 ,	7.40E+04	7.42E+04	4.43E+04	3.12E+04	2.21E+04	1.54E+04	7.00E+03	4.52E+03

Estimated population abundance at 1st Jan 1995

, 6.19E+04, 6.38E+04, 6.45E+04, 3.88E+04, 2.64E+04, 1.82E+04, 1.09E+04, 5.20E+03,

Taper weighted geometric mean of the VPA populations:

, 7.61E+04, 6.17E+04, 4.47E+04, 2.75E+04, 1.59E+04, 9.21E+03, 5.18E+03, 2.57E+03,

Standard error of the weighted Log(VPA populations) :

, .4818, .4547, .3515, .2605, .3389, .4887, .7083, .8748,

Continued

Table 6.11 Continued

Log catchability residuals.

Fleet : FLT04: RUSSIAN PST-T

Age	1978	1979	1980	1981	1982	1983	1984
1	No data for this fleet at this age						
2	No data for this fleet at this age						
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	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	99.99	99.99	99.99	99.99	-.42	-.95	-.72
10	99.99	99.99	99.99	99.99	-.05	-.77	-.66
11	99.99	99.99	99.99	99.99	-.21	-.34	-.04
12	99.99	99.99	99.99	99.99	-.43	-.08	.47
13	99.99	99.99	99.99	99.99	-.60	-.05	.77
14	99.99	99.99	99.99	99.99	-.96	-.09	.81
15	99.99	99.99	99.99	99.99	-.65	.31	.90
16	99.99	99.99	99.99	99.99	-.51	.46	1.06
17	99.99	99.99	99.99	99.99	-.19	.91	.83
18	99.99	99.99	99.99	99.99	-.22	.43	.58

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	No data for this fleet at this age									
2	No data for this fleet at this age									
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	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	.06	-1.19	.01	-1.36	1.01	1.20	.77	.63	-.08	-.03
10	.58	-.46	.25	-.67	.40	.64	.30	-.49	.22	.21
11	.56	.09	.06	-.24	.00	.32	.15	-.62	.30	-.15
12	.56	.13	.27	-.12	-.22	.44	-.01	-.78	.21	-.35
13	.56	.42	.24	.37	.38	.54	.08	-.94	-.17	-1.36
14	-.06	.26	-.07	.11	.65	.46	.24	-.87	-.10	-.58
15	.25	-.21	.01	.01	-.28	.10	.02	-.27	.20	-.29
16	.29	-.30	-.38	.31	-.30	-1.01	-.39	-.26	.57	.70
17	.69	.08	-.17	.06	.45	-2.00	-1.50	.02	.69	.82
18	.14	-.33	-.59	.13	-.22	-2.85	-1.18	.05	.54	.19

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

Age	9	10	11	12	13	14	15	16	17	18
Mean Log q,	-13.8191,	-12.8612,	-12.4934,	-12.0977,	-11.6264,	-11.4071,	-11.5137,	-11.5992,	-11.7881,	-11.7881,
S.E(Log q),	.8483,	.4992,	.3173,	.3966,	.6574,	.5215,	.3417,	.5876,	.9384,	1.0224,

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
9	.77	.269	13.26	.14	13	.69	-13.82
10	2.55	-1.347	15.30	.08	13	1.22	-12.86
11	1.07	-.257	12.58	.61	13	.36	-12.49
12	.92	.279	12.01	.59	13	.38	-12.10
13	.89	.201	11.52	.27	13	.61	-11.63
14	2.10	-.815	12.73	.06	13	1.12	-11.41
15	1.17	-.440	11.83	.43	13	.42	-11.51
16	1.26	-.518	12.24	.31	13	.77	-11.60
17	2.90	-1.719	18.06	.08	13	2.49	-11.79
18	1.28	-.588	13.32	.32	13	1.29	-12.10

Continued

Table 6.11 Continued

Fleet : FLT10: RUSSIAN SURVE

Age	1978	1979	1980	1981	1982	1983	1984
1	-.20	99.99	.15	-.11	-.07	-.14	-.17
2	.37	-.33	-.06	.07	.04	-.01	-.09
3	-.08	.05	-.37	-.07	.19	.05	.23
4	-.62	-.01	-.08	-.49	.01	-.14	.30
5	-1.25	.01	-.62	.10	-.18	-.29	.21
6	-1.32	-.21	-.68	-.27	.05	-.20	-.42
7	-.55	.88	-.65	-.86	-.29	-.13	-1.87
8	.36	1.30	.19	-.28	99.99	99.99	-.97
9	.11	1.40	.68	.00	99.99	99.99	99.99
10	-.86	.94	.80	.04	99.99	99.99	99.99
11	No data for this fleet at this age						
12	No data for this fleet at this age						
13	No data for this fleet at this age						
14	No data for this fleet at this age						
15	No data for this fleet at this age						
16	No data for this fleet at this age						
17	No data for this fleet at this age						
18	No data for this fleet at this age						

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	.15	.27	99.99	.04	.20	.06	.13	-.01	-.21	-.27
2	-.11	-.06	99.99	.01	.41	-.09	.19	.14	-.18	-.27
3	-.08	-.09	99.99	-.04	.07	-.13	.07	.23	-.17	-.04
4	-.12	.09	.19	-.12	.05	.20	.03	.18	-.22	-.12
5	-.08	.13	.54	.54	.40	.49	-.27	-.36	-.55	-.32
6	.35	.26	.72	.37	.43	.39	-.45	-.32	-.52	-.08
7	1.17	1.00	1.36	.88	1.21	.45	-1.12	-1.22	-1.56	.44
8	1.86	.73	-1.01	-.40	.61	-.02	.08	-.24	-1.50	.75
9	1.98	-.07	99.99	99.99	99.99	-.37	.03	.47	-2.41	.37
10	1.20	99.99	99.99	99.99	99.99	.10	-1.09	.82	-1.15	.08
11	No data for this fleet at this age									
12	No data for this fleet at this age									
13	No data for this fleet at this age									
14	No data for this fleet at this age									
15	No data for this fleet at this age									
16	No data for this fleet at this age									
17	No data for this fleet at this age									
18	No data for this fleet at this age									

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

Age	7	8	9	10
Mean Log q	-7.1998	-7.8610	-8.0716	-8.2869
S.E(Log q)	1.1338	.9151	1.2237	.9092

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e	Mean Log q
1	.11	2.076	11.78	.38	15	.18	-8.85
2	.15	1.884	11.51	.35	16	.21	-8.59
3	.16	2.631	11.37	.52	16	.15	-8.36
4	.27	1.894	10.65	.40	17	.20	-7.41
5	.52	.692	9.38	.17	17	.44	-7.20
6	.42	1.049	9.82	.24	17	.46	-7.22

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
7	.68	.435	8.60	.16	17	.80	-7.20
8	.69	.621	8.99	.31	15	.65	-7.86
9	.77	.295	8.86	.23	11	1.01	-8.07
10	.75	.391	9.06	.35	10	.74	-8.29

Continued

Table 6.11 Continued

Fleet : FLT11: NORWAY TRAWL

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	No data for this fleet at this age									
2	No data for this fleet at this age									
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	No data for this fleet at this age									
7	No data for this fleet at this age									
8	99.99	99.99	99.99	99.99	1.97	99.99	-.48	-.49	-.91	99.99
9	99.99	99.99	99.99	99.99	1.58	99.99	.81	.19	-2.50	99.99
10	99.99	99.99	99.99	99.99	.42	99.99	.55	-.26	-.69	99.99
11	99.99	99.99	99.99	99.99	.19	99.99	-.08	.48	-.58	99.99
12	99.99	99.99	99.99	99.99	-.15	-1.44	.51	1.25	-.20	99.99
13	99.99	99.99	99.99	99.99	.30	-1.56	.60	.76	-.12	99.99
14	99.99	99.99	99.99	99.99	.05	-2.14	.81	.62	.62	99.99
15	99.99	99.99	99.99	99.99	.81	-.28	-.51	.85	-.83	99.99
16	99.99	99.99	99.99	99.99	.73	-1.16	-.55	.90	.09	99.99
17	99.99	99.99	99.99	99.99	.72	-.81	.58	.15	-.62	99.99
18	99.99	99.99	99.99	99.99	.95	.42	.67	.28	-.71	99.99

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

Age	8	9	10	11	12	13	14	15	16	17
Mean Log q	-16.5177	-15.1373	-13.9337	-14.1465	-13.8868	-13.0060	-12.4833	-11.8396	-11.5688	-10.5969
S.E(Log q)	1.3028	1.7809	.5877	.4572	.9951	.9332	1.2258	.7780	.8655	.6929

Age	18
Mean Log q	-10.5969
S.E(Log q)	.7252

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
8	.26	.536	12.76	.21	4	.39	-16.52
9	.24	.457	12.31	.16	4	.51	-15.14
10	-.70	-1.471	9.39	.28	4	.35	-13.93
11	-1.63	-1.567	5.98	.16	4	.61	-14.15
12	-.14	-1.709	10.29	.43	5	.12	-13.89
13	-.11	-3.472	10.19	.77	5	.05	-13.01
14	.28	.424	10.75	.11	5	.39	-12.48
15	.80	.139	11.40	.14	5	.72	-11.84
16	2.23	-.354	14.38	.03	5	2.19	-11.57
17	1.11	-.095	10.78	.21	5	.89	-10.60
18	.66	.797	9.58	.65	5	.44	-10.28

Continued

Table 6.11 Continued

Terminal year survivor and F summaries :

Age 1 Catchability dependent on age and year class strength

Year class = 1993

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	119169.,	.300,	.000,	.00,	1,	.194,	.000
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	168527.,	.15,,,,				.806,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
157589.,	.13,	.31,	2,	2.357,	.000

Age 2 Catchability dependent on age and year class strength

Year class = 1992

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	104926.,	.212,	.027,	.13,	2,	.353,	.000
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	154375.,	.16,,,,				.647,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
134720.,	.13,	.22,	3,	1.746,	.000

Age 3 Catchability dependent on age and year class strength

Year class = 1991

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	117977.,	.173,	.052,	.30,	3,	.523,	.000
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	141280.,	.18,,,,				.477,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
128580.,	.13,	.08,	4,	.625,	.000

Continued

Table 6.11 Continued

Age 4 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
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	122006.,	.150,	.082,	.55,	4,	.686,	.000
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000

P shrinkage mean , 129401., .22,,,,, .310, .000

F shrinkage mean , 10902., 2.00,,,,, .004, .005

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
123092.,	.12,	.09,	6,	.696,	.000

Age 5 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
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	127186.,	.143,	.100,	.70,	5,	.794,	.001
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000

P shrinkage mean , 118293., .28,,,,, .202, .001

F shrinkage mean , 16320., 2.00,,,,, .004, .005

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
124287.,	.13,	.09,	7,	.717,	.001

Age 6 Catchability dependent on age and year class strength

Year class = 1988

Fleet,	Estimated, Survivors,	Int, s.e.,	Ext, s.e.,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	121082.,	.138,	.093,	.68,	6,	.862,	.005
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000

P shrinkage mean , 108535., .35,,,,, .133, .006

F shrinkage mean , 55207., 2.00,,,,, .004, .011

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
118938.,	.13,	.08,	8,	.602,	.005

Age 7 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
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	90966.,	.139,	.110,	.79,	7,	.995,	.007
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000

F shrinkage mean , 38213., 2.00,,,,, .005, .016

Weighted prediction :

Survivors, at end of year,	Int, s.e.,	Ext, s.e.,	N,	Var, Ratio,	F
90582.,	.14,	.10,	8,	.754,	.007

Continued

Table 6.11 Continued

Age 8 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
FLT04: RUSSIAN PST-T,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT10: RUSSIAN SURVE,	67939.,	.155,	.121,	.78,	7,	.994,	.010
FLT11: NORWAY TRAWL ,	1.,	.000,	.000,	.00,	0,	.000,	.000
F shrinkage mean ,	54654.,	2.00,,,,				.006,	.012

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
67846.,	.15,	.11,	8,	.725,	.010

Age 9 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
FLT04: RUSSIAN PST-T,	59610.,	.886,	.000,	.00,	1,	.031,	.015
FLT10: RUSSIAN SURVE,	62589.,	.157,	.149,	.95,	8,	.951,	.014
FLT11: NORWAY TRAWL ,	24654.,	1.459,	.000,	.00,	1,	.012,	.035
F shrinkage mean ,	75457.,	2.00,,,,				.006,	.012

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
61899.,	.15,	.13,	11,	.819,	.014

Age 10 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
FLT04: RUSSIAN PST-T,	70652.,	.449,	.126,	.28,	2,	.117,	.032
FLT10: RUSSIAN SURVE,	61979.,	.159,	.141,	.89,	9,	.860,	.037
FLT11: NORWAY TRAWL ,	18453.,	1.179,	.961,	.82,	2,	.017,	.118
F shrinkage mean ,	116814.,	2.00,,,,				.006,	.020

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
61916.,	.15,	.12,	14,	.800,	.037

Age 11 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
FLT04: RUSSIAN PST-T,	64421.,	.267,	.175,	.66,	3,	.242,	.052
FLT10: RUSSIAN SURVE,	66111.,	.148,	.102,	.68,	10,	.702,	.050
FLT11: NORWAY TRAWL ,	35263.,	.575,	.174,	.30,	3,	.051,	.093
F shrinkage mean ,	119259.,	2.00,,,,				.005,	.028

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
63805.,	.13,	.08,	17,	.637,	.052

Continued

Table 6.11 Continued

Age 12 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
FLT04: RUSSIAN PST-T,	63630.,	.224,	.228,	1.01,	4,	.314,	.043
FLT10: RUSSIAN SURVE,	69931.,	.155,	.093,	.60,	10,	.582,	.039
FLT11: NORWAY TRAWL ,	42438.,	.396,	.201,	.51,	3,	.100,	.064
F shrinkage mean ,	57949.,	2.00,,,,				.004,	.047

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
64540.,	.12,	.09,	18,	.702,	.042

Age 13 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,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	30229.,	.214,	.312,	1.46,	5,	.365,	.045
FLT10: RUSSIAN SURVE,	41704.,	.162,	.113,	.70,	10,	.511,	.033
FLT11: NORWAY TRAWL ,	63315.,	.369,	.238,	.64,	4,	.119,	.022
F shrinkage mean ,	20750.,	2.00,,,,				.005,	.065

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
38846.,	.12,	.12,	20,	.986,	.035

Age 14 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,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	22930.,	.201,	.239,	1.19,	6,	.436,	.086
FLT10: RUSSIAN SURVE,	29126.,	.174,	.086,	.50,	9,	.459,	.068
FLT11: NORWAY TRAWL ,	31177.,	.416,	.316,	.76,	4,	.100,	.064
F shrinkage mean ,	18452.,	2.00,,,,				.006,	.105

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
26352.,	.13,	.10,	20,	.812,	.075

Age 15 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,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	16247.,	.179,	.166,	.93,	7,	.569,	.115
FLT10: RUSSIAN SURVE,	19634.,	.192,	.111,	.58,	8,	.353,	.096
FLT11: NORWAY TRAWL ,	31418.,	.477,	.080,	.17,	4,	.072,	.061
F shrinkage mean ,	11415.,	2.00,,,,				.006,	.159

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
18172.,	.13,	.09,	20,	.715,	.104

Continued



Table 6.11 Continued

Age 16 Catchability constant w.r.t. time and dependent on age

Year class = 1978

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	11459.,	.180,	.175,	.97,	8,	.639,	.238
FLT10: RUSSIAN SURVE,	10299.,	.227,	.128,	.56,	7,	.230,	.262
FLT11: NORWAY TRAWL ,	9206.,	.389,	.343,	.88,	5,	.122,	.289
F shrinkage mean ,	12185.,	2.00,,,,				.009,	.226

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
10893.,	.14,	.11,	21,	.775,	.251

Age 17 Catchability constant w.r.t. time and dependent on age

Year class = 1977

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	5347.,	.197,	.149,	.76,	9,	.697,	.197
FLT10: RUSSIAN SURVE,	3979.,	.241,	.195,	.81,	9,	.167,	.256
FLT11: NORWAY TRAWL ,	6648.,	.508,	.351,	.69,	5,	.121,	.161
F shrinkage mean ,	3805.,	2.00,,,,				.015,	.267

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
5199.,	.16,	.11,	24,	.665,	.203

Age 18 Catchability constant w.r.t. time and age (fixed at the value for age) 17

Year class = 1976

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT04: RUSSIAN PST-T,	3663.,	.197,	.094,	.48,	10,	.682,	.163
FLT10: RUSSIAN SURVE,	3649.,	.288,	.177,	.61,	8,	.117,	.164
FLT11: NORWAY TRAWL ,	2604.,	.457,	.377,	.83,	5,	.184,	.223
F shrinkage mean ,	4544.,	2.00,,,,				.018,	.134

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, Ratio,	Var, Ratio,	F
3452.,	.17,	.09,	24,	.567,	.173

Table 6.12

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Terminal Fs derived using XSA (With F shrinkage)

Table 8	Fishing mortality (F) at age									
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.0003,	.0000,	.0000,	.0000,	.0001,	.0000,	.0000,	.0009,	.0004,	.0015,
7,	.0021,	.0000,	.0000,	.0000,	.0005,	.0000,	.0000,	.0016,	.0036,	.0130,
8,	.0116,	.0002,	.0001,	.0001,	.0032,	.0002,	.0004,	.0125,	.0106,	.0381,
9,	.0237,	.0023,	.0001,	.0008,	.0049,	.0011,	.0017,	.0144,	.0239,	.0722,
10,	.0129,	.0065,	.0016,	.0019,	.0084,	.0065,	.0065,	.0138,	.0209,	.0864,
11,	.0175,	.0059,	.0039,	.0035,	.0101,	.0240,	.0186,	.0190,	.0199,	.1054,
12,	.0145,	.0093,	.0048,	.0066,	.0106,	.0421,	.0576,	.0518,	.0385,	.0936,
13,	.0225,	.0101,	.0056,	.0086,	.0144,	.0503,	.0702,	.0699,	.0824,	.1267,
14,	.0208,	.0198,	.0045,	.0136,	.0108,	.0687,	.0812,	.0805,	.1046,	.1712,
15,	.0210,	.0168,	.0057,	.0078,	.0085,	.0559,	.1166,	.0729,	.0945,	.1510,
16,	.0182,	.0206,	.0059,	.0120,	.0092,	.0809,	.1857,	.1395,	.1161,	.1525,
17,	.0244,	.0141,	.0081,	.0072,	.0065,	.0353,	.1107,	.1157,	.1425,	.0881,
18,	.0214,	.0163,	.0060,	.0099,	.0099,	.0582,	.1130,	.0958,	.1082,	.1381,
+gp,	.0214,	.0163,	.0060,	.0099,	.0099,	.0582,	.1130,	.0958,	.1082,	.1381,
FBAR 10-16,	.0182,	.0127,	.0046,	.0077,	.0103,	.0469,	.0766,	.0639,	.0681,	.1267,

Table 8	Fishing mortality (F) at age									
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
6,	.0123,	.0351,	.0000,	.0075,	.0138,	.0059,	.0089,	.0001,	.0002,	.0000,
7,	.0547,	.0727,	.0051,	.0626,	.0601,	.0318,	.0187,	.0091,	.0011,	.0004,
8,	.1359,	.2107,	.0492,	.1641,	.1088,	.0920,	.0424,	.0338,	.0238,	.0074,
9,	.2601,	.3518,	.1578,	.1903,	.1533,	.1377,	.1145,	.0723,	.0371,	.0286,
10,	.3736,	.5810,	.3716,	.2102,	.1775,	.1715,	.1967,	.2714,	.1167,	.0756,
11,	.5011,	.7325,	.4947,	.2108,	.2263,	.1686,	.2236,	.3344,	.2585,	.1997,
12,	.4374,	.8266,	.8494,	.2821,	.3145,	.2394,	.2880,	.3985,	.4984,	.4827,
13,	.3615,	.7446,	.7087,	.2933,	.4175,	.2488,	.3818,	.5391,	.8251,	1.0732,
14,	.4483,	.5520,	.6365,	.2926,	.2826,	.2540,	.4022,	.4720,	.9868,	1.3746,
15,	.5016,	.5367,	.4988,	.3299,	.2009,	.4065,	.3587,	.5766,	1.3339,	1.3651,
16,	.4657,	.5609,	.3972,	.2671,	.3206,	.6272,	.3101,	.6098,	1.4191,	1.5234,
17,	.5467,	.3663,	.5308,	.2212,	.2254,	.5358,	.3680,	.6965,	1.8410,	.9727,
18,	.4664,	.5542,	.5565,	.2815,	.2901,	.4157,	.3652,	.6712,	1.1360,	.8639,
+gp,	.4664,	.5542,	.5565,	.2815,	.2901,	.4157,	.3652,	.6712,	1.1360,	.8639,
FBAR 10-16,	.4413,	.6478,	.5653,	.2694,	.2771,	.3023,	.3087,	.4574,	.7769,	.8706,

Continued

Table 6.12 Continued]

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Terminal Fs derived using XSA (With F shrinkage)

Table 8 YEAR,	Fishing mortality (F) at age									
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0072,	.0027,	.0004,
5,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0204,	.0082,	.0015,	.0006,
6,	.0011,	.0003,	.0000,	.0000,	.0004,	.0000,	.0179,	.0211,	.0011,	.0052,
7,	.0066,	.0014,	.0000,	.0000,	.0035,	.0063,	.0569,	.0307,	.0018,	.0069,
8,	.0249,	.0028,	.0015,	.0000,	.0208,	.0336,	.0779,	.0228,	.0017,	.0099,
9,	.0801,	.0146,	.0151,	.0057,	.0559,	.0853,	.0656,	.0183,	.0048,	.0142,
10,	.3020,	.0591,	.0501,	.0297,	.0765,	.1242,	.1268,	.0199,	.0195,	.0370,
11,	.4213,	.1450,	.0603,	.0655,	.0813,	.1275,	.1132,	.0282,	.0284,	.0525,
12,	.6143,	.2185,	.1101,	.1106,	.1048,	.2062,	.1685,	.0537,	.0401,	.0423,
13,	.9650,	.4459,	.1704,	.2877,	.2530,	.3616,	.3450,	.0774,	.0520,	.0353,
14,	.6445,	.4804,	.1559,	.2767,	.3875,	.4123,	.5966,	.1099,	.1008,	.0754,
15,	.7849,	.2708,	.1520,	.2263,	.2390,	.3196,	.3631,	.2341,	.0842,	.1038,
16,	.7535,	.2467,	.0947,	.2794,	.2601,	.1220,	.3230,	.2949,	.1555,	.2506,
17,	.9207,	.2822,	.0968,	.1798,	.5728,	.1531,	1.6647,	.3605,	.1718,	.2030,
18,	.5378,	.2301,	.0629,	.1928,	.4841,	.4933,	1.8347,	.4061,	.1537,	.1734,
+gp,	.5378,	.2301,	.0629,	.1928,	.4841,	.4933,	1.8347,	.4061,	.1537,	.1734,
FBAR 10-16,	.6408,	.2666,	.1134,	.1823,	.2003,	.2391,	.2909,	.1169,	.0686,	.0853,

Table 6.13

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10** <sup>-3</sup>				
	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	976117,	978800,	879296,	716554,	700101,	824283,	948940,	952528,	677621,	460056,
2,	531599,	883227,	885655,	795620,	648364,	633477,	745843,	858637,	861882,	613137,
3,	317960,	481011,	799177,	801374,	719906,	586664,	573194,	674866,	776926,	779864,
4,	200870,	287702,	435236,	723125,	725113,	651398,	530836,	518647,	610644,	702992,
5,	167181,	181754,	260324,	393818,	654311,	656110,	589410,	480320,	469291,	552534,
6,	156769,	151271,	164458,	235550,	356341,	592044,	593672,	533320,	434612,	424633,
7,	146074,	141805,	136876,	148808,	213128,	322401,	535704,	537177,	482124,	393089,
8,	145046,	131902,	128310,	123851,	134647,	192757,	291721,	484725,	485304,	434665,
9,	97272,	129729,	119325,	116093,	112050,	121444,	174382,	263852,	433149,	434494,
10,	93532,	85957,	117118,	107955,	104961,	100889,	109763,	157518,	235332,	382675,
11,	93843,	83546,	77271,	105799,	97499,	94175,	90698,	98670,	140579,	208527,
12,	143542,	83443,	75153,	69647,	95394,	87333,	83195,	80555,	87596,	124696,
13,	116527,	128006,	74807,	67675,	62604,	85408,	75762,	71065,	69212,	76266,
14,	142860,	103087,	114661,	67313,	60708,	55839,	73492,	63906,	59961,	57672,
15,	101098,	126598,	91444,	103285,	60086,	54343,	47171,	61313,	53350,	48865,
16,	120486,	89579,	112641,	82270,	92725,	53909,	46500,	37983,	51580,	43918,
17,	69511,	107054,	79398,	101325,	73556,	83134,	44990,	34945,	29894,	41554,
18,	73136,	61382,	95514,	71259,	91022,	66127,	72613,	36442,	28165,	23457,
+gp,	128470,	128674,	575284,	192999,	271750,	106072,	146699,	39616,	31261,	43129,
TOTAL,	3821891,	4364528,	5221948,	5024317,	5274269,	5367811,	5774588,	5986085,	6018484,	5846224,

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10** <sup>-3</sup>				
	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	311387,	181968,	151639,	173133,	166309,	157059,	170867,	198573,	259350,	227343,
2,	416276,	281754,	164651,	137209,	156657,	150483,	142113,	154606,	179676,	234669,
3,	554790,	376662,	254942,	148983,	124152,	141749,	136162,	128589,	139894,	162578,
4,	705650,	501994,	340818,	230681,	134805,	112337,	128260,	123205,	116352,	126581,
5,	636094,	638498,	454223,	308385,	208729,	121977,	101647,	116054,	111480,	105280,
6,	499953,	575561,	577737,	410998,	279038,	188866,	110369,	91974,	105010,	100872,
7,	383647,	446827,	502820,	522758,	369123,	249028,	169879,	98979,	83217,	94998,
8,	351071,	328668,	375945,	452670,	444324,	314499,	218280,	150860,	88748,	75216,
9,	378604,	277306,	240893,	323832,	347608,	360612,	259557,	189308,	131961,	78412,
10,	365769,	264117,	176492,	186146,	242228,	269825,	284316,	209444,	159351,	115051,
11,	317584,	227789,	133671,	110136,	136500,	183535,	205679,	211325,	144474,	128306,
12,	169808,	174095,	99076,	73753,	80717,	98495,	140302,	148812,	136867,	100942,
13,	102744,	99209,	68926,	38340,	50334,	53329,	70145,	95185,	90391,	75236,
14,	60795,	64762,	42634,	30703,	25874,	30000,	37627,	43325,	50236,	35838,
15,	43971,	35135,	33739,	20413,	20733,	17648,	21057,	22771,	24452,	16944,
16,	38019,	24092,	18587,	18538,	13281,	15346,	10635,	13310,	11575,	5829,
17,	34119,	21592,	12440,	11305,	12842,	8721,	7416,	7058,	6545,	2534,
18,	34430,	17871,	13545,	6620,	8200,	9275,	4618,	4644,	3182,	940,
+gp,	62814,	28122,	34081,	12465,	27389,	7838,	6540,	8943,	1032,	851,
TOTAL,	5467525,	4566023,	3696860,	3217069,	2848842,	2490621,	2225470,	2016964,	1843794,	1688419,

Continued

Table 6.13 Continued

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:50

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)								Numbers*10** <sup>-3</sup>			
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	
AGE												
1,	188768,	161148,	158570,	184740,	219556,	205077,	182801,	172519,	163191,	172692,	0,	
2,	205708,	170804,	145813,	143480,	167159,	198663,	185561,	165405,	156102,	147661,	157589,	
3,	212337,	186133,	154550,	131937,	129826,	151252,	179757,	167903,	149665,	141247,	134720,	
4,	147106,	192131,	168420,	139843,	119381,	117472,	136858,	162651,	151925,	135422,	128580,	
5,	114535,	133107,	173847,	152392,	126535,	108021,	106293,	123835,	146119,	137092,	123092,	
6,	95261,	103636,	120440,	157303,	137891,	114493,	97741,	94233,	111140,	132017,	124287,	
7,	91272,	86103,	93746,	108979,	142334,	124723,	103597,	86867,	83484,	100455,	118938,	
8,	85926,	82044,	77798,	84825,	98608,	128337,	112142,	88551,	76225,	75402,	90582,	
9,	67559,	75838,	74032,	70290,	76753,	87386,	112285,	93866,	78319,	68852,	67846,	
10,	68947,	56422,	67623,	65983,	63241,	65670,	72604,	95149,	83391,	70526,	61899,	
11,	96522,	46124,	48124,	58196,	57955,	53007,	52480,	57870,	84402,	74001,	61916,	
12,	95082,	57312,	36102,	40996,	49317,	48347,	42219,	42402,	50907,	74234,	63805,	
13,	56366,	46547,	41679,	29261,	33210,	40185,	35596,	32278,	36362,	44250,	64540,	
14,	23277,	19431,	26964,	31803,	19858,	23332,	25326,	22811,	27030,	31234,	38846,	
15,	8202,	11056,	10875,	20877,	21820,	12196,	13978,	12620,	18492,	22112,	26352,	
16,	3915,	3385,	7631,	8452,	15064,	15547,	8016,	8797,	9035,	15382,	18172,	
17,	1150,	1668,	2394,	6280,	5783,	10509,	12452,	5251,	5927,	6998,	10893,	
18,	867,	414,	1138,	1966,	4748,	2951,	8159,	2132,	3313,	4516,	5199,	
+gp,	131,	342,	0,	634,	6055,	41915,	23787,	29049,	45054,	20456,	19014,	
TOTAL,	1562931,	1433642,	1409744,	1438238,	1495095,	1549082,	1511655,	1464193,	1480082,	1474550,	1316269,	

Table 6.14

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:51

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)					Tonnes				
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	26337,	25414,	27629,	39573,	59865,	99464,	99737,	89598,	73015,	71338,
7,	26732,	25950,	25048,	27232,	39002,	58999,	98034,	98303,	88229,	71935,
8,	32635,	29678,	28870,	27866,	30296,	43370,	65637,	109063,	109194,	97800,
9,	30251,	40346,	37110,	36105,	34848,	37769,	54233,	82058,	134709,	135128,
10,	34326,	31546,	42982,	39620,	38521,	37026,	40283,	57809,	86367,	140442,
11,	40540,	36092,	33381,	45705,	42120,	40684,	39182,	42625,	60730,	90084,
12,	72919,	42389,	38178,	35381,	48460,	44365,	42263,	40922,	44499,	63346,
13,	71198,	78212,	45707,	41349,	38251,	52184,	46290,	43421,	42289,	46599,
14,	97002,	69996,	77855,	45706,	41221,	37915,	49901,	43392,	40713,	39159,
15,	76127,	95328,	68858,	77773,	45245,	40920,	35520,	46169,	40173,	36795,
16,	98919,	73544,	92479,	67544,	76127,	44260,	38177,	31184,	43147,	36057,
17,	60613,	93351,	69235,	88355,	64141,	72493,	39232,	30472,	26068,	36235,
18,	66554,	55857,	86918,	64846,	82830,	60176,	66078,	33162,	25630,	21346,
+gp,	128341,	127774,	593693,	194929,	278815,	106072,	149927,	38704,	30636,	43129,
TOTALBIO,	862495,	825477,	1267941,	831984,	919741,	775697,	864493,	786883,	844597,	929392,

Table 12	Stock biomass at age (start of year)					Tonnes				
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	83992,	96694,	97060,	69048,	29857,	20209,	11258,	9381,	10711,	10289,
7,	70207,	81769,	92016,	95665,	57214,	38599,	23443,	13659,	11484,	9975,
8,	78991,	73950,	84588,	101851,	88865,	62900,	41037,	28362,	16685,	12411,
9,	117746,	86242,	74918,	100712,	87597,	90874,	65408,	47706,	33254,	16623,
10,	134237,	96931,	64773,	68316,	75091,	83646,	88138,	64928,	49399,	32559,
11,	137196,	98405,	57746,	47579,	51051,	68642,	74867,	76922,	46232,	43367,
12,	86262,	88440,	50331,	37467,	38098,	46490,	61733,	65477,	54747,	38661,
13,	62777,	60617,	42114,	23426,	28589,	30291,	39281,	53303,	42122,	32953,
14,	41280,	43973,	28949,	20848,	18500,	21450,	25586,	29461,	28283,	17991,
15,	33110,	26457,	25406,	15371,	18618,	15848,	17435,	18855,	17850,	9590,
16,	31213,	19780,	15260,	15220,	12404,	14333,	9635,	12058,	11483,	4144,
17,	29752,	18829,	10848,	9858,	13150,	8930,	7194,	6846,	7370,	2182,
18,	31331,	16263,	12326,	6024,	8610,	9739,	4849,	4877,	3656,	908,
+gp,	63254,	28712,	35171,	12839,	30950,	8661,	7312,	10034,	1267,	1099,
TOTALBIO,	1001350,	837062,	691504,	624221,	558595,	520612,	477176,	441869,	334542,	232752,

Continued

Table 6.14 Continued

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:51

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)					Tonnes				
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	9717,	10571,	17343,	22652,	27302,	16029,	12706,	17904,	18894,	21123,
7,	12322,	10332,	16874,	19616,	28751,	18210,	18647,	19111,	20036,	22100,
8,	14350,	11240,	15171,	16541,	23863,	20277,	23550,	23023,	19056,	18096,
9,	14525,	16533,	16213,	14691,	21644,	18001,	30317,	26283,	21929,	20656,
10,	20891,	16983,	19475,	18475,	20933,	18388,	24685,	29496,	27519,	23979,
11,	33976,	16282,	15881,	19379,	21907,	18817,	18368,	19097,	32073,	27380,
12,	39934,	25676,	15849,	16275,	22489,	22772,	17732,	16113,	21890,	28951,
13,	27112,	23739,	21298,	13694,	17070,	21820,	16374,	14848,	17090,	19470,
14,	13128,	11289,	15208,	17078,	11279,	14256,	12916,	9809,	13245,	14055,
15,	5520,	7164,	6916,	12213,	12852,	7623,	8107,	5427,	10356,	10835,
16,	3167,	2861,	5891,	6314,	10123,	9717,	4730,	3958,	5060,	8460,
17,	1166,	1581,	1936,	5075,	4095,	6925,	7347,	2731,	3556,	4059,
18,	927,	437,	1086,	1771,	3675,	1945,	4814,	1215,	2054,	3026,
+gp,	152,	431,	0,	664,	5074,	29215,	16651,	19463,	29736,	16160,
TOTALBIO,	196886,	155119,	169141,	184438,	231058,	223994,	216945,	208478,	242494,	238350,

Table 6.15

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:51

Terminal Fs derived using XSA (With F shrinkage)

Table 13	Spawning stock biomass at age (spawning time)						Tonnes				
YEAR,	1965,	1966,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,	
AGE											
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
6,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
7,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
8,	979,	890,	866,	836,	909,	1301,	1969,	3272,	3276,	2934,	
9,	1815,	2421,	2227,	2166,	2091,	2266,	3254,	4923,	8083,	8108,	
10,	2746,	2524,	3439,	3170,	3082,	2962,	3223,	4625,	6909,	11235,	
11,	8919,	7940,	7344,	10055,	9266,	8950,	8620,	9378,	13361,	19818,	
12,	26251,	15260,	13744,	12737,	17446,	15972,	15215,	14732,	16020,	22804,	
13,	39159,	43016,	25139,	22742,	21038,	28701,	25460,	23881,	23259,	25629,	
14,	69841,	50397,	56056,	32908,	29679,	27299,	35929,	31242,	29314,	28195,	
15,	64708,	81029,	58529,	66107,	38458,	34782,	30192,	39243,	34147,	31276,	
16,	87049,	64719,	81381,	59439,	66992,	38948,	33596,	27442,	37266,	31730,	
17,	57583,	88683,	65773,	83937,	60934,	68868,	37270,	28948,	24764,	34423,	
18,	64557,	54182,	84310,	62900,	80345,	58370,	64096,	32167,	24861,	20705,	
+gp,	128341,	127774,	593693,	194929,	278815,	106072,	149927,	38704,	30636,	43129,	
TOTSPB10,	551948,	538835,	992500,	551927,	609055,	394492,	408749,	258559,	251894,	279988,	

Table 13	Spawning stock biomass at age (spawning time)						Tonnes			
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
7,	0,	736,	828,	861,	515,	347,	211,	123,	103,	50,
8,	2370,	1183,	1353,	1630,	1422,	1006,	657,	454,	267,	99,
9,	7065,	8710,	7567,	10172,	8847,	9178,	6606,	4818,	3359,	948,
10,	10739,	18902,	12631,	13322,	14643,	16311,	17187,	12661,	9633,	5470,
11,	30183,	29521,	17324,	14274,	15315,	20593,	22460,	23077,	13869,	13097,
12,	31054,	47758,	27179,	20232,	20573,	25104,	33336,	35358,	29563,	20645,
13,	34527,	42553,	29564,	16445,	20070,	21264,	27575,	37419,	29570,	23759,
14,	29722,	37905,	24954,	17971,	15947,	18490,	22055,	25395,	24380,	15814,
15,	28144,	25557,	24542,	14849,	17985,	15309,	16842,	18214,	17243,	9130,
16,	27468,	19661,	15169,	15129,	12330,	14247,	9578,	11986,	11414,	4082,
17,	28264,	18829,	10848,	9858,	13150,	8930,	7194,	6846,	7370,	2182,
18,	30391,	16263,	12326,	6024,	8610,	9739,	4849,	4877,	3656,	908,
+gp,	63254,	28712,	35171,	12839,	30950,	8661,	7312,	10034,	1267,	1099,
TOTSPB10,	323181,	296290,	219455,	153604,	180356,	169181,	175862,	191261,	151695,	97282,

Continued



Table 6.15 Continued

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:51

Terminal Fs derived using XSA (With F shrinkage)

Table 13 YEAR,	Spawning stock biomass at age (spawning time)							Tonnes			
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	
AGE											
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
6,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
7,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
8,	0,	0,	0,	0,	0,	304,	353,	345,	0,	0,	
9,	145,	562,	730,	1219,	87,	900,	1667,	1630,	504,	475,	
10,	1650,	1919,	1480,	1755,	1633,	2317,	3258,	3923,	3110,	2710,	
11,	7407,	3875,	2827,	3760,	4403,	3858,	3710,	4278,	8563,	7311,	
12,	18090,	13018,	6815,	7519,	10930,	11522,	8529,	6622,	9588,	12681,	
13,	21175,	18849,	15654,	9435,	11147,	13594,	8924,	8003,	9810,	11176,	
14,	11107,	9844,	12577,	13679,	8651,	10350,	9571,	7592,	11165,	11849,	
15,	4968,	6534,	6121,	10528,	10693,	6106,	6891,	4819,	9848,	10304,	
16,	2930,	2718,	5643,	6314,	10123,	9717,	4550,	3745,	4655,	7783,	
17,	1166,	1581,	1936,	5075,	4095,	6925,	7347,	2709,	3517,	4014,	
18,	927,	437,	1086,	1771,	3675,	1945,	4814,	1215,	2054,	3026,	
+gp,	152,	431,	0,	664,	5074,	29215,	16651,	19463,	29736,	16160,	
TOTSPBIO,	69715,	59768,	54869,	61719,	70510,	96752,	76266,	64344,	92550,	87488,	

Table 6.16

Run title : Arctic S. mentella (run: FINAL02/VP2)

At 29-Aug-95 10:05:51

Table 16 Summary (without SOP correction)

Terminal Fs derived using XSA (With F shrinkage)

	RECRUITS, Age 6	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	FBAR 10-16,
1965,	156769,	862495,	551947,	15662,	.0284,	.0182,
1966,	151271,	825477,	538835,	10143,	.0188,	.0127,
1967,	164458,	1267942,	992500,	6239,	.0063,	.0046,
1968,	235550,	831983,	551927,	5413,	.0098,	.0077,
1969,	356341,	919741,	609054,	6836,	.0112,	.0103,
1970,	592044,	775697,	394492,	22916,	.0581,	.0469,
1971,	593672,	864493,	408749,	45063,	.1102,	.0766,
1972,	533320,	786883,	258559,	28862,	.1116,	.0639,
1973,	434612,	844597,	251894,	38380,	.1524,	.0681,
1974,	424633,	929392,	279988,	69372,	.2478,	.1267,
1975,	499953,	1001350,	323181,	239070,	.7397,	.4413,
1976,	575561,	837062,	296289,	269022,	.9080,	.6478,
1977,	577737,	691504,	219455,	146365,	.6669,	.5653,
1978,	410998,	624221,	153604,	92611,	.6029,	.2694,
1979,	279038,	558594,	180356,	87145,	.4832,	.2771,
1980,	188866,	520612,	169181,	79354,	.4690,	.3023,
1981,	110369,	477176,	175862,	81546,	.4637,	.3087,
1982,	91974,	441869,	191261,	115383,	.6033,	.4574,
1983,	105010,	334542,	151695,	105273,	.6940,	.7769,
1984,	100872,	232753,	97282,	72934,	.7497,	.8706,
1985,	95261,	196886,	69715,	63068,	.9047,	.6408,
1986,	103636,	155119,	59768,	23112,	.3867,	.2666,
1987,	120440,	169141,	54869,	10518,	.1917,	.1134,
1988,	157303,	184438,	61719,	15586,	.2525,	.1823,
1989,	137891,	231058,	70510,	23494,	.3332,	.2003,
1990,	114493,	223994,	96752,	35070,	.3625,	.2391,
1991,	97741,	216945,	76266,	48735,	.6390,	.2909,
1992,	94233,	208478,	64344,	15587,	.2422,	.1169,
1993,	111140,	242493,	92550,	10781,	.1165,	.0686,
1994,	132017,	238350,	87488,	12114,	.1385,	.0853,
Arith.						
Mean	258240,	556509,	251003,	59855,	.3568,	.2519,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),		

Table 6.17

15:57 Tuesday, August 29, 1995 12

Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

Single option prediction: Input data

Year: 1995								
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
6	124287.00	0.1000	0.0000	0.0000	0.0000	0.173	0.0090	0.173
7	118938.00	0.1000	0.0000	0.0000	0.0000	0.227	0.0120	0.227
8	90582.000	0.1000	0.0000	0.0000	0.0000	0.250	0.0110	0.250
9	67846.000	0.1000	0.0115	0.0000	0.0000	0.287	0.0120	0.287
10	61899.000	0.1000	0.0840	0.0000	0.0000	0.327	0.0240	0.327
11	61916.000	0.1000	0.1890	0.0000	0.0000	0.360	0.0340	0.360
12	63805.000	0.1000	0.4030	0.0000	0.0000	0.400	0.0430	0.400
13	64540.000	0.1000	0.5805	0.0000	0.0000	0.457	0.0520	0.457
14	38846.000	0.1000	0.7695	0.0000	0.0000	0.457	0.0900	0.457
15	26352.000	0.1000	0.8400	0.0000	0.0000	0.493	0.1330	0.493
16	18172.000	0.1000	0.8545	0.0000	0.0000	0.520	0.2210	0.520
17	10893.000	0.1000	0.9945	0.0000	0.0000	0.567	0.2320	0.567
18	5199.000	0.1000	1.0000	0.0000	0.0000	0.620	0.2310	0.620
19+	19014.000	0.1000	1.0000	0.0000	0.0000	0.707	0.2310	0.707
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
6	111378.00	0.1000	0.0000	0.0000	0.0000	0.173	0.0090	0.173
7	.	0.1000	0.0000	0.0000	0.0000	0.227	0.0120	0.227
8	.	0.1000	0.0000	0.0000	0.0000	0.250	0.0110	0.250
9	.	0.1000	0.0115	0.0000	0.0000	0.287	0.0120	0.287
10	.	0.1000	0.0840	0.0000	0.0000	0.327	0.0240	0.327
11	.	0.1000	0.1890	0.0000	0.0000	0.360	0.0340	0.360
12	.	0.1000	0.4030	0.0000	0.0000	0.400	0.0430	0.400
13	.	0.1000	0.5805	0.0000	0.0000	0.457	0.0520	0.457
14	.	0.1000	0.7695	0.0000	0.0000	0.457	0.0900	0.457
15	.	0.1000	0.8400	0.0000	0.0000	0.493	0.1330	0.493
16	.	0.1000	0.8545	0.0000	0.0000	0.520	0.2210	0.520
17	.	0.1000	0.9945	0.0000	0.0000	0.567	0.2320	0.567
18	.	0.1000	1.0000	0.0000	0.0000	0.620	0.2310	0.620
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.2310	0.707
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1997								
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
6	105272.00	0.1000	0.0000	0.0000	0.0000	0.173	0.0090	0.173
7	.	0.1000	0.0000	0.0000	0.0000	0.227	0.0120	0.227
8	.	0.1000	0.0000	0.0000	0.0000	0.250	0.0110	0.250
9	.	0.1000	0.0115	0.0000	0.0000	0.287	0.0120	0.287
10	.	0.1000	0.0840	0.0000	0.0000	0.327	0.0240	0.327
11	.	0.1000	0.1890	0.0000	0.0000	0.360	0.0340	0.360
12	.	0.1000	0.4030	0.0000	0.0000	0.400	0.0430	0.400
13	.	0.1000	0.5805	0.0000	0.0000	0.457	0.0520	0.457
14	.	0.1000	0.7695	0.0000	0.0000	0.457	0.0900	0.457
15	.	0.1000	0.8400	0.0000	0.0000	0.493	0.1330	0.493
16	.	0.1000	0.8545	0.0000	0.0000	0.520	0.2210	0.520
17	.	0.1000	0.9945	0.0000	0.0000	0.567	0.2320	0.567
18	.	0.1000	1.0000	0.0000	0.0000	0.620	0.2310	0.620
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.2310	0.707
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

(cont.)

Continued

Table 6.17 Continued

Sebastes mentella in the North-East Arctic (Fishing Areas I & II)

Single option prediction: Input data

(cont.)

Year: 1998								
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
6	99803.000	0.1000	0.0000	0.0000	0.0000	0.173	0.0090	0.173
7	.	0.1000	0.0000	0.0000	0.0000	0.227	0.0120	0.227
8	.	0.1000	0.0000	0.0000	0.0000	0.250	0.0110	0.250
9	.	0.1000	0.0115	0.0000	0.0000	0.287	0.0120	0.287
10	.	0.1000	0.0840	0.0000	0.0000	0.327	0.0240	0.327
11	.	0.1000	0.1890	0.0000	0.0000	0.360	0.0340	0.360
12	.	0.1000	0.4030	0.0000	0.0000	0.400	0.0430	0.400
13	.	0.1000	0.5805	0.0000	0.0000	0.457	0.0520	0.457
14	.	0.1000	0.7695	0.0000	0.0000	0.457	0.0900	0.457
15	.	0.1000	0.8400	0.0000	0.0000	0.493	0.1330	0.493
16	.	0.1000	0.8545	0.0000	0.0000	0.520	0.2210	0.520
17	.	0.1000	0.9945	0.0000	0.0000	0.567	0.2320	0.567
18	.	0.1000	1.0000	0.0000	0.0000	0.620	0.2310	0.620
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.2310	0.707
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : PRED01  
Date and time: 29AUG95:16:36

Table 6.18

15:57 Tuesday, August 29, 1995 23

Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

Prediction with management option table

Year: 1995					Year: 1996					Year: 1997	
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
1.0000	0.0853	251124	88974	13834	0.0000	0.0000	257430	95675	0	276700	112474
.	.	.	.	.	0.1000	0.0085	.	95675	1598	275068	111161
.	.	.	.	.	0.2000	0.0171	.	95675	3173	273460	109870
.	.	.	.	.	0.3000	0.0256	.	95675	4726	271874	108601
.	.	.	.	.	0.4000	0.0341	.	95675	6257	270311	107353
.	.	.	.	.	0.5000	0.0426	.	95675	7766	268771	106126
.	.	.	.	.	0.6000	0.0512	.	95675	9254	267252	104919
.	.	.	.	.	0.7000	0.0597	.	95675	10722	265755	103733
.	.	.	.	.	0.8000	0.0682	.	95675	12169	264278	102566
.	.	.	.	.	0.9000	0.0768	.	95675	13596	262823	101418
.	.	.	.	.	1.0000	0.0853	.	95675	15004	261387	100289
.	.	.	.	.	1.1000	0.0938	.	95675	16392	259971	99179
.	.	.	.	.	1.2000	0.1023	.	95675	17761	258575	98087
.	.	.	.	.	1.3000	0.1109	.	95675	19112	257197	97012
.	.	.	.	.	1.4000	0.1194	.	95675	20445	255838	95955
.	.	.	.	.	1.5000	0.1279	.	95675	21760	254498	94915
.	.	.	.	.	1.6000	0.1365	.	95675	23058	253175	93892
.	.	.	.	.	1.7000	0.1450	.	95675	24338	251871	92885
.	.	.	.	.	1.8000	0.1535	.	95675	25601	250583	91895
.	.	.	.	.	1.9000	0.1620	.	95675	26848	249313	90920
.	.	.	.	.	2.0000	0.1706	.	95675	28079	248059	89960
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : MOT01  
Date and time : 29AUG95:21:09  
Computation of ref. F: Simple mean, age 10 - 16  
Basis for 1995 : F factors

Table 6.19

23:33 Wednesday, August 30, 1995

Sebastes mentella in the North-East Arctic (Fishing Areas I &amp; II)

Single option prediction: Summary table

Year	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
1995	1.0000	0.0853	29819	13834	772289	251124	183462	88974	183462	88974
1996	0.0000	0.0000	0	0	781849	257430	196086	95675	196086	95675
1997	0.0000	0.0000	0	0	812718	276700	225024	112474	225024	112474
1998	0.0000	0.0000	0	0	835181	294384	252520	129219	252520	129219
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : PRED01  
 Date and time : 30AUG95:23:35  
 Computation of ref. F: Simple mean, age 10 - 16  
 Prediction basis : F factors

Year	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
1995	1.0000	0.0853	29819	13834	772289	251124	183462	88974	183462	88974
1996	0.2600	0.0222	8708	4108	781849	257430	196086	95675	196086	95675
1997	0.2600	0.0222	10092	4901	804441	272506	219033	109106	219033	109106
1998	0.2600	0.0222	11529	5759	818098	285322	239384	121613	239384	121613
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : PRED01  
 Date and time : 30AUG95:10:26  
 Computation of ref. F: Simple mean, age 10 - 16  
 Prediction basis : F factors

Year	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
1995	1.0000	0.0853	29819	13834	772289	251124	183462	88974	183462	88974
1996	0.8900	0.0759	28708	13454	781849	257430	196086	95675	196086	95675
1997	0.8900	0.0759	31017	14781	785447	262967	205491	101532	205491	101532
1998	0.8900	0.0759	33161	16074	781041	265999	211622	105698	211622	105698
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : PRED01  
 Date and time : 30AUG95:10:26  
 Computation of ref. F: Simple mean, age 10 - 16  
 Prediction basis : F factors

Year	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
1995	1.0000	0.0853	29819	13834	772289	251124	183462	88974	183462	88974
1996	1.0000	0.0853	32050	15004	781849	257430	196086	95675	196086	95675
1997	1.0000	0.0853	34224	16256	782275	261387	203259	100289	203259	100289
1998	1.0000	0.0853	36204	17457	775129	262961	207295	103239	207295	103239
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : PRED01  
 Date and time : 30AUG95:10:26  
 Computation of ref. F: Simple mean, age 10 - 16  
 Prediction basis : F factors

Table 7.1 *Sebastes marinus* in Sub-area I and Divisions IIa and IIb combined.

Year	Faroe Islands	France	Germany <sup>2</sup>	Greenland	Ireland	Norway	Portugal	Spain	UK England & Wales	UK Scotland	Russia <sup>3</sup>	Total
1986	29	2,719	3,369		-	21,680	-	-	42	14	2,350	30,203
1987	250	1,553	4,508		-	16,728	-	-	181	7	850	24,077
1988	No species specific data presently available on countries											25,908
1989	3	784	412		-	20,662			93	4	1,264	23,222
1990	278	1,684	387	1	-	23,917			260	15	1,549	28,091
1991	152	719	981	-	-	15,872	-	-	228	47	1,052	19,051
1992	35	1,294	530	623	-	12,700	5	2	225	18	758	16,190
1993	139	239	650	14	-	12,865	77	8	440	1	923	15,356
1994 <sup>1</sup>	22	647	783	5	4	13,927	90	4	135	1	1,199	16,817

<sup>1</sup>Provisional figures.

<sup>2</sup>Includes former GDR prior to 1991.

<sup>3</sup>USSR prior to 1991.

**Table 7.2** *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I.

Year	Faroe Islands	Germany <sup>4</sup>	Iceland	Norway	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	-	50	-	2,972	32	3	155	3,212
1987 <sup>3</sup>	-	8	-	2,013	11	-	50	2,082
1988	No species specific data presently available							
1989	-	-	-	1763	4 <sup>2</sup>	1 <sup>2</sup>	110	1,878
1990	5	-	-	1263	-	14	-	1,282
1991	-	-	-	1,993	-	-	92	2,085
1992	-	-	-	2,162	-	-	174	2,336
1993 <sup>1</sup>	24 <sup>2</sup>	-	-	1,317	-	-	237	1,578
1994 <sup>1</sup>	12 <sup>2</sup>	-	4	1,683	+	-	109	1,808

<sup>1</sup>Provisional figures.

<sup>2</sup>Split on species according the reports to Norwegian authorities.

<sup>3</sup>Based on preliminary estimates of species breakdown by area.

<sup>4</sup>Includes former GDR prior to 1991.

<sup>5</sup>USSR prior to 1991.



**Table 7.3** *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Division IIa.

Year	Faroe Islands	France	Germany <sup>4</sup>	Greenland	Norway	Portugal	UK England & Wales	UK Scotland	Russia <sup>5</sup>	Total
1986 <sup>3</sup>	29	2,719	3,319		18,708		10	11	2,195	26,991
1987 <sup>3</sup>	250	1,553	2,967		14,715		170	7	800	20,462
1988	No species specific data presently available									
1989	3 <sup>2</sup>	784 <sup>2</sup>	412		18,833		89 <sup>2</sup>	3 <sup>2</sup>	912	21,036
1990	273	1,684	387		22,444		260	1	392	25,441
1991	152 <sup>2</sup>	719 <sup>2</sup>	678		13,835	-	228 <sup>2</sup>	47 <sup>2</sup>	534	16,193
1992	35 <sup>2</sup>	1,294 <sup>2</sup>	211	614	10,536	-	192 <sup>2</sup>	18 <sup>2</sup>	404	13,304
1993 <sup>1</sup>	115 <sup>2</sup>	239 <sup>2</sup>	473	14 <sup>2</sup>	11,548	77 <sup>2</sup>	430 <sup>2</sup>	1 <sup>2</sup>	654	13,551
1994 <sup>1</sup>	10 <sup>2</sup>	647 <sup>2</sup>	501 <sup>2</sup>	5 <sup>2</sup>	12,231	90 <sup>2</sup>	129 <sup>2</sup>	-	1,030	14,643

<sup>1</sup> Provisional figures.

<sup>2</sup> Split on species according the reports to Norwegian authorities.

<sup>3</sup> Based on preliminary estimates of species breakdown by area.

<sup>4</sup> Includes former GDR prior to 1991.

<sup>5</sup> USSR prior to 1991.

**Table 7.4** *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Division IIb.

Year	Germany <sup>5</sup>	Greenland	Norway	Portugal	Spain	UK England & Wales	UK Scotland	Russia <sup>6</sup>	Total
1986 <sup>4</sup>									+
1987 <sup>4</sup>	1533	-	-	-	-	-	-	-	1533
1988	No species specific data presently available								
1989	-	-	66	-	-	-	-	242	308
1990	-	1 <sup>2</sup>	210	-	-	-	-	1157	1368
1991	303	-	44	-	-	-	-	426	773
1992	319	9 <sup>2</sup>	2	5 <sup>2</sup>	2	33 <sup>2</sup>	-	180	550
1993 <sup>1</sup>	177	-	+	-	8 <sup>3</sup>	10 <sup>2</sup>	-	32	227
1994 <sup>1</sup>	282	-	13	-	4 <sup>3</sup>	6 <sup>2</sup>	1 <sup>2</sup>	60	366

<sup>1</sup>Provisional figures.

<sup>2</sup>Split on species according the reports to Norwegian authorities.

<sup>3</sup>Split on species according to the 1992 catches.

<sup>4</sup>Based on preliminary estimates of species breakdown by area.

<sup>5</sup>Includes former GDR prior to 1991.

<sup>6</sup>USSR prior to 1991.

**Table 7.5** *Sebastes marinus*. Catch and catch per unit effort for Norwegian stern trawlers (ISSCFV - Code 07, 250-499,9 GRT), and total international effort (Norwegian trawl units).<sup>1</sup>

Year	Catch (t)	% of total international catch	CPUE (t/hour)	Effort hours trawling
1981	1,315	6.3	0.30	69,420
1982	2,014	12.3	0.35	46,760
1983	1,590	8.3	0.42	45,857
1984	3,963	14.0	0.40	70,948
1985	3,080	10.5	0.32	92,138
1986	4,500	14.9	0.42	71,912
1987	2,168	9.0	0.34	70,814
1988	4,349	16.8	0.54	47,978
1989	3,044	13.1	0.23	100,965
1990	3,826	13.6	0.60	46,819
1991 <sup>2</sup>	10,693	56.1	0.71	26,832
1992 <sup>2</sup>	4,094	25.3	0.43	37,651
1993 <sup>2</sup>	1,982	12.9	0.43	35,712
1994 <sup>2</sup>	1,446	8.6	0.43	39,109

<sup>1</sup>Only including trips with more than 50% *S. marinus* in the catches, and put into a GLIM-analysis.

<sup>2</sup> Provisional figures.

Table 7.6

Run title : Arctic S. marinus (run: TEST06/VP6)

At 31-Aug-95 11:50:49

Table 1	Catch numbers at age				Numbers*10**-3					
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
6,	0,	0,	0,	0,	0,	0,	0,	2,	0,	0,
7,	0,	0,	0,	0,	0,	0,	0,	5,	0,	0,
8,	0,	88,	6,	0,	232,	0,	142,	22,	24,	5,
9,	0,	157,	5,	102,	445,	0,	88,	78,	192,	268,
10,	0,	197,	10,	225,	739,	0,	520,	114,	354,	601,
11,	66,	145,	25,	306,	1339,	266,	321,	394,	399,	761,
12,	880,	251,	123,	389,	1948,	1488,	350,	549,	1018,	1831,
13,	1009,	838,	332,	841,	1591,	1708,	1387,	783,	1014,	1963,
14,	2697,	3150,	413,	1458,	1527,	1854,	2062,	1718,	1492,	1907,
15,	5720,	3697,	1281,	1304,	2013,	1722,	1258,	3102,	2277,	1498,
16,	5300,	5264,	1735,	907,	1331,	1571,	2497,	2495,	1337,	2552,
17,	2275,	2827,	1141,	1305,	1619,	1894,	1695,	2104,	1552,	2473,
18,	4421,	7309,	1409,	2886,	1575,	1895,	2472,	1837,	1576,	1290,
19,	2632,	3188,	1570,	3368,	1413,	1921,	1150,	998,	693,	579,
20,	1818,	1866,	1635,	2954,	1457,	1808,	1026,	858,	665,	678,
21,	2242,	3237,	2810,	2887,	976,	1935,	617,	688,	487,	479,
22,	1168,	496,	1372,	1649,	932,	1304,	425,	547,	498,	235,
23,	975,	447,	1678,	2061,	1053,	908,	659,	268,	510,	162,
+gp,	1329,	282,	3859,	3869,	5625,	6346,	3991,	3110,	3276,	1394,
TOTALNUM,	32532,	33439,	19404,	26511,	25815,	26620,	20660,	19672,	17364,	18676,
TONSLAND,	29484,	30203,	24077,	25908,	23222,	28091,	19051,	16190,	15356,	16817,
SOPCOF %,	100,	100,	99,	100,	84,	102,	101,	97,	100,	103,

Table 7.7

Run title : Arctic S. marinus (run: TEST06/VP6)

At 31-Aug-95 11:50:49

Table 2	Catch weights at age (kg)									
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0220,	.0220,	.0240,	.0200,	.0200,	.0200,	.0200,	.0200,	.0200,	.0200,
4,	.0330,	.0340,	.0370,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,	.0300,
5,	.0580,	.0590,	.0640,	.0530,	.0530,	.0530,	.0530,	.0530,	.0530,	.0530,
6,	.0860,	.0870,	.0950,	.0780,	.0780,	.0780,	.0780,	.0800,	.0900,	.0800,
7,	.1460,	.1490,	.1620,	.1330,	.1330,	.1330,	.1330,	.1800,	.1800,	.1800,
8,	.1920,	.1960,	.2130,	.1750,	.3900,	.3900,	.3700,	.2900,	.3300,	.3000,
9,	.2510,	.2570,	.2790,	.2290,	.4100,	.4100,	.5100,	.4800,	.3600,	.3900,
10,	.3300,	.3380,	.3670,	.3020,	.5100,	.5100,	.4600,	.4200,	.4300,	.5100,
11,	.4170,	.4260,	.4630,	.3800,	.6200,	.5500,	.5300,	.5000,	.5100,	.5700,
12,	.5150,	.5260,	.5720,	.4150,	.6600,	.7100,	.6100,	.5900,	.5100,	.6800,
13,	.5580,	.5700,	.6200,	.4170,	.7200,	.7200,	.6400,	.5800,	.6400,	.7500,
14,	.6960,	.7110,	.7730,	.4990,	.8100,	.7800,	.7100,	.6500,	.6400,	.7700,
15,	.7430,	.7590,	.8250,	.5450,	.8600,	.8500,	.7600,	.6500,	.7600,	.8400,
16,	.8370,	.8560,	.9300,	.6410,	.8900,	.8300,	.8300,	.7100,	.8600,	.9200,
17,	.8510,	.8700,	.9460,	.7050,	.9400,	.9100,	.8400,	.8200,	.8900,	.9600,
18,	.9220,	.9420,	1.0240,	.7710,	1.0400,	.9000,	1.0000,	.8400,	.9800,	1.0700,
19,	.9810,	1.0030,	1.0900,	.8630,	1.1000,	.9300,	.9600,	.9400,	1.0000,	1.0500,
20,	1.0180,	1.0410,	1.1310,	.9290,	1.1300,	1.0400,	1.0400,	1.0200,	1.0300,	1.0900,
21,	1.1370,	1.1620,	1.2630,	1.0410,	1.2700,	1.1300,	1.0300,	1.0300,	1.2100,	1.0600,
22,	1.1910,	1.2170,	1.3230,	1.1310,	1.2800,	1.0600,	1.0800,	1.1500,	1.0300,	1.0400,
23,	1.3960,	1.4270,	1.5510,	1.3560,	1.2500,	1.2300,	1.0200,	1.2700,	1.2000,	1.0400,
+gp,	1.5480,	1.5390,	1.8090,	1.7390,	1.6840,	1.4450,	1.2160,	1.2700,	1.2000,	1.2400,
SOPCOFAC,	1.0025,	.9978,	.9902,	.9992,	.8400,	1.0179,	1.0140,	.9705,	.9981,	1.0261,

**Table 8.1** GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries (Subarea I, Divisions IIa and IIb combined) as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	France	Germany	Greenland	Iceland	Ireland	Lithuania	Norway	Portugal	Russia <sup>4</sup>	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	-	138	2,165	-	-	-	-	4,376	-	15,181	-	23	-	21,883
1985	-	-	-	239	4,000	-	-	-	-	5,464	-	10,237	-	5	-	19,945
1986	-	-	42	13	2,178	-	-	-	-	7,890	-	12,200	-	10	2	22,875
1987	+	-	-	13	2,024	-	-	-	-	7,261	-	9,733	-	61	20	19,112
1988	-	-	186	67	744	-	-	-	-	9,076	-	9,430	-	82	2	19,587
1989	-	-	67	31	600	-	-	-	-	10,622	-	8,812	-	6	-	20,138
1990	-	-	163	49	954	-	-	-	-	17,243	-	4,764 <sup>2</sup>	-	10	-	23,183
1991	11	2,564	314	119	101	-	-	-	-	27,587	-	2,490 <sup>2</sup>	132 <sup>2</sup>	+	2	33,320
1992	-	-	16	111 <sup>1</sup>	13	13	-	-	-	8,313	31	718	23	7	3	9,253
1993	2 <sup>2</sup>	-	61	40 <sup>3</sup>	22	8	56	-	30 <sup>3</sup>	10,366 <sup>2</sup>	43	1,235	-	16	-	11,879
1994 <sup>1</sup>	4	-	86 <sup>3</sup>	27 <sup>3</sup>	69 <sup>2</sup>	3	15	5	4 <sup>3</sup>	8,219 <sup>2</sup>	36	283	2 <sup>2</sup>	76	2	8,831

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> USSR prior to 1991.

**Table 8.2** GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I as officially reported to ICES.

Year	Estonia	Faroe Islands	Germany	Iceland	Norway	Russia <sup>3</sup>	UK (England & Wales)	UK (Scotland)	Total
1984		-	-	-	593	81	17	-	691
1985		-	-	-	602	122	1	-	725
1986		-	1	-	557	615	5	1	1,179
1987		-	2	-	984	259	10	+	1,255
1988		9	4	-	978	420	7	-	1,418
1989		-	-	-	322 <sup>2</sup>	482	+	-	804
1990		7	-	-	312 <sup>2</sup>	321 <sup>2</sup>	-	-	640
1991	164	-	-	-	2,033 <sup>2</sup>	522 <sup>2</sup>	-	-	2,719
1992	-	-	+	-	2,282 <sup>2</sup>	467	-	-	2,749
1993	-	32	-	56	1,691 <sup>2</sup>	867	-	-	2,646
1994 <sup>1</sup>	-	17	-	15	1,154 <sup>2</sup>	175	+	-	1,361

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figures.

<sup>3</sup> USSR prior to 1991

**Table 8.3** GREENLAND HALIBUT in Sub areas I and II. Nominal catch (t) by countries in Division IIa as officially reported to ICES.

Year	Estonia	Faroe Islands	France	Germany	Greenland	Ireland	Norway	Portugal	Russia <sup>5</sup>	UK (England & Wales)	UK (Scotland)	Total
1984		-	138	265	-	-	3,703	-	5,459	1	-	9,566
1985		-	239	254	-	-	4,791	-	6,894	2	-	12,180
1986		6	13	97	-	-	6,389	-	5,553	5	1	12,064
1987		-	13	75	-	-	5,705	-	4,739	44	10	10,586
1988		177	67	150	-	-	7,859	-	4,002	56	2	12,313
1989		67	31	104	-	-	6,933 <sup>2</sup>	-	4,964	6	-	12,105
1990		133	49	12	-	-	8,224 <sup>2</sup>	-	1,246 <sup>2</sup>	1	-	9,665
1991	1,400	314	119 <sup>1</sup>	21	-	-	10,268 <sup>2</sup>	-	305 <sup>2</sup>	+	1	12,428
1992	-	16	108 <sup>1</sup>	1	13 <sup>4</sup>	-	4,144 <sup>2</sup>	15 <sup>3</sup>	58	1	-	4,356
1993	-	29	38 <sup>3</sup>	14	8 <sup>4</sup>	-	7,989 <sup>2</sup>	17	210	2	-	8,307
1994 <sup>1</sup>	-	68 <sup>3</sup>	19 <sup>3</sup>	23 <sup>2</sup>	3 <sup>4</sup>	4	6,106 <sup>2</sup>	26	67	14	-	6,330

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> Includes Division IIb.

<sup>5</sup> USSR prior to 1991.

Table 8.4 GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries in Division IIb as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	France	Germany	Ireland	Lithuania	Norway	Portugal	Russia <sup>4</sup>	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-		-	-	1,900	-		80	-	9,641	-	5	-	11,626
1985	-		-	-	3,746	-		71	-	3,221	-	2	-	7,040
1986	-		36	-	2,620	-		944	-	6,032	-	+	-	9,632
1987	+		-	-	1,947	-		572	-	4,735	-	7	10	7,271
1988	-		-	-	590	-		239	-	5,008	-	19	+	5,856
1989	-		-	-	496	-		3,367 <sup>2</sup>	-	3,366	-	-	-	7,229
1990	-		23 <sup>2</sup>	-	942	-		8,707 <sup>2</sup>	-	3,197 <sup>2</sup>	-	9	-	12,878
1991	11	1,000	-	-	80	-	-	15,286 <sup>2</sup>	-	1,663 <sup>2</sup>	132	+	1	18,173
1992	-	-	-	3 <sup>2</sup>	12	-	-	1,892 <sup>2</sup>	16 <sup>2</sup>	193	23	6	3	2,148
1993	2 <sup>3</sup>	-	-	2 <sup>3</sup>	8	-	30 <sup>3</sup>	686 <sup>2</sup>	26	158	-	14	-	926
1994 <sup>1</sup>	4	-	1 <sup>3</sup>	8 <sup>3</sup>	46 <sup>2</sup>	1	4 <sup>3</sup>	959 <sup>2</sup>	10	41	2 <sup>2</sup>	62	2	1,140

<sup>1</sup> Provisional figures.

<sup>2</sup> Working Group figure.

<sup>3</sup> As reported to Norwegian authorities.

<sup>4</sup> USSR prior to 1991.



**Table 8.5** Greenland halibut in the Sub-areas I and II.  
Landings by gear (tonnes).

Year	Gillnet	Longline	Trawl	Total
1980	1,189	336	11,759	13,284
1981	730	459	13,829	15,018
1982	748	679	15,362	16,789
1983	1,648	1,388	19,111	22,147
1984	1,200	1,453	19,230	21,883
1985	1,668	750	17,527	19,945
1986	1,677	497	20,701	22,875
1987	2,239	588	16,285	19,112
1988	2,815	838	15,934	19,587
1989	1,342	197	18,599	20,138
1990	1,372	1,491	20,325	23,183
1991	1,904	1,552	26,864	33,320
1992	1,679	1,787	5,787	9,253
1993	1,497	2,493	7,889	11,879
1994	1,403	2,361	5,067	8,831

**Table 8.6** GREENLAND HALIBUT in Sub-areas I and II. Catch per unit effort and total effort.

Year	USSR catch/hour trawling (t)		Norway <sup>11</sup> catch/hour trawling (t)		Average CPUE		Total effort (in '000 hrs trawling) <sup>6</sup>	CPUE 7+ <sup>7</sup>	GDR <sup>8</sup> (catch/day tonnage (kg))
	RT <sup>2</sup>	PST <sup>3</sup>	A <sup>9</sup>	B <sup>10</sup>	A <sup>4</sup>	B <sup>5</sup>			
1965	0.80	-	-	-	0.80	-	-	-	-
1966	0.77	-	-	-	0.77	-	-	-	-
1967	0.70	-	-	-	0.70	-	-	-	-
1968	0.65	-	-	-	0.65	-	-	-	-
1969	0.53	-	-	-	0.53	-	-	-	-
1970	0.53	-	-	-	0.53	-	169	0.50	-
1971	0.46	-	-	-	0.46	-	172	0.43	-
1972	0.37	-	-	-	0.37	-	116	0.33	-
1973	0.37	-	0.34	-	0.36	-	83	0.36	-
1974	0.40	-	0.36	-	0.38	-	100	0.36	-
1975	0.39	0.51	0.38	-	0.39	0.45	99	0.37	-
1976	0.40	0.56	0.33	-	0.37	0.45	100	0.34	-
1977	0.27	0.41	0.33	-	0.30	0.37	96	0.26	-
1978	0.21	0.32	0.21	-	0.21	0.27	123	0.17	-
1979	0.23	0.35	0.28	-	0.26	0.32	67	0.19	-
1980	0.24	0.33	0.32	-	0.28	0.33	47	0.25	-
1981	0.30	0.36	0.36	-	0.33	0.36	42	0.28	-
1982	0.26	0.45	0.41	-	0.34	0.43	39	0.37	-
1983	0.26	0.40	0.35	-	0.31	0.38	58	0.32	-
1984	0.27	0.41	0.32	-	0.30	0.37	59	0.30	-
1985	0.28	0.52	0.37	-	0.33	0.45	44	0.37	-
1986	0.23	0.42	0.37	-	0.30	0.40	57	0.32	-
1987	0.25	0.50	0.35	-	0.30	0.43	44	0.35	-
1988	0.20	0.30	0.31	-	0.26	0.31	63	0.26	4.26
1989	0.20	0.30	0.26	-	0.23	0.28	73	0.19	2.95
1990	-	0.20	0.27	-	-	0.24	95	0.16	1.66
1991	-	-	0.24	-	-	-	134	0.18	-
1992	-	-	0.46	0.72	-	-	20	0.29	-
1993 <sup>1</sup>	-	-	0.79	1.22	-	-	15	0.65	-
1994 <sup>1</sup>	-	-	0.77	1.27	-	-	11	0.70	-
1995 <sup>1</sup>	-	-	1.03	1.48	-	-	-	-	-

<sup>1</sup> Provisional.

<sup>2</sup> Side trawlers, 800-1000 hp. From 1983 onwards, side trawlers (SRTM), 1,000 hp.

<sup>3</sup> Stern trawlers, up to 2,000 HP.

<sup>4</sup> Arithmetic average of CPUE from USSR RT (or SRTM trawlers) and Norwegian trawlers.

<sup>5</sup> Arithmetic average of CPUE from USSR PST and Norwegian trawlers.

<sup>6</sup> For the years 1981-1990, based on average CPUE type B. For 1991-1993, based on the Norwegian CPUE, type A.

<sup>7</sup> Total catch (t) of seven years and older fish divided by total effort.

<sup>8</sup> For the years 1988-1989, frost-trawlers 995 BRT (FAO Code 095). For 1990, factory trawlers FVS IV, 1943 BRT (FAO Code 090).

<sup>9</sup> Norwegian trawlers, ISSCFV-code 07, 250-499.9 GRT.

<sup>10</sup> Norwegian factory trawlers, ISSCFV-code 09, 1000-1999.9 GRT

<sup>11</sup> From 1992 based on research fishing. 1992-1993: two weeks in May/June and October; 1994-1995: 10 days in May/June

Table 8.7

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:07

Table 1	Catch numbers at age Numbers*10** <sup>-3</sup>				
YEAR,	1970,	1971,	1972,	1973,	1974,
AGE					
1,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,
3,	1,	1,	1,	1,	1,
4,	34,	1,	461,	19,	276,
5,	526,	80,	1109,	212,	917,
6,	2792,	4486,	3521,	1117,	2519,
7,	10464,	12712,	9605,	3923,	6204,
8,	18562,	12283,	6438,	3515,	3838,
9,	10034,	6130,	2775,	2551,	1834,
10,	6671,	4339,	1734,	1919,	1942,
11,	2517,	2703,	1368,	1536,	1622,
12,	1250,	1660,	1234,	1127,	1338,
13,	616,	1044,	675,	716,	734,
14,	1104,	300,	200,	251,	531,
+gp,	281,	143,	80,	126,	216,
TOTALNUM,	54852,	45882,	29201,	17013,	21972,
TONSLAND,	89484,	79034,	43055,	29938,	37763,
SOPCOF %,	94,	104,	97,	92,	98,

Table 1	Catch numbers at age Numbers*10** <sup>-3</sup>									
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	22,	1,	62,	78,	88,	64,	664,	48,	314,	0,
4,	334,	98,	755,	532,	887,	275,	1146,	551,	1212,	36,
5,	840,	830,	2037,	1897,	2218,	731,	1896,	1304,	1543,	915,
6,	2337,	2982,	3255,	3589,	3155,	1138,	1917,	1494,	1864,	3698,
7,	6520,	5824,	4200,	4118,	2727,	1665,	1919,	1276,	1851,	3350,
8,	4118,	5002,	2524,	2365,	1234,	1341,	933,	1208,	2287,	1938,
9,	2265,	3000,	1610,	1509,	495,	944,	484,	1493,	1491,	1064,
10,	1654,	1350,	1104,	946,	319,	473,	448,	1258,	1228,	1191,
11,	1857,	915,	1062,	934,	296,	511,	482,	838,	713,	602,
12,	1536,	1212,	858,	438,	243,	275,	380,	502,	488,	340,
13,	1122,	698,	595,	349,	103,	242,	384,	324,	247,	171,
14,	600,	526,	384,	147,	45,	145,	150,	108,	201,	132,
+gp,	368,	358,	180,	112,	51,	78,	62,	46,	64,	71,
TOTALNUM,	23573,	22796,	18626,	17014,	11861,	7882,	10865,	10450,	13503,	13508,
TONSLAND,	38172,	36074,	28827,	24617,	17312,	13284,	15018,	16789,	22147,	21883,
SOPCOF %,	88,	92,	100,	104,	100,	108,	102,	98,	95,	100,

Continued

Table 8.7 Continued

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:07

Table 1	Catch numbers at age Numbers*10**-3									
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	7,	21,	0,	0,
2,	0,	0,	0,	0,	0,	0,	67,	21,	0,	0,
3,	88,	141,	50,	5,	214,	155,	389,	98,	10,	0,
4,	461,	985,	435,	233,	924,	793,	2084,	437,	224,	74,
5,	1219,	1672,	1212,	907,	2080,	2139,	3312,	1098,	1140,	646,
6,	2874,	3335,	2972,	2540,	4453,	5163,	3889,	1195,	1088,	700,
7,	2561,	2712,	3572,	3141,	3655,	4642,	4716,	1069,	1608,	1186,
8,	1548,	1531,	1746,	2096,	1657,	1932,	2355,	778,	1118,	750,
9,	972,	1128,	752,	1182,	801,	1221,	1031,	360,	140,	337,
10,	1037,	997,	828,	860,	318,	499,	1284,	600,	976,	588,
11,	614,	530,	362,	481,	228,	264,	774,	188,	444,	380,
12,	363,	434,	202,	313,	126,	314,	673,	150,	144,	302,
13,	161,	314,	186,	133,	120,	42,	177,	79,	36,	83,
14,	120,	305,	63,	140,	140,	96,	266,	89,	20,	36,
+gp,	63,	239,	7,	47,	28,	44,	517,	56,	4,	4,
TOTALNUM,	12081,	14323,	12387,	12078,	14744,	17304,	21541,	6239,	6952,	5086,
TONSLAND,	19945,	22875,	19112,	19587,	20138,	23183,	33320,	9253,	11879,	8831,
SOPCOF %,	98,	96,	100,	99,	100,	100,	100,	100,	100,	100,

Table 8.8

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Mean Weight of Stock (Kilograms)

(WEST)

Year	Age 1	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	Age 15	Age 16
1970	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1971	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1972	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1973	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1974	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1975	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1976	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1977	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1978	0.000	0.000	0.200	0.441	0.567	0.737	1.079	1.421	1.848	2.281	2.887	3.247	4.303	4.931	5.765	6.308
1979	0.000	0.000	0.300	0.600	0.900	1.200	1.500	1.800	2.200	2.600	3.000	3.500	4.100	4.800	5.600	7.000
1980	0.000	0.000	0.200	0.482	0.702	0.872	1.141	1.468	1.778	2.302	2.664	3.046	3.368	4.285	5.025	6.589
1981	0.000	0.000	0.200	0.500	0.660	0.840	1.150	1.560	2.040	2.570	2.980	3.430	4.130	4.680	5.810	6.590
1982	0.000	0.000	0.270	0.620	0.690	0.840	1.030	1.310	1.740	2.240	2.770	3.370	4.320	5.350	5.780	6.600
1983	0.000	0.000	0.310	0.450	0.750	1.040	1.340	1.570	1.970	2.730	3.290	4.220	4.710	6.080	6.000	6.600
1984	0.000	0.000	0.300	0.480	0.630	0.960	1.180	1.530	2.310	2.870	3.460	3.770	3.990	4.350	4.470	4.600
1985	0.000	0.000	0.300	0.380	0.600	0.890	1.200	1.850	2.590	3.180	3.620	3.950	4.480	4.250	4.800	5.000
1986	0.000	0.000	0.340	0.470	0.620	0.920	1.280	1.900	2.480	3.110	3.350	3.720	4.000	4.180	4.500	5.400
1987	0.000	0.000	0.307	0.574	0.709	1.003	1.266	1.683	2.482	2.982	3.547	3.800	4.560	5.002	5.953	5.953
1988	0.000	0.000	0.414	0.554	0.740	0.962	1.249	1.626	2.164	2.897	3.406	3.661	4.247	4.187	4.463	4.463
1989	0.000	0.000	0.310	0.630	0.760	1.030	1.320	1.800	2.420	3.130	3.370	4.050	4.290	4.500	4.720	4.720
1990	0.000	0.000	0.280	0.550	0.710	1.060	1.290	1.700	2.100	2.610	2.870	3.450	3.720	4.090	4.520	4.520
1991	0.000	0.000	0.290	0.600	0.770	1.050	1.380	1.750	2.200	2.600	2.790	3.280	3.890	4.380	5.290	5.290
1992	0.000	0.000	0.220	0.460	0.680	0.970	1.270	1.760	2.210	2.560	3.110	3.590	3.830	4.250	4.800	4.800
1993	0.000	0.000	0.340	0.540	0.790	1.020	1.350	1.880	2.460	2.670	3.430	4.290	5.080	6.320	8.910	8.910
1994	0.000	0.000	0.311	0.520	0.720	0.940	1.270	1.710	2.180	2.520	2.970	3.300	3.840	4.900	6.750	6.750

Table 8.9

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Proportion Mature at Year Start

(MATPROP)

Year	Age 1	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	Age 15	Age 16
1970	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1971	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1972	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1973	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1974	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1975	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1976	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1977	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1978	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1979	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1980	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1981	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1982	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1983	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1984	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1985	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1986	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1987	.	.	0.00	0.05	0.23	0.49	0.66	0.78	0.89	0.95	0.99	0.99	0.99	1.00	1.00	1.00
1988	.	.	0.00	0.02	0.11	0.51	0.67	0.68	0.80	0.92	0.98	1.00	1.00	1.00	1.00	1.00
1989	.	.	0.00	0.03	0.14	0.53	0.66	0.69	0.73	0.86	0.96	1.00	1.00	1.00	1.00	1.00
1990	.	.	0.00	0.05	0.20	0.59	0.70	0.72	0.76	0.85	0.94	1.00	1.00	1.00	1.00	1.00
1991	.	.	0.00	0.05	0.20	0.59	0.70	0.72	0.76	0.85	0.94	1.00	1.00	1.00	1.00	1.00
1992	.	.	0.00	0.05	0.20	0.59	0.70	0.72	0.76	0.85	0.94	1.00	1.00	1.00	1.00	1.00
1993	.	.	0.00	0.10	0.38	0.51	0.65	0.73	0.82	0.91	0.97	0.98	1.00	1.00	1.00	1.00
1994	.	.	0.00	0.10	0.38	0.51	0.65	0.73	0.82	0.91	0.97	0.98	1.00	1.00	1.00	1.00

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Norwegian Svalbard Trawl Survey, Autumn (code: FLT09) (Catch: Number)

Year	Effort	Catch, age 1	Catch, age 2	Catch, age 3	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8
1984	1	550	3042	2924	8573	6847	5657	4345	2796
1985	1	884	3921	4294	6674	8793	8622	3920	1817
1986	1	49	1005	1967	7314	4671	1754	2301	372
1987	1	630	1014	3076	4409	4786	3141	964	364
1988	1	818	4298	6191	6696	12289	2396	6015	338
1989	1	712	3232	8158	7493	7069	2374	1753	353
1990	1	115	336	5050	7130	7730	4490	2330	918
1991	1	71	877	3080	6720	9270	5450	2800	1660
1992	1	33	30	338	1190	3520	4420	2280	1280
1993	1	25	60	51	1049	2369	2056	2772	1114
1994	1	4	238	296	652	2775	2371	2593	531

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Russian Bottom Trawl Survey, Autumn (code: FLT10) (Catch: Number)

Year	Effort	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8	Catch, age 9
1990	1	83	189	172	83	29	12
1991	1	0	0	0	0	0	0
1992	1	69	246	122	34	16	9
1993	1	32	80	121	45	19	13
1994	1	8	44	74	52	32	14

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Norwegian Svalbard Shrimp Survey (code: FLT11) (Catch: Number)

Year	Effort	Catch, age 1	Catch, age 2	Catch, age 3	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8
1988	1	4163	14278	8259	8354	2594	0	0	0
1989	1	4653	9777	9943	4855	4057	1054	542	83
1990	1	247	1569	8324	9800	6910	2148	295	245
1991	1	25	577	2465	4969	5362	2541	1380	158
1992	1	95	57	505	1780	2914	1129	713	333
1993	1	39	54	50	814	1572	433	589	395
1994	1	0	13	43	446	2214	1218	1764	485

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Experimental CPUE (code: FLT12) (Catch: Number) (Effort: hours)

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
1992	1	80	97	109	56	7	29	12	7	2	1
1993	1	176	130	191	87	5	52	22	7	3	1
1994	1	198	191	215	90	8	47	19	5	2	1

**Table 8.11**

Lowestoft VPA Version 3.1

28-Aug-95 21:00:18

Extended Survivors Analysis

Arctic Green.halibut (run: FIN/AL)

CPUE data from file /users/fish/ifad/ifapwork/afwg/ghl\_arct/FLEET.AL

Catch data for 25 years. 1970 to 1994. Ages 1 to 15.

Fleet,	First,	Last,	First,	Last,	Alpha,	Beta
,	year,	year,	age,	age		
FLT09: Norwegian Sva,	1984,	1994,	1,	8,	.650,	.750
FLT10: Russian Botto,	1990,	1994,	4,	9,	.850,	.950
FLT11: Norwegian Sva,	1988,	1994,	1,	8,	.500,	.600
FLT12: Experimental ,	1992,	1994,	5,	14,	.000,	1.000

Time series weights :

Tapered time weighting applied  
Power = 3 over 20 years

Catchability analysis :

Catchability dependent on stock size for ages < 4

Regression type = C  
Minimum of 5 points used for regression  
Survivor estimates shrunk to the population mean for ages < 4

Catchability independent of age for ages >= 10

Terminal population estimation :

Survivor estimates shrunk towards the mean F  
of the final 2 years or the 5 oldest ages.

S.E. of the mean to which the estimates are shrunk = 2.000

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

Prior weighting not applied

Tuning had not converged after 100 iterations

Total absolute residual between iterations  
99 and 100 = .00276

Final year F values

Age	1,	2,	3,	4,	5,	6,	7,	8,	9,	10
Iteration 99,	.0000,	.0000,	.0000,	.0327,	.1311,	.1058,	.1367,	.1108,	.0908,	.2835
Iteration **,	.0000,	.0000,	.0000,	.0324,	.1304,	.1054,	.1368,	.1107,	.0908,	.2836

Age	11,	12,	13,	14
Iteration 99,	.4559,	1.1582,	.9011,	.7164
Iteration **,	.4561,	1.1586,	.9014,	.7166

Continued

**Table 8.11 Continued**

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

Fishing mortalities

Age,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994
1,	.000,	.000,	.000,	.000,	.000,	.000,	.002,	.004,	.000,	.000
2,	.000,	.000,	.000,	.000,	.000,	.000,	.008,	.007,	.000,	.000
3,	.004,	.005,	.002,	.000,	.008,	.007,	.029,	.013,	.004,	.000
4,	.022,	.047,	.017,	.010,	.046,	.037,	.114,	.040,	.036,	.032
5,	.068,	.096,	.071,	.043,	.105,	.135,	.202,	.077,	.131,	.130
6,	.241,	.255,	.234,	.198,	.292,	.382,	.365,	.099,	.096,	.105
7,	.357,	.355,	.448,	.390,	.456,	.530,	.682,	.151,	.177,	.137
8,	.278,	.354,	.384,	.487,	.346,	.439,	.531,	.207,	.221,	.111
9,	.237,	.316,	.278,	.459,	.327,	.437,	.418,	.133,	.049,	.091
10,	.360,	.384,	.381,	.553,	.201,	.328,	1.109,	.432,	.593,	.284
11,	.349,	.298,	.220,	.376,	.258,	.242,	1.201,	.424,	.625,	.456
12,	.406,	.419,	.167,	.284,	.149,	.638,	1.656,	.740,	.635,	1.159
13,	.146,	.701,	.300,	.149,	.158,	.064,	.880,	.863,	.365,	.901
14,	.301,	.426,	.270,	.366,	.219,	.173,	.673,	1.735,	.516,	.717

Continued



Table 8.11 Continued

XSA population numbers (Thousands)

YEAR ,	1,	AGE 2,	3,	4,	5,	6,	7,	8,		
1985 ,	4.16E+04,	3.68E+04,	2.70E+04,	2.33E+04,	1.99E+04,	1.45E+04,	9.19E+03,	6.88E+03,	4.97E+03,	3.70E+03,
1986 ,	3.48E+04,	3.58E+04,	3.17E+04,	2.31E+04,	1.97E+04,	1.60E+04,	9.78E+03,	5.54E+03,	4.49E+03,	3.37E+03,
1987 ,	3.72E+04,	3.00E+04,	3.08E+04,	2.72E+04,	1.90E+04,	1.54E+04,	1.07E+04,	5.90E+03,	3.34E+03,	2.82E+03,
1988 ,	3.30E+04,	3.20E+04,	2.58E+04,	2.65E+04,	2.30E+04,	1.52E+04,	1.05E+04,	5.86E+03,	3.46E+03,	2.18E+03,
1989 ,	1.95E+04,	2.84E+04,	2.75E+04,	2.22E+04,	2.26E+04,	1.89E+04,	1.07E+04,	6.10E+03,	3.10E+03,	1.88E+03,
1990 ,	1.10E+04,	1.68E+04,	2.44E+04,	2.35E+04,	1.82E+04,	1.75E+04,	1.22E+04,	5.86E+03,	3.72E+03,	1.92E+03,
1991 ,	3.97E+03,	9.46E+03,	1.45E+04,	2.09E+04,	1.95E+04,	1.37E+04,	1.03E+04,	6.16E+03,	3.25E+03,	2.07E+03,
1992 ,	5.93E+03,	3.41E+03,	8.08E+03,	1.21E+04,	1.60E+04,	1.37E+04,	8.20E+03,	4.48E+03,	3.12E+03,	1.84E+03,
1993 ,	4.66E+03,	5.08E+03,	2.91E+03,	6.86E+03,	9.99E+03,	1.28E+04,	1.07E+04,	6.07E+03,	3.13E+03,	2.35E+03,
1994 ,	6.25E+03,	4.01E+03,	4.38E+03,	2.50E+03,	5.70E+03,	7.54E+03,	1.00E+04,	7.71E+03,	4.19E+03,	2.57E+03,

Estimated population abundance at 1st Jan 1995

, .00E+00, 5.42E+03, 3.49E+03, 3.80E+03, 2.10E+03, 4.33E+03, 5.86E+03, 7.50E+03, 5.95E+03, 3.29E+03,

Taper weighted geometric mean of the VPA populations:

, 1.66E+04, 1.65E+04, 1.68E+04, 1.66E+04, 1.66E+04, 1.44E+04, 1.05E+04, 6.44E+03, 3.98E+03, 2.63E+03,

Standard error of the weighted Log(VPA populations) :

, .9418, .9152, .8178, .7108, .3969, .2295, .1137, .1880, .2468, .2982,

YEAR ,	11,	AGE 12,	13,	14,
1985 ,	2.25E+03,	1.17E+03,	1.28E+03,	4.98E+02,
1986 ,	2.22E+03,	1.37E+03,	6.72E+02,	9.48E+02,
1987 ,	1.98E+03,	1.42E+03,	7.73E+02,	2.87E+02,
1988 ,	1.66E+03,	1.37E+03,	1.03E+03,	4.93E+02,
1989 ,	1.08E+03,	9.78E+02,	8.86E+02,	7.66E+02,
1990 ,	1.33E+03,	7.17E+02,	7.25E+02,	6.51E+02,
1991 ,	1.19E+03,	8.96E+02,	3.26E+02,	5.85E+02,
1992 ,	5.86E+02,	3.09E+02,	1.47E+02,	1.16E+02,
1993 ,	1.03E+03,	3.30E+02,	1.27E+02,	5.34E+01,
1994 ,	1.12E+03,	4.74E+02,	1.51E+02,	7.58E+01,

Estimated population abundance at 1st Jan 1995

, 1.66E+03, 6.10E+02, 1.28E+02, 5.26E+01,

Taper weighted geometric mean of the VPA populations:

, 1.50E+03, 9.04E+02, 5.15E+02, 3.46E+02,

Standard error of the weighted Log(VPA populations) :

, .4556, .6088, .8442, .9576,

Continued

Table 8.11 Continued

Log catchability residuals.

Fleet : FLT09: Norwegian Sva

Age	1984
1	-.05
2	.22
3	-.23
4	.41
5	.07
6	.54
7	.40
8	1.00
9	No data for this fleet at this age
10	No data for this fleet at this age
11	No data for this fleet at this age
12	No data for this fleet at this age
13	No data for this fleet at this age
14	No data for this fleet at this age

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	.31	-1.52	.19	.49	.92	.22	.91	-.03	.02	-1.55
2	.22	-.61	-.43	.41	.35	-.55	.64	-.47	-.44	.67
3	.00	-.61	-.33	.25	.34	.19	.44	-.24	-.30	.29
4	.17	.29	-.40	.04	.35	.24	.35	-.88	-.45	.09
5	.22	-.38	-.34	.39	-.10	.22	.39	-.47	-.36	.36
6	.92	-.76	-.15	-.44	-.60	.18	.60	.21	-.49	.19
7	.52	-.08	-.97	.84	-.37	-.16	.30	-.05	-.11	-.13
8	.68	-.63	-.70	-.69	-.79	.27	.88	.71	.28	-.78
9	No data for this fleet at this age									
10	No data for this fleet at this age									
11	No data for this fleet at this age									
12	No data for this fleet at this age									
13	No data for this fleet at this age									
14	No data for this fleet at this age									

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
Mean Log q	-1.3012	-.8835	-1.1666	-1.0154	-1.7136
S.E(Log q)	.4263	.3494	.5345	.4798	.7352

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e	Mean Log q
1	.70	.976	6.15	.57	11	.89	-4.67
2	.63	1.945	5.45	.78	11	.55	-3.03
3	.57	3.089	5.38	.87	11	.37	-2.16

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	.827	2.42	.83	11	.38	-1.30
5	1.05	-.159	.46	.58	11	.39	-.88
6	2.27	-.763	-9.47	.04	11	1.24	-1.17
7	2.08	-.333	-7.83	.01	11	1.05	-1.02
8	1.56	-.215	-2.23	.02	11	1.22	-1.71

Continued

Table 8.11 Continued

Fleet : FLT10: Russian Botto

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	No data for this fleet at this age									
2	No data for this fleet at this age									
3	No data for this fleet at this age									
4	99.99	99.99	99.99	99.99	99.99	-.17	99.99	.32	.11	-.27
5	99.99	99.99	99.99	99.99	99.99	.06	99.99	.40	-.21	-.24
6	99.99	99.99	99.99	99.99	99.99	.23	99.99	-.13	-.07	-.02
7	99.99	99.99	99.99	99.99	99.99	.57	99.99	-.27	-.23	-.06
8	99.99	99.99	99.99	99.99	99.99	.42	99.99	-.12	-.24	-.05
9	99.99	99.99	99.99	99.99	99.99	.19	99.99	-.20	.09	-.09
10	No data for this fleet at this age									
11	No data for this fleet at this age									
12	No data for this fleet at this age									
13	No data for this fleet at this age									
14	No data for this fleet at this age									

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
Mean Log q,	-5.3126,	-4.3688,	-4.3702,	-4.9451,	-5.1960,	-5.3985,
S.E(Log q),	.2671,	.2955,	.1550,	.3872,	.2854,	.1738,

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	.91	.496	5.63	.94	4	.28	-5.31
5	.70	1.668	5.86	.94	4	.16	-4.37
6	.84	.701	5.19	.90	4	.14	-4.37
7	.35	1.726	7.71	.78	4	.11	-4.95
8	.95	.062	5.38	.41	4	.33	-5.20
9	.88	.153	5.72	.47	4	.19	-5.40

Continued

Table 8.11 Continued

Fleet : FLT11: Norwegian Sva

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	99.99	99.99	99.99	-.20	.36	-.18	-.03	.07	-.02	99.99
2	99.99	99.99	99.99	.03	-.02	-.10	-.13	.34	-.08	-.34
3	99.99	99.99	99.99	-.03	-.03	.02	.09	.05	.18	-.29
4	99.99	99.99	99.99	.37	-.02	.66	.15	-.37	-.59	-.19
5	99.99	99.99	99.99	-.71	-.21	.55	.27	-.21	-.33	.58
6	99.99	99.99	99.99	99.99	-.45	.38	.79	-.17	-1.06	.51
7	99.99	99.99	99.99	99.99	-.30	-1.00	.80	.07	-.37	.77
8	99.99	99.99	99.99	99.99	-1.08	.09	-.34	.54	.42	.32
9	No data for this fleet at this age									
10	No data for this fleet at this age									
11	No data for this fleet at this age									
12	No data for this fleet at this age									
13	No data for this fleet at this age									
14	No data for this fleet at this age									

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
Mean Log q	-1.4359	-1.3686	-2.1905	-2.3492	-2.9449
S.E(Log q)	.4348	.4823	.6934	.7024	.6066

Regression statistics :

Ages with q dependent on year class strength

Age	Slope	t-value	Intercept	RSquare	No Pts	Reg s.e	Mean Log q
1	.38	4.985	7.00	.94	6	.23	-3.50
2	.35	6.201	7.03	.95	7	.23	-3.02
3	.39	8.402	6.62	.97	7	.16	-2.29

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	.76	1.845	3.38	.92	7	.28	-1.44
5	1.68	-1.051	-4.24	.33	7	.80	-1.37
6	2.15	-.512	-6.24	.05	6	1.62	-2.19
7	-.57	-1.174	13.14	.13	6	.38	-2.35
8	3.09	-.393	-9.06	.01	6	2.06	-2.94

Continued

Table 8.11 Continued

Fleet : FLT12: Experimental

Age	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
1	No data for this fleet at this age									
2	No data for this fleet at this age									
3	No data for this fleet at this age									
4	No data for this fleet at this age									
5	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-1.09	.20	.88
6	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
7	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
8	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
9	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
10	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
11	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
12	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
13	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
14	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99

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

Age	5	6	7	8	9	10	11	12	13	14
Mean Log q	-4.1036	-4.2823	-3.9130	-4.1989	-6.1488	-3.7096	-3.7096	-3.7096	-3.7096	-3.7096
S.E(Log q)	.9991	.6595	.2407	.1295	.1905	.2179	.1818	.3379	.1970	.2361

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
5	-1.14	-4.341	14.96	.81	3	.36	-4.10
6	-1.01	-5.791	14.39	.89	3	.16	-4.28
7	.41	1.456	7.01	.86	3	.08	-3.91
8	1.22	-.413	3.20	.78	3	.21	-4.20
9	.98	.018	6.19	.45	3	.26	-6.15
10	.64	.492	5.15	.65	3	.18	-3.71
11	1.09	-.196	3.34	.82	3	.23	-3.63
12	-2.73	-29.345	12.15	.98	3	.04	-3.61
13	-.91	-9.527	6.07	.96	3	.03	-3.72
14	1.58	-1.913	3.56	.92	3	.17	-3.85

Continued

Table 8.11 Continued

Terminal year survivor and F summaries :

Age 1 Catchability dependent on age and year class strength

Year class = 1993

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	1137.,	1.086,	.000,	.00,	1,	.415,	.000
FLT10: Russian Botto,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT11: Norwegian Sva,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	16453.,	.92,,,,				.585,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
5424.,	.70,	2.04,	2,	2.920,	.000

Age 2 Catchability dependent on age and year class strength

Year class = 1992

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	5666.,	.498,	.287,	.58,	2,	.145,	.000
FLT10: Russian Botto,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT11: Norwegian Sva,	2876.,	.212,	.159,	.75,	2,	.801,	.000
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	16753.,	.82,,,,				.054,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
3489.,	.19,	.24,	5,	1.282,	.000

Age 3 Catchability dependent on age and year class strength

Year class = 1991

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	4026.,	.319,	.224,	.70,	3,	.218,	.000
FLT10: Russian Botto,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT11: Norwegian Sva,	3417.,	.173,	.104,	.60,	3,	.738,	.000
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
P shrinkage mean ,	16638.,	.71,,,,				.044,	.000
F shrinkage mean ,	0.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
3796.,	.15,	.16,	7,	1.052,	.000

Continued

Table 8.11 Continued

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

Year class = 1990

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	1921.,	.275,	.213,	.77,	4,	.212,	.035
FLT10: Russian Botto,	1594.,	.300,	.000,	.00,	1,	.179,	.042
FLT11: Norwegian Sva,	2348.,	.163,	.106,	.65,	4,	.605,	.029
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
F shrinkage mean ,	1779.,	2.00,,,,				.004,	.038

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
2097.,	.13,	.09,	10,	.707,	.032

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

Year class = 1989

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	4535.,	.209,	.196,	.94,	5,	.268,	.124
FLT10: Russian Botto,	4089.,	.222,	.177,	.80,	2,	.241,	.137
FLT11: Norwegian Sva,	4261.,	.156,	.146,	.94,	5,	.478,	.132
FLT12: Experimental ,	10388.,	1.154,	.000,	.00,	1,	.009,	.056
F shrinkage mean ,	5459.,	2.00,,,,				.003,	.104

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
4329.,	.11,	.09,	14,	.803,	.130

Age 6 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
FLT09: Norwegian Sva,	4974.,	.196,	.233,	1.19,	6,	.253,	.123
FLT10: Russian Botto,	6062.,	.179,	.148,	.83,	3,	.319,	.102
FLT11: Norwegian Sva,	6085.,	.153,	.121,	.79,	6,	.398,	.101
FLT12: Experimental ,	10486.,	.637,	.237,	.37,	2,	.027,	.060
F shrinkage mean ,	6334.,	2.00,,,,				.003,	.098

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
5861.,	.10,	.09,	18,	.884,	.105

Age 7 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
FLT09: Norwegian Sva,	7012.,	.185,	.146,	.79,	7,	.256,	.146
FLT10: Russian Botto,	8199.,	.198,	.153,	.77,	3,	.245,	.126
FLT11: Norwegian Sva,	7124.,	.152,	.128,	.84,	7,	.355,	.144
FLT12: Experimental ,	8336.,	.272,	.209,	.77,	3,	.141,	.124
F shrinkage mean ,	6152.,	2.00,,,,				.003,	.165

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
7504.,	.10,	.07,	21,	.734,	.137

Continued

Table 8.11 Continued

Age 8 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
FLT09: Norwegian Sva,	6959.,	.184,	.124,	.67,	8,	.217,	.095
FLT10: Russian Botto,	5232.,	.167,	.036,	.21,	4,	.310,	.125
FLT11: Norwegian Sva,	6618.,	.172,	.108,	.63,	7,	.239,	.100
FLT12: Experimental ,	5505.,	.205,	.102,	.50,	3,	.231,	.119
F shrinkage mean ,	2900.,	2.00, , , ,				.003,	.215

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
5947.,	.09,	.05,	23,	.585,	.111

Age 9 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
FLT09: Norwegian Sva,	3801.,	.188,	.139,	.74,	8,	.179,	.079
FLT10: Russian Botto,	2872.,	.176,	.063,	.36,	4,	.330,	.103
FLT11: Norwegian Sva,	4027.,	.212,	.124,	.59,	6,	.141,	.075
FLT12: Experimental ,	3205.,	.175,	.109,	.62,	3,	.346,	.093
F shrinkage mean ,	3272.,	2.00, , , ,				.003,	.091

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
3291.,	.10,	.05,	22,	.574,	.091

Age 10 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
FLT09: Norwegian Sva,	1790.,	.201,	.140,	.69,	8,	.133,	.266
FLT10: Russian Botto,	1724.,	.194,	.087,	.45,	3,	.323,	.275
FLT11: Norwegian Sva,	2462.,	.310,	.155,	.50,	5,	.074,	.200
FLT12: Experimental ,	1505.,	.174,	.052,	.30,	3,	.465,	.309
F shrinkage mean ,	809.,	2.00, , , ,				.005,	.516

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
1663.,	.11,	.05,	20,	.482,	.284

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

Year class = 1983

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	587.,	.197,	.191,	.97,	8,	.110,	.470
FLT10: Russian Botto,	558.,	.266,	.265,	1.00,	2,	.180,	.489
FLT11: Norwegian Sva,	344.,	.356,	.143,	.40,	4,	.045,	.706
FLT12: Experimental ,	656.,	.183,	.106,	.58,	3,	.653,	.430
F shrinkage mean ,	507.,	2.00, , , ,				.011,	.528

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
610.,	.13,	.07,	18,	.509,	.456

Continued



Table 8.11 Continued

Age 12 Catchability constant w.r.t. time and age (fixed at the value for age) 10

Year class = 1982

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	115.,	.203,	.118,	.58,	7,	.096,	1.233
FLT10: Russian Botto,	195.,	.323,	.000,	.00,	1,	.067,	.892
FLT11: Norwegian Sva,	124.,	.516,	.185,	.36,	2,	.023,	1.181
FLT12: Experimental ,	121.,	.204,	.155,	.76,	3,	.776,	1.201
F shrinkage mean ,	281.,	2.00,,,,				.038,	.692

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
128.,	.18,	.08,	14,	.458,	1.159

Age 13 Catchability constant w.r.t. time and age (fixed at the value for age) 10

Year class = 1981

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	50.,	.218,	.231,	1.06,	6,	.032,	.938
FLT10: Russian Botto,	64.,	.304,	.000,	.00,	1,	.039,	.792
FLT11: Norwegian Sva,	18.,	.672,	.000,	.00,	1,	.006,	1.669
FLT12: Experimental ,	52.,	.205,	.103,	.50,	3,	.894,	.912
F shrinkage mean ,	90.,	2.00,,,,				.030,	.618

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
53.,	.19,	.06,	12,	.330,	.901

Age 14 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
FLT09: Norwegian Sva,	23.,	.256,	.285,	1.12,	5,	.013,	.896
FLT10: Russian Botto,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT11: Norwegian Sva,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT12: Experimental ,	32.,	.197,	.162,	.82,	3,	.963,	.718
F shrinkage mean ,	42.,	2.00,,,,				.023,	.582

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
32.,	.20,	.09,	9,	.437,	.717

Table 8.12

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10**-3
	1970,	1971,	1972,	1973,	1974,	
AGE						
1,	48666,	41630,	40984,	43779,	38949,	
2,	49416,	41887,	35831,	35276,	37681,	
3,	45330,	42533,	36053,	30840,	30362,	
4,	36716,	39015,	36608,	31030,	26544,	
5,	41120,	31571,	33579,	31081,	26690,	
6,	47159,	34904,	27099,	27873,	26555,	
7,	45290,	38000,	25880,	20058,	22954,	
8,	41612,	29273,	20913,	13365,	13624,	
9,	25216,	18595,	13800,	12028,	8242,	
10,	17383,	12395,	10317,	9303,	7986,	
11,	7544,	8773,	6643,	7272,	6227,	
12,	3812,	4158,	5043,	4448,	4834,	
13,	1577,	2121,	2039,	3196,	2783,	
14,	2991,	786,	857,	1129,	2086,	
+gp,	756,	372,	341,	564,	845,	
TOTAL,	414588,	346013,	295990,	271241,	256362,	

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10**-3				
	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	37115,	35916,	35089,	37392,	35975,	34537,	36738,	36612,	36410,	42802,
2,	33524,	31946,	30914,	30202,	32183,	30964,	29727,	31621,	31512,	31339,
3,	32432,	28854,	27496,	26608,	25995,	27700,	26651,	25586,	27216,	27123,
4,	26132,	27894,	24834,	23608,	22829,	22292,	23783,	22323,	21978,	23134,
5,	22590,	22182,	23918,	20674,	19826,	18826,	18932,	19407,	18702,	17792,
6,	22122,	18664,	18322,	18697,	16035,	15007,	15526,	14536,	15494,	14666,
7,	20519,	16872,	13298,	12750,	12763,	10874,	11861,	11585,	11125,	11606,
8,	14001,	11612,	9119,	7549,	7154,	8455,	7815,	8428,	8787,	7858,
9,	8166,	8231,	5354,	5507,	4304,	5013,	6033,	5861,	6134,	5441,
10,	5392,	4927,	4301,	3114,	3340,	3245,	3439,	4744,	3659,	3896,
11,	5072,	3107,	2988,	2678,	1803,	2579,	2354,	2544,	2916,	2010,
12,	3855,	2642,	1825,	1587,	1438,	1277,	1745,	1579,	1412,	1848,
13,	2919,	1893,	1150,	775,	959,	1012,	844,	1150,	893,	763,
14,	1715,	1472,	982,	438,	343,	730,	647,	370,	689,	540,
+gp,	1044,	995,	457,	331,	388,	391,	266,	157,	218,	289,
TOTAL,	236598,	217207,	200046,	191909,	185335,	182904,	186360,	186502,	187146,	191107,

Continued

Table 8.12 Continued

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)					Numbers*10**-3						GMST
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	
AGE												
1,	41635,	34821,	37187,	32978,	19507,	10987,	3969,	5930,	4663,	6252,	0,	293
2,	36840,	35835,	29970,	32008,	28385,	16790,	9456,	3409,	5084,	4013,	5424,	279
3,	26973,	31709,	30844,	25796,	27549,	24431,	14451,	8077,	2915,	4376,	3489,	270
4,	23345,	23135,	27161,	26501,	22198,	23513,	20884,	12077,	6861,	2500,	3796,	249
5,	19878,	19665,	18998,	22974,	22594,	18249,	19502,	16042,	9990,	5698,	2097,	221
6,	14465,	15978,	15375,	15228,	18933,	17517,	13722,	13713,	12789,	7540,	4329,	187
7,	9192,	9784,	10659,	10476,	10750,	12164,	10287,	8203,	10694,	9998,	5861,	142
8,	6882,	5536,	5905,	5860,	6103,	5862,	6163,	4479,	6069,	7713,	7504,	92
9,	4966,	4487,	3344,	3462,	3099,	3715,	3253,	3120,	3133,	4186,	5947,	60
10,	3696,	3372,	2815,	2181,	1884,	1924,	2065,	1843,	2351,	2567,	3291,	41
11,	2248,	2219,	1978,	1655,	1079,	1326,	1193,	586,	1030,	1118,	1663,	26
12,	1172,	1366,	1419,	1366,	978,	717,	896,	309,	330,	474,	610,	17
13,	1275,	672,	773,	1034,	886,	725,	326,	147,	127,	151,	128,	10
14,	498,	948,	287,	493,	766,	651,	585,	116,	53,	76,	53,	6
+gp,	260,	739,	32,	164,	153,	297,	1127,	72,	11,	8,	35,	
TOTAL,	193326,	190265,	186747,	182176,	164863,	138869,	107881,	78124,	66100,	56671,	44228,	

Table 8.13

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:07

Terminal Fs derived using XSA (With F shrinkage)

Table 8 YEAR,	Fishing mortality (F) at age				
	1970,	1971,	1972,	1973,	1974,
AGE					
1,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0010,	.0000,	.0137,	.0007,	.0113,
5,	.0139,	.0027,	.0362,	.0074,	.0377,
6,	.0659,	.1491,	.1509,	.0442,	.1079,
7,	.2864,	.4472,	.5109,	.2368,	.3444,
8,	.6555,	.6020,	.4032,	.3334,	.3619,
9,	.5602,	.4390,	.2443,	.2596,	.2742,
10,	.5338,	.4737,	.1999,	.2515,	.3040,
11,	.4457,	.4036,	.2510,	.2584,	.3296,
12,	.4361,	.5626,	.3062,	.3189,	.3543,
13,	.5465,	.7561,	.4413,	.2764,	.3344,
14,	.5073,	.5301,	.2897,	.2740,	.3207,
+gp,	.5073,	.5301,	.2897,	.2740,	.3207,
FBAR 6-10,	.4204,	.4222,	.3018,	.2251,	.2785,

Table 8 YEAR,	Fishing mortality (F) at age									
	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0007,	.0000,	.0024,	.0032,	.0037,	.0025,	.0272,	.0020,	.0125,	.0000,
4,	.0139,	.0038,	.0333,	.0246,	.0428,	.0134,	.0533,	.0270,	.0613,	.0017,
5,	.0409,	.0412,	.0963,	.1041,	.1285,	.0428,	.1142,	.0752,	.0931,	.0570,
6,	.1209,	.1890,	.2126,	.2318,	.2384,	.0853,	.1428,	.1174,	.1389,	.3172,
7,	.4193,	.4653,	.4162,	.4279,	.2618,	.1804,	.1916,	.1264,	.1976,	.3727,
8,	.3813,	.6242,	.3543,	.4120,	.2057,	.1875,	.1378,	.1678,	.3293,	.3090,
9,	.3552,	.4990,	.3918,	.3501,	.1324,	.2269,	.0904,	.3210,	.3038,	.2367,
10,	.4014,	.3500,	.3239,	.3966,	.1086,	.1709,	.1513,	.3367,	.4490,	.3997,
11,	.5020,	.3819,	.4830,	.4716,	.1947,	.2403,	.2494,	.4386,	.3059,	.3898,
12,	.5612,	.6821,	.7066,	.3532,	.2010,	.2641,	.2674,	.4196,	.4660,	.2210,
13,	.5350,	.5066,	.8160,	.6644,	.1230,	.2979,	.6739,	.3620,	.3539,	.2766,
14,	.4735,	.4866,	.5475,	.4495,	.1524,	.2409,	.2876,	.3773,	.3775,	.3060,
+gp,	.4735,	.4866,	.5475,	.4495,	.1524,	.2409,	.2876,	.3773,	.3775,	.3060,
FBAR 6-10,	.3356,	.4255,	.3397,	.3637,	.1894,	.1702,	.1428,	.2139,	.2837,	.3271,

Continued

Table 8.13 Continued

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:07

Terminal Fs derived using XSA (With F shrinkage)

Table 8 YEAR,	Fishing mortality (F) at age										FBAR 92-94
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	
AGE											
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0019,	.0038,	.0000,	.0000,	.0013,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0077,	.0067,	.0000,	.0000,	.0022,
3,	.0035,	.0048,	.0017,	.0002,	.0084,	.0069,	.0294,	.0132,	.0037,	.0000,	.0056,
4,	.0215,	.0470,	.0174,	.0095,	.0459,	.0370,	.1138,	.0398,	.0358,	.0324,	.0360,
5,	.0684,	.0961,	.0712,	.0435,	.1045,	.1351,	.2022,	.0766,	.1313,	.1304,	.1127,
6,	.2410,	.2549,	.2336,	.1982,	.2924,	.3823,	.3645,	.0986,	.0962,	.1054,	.1001,
7,	.3571,	.3549,	.4482,	.3903,	.4565,	.5299,	.6815,	.1514,	.1768,	.1368,	.1550,
8,	.2777,	.3540,	.3838,	.4870,	.3462,	.4389,	.5308,	.2073,	.2214,	.1107,	.1798,
9,	.2370,	.3160,	.2776,	.4588,	.3265,	.4373,	.4180,	.1328,	.0494,	.0908,	.0910,
10,	.3601,	.3837,	.3813,	.5535,	.2009,	.3278,	1.1092,	.4321,	.5931,	.2836,	.4363,
11,	.3486,	.2976,	.2198,	.3758,	.2584,	.2415,	1.2008,	.4241,	.6250,	.4561,	.5017,
12,	.4064,	.4194,	.1666,	.2836,	.1495,	.6383,	1.6564,	.7402,	.6350,	1.1586,	.8446,
13,	.1463,	.7009,	.3004,	.1493,	.1579,	.0645,	.8795,	.8635,	.3649,	.9014,	.7099,
14,	.3009,	.4257,	.2701,	.3659,	.2193,	.1731,	.6733,	1.7349,	.5165,	.7166,	.9893,
+gp,	.3009,	.4257,	.2701,	.3659,	.2193,	.1731,	.6733,	1.7349,	.5165,	.7166,	
FBAR 6-10,	.2946,	.3327,	.3449,	.4176,	.3245,	.4232,	.6208,	.2045,	.2274,	.1455,	

Table 8.14

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)					Tonnes
YEAR,	1970,	1971,	1972,	1973,	1974,	
AGE						
1,	0,	0,	0,	0,	0,	
2,	0,	0,	0,	0,	0,	
3,	9066,	8507,	7211,	6168,	6072,	
4,	16192,	17206,	16144,	13684,	11706,	
5,	23315,	17900,	19040,	17623,	15133,	
6,	34756,	25724,	19972,	20543,	19571,	
7,	48867,	41002,	27925,	21642,	24768,	
8,	59130,	41597,	29718,	18991,	19360,	
9,	46600,	34363,	25503,	22227,	15231,	
10,	39651,	28273,	23534,	21221,	18215,	
11,	21781,	25327,	19178,	20993,	17978,	
12,	12377,	13503,	16375,	14444,	15695,	
13,	6786,	9128,	8775,	13751,	11976,	
14,	14747,	3875,	4227,	5567,	10288,	
+gp,	4379,	2172,	2061,	3389,	5037,	
TOTALBIO,	337647,	268576,	219661,	200243,	191030,	

Table 12	Stock biomass at age (start of year)					Tonnes				
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	6486,	5771,	5499,	5322,	7798,	5540,	5330,	6908,	8437,	8137,
4,	11524,	12301,	10952,	10411,	13697,	10745,	11891,	13840,	9890,	11104,
5,	12809,	12577,	13562,	11722,	17844,	13216,	12495,	13391,	14027,	11209,
6,	16304,	13756,	13503,	13779,	19242,	13086,	13042,	12210,	16113,	14079,
7,	22140,	18205,	14349,	13758,	19144,	12407,	13640,	11932,	14908,	13695,
8,	19896,	16501,	12958,	10727,	12877,	12412,	12191,	11041,	13796,	12023,
9,	15090,	15210,	9894,	10177,	9468,	8912,	12308,	10198,	12083,	12570,
10,	12300,	11238,	9810,	7104,	8684,	7470,	8837,	10626,	9990,	11182,
11,	14641,	8969,	8627,	7730,	5409,	6870,	7015,	7047,	9593,	6955,
12,	12517,	8579,	5926,	5152,	5034,	3890,	5987,	5321,	5959,	6968,
13,	12561,	8146,	4948,	3335,	3933,	3410,	3487,	4967,	4207,	3043,
14,	8455,	7256,	4841,	2158,	1647,	3129,	3027,	1981,	4190,	2348,
+gp,	6173,	5891,	2752,	1956,	2396,	2092,	1597,	915,	1336,	1307,
TOTALBIO,	170896,	144401,	117621,	103332,	127173,	103179,	110847,	110378,	124529,	114620,

Continued

Table 8.14 Continued

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)									
YEAR,	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	8092,	10781,	9469,	10679,	8540,	6841,	4191,	1777,	991,	1361,
4,	8871,	10873,	15591,	14682,	13985,	12932,	12530,	5556,	3705,	1300,
5,	11927,	12193,	13470,	17001,	17171,	12957,	15017,	10908,	7892,	4102,
6,	12874,	14700,	15421,	14649,	19501,	18568,	14409,	13302,	13044,	7088,
7,	11031,	12523,	13494,	13085,	14190,	15692,	14196,	10418,	14437,	12697,
8,	12731,	10518,	9938,	9529,	10985,	9965,	10786,	7883,	11409,	13189,
9,	12861,	11128,	8301,	7493,	7500,	7802,	7156,	6895,	7707,	9126,
10,	11754,	10488,	8396,	6318,	5895,	5023,	5369,	4719,	6278,	6468,
11,	8139,	7435,	7014,	5637,	3637,	3806,	3330,	1823,	3532,	3322,
12,	4628,	5080,	5391,	5002,	3962,	2475,	2940,	1110,	1417,	1566,
13,	5714,	2687,	3524,	4390,	3799,	2698,	1269,	564,	645,	578,
14,	2116,	3964,	1435,	2062,	3448,	2662,	2563,	495,	338,	372,
+gp,	1255,	3343,	189,	734,	721,	1344,	5961,	344,	95,	56,
TOTALBIO,	111993,	115712,	111631,	111259,	113334,	102764,	99717,	65793,	71490,	61225,

Table 8.15

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 13		Spawning stock biomass at age (spawning time)					Tonnes
YEAR,	1970,	1971,	1972,	1973,	1974,		
AGE							
1,	0,	0,	0,	0,	0,		
2,	0,	0,	0,	0,	0,		
3,	0,	0,	0,	0,	0,		
4,	810,	860,	807,	684,	585,		
5,	5362,	4117,	4379,	4053,	3481,		
6,	17031,	12605,	9786,	10066,	9590,		
7,	32252,	27061,	18431,	14284,	16347,		
8,	46121,	32446,	23180,	14813,	15101,		
9,	41474,	30583,	22697,	19782,	13556,		
10,	37668,	26859,	22357,	20160,	17304,		
11,	21563,	25074,	18986,	20783,	17798,		
12,	12253,	13368,	16211,	14300,	15538,		
13,	6718,	9036,	8687,	13614,	11857,		
14,	14747,	3875,	4227,	5567,	10288,		
+gp,	4379,	2172,	2061,	3389,	5037,		
TOTSPBIO,	240379,	188056,	151810,	141494,	136481,		

Table 13		Spawning stock biomass at age (spawning time)						Tonnes			
YEAR,	1975,	1976,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	
AGE											
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	
4,	576,	615,	548,	521,	685,	537,	595,	692,	494,	555,	
5,	2946,	2893,	3119,	2696,	4104,	3040,	2874,	3080,	3226,	2578,	
6,	7989,	6740,	6617,	6752,	9428,	6412,	6390,	5983,	7896,	6899,	
7,	14612,	12015,	9470,	9080,	12635,	8189,	9002,	7875,	9839,	9039,	
8,	15519,	12870,	10107,	8367,	10044,	9681,	9509,	8612,	10761,	9378,	
9,	13430,	13537,	8806,	9057,	8426,	7932,	10954,	9076,	10754,	11187,	
10,	11685,	10676,	9320,	6749,	8250,	7096,	8395,	10095,	9490,	10622,	
11,	14495,	8880,	8541,	7653,	5355,	6801,	6945,	6976,	9497,	6886,	
12,	12392,	8494,	5867,	5101,	4983,	3852,	5927,	5268,	5900,	6898,	
13,	12435,	8064,	4898,	3301,	3894,	3376,	3452,	4918,	4165,	3013,	
14,	8455,	7256,	4841,	2158,	1647,	3129,	3027,	1981,	4190,	2348,	
+gp,	6173,	5891,	2752,	1956,	2396,	2092,	1597,	915,	1336,	1307,	
TOTSPBIO,	120707,	97932,	74885,	63392,	71848,	62136,	68667,	65471,	77548,	70711,	

Continued



Table 8.15 Continued

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Terminal Fs derived using XSA (With F shrinkage)

Table 13 YEAR,	Spawning stock biomass at age (spawning time)					Tonnes				
	1985,	1986,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,	444,	544,	780,	294,	420,	647,	627,	278,	370,	130,
5,	2743,	2804,	3098,	1870,	2404,	2591,	3003,	2182,	2999,	1559,
6,	6308,	7203,	7556,	7471,	10335,	10955,	8501,	7848,	6653,	3615,
7,	7280,	8265,	8906,	8767,	9365,	10984,	9937,	7292,	9384,	8253,
8,	9930,	8204,	7751,	6479,	7580,	7175,	7766,	5675,	8329,	9628,
9,	11446,	9904,	7388,	5994,	5475,	5930,	5439,	5240,	6320,	7483,
10,	11167,	9963,	7976,	5812,	5070,	4269,	4564,	4011,	5713,	5886,
11,	8058,	7361,	6944,	5525,	3491,	3578,	3130,	1714,	3426,	3222,
12,	4582,	5029,	5337,	5002,	3962,	2475,	2940,	1110,	1388,	1534,
13,	5657,	2660,	3488,	4390,	3799,	2698,	1269,	564,	645,	578,
14,	2116,	3964,	1435,	2062,	3448,	2662,	2563,	495,	338,	372,
+gp,	1255,	3343,	189,	734,	721,	1344,	5961,	344,	95,	56,
TOTSPBIO,	70986,	69244,	60848,	54399,	56071,	55308,	55700,	36754,	45660,	42317,

Table 8.16

Run title : Arctic Green.halibut (run: FIN/AL)

At 28-Aug-95 21:02:08

Table 16 Summary (without SOP correction)

Terminal Fs derived using XSA (With F shrinkage)

	RECRUITS, Age 1.3	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	FBAR	6-10,
1970,	45330,	337647,	240379,	89484,	.3723,		.4204,
1971,	42533,	268576,	188056,	79034,	.4203,		.4222,
1972,	36053,	219661,	151810,	43055,	.2836,		.3018,
1973,	30840,	200243,	141494,	29938,	.2116,		.2251,
1974,	30362,	191030,	136481,	37763,	.2767,		.2785,
1975,	32432,	170896,	120707,	38172,	.3162,		.3356,
1976,	28854,	144401,	97932,	36074,	.3684,		.4255,
1977,	27496,	117621,	74885,	28827,	.3849,		.3397,
1978,	26608,	103332,	63392,	24617,	.3883,		.3637,
1979,	25995,	127173,	71848,	17312,	.2410,		.1894,
1980,	27700,	103179,	62136,	13284,	.2138,		.1702,
1981,	26651,	110847,	68667,	15018,	.2187,		.1428,
1982,	25586,	110378,	65471,	16789,	.2564,		.2139,
1983,	27216,	124529,	77548,	22147,	.2856,		.2837,
1984,	27123,	114621,	70711,	21883,	.3095,		.3271,
1985,	26973,	111993,	70986,	19945,	.2810,		.2946,
1986,	31709,	115712,	69244,	22875,	.3304,		.3327,
1987,	30844,	111631,	60848,	19112,	.3141,		.3449,
1988,	25796,	111259,	54399,	19587,	.3601,		.4176,
1989,	27549,	113334,	56071,	20138,	.3592,		.3245,
1990,	24431,	102764,	55308,	23183,	.4192,		.4232,
1991,	14451,	99717,	55700,	33320,	.5982,		.6208,
1992,	8077,	65793,	36754,	9253,	.2518,		.2045,
1993,	2915,	71490,	45660,	11879,	.2602,		.2274,
1994,	4376,	61225,	42317,	8831,	.2087,		.1455,
Arith.							
Mean	<del>31221</del>	136362,	87152,	28061,	.3172,		.3110,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),			

24881

Table 8.17

12:58 Tuesday, August 29, 1995

Greenland halibut in the North-East Arctic (Fishing Areas I &amp; II)

Prediction with management option table: Input data

Year: 1995								
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	3489.000	0.1500	0.0000	0.0000	0.0000	0.290	0.0042	0.187
4	3796.000	0.1500	0.0833	0.0000	0.0000	0.507	0.0272	0.507
5	2097.000	0.1500	0.3200	0.0000	0.0000	0.730	0.0852	0.730
6	4329.000	0.1500	0.5367	0.0000	0.0000	0.977	0.0757	0.977
7	5861.000	0.1500	0.6667	0.0000	0.0000	1.297	0.1172	1.297
8	7504.000	0.1500	0.7267	0.0000	0.0000	1.783	0.1359	1.783
9	5947.000	0.1500	0.8000	0.0000	0.0000	2.283	0.0688	2.283
10	3291.000	0.1500	0.8900	0.0000	0.0000	2.583	0.3299	2.583
11	1663.000	0.1500	0.9600	0.0000	0.0000	3.170	0.3794	3.170
12	610.000	0.1500	0.9867	0.0000	0.0000	3.727	0.6387	3.727
13	128.000	0.1500	1.0000	0.0000	0.0000	4.250	0.5368	4.250
14	53.000	0.1500	1.0000	0.0000	0.0000	5.157	0.7481	5.160
15+	35.000	0.1500	1.0000	0.0000	0.0000	6.820	0.7481	6.820
Unit	Thousands	-	-	-	-	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	4600.000	0.1500	0.0000	0.0000	0.0000	0.290	0.0042	0.187
4	.	0.1500	0.0833	0.0000	0.0000	0.507	0.0272	0.507
5	.	0.1500	0.3200	0.0000	0.0000	0.730	0.0852	0.730
6	.	0.1500	0.5367	0.0000	0.0000	0.977	0.0757	0.977
7	.	0.1500	0.6667	0.0000	0.0000	1.297	0.1172	1.297
8	.	0.1500	0.7267	0.0000	0.0000	1.783	0.1359	1.783
9	.	0.1500	0.8000	0.0000	0.0000	2.283	0.0688	2.283
10	.	0.1500	0.8900	0.0000	0.0000	2.583	0.3299	2.583
11	.	0.1500	0.9600	0.0000	0.0000	3.170	0.3794	3.170
12	.	0.1500	0.9867	0.0000	0.0000	3.727	0.6387	3.727
13	.	0.1500	1.0000	0.0000	0.0000	4.250	0.5368	4.250
14	.	0.1500	1.0000	0.0000	0.0000	5.157	0.7481	5.160
15+	.	0.1500	1.0000	0.0000	0.0000	6.820	0.7481	6.820
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1997								
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	12100.000	0.1500	0.0000	0.0000	0.0000	0.290	0.0042	0.187
4	.	0.1500	0.0833	0.0000	0.0000	0.507	0.0272	0.507
5	.	0.1500	0.3200	0.0000	0.0000	0.730	0.0852	0.730
6	.	0.1500	0.5367	0.0000	0.0000	0.977	0.0757	0.977
7	.	0.1500	0.6667	0.0000	0.0000	1.297	0.1172	1.297
8	.	0.1500	0.7267	0.0000	0.0000	1.783	0.1359	1.783
9	.	0.1500	0.8000	0.0000	0.0000	2.283	0.0688	2.283
10	.	0.1500	0.8900	0.0000	0.0000	2.583	0.3299	2.583
11	.	0.1500	0.9600	0.0000	0.0000	3.170	0.3794	3.170
12	.	0.1500	0.9867	0.0000	0.0000	3.727	0.6387	3.727
13	.	0.1500	1.0000	0.0000	0.0000	4.250	0.5368	4.250
14	.	0.1500	1.0000	0.0000	0.0000	5.157	0.7481	5.160
15+	.	0.1500	1.0000	0.0000	0.0000	6.820	0.7481	6.820
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : MOT95A  
Date and time: 29AUG95:13:46

Table 8.18

Greenland halibut in the North-East Arctic (Fishing Areas I & II)

Prediction with management option table

Year: 1995					Year: 1996					Year: 1997	
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
1.0000	0.1455	60359	44500	8905	0.0000	0.0000	56349	43377	0	63548	49863
.	.	.	.	.	0.1000	0.0146	.	43377	1166	62244	48649
.	.	.	.	.	0.2000	0.0291	.	43377	2291	60986	47479
.	.	.	.	.	0.3000	0.0437	.	43377	3376	59773	46353
.	.	.	.	.	0.4000	0.0582	.	43377	4425	58601	45267
.	.	.	.	.	0.5000	0.0728	.	43377	5438	57470	44220
.	.	.	.	.	0.6000	0.0873	.	43377	6417	56377	43210
.	.	.	.	.	0.7000	0.1019	.	43377	7363	55321	42235
.	.	.	.	.	0.8000	0.1164	.	43377	8278	54300	41295
.	.	.	.	.	0.9000	0.1310	.	43377	9163	53313	40388
.	.	.	.	.	1.0000	0.1455	.	43377	10020	52358	39511
.	.	.	.	.	1.1000	0.1600	.	43377	10849	51434	38664
.	.	.	.	.	1.2000	0.1746	.	43377	11652	50539	37846
.	.	.	.	.	1.3000	0.1892	.	43377	12430	49673	37055
.	.	.	.	.	1.4000	0.2037	.	43377	13184	48835	36290
.	.	.	.	.	1.5000	0.2183	.	43377	13914	48022	35550
.	.	.	.	.	1.6000	0.2328	.	43377	14623	47234	34834
.	.	.	.	.	1.7000	0.2474	.	43377	15310	46470	34141
.	.	.	.	.	1.8000	0.2619	.	43377	15977	45729	33477
.	.	.	.	.	1.9000	0.2765	.	43377	16624	45011	32826
.	.	.	.	.	2.0000	0.2910	.	43377	17253	44313	32190
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : MOT95A  
 Date and time : 29AUG95:13:46  
 Computation of ref. F: Simple mean, age 6 - 10  
 Basis for 1995 : F factors

Table 8.19

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Greenland halibut in the North-East Arctic (Fishing Areas I &amp; II)

Single option prediction: Summary table

Year	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
1995	1.0000	0.1455	4286	8982	38803	60359	22772	44500	22772	44500
1996	0.0000	0.0000	0	0	34037	56246	19736	43344	19736	43344
1997	0.0000	0.0000	0	0	41396	63429	19923	49799	19923	49799
1998	0.0000	0.0000	0	0	47730	71472	20562	56038	20562	56038
1999	0.0000	0.0000	0	0	53181	80241	22299	62695	22299	62695
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Year	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
1995	1.0000	0.1455	4286	8982	38803	60359	22772	44500	22772	44500
1996	0.2000	0.0291	942	2302	34037	56246	19736	43344	19736	43344
1997	0.2000	0.0291	1123	3115	40523	60853	19165	47411	19165	47411
1998	0.2000	0.0291	1351	3987	45939	65381	18942	50221	18942	50221
1999	0.2000	0.0291	1484	4608	50389	69616	19756	52406	19756	52406
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Year	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
1995	1.0000	0.1455	4286	8982	38803	60359	22772	44500	22772	44500
1996	0.6000	0.0873	2676	6449	34037	56246	19736	43344	19736	43344
1997	0.6000	0.0873	2880	7684	38921	56214	17785	43133	17785	43133
1998	0.6000	0.0873	3141	8516	42937	55561	16262	40908	16262	40908
1999	0.6000	0.0873	3180	8543	46153	54563	15990	37969	15990	37969
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Year	F Factor	Reference F <sub>med</sub>	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
1995	1.0000	0.1455	4286	8982	38803	60359	22772	44500	22772	44500
1996	0.8300	0.1208	3590	8591	34037	56246	19736	43344	19736	43344
1997	0.8300	0.1208	3662	9556	38078	53821	17064	40938	17064	40938
1998	0.8300	0.1208	3810	9834	41491	51029	14992	36646	14992	36646
1999	0.8300	0.1208	3737	9223	44293	48455	14384	32185	14384	32185
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Year	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
1995	1.0000	0.1455	4286	8982	38803	60359	22772	44500	22772	44500
1996	1.0000	0.1455	4232	10073	34037	56246	19736	43344	19736	43344
1997	1.0000	0.1455	4155	10670	37487	52167	16563	39426	16563	39426
1998	1.0000	0.1455	4194	10437	40530	48092	14155	33899	14155	33899
1999	1.0000	0.1455	4042	9371	43113	44768	13386	28726	13386	28726
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SOP95A  
Date and time : 29AUG95:14:31  
Computation of ref. F: Simple mean, age 6 - 10  
Prediction basis : F factors

**Table 9.1** Landings of Coastal cod in:

A) Norway in Division IIa - areas 00, 05, 06 and 07 (in 1,000 tonnes).

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
43	32	30	40	46	24	29	33	47	52
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
49	*)	*)	*)	*)	*)	*)	*)	*)	*)
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
40	49	42	38	33	28	26	31	22	17
1990	1991	1992	1993	1994					
24	25	35	44	48**)					

\*) No data  
\*\*) Provisional data

B) Russian/USSR data in Division I (in 1,000 tonnes).

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
71	108	114	127	63	52	73	79	118	122
1970	1971	1972	1973	1974					
70	48	23	122	99					

Table 9.2 Length (cm) at age (year) for Coastal cod from the survey during the autumn of 1994.

Area	Age (year)												
	1	2	3	4	5	6	7	8	9	10	11	12	13+
Leka	23,5	34,5	41,0	51,2	56,0	61,7	61,0						
Folla	22,9	35,7	43,3	51,3	55,1	57,1	60,2	63,2	105,0	98,0			
Halten	19,0	36,0		61,5	73,0		84,5						
Outer-Halten													
Trondheimsfjord	39,0	31,7	46,7	55,6	61,8	63,8	80,0	80,0					
Frohavet			53,0	63,6	70,3	74,0	81,0	80,0					
Sula	27,0	40,3	49,6	55,2	90,0								
Aure	25,6	35,3	47,5	57,4	66,2	78,0	70,0						
Romsdalsfjord	33,5	35,0	50,0	58,3	71,8	71,3	71,5	84,0	70,0	102,0	110,0		
Vartdalsfjord				66,0			78,0						
Møre	31,3	39,0	52,9	58,7	67,0	73,0	76,0		70,0				

Table 9.3 Weight (gram) at age (year) for Coastal cod from the survey during the autumn of 1994.

Area	Age (year)												
	1	2	3	4	5	6	7	8	9	10	11	12	13+
Leka	110	382	709	1414	1747	2272	2045						
Folla	122	481	915	1475	1874	2069	2619	3076	11030	11532			
Halten	55	425		2147	3765		5035						
Outer-Halten													
Trondheimsfjord	510	331	1055	1798	2590	2360	5108	4765					
Frohavet			1451	2609	3551	3944	5127	5600					
Sula	190	665	1738	1746	7750								
Aure	177	413	1042	1897	2631	5316	3860						
Romsdalsfjord	410	395	1249	1955	4139	3887	3965	5710	3510	12000	14400		
Vartdalsfjord				2540			5550						
Møre	356	745	1410	2171	3281	4046	4440		3510				



**Table 9.4 Length (cm) of Coastal cod at age from the survey during the autumn.**

Area	Year	Age (year)												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Finnm-Troms	1,992	19.4	27.7	36.8	46.1	50.7	59.7	61.4	64.0	69.5	70.6	62.4		63.8
Nordland	1,993	20.0	29.5	40.7	49.8	57.3	65.0	75.0	87.3	92.7	98.2	103.0	104.5	
Tr.lag-Møre	1,994	24.7	35.7	45.9	53.9	57.6	61.2	64.1	64.5	87.5	98.0			

**Table 9.5 Weight (gram) of Coastal cod at age from the survey during the autumn.**

Area	Year	Age (year)												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Finnm-Troms	1,992	64	197	471	963	1,333	2,119	2,286	2,652	3,577	4,108	2,734		2,153
Nordland	1,993	71	262	678	1,248	1,909	2,850	4,348	6,951	8,185	9,957	10,185	11,062	
Tr.lag-Møre	1,994	165	465	1,066	1,680	2,128	2,521	3,067	3,206	7,270	11,532			

Table 9.6 Percent maturity for Coastal cod during the autumn.

Area	Year	Age (year)													
		0	1	2	3	4	5	6	7	8	9	10	11	12	13+
Finnm-Troms	1,992	0	0	4	1	13	57	80	94	98	100	100	96	100	100
Nordland	1,993	0	0	0	9	37	81	95	96	100	93	100	100	100	100
Tr.lag-Møre	1,994	0	0	0	4	34	61	76	86	87	100	100	100	100	100

Table 9.7 Biomass (tonnes) of Coastal cod at age from the survey during the autumn of 1994.

Area	Age (year)														Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Leka	0	2	93	271	915	790	283	64	21	0	0	0	0	0	2 439
Folla	0	3	48	250	2 661	2 487	908	308	173	78	30	0	22	413	7 381
Halten	0	27	39	51	379	1 798	1 708	1 020	506	119	93	0	193	0	5 933
Outer-Halten	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trondheimsfjord	0	0	2	8	50	61	31	12	6	1	1	0	2	18	192
Frohavet	0	0	0	3	114	307	223	91	56	10	9	0	4	0	817
Sula	0	0	19	96	334	455	286	212	66	113	46	0	0	0	1 627
Aure	0	1	13	28	166	243	122	43	34	4	4	0	0	70	728
Romsdalsfjord	0	0	5	21	191	404	301	128	75	16	13	0	8	199	1 361
Vartdalsfjord	0	0	0	0	1	45	64	17	1	4	0	0	0	0	132
Møre	0	0	24	49	479	890	608	220	92	26	0	0	30	0	2 418
<b>Total</b>	0	33	243	777	5 290	7 480	4 534	2 115	1 030	371	196	0	259	700	23 028

Table 9.8 Number (x1000) of Coastal cod at age from the survey during the autumn of 1994.

Area	Age (year)															Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13+		
Leka	0	24	357	555	833	469	153	26	9	0	0	0	0	0	2.426	
Folla	0	38	182	336	1.756	1.271	385	76	46	10	4	0	2	33	4.139	
Halten	0	561	398	121	225	492	346	210	112	22	22	0	33	0	2.542	
Outer-Halten	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Trondhelmsfjord	0	0	9	14	39	31	11	3	1	0	0	0	0	2	110	
Frohavet	5	5	0	3	67	115	65	23	14	2	2	0	1	0	302	
Sula	0	0	51	145	295	203	90	44	19	16	7	0	0	0	870	
Aure	0	5	57	50	128	117	46	13	10	1	1	0	0	7	435	
Romsdalsfjord	0	0	15	31	122	149	83	30	17	3	2	0	1	15	468	
Vardalsfjord	0	0	0	0	1	12	14	4	1	1	0	0	0	0	33	
Møre	0	0	83	76	298	338	175	54	22	6	0	0	4	0	1.056	
<b>Total</b>	<b>5</b>	<b>633</b>	<b>1.152</b>	<b>1.331</b>	<b>3.764</b>	<b>3.197</b>	<b>1.368</b>	<b>483</b>	<b>251</b>	<b>60</b>	<b>38</b>	<b>0</b>	<b>41</b>	<b>57</b>	<b>12.380</b>	

Table 9.9 Number (x1000) of Coastal cod at age from the survey during the autumn.

Area	Year	Age (year)														Total
		0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Finnm-Troms	1,992 -		5,594	8,648	15,936	10,843	13,788	7,312	1,012	774	1,147	536	480	0	39	66,109
Nordland	1,993	2,825	1,369	3,183	6,115	9,429	11,529	6,100	3,028	920	278	406	529	449	221	46,381
Tr.lag-Møre	1,994	5	633	1,152	1,331	3,765	3,198	1,368	483	251	61	38	0	41	57	12,383
																124,873

Table 9.10 Biomass (tonnes) of Coastal cod at age from the survey during the autumn.

Area	Year	Age (year)														Total
		0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Finnm-Troms	1,992 -		164	1,639	9,198	14,783	23,832	17,996	2,564	2,180	2,712	1,577	1,203	0	146	77,994
Nordland	1,993	5	91	957	4,452	12,232	25,356	18,233	14,635	5,816	2,353	3,965	5,161	4,912	3,056	101,224
Tr.lag-Møre	1,994	0	33	243	777	5290	7480	4534	2115	1030	371	196	0	259	700	23,028
																202,246

Table 9.11 Spawning stock biomass (tonnes) of Coastal cod at age from the survey during the autumn of 1994.

Area	Age (year)														Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Leka	0	0	3	92	556	602	244	56	21	0	0	0	0	0	1.574
Folla	0	0	2	85	1.616	1.896	783	269	173	78	30	0	22	413	5.365
Halten	0	0	1	17	230	1.371	1.472	889	506	119	93	0	193	0	4.892
Outer-Halten	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trondheimsfjord	0	0	0	3	30	47	27	10	6	1	1	0	2	18	145
Frohavel	0	0	0	1	69	234	192	79	56	10	9	0	4	0	655
Sula	0	0	1	32	203	347	247	185	66	113	46	0	0	0	1.239
Aure	0	0	0	9	101	185	105	37	34	4	4	0	0	70	551
Romsdalsfjord	0	0	0	7	116	308	259	112	75	16	13	0	8	199	1.113
Vardalsfjord	0	0	0	0	1	34	55	15	1	4	0	0	0	0	110
Møre	0	0	1	17	290	677	522	191	92	26	0	0	30	0	1.846
<b>Total</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>263</b>	<b>3.211</b>	<b>5.701</b>	<b>3.906</b>	<b>1.843</b>	<b>1.030</b>	<b>371</b>	<b>196</b>	<b>0</b>	<b>259</b>	<b>700</b>	<b>17.490</b>

Table 9.12 Spawning stock number (x1000) of Coastal cod at age from the survey during the autumn of 1994

Area	Age (year)														Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Leka	0	0	13	188	506	358	132	23	9	0	0	0	0	0	1.228
Folla	0	0	7	114	1.066	969	332	66	46	10	4	0	2	33	2.649
Hallen	0	0	14	41	137	375	298	183	112	22	22	0	33	0	1.237
Outer-Hallen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trondheimsfjord	0	0	0	5	24	24	9	3	1	0	0	0	0	2	67
Frohavel	0	0	0	1	41	88	56	20	14	2	2	0	1	0	224
Sula	0	0	2	49	179	155	78	38	19	16	7	0	0	0	543
Aure	0	0	2	17	78	89	40	11	10	1	1	0	0	7	256
Romsdalsfjord	0	0	1	10	74	114	72	26	17	3	2	0	1	15	334
Vardalsfjord	0	0	0	0	0	9	12	4	1	1	0	0	0	0	27
Møre	0	0	3	26	181	258	151	47	22	6	0	0	4	0	697
<b>Total</b>	<b>0</b>	<b>0</b>	<b>42</b>	<b>450</b>	<b>2.285</b>	<b>2.438</b>	<b>1.179</b>	<b>421</b>	<b>251</b>	<b>60</b>	<b>38</b>	<b>0</b>	<b>41</b>	<b>57</b>	<b>7.263</b>

Table 9.13 Spawning stock numbers of Coastal cod at age from the survey during the autumn.

Area	Year	Age (year)														Total
		0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Finnm-Troms	1,992 -		0	13	1,016	4,852	10,030	6,876	939	755	804	469	444	0	36	26,234
Nordland	1,993	0	0	0	142	3,955	8,867	5,733	3,457	887	259	397	522	441	207	24,867
Tr.lag-Møre	1,994	0	0	42	450	2,285	2,438	1,179	421	251	60	38	0	41	57	7,262
																58,363

Table 9.14 Spawning stock biomass (tonnes) of Coastal cod at age from the survey during the autumn.

Area	Year	Age (year)														Total
		0	1	2	3	4	5	6	7	8	9	10	11	12	13+	
Finnm-Troms	1,992 -		0	3	629	6,579	17,425	16,990	2,458	2,160	2,709	1,515	1,203	0	146	51,817
Nordland	1,993	0	0	0	85	5,097	20,068	17,476	16,950	5,634	2,179	3,761	5,048	4,794	2,883	83,975
Tr.lag-Møre	1,994	0	0	9	263	3,211	5,701	3,906	1,843	1,030	371	196	0	259	700	17,489
																153,281



**Table 9.15 Total biomasses of cod along the coastal areas from Varanger to Stadt during the period 1992-1994.**

Area	Year	Coastal cod	SSB Coastal cod	NE Arctic cod	Total
Finnmark-Troms	1992	78,000	52,000	35,000	112,000
Nordland	1993	100,000	84,000	20,000	120,000
Trøndelag-Møre	1994	23,000	17,000	0	23,000
Sum	92-94	201,000	153,000	55,000	255,000

**Table 9.16 Estimation of landings from Coastal cod.**

Area	Average Landings 1992-1994	Estimated landings 1)	Total biomass	Yield/ Total biomass
00, 05, 06 and 07	42,300	1) 31 700	123,000	2) 0.257
03 and 04	3)	20,100	78,000	0.257
Sum	42,300	50,800	201,000	

1) 75% of 42,300 tonnes is allocated to be coastal cod

2) Similar ratio of yield/total biomass is used for the distribution areas

3) No data

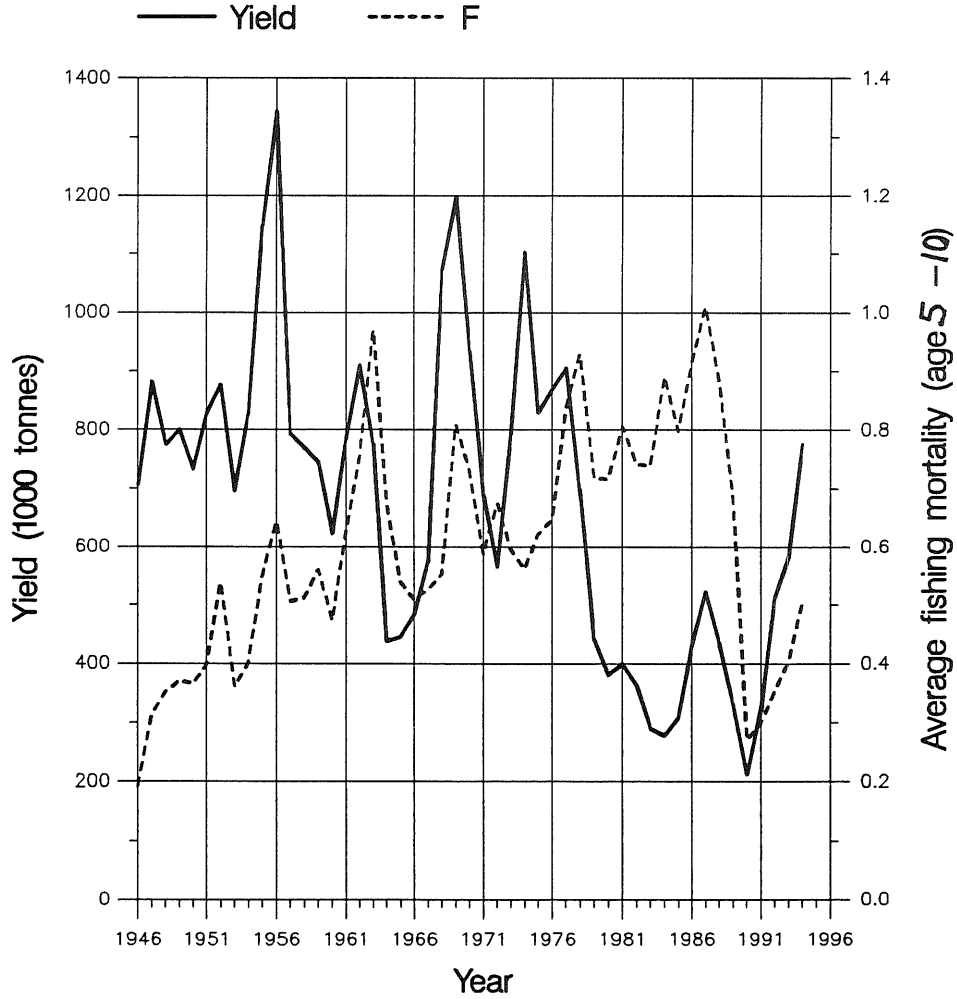
Figure 3.1.A.B.

# Fish Stock Summary

## Cod in the North–East Arctic (Fishing Areas I and II)

### 18–10–1995

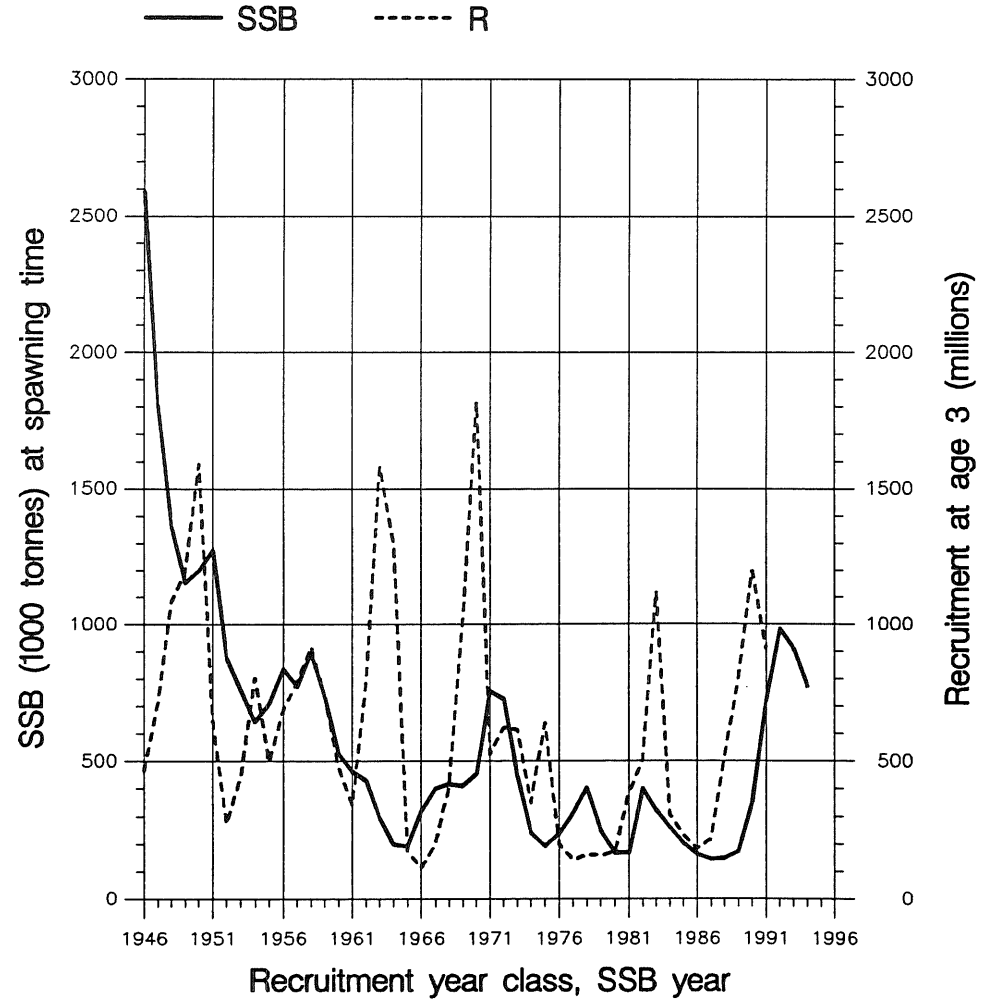
Yield and fishing mortality



(run: H54)

A

Spawning stock and recruitment



(run: H54)

B

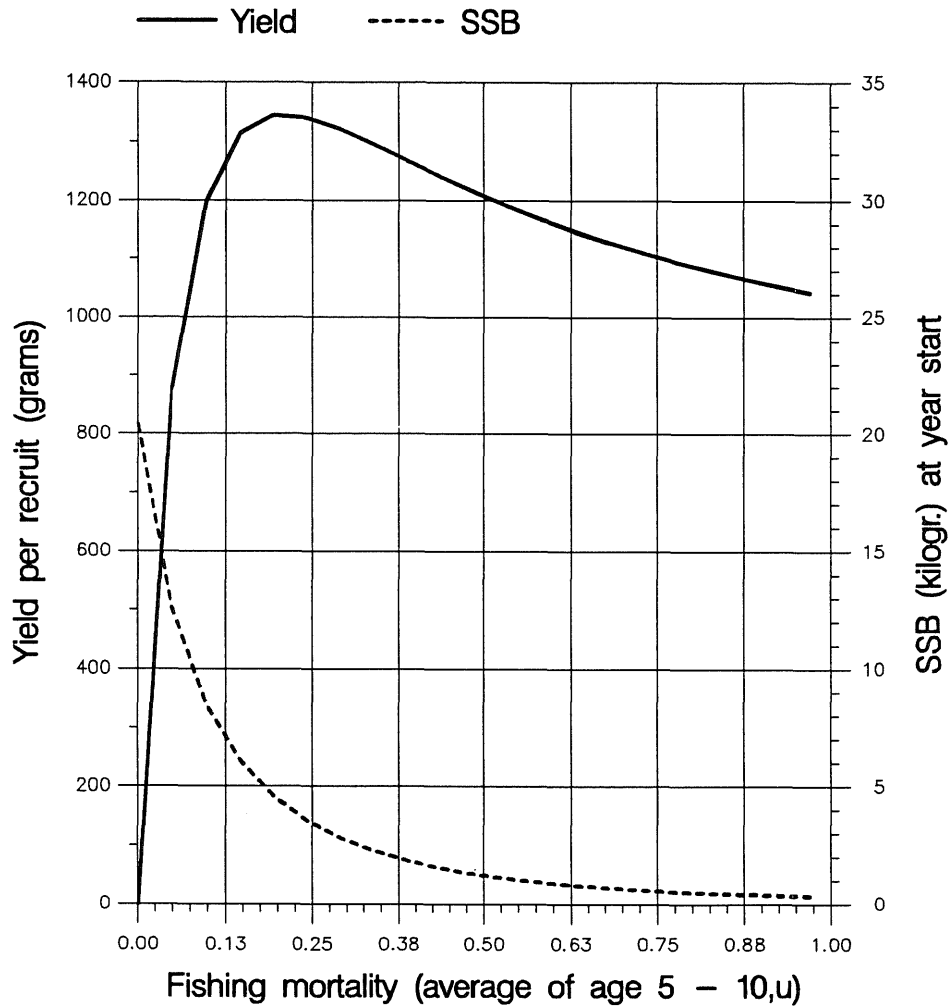
Figure 3.1.C.D.

## Fish Stock Summary

### Cod in the North – East Arctic (Fishing Areas I and II)

31 – 8 – 1995

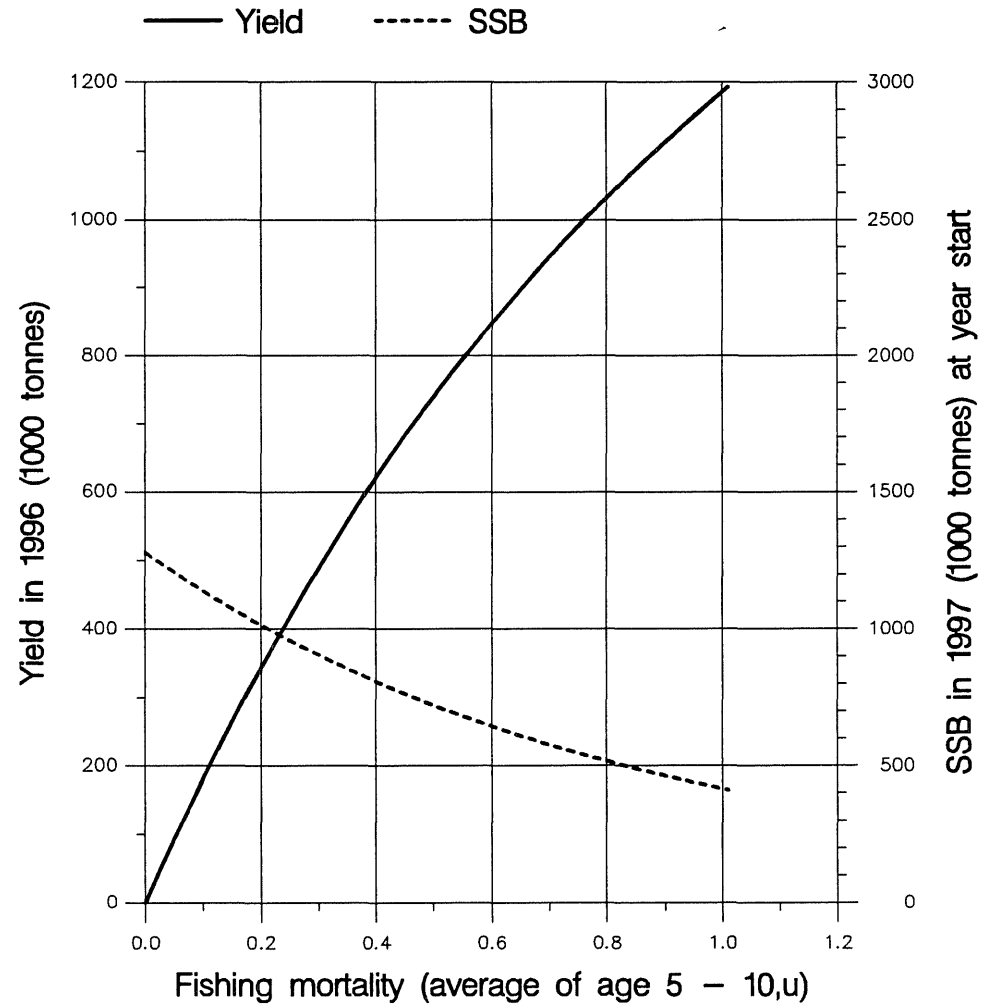
Long term yield and spawning stock biomass



(run: YPR02)

C

Short term yield and spawning stock biomass



(run: H1)

D

Figure 3.2 Cod Growth - Norwegian data. Plotted vs. consumption/biomass ratio.

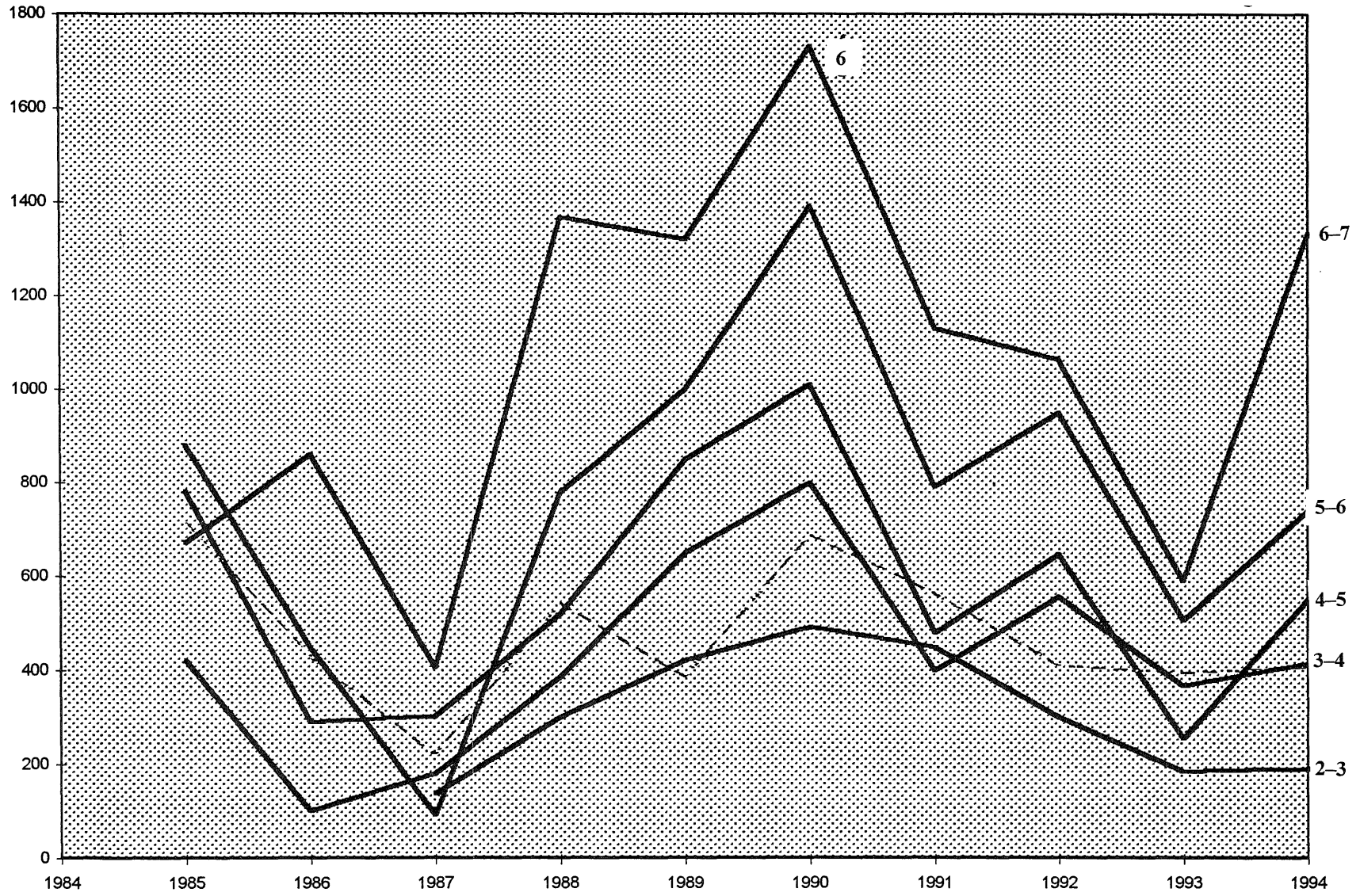


Figure 3.3 Cod growth - Russian data. Plotted vs. consumption/biomass ratio.



Figure 3.4 Retrospective analysis, NE Arctic cod. Shrinkage = 2.0.

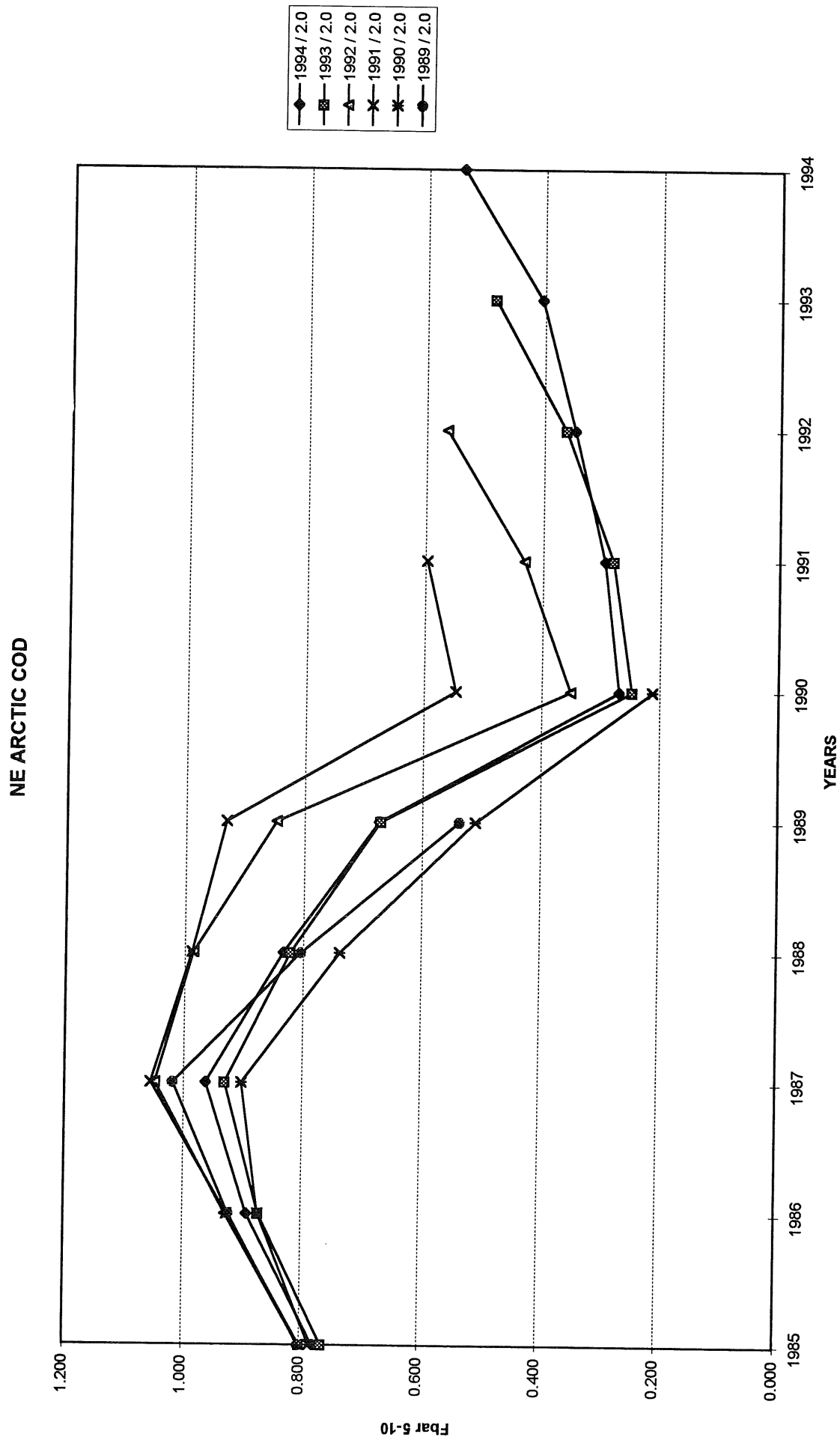


Figure 3.5 Retrospective analysis, NE Arctic cod. Shrinkage 1.0

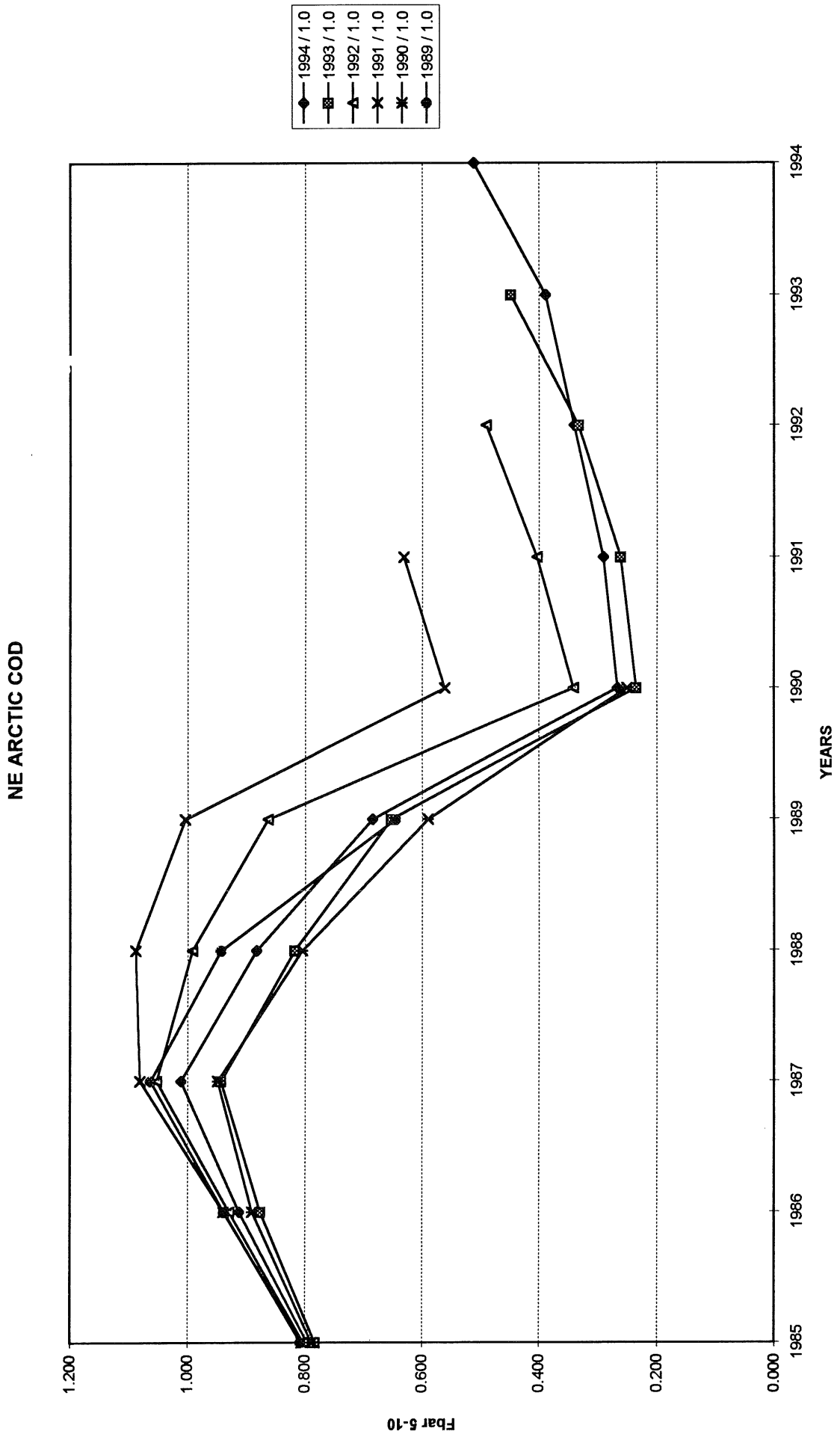
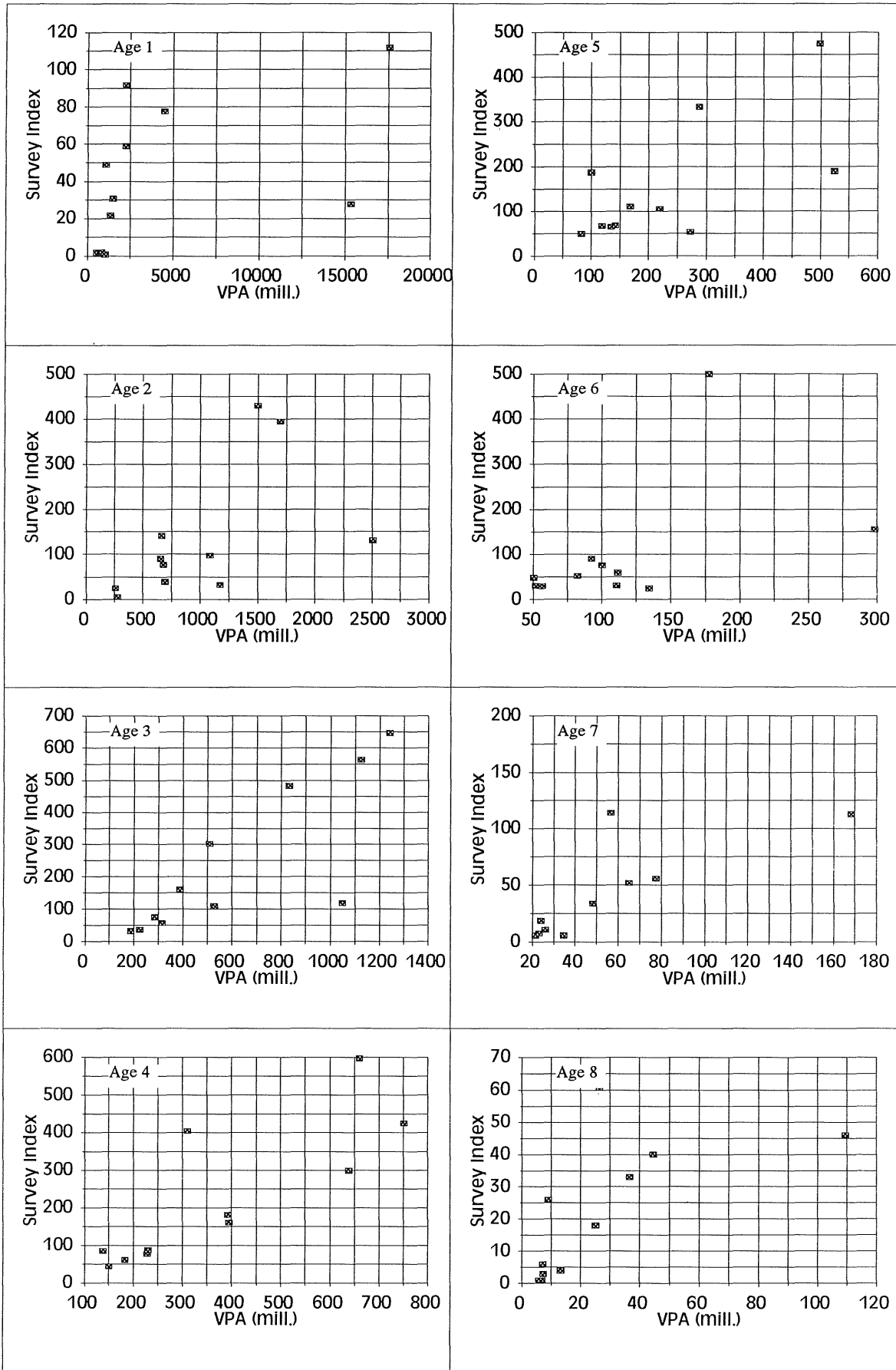


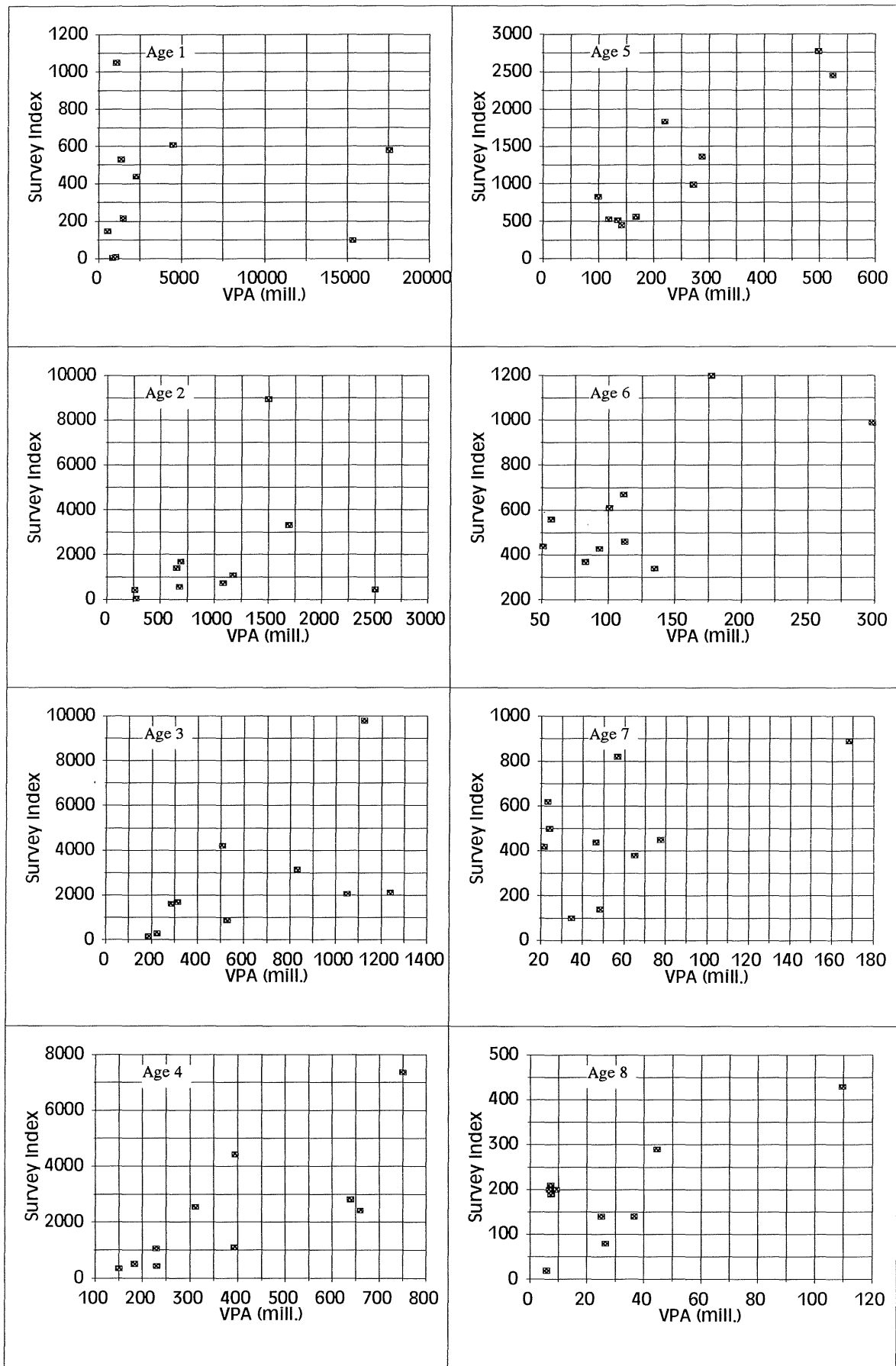
Figure 3.6A



FLT:43 - NE Arctic Cod - Russian trawl acoustic survey index vs VPA stock estimates.

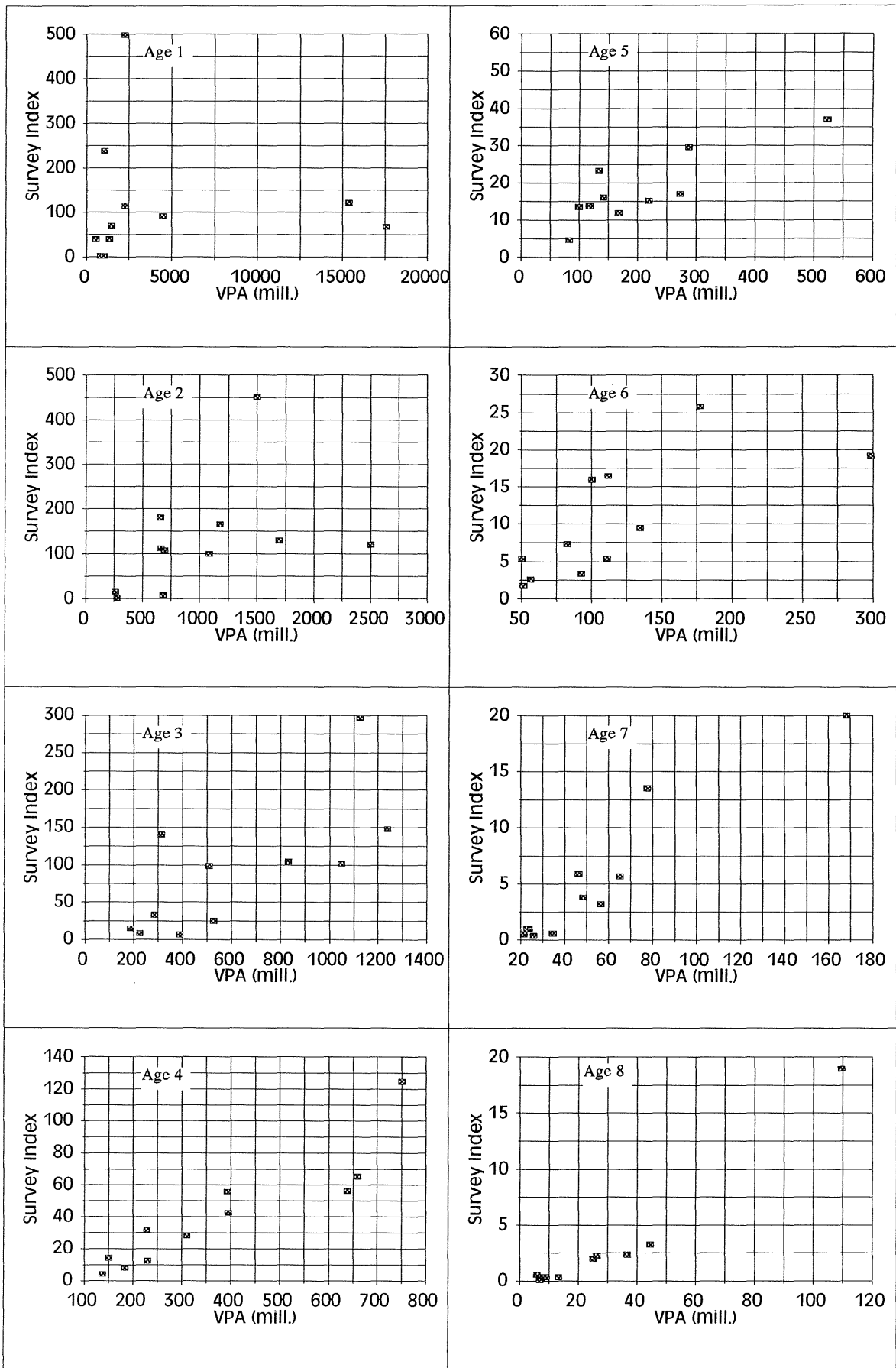


Figure 3.6B



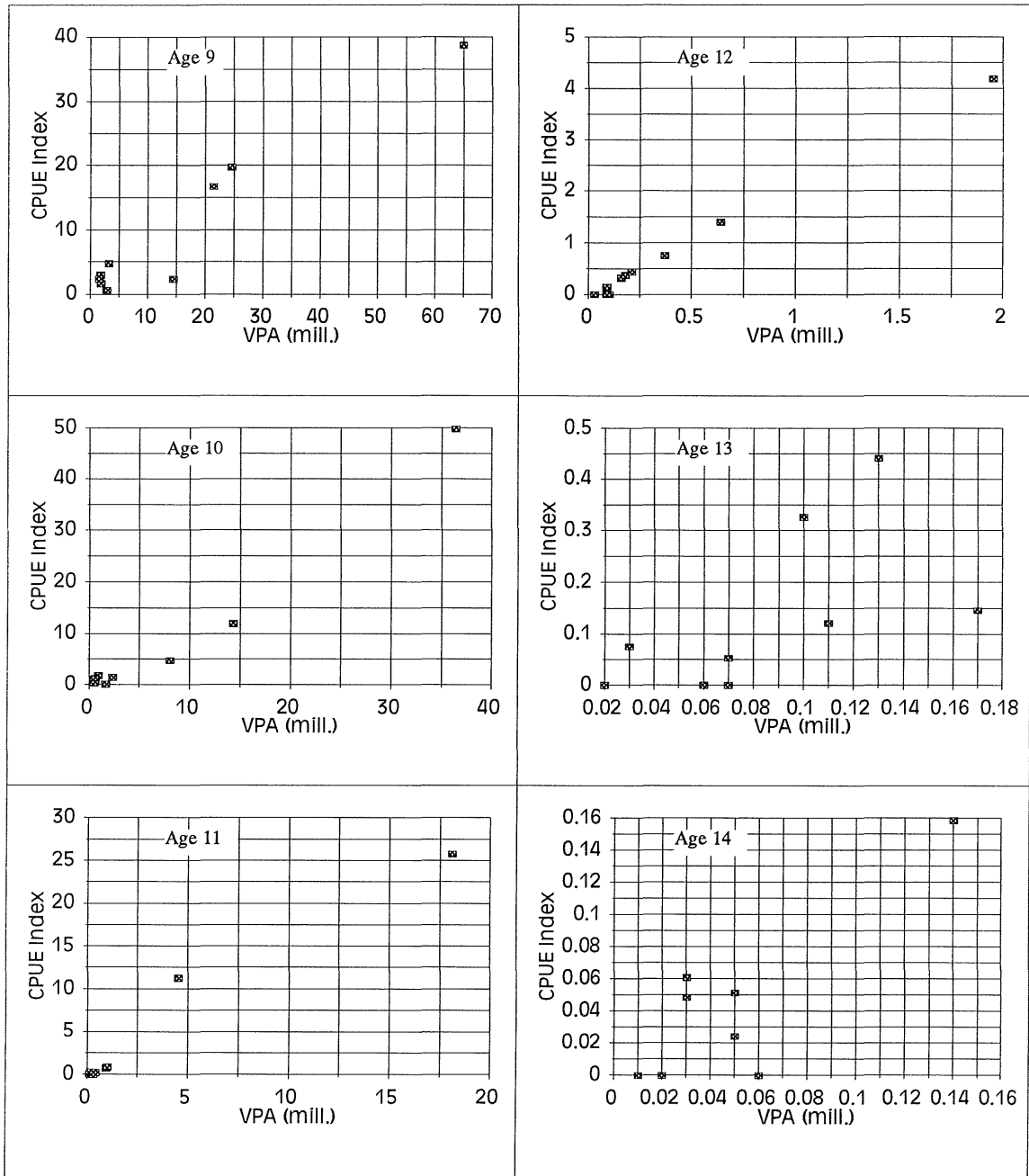
FLT:44 - NE Arctic Cod - Russian acoustic survey index vs VPA stock estimates.

Figure 3.6C



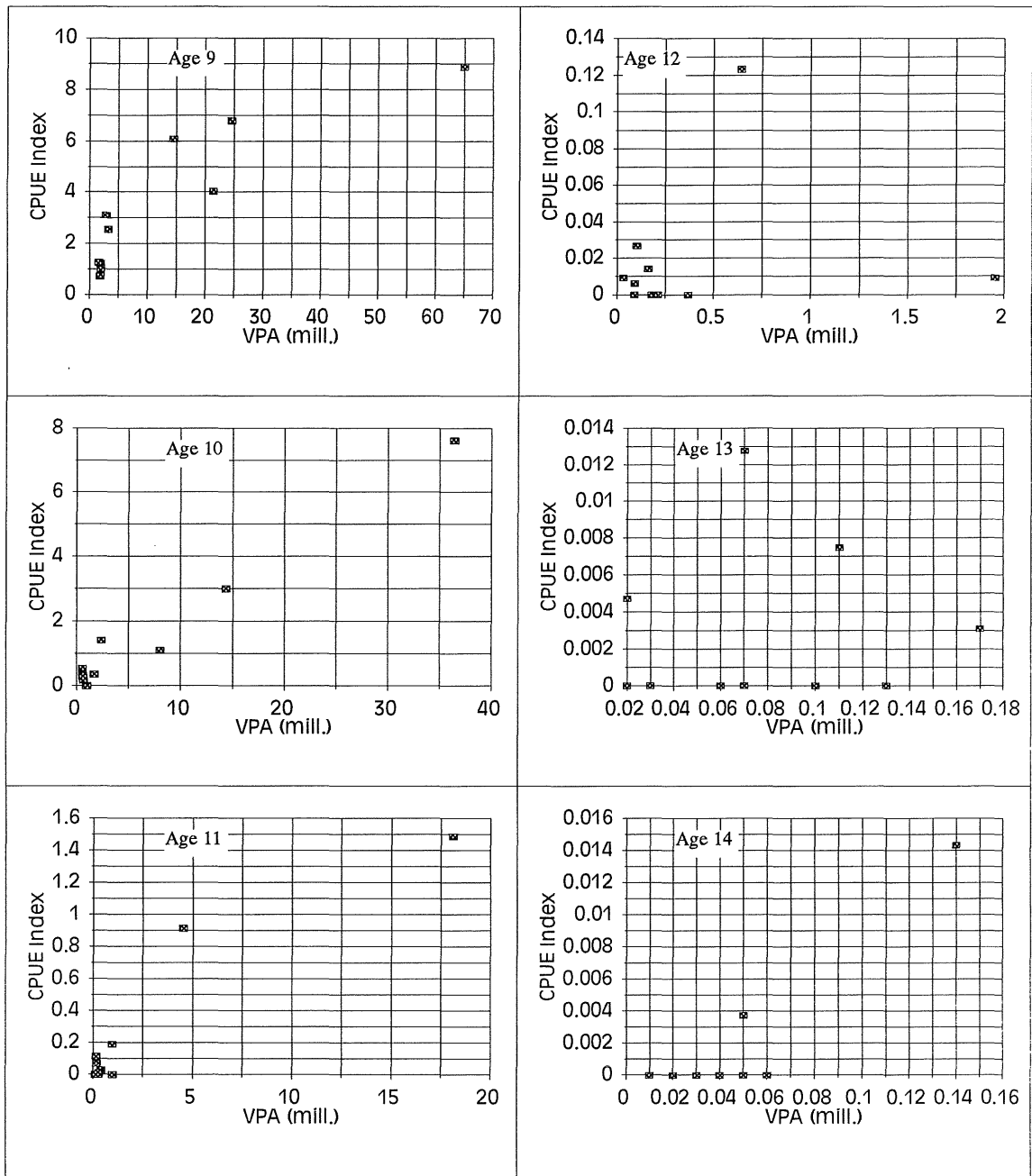
FLT:45 - NE Arctic Cod - Norwegian svalbard bottom trawl survey index vs VPA stock estimates.

Figure 3.6D



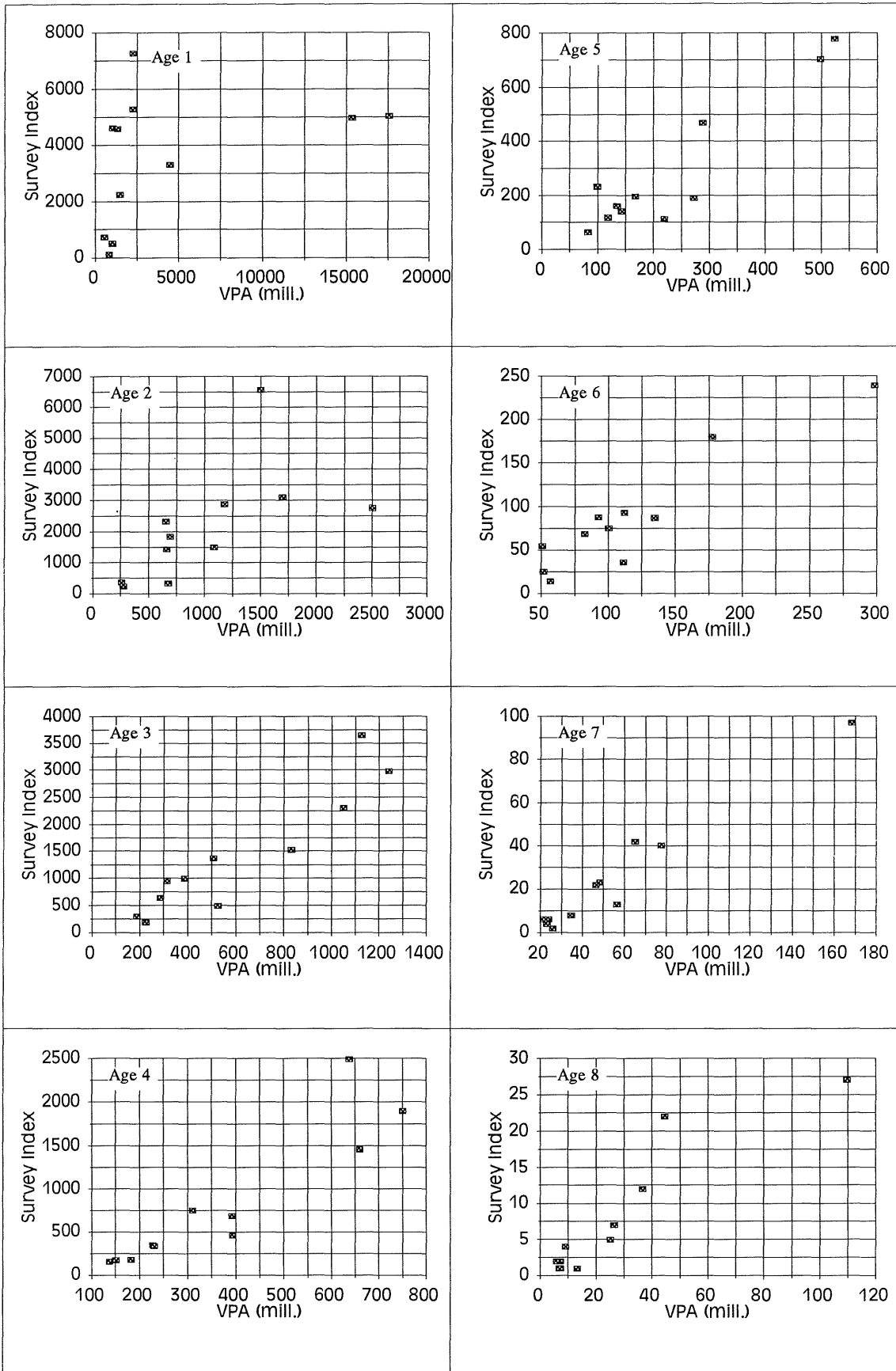
FLT:52 - NE Arctic Cod - Norwegian commercial trawl CPUE index vs VPA stock estimates.

Figure 3.6E



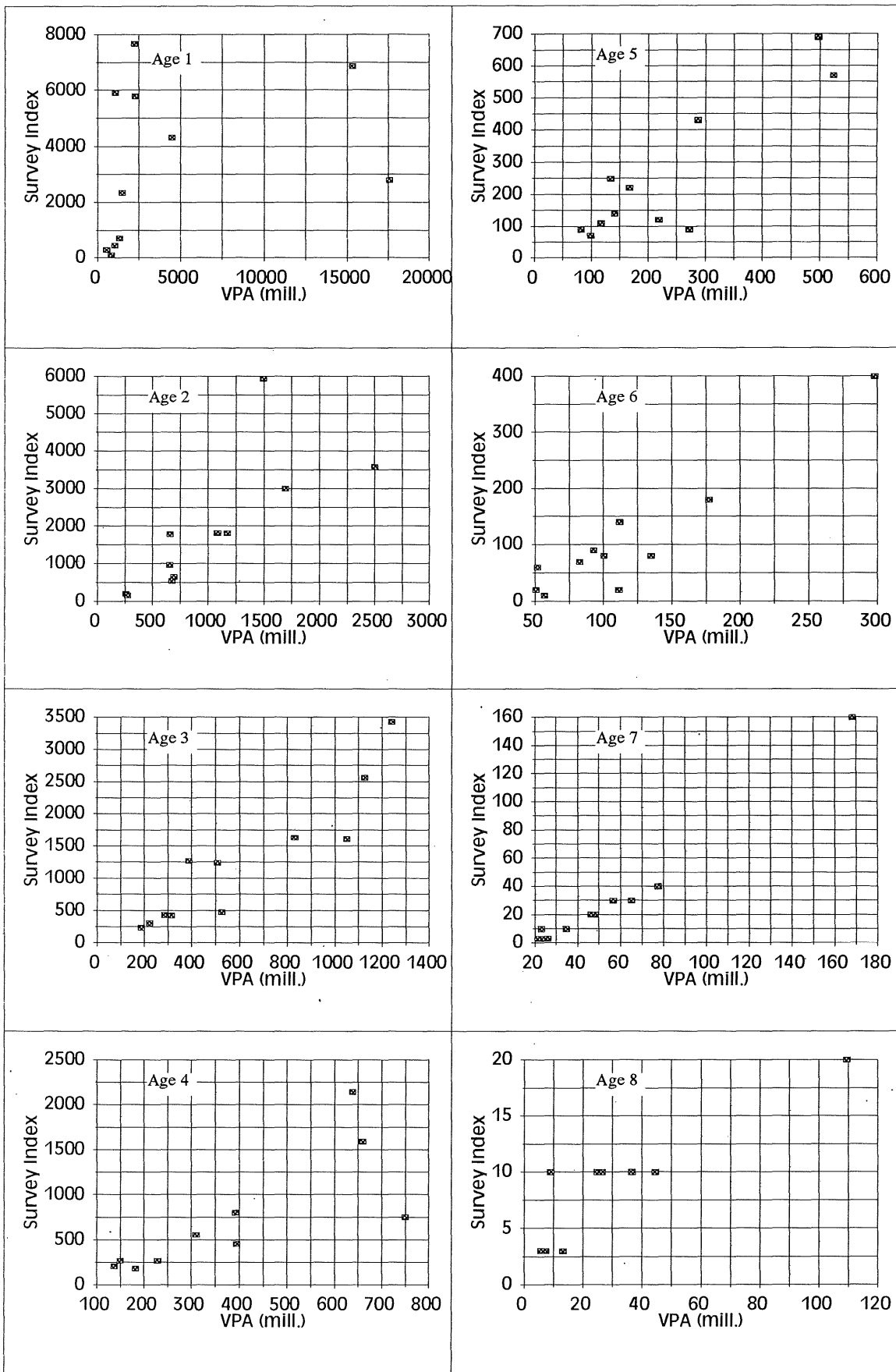
FLT:53 - NE Arctic Cod - Russian commercial trawl CPUE index vs VPA stock estimates.

Figure 3.6F



FLT:54 - NE Arctic Cod - Norwegian Barents Sea trawl survey index (adjusted 1 year) vs VPA stock estimates. Swept area corrected.

Figure 3.6G



FLT:55 - NE Arctic Cod - Norwegian Barents Sea acoustic survey index vs VPA stock estimates. Swept area corrected.

N.E. arctic cod. SSB SOP corrected.

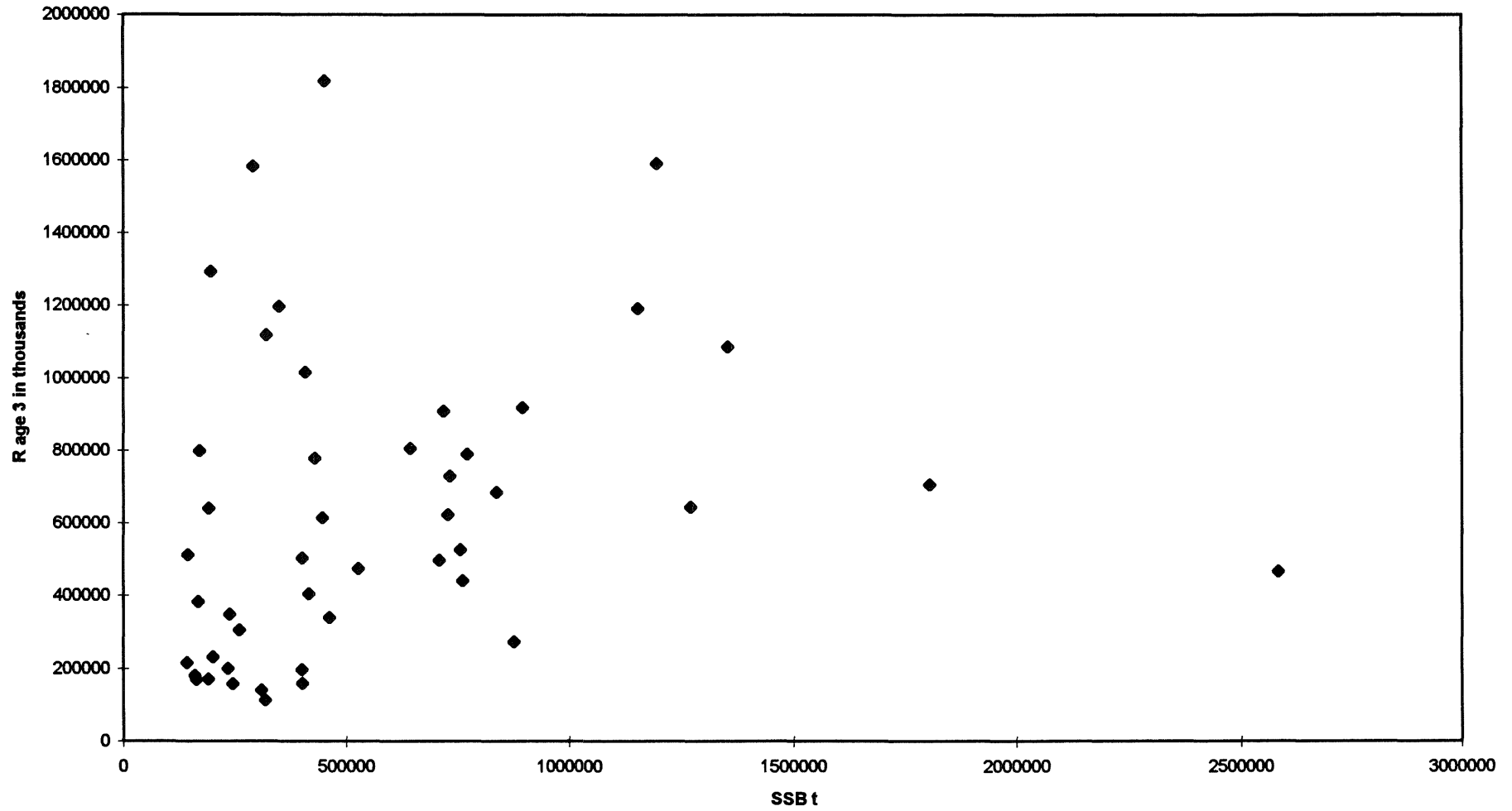


Figure 3.7. S-R plot.

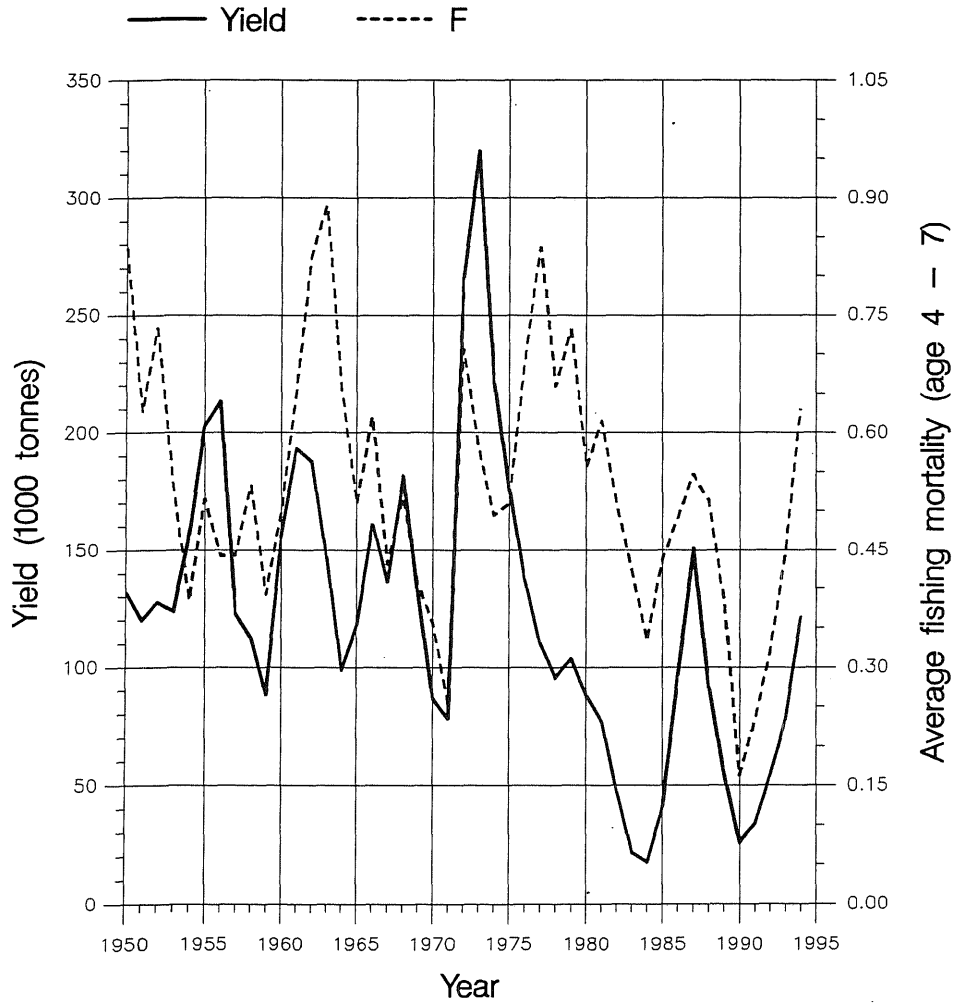
Figure 4.1A and B

# Fish Stock Summary

## Haddock in the North-East Arctic (Fishing Areas I and II)

### 6-10-1995

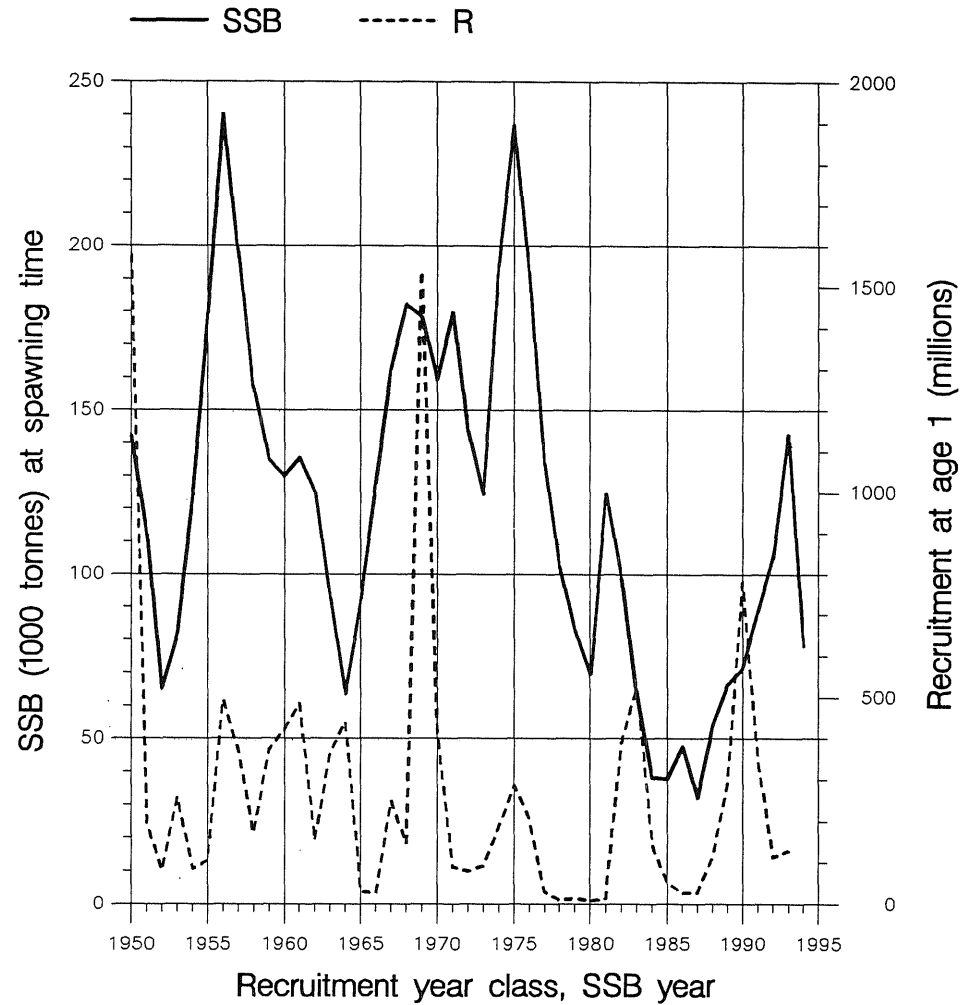
Yield and fishing mortality



(run: FINH1)

A

Spawning stock and recruitment



(run: FINH1)

B



Figure 4.1C and D

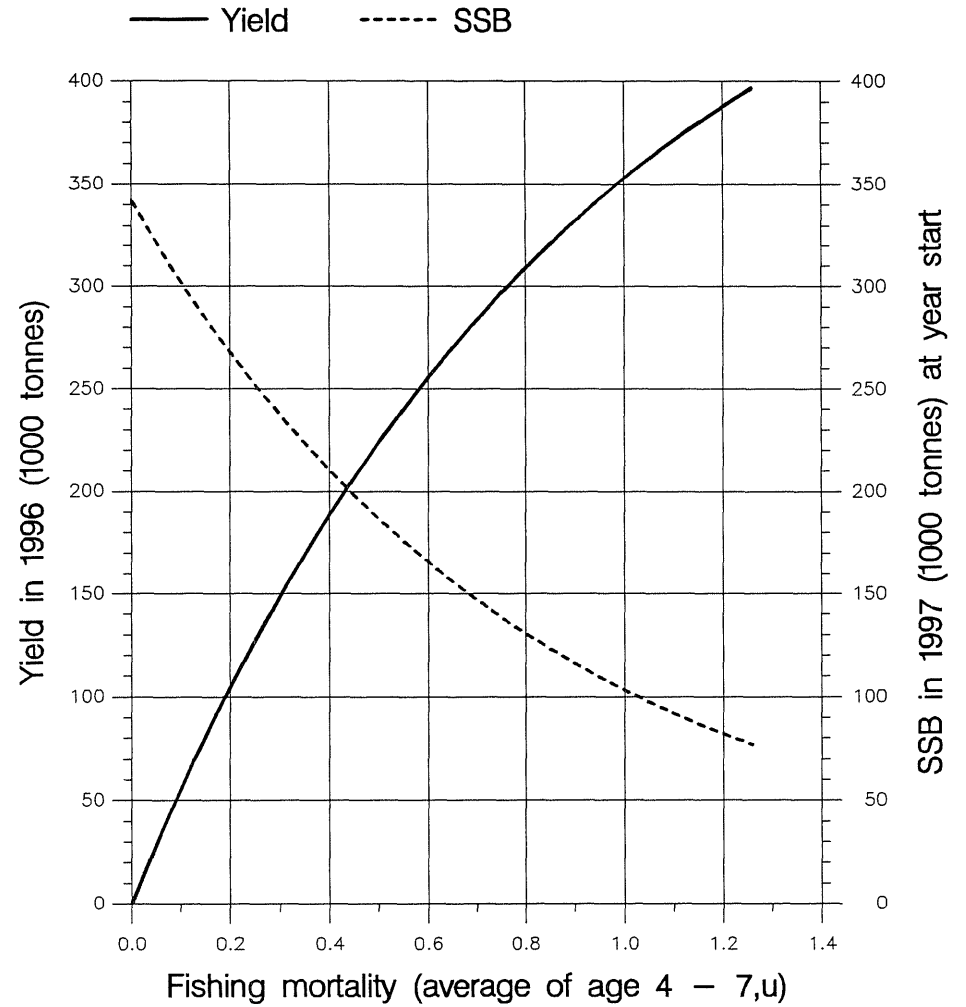
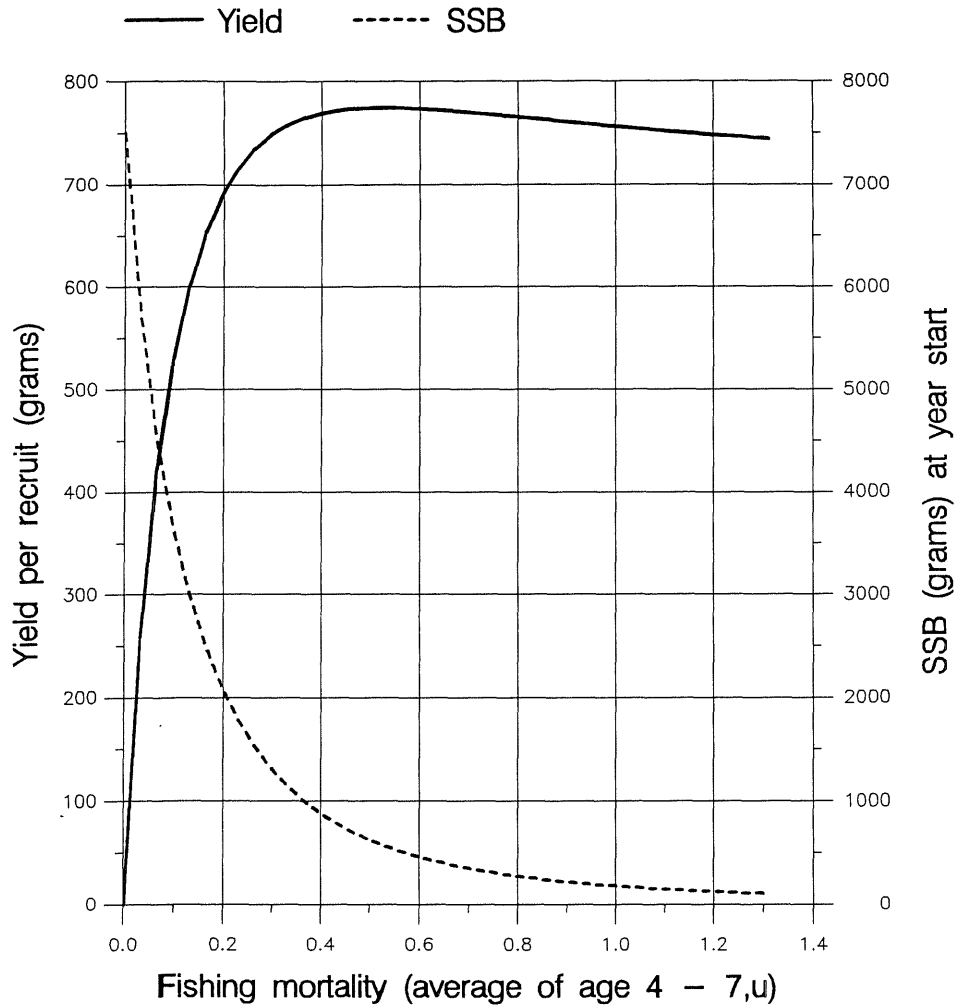
# Fish Stock Summary

## Haddock in the North-East Arctic (Fishing Areas I and II)

### 30 - 8 - 1995

Long term yield and spawning stock biomass

Short term yield and spawning stock biomass



(run: YPR95A)

C

(run: H1)

D

Figure 4.2

NORTHEAST ARCTIC HADDOCK catchability proportional to abundance on ages < 8  
 catchability independent of age > 11

RETROSPECTIVE ANALYSIS  
 Different levels of shrinkage

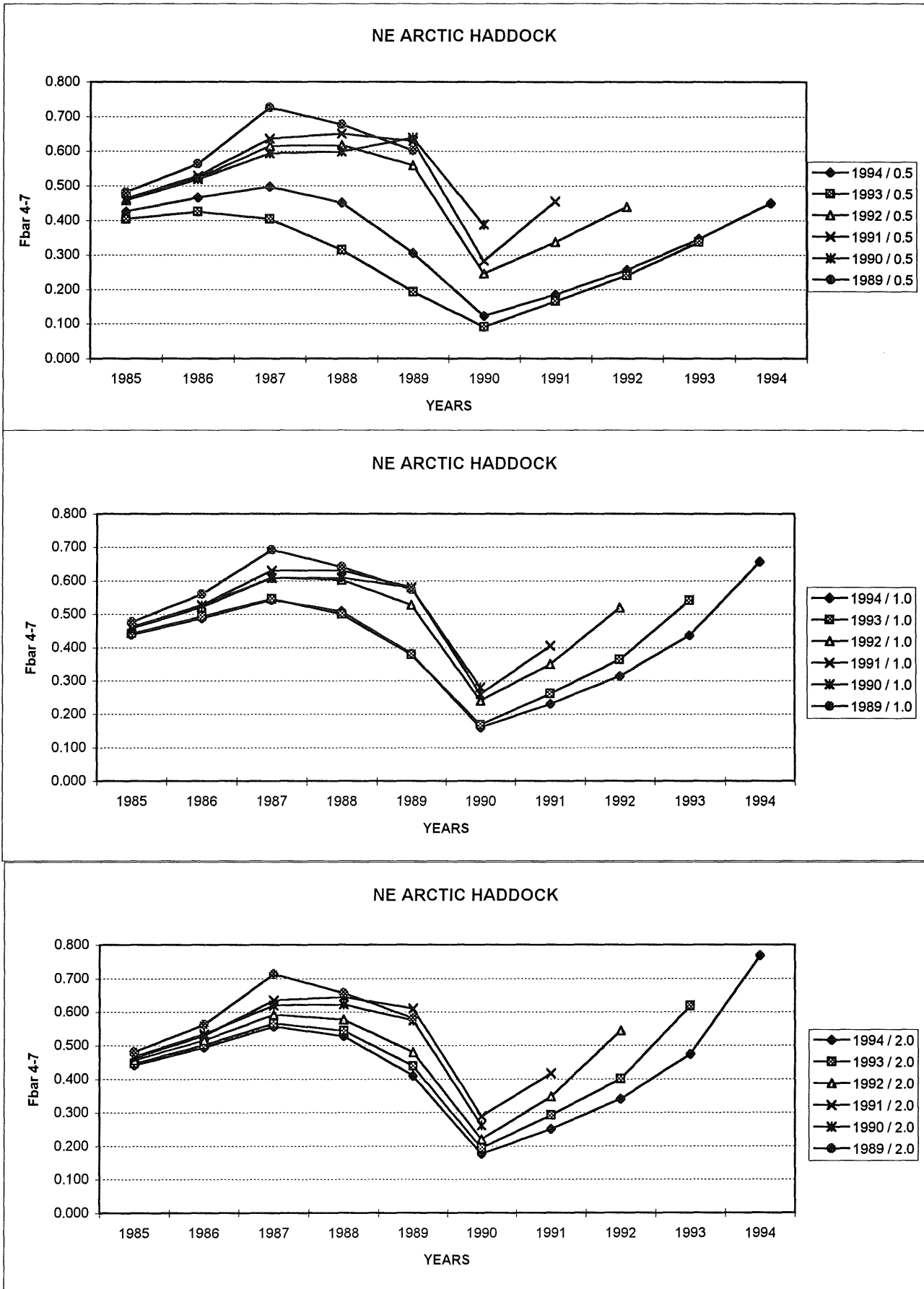
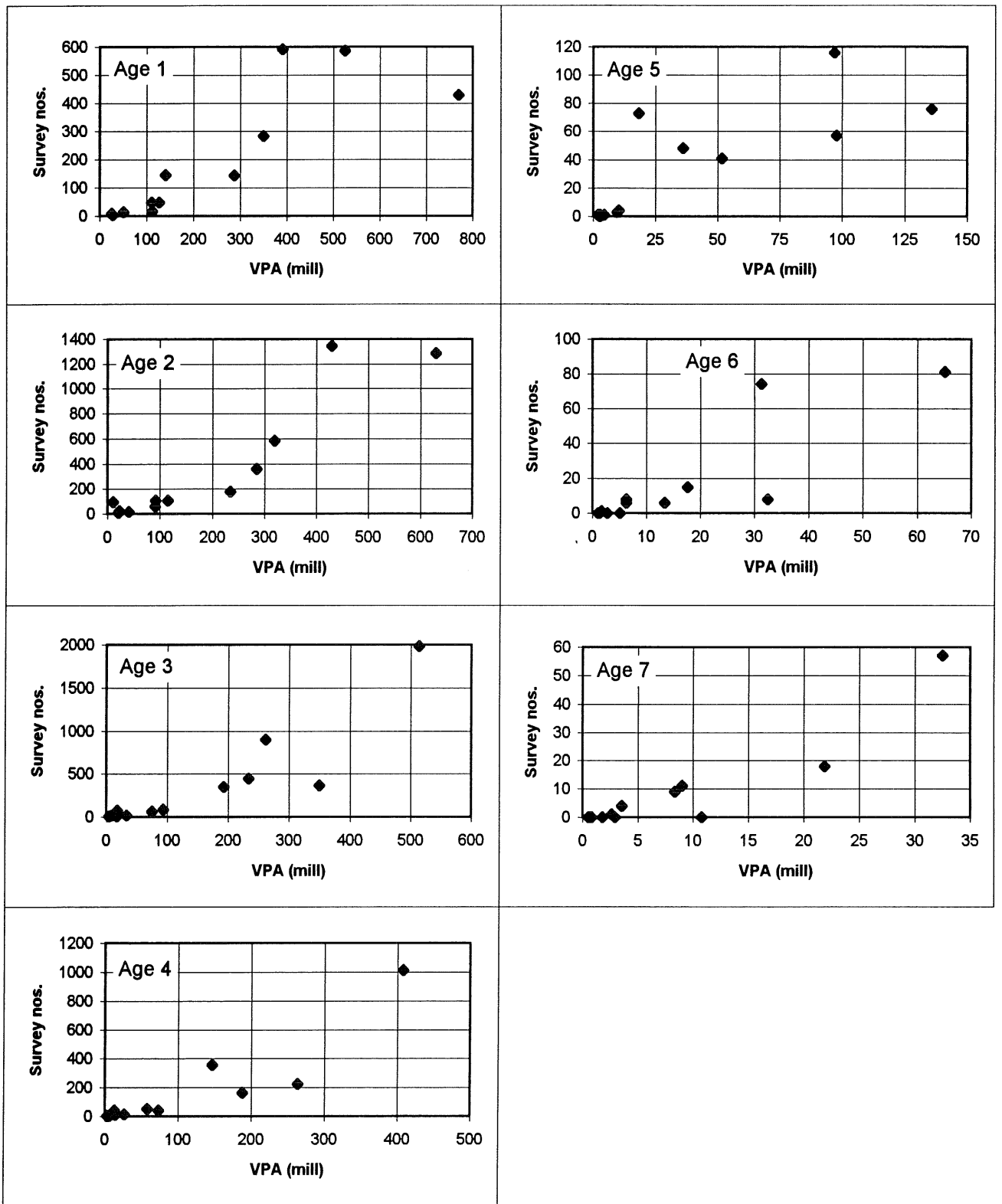


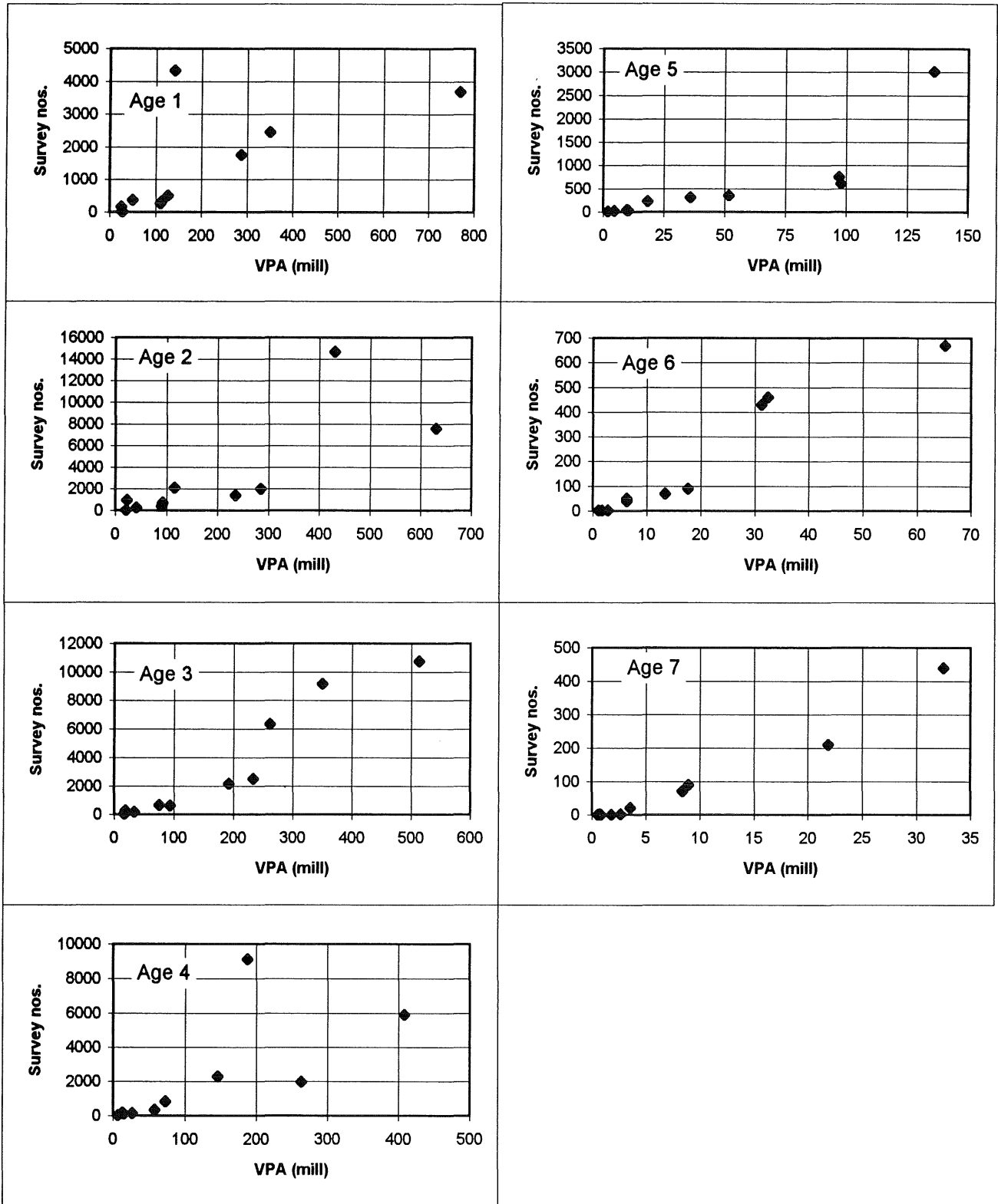
Figure 4.3



NE Arctic Haddock abundance index from the Russian bottom trawl survey plotted again VPA results on stock number at age

Continued

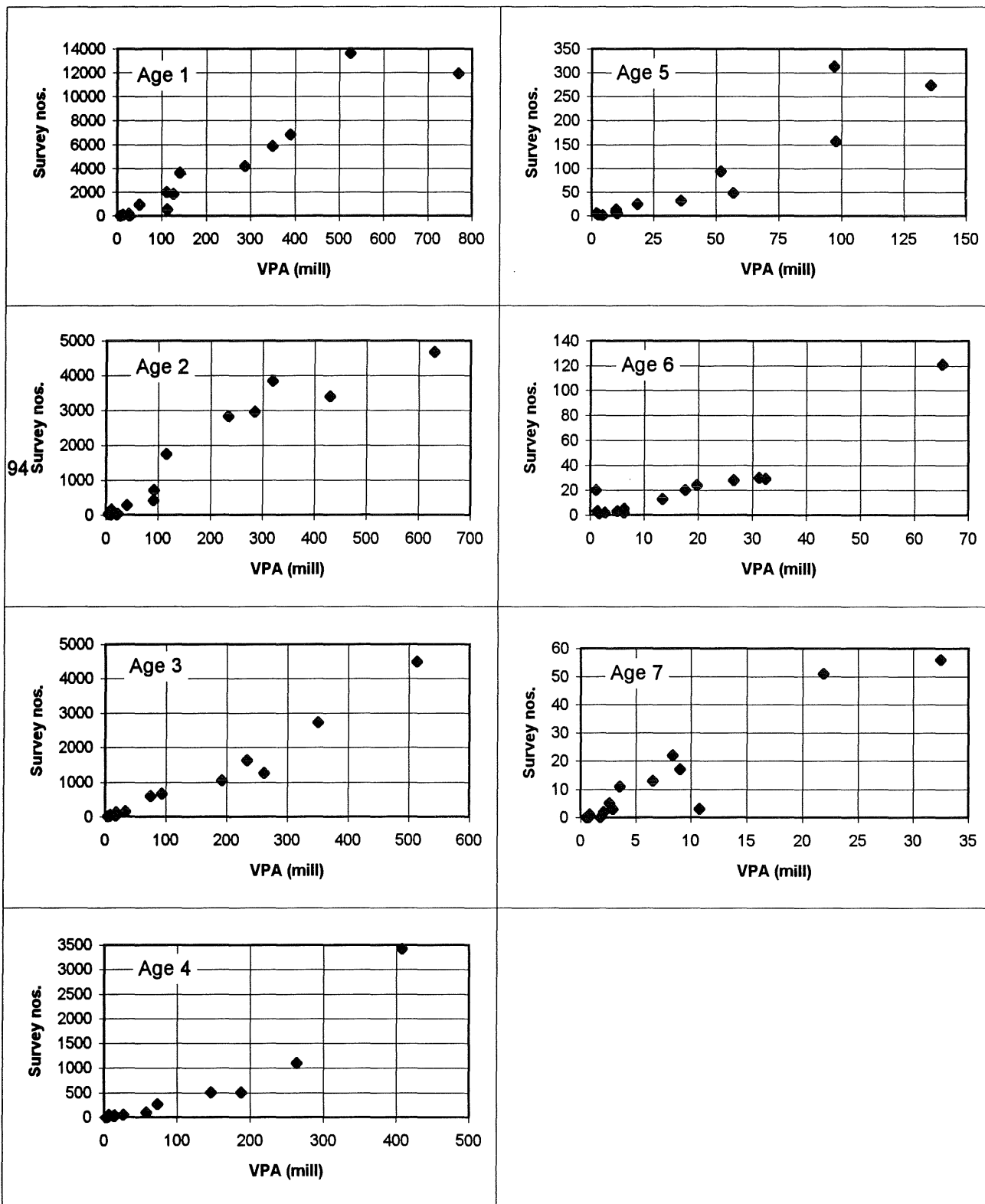
Figure 4.3 Continued



NE Arctic Haddock abundance index from the Russian acoustic survey plotted again VPA results on stock number at age

Continued

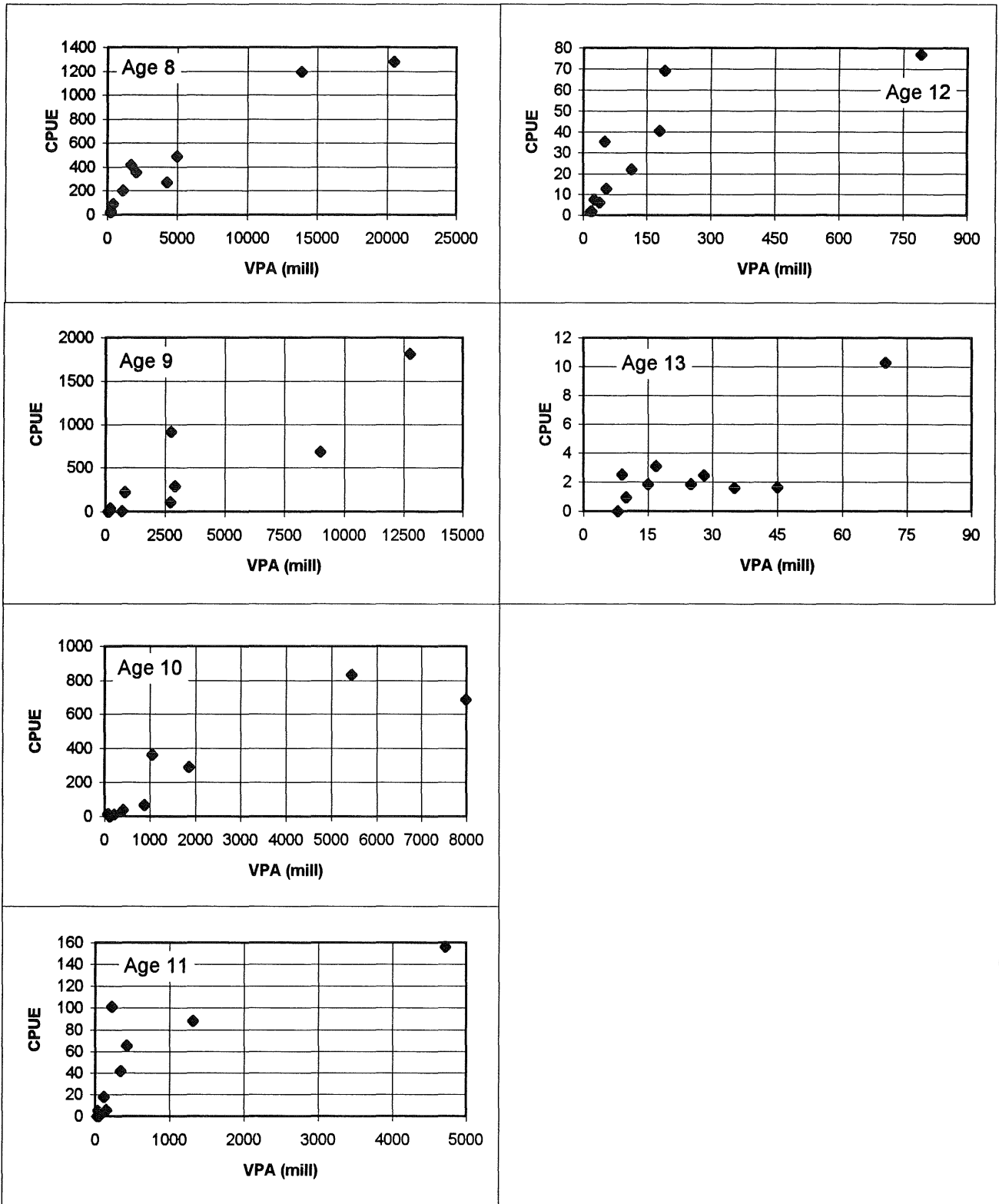
Figure 4.3 Continued



NE Arctic Haddock abundance index from the Norwegian bottom trawl survey plotted again VPA results on stock number at age

Continued

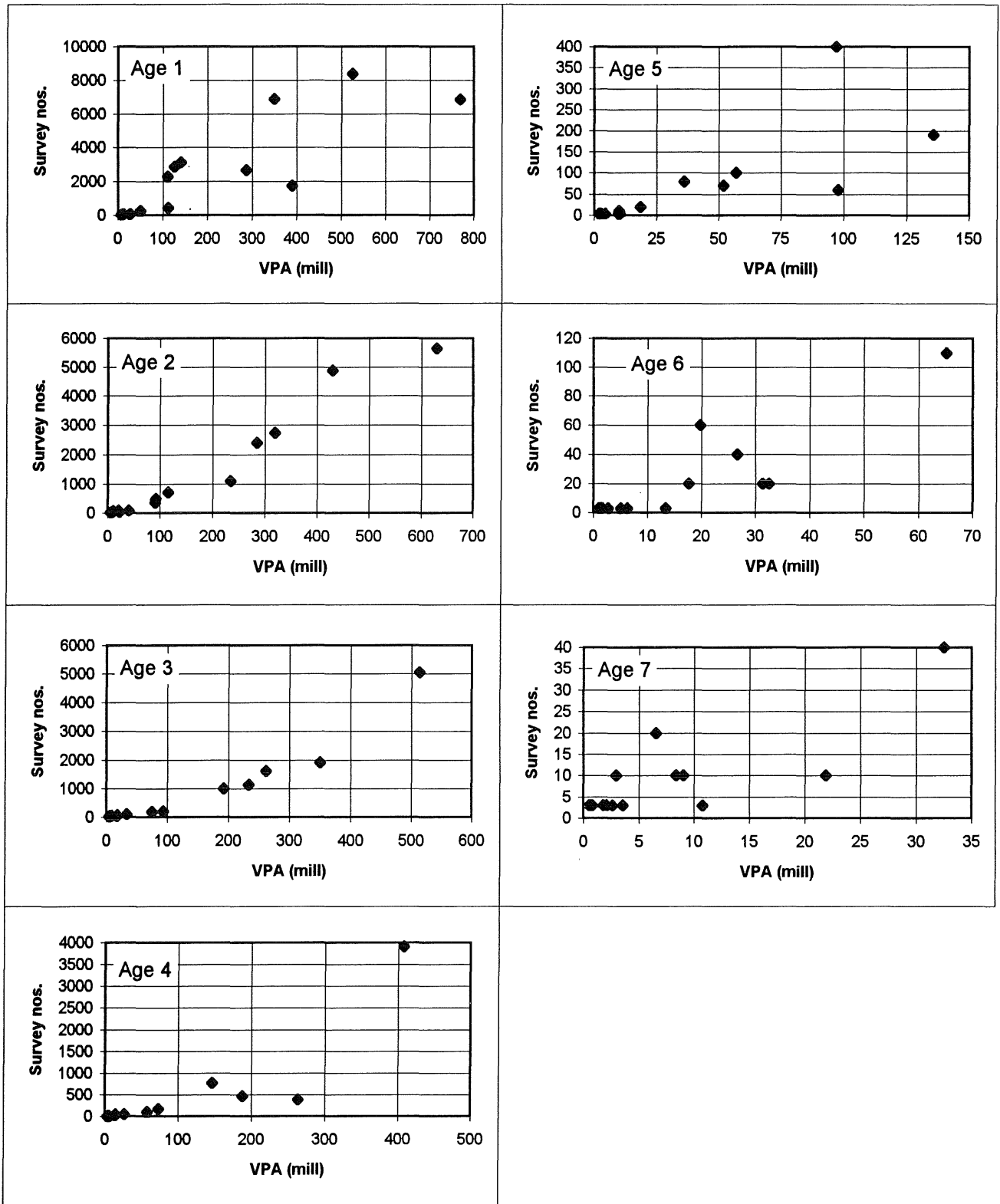
Figure 4.3 Continued



NE Arctic Haddock CPUE index from the Norwegian commercial trawl fleet plotted against VPA results on stock number at age

Continued

Figure 4.3 Continued



NE Arctic Haddock abundance index from the Norwegian acoustic survey plotted again VPA results on stock number at age

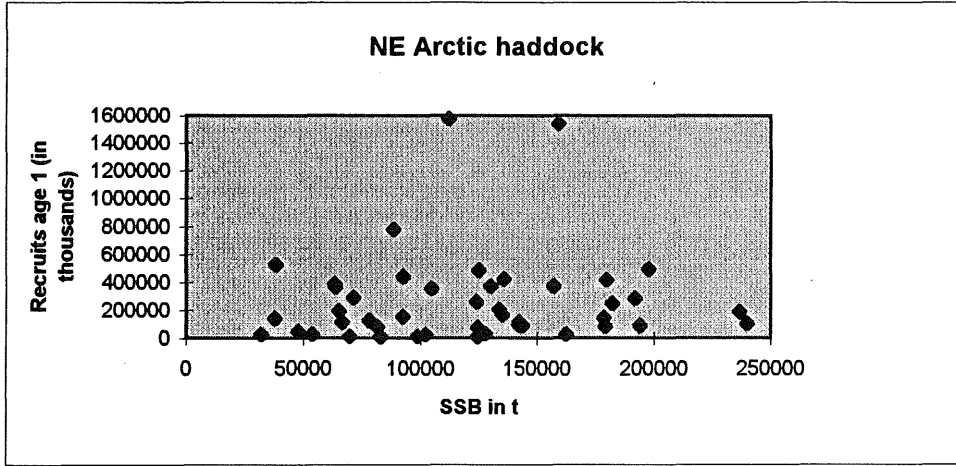


Figure 4.4. SSB-R plot.



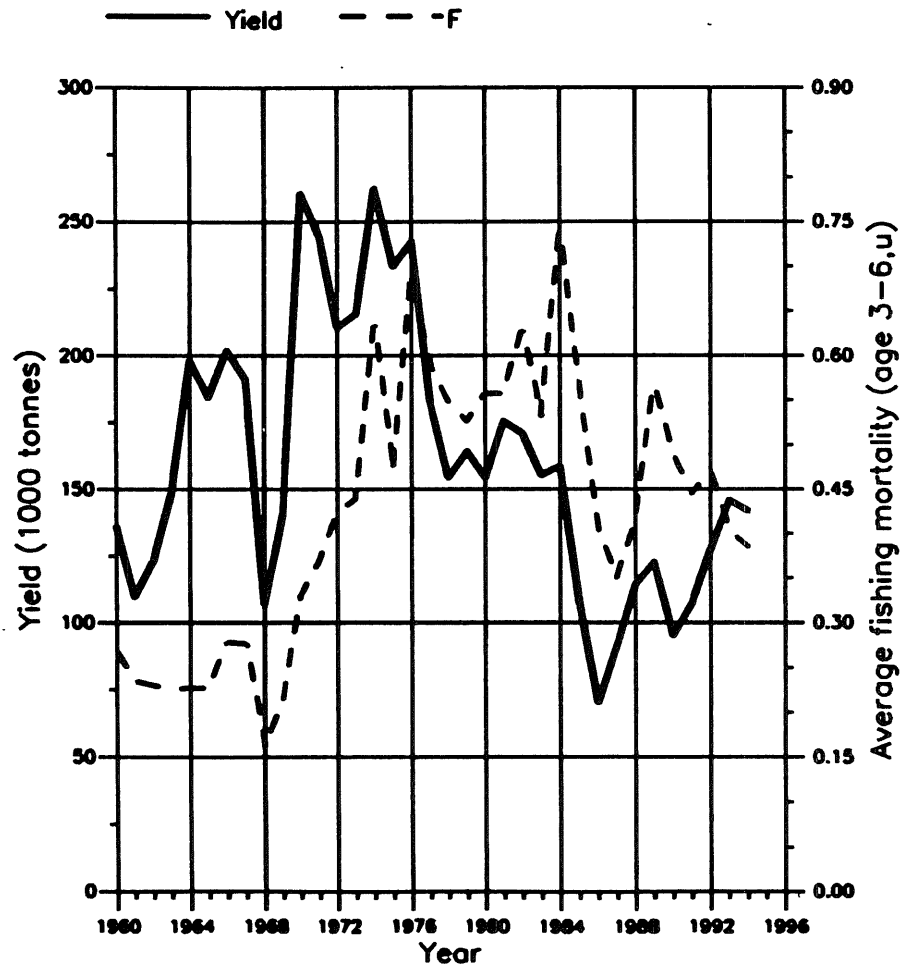
Figure 5.1

# FISH STOCK SUMMARY

## STOCK: Saithe in the North-East Arctic (Fishing Areas I and II)

29-8-1995

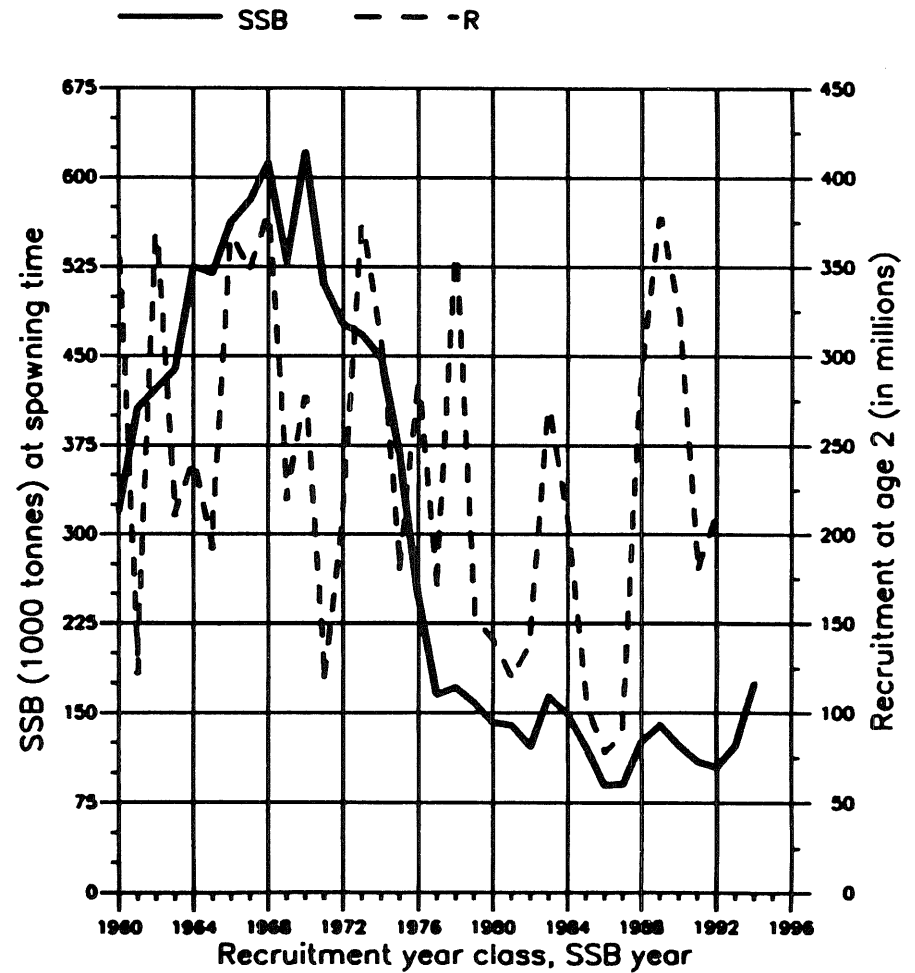
Trends in yield and fishing mortality (F)



(run: FIN95)

A

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



(run: FIN95)

B

Continued

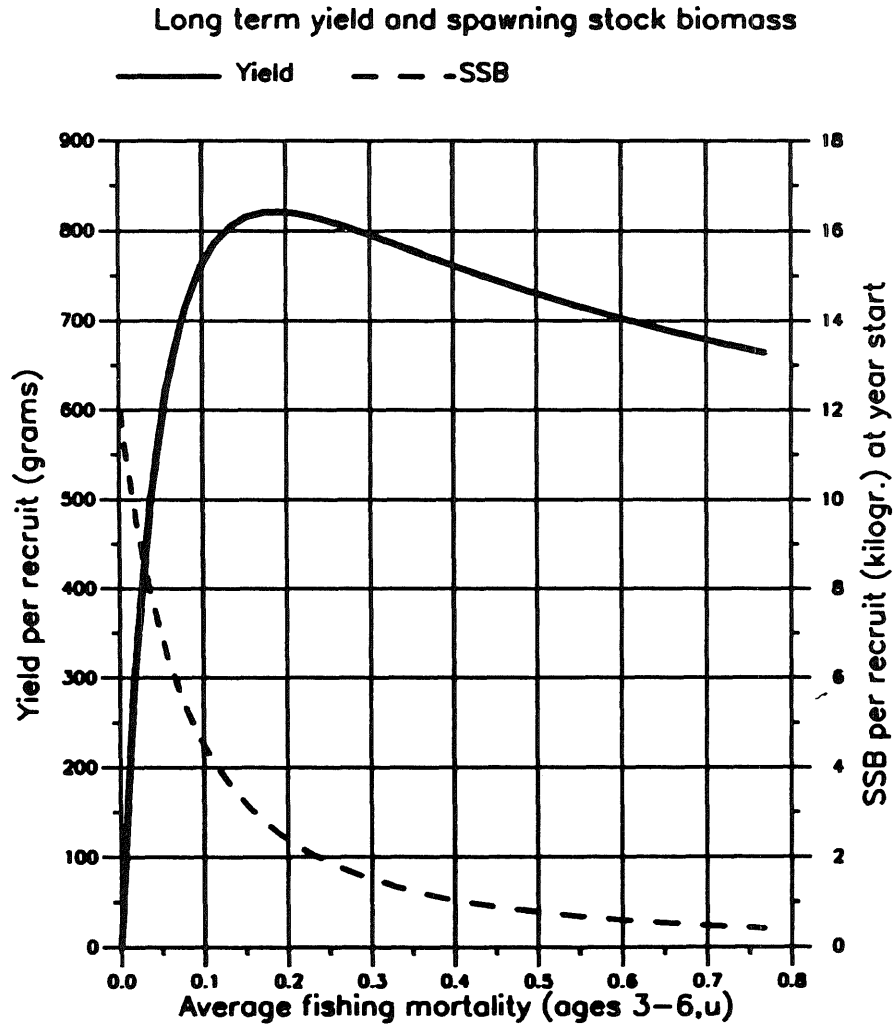
Figure 5.1 Continued

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## FISH STOCK SUMMARY

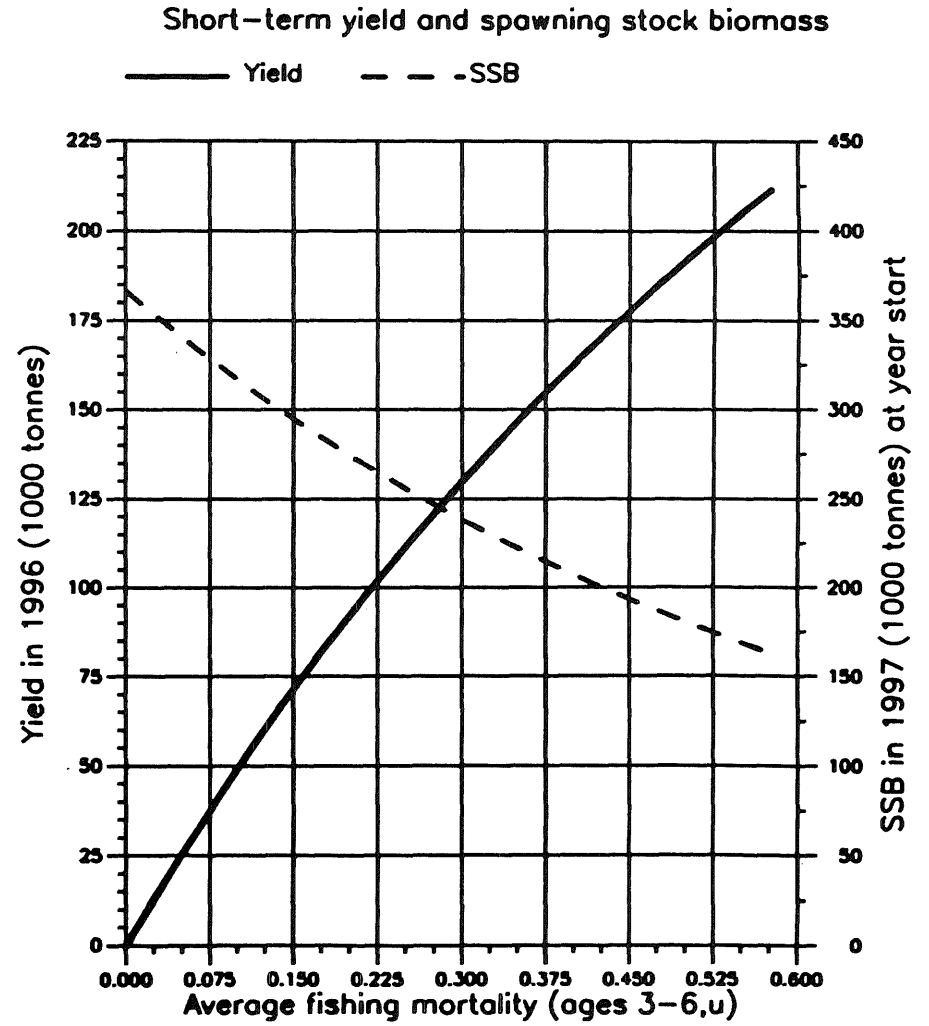
### STOCK: Saithe in the North-East Arctic (Fishing Areas I and II)

30-8-1995



(run: YPR95-1)

**C**



(run: PRED95-1)

**D**

Figure 5.2A. North-East Arctic Saithe - Acoustic survey vs VPA

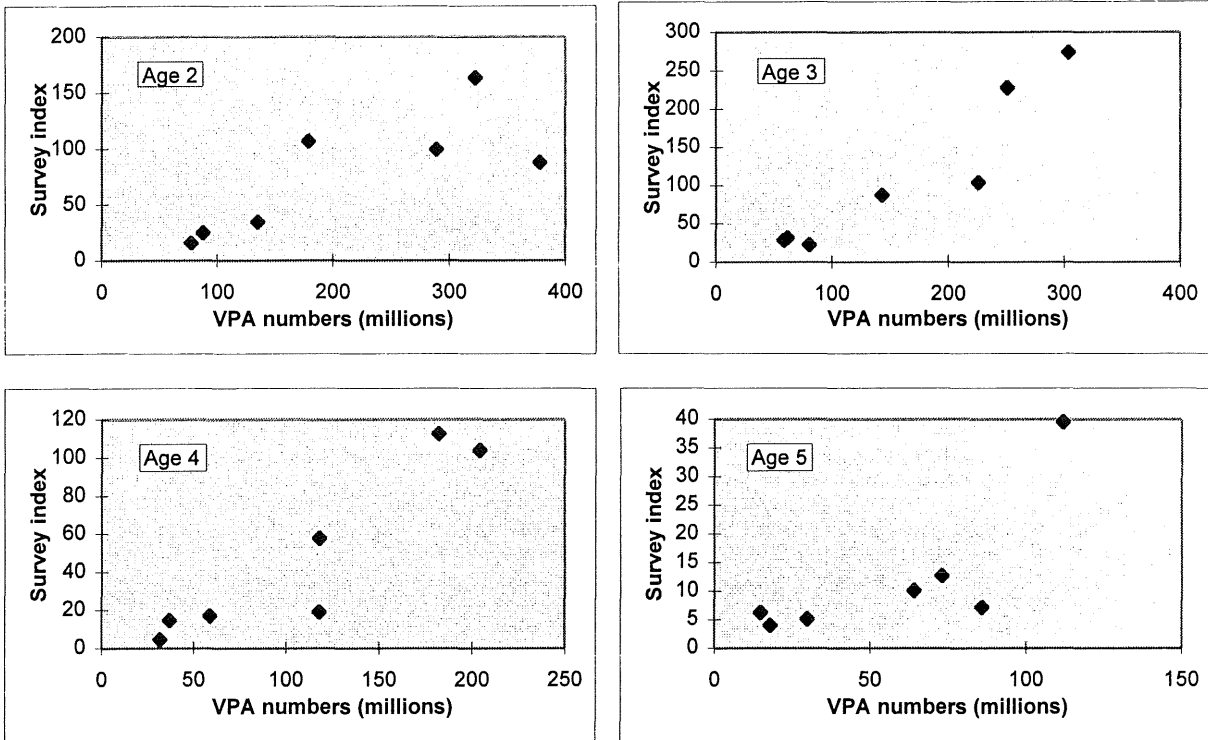


Figure 5.2B. North-East Arctic Saithe - Norwegian purse seine vs VPA

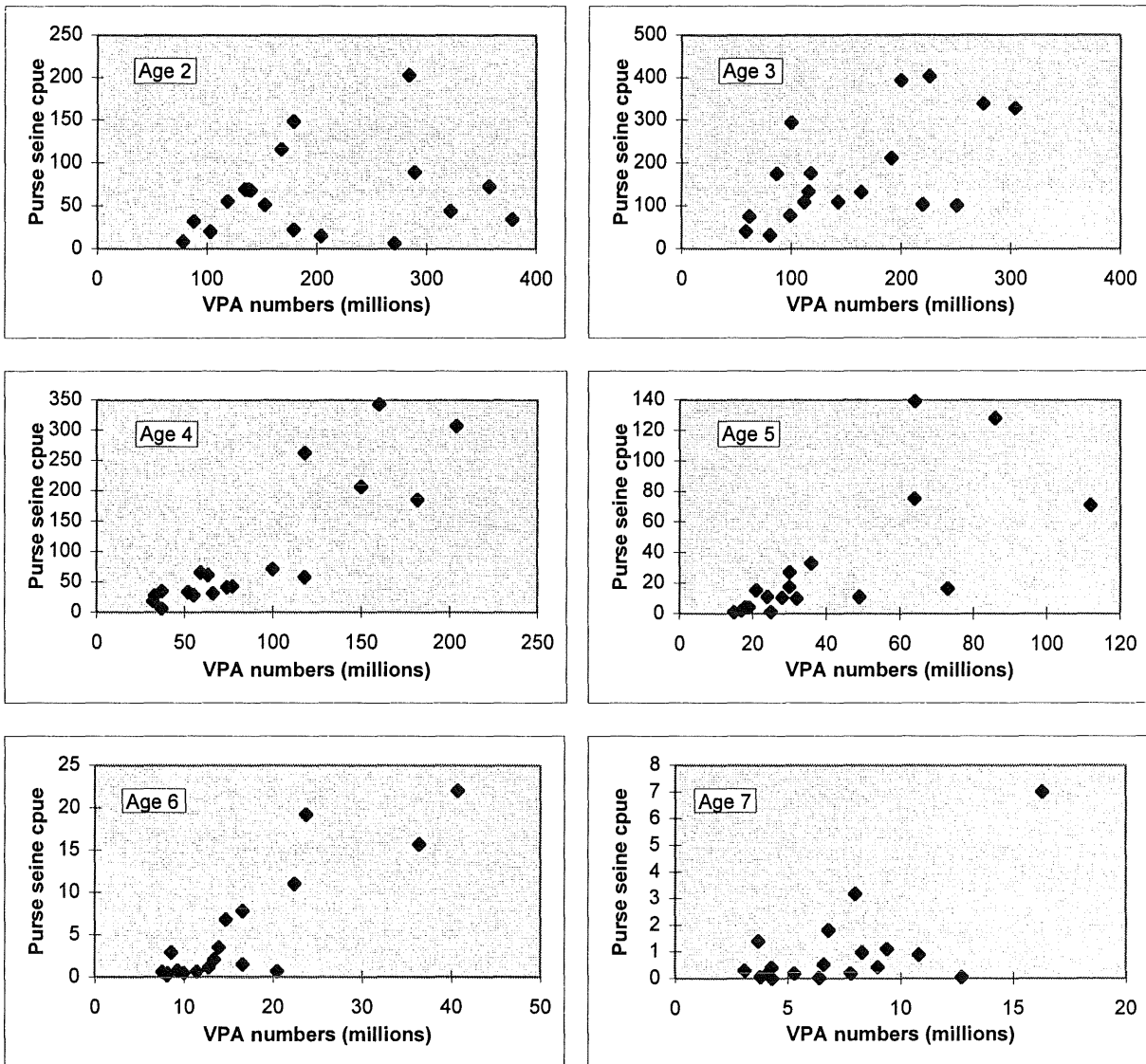


Figure 5.2C. North-East Arctic Saithe - Norwegian trawl vs VPA

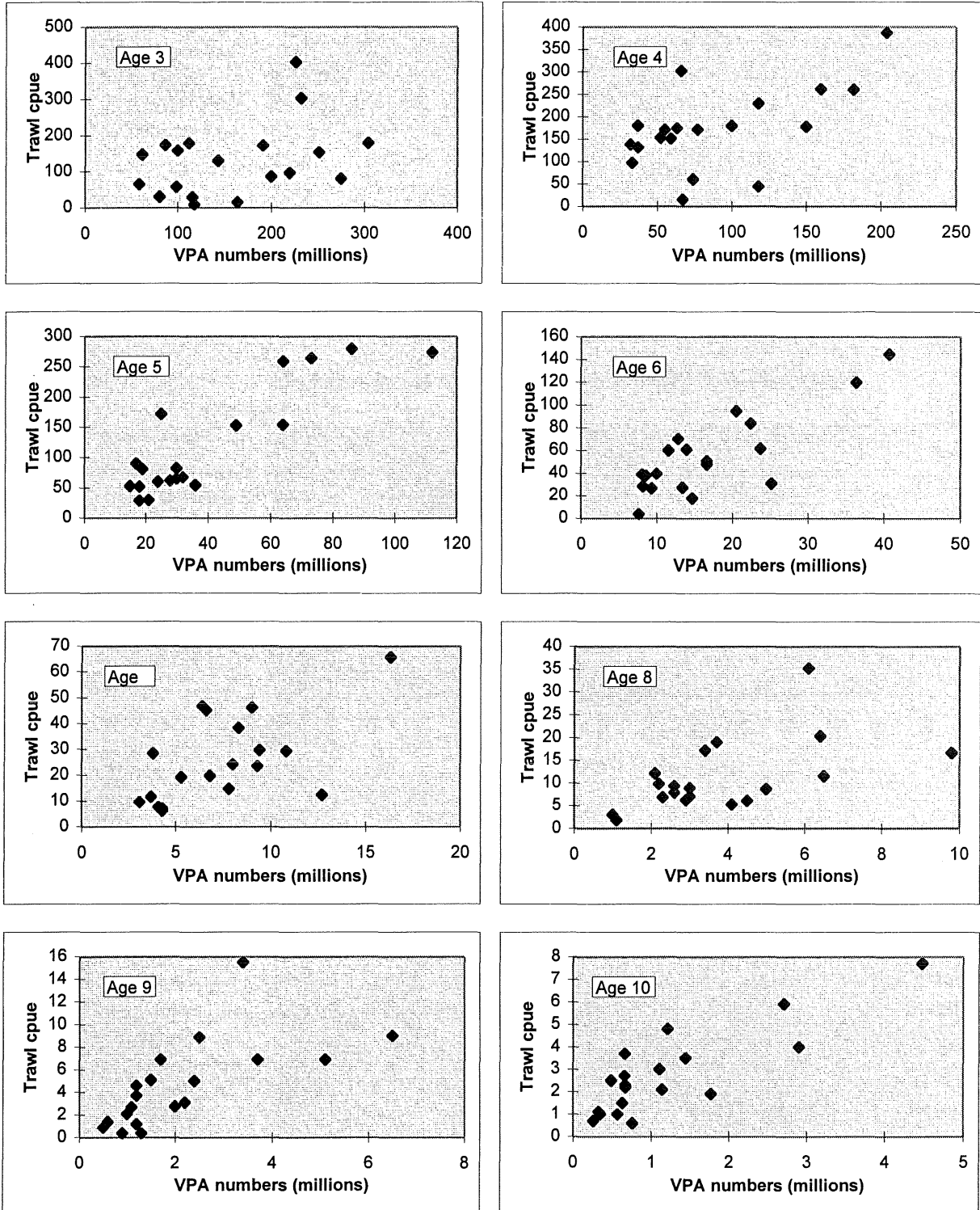


Figure 5.3A. North-East Arctic Saithe - Retrospective analysis

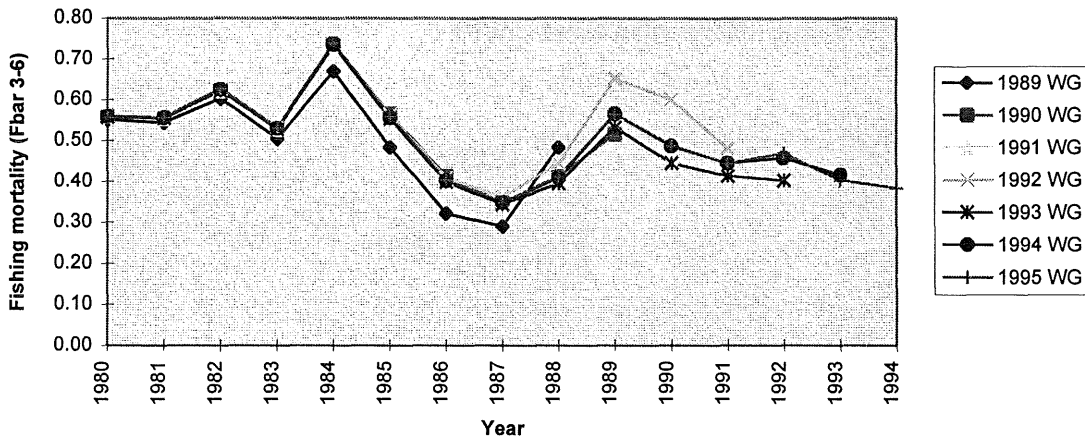


Figure 5.3B. North-East Arctic Saithe - Retrospective analysis

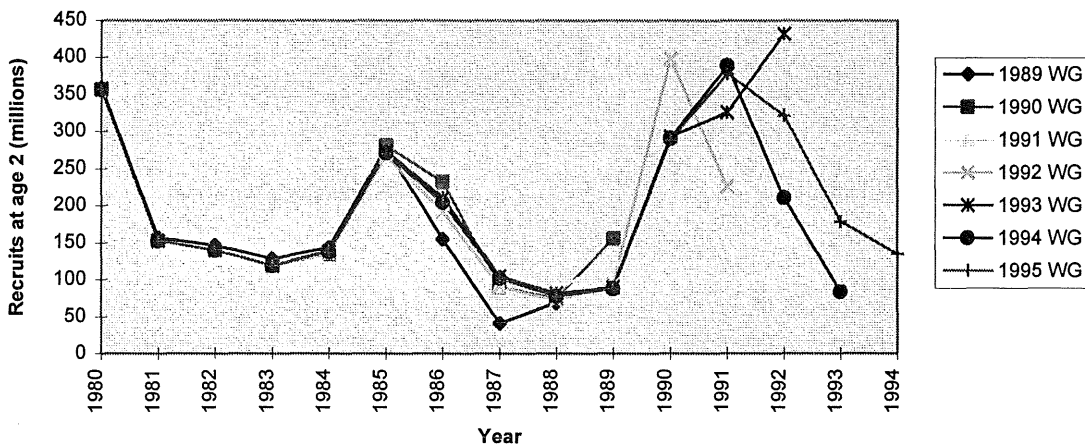


Figure 5.3C. North-East Arctic Saithe - Retrospective analysis

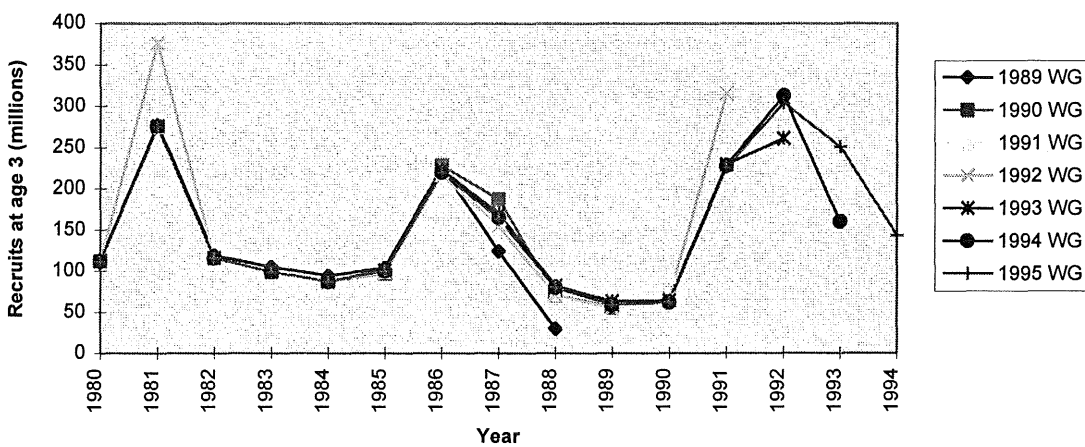
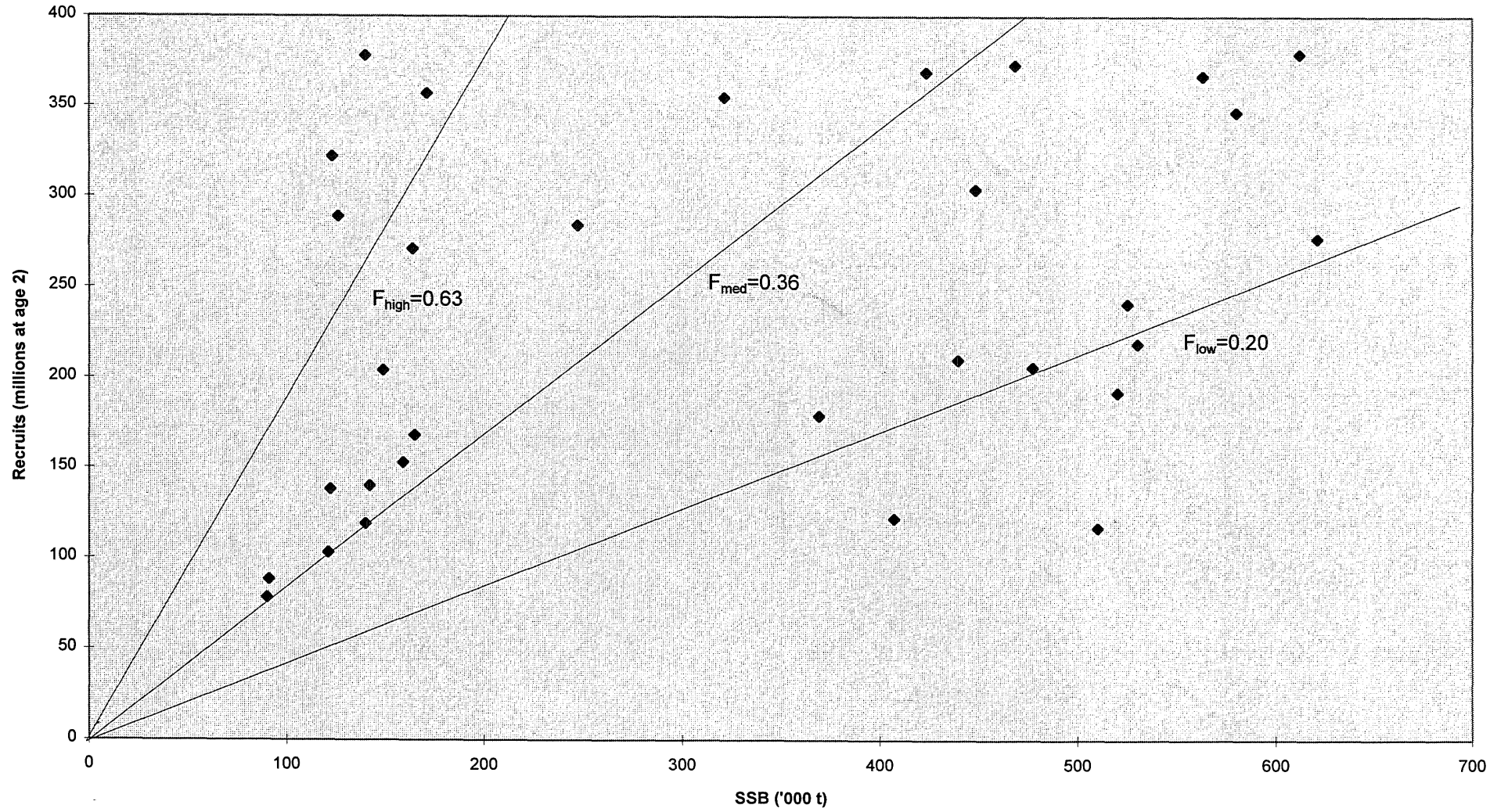


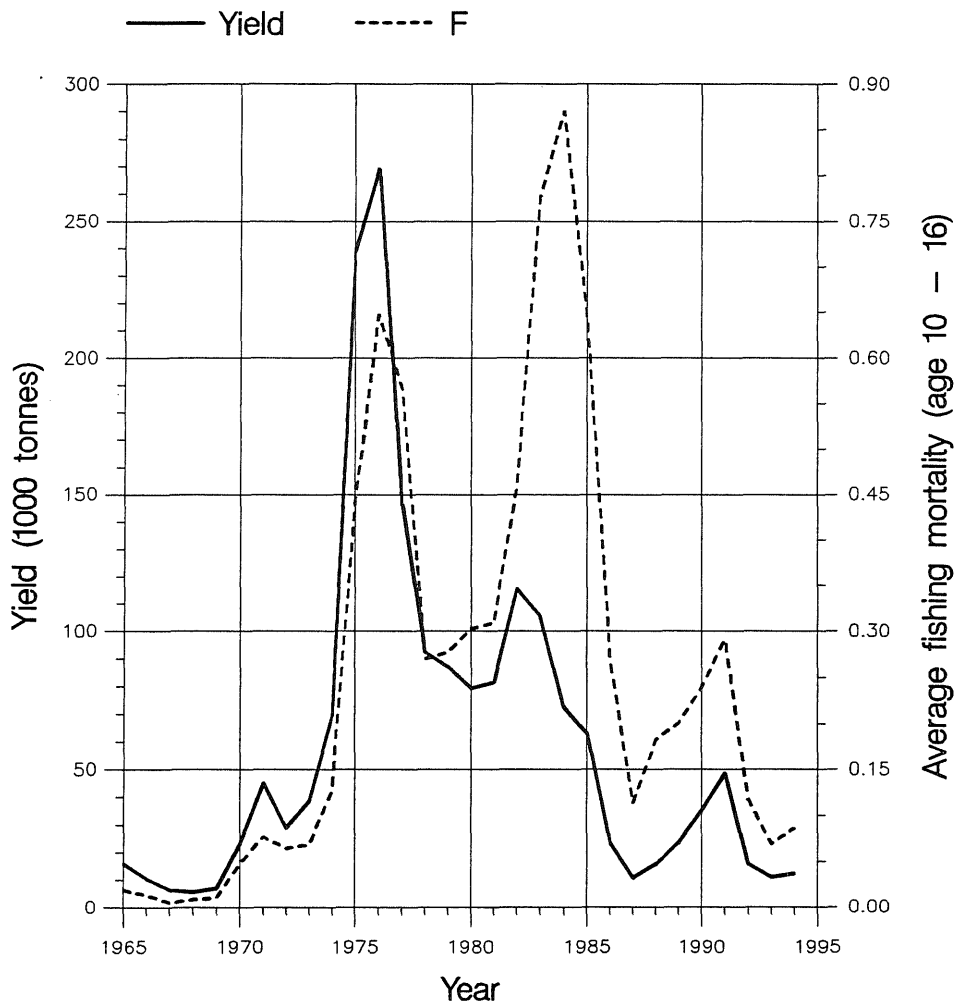
Figure 5.4. North-East Arctic Saithe - SSB vs Recruitment



# Fish Stock Summary

Figure 6.1 *Sebastes mentella* in the North – East Arctic (Fishing Areas I & II)  
29 – 8 – 1995

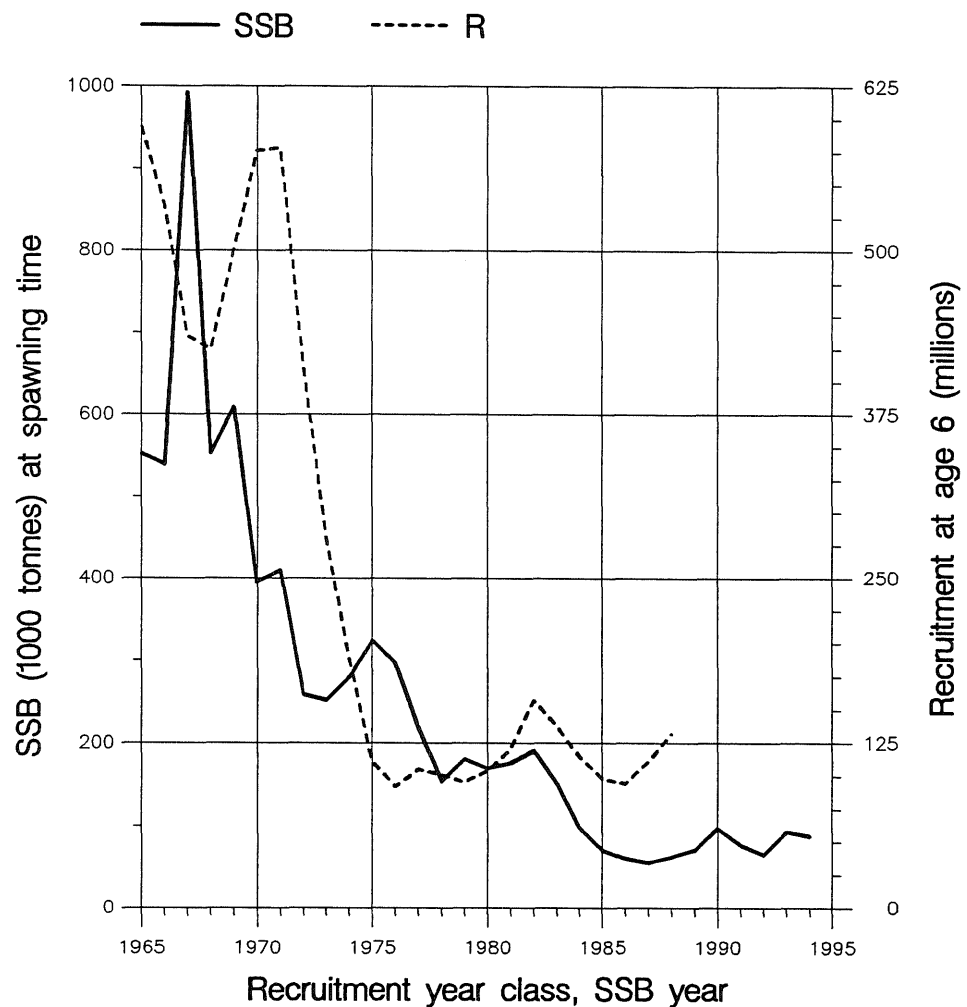
Yield and fishing mortality



(run: FINAL02)

A

Spawning stock and recruitment



(run: FINAL02)

B

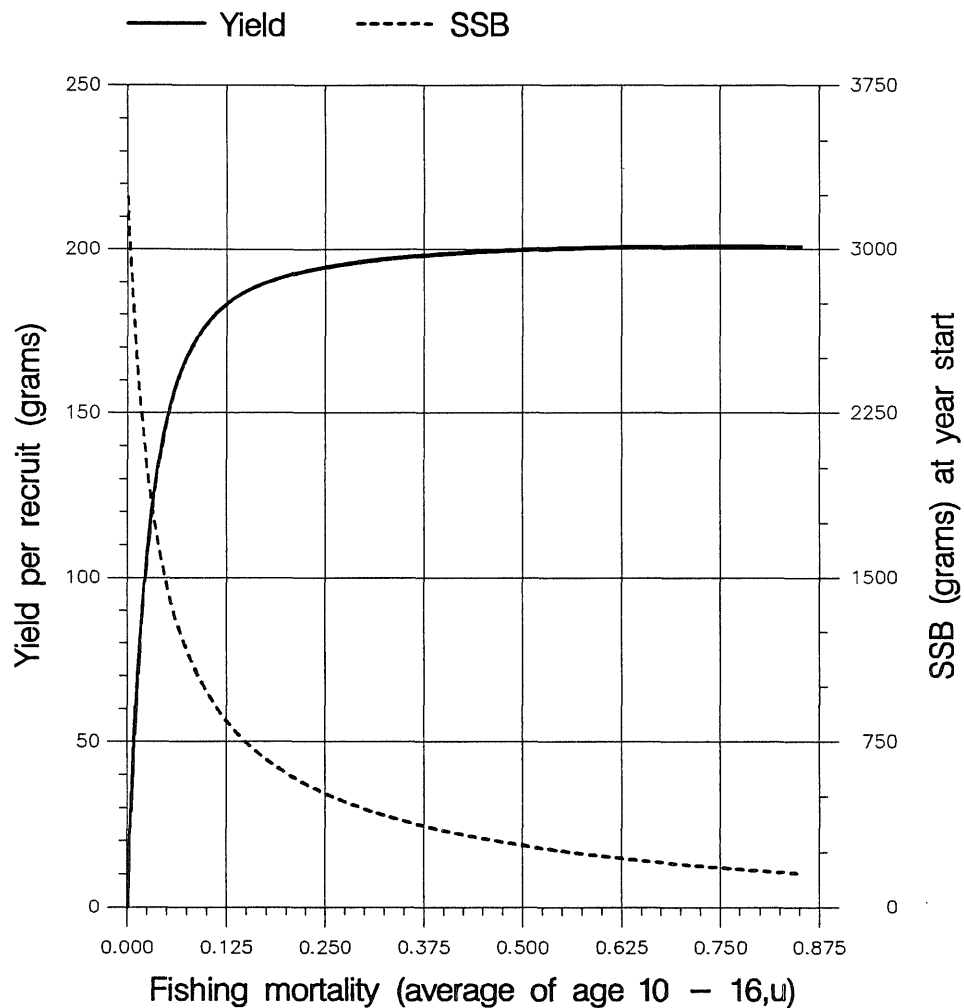
Continued



# Fish Stock Summary

Figure 6.1 Continued *Sebastes mentella* in the North-East Arctic (Fishing Areas I & II)  
29-8-1995

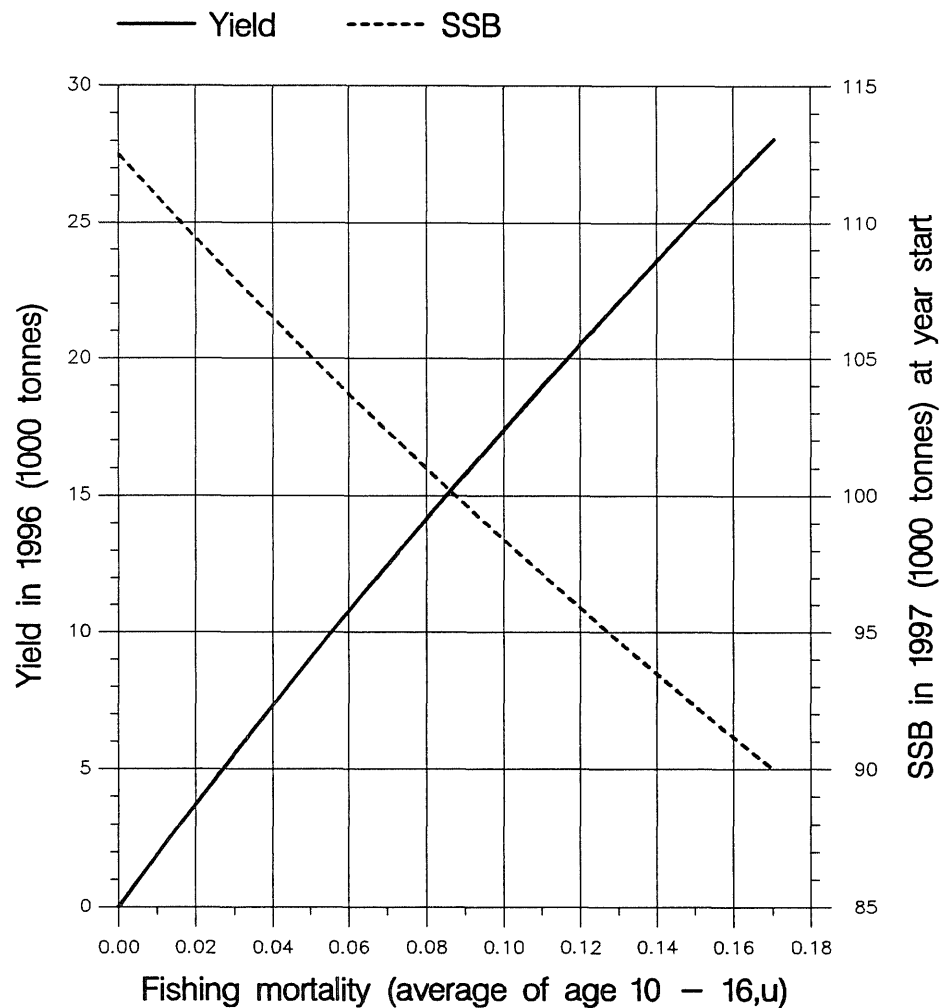
Long term yield and spawning stock biomass



(run: YPR1)

C

Short term yield and spawning stock biomass



(run: MOT01)

D

Figure 6.2 *Sebastes mentella* in ICES Sub-areas I and II.

Retrospective analysis of XSA

Input values: 2 years, 5 ages, and shrinkage = 2.0

Catchability dependent on stock size for ages < 7

Starting year for the XSA-run, F10-16

Year	1994	1993	1992	1991	1990
1975	0.44	0.44	0.44	0.44	0.44
1976	0.65	0.65	0.64	0.64	0.65
1977	0.57	0.57	0.56	0.56	0.58
1978	0.27	0.27	0.27	0.27	0.28
1979	0.28	0.28	0.27	0.27	0.28
1980	0.3	0.3	0.3	0.29	0.32
1981	0.31	0.31	0.3	0.3	0.32
1982	0.46	0.46	0.45	0.45	0.46
1983	0.78	0.78	0.75	0.75	0.8
1984	0.87	0.87	0.82	0.82	0.95
1985	0.64	0.65	0.6	0.6	0.8
1986	0.27	0.27	0.26	0.25	0.37
1987	0.11	0.11	0.11	0.11	0.16
1988	0.18	0.19	0.18	0.17	0.27
1989	0.2	0.21	0.2	0.18	0.33
1990	0.24	0.26	0.25	0.21	0.28
1991	0.29	0.32	0.32	0.25	
1992	0.12	0.14	0.13		
1993	0.07	0.08			
1994	0.09				

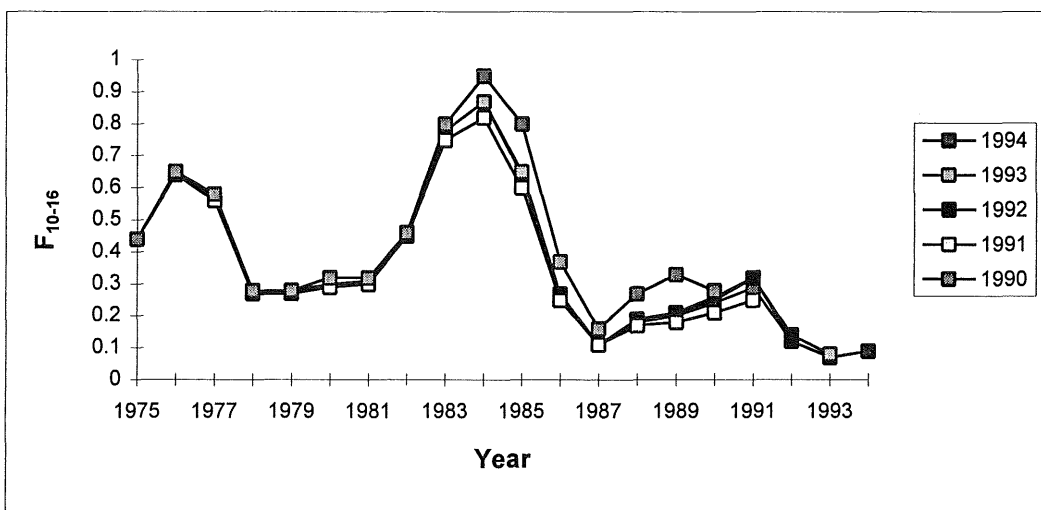
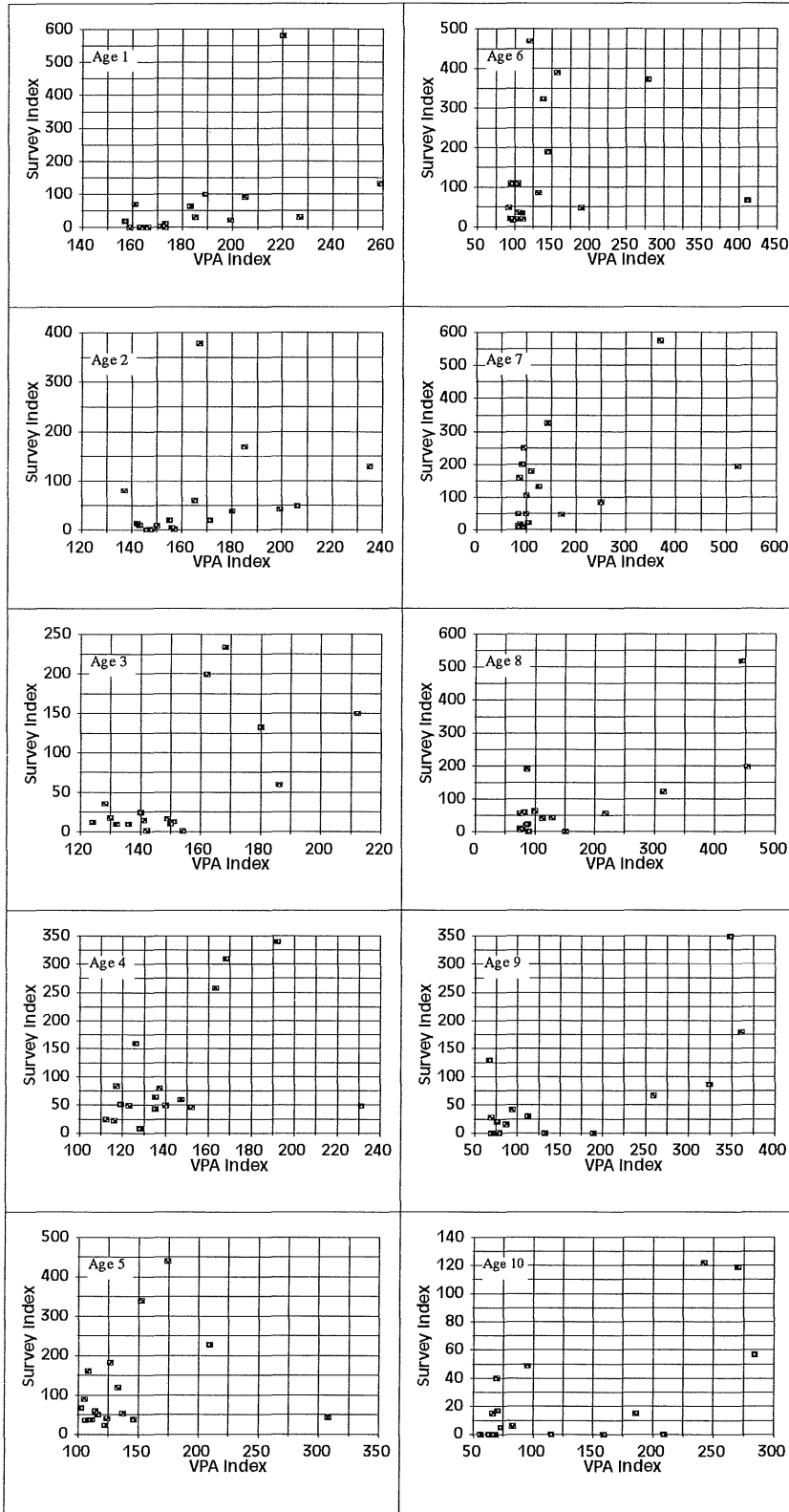


Figure 6.3A

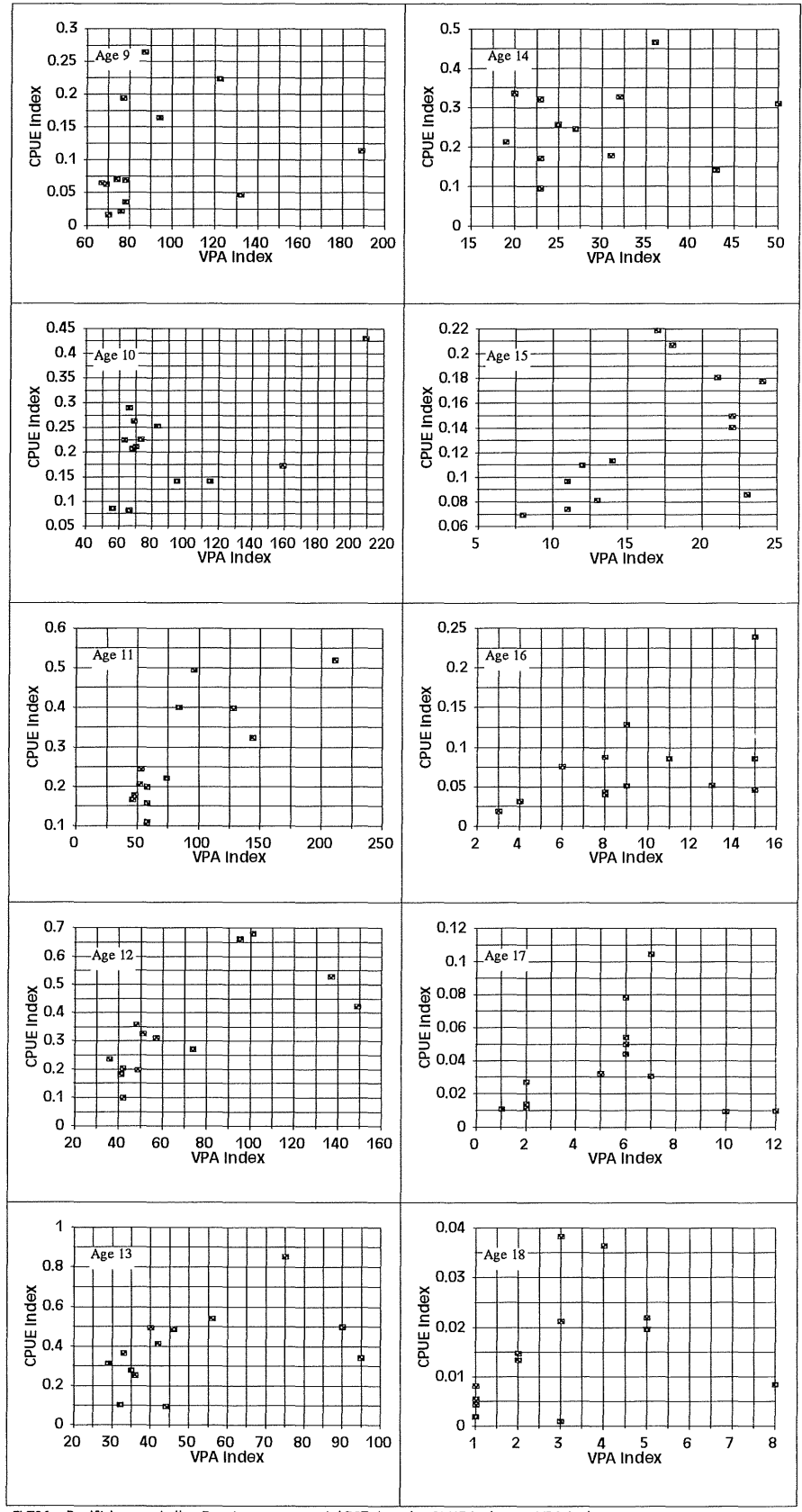
A



FLT10 - Redfish mentella - Russian bottom trawl survey Index vs. VPA Index.

Figure 6.3B

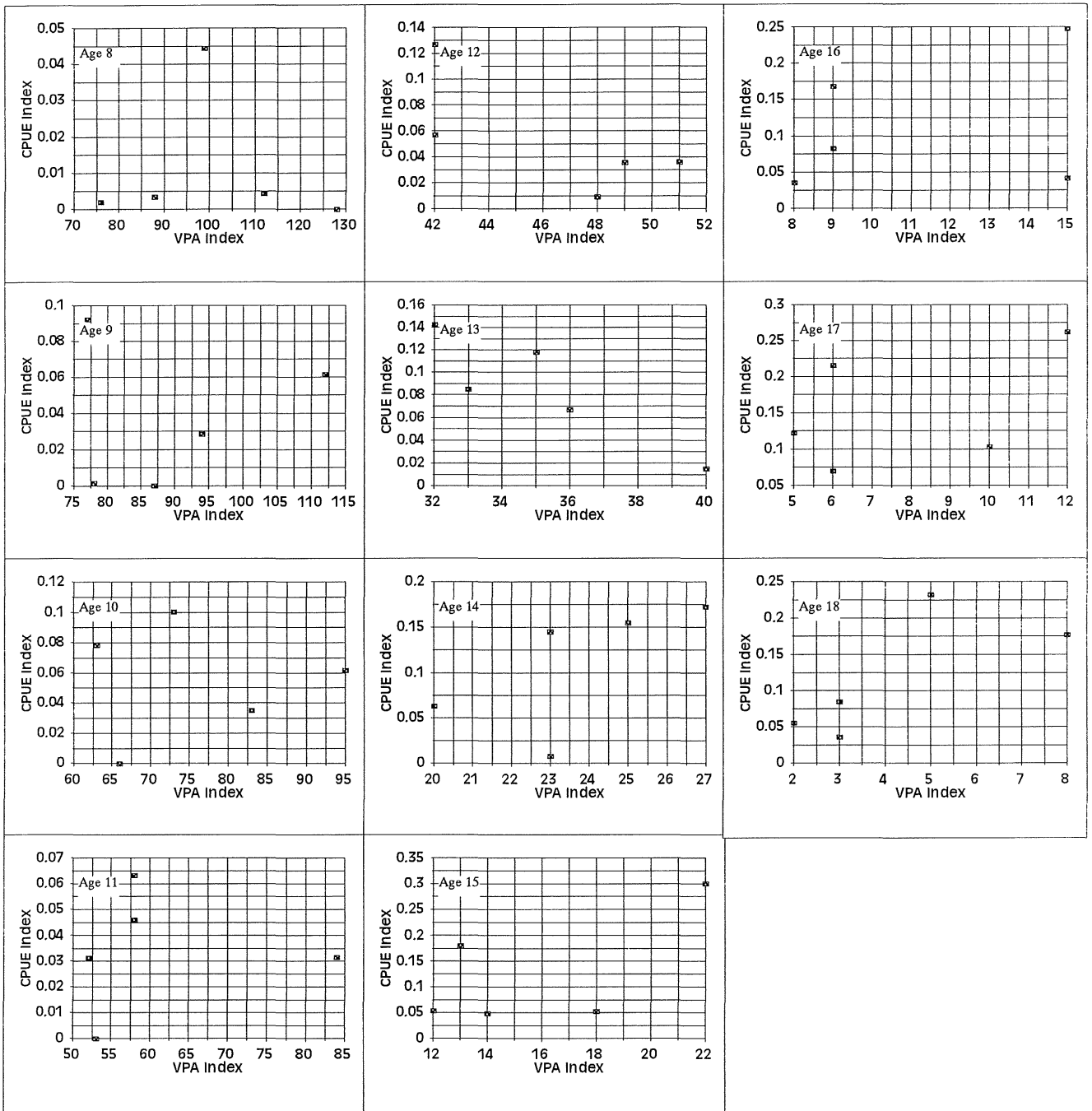
A



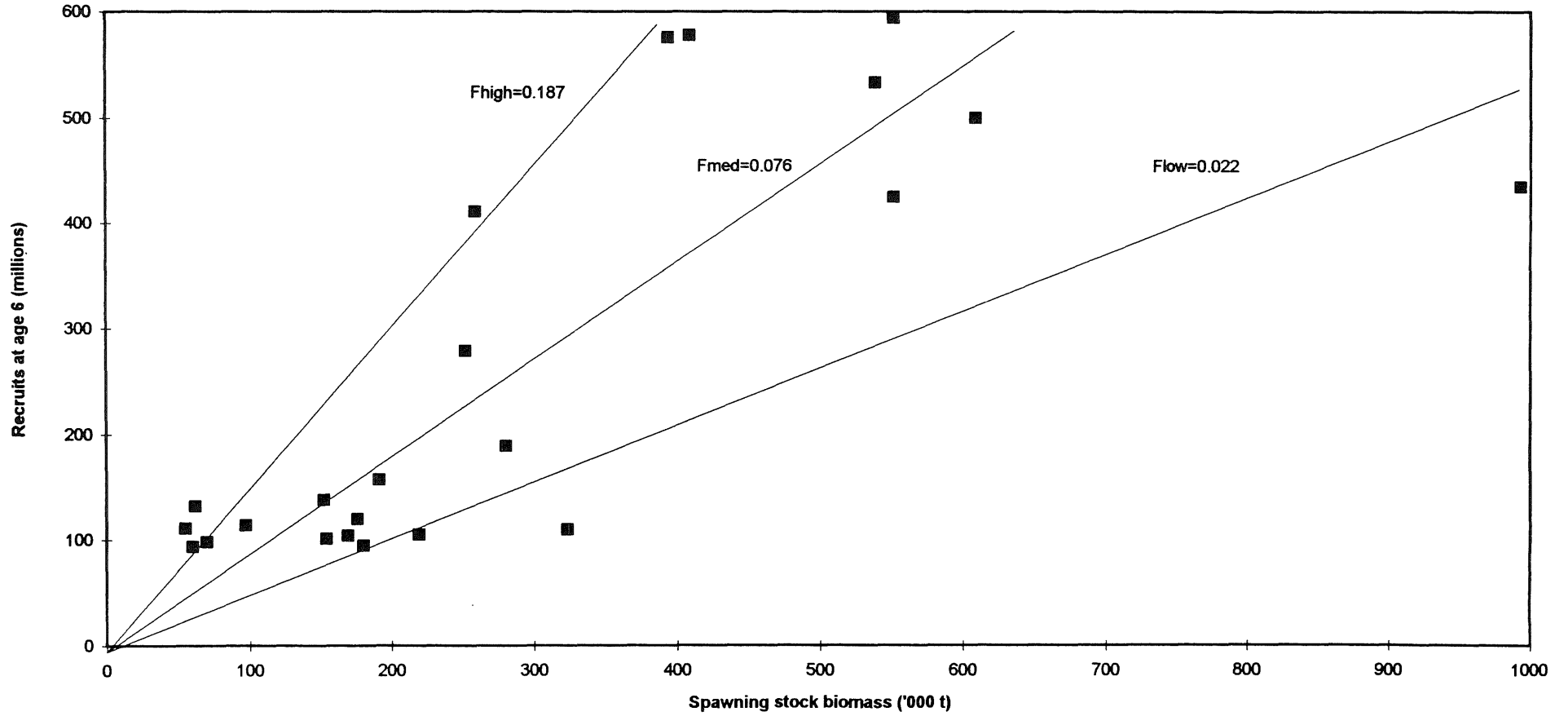
FLT04 - Redfish mentella - Russian commercial PST- trawler CPUE Index vs. VPA Index.

Figure 6.3C

A



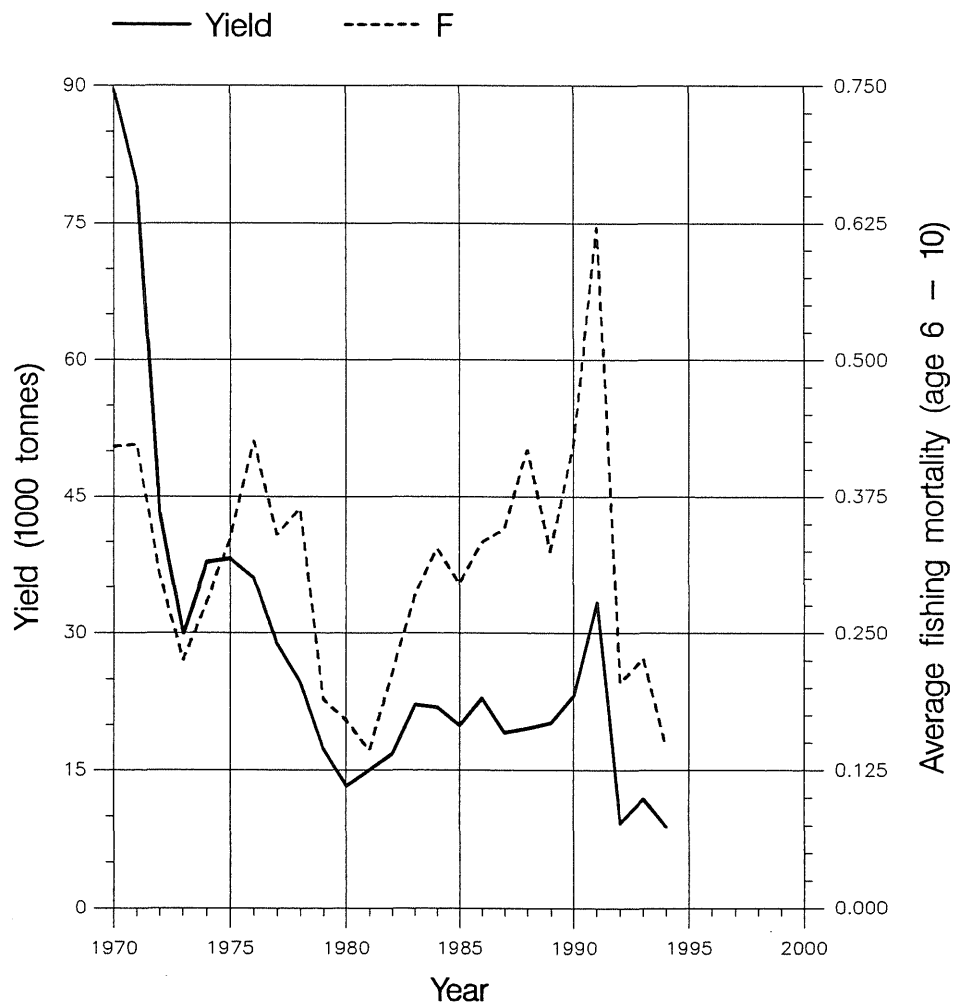
FLT11 - Redfish mentella - Norwegian commercial trawler CPUE Index vs. VPA Index.

Figure 6.4. *Sebastes mentella*. Stock and recruitment plot.

# Fish Stock Summary

Figure 8.1 Greenland halibut in the North-East Arctic (Fishing Areas I & II)  
28-8-1995

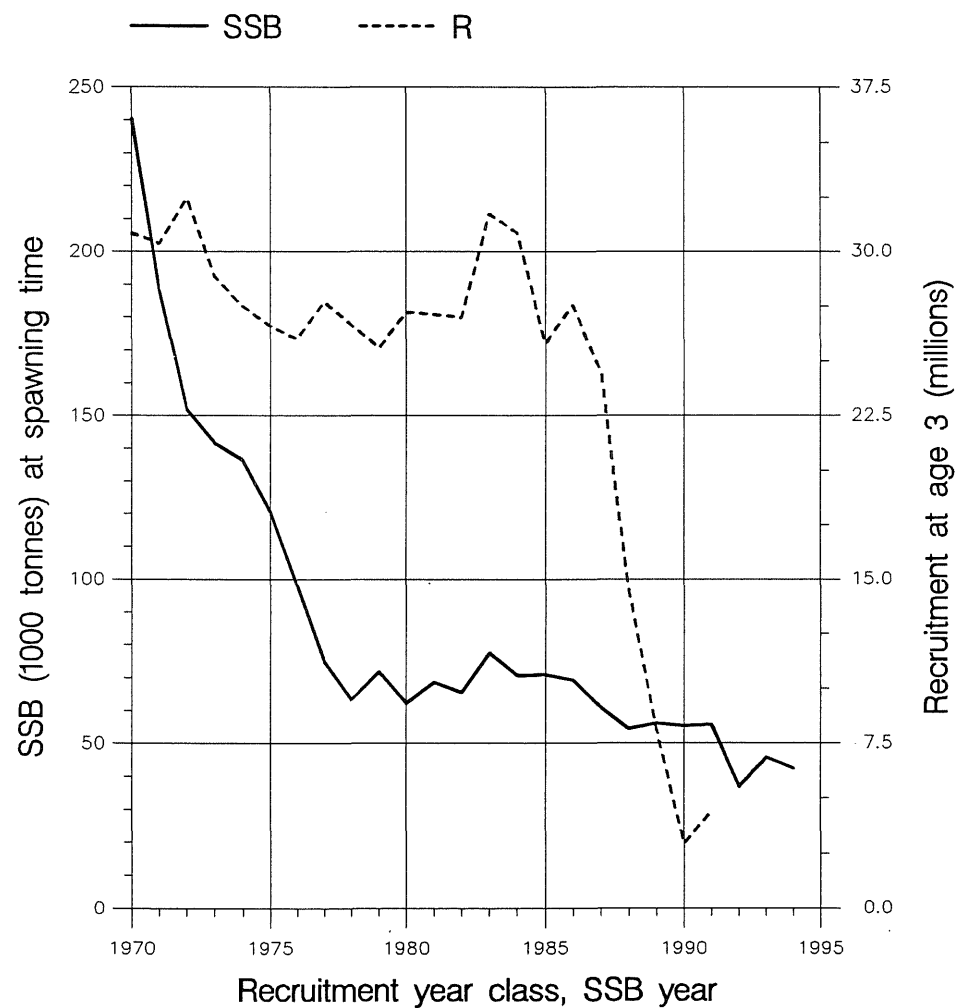
Yield and fishing mortality



(run: FIN)

A

Spawning stock and recruitment



(run: FIN)

B

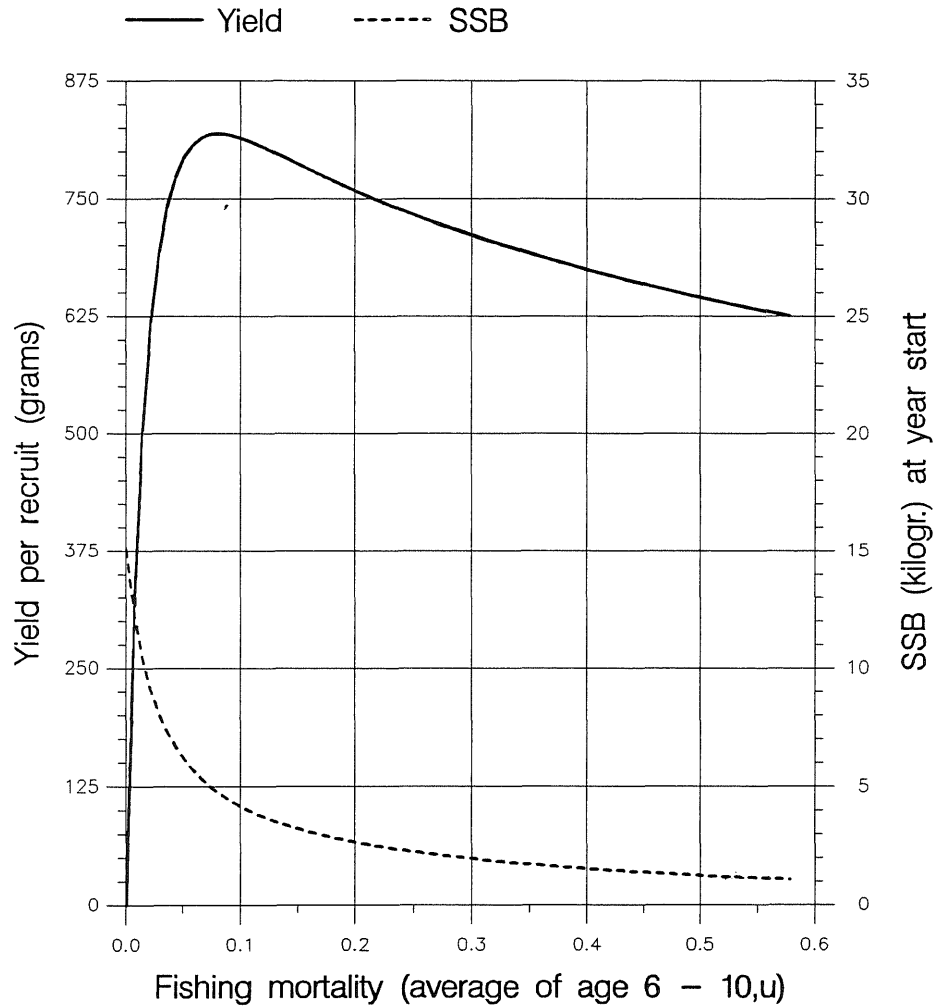
Continued

# Fish Stock Summary

Figure 8.1 Continued Greenland halibut in the North-East Arctic (Fishing Areas I & II)  
29 - 8 - 1995

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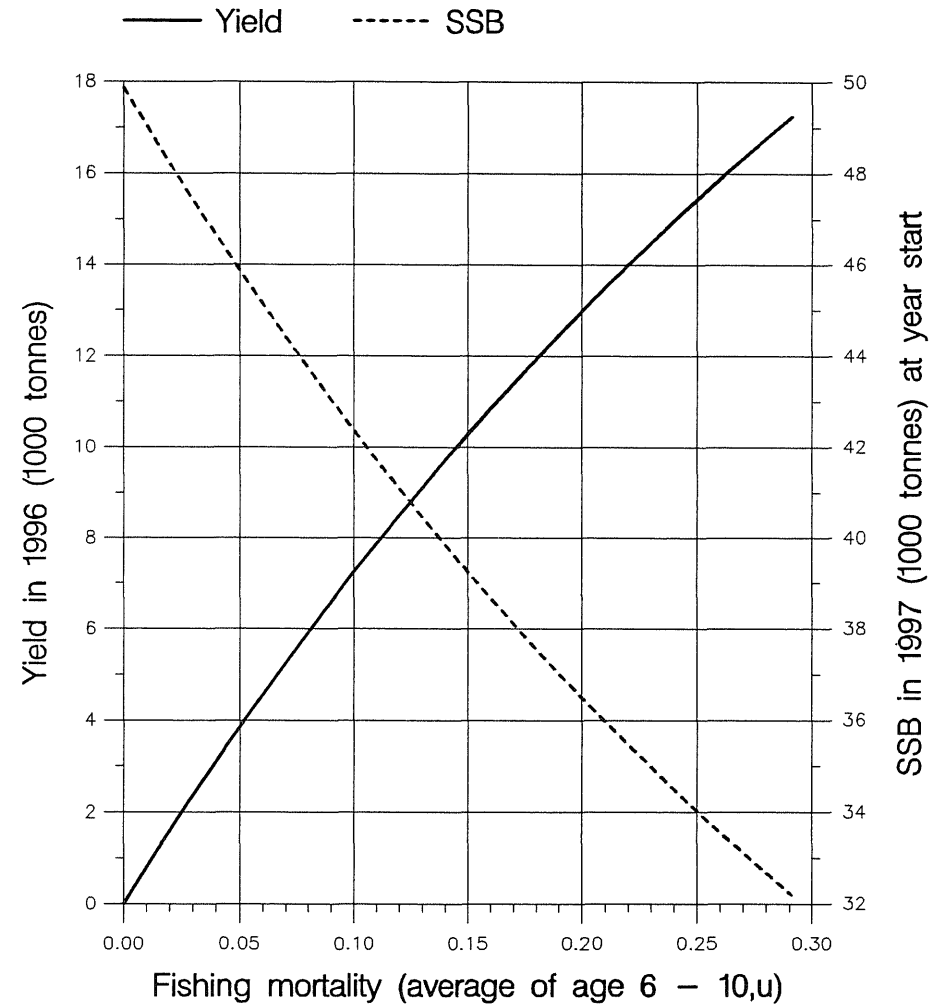
Long term yield and spawning stock biomass



(run: YPR95A)

C

Short term yield and spawning stock biomass

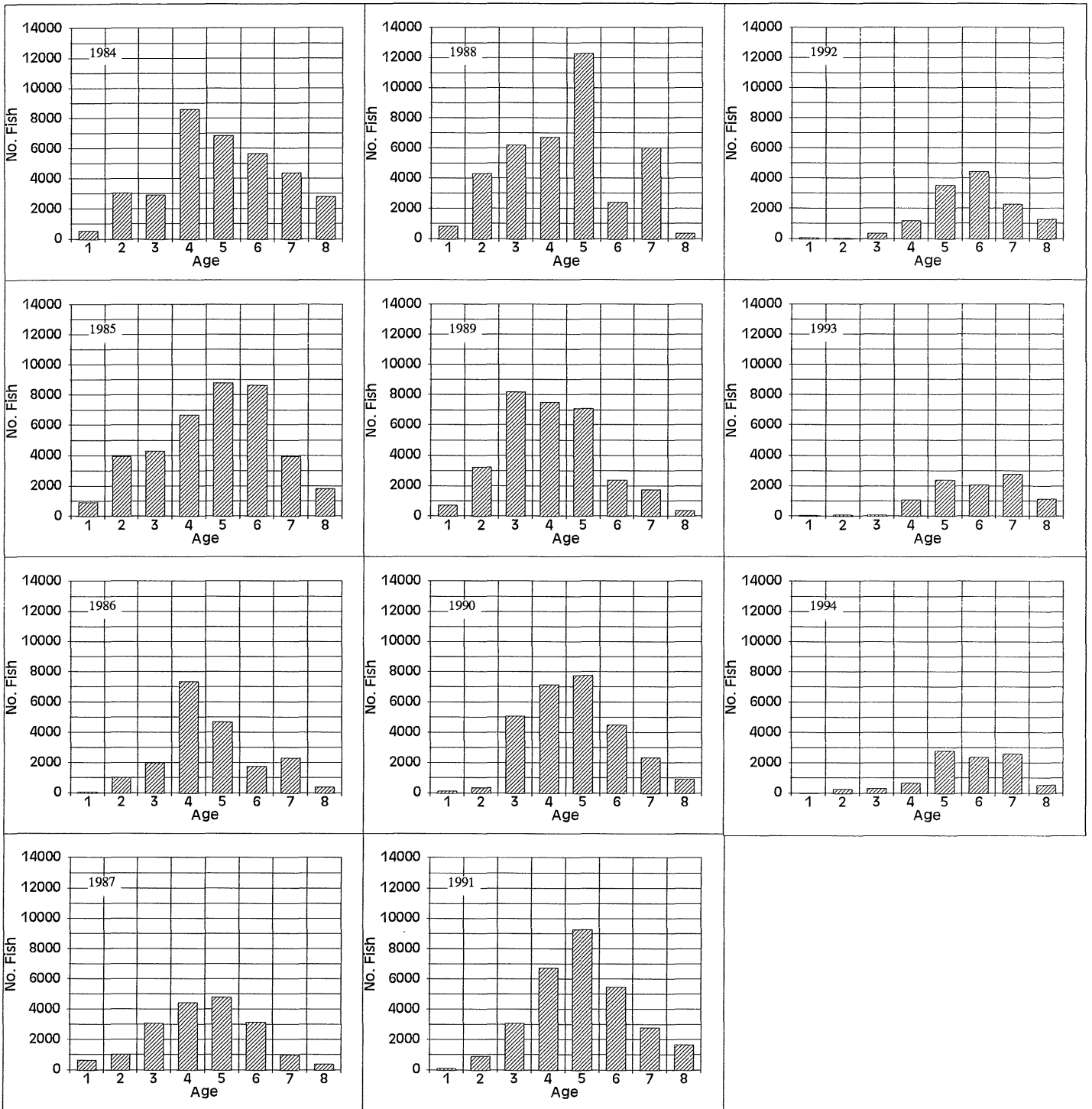


(run: MOT95A)

D

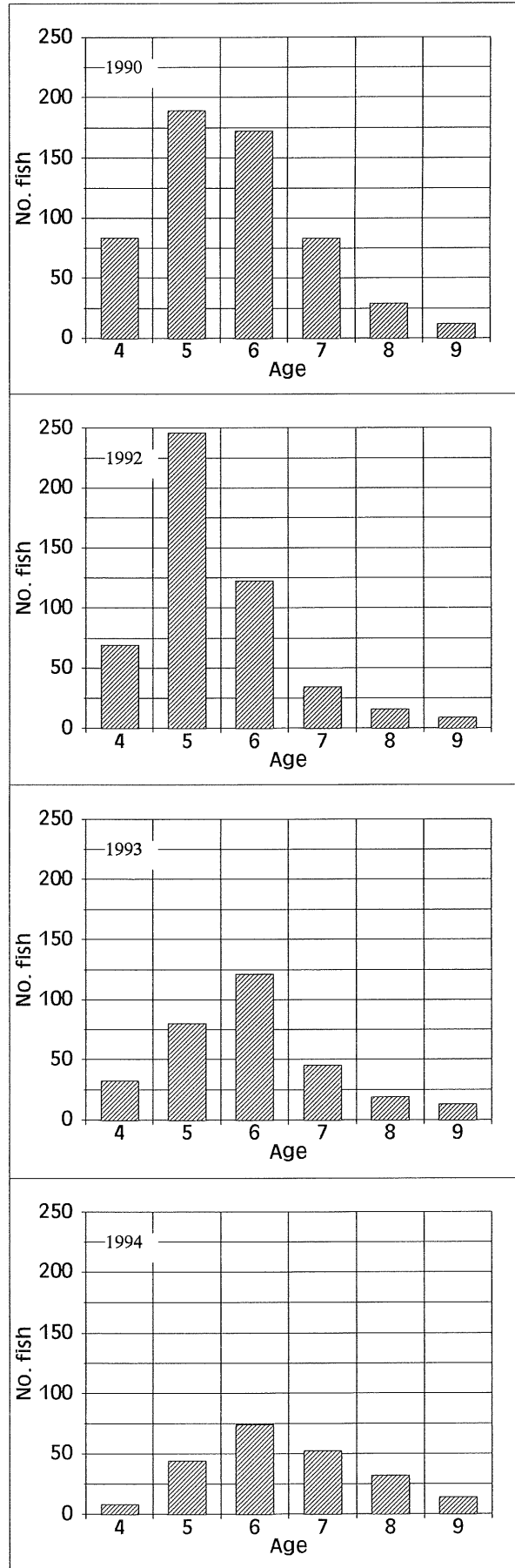


Figure 8.2A



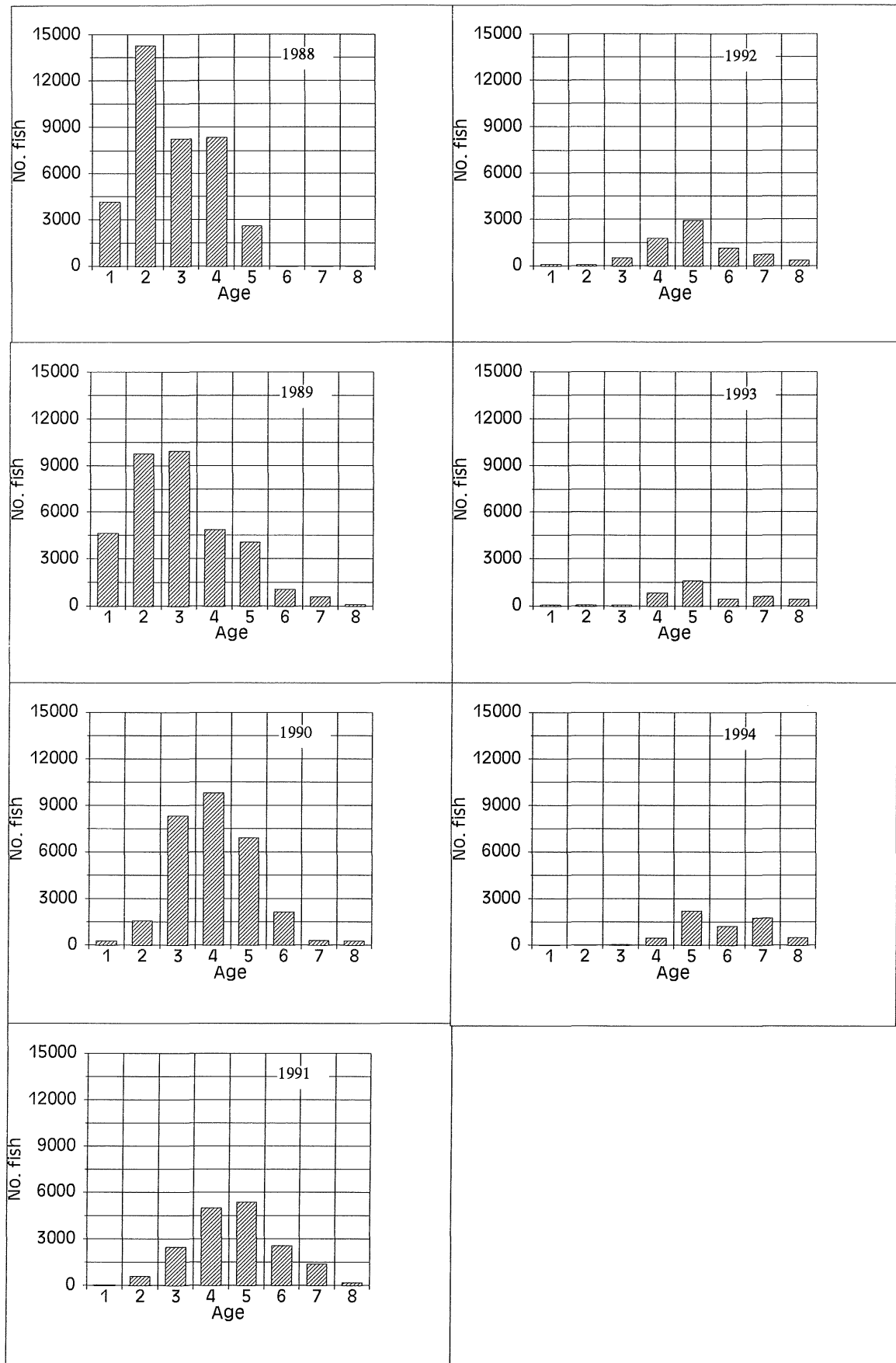
FLT09 - Number of Greenland halibut caught at age from the Norwegian Svalbard trawl survey (autumn) from 1984-94.

Figure 8.2B



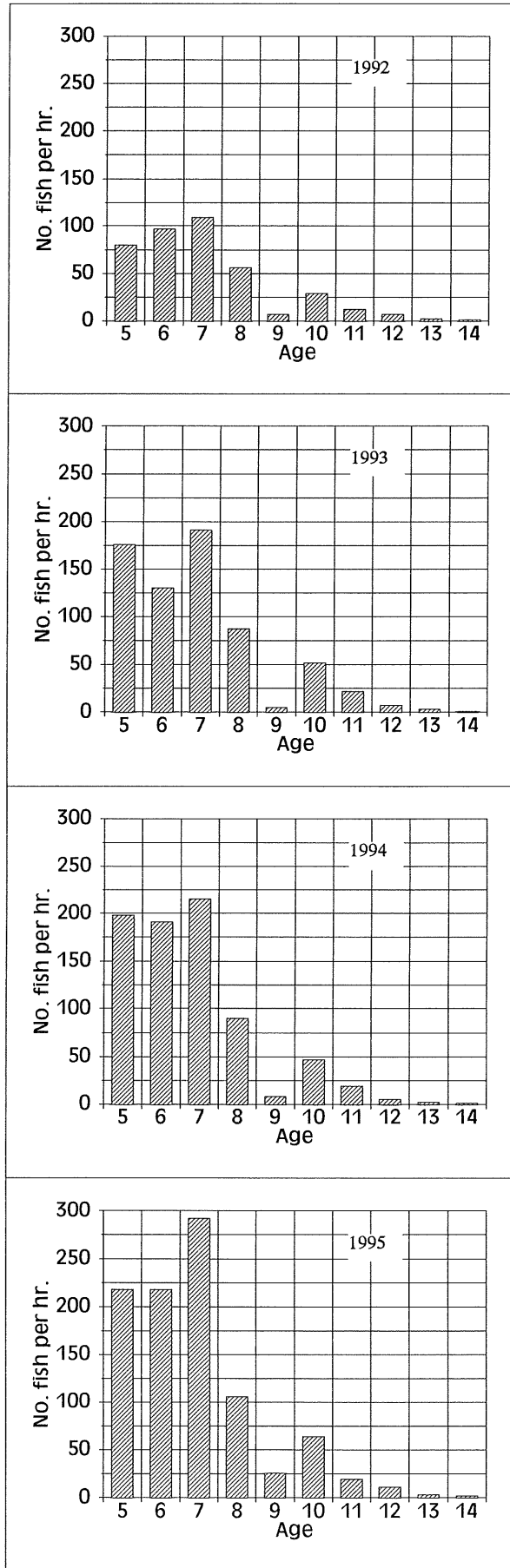
FLT10 - Number of Greenland halibut caught at age from the Russian Bottom Trawl survey (autumn) during 1990-94 (except 1991).

Figure 8.2C



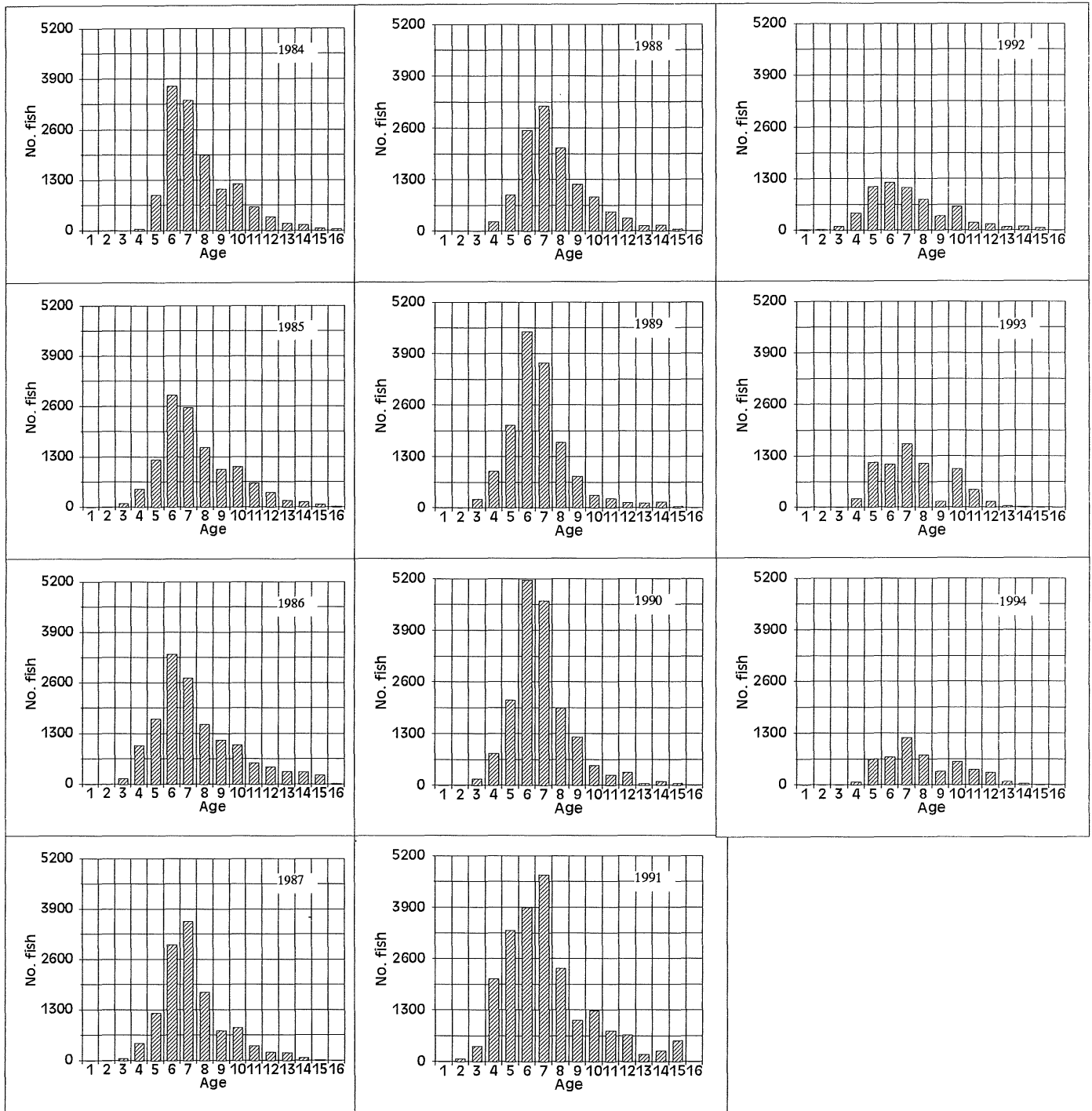
FLT11 - Catch numbers at age of Greenland halibut from the Norwegian Svalbard Shrimp Surveys

Figure 8.2D



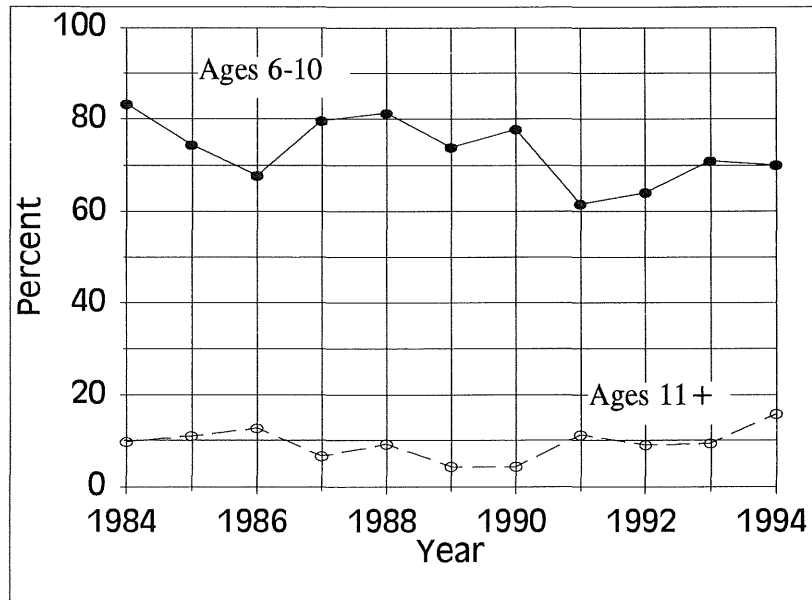
FLT12 - Greenland halibut CPUE at age from a limited experimental commercial fishery by Norway during 1992-95.

Figure 8.3A



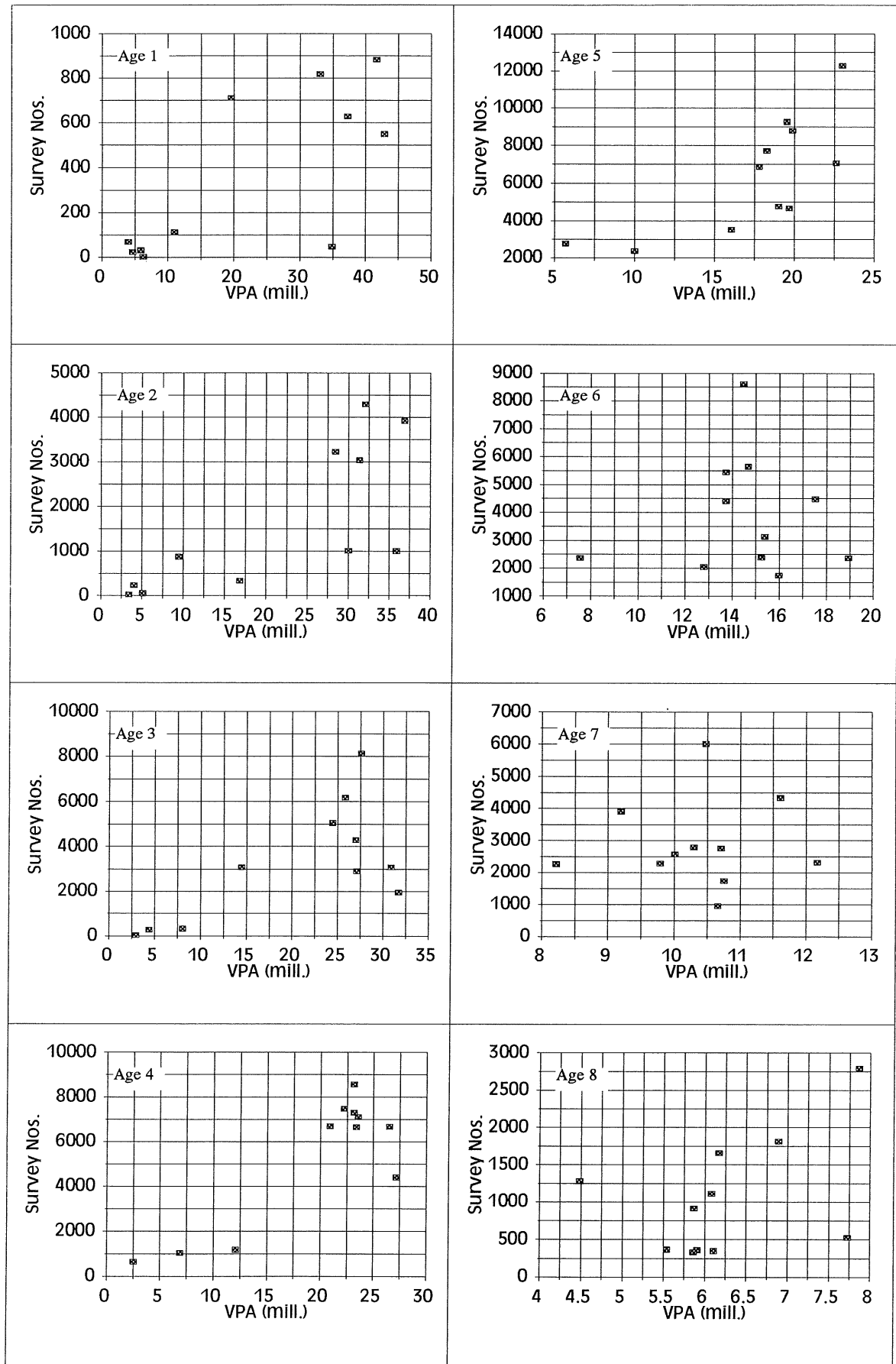
Catch numbers ('000s) at age of Greenland halibut from the commercial fishery.

Figure 8.3B



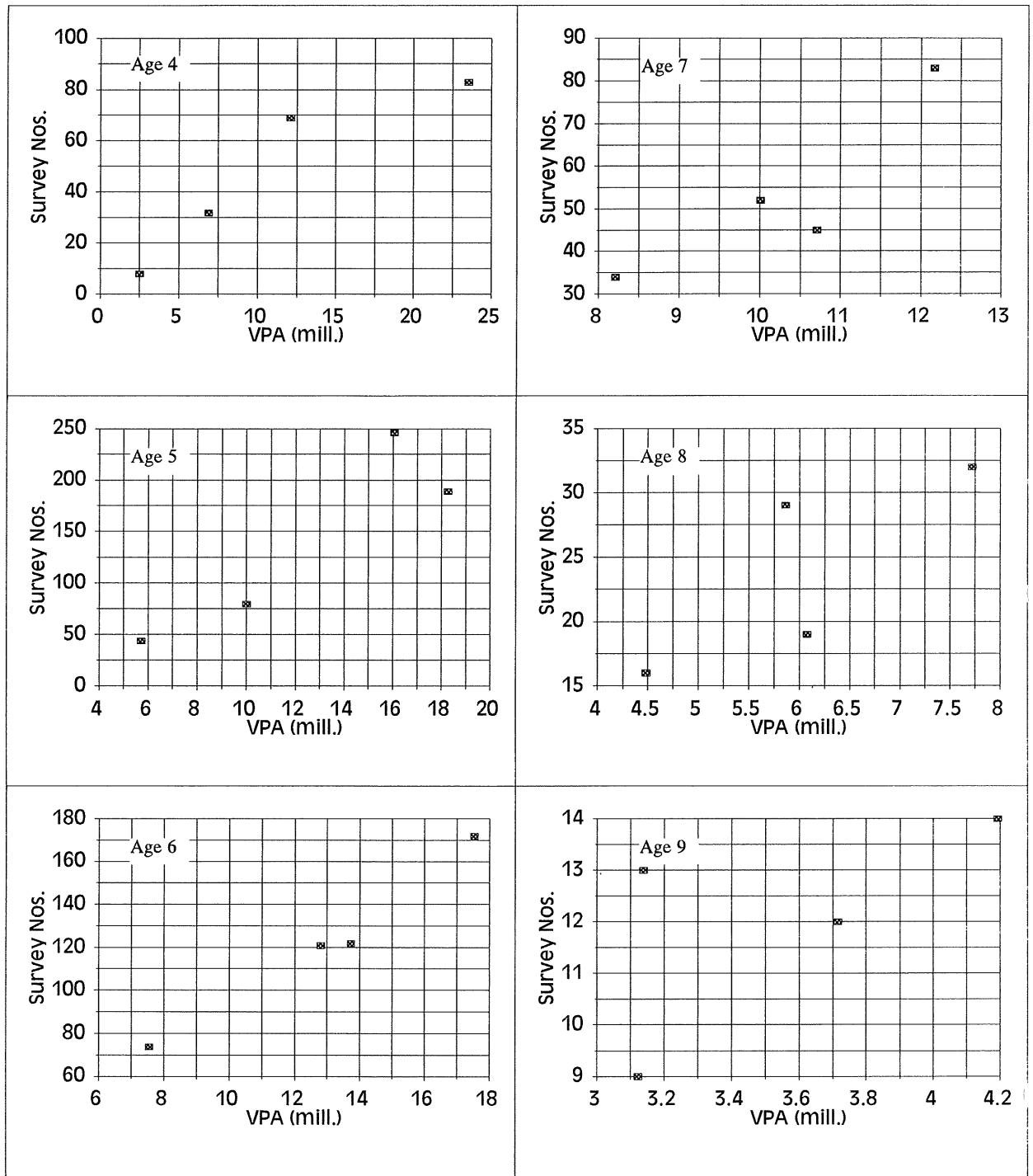
Greenland halbut catch proportions (numbers) by age grouping.

Figure 8.4A



Greenland halibut abundance index from the Norwegian svalbard trawl survey plotted against the VPA

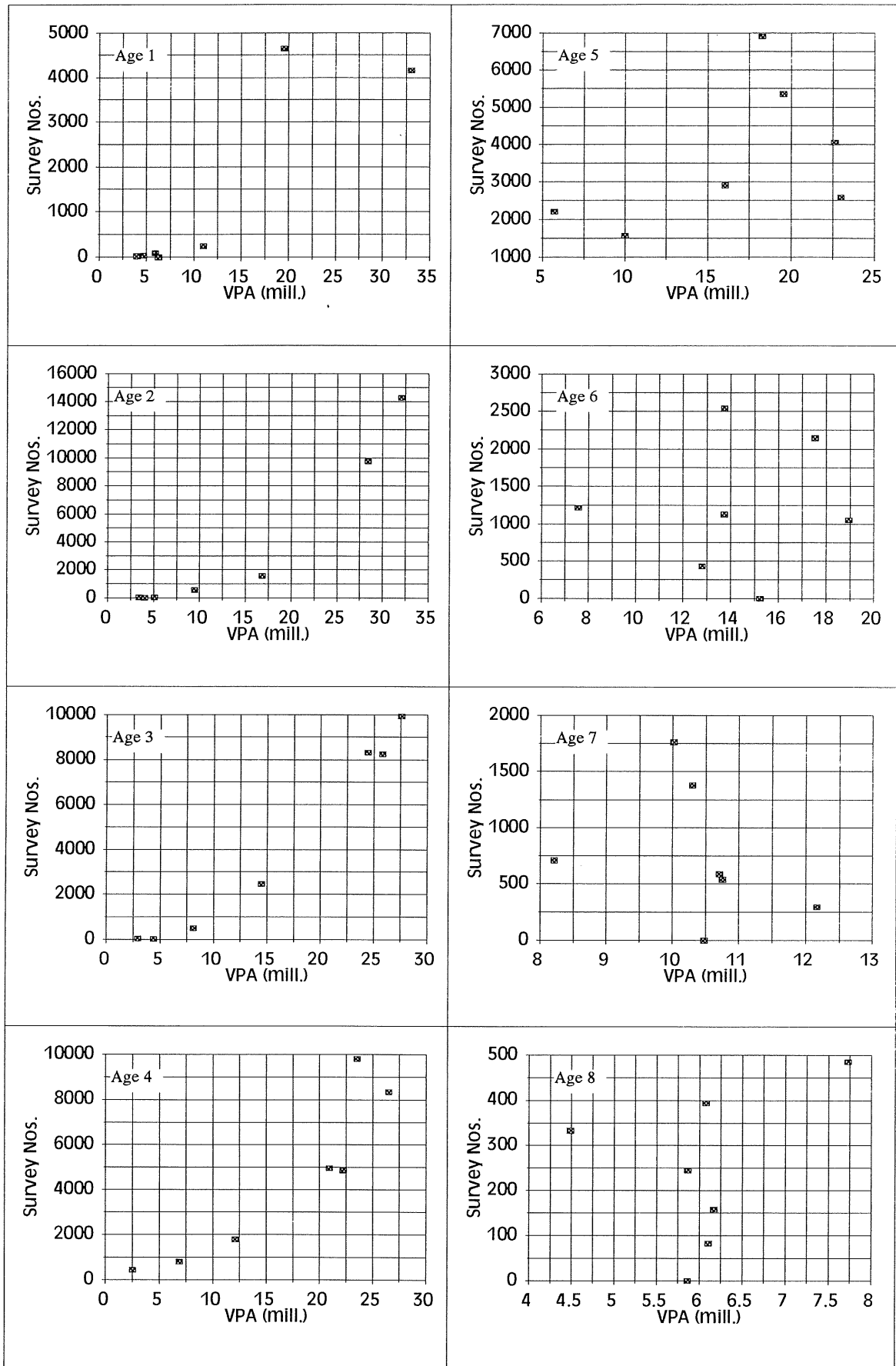
Figure 8.4B



Greenland halbut abundance index from the Russian trawl survey plotted against the VPA

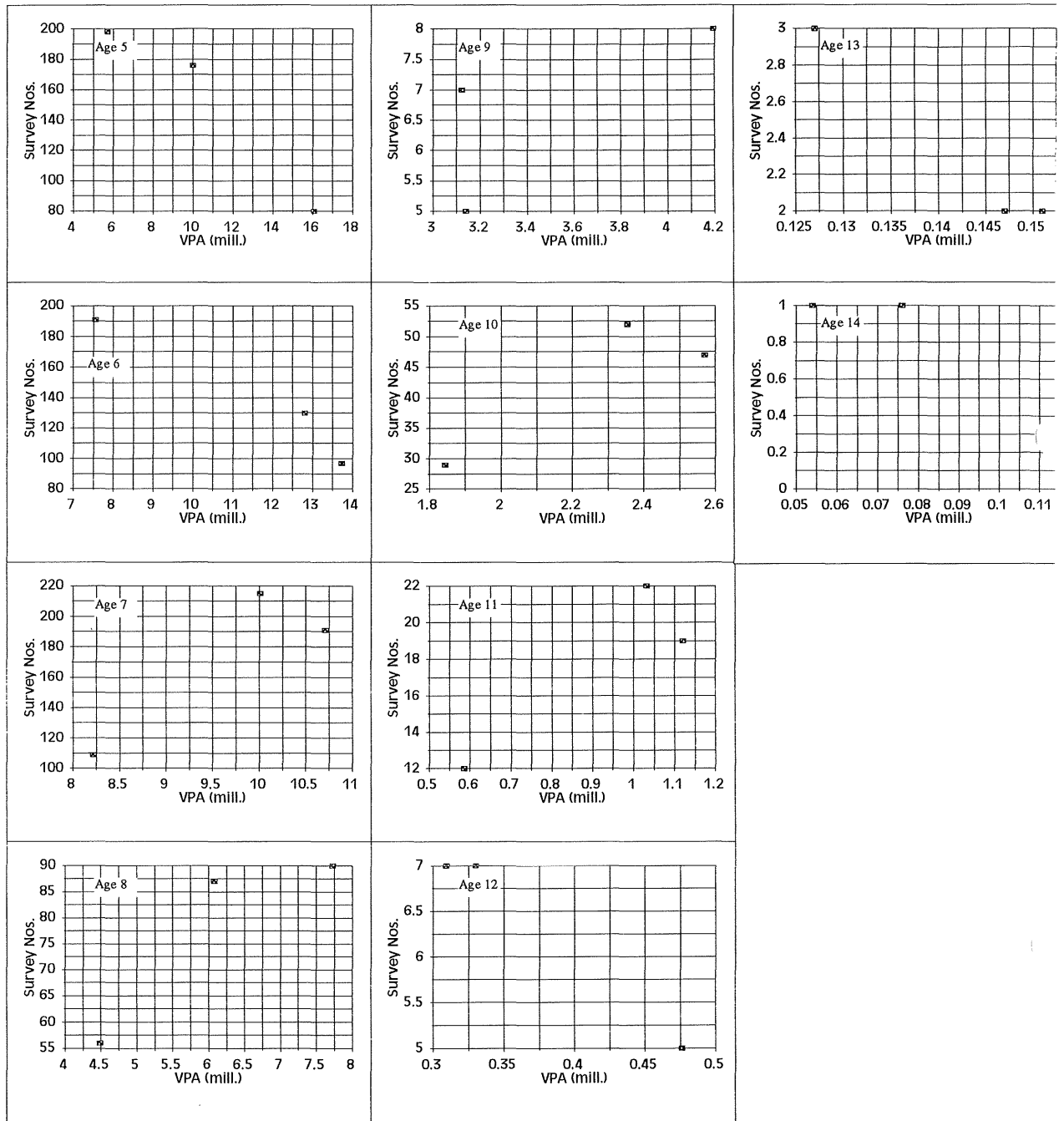


Figure 8.4C



Greenland halibut abundance index from the Norwegian shrimp survey plotted against the VPA

Figure 8.4D



Greenland halibut abundance index from the Norwegian experimental fishery plotted against the VPA

Figure 8.5 North east arctic Greenland halibut, SSB vers recr.

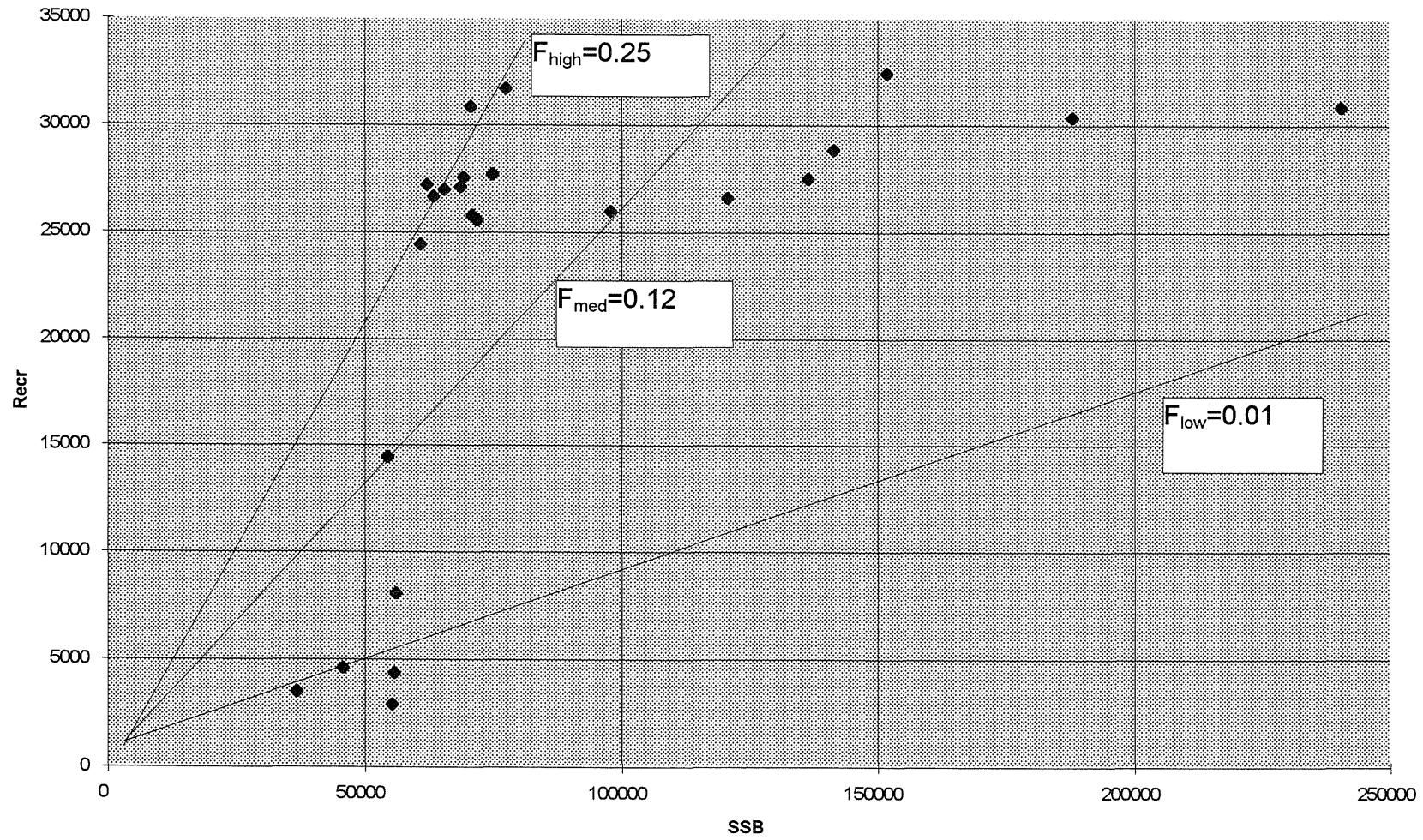
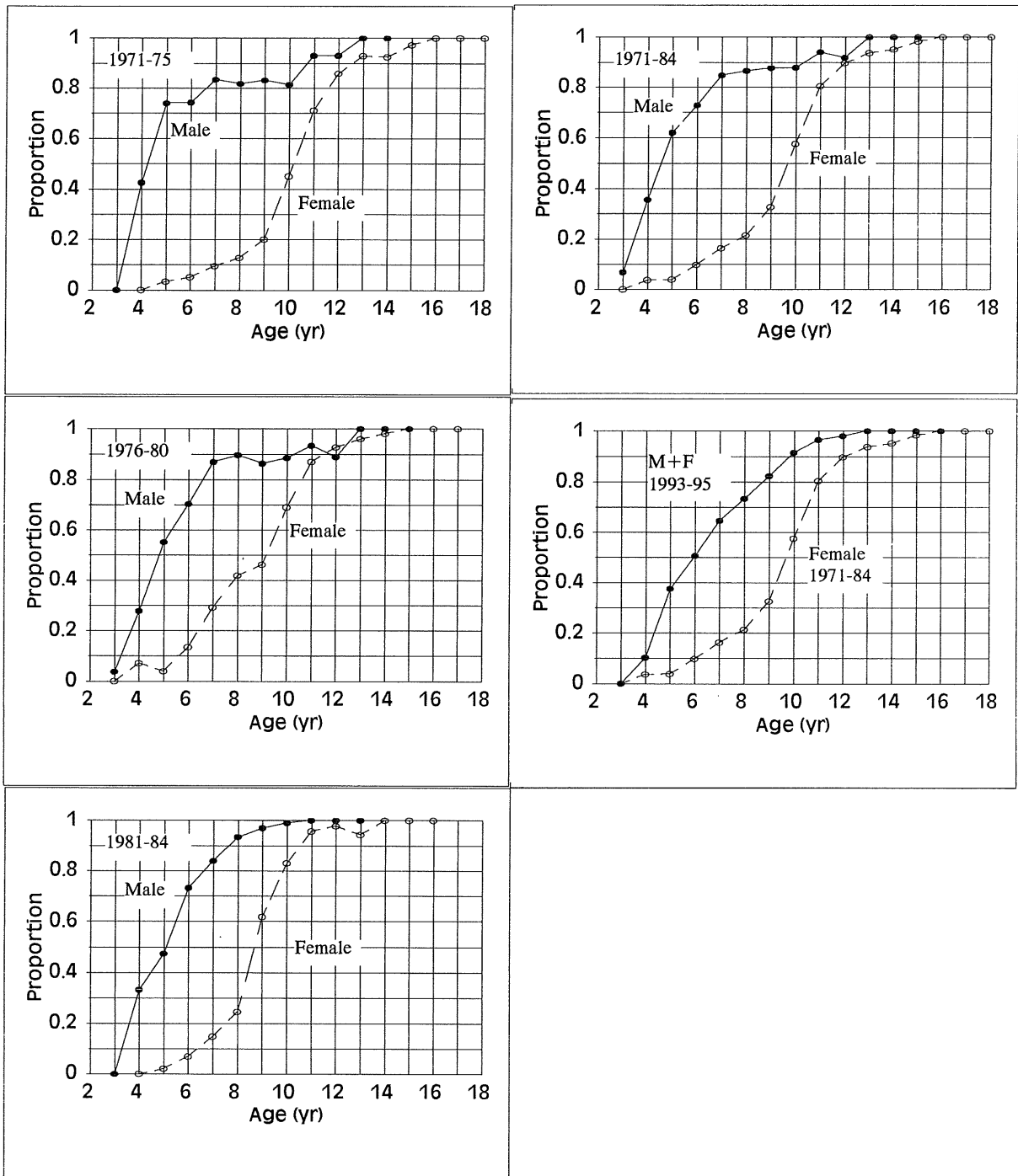


Figure 8.6



Greenland halibut maturity ogives from Russian data collected during 1971-95.

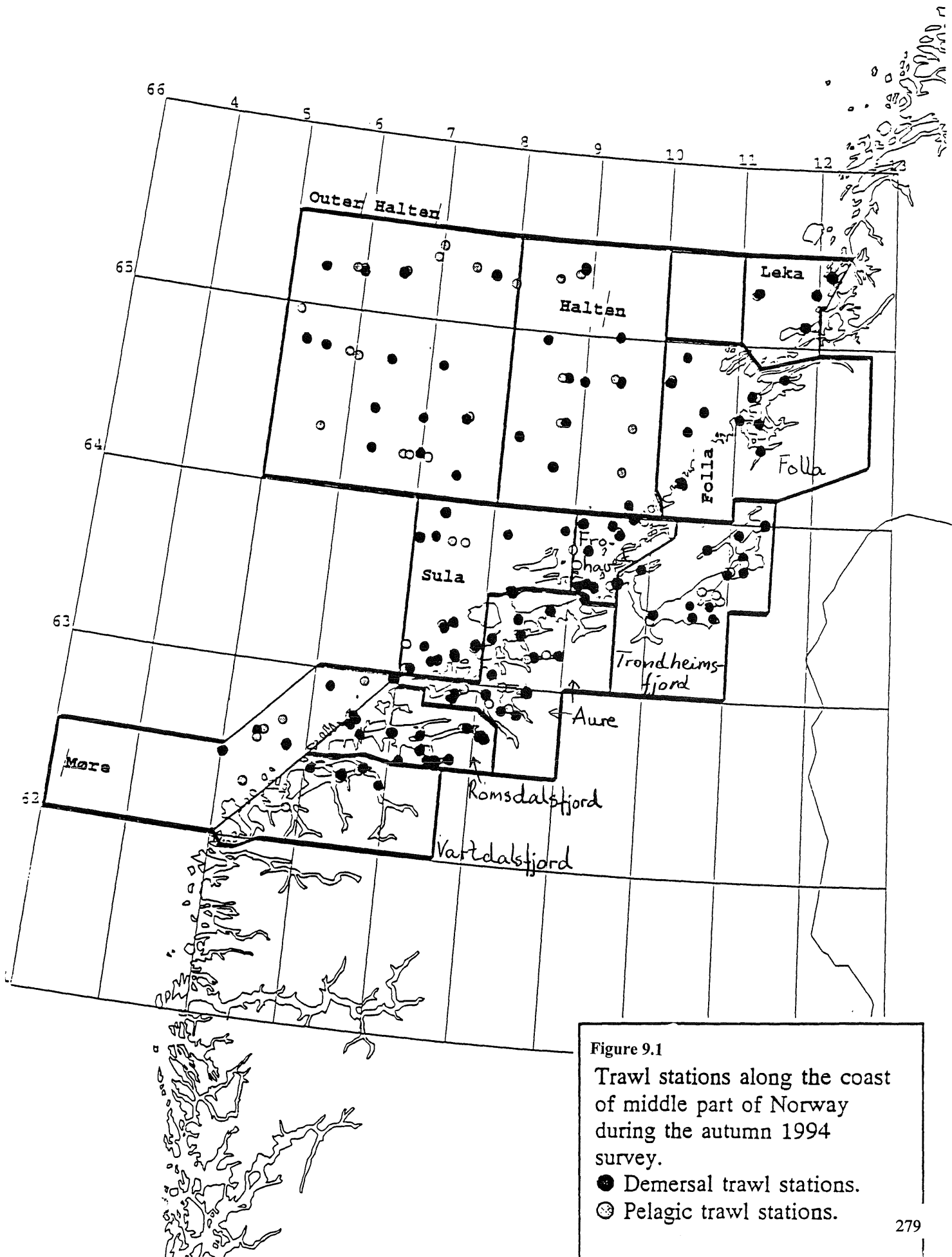


Figure 9.1  
 Trawl stations along the coast  
 of middle part of Norway  
 during the autumn 1994  
 survey.  
 ● Demersal trawl stations.  
 ⊙ Pelagic trawl stations.

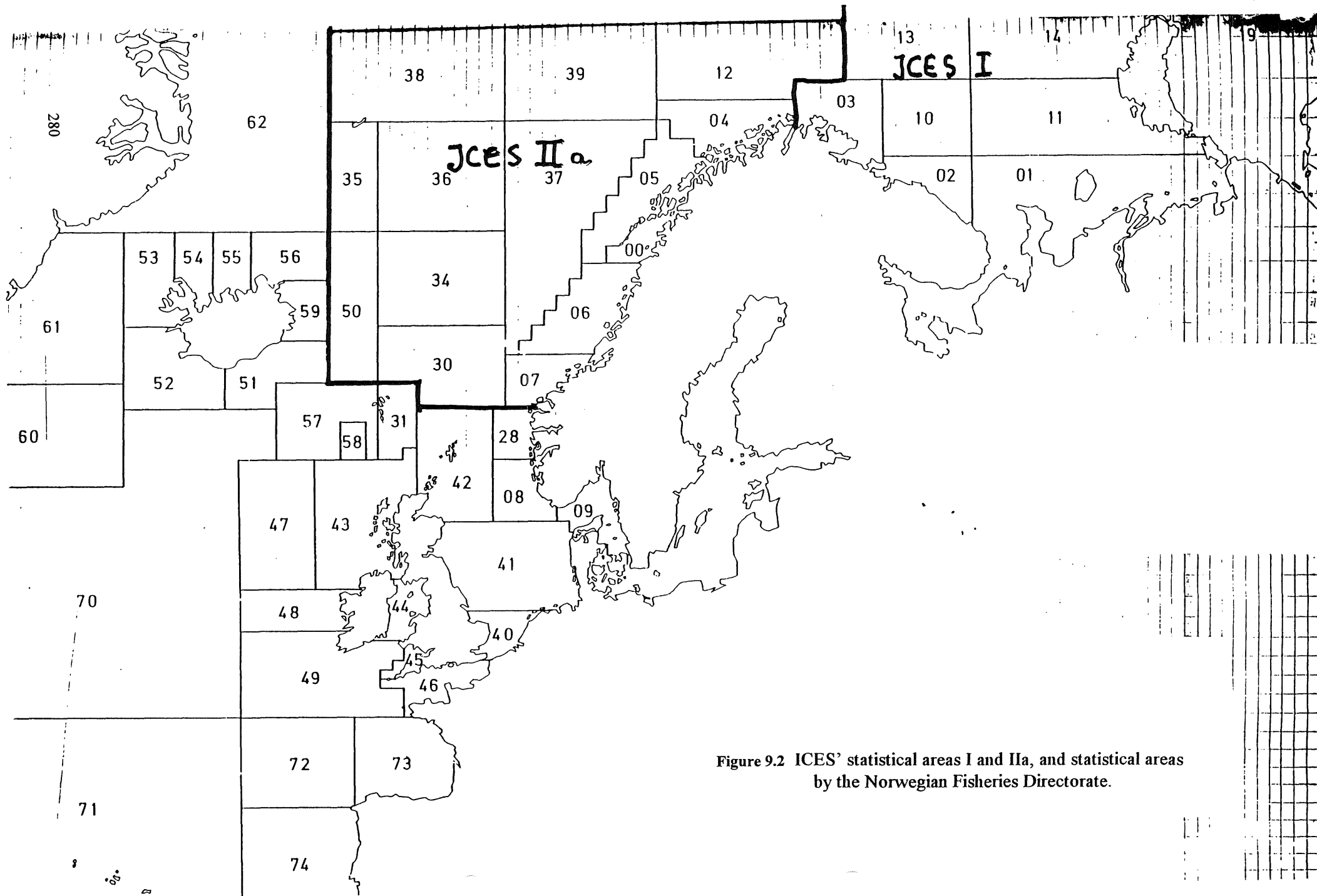


Figure 9.2 ICES' statistical areas I and IIa, and statistical areas by the Norwegian Fisheries Directorate.

APPENDIX I

**Table A1** North-East Arctic COD. Results from the Norwegian acoustic survey in the Barents Sea in January–March. Stock numbers in millions. New TS and rock-hopper gear (1981–1988 back-calculated from bobbins gear). Corrected for length dependent effective spread of trawl.

Year	Age										Total
	1	2	3	4	5	6	7	8	9	10+	
1981	8	82	40	63	106	103	16	3	1	1	423
1982	4	5	49	43	40	26	28	2	+	0	197
1983	0	19	13	23	27	14	7	4	1	+	108
1984	1,807	150	31	11	7	5	2	+	+	0	2,013
1985	108	768	179	127	21	9	6	+	+	+	1,218
1986	1,302	590	595	124	56	7	2	+	+	0	2,676
1987	3	72	96	256	46	12	1	1	+	0	487
1988	2	29	64	42	75	9	2	+	+	0	224
1989	9	9	20	43	27	57	8	1	+	0	174
1990	350	45	16	24	27	22	40	3	1	0	526
1991	187	234	55	31	27	25	14	16	1	0	591
1992	348	579	182	48	18	11	8	4	2	0	1,201
1993	1,686	432	300	163	80	14	7	3	1	3	2,688
1994	1,083	686	358	343	159	43	9	2	1	1	2,685
1995	2,644	280	181	161	214	69	18	2	1	1	3,570

**Table A2** North-East Arctic COD. Results from the Norwegian Bottom trawl survey in the Barents Sea in January–March. Index of number of fish at each age. Rock-hopper gear<sup>1</sup>. Corrected for length dependent effective spread of trawl.

Year	Age										Total
	1	2	3	4	5	6	7	8	9	10	
1981	4.6	34.3	16.4	23.3	40.0	38.4	4.8	1.0	0.3	0.0	163.1
1982	0.8	2.9	28.3	27.7	23.6	15.5	16.0	1.4	0.2	0.0	116.5
1983	341.9	19.0	22.3	37.1	33.3	13.5	4.6	3.0	0.6	0.2	474.4
1984	2864.4	393.2	115.9	26.2	18.9	10.6	3.2	0.5	0.2	0.1	3433.1
1985	51.5	727.6	144.4	99.5	15.7	6.4	2.5	0.2	0.1	0.1	1047.8
1986	741.8	461.5	657.1	137.1	75.0	23.3	5.5	0.6	0.2	0.1	2102.2
1987	33.4	457.4	233.4	365.5	46.1	11.3	1.4	0.4	+	0.0	1148.9
1988	5.0	72.9	185.2	95.3	189.5	19.1	3.6	0.6	0.1	0.0	571.3
1989	9.4	13.6	36.5	64.9	35.2	77.9	8.7	0.8	0.2	0.2	247.4
1990	161.0	50.8	23.3	30.1	33.6	19.7	23.9	1.3	0.4	0.1	344.1
1991	470.8	224.7	32.3	19.1	17.5	16.1	9.3	9.7	0.5	0.1	800.1
1992	131.6	528.9	149.6	49.5	18.4	11.8	7.5	4.0	2.7	0.2	904.3
1993	534.1	331.0	311.8	152.6	69.0	14.2	6.9	4.2	2.2	2.1	1430.2
1994	861.8	496.8	276.3	297.6	145.9	46.9	8.8	2.3	1.2	1.2	2138.8
1995	2892.4	503.8	288.2	231.2	249.2	70.4	18.0	2.2	0.7	1.0	6256.8

<sup>1</sup>1981-1988 back-calculated from bobbins gear.

<sup>2</sup> Survey covered a larger area.



**Table A3** North-East Arctic COD. Results from the Norwegian Bottom trawl survey in the Svalbard Area in September-October. Index of number of fish at each age. Rock-hopper gear<sup>1</sup>.

Year	Age										Total
	1	2	3	4	5	6	7	8	9	10	
1983	145.0	26.8	10.7	9.5	2.4	1.9	1.0	1.3	0.3	-	210.4
1984	499.0	113.0	7.3	4.3	4.7	1.8	0.4	0.4	0.3	0.1	631.1
1985	239.0	452.0	99.1	28.4	13.6	5.4	1.0	0.4	0.1	0.2	839.2
1986	40.9	181.0	297.0	2.8	15.3	2.6	1.0	0.3	0.1	0.1	581.1
1987	41.5	108.0	141.0	125.0	17.1	5.4	0.5	0.1	0.1	+	438.7
1988	3.1	16.6	33.2	31.8	37.1	9.5	0.6	0.6	0.6	-	133.3
1989	3.6	2.7	15.4	12.8	11.9	19.2	3.2	0.4	0.2	-	69.4
1990	70.1	9.4	8.6	14.6	23.4	16.5	20.0	2.0	0.3	-	164.9
1991	116.0	101.0	25.3	8.5	13.9	16.0	13.5	19.0	1.5	-	314.2
1992	91.8	130.0	105.0	56.0	16.2	7.3	5.7	3.3	8.9	-	424.2
1993	122.3	120.9	148.6	65.6	29.6	3.4	3.8	2.4	1.6	3.4	501.6
1994	68.6	166.5	102.4	56.4	54.1	25.9	5.9	2.3	1.2	0.5	483.8

<sup>1</sup>1983-1988 back-calculated from bobbins gear.

**Table A4** North-East Arctic COD. Index from Norwegian trawler survey conducted in areas I, IIa and IIb during October–November.

Year	Age									Total
	3	4	5	6	7	8	9	10	11	
1989	437	1,569	2,098	6,658	1,626	192	24	2	0	12,606
1990	618	1,606	2,775	2,390	5,124	624	59	7	2	13,205
1991	2,662	2,534	3,183	3,528	2,360	4,468	391	19	1	19,146
1992	4,187	8,627	2,745	1,093	1,017	573	907	57	9	19,215
1993	3,057	6,243	5,691	2,217	724	461	306	528	50	19,277

**Table A5** North-East Arctic COD. Length at age (cm) from Norwegian surveys in January–March.

Year	1	2	3	4	5	6	7	8	9	10
1978	14.2	24.0	32.1	45.7	54.2	64.6	67.6	76.9	-	-
1979	12.8	22.9	33.1	42.0	53.3	64.4	74.7	83.0	-	-
1980	17.6	24.8	34.2	42.5	52.5	63.5	73.6	83.6	-	-
1981	17.0	26.1	35.5	44.7	52.0	61.3	69.6	77.9	-	-
1982	14.8	25.8	37.6	46.3	54.7	63.1	70.8	82.9	-	-
1983	-	26.1	34.8	46.8	56.0	64.5	73.3	80.4	-	-
1984	13.8	26.2	35.8	49.2	57.9	67.4	79.6	82.2	-	-
1985	14.5	23.5	40.3	50.8	62.2	71.1	81.8	88.7	-	-
1986	13.3	22.6	34.4	50.4	60.0	70.2	82.3	95.2	-	-
1987	14.5	21.0	31.8	41.1	55.7	67.2	81.8	94.5	-	-
1988	14.7	22.5	29.7	37.0	46.4	58.0	70.1	81.1	-	-
1989	12.7	25.7	34.7	40.6	47.5	57.1	68.5	84.0	-	-
1990	14.3	29.0	39.4	47.4	59.9	60.9	70.9	87.5	-	-
1991	13.8	27.6	41.6	52.6	60.2	68.2	73.8	79.0	94.2	-
1992	13.4	24.7	41.3	50.7	59.9	69.2	77.0	82.7	85.3	106.8
1993	11.4	20.7	35.9	50.9	59.2	68.8	76.2	84.5	90.0	92.8
1994	12.0	18.5	30.5	44.8	55.0	64.6	73.5	84.0	89.4	96.4
1995	12.7	18.8	29.9	42.5	54.2	63.9	76.0	82.0	94.2	98.6

**Table A6** North-East Arctic COD. Weight (g) at age from Norwegian surveys in January-March.

Year	Age											
	1	2	3	4	5	6	7	8	9	10	11	12
1985	-	-	670	1,070	2,230	3,650	4,920	5,060	-	-	-	-
1986	-	-	390	1,090	1,850	3,110	4,320	5,509	-	-	-	-
1987	21	65	230	490	1,380	2,300	3,970	-	-	-	-	-
1988	20	80	203	410	793	1,473	2,706	4,613	-	-	-	-
1989	10	150	380	590	930	1,570	2,640	4,940	-	-	-	-
1990	28	229	570	1,030	1,460	1,930	2,890	4,370	-	-	-	-
1991	20	190	720	1,370	2,040	2,850	3,660	4,630	8,380	-	-	-
1992	20	130	640	1,120	1,850	2,830	3,980	4,990	6,040	11,200	-	-
1993	11	76	430	1,196	1,766	2,774	3,894	5,519	6,150	7,450	8,910	-
1994	12	59	261	797	1,452	2,273	3,369	5,062	7,060	8,214	8,685	8,600
1995	16	56	250	675	1,347	2,192	3,606	4,974	7,562	8,526	-	-

**Table A7** North-East Arctic COD. Results from the Russian acoustic trawl survey in the Barents Sea and adjacent waters in the autumn. Stock numbers in millions.

Year	Age										Older	Total
	0	1	2	3	4	5	6	7	8	9		
1985 <sup>1</sup>	45	105	895	422	255	83	44	50	21	2	16	1,939
1986 <sup>1</sup>	60	53	141	980	444	183	56	62	19	-	2	2,000
1987 <sup>2</sup>	8	15	170	170	738	99	67	42	20	9	5	1,344
1988 <sup>2</sup>	+	+	43	161	106	245	34	10	2	+	+	602
1989 <sup>1</sup>	2	1	4	17	44	56	99	82	20	6	4	335
1990 <sup>1</sup>	29	22	57	29	35	52	46	89	14	2	1	376
1991 <sup>1,3</sup>	33	44	75	89	51	53	61	45	43	+	+	494
1992 <sup>1</sup>	228	61	333	317	110	45	37	38	29	22	3	1,223
1993 <sup>1</sup>	9	10	45	215	243	136	43	14	14	8	11	783
1994	215	58	110	208	282	277	120	44	8	4	6	1332

<sup>1</sup>October-December.

<sup>2</sup>September-October.

**Table A8** North-East Arctic COD. Results from the Russian Bottom trawl survey in the Barents Sea and adjacent waters in November–December (numbers per hour trawling).

Year	Age										Older	Total
	0	1	2	3	4	5	6	7	8	9		
<u>Sub-area I</u>												
1982	1.4	0.2	6.9	13.2	7.4	1.9	2.8	0.4	-	-	-	34.2
1983	4.3	8.0	5.1	4.6	5.4	5.9	2.7	0.7	1.2	0.1	-	38.0
1984	0.7	12.3	11.6	25.5	13.7	6.5	4.0	1.6	0.6	0.3	-	76.8
1985	3.3	2.9	51.3	35.2	53.1	25.2	4.4	1.8	0.8	0.1	0.1	178.2
1986	0.3	2.2	7.0	60.4	15.8	8.2	1.8	0.6	0.1	0.1	-	96.5
1987	+	0.1	3.6	4.0	35.9	6.3	3.6	0.6	0.1	0.1	+	54.4
1988	0.2	0.1	1.7	5.7	5.2	17.2	2.6	0.6	0.2	0.1	+	33.4
1989	0.4	0.1	1.0	3.5	11.2	15.4	20.8	16.1	3.7	0.7	0.3	73.4
1990	6.8	4.8	12.7	5.3	6.0	9.4	8.2	14.6	2.2	0.2	+	70.2
1991	3.1	5.9	10.9	14.0	7.5	7.7	8.1	5.5	4.2	0.3	0.1	67.3
1992	10.3	2.9	26.4	42.3	22.4	8.5	4.6	5.6	3.3	2.7	0.6	129.6
1993	1.7	1.1	7.8	67.9	89.5	47.2	16.0	4.6	4.2	2.0	3.2	245.3
1994	15.8	2.8	10.9	28.4	45.0	52.4	17.9	6.3	1.4	0.7	1.1	182.6
<u>Division IIa</u>												
1982	0.1	+	11.7	10.6	4.7	1.1	4.1	2.0	0.2	0.3	0.2	35.0
1983	0.7	0.4	0.3	1.5	6.4	5.0	2.1	1.3	1.2	0.1	0.2	19.2
1984	0.4	0.7	0.6	3.7	4.0	6.7	4.7	1.1	0.3	0.1	0.2	22.5
1985	0.2	0.2	1.4	3.7	9.5	12.6	6.4	2.5	0.6	0.1	0.1	37.6
1986	-	+	0.1	2.5	2.9	3.2	1.5	0.5	0.4	-	0.2	11.3
1987	-	-	-	-	3.0	1.7	2.3	0.9	0.1	-	0.1	8.1
1988	0.2	+	0.1	0.2	1.2	10.0	2.4	0.7	0.2	0.1	+	15.1
1989	-	+	0.1	0.3	0.9	1.3	3.9	3.9	1.2	0.5	0.2	12.3
1990	-	+	0.3	1.1	1.6	2.2	1.9	4.4	0.9	0.1	+	12.5
1991	1.0	0.1	0.5	1.3	1.9	2.2	2.5	1.9	1.7	0.2	0.1	13.3
1992	0.4	0.3	0.3	2.7	3.8	3.0	2.2	2.1	1.8	1.3	0.1	18.0
1993	0.2	0.1	0.1	3.5	9.9	13.1	4.5	1.3	1.2	0.7	0.8	35.4
1994	0.2	0.1	0.3	4.0	28.3	46.2	22.4	6.3	1.4	0.8	1.6	116.6
<u>Division IIb</u>												
1982	9.9	1.7	42.5	17.8	1.1	0.2	1.5	0.5	-	-	-	75.2
1983	9.7	14.9	5.0	9.4	11.0	2.6	0.7	0.8	0.7	0.1	0.1	55.0
1984	1.4	7.7	22.7	7.4	2.7	2.4	1.3	0.4	0.2	0.2	-	46.4
1985	9.1	9.4	45.2	32.3	32.8	11.5	5.3	1.8	0.3	-	0.1	147.8
1986	1.6	2.9	14.8	67.2	19.9	16.4	5.4	1.3	0.6	0.1	-	127.1
1987	-	0.2	5.6	11.0	64.4	4.0	2.2	0.5	0.1	-	-	88.0
1988	0.1	0.4	4.8	13.7	15.1	25.0	2.5	0.6	0.1	0.2	-	62.8
1989	0.6	0.1	0.3	3.8	6.4	6.1	9.2	5.4	0.2	0.4	0.2	33.7
1990	0.1	0.7	1.3	2.3	2.9	3.7	3.9	8.6	1.6	0.3	+	25.4
1991	6.4	7.1	10.1	8.4	5.2	6.3	8.2	6.5	5.9	0.5	0.1	64.7
1992	60.5	15.1	60.5	60.8	13.8	5.2	6.5	5.0	5.1	3.4	0.5	236.4
1993	4.7	5.9	23.8	60.3	44.6	24.7	5.6	3.2	3.4	2.5	3.6	182.3
1994	3.0	6.0	19.5	44.3	61.4	45.3	16.3	5.6	1.5	1.0	1.9	205.6
<u>Total (Sub-area I and Divisions IIa and IIb)</u>												
1982	3.7	0.6	18.1	14.1	5.1	1.3	2.6	0.7	-	0.1	-	46.3
1983	5.4	8.9	4.3	5.6	7.3	4.7	2.0	0.8	1.1	0.1	-	40.2
1984	0.9	9.2	14.2	16.2	8.6	5.0	3.1	1.1	0.4	0.3	0.1	59.1
1985	5.0	4.9	43.0	30.3	40.5	18.8	4.9	1.9	0.6	-	-	150.0
1986	0.7	2.2	9.1	56.5	16.1	10.6	3.0	0.8	0.3	0.1	-	99.4
1987	-	0.2	4.0	5.9	42.6	5.4	3.1	0.6	0.1	+	-	61.9
1988	0.1	0.2	2.5	7.7	7.8	19.0	2.5	0.6	0.1	0.2	-	40.8
1989	0.4	0.1	0.6	3.4	8.8	11.8	15.5	11.4	2.6	0.5	0.3	54.8
1990	4.0	3.1	7.8	3.8	4.4	6.6	6.0	11.3	1.8	0.2	+	49.0
1991	4.2	5.9	9.8	11.0	6.2	5.8	7.7	5.6	4.6	0.4	0.1	62.3
1992	30.6	7.8	39.5	48.5	18.2	6.9	5.3	5.2	4.0	2.9	0.5	169.4
1993	2.8	2.8	13.1	64.7	59.7	33.4	9.1	3.4	3.3	2.1	2.9	197.4
1994	11.2	3.3	12.0	30.0	47.5	50.0	18.0	6.1	1.4	0.8	1.3	181.5

**Table A9** North-East Arctic COD. Length at age (cm) from Russian surveys in November–December.

Year	Age									
	0	1	2	3	4	5	6	7	8	9
1984	15.7	22.3	30.7	44.3	51.7	63.6	73.4	82.5	88.4	97.0
1985	15.0	21.1	30.6	43.2	53.7	61.2	72.8	83.0	92.8	101.3
1986	15.2	19.7	28.3	39.0	51.8	62.2	70.9	83.0	91.3	104.0
1987	-	19.2	27.9	33.4	41.4	59.1	69.2	80.1	95.7	102.6
1988	11.3	21.3	28.7	36.2	43.9	53.3	65.3	79.5	85.0	-
1989	-	20.8	28.8	34.8	46.0	53.9	61.8	69.8	78.7	88.6
1990	16.0	24.0	30.4	46.5	54.9	62.5	69.7	77.6	87.8	102.0
1991	11.5	22.4	30.6	43.0	55.9	64.6	72.8	78.5	87.9	101.8
1992	11.3	21.3	31.9	50.1	59.8	69.1	78.6	84.0	90.8	97.5
1993	12.1	17.4	29.1	43.4	52.7	64.3	73.9	81.2	89.1	91.8
1994	12.2	20.3	26.3	33.7	47.4	58.7	70.6	80.8	90.1	96.1

**Table A10** North-East Arctic COD. Weight (g) at age from Russian surveys in November–December.

Year	Age										
	0	1	2	3	4	5	6	7	8	9	10
1984	26	90	250	746	1,187	2,234	3,422	5,027	6,479	9,503	-
1985	26	80	245	762	1,296	1,924	3,346	5,094	7,360	6,833	11,167
1986	25	63	191	506	1,117	1,940	2,949	4,942	7,406	9,300	-
1987	-	54	182	316	672	1,691	2,688	3,959	8,353	10,583	13,107
1988	15	78	223	435	789	1,373	2,609	4,465	5,816	-	-
1989	-	73	216	401	928	1,427	2,200	3,133	4,649	6,801	8,956
1990	28	106	230	908	1,418	2,092	2,897	4,131	6,359	10,078	13,540
1991	26	93	260	743	1,629	2,623	3,816	4,975	7,198	11,165	15,353
1992	10	76	273	1,165	1,895	2,971	4,377	5,596	7,319	9,452	12,414
1993	11	46	211	717	1,280	2,293	3,509	4,902	6,621	7,339	8,494
1994	12	69	153	316	919	1,670	2,884	4,505	6,520	8,207	9,812

**Table A11** Abundance indices of 0-group fish in the Barents Sea and adjacent waters in 1965–1994.

Year	Cod	Haddock	Polar cod		Redfish	Greenland halibut	Long rough dab
			West	East			
1965	6	7		0	159		66
1966	1	1		129	236		97
1967	34	42		165	44		73
1968	25	8		60	21		17
1969	93	82		208	295		26
1970	606	115		197	247	1	12
1971	157	73		181	172	1	81
1972	140	46		140	177	8	65
1973	684	54		(26)	385	3	67
1974	51	147		227	468	13	83
1975	343	170		75	315	21	113
1976	43	112		131	447	16	96
1977	173	116	157	70	472	9	72
1978	106	61	107	144	460	35	76
1979	94	69	23	302	980	22	69
1980	49	54	79	247	651	12	108
1981	65	30	149	73	861	38	95
1982	114	90	14	50	694	17	150
1983	386	184	48	39	851	16	80
1984	486	255	115	16	732	40	70
1985	742	156	60	334	795	36	86
1986	434	160	111	366	702	55	755
1987	102	72	17	155	631	41	174
1988	133	86	144	120	849	8	72
1989	202	112	206	41	698	5	92
1990	465	227	144	48	670	2	35
1991	766	472	90	239	200	1	28
1992	1,159	313	195	118	150	3	32
1993	910	240	171	156	162	11	55
1994	899	282	50	448	414	20	272

**Table A12** Estimated logarithmic indices with 90% confidence limits of year class abundance for 0-group herring, cod and haddock in the Barents Sea and adjacent waters 1965–1994

Year	Herring <sup>1</sup>			Cod			Haddock		
	Index	Confidence limits		Index	Confidence limits		Index	Confidence limits	
1965				+					
1966	0.14	0.04	0.31	0.02	0.01	0.04	0.01	0.00	0.03
1967	0.00	-	-	0.04	0.02	0.08	0.08	0.03	0.13
1968	0.00	-	-	0.02	0.01	0.04	0.00	0.00	0.02
1969	0.01	0.00	0.04	0.25	0.17	0.34	0.29	0.20	0.41
1970	0.00	-	-	2.51	2.02	3.05	0.64	0.42	0.91
1971	0.00	-	-	0.77	0.57	1.01	0.26	0.18	0.36
1972	0.00	-	-	0.52	0.35	0.72	0.16	0.09	0.27
1973	0.05	0.03	0.08	1.48	1.18	1.82	0.26	0.15	0.40
1974	0.01	0.01	0.01	0.29	0.18	0.42	0.51	0.39	0.68
1975	0.00	-	-	0.90	0.66	1.17	0.60	0.40	0.85
1976	0.00	-	-	0.13	0.06	0.22	0.38	0.24	0.51
1977	0.01	0.00	0.03	0.49	0.36	0.65	0.33	0.21	0.48
1978	0.02	0.01	0.05	0.22	0.14	0.32	0.12	0.07	0.19
1979	0.09	0.01	0.20	0.40	0.25	0.59	0.20	0.12	0.28
1980	-	-	-	0.13	0.08	0.18	0.15	0.10	0.20
1981	0.00	-	-	0.10	0.06	0.18	0.03	0.00	0.05
1982	0.00	-	-	0.59	0.43	0.77	0.38	0.30	0.52
1983	1.77	1.29	2.33	1.69	1.34	2.08	0.62	0.48	0.77
1984	0.34	0.20	0.52	1.55	1.18	1.98	0.78	0.60	0.99
1985	0.23	0.18	0.28	2.46	2.22	2.71	0.27	0.23	0.31
1986	0.00	-	-	1.37	1.06	1.70	0.39	0.28	0.52
1987	0.00	0.00	0.03	0.17	0.01	0.40	0.10	0.00	0.25
1988	0.32	0.16	0.53	0.33	0.22	0.47	0.13	0.05	0.34
1989	0.59	0.49	0.76	0.38	0.30	0.48	0.14	0.10	0.20
1990	0.31	0.16	0.50	1.23	1.04	1.34	0.61	0.48	0.75
1991	1.19	0.90	1.52	2.30	1.97	2.65	1.17	0.98	1.37
1992	1.06	0.69	1.50	2.94	2.53	3.39	0.87	0.71	1.06
1993	0.75	0.45	1.14	2.09	1.70	2.51	0.64	0.48	0.82
1994	0.28	0.17	0.42	2.27	1.83	2.76	0.64	0.49	0.81

<sup>1</sup>Assessment for 1965–1984 made by Toresen (1985).

Table A13. Consumption by cod of various prey species 1984-1994, in thousand tonnes.

Year	Amphipods	Shrimp	Capelin	Herring	Cod	Haddock	Redfish	Others	Total
1984	23	397	694	67	22	44	352	509	2108
1985	130	156	1633	183	32	4	225	1095	3458
1986	1225	144	874	140	96	119	331	885	3814
1987	1077	203	240	34	27	4	354	995	2934
1988	1376	144	374	8	10	3	257	779	2951
1989	790	131	642	3	8	12	242	910	2738
1990	144	181	1635	7	24	19	234	1672	3916
1991	54	173	2845	9	33	21	356	1117	4608
1992	58	307	2507	338	67	144	209	1009	4639
1993	118	486	2879	199	433	40	69	1598	5822
1994	432	705	1403	106	491	66	9	2789	6001



**Table B1** North-East Arctic HADDOCK. Results from the Norwegian bottom trawl survey in the Barents Sea in January-March. Index of number of fish at age. Backcalculated from bobbins gear to rockhopper gear. Corrected for length dependent effective spread of the trawl.

Year	Age								Total
	1	2	3	4	5	6	7	8	
1981	3.1	7.3	2.3	7.8	1.8	5.3	0.5	0.2	28.3
1982	3.9	1.5	1.7	1.8	1.9	4.8	2.4	0.2	18.2
1983	2776.8	6.6	2.7	2.7	1.3	1.3	2.8	1.3	2795.3
1984	5382.0	683.4	14.9	1.6	0.7	0.2	0.3	0.3	6083.3
1985	1421.2	1362.2	384.8	6.3	0.4	0.2	0.3	0.3	3175.5
1986	649.0	360.2	339.8	126.8	4.5	0.5	0.1	0.1	1480.9
1987	134.3	95.2	174.1	272.3	50.6	0.1	2.0	0.0	728.5
1988	44.6	16.1	28.8	67.4	110.7	15.7	0.2	0.0	283.6
1989	80.8	7.0	9.0	15.4	26.9	27.4	2.9	0.0	169.5
1990	555.4	51.4	4.1	3.4	5.2	9.4	12.1	1.7	642.8
1991	1526.0	420.9	72.4	12.6	3.1	2.4	3.0	5.6	2046.0
1992	1282.2	1191.2	283.5	59.9	4.1	0.9	1.3	5.1	2828.3
1993 <sup>1</sup>	717.5	585.1	467.8	105.6	10.3	0.5	0.5	2.2	1889.5
1994 <sup>1</sup>	587.5	200.3	296.0	448.2	50.8	3.2	0.2	1.1	1587.3
1995 <sup>1</sup>	1271.8	182.0	42.6	153.4	341.6	31.3	2.0	0.5	2025.3

<sup>1</sup> Extended survey area.

**Table B2** North-East Arctic HADDOCK. Results from the Russian trawl survey in the Barents Sea and adjacent waters in November-December (numbers per hour trawling).

Year	Age										Older	Total	
	0	1	2	3	4	5	6	7	8	9			
<u>Sub-area I</u>													
1983	39.9	97.3	16.5	0.8	0.7	+						1.1	156.3
1984	9.7	100.2	110.6	2.8	0.4	0.2	+					0.7	224.6
1985	3.9	19.1	213.4	168.8	0.8	0.2	0.1	-				0.3	406.6
1986	0.2	2.3	16.6	58.1	27.6	0.1	+	+	+			-	105.0
1987	0.4	1.4	2.5	12.5	34.2	8.6	+	+	-	+		-	59.8
1988	1.9	0.4	1.1	2.8	6.2	11.6	1.1	+	+	+		-	25.2
1989	3.3	3.0	3.6	0.7	2.5	7.1	13.9	1.8	0.1	+		-	36.0
1990	71.7	22.2	18.6	13.2	7.5	13.2	13.3	10.3	0.6	0.1		-	170.7
1991	15.9	61.5	27.5	10.8	1.6	0.6	1.0	3.3	2.6	0.3		-	125.1
1992	19.6	44.2	180.6	52.1	8.4	0.7	1.0	1.6	1.3	0.2		-	309.7
1993	5.5	8.1	69.2	371.5	78.4	10.2	1.4	0.7	0.8	1.8		-	547.7
1994	13.5	6.7	8.-	65.9	146.0	15.9	1.7	0.1	0.2	0.7		-	258.8
<u>Division IIa</u>													
1983	5.4	5.5	0.1	0.2	0.3	0.1						1.0	12.6
1984	4.9	14.4	5.6	0.1	0.1	0.1	-					0.2	25.4
1985	3.8	7.0	11.7	4.1	0.1	-	+	-				0.1	26.8
1986	0.4	0.3	3.5	10.4	2.9	0.1	+	+	-			-	17.6
1987	-	-	-	-	0.3	0.3	-	-	-	-		-	0.6
1988	1.0	0.1	-	+	0.2	0.5	0.2	-	-	-		-	2.1
1989	0.1	0.7	2.7	+	0.1	0.1	0.1	-	-	-		-	3.8
1990	6.1	0.9	0.9	0.1	0.1	0.1	0.1	0.1	-	-		-	8.4
1991	5.7	3.8	0.6	0.1	+	-	-	-	-	-		-	10.2
1992	1.2	2.3	5.6	2.3	3.0	0.3	0.3	0.4	0.4	-		-	15.9
1993	1.8	1.1	1.5	4.5	2.5	0.8	0.2	0.1	0.2	0.2		-	12.8
1994	1.0	0.6	0.5	3.1	15.9	4.4	1.5	+	0.1	0.1		-	27.2
<u>Division IIb</u>													
1983	22.1	9.9	0.2	0.1	+	+						0.1	32.4
1984	2.2	14.3	1.8	-	-	-	-					+	18.3
1985	1.4	10.2	61.4	5.1	+	+	+	-				+	78.1
1986	+	0.2	3.1	7.2	1.4	-	-	+	+			-	12.0
1987	-	-	0.1	0.7	1.4	0.5	+	-	-	-		-	2.8
1988	0.2	-	-	+	0.3	1.1	0.2	-	+	-		-	1.9
1989	0.7	0.1	0.2	+	0.1	0.3	0.6	0.1	+	-		-	2.1
1990	12.9	5.4	0.8	+	+	0.2	0.1	0.1	+	-		-	19.5
1991	20.0	22.9	6.2	0.4	0.1	0.1	0.1	+	+	-		-	49.8
1992	13.3	9.1	69.8	13.9	0.5	+	+	0	+	+		-	106.6
1993	0.7	0.9	1.9	24.7	1.9	0.2	+	+	+	+		-	30.4
1994	0.4	1.7	1.7	2.3	15.7	2.7	0.8	0.2	+	+		-	25.5
<u>Total - Sub-area I and Divisions IIa and IIb</u>													
1983	29.8	59.2	9.5	0.5	0.4	+						0.8	100.2
1984	6.4	58.6	58.4	1.5	0.2	0.1	+					0.3	125.5
1985	3.0	14.4	134.3	90.0	0.4	0.1	0.1	-				0.2	242.7
1986	0.2	1.4	10.7	36.3	16.4	0.1	+	+	+			+	65.1
1987	0.3	0.9	1.7	8.3	22.5	5.7	+	+	-	+		-	39.4
1988	1.3	0.3	0.7	1.7	4.0	7.6	0.8	+	+	+		-	16.4
1989	2.2	1.8	2.4	0.4	1.4	4.1	8.1	1.1	0.1	+		-	21.6
1990	44.8	14.3	10.6	7.3	4.2	7.3	7.4	5.7	0.3	0.1		-	102.0
1991	16.7	42.9	17.6	6.2	0.9	0.3	0.6	1.8	1.5	0.2		-	88.7
1992	16.4	28.2	128.6	34.6	5.0	0.4	0.6	0.9	0.8	0.1		-	215.6
1993	3.5	4.8	35.7	198.5	35.6	4.8	0.8	0.4	0.4	-		-	285.3
1994	9.1	4.9	5.8	44.2	101.4	11.6	1.5	0.1	0.1	0.5		-	179.1

**Table B3** North-East Arctic HADDOCK. Results from the Norwegian acoustic survey in the Barents Sea in January-March. Stock numbers in millions. New TS and rock-hopper gear (1981-1988 back-calculated from bobbins gear). Corrected for length dependent effective spread of the trawl.

Year	Age										Total
	1	2	3	4	5	6	7	8	9	10+	
1981	7	14	5	21	60	18	1	+	+	+	125
1982	9	2	3	4	4	10	6	+	+	+	38
1983	0	5	2	3	1	1	4	2	+	+	18
1984	1685	173	6	2	1	+	+	+	+	+	1866
1985	1809	839	274	6	+	+	+	1	+	+	2928
1986	680	312	488	162	+	+	+	+	+	+	1644
1987	111	26	71	190	47	+	+	+	0	+	446
1988	20	5	8	20	38	6	+	+	0	+	97
1989	58	6	8	10	17	19	2	+	0	+	119
1990	493	44	4	3	4	7	11	1	+	+	568
1991	1938	265	49	7	2	2	2	4	+	0	2269
1992	859	685	110	19	2	+	+	1	2	+	1714
1993	1424	690	565	99	10	+	+	1	+	2	2790
1994	848	228	240	506	77	8	+	+	+	+	1908
1995	1380	285	36	113	391	40	2	+	+	1	2247

**Table B4** North-East Arctic HADDOCK. Results from the Russian trawl acoustic survey in the Barents Sea and adjacent waters in the autumn 1985-1994. Index of number of fish at age.

Year	Age											Total
	0	1	2	3	4	5	6	7	8	9	Older	
1985 <sup>1</sup>	194	434	1,468	636	3	1	+	-	-	-	1	2,737
1986 <sup>1</sup>	34	37	208	917	910	2	+	+	+	-	+	2,109
1987 <sup>2</sup>	6	16	29	62	197	61	+	-	-	+	12	383
1988 <sup>2</sup>	2	1	3	18	83	301	46	-	-	-	+	454
1989 <sup>1</sup>	41	32	94	2	14	35	67	9	1	+	-	295
1990 <sup>1</sup>	594	176	75	28	17	23	43	44	4	1	-	1,004
1991 <sup>1</sup>	240	368	143	65	11	4	7	21	17	2	+	878
1992 <sup>1</sup>	199	245	758	218	35	3	4	7	6	+	+	1,475
1993 <sup>1</sup>	20	26	199	1,076	228	31	5	2	3	2	3	1,595
1994 <sup>1</sup>	118	51	39	252	591	76	9	+	1	1	3	1,141

<sup>1</sup>October-December.

<sup>2</sup>September-October.

**Table B5** North-East Arctic HADDOCK. Length data (cm) from Norwegian surveys in January-March and Russian surveys in November-December.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
<u>Norway</u>										
1987	13.9	21.6	30.2	39.2	47.0	62.5	-	-	-	-
1988	13.5	24.3	29.3	36.2	42.7	50.1	56.6	-	-	-
1989	16.3	22.5	32.0	36.8	43.0	47.3	53.6	-	-	-
1990	16.3	24.9	33.8	44.2	46.9	50.7	53.0	-	-	-
1991	16.9	25.0	37.0	42.7	54.3	55.2	53.8	56.8	63.7	-
1992	15.6	25.4	36.5	45.9	53.9	61.6	62.9	59.8	66.9	77.5
1993	14.4	21.8	32.2	42.6	50.6	58.4	57.9	-	-	-
1994	14.8	21.5	29.7	38.7	47.4	54.2	57.4	-	-	-
1995	15.4	19.9	27.9	34.0	42.6	51.3	55.9	-	-	-
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+
<u>Russia</u>										
1984	-	24.1	35.8	44.4	56.4	62.8	64.8	-	-	-
1985	16.5	22.4	30.9	44.1	53.8	61.3	64.7	-	-	-
1986	16.1	20.7	28.1	35.4	46.7	62.0	-	-	-	-
1987	17.0	21.5	27.8	32.3	37.3	48.6	-	-	-	-
1988	17.3	23.2	29.7	33.7	39.3	46.2	51.2	-	-	-
1989	17.7	22.2	26.5	38.5	44.5	49.3	53.0	57.7	-	-
1990	18.8	24.5	30.9	40.4	50.6	53.2	55.7	59.7	63.8	-
1991	17.4	24.2	30.5	39.7	53.4	55.4	58.3	60.5	62.7	70.2
1992	15.3	22.8	31.1	44.6	53.8	63.8	61.2	66.4	69.0	69.6
1993	15.3	21.7	28.7	38.3	48.3	54.3	60.9	64.2	63.2	65.0
1994	15.7	22.5	28.1	33.0	44.1	54.9	61.5	67.5	67.7	67.8

**Table B6** North-East Arctic HADDOCK. Weight data (g) from Norwegian surveys in January-March and Russian surveys in November-December.

Year	Age										
	1	2	3	4	5	6	7	8	9	10	
<u>Norway</u>											
1987	24	91	273	542	934	2,197	-	-	-	-	
1988	25	120	350	450	730	1,140	1,560	-	-	-	
1989	40	100	320	490	780	1,040	1,440	-	-	-	
1990	42	148	370	827	988	1,247	1,425	-	-	-	
1991	40	140	490	840	1,630	1,710	1,600	1,860	2,480	-	
1992	30	150	450	940	1,510	2,280	2,810	2,170	2,980	4,870	
1993	27	98	329	788	1,331	2,030	2,324	-	-	-	
1994	25	91	251	555	1,026	1,578	1,813	-	-	-	
1995	30	71	207	374	750	1,278	1,650	-	-	-	
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+
<u>Russia</u>											
1984	36	127	438	815	1,777	2,395	2,688	-	-	-	
1985	37	105	282	817	1,530	2,262	2,263	-	-	-	
1986	38	88	209	419	919	2,240	-	-	-	-	
1987	-	95	196	330	497	1,055	-	-	-	-	
1988	35	106	248	398	627	997	1,431	-	-	-	
1989	52	105	181	606	903	1,287	1,587	2,004	-	-	
1990	62	143	288	667	1,337	1,533	1,778	2,233	2,731	3,092	
1991	57	133	292	690	1,570	1,863	2,206	2,320	2,568	3,525	
1992	40	108	279	850	1,542	2,199	2,363	3,045	3,391	3,400	4
1993	31	96	217	535	1,077	1,493	2,094	2,509	2,374	2,621	,200
1994	27	106	205	337	841	1,602	2,256	2,913	2,934	3,033	3160
											3,623

**Table D1** REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Sub-areas I, Divisions IIa and IIb combined as officially reported to ICES.

Year	Canada	Denmark	Faroe Islands	France	Greenland	Germany <sup>4</sup>	Iceland	Ireland	Norway	Portugal	Spain	UK (England & Wales)	UK (Scotland)	Russia <sup>5</sup>	Total
1984	-	-	-	2.970	-	7,457	-	-	18.650	1.806	25	716	-	69.689	101.313
1985	-	-	-	3.326	-	6,566	-	-	20.456	2.056	38	167	-	59.943	92.552
1986	-	-	29	2.719	-	4,884	-	-	23.255	1.591	-	129	14	20.694	53.315
1987	-	+	450 <sup>3</sup>	1.611	-	5,829	-	-	18.051	1.175	25	230	9	7.215	34.595
1988	-	-	973	3.369	-	2,355	-	-	24.662	500	26	468	2	9.139	41.494
1989	-	-	338	1.877 <sup>1</sup>	-	4,245	-	-	25.295	340	5 <sup>2</sup>	259	13	14.344	46.716
1990	-	37 <sup>3</sup>	386	1.826 <sup>1</sup>	-	6,741	-	-	34.090	830	-	332	1	18.918	63.161
1991	-	23	644	804	-	981	-	-	49.464	166	1	285	64	15.354	67.786
1992	-	9	58	1.306	614	530	-	-	23,451	977	16	447	34	4.335	31,777
1993 <sup>1</sup>	8 <sup>3</sup>	4	152	278 <sup>3</sup>	15	685	-	-	17,847	1,040 <sup>3</sup>	65	733	1	5.309 <sup>2</sup>	26,137
1994 <sup>1</sup>	-	28	26	721 <sup>3</sup>	6	795 <sup>2</sup>	4	3	19,837	985	34 <sup>2</sup>	259	13	6,220	28,931

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian authorities.

<sup>4</sup>Includes former GDR prior to 1991.

<sup>5</sup>USSR prior to 1991.

**Table D2** REDFISH in Sub-area IV (North Sea). Nominal catch (t) by countries as officially reported to ICES. Not included in the assessment.

Year	Belgium	Denmark	Faroe Islands	France	Germany	Netherlands	Norway	UK (England & Wales)	UK (Scotland)	Total
1986	-	24	-	578	183	-	1.048	35	1	1.869
1987	-	16	3	833	70	-	411	16	55	1.404
1988	-	32	90	915	188	-	696	125	9	2.055
1989	1	23	13	554 <sup>1</sup>	111	-	500 <sup>2</sup>	134	6	1.342
1990	+	41	25	554 <sup>1</sup>	47	-	483 <sup>2</sup>	369	6	1.525
1991	5	29	144	914 <sup>1</sup>	213	2	415 <sup>2</sup>	43	38	1.803
1992	4	22	23	1,960 <sup>1</sup>	170	1	232 <sup>2</sup>	65	122	2.599
1993 <sup>1</sup>	28	14	4	n/a	33	1	281 <sup>2</sup>	138	70	569
1994 <sup>1</sup>	4	13	1	n/a	323	8	306 <sup>2</sup>	38	66	759

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

n/a = not available.



**Table D3** *Sebastes mentella*. Maturity ogives from Russian research vessels. Sexes combined. Data collected during April-June in the Kopytov area (western Barents Sea) and adjacent waters.

Age	1986	1987	1988	1989	1990	1991	1992	1993	1995
7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000
9	0.006	0.083	0.000	0.000	0.012	0.139	0.013	0.033	0.000
10	0.017	0.182	0.028	0.074	0.131	0.174	0.092	0.133	0.055
11	0.132	0.278	0.125	0.178	0.300	0.138	0.169	0.364	0.111
12	0.377	0.616	0.297	0.473	0.688	0.358	0.396	0.480	0.368
13	0.822	0.821	0.562	0.684	0.714	0.470	0.452	0.696	0.587
14	0.795	0.926	0.760	0.716	0.824	0.637	0.761	0.925	0.696
15	0.862	0.938	0.855	0.794	0.848	0.762	0.939	0.962	0.729
16	0.875	1.000	1.000	1.000	1.000	1.000	0.886	0.953	0.789
17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.977	1.000
18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**Table D4** REDFISH in Sub-areas I and II. Year-class strength.

Year class	International 0-group survey abundance indices	Russian Young fish surveys <sup>1</sup>
1961	-	poor
1962	-	poor
1963	-	strong
1964	-	strong
1965	159	strong
1966	236	strong
1967	44	average
1968	21	average
1969	295	very strong
1970	247	strong
1971	172	strong
1972	177	average
1973	385	below average
1974	468	poor
1975	315	poor
1976	447	poor
1977	472	poor
1978	460	poor
1979	980	poor
1980	651	poor
1981	861	close to poor
1982	694	strong
1983	851	average
1984	732	poor
1985	795	poor
1986	702	poor
1987	631	poor
1988	949	below average
1989	698	below average
1990	670	poor
1991	200	poor
1992	150	poor
1993	162	poor
1994	414	-

<sup>1</sup> On the basis of the abundance of age groups 1+ to 6+ (ref. Table D6).

**Table D5** *Sebastes mentella*. Average catch (no. of specimens) of different year classes per hour trawling in the USSR survey in the Barents and Norwegian Sea (1976–1983 published in "Annales Biologiques"). These data are used as input for the tuning and recruitment estimation (ref. Table 6.13b).

Year class	0	1	2	3	4	5	6	7	8	9	10	11
1965	-	-	-	-	-	-	-	-	-	-	-	0.4
1966	-	-	-	-	-	-	-	-	-	-	3.0	-
1967	-	-	-	-	-	-	-	-	-	11.7	-	0.3
1968	-	-	-	-	-	-	-	-	16.2	-	1.5	0.3
1969	-	-	-	-	-	-	-	43.4	-	8.7	12.2	3.1
1970	-	-	-	-	-	-	85.8	-	19.8	34.9	11.9	-
1971	-	-	-	-	-	22.7	-	19.5	51.9	18.0	5.7	-
1972	-	-	-	-	9.4	-	6.7	57.6	12.3	6.7	-	-
1973	-	-	-	0.6	-	4.3	37.3	8.6	5.6	-	-	-
1974	-	-	4.8	-	4.9	22.8	4.8	4.8	-	-	-	3.0
1975	-	7.4	-	1.7	6.4	2.4	3.5	5.0	-	-	4.0	-
1976	7.0	-	8.1	1.2	2.5	6.8	4.9	5.0	1.0	13.0	-	-
1977	-	0.2	0.2	0.2	0.9	5.1	3.7	1.0	19.0	2.0	-	-
1978	0.8	0.02	0.9	1.0	5.0	3.8	2.0	20.0	6.0	-	-	-
1979	-	1.9	1.4	3.6	2.3	9.0	11.0	16.0	1.0	-	-	0.1
1980	0.3	0.4	2.0	2.5	16.0	6.0	11.0	25.0	2.0	-	1.5	2.0
1981	-	2.2	3.9	20.0	6.0	12.0	47.0	18.0	6.3	1.6	0.5	1.0
1982	19.8	13.2	13.0	15.0	34.0	44.0	39.0	32.6	4.3	3.1	4.9	+
1983	12.5	3.0	5.0	6.0	31.0	34.0	32.3	13.3	4.0	4.2	0.6	1.1
1984	-	10.0	2.0	-	5.0	18.3	19.0	2.2	2.4	0.2	1.7	-
1985	107.0	7.0	-	1.0	5.2	16.2	1.7	1.7	0.6	2.8	-	-
1986	2.0	-	1.0	1.8	8.4	3.6	2.1	1.2	5.6	-	-	-
1987	-	3.0	37.9	1.3	8.0	4.1	2.0	10.6	-	-	-	-
1988	4.0	58.1	4.3	13.3	25.8	3.9	8.6	-	-	-	-	-
1989	8.7	9.0	17.0	23.4	4.6	5.4	-	-	-	-	-	-
1990	2.5	6.3	6.1	1.0	4.3	-	-	-	-	-	-	-
1991	0.3	1.0	0.5	1.5	-	-	-	-	-	-	-	-
1992	0.6	+	0.2	-	-	-	-	-	-	-	-	-
1993	-	+	-	-	-	-	-	-	-	-	-	-
1994	0.3	-	-	-	-	-	-	-	-	-	-	-

**Table D6** *Sebastes mentella* in Sub-areas I and II. Preliminary Norwegian bottom trawl survey indices (numbers in millions) in the Svalbard area (Division IIb).

Year	Age														Total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1992	283	419	484	131	58	45	14	8	5	2	7	2	1	3	1,462
1993	2	527	117	202	142	8	23	6	13	1	7	1	1	+	1,050
1994	7	280	290	202	235	42	94	1	1	3	4	1	1	+	1,161

**Table D7** *Sebastes mentella*<sup>1</sup>. Abundance indices from the bottom trawl surveys in the Barents Sea winter 1986–1995 (numbers in millions). 1986–1992 includes only main areas A, B, C and D.

År (Year)	Lengdegruppe (cm) / Length group (cm)									Total
	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	>45	
1986	81.3	151.9	205.4	87.7	169.2	129.8	87.5	23.6	13.8	951
1987	71.8	25.1	227.4	56.1	34.6	11.4	5.3	1.1	0.1	433
1988	587.0	25.2	132.6	182.1	39.6	50.1	47.9	3.6	0.1	1070
1989	622.9	55.0	28.4	177.1	58.0	9.4	8.0	1.9	0.3	962
1990	323.6	304.5	36.4	55.9	80.2	12.9	12.5	1.5	0.2	830
1991	395.2	448.8	86.2	38.9	95.6	34.8	24.3	2.5	0.2	1123
1992	139.0	366.5	227.1	34.6	55.2	34.4	7.5	1.8	0.5	867
1993	30.8	592.7	320.2	116.3	24.2	25.0	6.3	1.0	+	1117
1994	6.9	258.6	289.4	284.3	51.4	69.8	19.9	1.4	0.1	979
1995	263.7	71.4	637.8	505.8	90.8	68.8	31.3	3.9	0.5	1674

<sup>1)</sup> Inkluderer uidentifiserte *Sebastes* individer, for det meste mindre enn 15 cm.

(Includes unidentified *Sebastes* individuals, mostly less than 15 cm.)

**Table D8** *Sebastes mentella* in Sub-areas I and II. Results of the Russian trawl/acoustic redfish survey in the western Barents Sea in April-May 1992-1995. Stock numbers in millions. SSN = spawning stock numbers. SSB = spawning stock biomass.

Year	Period of survey	Age																		Total			
		1-4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21+	Numbers	Biomass t 10 <sup>3</sup>	SSN	SSB t 10 <sup>3</sup>
1992	April	29	27	27	37	36	50	78	39	34	40	44	43	28	17	13	4	7	3	566	218	191	114
1993	April	31	15	13	6	6	20	56	56	38	28	29	27	19	12	7	3	1	2	369	150	151	90
1994		No Data																					
1995	May	+	32	51	83	90	41	31	31	41	94	73	48	30	10	9	4	1	+	669	202	211	102

**Table D9** *Sebastes marinus* in Sub-areas I and II. Preliminary Norwegian bottom trawl survey indices (numbers in thousands) in the Svalbard area (Division IIb).

Year	Age														Total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1992	284	12,378	5,576	2,279	371	2,064	3,687	5,704	9,215	6,413	1,454	1,387	696	22	51,530
1993	32	10,704	5,710	5,142	1,855	1,052	1,314	3,520	2,847	2,757	2,074	1,245	844	119	39,215
1994	429	1,150	3,418	2,393	1,723	1,106	1,714	1,256	1,938	1,596	2,039	484	550	319	20,115

**Table D10** *Sebastes marinus* in Sub-areas I and II. Preliminary Norwegian bottom trawl indices (numbers in thousands) from the annual Barents Sea survey in winter.

Year	Age													Total
	3	4	5	6	7	8	9	10	11	12	13	14	15	
1992	2,295	4,261	10,760	2,043	1,474	13,178	4,230	6,302	8,251	3,751	3,865	3,064	3,568	67,042
1993	468	1,218	1,424	2,020	979	5,048	2,968	4,230	2,142	4,634	3,338	2,951	9,148	40,568
1994	2,951	4,485	2,573	3,801	8,338	3,254	1,297	7,231	6,443	248	10,192	6,341	2,612	59,766

**Table D11** *Sebastes marinus*. Abundance indices from bottom trawl surveys in the Barents Sea winter 1986–1995 (numbers in millions). 1986–1992 includes only main areas A, B, C and D.

År (Year)	Lengdegruppe (cm) / Length group (cm)									Total
	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	>45	
1986	3.0	11.7	26.4	34.3	17.7	21.0	12.8	4.4	2.6	134
1987	7.7	12.7	32.8	7.7	6.4	3.4	3.8	3.8	4.2	83
1988	1.0	5.6	5.5	14.2	12.6	7.3	5.2	4.1	3.7	59
1989	48.7	4.9	4.3	11.8	15.9	12.2	6.6	4.8	3.0	114
1990	9.2	5.3	6.5	9.4	15.5	14.0	8.0	4.0	3.4	75
1991	4.2	13.6	8.4	19.4	18.0	16.1	14.8	6.0	4.0	105
1992	1.8	3.9	7.7	20.6	19.7	13.7	10.5	6.6	5.8	92
1993	0.1	1.2	3.5	6.9	10.3	14.5	12.5	8.6	6.3	64
1994	0.7	6.5	9.3	11.7	11.5	19.4	9.1	4.4	2.8	75
1995	0.6	5.1	13.2	11.9	9.3	16.0	17.3	10.9	4.6	89



**Table E1** Greenland HALIBUT in Sub-areas I and II. Norwegian bottom-trawl survey indices (numbers in thousands) in the Svalbard area (Division IIb).

Year	Fish <sup>2</sup> <20 cm	Age									Total
		1	2	3	4	5	6	7	8	9+	
1981	2.1	No age data									20,100
1982	0.7										26,000
1983	5.9										26,690
1984	3.2	550	3,042	2,924	8,573	6,847	5,657	4,345	2,796	1,896	36,630
1985	1.6	884	3,921	4,294	6,674	8,793	8,622	3,920	1,817	525	39,450
1986	0.1	49	1,005	1,967	7,314	4,671	1,754	2,301	372	37	19,470
1987	1.0	630	1,014	3,076	4,409	4,786	3,141	964	364	116	18,500
1988	2.5	818	4,298	6,191	6,696	12,289	2,396	6,015	338	1,277	39,300
1989 <sup>1</sup>	1.4	712	3,232	8,158	7,493	7,069	2,374	1,753	353	744	31,888
1990 <sup>1</sup>	0.4	115	336	5,050	7,130	7,730	4,490	2,330	918	544	28,643
1991 <sup>1</sup>	0.1	71	877	3,080	6,720	9,270	5,450	2,800	1,660	524	30,452
1992 <sup>1</sup>	+	33	30	338	1,190	3,520	4,420	2,280	1,280	474	13,565
1993 <sup>1</sup>	+	25	60	51	1,049	2,369	2,056	2,772	1,114	665	10,161
1994 <sup>1</sup>	+	4	238	296	652	2,775	2,371	2,593	531	844	10,304

<sup>1</sup> New standard trawl equipment (rockhopper gear and 40 meter sweep length).

<sup>2</sup> In millions.

**Table E2** GREENLAND HALIBUT in Sub-areas I and II. Results from the Norwegian bottom trawl survey in the Barents Sea in January-March. Numbers in thousands.

Year	Length group (cm)															Total
	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+	
1988	141	426	226	258	810	1858	2997	1800	869	402	203	166	201	58	104	10518
1989	457	508	647	478	786	1680	3890	2856	1287	610	149	19	75	0	55	13493
1990	21	199	777	785	1,205	1,657	1,829	2,043	1,349	479	159	160	40	82	0	10,800
1991	0	42	262	618	655	868	954	1,320	1,875	1,577	847	165	34	51	0	9,270
1992	14	35	64	149	509	843	1,096	1,072	1,029	827	633	108	31	27	26	6,500
1993	0	0	17	67	117	484	1,415	1,255	1,418	846	589	358	89	31	34	6,720
1994	0	0	16	99	118	957	1,631	2,379	1,473	800	307	264	25	0	0	8,069
1995	0	0	0	0	35	63	852	1,250	1,067	668	603	227	125	0	0	4,890

**Table E3** GREENLAND HALIBUT in Sub-areas I and II. Results of the Russian bottom-trawl survey in the Svalbard and Barents Sea regions in October-January (numbers in millions).

Year	Survey area	Age								Total
		to 3	4	5	6	7	8	9	10+	
1990	I-III	1.2	8.3	18.9	17.2	8.3	2.9	1.2	1.2	59.2
1991	I-III	No age data								16.7
	I-IV									63.0
1992	I-III	0.5	6.9	24.6	12.2	3.4	1.6	0.9	1.1	51.2
	I-IV	0.7	7.0	30.3	18.7	7.2	4.3	1.5	1.5	72.1
1993	I-III	0.2	3.2	8.0	12.1	4.5	1.9	1.3	0.8	32.0
	I-IV	0.5	5.4	13.1	20.7	8.2	3.3	2.2	1.1	54.5
1994	I-III	+	0.8	4.4	7.4	5.2	3.2	1.4	1.4	23.8
	I-IV	+	1.4	7.3	12.3	8.5	5.3	2.3	2.3	39.4

Sub-areas I-III: Along the continental slope to the west of Bear Island and Svalbard from 71°40'N-80°N.

Sub-area IV: From the Bear Island and Svalbard east to 33°E and from 73°N-77°N.

**Table E4** GREENLAND HALIBUT. Abundance indices on age from the Norwegian trawl survey for shrimp at Svalbard. July-August 1988-1992 and June 1993-1994. Numbers in thousands.

Year	Age									Total
	1	2	3	4	5	6	7	8	9+	
1988 <sup>1</sup>	4,163	14,278	8,259	8,354	2,594	144				37,792
1989 <sup>2</sup>	4,653	9,777	9,943	4,855	4,057	1,054	542	83	372	35,336
1990	247	1,569	8,324	9,800	6,910	2,148	295	245	175	29,713
1991	25	577	2,465	4,969	5,362	2,541	1,380	158	278	17,755
1992	95	57	505	1,780	2,914	1,129	713	333	200	7,726
1993 <sup>3</sup>	39	54	50	814	1,572	433	589	395	512	4,458
1994 <sup>3</sup>	0	13	43	446	2,214	1,218	1,764	485	797	6,980

<sup>1</sup>The length distribution was split on age according to Macdonald and Pitcher (1979).

<sup>2</sup>An age-length key from the bottom trawl survey for cod at Svalbard in September 1989 was used to convert the indices from length to age.

<sup>3</sup>An age-length key from the bottom trawl survey for cod at Svalbard in September the same year was used to convert the indices from length to age.

Table E5 GREENLAND HALIBUT ( <i>Reinhardtius hippoglossoides</i> )																
Results from a research programme using trawlers in a limited commercial fishery																
1992-1995. All areas combined. Spring and autumn combined.																
Age	Catch in numbers on age (%)	1992			Catch in numbers on age (%)	1993			Catch in numbers on age (%)	1994*			Catch in numbers on age (%)	1995*		
		CPUE (N) on age	Mean individual weight (kg)	CPUE (kg) on age		CPUE (N) on age	Mean individual weight (kg)	CPUE (kg) on age		CPUE (N) on age	Mean individual weight (kg)	CPUE (kg) on age		CPUE (N) on age	Mean individual weight (kg)	CPUE (kg) on age
1																
2																
3	0.1	0	0.26	0									0.1	1	0.40	0
4	4.6	19	0.50	10	4.2	30	0.53	16	3.2	26	0.52	13	0.7	7	0.47	3
5	19.1	80	0.71	57	25.0	176	0.76	134	24.7	198	0.73	145	22.5	218	0.70	152
6	23.0	97	0.96	93	18.4	130	0.98	127	23.8	191	0.95	182	22.6	218	0.94	205
7	25.9	109	1.29	140	27.1	191	1.33	254	26.8	215	1.28	276	30.2	292	1.24	362
8	13.3	56	1.77	99	12.4	87	1.85	162	11.2	90	1.79	161	11.0	106	1.71	182
9	1.7	7	2.00	14	0.7	5	2.28	11	1.0	8	2.23	18	2.7	26	2.03	53
10	6.8	29	2.46	70	7.4	52	2.65	138	5.9	47	2.55	121	6.6	64	2.50	160
11	2.9	12	3.10	38	3.1	22	3.43	75	2.4	19	3.37	65	2.0	19	3.28	63
12	1.7	7	3.86	28	1.0	7	4.32	30	0.6	5	4.22	20	1.1	11	3.71	39
13	0.5	2	4.44	9	0.4	3	5.18	15	0.2	2	5.01	8	0.3	3	4.62	13
14	0.2	1	6.00	5	0.2	1	6.44	9	0.1	1	6.29	5	0.2	2	5.59	11
15	0.1	0	5.22	2												
		420		565		704		971		802		1013		966		1244
Overall mean individual weight (kg)	1.35				1.38				1.27				1.29			
CPUE (kg round weight per trawhour)**	567				973				1020				1247			
CPUE (number fish per trawhour)**	420				705				803				967			
Catch (in tonnes)	695				862				811				368			
*) Only in spring																
* *) Average for freezer- and factorytrawler																

**Table E6** Proportion of mature GREENLAND HALIBUT by age. Data from Russia for the years 1983–1995.

Age years	Average 1983-1987	1988 <sup>1</sup>	1989 <sup>2</sup>	1990 <sup>2</sup>	1992 <sup>3</sup>	1994 <sup>4</sup>	1995 <sup>4</sup>
3	-	-	-	-	-	-	0.00
4	0.05	-	0.01	0.09	0.03	-	0.10
5	0.23	0.04	0.10	0.29	0.14	0.34	0.41
6	0.49	0.40	0.66	0.52	0.22	0.47	0.54
7	0.66	0.57	0.74	0.66	0.26	0.63	0.66
8	0.78	0.63	0.68	0.75	0.34	0.71	0.76
9	0.89	0.67	0.81	0.71	0.55	0.77	0.88
10	0.95	0.89	0.92	0.77	0.95	0.97	0.86
11	0.99	1.00	0.94	0.93	0.83	0.93	1.00
12	0.99	1.00	1.00	1.00	1.00	0.96	1.00
13	0.99	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	-	1.00	1.00
15	1.00	1.00	1.00	1.00	-	1.00	1.00

<sup>1</sup>The specimens analysed were sampled through the whole year.

<sup>2</sup>The specimens analysed were sampled in August-February.

<sup>3</sup>The specimens analysed were sampled in October-December.

<sup>4</sup>The specimens analysed were sampled in November-January.

**Table E7** Greenland halibut in ICES Sub-area IV (North Sea. Nominal catch (t) by countries as officially reported to ICES. Not included in the assessment .

Year	Denmark	Faroe Islands	France	Germany	Norway	Russia	UK England & Wales	UK Scotland	Total
1973	-	-	-	4	9	8	28	-	49
1974	-	-	-	2	2	-	30	-	34
1975	-	-	-	1	4	-	12	-	17
1976	-	-	-	1	2	-	18	-	21
1977	-	-	-	2	2	-	8	-	12
1978	-	-	2	30	-	-	1	-	33
1979	-	-	2	16	2	-	1	-	27
1980	-	177	-	34	5	-	-	-	216
1981	-	-	-	-	7	-	-	-	7
1982	-	-	2	26	17	-	-	-	45
1983	-	-	1	64	89	-	-	-	154
1984	-	-	3	50	32	-	-	-	85
1985	-	1	2	49	12	-	-	-	64
1986	-	-	30	2	34	-	-	-	66
1987	-	28	16	1	35	-	-	-	80
1988	-	71	62	3	19	-	1	-	156
1989	-	21	14 <sup>1</sup>	1	197	-	5	-	224
1990	-	10	30 <sup>1</sup>	3	29	-	4	-	46
1991	-	48	291 <sup>1</sup>	1	216	-	2	-	267
1992	1	15	416 <sup>1</sup>	3	625 <sup>1</sup>	-	-	1	645
1993	1	-	78 <sup>1</sup>	1	863 <sup>1</sup>	-	10	-	875
1994 <sup>1</sup>	+	103	-	-	724	-	6	-	833

<sup>1</sup> Provisional figures

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