



REPORT OF THE
ARCTIC FISHERIES WORKING GROUP

ICES, Headquarters
20 - 28 August 1997

PART 2 OF 2

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International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

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Table 6.10

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:33:09

Terminal Fs derived using XSA (With F shrinkage)

Table 8	Fishing mortality (F) at age	
YEAR,	1965,	1966,
AGE		
1,	.0000,	.0000,
2,	.0000,	.0000,
3,	.0000,	.0000,
4,	.0000,	.0000,
5,	.0000,	.0000,
6,	.0003,	.0000,
7,	.0021,	.0000,
8,	.0116,	.0002,
9,	.0236,	.0023,
10,	.0129,	.0065,
11,	.0174,	.0059,
12,	.0145,	.0092,
13,	.0225,	.0101,
14,	.0208,	.0198,
15,	.0210,	.0168,
16,	.0182,	.0206,
17,	.0244,	.0141,
18,	.0214,	.0163,
+gp,	.0214,	.0163,
FBAR 10-16,	.0182,	.0127,

Table 8	Fishing mortality (F) at age									
YEAR,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
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,	.0001,	.0000,	.0000,	.0009,	.0004,	.0015,	.0124,	.0351,
7,	.0000,	.0000,	.0005,	.0000,	.0000,	.0015,	.0036,	.0130,	.0547,	.0728,
8,	.0001,	.0001,	.0032,	.0002,	.0004,	.0125,	.0106,	.0380,	.1358,	.2108,
9,	.0001,	.0008,	.0049,	.0011,	.0017,	.0144,	.0239,	.0721,	.2598,	.3516,
10,	.0016,	.0019,	.0084,	.0065,	.0065,	.0138,	.0209,	.0864,	.3728,	.5799,
11,	.0039,	.0035,	.0101,	.0240,	.0186,	.0190,	.0199,	.1054,	.5009,	.7297,
12,	.0048,	.0066,	.0106,	.0421,	.0575,	.0517,	.0385,	.0935,	.4372,	.8258,
13,	.0055,	.0086,	.0144,	.0502,	.0701,	.0698,	.0823,	.1265,	.3610,	.7437,
14,	.0045,	.0136,	.0108,	.0686,	.0811,	.0805,	.1045,	.1711,	.4475,	.5507,
15,	.0057,	.0078,	.0085,	.0558,	.1166,	.0728,	.0945,	.1508,	.5009,	.5350,
16,	.0059,	.0120,	.0092,	.0808,	.1856,	.1394,	.1160,	.1523,	.4651,	.5595,
17,	.0081,	.0072,	.0065,	.0353,	.1107,	.1156,	.1424,	.0880,	.5460,	.3656,
18,	.0060,	.0099,	.0098,	.0582,	.1129,	.0957,	.1081,	.1379,	.4657,	.5530,
+gp,	.0060,	.0099,	.0098,	.0582,	.1129,	.0957,	.1081,	.1379,	.4657,	.5530,
FBAR 10-16,	.0046,	.0077,	.0103,	.0469,	.0766,	.0639,	.0681,	.1266,	.4408,	.6463,

Table 6.10 (continued)

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:33:09

Terminal Fs derived using XSA (With F shrinkage)

Table 8	Fishing mortality (F) at age									
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
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,	.0075,	.0138,	.0060,	.0086,	.0001,	.0002,	.0000,	.0012,	.0004,
7,	.0051,	.0629,	.0609,	.0319,	.0188,	.0088,	.0011,	.0004,	.0064,	.0016,
8,	.0493,	.1639,	.1093,	.0932,	.0426,	.0339,	.0229,	.0072,	.0246,	.0027,
9,	.1579,	.1906,	.1531,	.1385,	.1162,	.0725,	.0372,	.0275,	.0784,	.0145,
10,	.3712,	.2103,	.1778,	.1712,	.1981,	.2761,	.1172,	.0758,	.2879,	.0577,
11,	.4930,	.2105,	.2265,	.1690,	.2232,	.3375,	.2645,	.2007,	.4228,	.1366,
12,	.8421,	.2807,	.3140,	.2396,	.2888,	.3975,	.5054,	.4991,	.6189,	.2196,
13,	.7073,	.2890,	.4146,	.2483,	.3823,	.5414,	.8212,	1.1082,	1.0377,	.4517,
14,	.6351,	.2917,	.2771,	.2515,	.4011,	.4728,	.9961,	1.3540,	.6948,	.5586,
15,	.4968,	.3287,	.2001,	.3954,	.3541,	.5740,	1.3401,	1.4095,	.7528,	.3052,
16,	.3953,	.2655,	.3190,	.6233,	.2981,	.5969,	1.4005,	1.5541,	.8244,	.2306,
17,	.5284,	.2197,	.2237,	.5318,	.3643,	.6527,	1.7021,	.9333,	.9826,	.3285,
18,	.5547,	.2796,	.2876,	.4113,	.3610,	.6598,	.9700,	.6719,	.4946,	.2580,
+gp,	.5547,	.2796,	.2876,	.4113,	.3610,	.6598,	.9700,	.6719,	.4946,	.2580,
FBAR 10-16,	.5630,	.2681,	.2756,	.2998,	.3065,	.4566,	.7778,	.8859,	.6628,	.2800,

Table 8	Fishing mortality (F) at age										
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	FBAR 94-96
AGE											
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0003,	.0000,	.0000,	.0001,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0010,	.0000,	.0000,	.0003,
4,	.0000,	.0000,	.0000,	.0000,	.0000,	.0050,	.0039,	.0004,	.0000,	.0000,	.0001,
5,	.0000,	.0000,	.0000,	.0000,	.0280,	.0080,	.0015,	.0007,	.0009,	.0029,	.0015,
6,	.0000,	.0000,	.0005,	.0000,	.0281,	.0292,	.0014,	.0040,	.0056,	.0017,	.0037,
7,	.0000,	.0000,	.0048,	.0084,	.0913,	.0487,	.0027,	.0072,	.0058,	.0054,	.0061,
8,	.0017,	.0000,	.0267,	.0459,	.1045,	.0375,	.0038,	.0136,	.0145,	.0106,	.0129,
9,	.0147,	.0065,	.0669,	.1112,	.0912,	.0250,	.0112,	.0237,	.0155,	.0187,	.0193,
10,	.0496,	.0290,	.0876,	.1515,	.1711,	.0281,	.0361,	.0632,	.0205,	.0298,	.0378,
11,	.0588,	.0648,	.0792,	.1482,	.1420,	.0391,	.0560,	.0534,	.0362,	.0335,	.0411,
12,	.1029,	.1077,	.1036,	.2002,	.2010,	.0688,	.0773,	.0628,	.0470,	.0380,	.0493,
13,	.1715,	.2651,	.2450,	.3563,	.3318,	.0948,	.0884,	.0522,	.1092,	.0376,	.0663,
14,	.1586,	.2788,	.3461,	.3942,	.5825,	.1047,	.1517,	.1029,	.1401,	.0568,	.0999,
15,	.1876,	.2311,	.2413,	.2732,	.3402,	.2260,	.1047,	.1388,	.1257,	.0450,	.1032,
16,	.1095,	.3659,	.2672,	.1234,	.2617,	.2697,	.1816,	.2393,	.1196,	.0437,	.1342,
17,	.0894,	.2127,	.9104,	.1582,	1.7196,	.2711,	.1807,	.2021,	.0723,	.0496,	.1080,
18,	.0755,	.1760,	.6196,	1.3781,	2.0460,	.4416,	.1252,	.1621,	.1712,	.0780,	.1371,
+gp,	.0755,	.1760,	.6196,	1.3781,	2.0460,	.4416,	.1252,	.1621,	.1712,	.0780,	.1371,
FBAR 10-16,	.1198,	.1918,	.1957,	.2353,	.2900,	.1187,	.0994,	.1018,	.0855,	.0406,	

Table 6.11

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:33:10

Terminal Fs derived using XSA (With F shrinkage)

Table 10	Stock number at age (start of year)		Numbers*10**-3
YEAR,	1965,	1966,	
AGE			
1,	976425,	980427,	
2,	531820,	883506,	
3,	318318,	481211,	
4,	201118,	288026,	
5,	167323,	181979,	
6,	156880,	151400,	
7,	146162,	141905,	
8,	145156,	131982,	
9,	97330,	129828,	
10,	93586,	86010,	
11,	93899,	83595,	
12,	143631,	83494,	
13,	116598,	128087,	
14,	142944,	103151,	
15,	101157,	126674,	
16,	120558,	89632,	
17,	69552,	107119,	
18,	73179,	61419,	
+gp,	128546,	128752,	
TOTAL,	3824184,	4368197,	

Table 10	Stock number at age (start of year)					Numbers*10**-3				
YEAR,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE										
1,	880234,	716867,	699883,	823276,	949874,	948133,	669878,	458497,	310627,	189116,
2,	887126,	796469,	648649,	633280,	744931,	859482,	857907,	606130,	414865,	281067,
3,	799429,	802706,	720674,	586921,	573015,	674042,	777691,	776266,	548449,	375385,
4,	435418,	723353,	726318,	652093,	531068,	518486,	609898,	703684,	702394,	496257,
5,	260617,	393982,	654517,	657200,	590038,	480531,	469145,	551858,	636720,	635553,
6,	164662,	235816,	356490,	592231,	594659,	533889,	434802,	424500,	499342,	576128,
7,	136992,	148992,	213368,	322536,	535873,	538069,	482639,	393261,	383527,	446274,
8,	128401,	123956,	134813,	192974,	291842,	484878,	486112,	435131,	351227,	328560,
9,	119397,	116176,	112146,	121595,	174579,	263962,	433287,	435224,	379025,	277448,
10,	117208,	108020,	105035,	100975,	109899,	157695,	235431,	382800,	366430,	264499,
11,	77319,	105881,	97558,	94243,	90776,	98793,	140740,	208617,	317698,	228387,
12,	75197,	69690,	95468,	87387,	83256,	80625,	87708,	124842,	169889,	174197,
13,	74853,	67715,	62643,	85475,	75810,	71120,	69276,	76367,	102876,	99282,
14,	114735,	67355,	60744,	55874,	73552,	63950,	60011,	57730,	60887,	64881,
15,	91502,	103351,	60123,	54376,	47203,	61368,	53390,	48910,	44023,	35218,
16,	112710,	82323,	92785,	53943,	46530,	38012,	51630,	43954,	38060,	24139,
17,	79447,	101387,	73603,	83188,	45021,	34972,	29920,	41599,	34152,	21629,
18,	95573,	71303,	91079,	66170,	72662,	36470,	28189,	23480,	34471,	17900,
+gp,	575645,	193119,	271920,	106140,	146799,	39646,	31288,	43172,	62889,	28168,
TOTAL,	5226461,	5028459,	5277817,	5369879,	5777391,	5984121,	6008940,	5836024,	5457549,	4564090,

Table 6.11 (continued)

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:33:10

Terminal Fs derived using XSA (With F shrinkage)

Table 10 YEAR,	Stock number at age (start of year)				Numbers*10***-3					
	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	154814,	174777,	170241,	138216,	143565,	155238,	191445,	172014,	119730,	103495,
2,	171119,	140082,	158145,	154040,	125063,	129903,	140465,	173226,	155644,	108336,
3,	254320,	154835,	126751,	143095,	139381,	113162,	117541,	127098,	156742,	140833,
4,	339663,	230118,	140100,	114689,	129478,	126118,	102393,	106356,	115003,	141826,
5,	449032,	307339,	208219,	126768,	103775,	117157,	114116,	92649,	96235,	104059,
6,	575072,	406301,	278092,	188405,	114704,	93900,	106008,	103256,	83832,	87077,
7,	503333,	520346,	364873,	248172,	169463,	102902,	84959,	95901,	93430,	75761,
8,	375445,	453134,	442142,	310653,	217505,	150482,	92298,	76792,	86742,	83996,
9,	240795,	323379,	348028,	358638,	256077,	188607,	131620,	81624,	68985,	76576,
10,	176620,	186058,	241818,	270205,	282530,	206295,	158717,	114742,	71853,	57713,
11,	134016,	110251,	136420,	183164,	206023,	209709,	141625,	127732,	96242,	48753,
12,	99617,	74065,	80821,	98423,	139966,	149123,	135405,	98364,	94562,	57059,
13,	69019,	38830,	50616,	53424,	70080,	94881,	90673,	73912,	54034,	46077,
14,	42701,	30787,	26317,	30255,	37712,	43265,	49961,	36093,	22080,	17320,
15,	33847,	20474,	20809,	18049,	21288,	22849,	24398,	16696,	8432,	9972,
16,	18662,	18636,	13335,	15415,	10998,	13519,	11645,	5780,	3690,	3594,
17,	12483,	11373,	12930,	8770,	7478,	7386,	6734,	2597,	1106,	1464,
18,	13578,	6659,	8261,	9355,	4663,	4701,	3479,	1111,	924,	374,
+gp,	34166,	12538,	27595,	7906,	6604,	9052,	1130,	1008,	139,	309,
TOTAL,	3698299,	3219982,	2855514,	2477643,	2186354,	1938250,	1704613,	1506953,	1329407,	1164596,

Table 10	Stock number at age (start of year)					Numbers*10**-3						
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	1997,	GMST
AGE												
1,	116065,	188808,	313284,	205534,	206831,	75845,	19147,	24657,	104506,	42980,	0,	2423
2,	93647,	105020,	170841,	283471,	185975,	187149,	68627,	17325,	22311,	94561,	38907,	2437
3,	98027,	84735,	95026,	154583,	256495,	168277,	169339,	62096,	15671,	20188,	85602,	2438
4,	127431,	88698,	76671,	85983,	139873,	232086,	152263,	153224,	56130,	14180,	18277,	2302
5,	128329,	115304,	80257,	69375,	77801,	126562,	208946,	137243,	138585,	50789,	12838,	2095
6,	94157,	116117,	104331,	72620,	62773,	68453,	113608,	188785,	124102,	125285,	45846,	1908
7,	78763,	85196,	105067,	94357,	65708,	55227,	60157,	102648,	170144,	111669,	113231,	1709
8,	68440,	71267,	77089,	94617,	84667,	54268,	47595,	54284,	92212,	153067,	100548,	1544
9,	75798,	61824,	64486,	67914,	81774,	69005,	47298,	42903,	48457,	82234,	137100,	1373
10,	68291,	67581,	55580,	54571,	54986,	67542,	60896,	42320,	37913,	43169,	73063,	1194
11,	49292,	58801,	59402,	46075,	42436,	41928,	59421,	53147,	35949,	33609,	37929,	987
12,	38482,	42053,	49865,	49656,	35947,	33315,	36482,	50837,	45588,	31370,	29413,	791
13,	41450,	31414,	34166,	40680,	36780,	26603,	28139,	30555,	43198,	39355,	27329,	591
14,	26539,	31596,	21806,	24197,	25775,	23882,	21895,	23308,	26242,	35045,	34301,	417
15,	8965,	20492,	21633,	13959,	14761,	13026,	19462,	17023,	19027,	20640,	29964,	289
16,	6650,	6724,	14716,	15377,	9611,	9505,	9402,	15859,	13407,	15183,	17858,	205
17,	2582,	5393,	4220,	10194,	12299,	6694,	6568,	7095,	11297,	10763,	13153,	141
18,	954,	2137,	3945,	1536,	7874,	1994,	4619,	4960,	5245,	9509,	9269,	94
+gp,	0,	689,	5026,	21668,	22923,	27151,	52707,	21979,	15860,	31099,	33987,	
TOTAL,	1123862,	1183851,	1357410,	1406368,	1425288,	1288510,	1186572,	1050248,	1025844,	964695,	858615,	

Table 6.12

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:45:56

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)		Tonnes
YEAR,	1965,	1966,	
AGE			
1,	0,	0,	
2,	0,	0,	
3,	0,	0,	
4,	0,	0,	
5,	0,	0,	
6,	26356,	25435,	
7,	26748,	25969,	
8,	32660,	29696,	
9,	30270,	40377,	
10,	34346,	31566,	
11,	40564,	36113,	
12,	72965,	42415,	
13,	71241,	78261,	
14,	97059,	70040,	
15,	76172,	95386,	
16,	98978,	73588,	
17,	60649,	93408,	
18,	66593,	55891,	
+gp,	128418,	127851,	
TOTALB10,	863018,	825994,	

Table 12	Stock biomass at age (start of year)					Tonnes				
YEAR,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
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,	27663,	39617,	59890,	99495,	99903,	89693,	73047,	71316,	83889,	96789,
7,	25070,	27266,	39046,	59024,	98065,	98467,	88323,	71967,	70186,	81668,
8,	28890,	27890,	30333,	43419,	65665,	109098,	109375,	97904,	79026,	73926,
9,	37132,	36131,	34877,	37816,	54294,	82092,	134752,	135355,	117877,	86286,
10,	43015,	39643,	38548,	37058,	40333,	57874,	86403,	140488,	134480,	97071,
11,	33402,	45741,	42145,	40713,	39215,	42679,	60800,	90122,	137245,	98663,
12,	38200,	35403,	48498,	44392,	42294,	40958,	44556,	63420,	86304,	88492,
13,	45735,	41374,	38275,	52225,	46320,	43454,	42328,	46660,	62857,	60661,
14,	77905,	45734,	41245,	37939,	49942,	43422,	40747,	39199,	41342,	44054,
15,	68901,	77823,	45273,	40945,	35544,	46210,	40202,	36829,	33149,	26519,
16,	92535,	67587,	76177,	44288,	38201,	31208,	42388,	36086,	31247,	19818,
17,	69277,	88409,	64182,	72540,	39259,	30495,	26090,	36274,	29780,	18861,
18,	86971,	64886,	82882,	60215,	66123,	33187,	25652,	21367,	31368,	16289,
+gp,	594066,	195051,	278989,	106140,	150028,	38734,	30662,	43172,	63329,	28760,
TOTALB10,	1268763,	832554,	920361,	776209,	865185,	787571,	845326,	930161,	1002079,	837859,

Table 6.12 (continued)

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:45:56

Terminal Fs derived using XSA (With F shrinkage)

Table 12 YEAR,	Stock biomass at age (start of year)					Tonnes				
	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
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,	96612,	68259,	29756,	20159,	11700,	9578,	10813,	10532,	8551,	8882,
7,	92110,	95223,	56555,	38467,	23386,	14201,	11724,	10070,	12613,	9091,
8,	84475,	101955,	88428,	62131,	40891,	28291,	17352,	12671,	14486,	11507,
9,	74887,	100571,	87703,	90377,	64531,	47529,	33168,	17304,	14832,	16694,
10,	64819,	68283,	74964,	83764,	87584,	63952,	49202,	32472,	21772,	17372,
11,	57895,	47629,	51021,	68503,	74992,	76334,	45320,	43174,	33877,	17210,
12,	50606,	37625,	38148,	46456,	61585,	65614,	54162,	37674,	39716,	25562,
13,	42170,	23725,	28750,	30345,	39245,	53133,	42254,	32374,	25990,	23499,
14,	28994,	20905,	18817,	21633,	25644,	29421,	28128,	18119,	12453,	10063,
15,	25487,	15417,	18686,	16208,	17627,	18919,	17811,	9450,	5675,	6462,
16,	15322,	15300,	12455,	14397,	9964,	12248,	11552,	4110,	2985,	3037,
17,	10885,	9917,	13240,	8981,	7254,	7164,	7583,	2236,	1121,	1388,
18,	12356,	6060,	8674,	9823,	4896,	4936,	3998,	1073,	988,	395,
+gp,	35259,	12914,	31182,	8736,	7383,	10157,	1388,	1302,	162,	390,
TOTALBIO,	691878,	623782,	558379,	519978,	476683,	441475,	334454,	232559,	195221,	151553,

Table 12 YEAR,	Stock biomass at age (start of year)					Tonnes				
	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
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,	13559,	16721,	20658,	10167,	8161,	13006,	19313,	30206,	21470,	21674,
7,	14177,	15335,	21224,	13776,	11827,	12150,	13836,	22583,	37942,	24902,
8,	13346,	13897,	18656,	14949,	17780,	14110,	11899,	13028,	23053,	38267,
9,	16600,	12921,	18185,	13990,	22079,	19321,	13244,	12871,	13907,	23601,
10,	19668,	18923,	18397,	15280,	18695,	20938,	20096,	14389,	12398,	14116,
11,	16266,	19581,	22454,	16357,	14853,	13836,	22580,	19664,	12942,	12099,
12,	16893,	16695,	22738,	23388,	15098,	12660,	16052,	20335,	18554,	12768,
13,	21181,	14702,	17561,	22089,	16919,	12237,	13225,	13444,	19742,	17985,
14,	14968,	16967,	12386,	14784,	13145,	10269,	10728,	10489,	12072,	16121,
15,	5702,	11988,	12742,	8724,	8562,	5601,	11093,	8341,	9457,	10258,
16,	5134,	5023,	9889,	9611,	5671,	4277,	5453,	8723,	7065,	8001,
17,	2089,	4358,	2988,	6718,	7256,	3481,	4072,	4115,	6473,	6167,
18,	910,	1925,	3053,	1012,	4646,	1136,	3002,	3323,	3304,	5991,
+gp,	0,	722,	4212,	15103,	16046,	18191,	34892,	17364,	11213,	21987,
TOTALBIO,	160493,	169757,	205141,	185949,	180737,	161214,	199486,	198874,	209590,	233938,

Table 6.13

Run title : Arctic S. mentella (run: XSAKHN06/X06)

At 27-Aug-97 22:28:11

Terminal Fs derived using XSA (With F shrinkage)

Table 13	Spawning stock biomass at age (spawning time)		Tonnes
YEAR,	1965,	1966,	
AGE			
1,	0,	0,	
2,	0,	0,	
3,	0,	0,	
4,	0,	0,	
5,	0,	0,	
6,	0,	0,	
7,	0,	0,	
8,	980,	891,	
9,	1816,	2423,	
10,	2748,	2525,	
11,	8924,	7945,	
12,	26267,	15269,	
13,	39183,	43044,	
14,	69883,	50429,	
15,	64746,	81078,	
16,	87100,	64758,	
17,	57617,	88737,	
18,	64595,	54214,	
+gp,	128418,	127851,	
TOTSPBIO,	552276,	539163,	

Table 13	Spawning stock biomass at age (spawning time)						Tonnes			
YEAR,	1967,	1968,	1969,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
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,	735,
8,	867,	837,	910,	1303,	1970,	3273,	3281,	2937,	2371,	1183,
9,	2228,	2168,	2093,	2269,	3258,	4926,	8085,	8121,	7073,	8715,
10,	3441,	3171,	3084,	2965,	3227,	4630,	6912,	11239,	10758,	18929,
11,	7348,	10063,	9272,	8957,	8627,	9389,	13376,	19827,	30194,	29599,
12,	13752,	12745,	17459,	15981,	15226,	14745,	16040,	22831,	31069,	47786,
13,	25154,	22756,	21051,	28724,	25476,	23900,	23280,	25663,	34571,	42584,
14,	56091,	32928,	29697,	27316,	35958,	31264,	29338,	28223,	29766,	37975,
15,	58566,	66150,	38482,	34803,	30212,	39278,	34172,	31305,	28177,	25617,
16,	81431,	59477,	67036,	38973,	33617,	27463,	37301,	31756,	27497,	19700,
17,	65814,	83989,	60973,	68913,	37296,	28971,	24786,	34460,	28291,	18861,
18,	84362,	62939,	80395,	58408,	64139,	32192,	24882,	20726,	30427,	16289,
+gp,	594066,	195051,	278989,	106140,	150028,	38734,	30662,	43172,	63329,	28760,
TOTSPBIO,	993120,	552273,	609440,	394752,	409034,	258764,	252117,	280262,	323524,	296732,

Table 6.13 (continued)

Run title : Arctic S. mentella (run: XSAKHNO6/X06)

At 27-Aug-97 22:28:11

Terminal Fs derived using XSA (With F shrinkage)

Table 13	Spawning stock biomass at age (spawning time)					Tonnes				
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
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,	829,	857,	509,	346,	210,	128,	106,	50,	0,	0,
8,	1352,	1631,	1415,	994,	654,	453,	278,	101,	0,	0,
9,	7564,	10158,	8858,	9128,	6518,	4800,	3350,	986,	148,	568,
10,	12640,	13315,	14618,	16334,	17079,	12471,	9594,	5455,	1720,	1963,
11,	17368,	14289,	15306,	20551,	22498,	22900,	13596,	13038,	7385,	4096,
12,	27327,	20318,	20600,	25086,	33256,	35432,	29247,	20118,	17991,	12960,
13,	29604,	16655,	20182,	21302,	27550,	37300,	29662,	23341,	20298,	18659,
14,	24993,	18020,	16220,	18647,	22106,	25360,	24247,	15926,	10535,	8775,
15,	24620,	14892,	18051,	15657,	17027,	18276,	17205,	8996,	5108,	5893,
16,	15230,	15208,	12381,	14311,	9904,	12175,	11483,	4048,	2761,	2885,
17,	10885,	9917,	13240,	8981,	7254,	7164,	7583,	2236,	1121,	1388,
18,	12356,	6060,	8674,	9823,	4896,	4936,	3998,	1073,	988,	395,
+gp,	35259,	12914,	31182,	8736,	7383,	10157,	1388,	1302,	162,	390,
TOTSPBIO,	220026,	154234,	181236,	169896,	176335,	191550,	151736,	96672,	68218,	57972,

Table 13	Spawning stock biomass at age (spawning time)					Tonnes				
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
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,	224,	267,	212,	0,	0,	0,	0,
9,	747,	1072,	73,	700,	1214,	1198,	305,	296,	0,	330,
10,	1495,	1798,	1435,	1925,	2468,	2785,	2271,	1626,	682,	1313,
11,	2895,	3799,	4513,	3353,	3000,	3099,	6029,	5250,	1437,	2565,
12,	7264,	7713,	11051,	11834,	7262,	5203,	7031,	8907,	6828,	4149,
13,	15568,	10130,	11468,	13762,	9221,	6596,	7591,	7717,	11588,	10378,
14,	12379,	13590,	9500,	10734,	9740,	7948,	9044,	8842,	8402,	11542,
15,	5046,	10334,	10601,	6988,	7277,	4974,	10550,	7933,	6894,	8001,
16,	4918,	5023,	9889,	9611,	5455,	4046,	5017,	8025,	5574,	6993,
17,	2089,	4358,	2988,	6718,	7256,	3453,	4027,	4070,	6473,	6013,
18,	910,	1925,	3053,	1012,	4646,	1136,	3002,	3323,	3304,	5991,
+gp,	0,	722,	4212,	15103,	16046,	18191,	34892,	17364,	11213,	21987,
TOTSPBIO,	53311,	60463,	68782,	81964,	73853,	58842,	89759,	73352,	62395,	79263,

Table 6.14

Run title : Arctic S. mentella (run: SVPKHN01/V01)

At 26-Aug-97 19:10:17

Table 16 Summary (without SOP correction)

Traditional vpa using file input for terminal F

	RECRUITS, Age 6	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	FBAR 10-16,
1965,	156356,	861555,	551317,	15662,	.0284,	.0182,
1966,	150872,	824509,	538253,	10143,	.0188,	.0127,
1967,	164100,	1263135,	988128,	6239,	.0063,	.0046,
1968,	234958,	830650,	551138,	5413,	.0098,	.0077,
1969,	354881,	920725,	610816,	6836,	.0112,	.0103,
1970,	589215,	774287,	394317,	22916,	.0581,	.0469,
1971,	591684,	862779,	408572,	45063,	.1103,	.0767,
1972,	531629,	784672,	258178,	28862,	.1118,	.0640,
1973,	433246,	841957,	251367,	38380,	.1527,	.0683,
1974,	422929,	926348,	279346,	69372,	.2483,	.1269,
1975,	497357,	997774,	322327,	239070,	.7417,	.4411,
1976,	573755,	833985,	295368,	269022,	.9108,	.6457,
1977,	572752,	688979,	219180,	146365,	.6678,	.5624,
1978,	404671,	621194,	153662,	92611,	.6027,	.2685,
1979,	276866,	555953,	180542,	87145,	.4827,	.2762,
1980,	187566,	517402,	169028,	79354,	.4695,	.3005,
1981,	114441,	474122,	175298,	81546,	.4652,	.3077,
1982,	93685,	438892,	190266,	115383,	.6064,	.4585,
1983,	105705,	332293,	150500,	105273,	.6995,	.7780,
1984,	103087,	231212,	95947,	72934,	.7601,	.8836,
1985,	83696,	194320,	67805,	63068,	.9301,	.6617,
1986,	87011,	150979,	57669,	23112,	.4008,	.2805,
1987,	94001,	159940,	53014,	10518,	.1984,	.1203,
1988,	116021,	169210,	60138,	15586,	.2592,	.1926,
1989,	104280,	204576,	68428,	23494,	.3433,	.1964,
1990,	72632,	185482,	81632,	35070,	.4296,	.2354,
1991,	62769,	180377,	73593,	48727,	.6621,	.2896,
1992,	68426,	161099,	58784,	15590,	.2652,	.1187,
1993,	113529,	199357,	89686,	12623,	.1407,	.0994,
1994,	189392,	198866,	73290,	12239,	.1670,	.1017,
1995,	124895,	209765,	62347,	10172,	.1632,	.0855,
1996,	125587,	234217,	79458,	8086,	.1018,	.0406,
Arith.						
Mean	243812,	525957,	237794,	56746,	.3507,	.2431,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),		

Table 6.15

The SAS System

10:17 Wednesday, August 27, 1997 4

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

Single option prediction: Input data

Year: 1997								
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	45846.000	0.1000	0.0000	0.0000	0.0000	0.173	0.0020	0.170
7	113231.00	0.1000	0.0000	0.0000	0.0000	0.223	0.0030	0.197
8	100548.00	0.1000	0.0090	0.0000	0.0000	0.250	0.0070	0.227
9	137100.00	0.1000	0.0140	0.0000	0.0000	0.287	0.0100	0.273
10	73063.000	0.1000	0.0930	0.0000	0.0000	0.327	0.0200	0.343
11	37929.000	0.1000	0.2120	0.0000	0.0000	0.360	0.0220	0.383
12	29413.000	0.1000	0.3250	0.0000	0.0000	0.407	0.0260	0.420
13	27329.000	0.1000	0.5770	0.0000	0.0000	0.457	0.0350	0.467
14	34301.000	0.1000	0.7160	0.0000	0.0000	0.460	0.0530	0.513
15	29964.000	0.1000	0.7800	0.0000	0.0000	0.497	0.0550	0.537
16	17858.000	0.1000	0.8740	0.0000	0.0000	0.527	0.0720	0.597
17	13153.000	0.1000	0.9750	0.0000	0.0000	0.573	0.0580	0.637
18	9269.000	0.1000	1.0000	0.0000	0.0000	0.630	0.0730	0.703
19+	33987.000	0.1000	1.0000	0.0000	0.0000	0.707	0.0730	0.813
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

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	11616.000	0.1000	0.0000	0.0000	0.0000	0.173	0.0020	0.170
7	.	0.1000	0.0000	0.0000	0.0000	0.223	0.0030	0.197
8	.	0.1000	0.0090	0.0000	0.0000	0.250	0.0070	0.227
9	.	0.1000	0.0140	0.0000	0.0000	0.287	0.0100	0.273
10	.	0.1000	0.0930	0.0000	0.0000	0.327	0.0200	0.343
11	.	0.1000	0.2120	0.0000	0.0000	0.360	0.0220	0.383
12	.	0.1000	0.3250	0.0000	0.0000	0.407	0.0260	0.420
13	.	0.1000	0.5770	0.0000	0.0000	0.457	0.0350	0.467
14	.	0.1000	0.7160	0.0000	0.0000	0.460	0.0530	0.513
15	.	0.1000	0.7800	0.0000	0.0000	0.497	0.0550	0.537
16	.	0.1000	0.8740	0.0000	0.0000	0.527	0.0720	0.597
17	.	0.1000	0.9750	0.0000	0.0000	0.573	0.0580	0.637
18	.	0.1000	1.0000	0.0000	0.0000	0.630	0.0730	0.703
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.0730	0.813
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1999								
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	14964.000	0.1000	0.0000	0.0000	0.0000	0.173	0.0020	0.170
7	.	0.1000	0.0000	0.0000	0.0000	0.223	0.0030	0.197
8	.	0.1000	0.0090	0.0000	0.0000	0.250	0.0070	0.227
9	.	0.1000	0.0140	0.0000	0.0000	0.287	0.0100	0.273
10	.	0.1000	0.0930	0.0000	0.0000	0.327	0.0200	0.343
11	.	0.1000	0.2120	0.0000	0.0000	0.360	0.0220	0.383
12	.	0.1000	0.3250	0.0000	0.0000	0.407	0.0260	0.420
13	.	0.1000	0.5770	0.0000	0.0000	0.457	0.0350	0.467
14	.	0.1000	0.7160	0.0000	0.0000	0.460	0.0530	0.513
15	.	0.1000	0.7800	0.0000	0.0000	0.497	0.0550	0.537
16	.	0.1000	0.8740	0.0000	0.0000	0.527	0.0720	0.597
17	.	0.1000	0.9750	0.0000	0.0000	0.573	0.0580	0.637
18	.	0.1000	1.0000	0.0000	0.0000	0.630	0.0730	0.703
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.0730	0.813
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

(cont.)

Table 6.15 (continued)

The SAS System

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

Single option prediction: Input data

(cont.)

Year: 2000								
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	63416.000	0.1000	0.0000	0.0000	0.0000	0.173	0.0020	0.170
7	.	0.1000	0.0000	0.0000	0.0000	0.223	0.0030	0.197
8	.	0.1000	0.0090	0.0000	0.0000	0.250	0.0070	0.227
9	.	0.1000	0.0140	0.0000	0.0000	0.287	0.0100	0.273
10	.	0.1000	0.0930	0.0000	0.0000	0.327	0.0200	0.343
11	.	0.1000	0.2120	0.0000	0.0000	0.360	0.0220	0.383
12	.	0.1000	0.3250	0.0000	0.0000	0.407	0.0260	0.420
13	.	0.1000	0.5770	0.0000	0.0000	0.457	0.0350	0.467
14	.	0.1000	0.7160	0.0000	0.0000	0.460	0.0530	0.513
15	.	0.1000	0.7800	0.0000	0.0000	0.497	0.0550	0.537
16	.	0.1000	0.8740	0.0000	0.0000	0.527	0.0720	0.597
17	.	0.1000	0.9750	0.0000	0.0000	0.573	0.0580	0.637
18	.	0.1000	1.0000	0.0000	0.0000	0.630	0.0730	0.703
19+	.	0.1000	1.0000	0.0000	0.0000	0.707	0.0730	0.813
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : SPRKHN01
Date and time: 27AUG97:10:39

Table 6.16

The SAS System

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

Prediction with management option table

Year: 1997					Year: 1998					Year: 1999	
F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	Stock biomass	Sp.stock biomass
0.6884	0.0278	237160	85346	5000	0.0000	0.0000	234326	94368	0	235202	109144
.	0.1000	0.0040	.	94368	822	234437	108574
.	0.2000	0.0081	.	94368	1639	233675	108008
.	0.3000	0.0121	.	94368	2452	232917	107444
.	0.4000	0.0162	.	94368	3261	232163	106885
.	0.5000	0.0202	.	94368	4065	231412	106328
.	0.6000	0.0243	.	94368	4866	230666	105775
.	0.7000	0.0283	.	94368	5662	229923	105226
.	0.8000	0.0323	.	94368	6454	229185	104679
.	0.9000	0.0364	.	94368	7243	228449	104136
.	1.0000	0.0404	.	94368	8027	227718	103597
.	1.1000	0.0445	.	94368	8807	226990	103060
.	1.2000	0.0485	.	94368	9583	226266	102527
.	1.3000	0.0526	.	94368	10355	225546	101997
.	1.4000	0.0566	.	94368	11123	224829	101470
.	1.5000	0.0606	.	94368	11887	224116	100947
.	1.6000	0.0647	.	94368	12648	223407	100426
.	1.7000	0.0687	.	94368	13404	222701	99909
.	1.8000	0.0728	.	94368	14156	221999	99394
.	1.9000	0.0768	.	94368	14905	221300	98883
.	2.0000	0.0809	.	94368	15650	220604	98375
.	2.1000	0.0849	.	94368	16391	219912	97870
.	2.2000	0.0889	.	94368	17128	219224	97368
.	2.3000	0.0930	.	94368	17862	218539	96869
.	2.4000	0.0970	.	94368	18592	217858	96373
.	2.5000	0.1011	.	94368	19318	217179	95880
.	2.6000	0.1051	.	94368	20040	216505	95390
.	2.7000	0.1092	.	94368	20759	215833	94903
.	2.8000	0.1132	.	94368	21474	215165	94419
.	2.9000	0.1172	.	94368	22186	214500	93938
.	3.0000	0.1213	.	94368	22894	213839	93459
.	3.1000	0.1253	.	94368	23598	213181	92984
.	3.2000	0.1294	.	94368	24299	212526	92511
.	3.3000	0.1334	.	94368	24996	211874	92041
.	3.4000	0.1375	.	94368	25690	211226	91574
.	3.5000	0.1415	.	94368	26380	210581	91109
.	3.6000	0.1455	.	94368	27067	209939	90648
.	3.7000	0.1496	.	94368	27751	209300	90189
.	3.8000	0.1536	.	94368	28431	208664	89733
.	3.9000	0.1577	.	94368	29107	208031	89280
.	4.0000	0.1617	.	94368	29780	207402	88829
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : MANKHN02
Date and time : 26AUG97:20:57
Computation of ref. F: Simple mean, age 10 - 16
Basis for 1997 : TAC constraints

Table 6.17

The SAS System

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

Single option prediction: Summary table

F=0

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
1997	0.6884	0.0278	9807	5000	702991	237160	162608	85346	162608	85346
1998	0.0000	0.0000	0	0	638386	234326	180630	94368	180630	94368
1999	0.0000	0.0000	0	0	592600	235202	208319	109144	208319	109144
2000	0.0000	0.0000	0	0	599622	243967	239119	126515	239119	126515
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRKHN01
 Date and time : 27AUG97:10:39
 Computation of ref. F: Simple mean, age 10 - 16
 Prediction basis : F factors

The SAS System

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

Single option prediction: Summary table

Flow

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
1997	0.6884	0.0278	9807	5000	702991	237160	162608	85346	162608	85346
1998	0.5000	0.0202	7863	4065	638386	234326	180630	94368	180630	94368
1999	0.5000	0.0202	8272	4410	585125	231412	203431	106328	203431	106328
2000	0.5000	0.0202	8694	4774	584995	236203	228766	120451	228766	120451
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRKHN01
 Date and time : 27AUG97:10:39
 Computation of ref. F: Simple mean, age 10 - 16
 Prediction basis : F factors

The SAS System

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

Single option prediction: Summary table

Fmed

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
1997	0.6884	0.0278	9807	5000	702991	237160	162608	85346	162608	85346
1998	1.7500	0.0708	26781	13781	638386	234326	180630	94368	180630	94368
1999	1.7500	0.0708	26773	14078	567152	222349	191811	99651	191811	99651
2000	1.7500	0.0708	26836	14420	551156	218412	205239	106753	205239	106753
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRKHN01
 Date and time : 27AUG97:10:39
 Computation of ref. F: Simple mean, age 10 - 16
 Prediction basis : F factors

Table 7.1 *Sebastes marinus* in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I and Divisions IIa and IIb combined.

Year	Faroe Islands	France	Germany ²	Greenland	Iceland	Ireland	Netherlands	Norway	Portugal	Russia ³	Spain	UK England & Wales	UK Scotland	Total
1986	29	2,719	3,369	-	-	-	-	21,680	-	2,350	-	42	14	30,203
1987	250	1,553	4,508	-	-	-	-	16,728	-	850	-	181	7	24,077
1988	No species specific data presently available on countries													25,908
1989	3	784	412	-	-	-	-	20,662	-	1,264	-	97	-	23,222
1990	278	1,684	387	1	-	-	-	23,917	-	1,549	-	261	-	28,077
1991	152	719	981	-	-	-	-	15,872	-	1,052	-	268	10	19,054
1992	35	1,294	530	623	-	-	-	12,700	5	758	2	241	2	16,190
1993	139	906	650	14	-	-	-	13,380	77	1,313	8	441	1	16,929
1994 ¹	22	647	1,008	5	4	-	-	13,935	90	1,199	4	135	1	17,050
1995 ¹	27	635	517	5	1	1	1	13,023	9	639	-	159	9	15,025
1996 ¹	31	347	499	33	-	-	-	14,432	51	716	81	229	98	16,517

¹ Provisional figures.² Includes former GDR prior to 1991.³ 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 ⁴	Iceland	Norway	Russia ⁵	UK England & Wales	UK Scotland	Total
1986 ³	-	50	-	2,972	155	32	3	3,212
1987 ³	-	8	-	2,013	50	11	-	2,082
1988	No species specific data presently available							
1989	-	-	-	1,763	110	4 ²	-	1,877
1990	5	-	-	1,263	14	-	-	1,282
1991	-	-	-	1,993	92	-	-	2,085
1992	-	-	-	2,162	174	-	-	2,336
1993	24 ²	-	-	1,800	330	-	-	2,154
1994 ¹	12 ²	72	4	1,652	109		-	1,849
1995 ¹	19 ²	1 ²	1 ²	2,250	201	1 ²	-	2,473
1996 ¹	-	-	-	2,274	131	3 ²	-	2,408

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Based on preliminary estimates of species breakdown by area.

⁴ Includes former GDR prior to 1991.

⁵ 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 ⁴	Greenland	Ireland	Netherlands	Norway	Portugal	Russia ⁵	Spain	UK England & Wales	UK Scotland	Total
1986 ³	29	2,719	3,319	-	-	-	18,708	-	2,195	-	10	11	26,991
1987 ³	250	1,553	2,967	-	-	-	14,715	-	800	-	170	7	20,462
1988	No species specific data presently available												
1989	3 ²	784 ²	412	-	-	-	18,833	-	912	-	93 ²	-	21,037
1990	273	1,684	387	-	-	-	22,444	-	392	-	261	-	25,441
1991	152 ²	719 ²	678	-	-	-	13,835	-	534	-	268 ²	10 ²	16,196
1992	35 ²	1,294 ²	211	614	-	-	10,536	-	404	-	206 ²	2 ²	13,302
1993	115 ²	906 ²	473	14 ²	-	-	11,580	77 ²	940	-	431 ²	1 ²	14,537
1994 ¹	10 ²	647 ²	654 ²	5 ²	-	-	12,265	90 ²	1,030	-	129 ²	-	14,830
1995 ¹	8 ²	635 ²	328 ²	5 ²	1 ²	1	10,658	2 ²	405	-	158 ²	9 ²	12,210
1996 ¹	27 ²	347 ²	448 ²	33 ²	-	-	12,121	51 ²	449	5 ²	223 ²	98 ²	13,802

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Based on preliminary estimates of species breakdown by area.

⁴ Includes former GDR prior to 1991.

⁵ 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 ⁵	Greenland	Norway	Portugal	Russia ⁶	Spain	UK England & Wales	UK Scotland	Total
1986									+
1987 ⁴	1,533	-	-	-	-	-	-	-	1,533
1988	No species specific data presently available								
1989	-	-	66	-	242	-	-	-	308
1990	-	1 ²	210	-	1,157	-	-	-	1,368
1991	303	-	44	-	426	-	-	-	773
1992	319	9 ²	2	5 ²	180	2	35 ²	-	552
1993	177	-	-	-	43	8 ³	10 ²	-	238
1994 ¹	282	-	18	-	60	4 ³	6 ²	1 ²	371
1995 ¹	187	-	115	7	33	-	-	-	342
1996 ¹	51 ²	-	37	-	136	76 ²	3 ²	-	307

¹ Provisional figures.

² Split on species according to reports to Norwegian authorities.

³ Split on species according to the 1992 catches.

⁴ Based on preliminary estimates of species breakdown by area.

⁵ Includes former GDR prior to 1991.

⁶ USSR prior to 1991.

Table 7.5

Run title : Arctic S. marinus (run: XSAKHN03/X03)

At 27-Aug-97 17:20:39

Table 1	Catch numbers at age							
YEAR,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE								
2,	0,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,	0,
4,	0,	0,	0,	0,	0,	0,	0,	0,
5,	0,	0,	0,	0,	0,	0,	1,	0,
6,	0,	0,	0,	2,	0,	0,	4,	0,
7,	0,	0,	0,	5,	0,	43,	58,	11,
8,	232,	0,	142,	22,	24,	7,	82,	142,
9,	445,	0,	88,	78,	196,	276,	222,	306,
10,	739,	0,	520,	114,	364,	604,	647,	325,
11,	1339,	266,	321,	394,	412,	770,	873,	827,
12,	1948,	1488,	350,	549,	1051,	1821,	1549,	1094,
13,	1591,	1708,	1387,	783,	1037,	1978,	1961,	1501,
14,	1527,	1854,	2062,	1718,	1545,	1916,	2209,	2022,
15,	2013,	1722,	1258,	3102,	2387,	1511,	1716,	1636,
16,	1331,	1571,	2497,	2495,	1431,	2572,	1353,	1638,
17,	1619,	1894,	1695,	2104,	1679,	2518,	755,	1257,
18,	1575,	1895,	2472,	1837,	1702,	1330,	541,	960,
19,	1413,	1921,	1150,	998,	756,	582,	645,	576,
20,	1457,	1808,	1026,	858,	726,	692,	570,	428,
21,	976,	1935,	617,	688,	542,	485,	403,	549,
22,	932,	1304,	425,	547,	536,	242,	354,	330,
23,	1053,	908,	659,	268,	584,	167,	240,	511,
+gp,	5625,	6346,	3991,	3110,	3533,	1423,	3110,	2991,
TOTALNUM,	25815,	26620,	20660,	19672,	18505,	18937,	17293,	17104,
TONSLAND,	23222,	28077,	19054,	16190,	16929,	17050,	15025,	16517,
SOPCOF %,	84,	102,	101,	97,	104,	100,	100,	100,

Table 7.6

Run title : Arctic S. marinus (run: XSAKHN03/X03)

At 27-Aug-97 17:20:39

Table 2	Catch weights at age (kg)							
YEAR,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE								
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0200,	.0200,	.0200,	.0200,	.0000,	.0000,	.0000,	.0000,
4,	.0300,	.0300,	.0300,	.0300,	.0000,	.0000,	.0000,	.0000,
5,	.0530,	.0530,	.0530,	.0530,	.0000,	.0000,	.1600,	.0000,
6,	.0780,	.0780,	.0780,	.0800,	.0000,	.0000,	.2400,	.0000,
7,	.1330,	.1330,	.1330,	.1800,	.0000,	.2500,	.3300,	.2300,
8,	.3900,	.3900,	.3700,	.2900,	.3300,	.3700,	.4300,	.5200,
9,	.4100,	.4100,	.5100,	.4800,	.3600,	.3800,	.6400,	.5600,
10,	.5100,	.5100,	.4600,	.4200,	.4300,	.4900,	.6100,	.6500,
11,	.6200,	.5500,	.5300,	.5000,	.5100,	.5100,	.5900,	.7000,
12,	.6600,	.7100,	.6100,	.5900,	.5100,	.6400,	.6500,	.8100,
13,	.7200,	.7200,	.6400,	.5800,	.6400,	.7400,	.7400,	.8300,
14,	.8100,	.7800,	.7100,	.6500,	.6400,	.7600,	.7900,	.8900,
15,	.8600,	.8500,	.7600,	.6500,	.7600,	.8600,	.8400,	.9600,
16,	.8900,	.8300,	.8300,	.7100,	.8600,	.9500,	.9200,	1.0100,
17,	.9400,	.9100,	.8400,	.8200,	.8900,	1.0300,	1.1200,	1.0100,
18,	1.0400,	.9000,	1.0000,	.8400,	.9800,	1.0700,	1.0100,	1.0300,
19,	1.1000,	.9300,	.9600,	.9400,	1.0000,	1.1100,	1.0100,	1.0000,
20,	1.1300,	1.0400,	1.0400,	1.0200,	1.0300,	1.1600,	1.2100,	1.0400,
21,	1.2700,	1.1300,	1.0300,	1.0300,	1.2100,	1.1500,	1.1400,	1.0500,
22,	1.2800,	1.0600,	1.0800,	1.1500,	1.0300,	1.1300,	1.0900,	1.1900,
23,	1.2500,	1.2300,	1.0200,	1.2700,	1.2000,	1.0200,	1.3000,	1.1200,
+gp,	1.6840,	1.4450,	1.2160,	1.2700,	1.1400,	1.3600,	1.0100,	1.1700,
SOPCOFAC,	.8400,	1.0174,	1.0142,	.9705,	1.0398,	1.0007,	.9998,	1.0001,

Table 7.7

The SAS System 10:50 Tuesday, August 26, 1997 1
 SMR-ARCT: Sebastes marinus in the North-East Arctic (Areas I & II)

FLT04: NORWAY TRAWL 07. Effort and catch-in-numbers. S.marinus (Catch: Thousands)

Fishing Year	Catch, 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	Catch, age 19	Catch, age 20	Catch, age 21	Catch, age 22	Catch, age 23
1989	11234	131	366	758	1203	889	994	1282	785	1072	968	942	994	575	575	602
1990	9971	0	0	178	962	979	1050	911	832	1058	1047	1011	1004	1191	721	643
1991	4356	57	291	153	164	580	1059	373	1123	686	1490	311	245	83	85	143
1992	4585	21	48	117	234	275	646	1032	908	839	626	406	303	220	131	124
1993	3729	156	279	277	583	360	768	924	609	651	532	284	222	154	158	93
1994	4210	116	304	371	1020	973	967	660	1048	746	460	85	125	138	87	66
1995	4232	137	393	530	976	851	1030	643	356	333	235	182	153	122	166	55
1996	4555	166	132	370	401	530	737	703	653	456	337	234	158	277	143	303

The SAS System 10:50 Tuesday, August 26, 1997 2
 SMR-ARCT: Sebastes marinus in the North-East Arctic (Areas I & II)

FLT05: Norw bottom trawl Svalbard (Catch: Number)

Year	Fishing effort	Catch, age 2	Catch, age 3	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8
1992	1	284	12378	5576	2279	371	2064	3687
1993	1	32	10704	5710	5142	1855	1052	1314
1994	1	429	1150	3418	2393	1723	1106	1714
1995	1	600	1600	6400	5100	1800	2200	1800
1996	1	40	110	10	560	1050	940	930

Year	Catch, age 9	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15
1992	5704	9215	6413	1454	1387	696	22
1993	3520	2847	2757	2074	1245	844	119
1994	1256	1938	1596	2039	484	550	319
1995	700	700	400	700	500	400	500
1996	400	1050	280	320	590	160	70

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 SMR-ARCT: Sebastes marinus in the North-East Arctic (Areas I & II)

FLT06: Norw bottom Barents Sea wintersurvey (Catch: Number)

Year	Fishing effort	Catch, age 3	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8	Catch, age 9
1992	1	2295	4261	10760	2043	1474	13178	4230
1993	1	468	1218	1424	2020	979	5048	2968
1994	1	2951	4485	2573	3801	8338	3254	1297
1995	1	2540	7450	6090	7150	5820	6590	5670
1996	1	310	1300	2340	3520	3660	8720	5650

Year	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15
1992	6302	8251	3751	3865	3064	3568
1993	4230	2142	4634	3338	2951	9148
1994	7231	6443	248	10192	6341	2612
1995	2000	4440	6500	4320	5330	6030
1996	3960	6590	5730	6230	4070	2950

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	Den mark	Est onia	Faroe Islands	France	Fed. Rep. Germany	Greenl and	Iceland	Ireland	Lithu ania	Norway	Portugal	Russia ⁴	Spain	UK (England & Wales)	UK (Scotl and)	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 ²	-	10	-	23,183
1991	11	2,564	314	119	101	-	-	-	-	27,587	-	2,490 ²	132 ²	+	2	33,320
1992	-	-	16	111 ¹	13	13	-	-	-	8,313	31	718	23	7	3	9,253
1993	2 ²	-	61	40 ³	22	8	56	-	30 ³	10,366 ²	43	1,235	-	16	-	11,879
1994	4	-	86 ³	27 ³	217 ²	3	15	5	4 ²	8,322 ²	36	283	2 ²	76	2	9,151
1995 ¹	-	-	12 ³	-	34 ²	12 ²	25	2	-	9192 ²	84 ¹	788 ²	757	115	7	11,028

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ 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	Fed. Rep. Germany	Greenland	Iceland	Norway	Russia ³	Spain	UK (England & Wales)	UK (Scotland)	Total
1984	-	-	-	-	-	593	81	-	17	-	691
1985	-	-	-	-	-	602	122	-	1	-	725
1986	-	-	1	-	-	557	615	-	5	1	1179
1987	-	-	2	-	-	984	259	-	10	+	1255
1988	-	9	4	-	-	978	420	-	7	-	1418
1989	-	-	-	-	-	2039	482	-	+	-	2521
1990	-	7	-	-	-	1304	321 ²	-	-	-	1632
1991	164	-	-	-	-	2,029	522 ²	-	-	-	2715
1992	-	-	+	-	-	2,349	467	-	-	-	2816
1993	-	32	-	-	56	1,754	867	-	-	-	2709
1994	-	17	217	-	15	1,157 ²	175	-	+	-	1581
1995	-	12	-	-	25	1,321 ²	270	57	-	-	1685
1996 ¹	-	-	+	30	70	792 ²	198	-	+	-	1090

¹ Provisional figures.

² Working Group figures.

³ 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	Fed. Rep. Germany	Greenland	Ireland	Norway	Portugal	Russia ⁵	Spain	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 ¹	104	-	-	8,050	-	4,964	-	6	-	13,222
1990		133	49 ¹	12	-	-	8,233	-	1,246 ²	-	1	-	9,674
1991	1,400	314	119 ¹	21	-	-	11,189	-	305 ²	-	+	1	13,349
1992	-	16	108 ¹	1	13 ⁴	-	3,586	15 ³	58	-	1	-	3,798
1993	-	29	78 ¹	14	8 ⁴	-	7,977	17	210	-	2	-	8,335
1994	-	68 ²	47 ¹	33	3 ⁴	4	6,390 ²	26	67	+	14	-	6,652
1995	-	-	-	30	12 ⁴	2	6,061 ²	60 ¹	227	-	83	2	6,477
1996 ¹	-	-	-	34	93 ⁴	-	9,586 ²	55 ¹	466	3	278	57	10,572

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ Includes Division IIb.

⁵ 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	Den mark	Estonia	Faroe Islands	France	Fed. rep. Germany	Ireland	Lithu ania	Norway	Portugal	Russia ⁴	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	-	-	533	-	3,366	-	-	-	4,395
1990	-	-	23 ²	-	942	-	-	7,706	-	3,197 ²	-	9	-	11,877
1991	11	1,000	-	-	80	-	-	14,369	-	1,663 ²	132	+	1	17,256
1992	-	-	-	3 ²	12	-	-	1,732	16 ²	193	23	6	-	1,985
1993	2 ³	-	-	2 ³	8	-	30 ³	649	26	158	-	14	-	889
1994	4	-	1 ³	8 ³	46	1	4 ³	775 ²	10	41	2 ²	62	2	956
1995	-	-	-	-	5	-	-	1,818 ²	24 ¹	297	700	32	5	2,881
1996	-	-	-	-	47 ¹	-	-	1,255 ²	24 ¹	912	134	39	+	2,411

¹ Provisional figures.

² Working Group figure.

³ As reported to Norwegian authorities.

⁴ 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	4,552	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	2,392	5,353	9,148
1995	1,500	4,034	5,494	11,028
1996	1,480	4,616	7,977	14,072

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 ¹⁰ catch/hour trawling (t)		Average CPUE		Total effort (in '000 hrs trawling) ⁵	CPUE 7+ ⁶	GDR ⁷ (catch/day tonnage (kg)
	RT ¹	PST ²	A ⁸	B ⁹	A ³	B ⁴			
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	-	-	0.79	1.22	-	-	15	0.65	-
1994	-	-	0.77	1.27	-	-	11	0.70	-
1995	-	-	1.03	1.48	-	-	-	-	-
1996	-	-	1.45	1.82	-	-	-	-	-
1997	-	-	1.23	1.60	-	-	-	-	-

¹ Side trawlers, 800-1000 hp. From 1983 onwards, side trawlers (SRTM), 1,000 hp.

² Stern trawlers, up to 2,000 HP.

³ Arithmetic average of CPUE from USSR RT (or SRTM trawlers) and Norwegian trawlers.

⁴ Arithmetic average of CPUE from USSR PST and Norwegian trawlers.

⁵ For the years 1981-1990, based on average CPUE type B. For 1991-1993, based on the Norwegian CPUE, type A.

⁶ Total catch (t) of seven years and older fish divided by total effort.

⁷ For the years 1988-1989, frost-trawlers 995 BRT (FAO Code 095). For 1990, factory trawlers FVS IV, 1943 BRT (FAO Code 090).

⁸ Norwegian trawlers, ISSCFV-code 07, 250-499.9 GRT.

⁹ Norwegian factory trawlers, ISSCFV-code 09, 1000-1999.9 GRT

¹⁰ 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: XSAOLE10/X10)

At 25-Aug-97 19:57:03

Table 1	Catch numbers at age			Numbers*10**-3			
YEAR,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,
3,	1,	1,	1,	1,	1,	22,	1,
4,	34,	1,	461,	19,	276,	334,	98,
5,	526,	80,	1109,	212,	917,	840,	830,
6,	2792,	4486,	3521,	1117,	2519,	2337,	2982,
7,	10464,	12712,	9605,	3923,	6204,	6520,	5824,
8,	18562,	12283,	6438,	3515,	3838,	4118,	5002,
9,	10034,	6130,	2775,	2551,	1834,	2265,	3000,
10,	6671,	4339,	1734,	1919,	1942,	1654,	1350,
11,	2517,	2703,	1368,	1536,	1622,	1857,	915,
12,	1250,	1660,	1234,	1127,	1338,	1536,	1212,
13,	616,	1044,	675,	716,	734,	1122,	698,
14,	1104,	300,	200,	251,	531,	600,	526,
*gp,	281,	143,	80,	126,	216,	368,	358,
TOTALNUM,	54852,	45882,	29201,	17013,	21972,	23573,	22796,
TONSLAND,	89484,	79034,	43055,	29938,	37763,	38172,	36074,
SOPCOF %,	94,	104,	97,	92,	98,	88,	92,

Table 1	Catch numbers at age			Numbers*10**-3						
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	62,	73,	88,	64,	664,	48,	314,	0,	88,	141,
4,	755,	532,	887,	275,	1146,	551,	1212,	36,	461,	985,
5,	2037,	1897,	2218,	731,	1896,	1304,	1543,	915,	1219,	1672,
6,	3255,	3589,	3155,	1138,	1917,	1494,	1864,	3698,	2874,	3335,
7,	4200,	4118,	2727,	1665,	1919,	1276,	1851,	3350,	2561,	2712,
8,	2524,	2365,	1234,	1341,	933,	1208,	2287,	1938,	1548,	1531,
9,	1610,	1509,	495,	944,	484,	1493,	1491,	1064,	972,	1128,
10,	1104,	946,	319,	473,	448,	1258,	1228,	1191,	1037,	997,
11,	1062,	934,	296,	511,	482,	838,	713,	602,	614,	530,
12,	858,	438,	243,	275,	380,	502,	488,	340,	363,	434,
13,	595,	349,	103,	242,	384,	324,	247,	171,	161,	314,
14,	384,	147,	45,	145,	150,	108,	201,	132,	120,	305,
*gp,	180,	112,	51,	78,	62,	46,	64,	71,	63,	239,
TOTALNUM,	18626,	17014,	11861,	7882,	10865,	10450,	13503,	13508,	12081,	14323,
TONSLAND,	28827,	24617,	17312,	13284,	15018,	16789,	22147,	21883,	19945,	22875,
SOPCOF %,	100,	104,	100,	108,	102,	98,	95,	100,	98,	96,

Table 1	Catch numbers at age			Numbers*10**-3						
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
1,	0,	0,	0,	0,	7,	21,	0,	0,	0,	0,
2,	0,	0,	0,	0,	67,	21,	0,	0,	0,	2,
3,	50,	5,	214,	155,	389,	98,	10,	0,	0,	5,
4,	435,	233,	924,	793,	2084,	437,	224,	72,	72,	47,
5,	1212,	907,	2080,	2139,	3312,	1098,	1140,	622,	814,	1031,
6,	2972,	2540,	4453,	5163,	3889,	1195,	1088,	695,	953,	2061,
7,	3572,	3141,	3655,	4642,	4716,	1069,	1608,	1231,	1637,	3744,
8,	1746,	2096,	1657,	1932,	2355,	778,	1118,	803,	934,	1406,
9,	752,	1182,	801,	1221,	1031,	360,	140,	305,	380,	259,
10,	828,	860,	318,	499,	1284,	600,	976,	630,	689,	643,
11,	362,	481,	228,	264,	774,	188,	444,	408,	437,	264,
12,	202,	313,	126,	314,	673,	150,	144,	324,	345,	129,
13,	186,	133,	120,	42,	177,	79,	36,	87,	142,	28,
14,	63,	140,	140,	96,	266,	89,	20,	38,	53,	22,
*gp,	7,	47,	28,	44,	517,	56,	4,	3,	7,	1,
TOTALNUM,	12387,	12078,	14744,	17304,	21541,	6239,	6952,	5218,	6463,	9642,
TONSLAND,	19112,	19587,	20138,	23183,	33320,	8599,	11933,	9189,	11043,	14072,
SOPCOF %,	100,	99,	100,	100,	100,	93,	101,	100,	100,	100,

Table 8.8

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

Table 3	Stock weights at age (kg)						
YEAR,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.2000,	.2000,	.2000,	.2000,	.2000,	.2000,	.2000,
4,	.4410,	.4410,	.4410,	.4410,	.4410,	.4410,	.4410,
5,	.5670,	.5670,	.5670,	.5670,	.5670,	.5670,	.5670,
6,	.7370,	.7370,	.7370,	.7370,	.7370,	.7370,	.7370,
7,	1.0790,	1.0790,	1.0790,	1.0790,	1.0790,	1.0790,	1.0790,
8,	1.4210,	1.4210,	1.4210,	1.4210,	1.4210,	1.4210,	1.4210,
9,	1.8480,	1.8480,	1.8480,	1.8480,	1.8480,	1.8480,	1.8480,
10,	2.2810,	2.2810,	2.2810,	2.2810,	2.2810,	2.2810,	2.2810,
11,	2.8870,	2.8870,	2.8870,	2.8870,	2.8870,	2.8870,	2.8870,
12,	3.2470,	3.2470,	3.2470,	3.2470,	3.2470,	3.2470,	3.2470,
13,	4.3030,	4.3030,	4.3030,	4.3030,	4.3030,	4.3030,	4.3030,
14,	4.9310,	4.9310,	4.9310,	4.9310,	4.9310,	4.9310,	4.9310,
+gp,	5.7940,	5.8410,	6.0370,	6.0060,	5.9640,	5.9100,	5.9230,

Table 3	Stock weights at age (kg)									
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.2000,	.2000,	.3000,	.2000,	.2000,	.2700,	.3100,	.3000,	.3000,	.3400,
4,	.4410,	.4410,	.6000,	.4820,	.5000,	.6200,	.4500,	.4800,	.3800,	.4700,
5,	.5670,	.5670,	.9000,	.7020,	.6600,	.6900,	.7500,	.6300,	.6000,	.6200,
6,	.7370,	.7370,	1.2000,	.8720,	.8400,	.8400,	1.0400,	.9600,	.8900,	.9200,
7,	1.0790,	1.0790,	1.5000,	1.1410,	1.1500,	1.0300,	1.3400,	1.1800,	1.2000,	1.2800,
8,	1.4210,	1.4210,	1.8000,	1.4680,	1.5600,	1.3100,	1.5700,	1.5300,	1.8500,	1.9000,
9,	1.8480,	1.8480,	2.2000,	1.7780,	2.0400,	1.7400,	1.9700,	2.3100,	2.5900,	2.4800,
10,	2.2810,	2.2810,	2.6000,	2.3020,	2.5700,	2.2400,	2.7300,	2.8700,	3.1800,	3.1100,
11,	2.8870,	2.8870,	3.0000,	2.6640,	2.9800,	2.7700,	3.2900,	3.4600,	3.6200,	3.3500,
12,	3.2470,	3.2470,	3.5000,	3.0460,	3.4300,	3.3700,	4.2200,	3.7700,	3.9500,	3.7200,
13,	4.3030,	4.3030,	4.1000,	3.3680,	4.1300,	4.3200,	4.7100,	3.9900,	4.4800,	4.0000,
14,	4.9310,	4.9310,	4.8000,	4.2850,	4.6800,	5.3500,	6.0800,	4.3500,	4.2500,	4.1800,
+gp,	6.0270,	5.9060,	6.1760,	5.3460,	5.9990,	5.8330,	6.1220,	4.5250,	4.8250,	4.5260,

Table 3	Stock weights at age (kg)									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.3070,	.4140,	.3100,	.2800,	.2900,	.2200,	.3400,	.2600,	.4400,	.1800,
4,	.5740,	.5540,	.6300,	.5500,	.6000,	.4600,	.5400,	.5200,	.5600,	.4700,
5,	.7090,	.7400,	.7600,	.7100,	.7700,	.6800,	.7900,	.7200,	.7300,	.7700,
6,	1.0030,	.9620,	1.0300,	1.0600,	1.0500,	.9700,	1.0200,	.9400,	.9400,	.9700,
7,	1.2660,	1.2490,	1.3200,	1.2900,	1.3800,	1.2700,	1.3500,	1.2700,	1.2500,	1.3100,
8,	1.6830,	1.6260,	1.8000,	1.7000,	1.7500,	1.7600,	1.8800,	1.7200,	1.7400,	1.7400,
9,	2.4820,	2.1640,	2.4200,	2.1000,	2.2000,	2.2100,	2.4600,	2.1900,	2.0900,	2.2400,
10,	2.9820,	2.8970,	3.1300,	2.6100,	2.6000,	2.5600,	2.6700,	2.5200,	2.5100,	2.5900,
11,	3.5470,	3.4060,	3.3700,	2.8700,	2.7900,	3.1100,	3.4300,	2.9700,	2.9500,	3.2900,
12,	3.8000,	3.6610,	4.0500,	3.4500,	3.2800,	3.5900,	4.2900,	3.2900,	3.3400,	4.0200,
13,	4.5600,	4.2470,	4.2900,	3.7200,	3.8900,	3.8300,	5.0800,	3.8400,	3.8300,	4.7500,
14,	5.0020,	4.1870,	4.5000,	4.0900,	4.3800,	4.2500,	6.3200,	4.9500,	4.9800,	6.2400,
+gp,	5.9530,	4.4630,	4.7200,	4.5200,	5.2900,	4.8000,	8.9100,	6.6800,	8.1500,	6.0900,

Table 8.9

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

Table 5	Proportion mature at age						
YEAR,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
4,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,
5,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,
6,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,
7,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,
8,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,
9,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,
10,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,
11,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
12,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
13,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
14,	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,

Table 5	Proportion mature at age									
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
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,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,	.0500,
5,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,	.2300,
6,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,	.4900,
7,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,	.6600,
8,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,	.7800,
9,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,	.8900,
10,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,	.9500,
11,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
12,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
13,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,	.9900,
14,	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 5	Proportion mature at age									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
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,	.0500,	.0200,	.0300,	.0500,	.0500,	.0500,	.1000,	.1000,	.1000,	.1000,
5,	.2300,	.1100,	.1400,	.2000,	.2000,	.2000,	.3800,	.3800,	.3800,	.3800,
6,	.4900,	.5100,	.5300,	.5900,	.5900,	.5900,	.5100,	.5100,	.5100,	.5100,
7,	.6600,	.6700,	.6600,	.7000,	.7000,	.7000,	.6500,	.6500,	.6500,	.6500,
8,	.7800,	.6800,	.6900,	.7200,	.7200,	.7200,	.7300,	.7300,	.7300,	.7300,
9,	.8900,	.8000,	.7300,	.7600,	.7600,	.7600,	.8200,	.8200,	.8200,	.8200,
10,	.9500,	.9200,	.8600,	.8500,	.8500,	.8500,	.9100,	.9100,	.9100,	.9100,
11,	.9900,	.9800,	.9600,	.9400,	.9400,	.9400,	.9700,	.9700,	.9700,	.9700,
12,	.9900,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	.9800,	.9800,	.9800,	.9800,
13,	.9900,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,
14,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	1.0000,	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 8.10

The SAS System 11:52 Wednesday, August 27, 1997
 GHL-ARCT: Greenland halibut in the North-East Arctic (Areas I & II)

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

Year	Fishing 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
1995	1	35	1	70	259	798	1225	1953	434
1996	1	2520	250	90	250	930	2120	2740	950

FLT11: Norwegian Svalbard Shrimp Survey (Catch: Number)

Year	Fishing 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
1995	1	24	26	31	407	1081	592	521	151
1996	1	1267	67	162	250	882	741	753	63

FLT12: Experimental CPUE (Catch: Number)

Year	Fishing 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
1995	1	218	218	292	106	26	64	19	11	3	2
1996	1	286	483	521	127	19	29	7	3	0	1

FLT13: Nor bot surv Barents (ABCD) winter (adj to autumn previous year) (Catch: Number)

Year	Fishing 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	Catch, age 11	Catch, age 12
1988	1	788	1056	2284	3655	2655	864	971	210	0	19	76	56
1989	1	907	2071	1716	1996	2262	1046	365	175	0	30	119	165
1990	1	279	755	1323	1257	1526	2440	906	450	457	0	55	127
1991	1	128	719	897	1554	543	1069	791	0	648	135	40	53
1992	1	17	168	502	1730	868	1490	758	88	655	382	31	35
1993	1	16	142	1178	2259	1644	1750	885	0	506	38	25	0
1994	1	0	0	168	786	749	1331	760	359	486	60	199	0
1995	1	0	28	40	709	1510	2964	1000	307	808	154	152	45
1996	1	48	0	48	306	1074	3032	2131	1368	397	145	41	0

FLT14: Norwegian G. halibut survey using commercial trawler (Catch: Thousands)

Year	Fishing effort	Catch, age 4	Catch, age 5	Catch, age 6	Catch, age 7	Catch, age 8	Catch, age 9	Catch, age 10	Catch, age 11	Catch, age 12	Catch, age 13	Catch, age 14	Catch, age 15
1994	1	2087	17737	11249	15408	6051	1227	3554	1424	430	124	79	11
1995	1	1376	16808	12967	20369	6552	1906	4092	1346	616	142	97	19
1996	1	672	14000	18460	23776	7638	1408	3201	785	379	124	77	16

Table 8.11

Lowestoft VPA Version 3.1

25-Aug-97 19:55:43

Extended Survivors Analysis

Arctic Green.halibut (run: XSAOLE10/X10)

CPUE data from file /users/fish/ifad/ifapwork/afwg/ghl_arct/FLEET.X10

Catch data for 27 years. 1970 to 1996. Ages 1 to 15.

Fleet,	First, Last, First, Last, Alpha, Beta
	year, year, age, age
FLT09: Norwegian Sva,	1984, 1996, 1, 8, .650, .750
FLT11: Norwegian Sva,	1988, 1996, 1, 8, .500, .600
FLT12: Experimental,	1992, 1996, 5, 14, .380, .440
FLT13: Nor bot surv,	1988, 1996, 1, 12, .100, .200
FLT14: Norwegian G.,	1994, 1996, 4, 14, .620, .670

Time series weights :

Tapered time weighting applied
Power = 3 over 20 years

Catchability analysis :

Catchability independent of stock size for all ages

Catchability independent of age for ages >= 10

Terminal population estimation :

Survivor estimates shrunk towards the mean F
of the final 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 120 iterations

Total absolute residual between iterations

19 and 120 = .00416

Final year F values

Age	1,	2,	3,	4,	5,	6,	7,	8,	9,	10
Iteration **,	.0000,	.0008,	.0088,	.0270,	.3429,	.6859,	.7009,	.3699,	.1122,	.3514
Iteration **,	.0000,	.0008,	.0094,	.0270,	.3440,	.6870,	.7015,	.3700,	.1122,	.3514

Age	11,	12,	13,	14
Iteration **,	.8096,	.7783,	.7643,	.7848
Iteration **,	.8096,	.7782,	.7642,	.7846

Table 8.11 (Continued)

Regression weights

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

Fishing mortalities

Age,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996
1,	.000,	.000,	.000,	.000,	.001,	.003,	.000,	.000,	.000,	.000
2,	.000,	.000,	.000,	.000,	.004,	.002,	.000,	.000,	.000,	.001
3,	.002,	.000,	.011,	.010,	.024,	.006,	.001,	.000,	.000,	.009
4,	.018,	.010,	.059,	.050,	.166,	.033,	.016,	.011,	.017,	.027
5,	.070,	.044,	.116,	.179,	.283,	.117,	.106,	.054,	.156,	.344
6,	.232,	.194,	.299,	.437,	.535,	.148,	.154,	.083,	.105,	.687
7,	.451,	.386,	.444,	.548,	.873,	.256,	.286,	.248,	.270,	.701
8,	.386,	.491,	.341,	.421,	.563,	.311,	.439,	.214,	.285,	.370
9,	.279,	.462,	.331,	.428,	.392,	.144,	.079,	.192,	.140,	.112
10,	.302,	.556,	.203,	.334,	1.056,	.392,	.670,	.565,	.809,	.351
11,	.252,	.272,	.260,	.244,	1.254,	.384,	.532,	.623,	.947,	.810
12,	.167,	.339,	.100,	.646,	1.715,	.830,	.539,	.906,	1.897,	.778
13,	.295,	.149,	.198,	.042,	.904,	.971,	.447,	.695,	1.391,	.764
14,	.260,	.357,	.219,	.228,	.374,	1.956,	.658,	1.175,	1.239,	.785

XSA population numbers (Thousands)

YEAR,	1,	AGE 2,	3,	4,	5,	6,	7,	8,		
1987,	2.80E+04,	2.34E+04,	2.80E+04,	2.67E+04,	1.93E+04,	1.55E+04,	1.06E+04,	5.88E+03,	3.33E+03,	3.42E+03,
1988,	2.33E+04,	2.41E+04,	2.01E+04,	2.41E+04,	2.26E+04,	1.55E+04,	1.06E+04,	5.82E+03,	3.44E+03,	2.17E+03,
1989,	2.35E+04,	2.00E+04,	2.07E+04,	1.73E+04,	2.05E+04,	1.86E+04,	1.10E+04,	6.18E+03,	3.06E+03,	1.87E+03,
1990,	2.37E+04,	2.02E+04,	1.72E+04,	1.77E+04,	1.41E+04,	1.57E+04,	1.19E+04,	6.06E+03,	3.78E+03,	1.89E+03,
1991,	1.12E+04,	2.04E+04,	1.74E+04,	1.47E+04,	1.45E+04,	1.01E+04,	8.73E+03,	5.90E+03,	3.43E+03,	2.12E+03,
1992,	7.10E+03,	9.66E+03,	1.75E+04,	1.46E+04,	1.07E+04,	9.37E+03,	5.10E+03,	3.14E+03,	2.89E+03,	1.99E+03,
1993,	2.99E+03,	6.09E+03,	8.30E+03,	1.50E+04,	1.22E+04,	8.20E+03,	6.96E+03,	3.39E+03,	1.98E+03,	2.15E+03,
1994,	7.80E+02,	2.57E+03,	5.24E+03,	7.13E+03,	1.27E+04,	9.41E+03,	6.05E+03,	4.50E+03,	1.88E+03,	1.57E+03,
1995,	3.25E+03,	6.72E+02,	2.21E+03,	4.51E+03,	6.07E+03,	1.03E+04,	7.46E+03,	4.06E+03,	3.13E+03,	1.34E+03,
1996,	9.62E+04,	2.80E+03,	5.78E+02,	1.90E+03,	3.82E+03,	4.47E+03,	8.00E+03,	4.90E+03,	2.63E+03,	2.34E+03,

Estimated population abundance at 1st Jan 1997

, .00E+00, 8.36E+04, 2.40E+03, 7.37E+02, 1.59E+03, 2.32E+03, 1.93E+03, 3.41E+03, 2.91E+03, 2.02E+03,

Taper weighted geometric mean of the VPA populations:

, 1.36E+04, 1.06E+04, 1.11E+04, 1.30E+04, 1.32E+04, 1.15E+04, 8.72E+03, 5.28E+03, 3.30E+03, 2.29E+03,

Standard error of the weighted Log(VPA populations):

, 1.3603, 1.2537, 1.2103, .7951, .5308, .4003, .2754, .2999, .3480, .3400,

YEAR,	11,	AGE 12,	13,	14,
1987,	1.75E+03,	1.42E+03,	7.84E+02,	2.97E+02,
1988,	2.18E+03,	1.17E+03,	1.03E+03,	5.02E+02,
1989,	1.07E+03,	1.43E+03,	7.20E+02,	7.67E+02,
1990,	1.31E+03,	7.11E+02,	1.11E+03,	5.08E+02,
1991,	1.17E+03,	8.85E+02,	3.21E+02,	9.18E+02,
1992,	6.36E+02,	2.87E+02,	1.37E+02,	1.12E+02,
1993,	1.16E+03,	3.73E+02,	1.08E+02,	4.47E+01,
1994,	9.48E+02,	5.86E+02,	1.87E+02,	5.93E+01,
1995,	7.70E+02,	4.38E+02,	2.04E+02,	8.04E+01,
1996,	5.13E+02,	2.57E+02,	5.65E+01,	4.36E+01,

Estimated population abundance at 1st Jan 1997

, 1.42E+03, 1.96E+02, 1.02E+02, 2.26E+01,

Taper weighted geometric mean of the VPA populations:

, 1.24E+03, 7.42E+02, 3.70E+02, 2.36E+02,

Standard error of the weighted Log(VPA populations):

, .5241, .6742, 1.0420, 1.2045,

Table 8.11 (Continued)

Log catchability residuals.

Fleet : FLT09: Norwegian Sva

Age	1984	1985	1986
1	.23	.81	-1.75
2	1.14	1.26	.01
3	.24	.62	-.29
4	.71	.46	.57
5	.17	.32	-.29
6	.42	.80	-.88
7	.09	.31	-.28
8	.89	.37	-.80
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	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	.77	1.22	1.07	-.76	-.50	-.80	-.22	-.71	.03	.92
2	.35	1.76	1.66	-.61	.34	-2.29	-1.14	1.11	-3.02	1.07
3	.27	1.29	1.55	1.25	.76	-1.47	-2.62	-.40	-.98	.62
4	-.09	.43	.91	.83	1.04	-.78	-.94	-.68	-1.14	-.31
5	-.26	.51	.10	.61	.84	.05	-.48	-.40	-.84	-.09
6	-.28	-.58	-.70	.20	.91	.50	-.13	-.17	-.91	.88
7	-1.17	.62	-.61	-.33	.39	.29	.19	.24	-.24	.33
8	-.87	-.85	-.98	.05	.77	.97	.84	-.34	-.39	.27
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	1	2	3	4	5	6	7	8
Mean Log q	-4.4608	-3.3801	-2.3686	-1.5976	-.9788	-1.0446	-.8082	-1.5422
S.E(Log q)	.8900	1.5784	1.2726	.8034	.5004	.6672	.4864	.7353

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

1	.78	1.511	5.57	.84	13	.65	-4.46
2	.62	1.699	5.58	.69	13	.90	-3.38
3	.84	.558	3.45	.58	13	1.11	-2.37
4	.67	1.769	4.21	.76	13	.49	-1.60
5	.73	1.353	3.31	.73	13	.35	-.98
6	5.25	-1.711	-34.14	.02	13	3.21	-1.04
7	3.86	-1.385	-22.76	.03	13	1.80	-.81
8	15.86	-1.114	*****	.00	13	11.53	-1.54

Table 8.11 (Continued)

Fleet : FLT11: Norwegian Sva

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	99.99	2.34	2.44	-.50	-2.05	-.25	-.28	99.99	-.85	-.27
2	99.99	2.85	2.65	.81	-.19	-1.76	-1.36	-1.92	.12	-.36
3	99.99	1.77	1.93	1.94	.72	-.88	-2.45	-2.14	-1.60	1.40
4	99.99	.76	.58	1.25	.82	-.27	-1.09	-.95	-.58	-.20
5	99.99	-.70	-.12	.83	.60	.20	-.55	-.28	-.20	.16
6	99.99	99.99	-.62	.33	.99	.04	-.78	.08	-.72	.66
7	99.99	99.99	-.63	-1.25	.77	.31	-.17	1.04	-.37	.16
8	99.99	99.99	-1.17	-.02	-.35	.89	1.05	.85	-.18	-1.19
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	1	2	3	4	5	6	7	8
Mean Log q	-3.9770	-3.2862	-2.5801	-1.7327	-1.3562	-1.9976	-2.0569	-2.8752
S.E(Log q)	1.5086	1.7134	1.8432	.8452	.4983	.6622	.7461	.8912

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

1	.72	.749	5.50	.57	8	1.13	-3.98
2	.61	1.347	5.45	.65	9	.99	-3.29
3	.78	.507	3.99	.44	9	1.51	-2.58
4	.68	1.288	4.09	.72	9	.55	-1.73
5	1.13	-.346	.28	.50	9	.60	-1.36
6	1.97	-.800	-5.01	.11	8	1.34	-2.00
7	-1.30	-2.143	17.96	.13	8	.78	-2.06
8	-.71	-2.395	12.37	.26	8	.48	-2.88

Table 8.11 (Continued)

Fleet : FLT12: Experimental

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
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	-1.08	-.42	-.36	.51	1.32
6	99.99	99.99	99.99	99.99	99.99	-.87	-.44	-.23	-.18	1.69
7	99.99	99.99	99.99	99.99	99.99	-.54	-.28	-.03	.07	.76
8	99.99	99.99	99.99	99.99	99.99	-.25	.16	-.18	.12	.15
9	99.99	99.99	99.99	99.99	99.99	-.59	-.57	.00	.65	.49
10	99.99	99.99	99.99	99.99	99.99	-.52	.10	.27	.84	-.70
11	99.99	99.99	99.99	99.99	99.99	-.26	-.20	-.11	.23	-.41
12	99.99	99.99	99.99	99.99	99.99	.18	-.21	-.84	.64	-.58
13	99.99	99.99	99.99	99.99	99.99	-.28	.15	-.71	-.10	99.99
14	99.99	99.99	99.99	99.99	99.99	-.37	.02	-.05	.36	.09

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,	-3.7105,	-3.5761,	-3.1408,	-3.5849,	-5.3170,	-3.4870,	-3.4870,	-3.4870,	-3.4870,	-3.4870,
S.E(Log q),	.9323,	.9908,	.4865,	.1974,	.5767,	.6232,	.2947,	.6224,	.4525,	.2629,

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,	-1.60,	-3.843,	17.51,	.42,	5,	.71,	-3.71,
6,	-.60,	-3.823,	12.24,	.66,	5,	.28,	-3.58,
7,	.31,	2.346,	7.02,	.80,	5,	.10,	-3.14,
8,	.76,	.539,	4.71,	.63,	5,	.17,	-3.58,
9,	.48,	.803,	6.60,	.45,	5,	.29,	-5.32,
10,	-.74,	-3.103,	10.51,	.52,	5,	.26,	-3.49,
11,	.78,	.709,	4.31,	.77,	5,	.20,	-3.64,
12,	1.33,	-.242,	2.90,	.15,	5,	.91,	-3.65,
13,	3.62,	-1.017,	.27,	.07,	4,	1.30,	-3.72,
14,	1.32,	-.691,	3.26,	.61,	5,	.37,	-3.47,

Table 8.11 (Continued)

Fleet : FLT13: Nor bot surv

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	99.99	1.61	1.74	.55	.52	-1.04	-.23	99.99	99.99	-2.61
2	99.99	.18	1.04	.02	-.04	-.74	-.45	99.99	.13	99.99
3	99.99	.69	.38	.30	-.09	-.68	.92	-.57	-1.14	.38
4	99.99	.20	-.07	-.55	-.14	-.04	.20	-.12	.24	.26
5	99.99	.04	-.01	-.02	-1.06	-.32	.19	-.64	.81	.96
6	99.99	-1.07	-1.04	-.01	-.38	-.03	.27	-.15	.56	1.51
7	99.99	-.18	-1.19	-.34	-.12	.28	.13	.11	.18	.93
8	99.99	-.55	-.82	.16	99.99	-.83	99.99	.20	.16	1.48
9	99.99	99.99	99.99	-.48	-.04	.10	.22	.24	.23	-.31
10	99.99	-1.60	-1.04	99.99	.46	1.46	-.88	-.12	1.02	.33
11	99.99	-.26	.90	-.08	-.13	.10	-.70	1.59	1.58	.65
12	99.99	.07	.92	1.43	.50	1.08	99.99	99.99	1.07	99.99
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	1	2	3	4	5	6	7	8	9	10
Mean Log q,	-4.9725,	-3.2852,	-2.8461,	-2.0622,	-2.1538,	-1.7683,	-2.1258,	-2.6743,	-1.5445,	-3.0360,
S.E(Log q),	1.5458,	.5595,	.6985,	.2607,	.6519,	.7892,	.5634,	.8217,	.2866,	1.0481,

Age	11	12
Mean Log q,	-3.0360,	-3.0360,
S.E(Log q),	.9439,	1.0633,

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
1	1.49	-.532	2.66	.21	7	2.47	-4.97
2	.94	.344	3.66	.86	7	.57	-3.29
3	.91	.474	3.41	.80	9	.67	-2.85
4	1.17	-1.319	.85	.90	9	.29	-2.06
5	4.20	-2.234	-20.82	.07	9	2.21	-2.15
6	-1.67	-4.384	21.72	.29	9	.71	-1.77
7	-6.81	-1.799	55.76	.01	9	3.37	-2.13
8	.77	.193	4.00	.13	7	.70	-2.67
9	2.77	-1.612	-9.73	.15	7	.70	-1.54
10	-1.45	-.775	14.10	.02	8	1.56	-3.04
11	7.41	-1.243	-24.78	.01	9	5.94	-2.61
12	1.63	-1.079	-.57	.45	6	.76	-2.18

Table 8.11 (Continued)

Fleet : FLT14: Norwegian G.

Age	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
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	99.99	99.99	-.08	-.04	.12
5	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.63	.11	.52
6	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.57	-.50	1.06
7	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.18	-.09	.27
8	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.16	.07	.09
9	99.99	99.99	99.99	99.99	99.99	99.99	99.99	.12	.02	-.13
10	99.99	99.99	99.99	99.99	99.99	99.99	99.99	.06	.52	-.58
11	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.31	.05	-.17
12	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.84	.45	-.23
13	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-1.08	-.58	.16
14	99.99	99.99	99.99	99.99	99.99	99.99	99.99	-.07	-.13	-.05

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

Age	4	5	6	7	8	9	10	11	12	13
Mean Log q,	-1.0439,	1.1013,	.8933,	1.3686,	.6897,	-.3240,	1.2163,	1.2163,	1.2163,	1.2163,
S.E(Log q),	.1037,	.5834,	.9235,	.2370,	.1377,	.1244,	.5524,	.2534,	.6943,	.8771,

Age	14
Mean Log q,	1.2163,
S.E(Log q),	.1128,

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	1.18,	-7.710,	-.27,	1.00,	3,	.02,	-1.04,
5	27.55,	-23.995,	*****,	.45,	3,	.95,	1.10,
6	-1.01,	-7.326,	18.83,	.93,	3,	.18,	.89,
7	.43,	1.383,	4.45,	.86,	3,	.08,	1.37,
8	.97,	.024,	-.38,	.33,	3,	.19,	.69,
9	1.37,	-.671,	-2.44,	.77,	3,	.20,	-.32,
10	-1.11,	-6.856,	17.04,	.91,	3,	.12,	1.22,
11	1.14,	-.211,	-2.12,	.71,	3,	.29,	1.07,
12	2.00,	-.341,	-8.01,	.10,	3,	1.73,	1.01,
13	4.48,	-1.965,	-20.12,	.24,	3,	1.80,	.71,
14	1.17,	-5.006,	-2.01,	1.00,	3,	.01,	1.13,

Table 8.11 (Continued)

Terminal year survivor and F summaries :

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

Year class = 1995

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	208523.,	.929,	.000,	.00,	1,	.607,	.000
FLT11: Norwegian Sva,	63189.,	1.606,	.000,	.00,	1,	.203,	.000
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT13: Nor bot surv ,	6101.,	1.660,	.000,	.00,	1,	.190,	.000
FLT14: Norwegian G. ,	1.,	.000,	.000,	.00,	0,	.000,	.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
83568.,	.72,	.96,	3,	1.320,	.000

Age 2 Catchability constant w.r.t. time and dependent on age

Year class = 1994

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	3198.,	.810,	.443,	.55,	2,	.688,	.001
FLT11: Norwegian Sva,	1275.,	1.202,	.241,	.20,	2,	.312,	.001
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT13: Nor bot surv ,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT14: Norwegian G. ,	1.,	.000,	.000,	.00,	0,	.000,	.000
F shrinkage mean ,	-31100752.,	2.00,,,,				.000,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
2400.,	.67,	.33,	4,	.498,	.001

Age 3 Catchability constant w.r.t. time and dependent on age

Year class = 1993

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	231.,	.692,	.843,	1.22,	3,	.278,	.020
FLT11: Norwegian Sva,	1002.,	1.327,	.638,	.48,	2,	.076,	.005
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0,	.000,	.000
FLT13: Nor bot surv ,	621.,	.466,	.123,	.26,	2,	.613,	.007
FLT14: Norwegian G. ,	1.,	.000,	.000,	.00,	0,	.000,	.000
F shrinkage mean ,	124402992.,	2.00,,,,				.034,	.000

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
737.,	.36,	.92,	8,	2.511,	.009

Table 8.11 (Continued)

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

Year class = 1992

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	1256.,	.535,	.306,	.57,	4, .115,	.034
FLT11: Norwegian Sva,	859.,	.674,	.395,	.59,	4, .073,	.049
FLT12: Experimental ,	1.,	.000,	.000,	.00,	0, .000,	.000
FLT13: Nor bot surv ,	1683.,	.274,	.343,	1.25,	3, .438,	.026
FLT14: Norwegian G. ,	1793.,	.300,	.000,	.00,	1, .366,	.024
F shrinkage mean ,	3058.,	2.00, , , ,			.008,	.014

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
1594.,	.18,	.13,	13,	.736,	.027

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

Year class = 1991

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	1434.,	.374,	.226,	.60,	5, .157,	.511
FLT11: Norwegian Sva,	1899.,	.415,	.296,	.71,	5, .128,	.408
FLT12: Experimental ,	8734.,	1.022,	.000,	.00,	1, .021,	.104
FLT13: Nor bot surv ,	2605.,	.235,	.232,	.99,	5, .396,	.313
FLT14: Norwegian G. ,	2466.,	.274,	.207,	.75,	2, .291,	.328
F shrinkage mean ,	8601.,	2.00, , , ,			.008,	.105

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
2322.,	.15,	.12,	19,	.831,	.344

Age 6 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,	1180.,	.331,	.428,	1.29,	6, .176,	.963
FLT11: Norwegian Sva,	1470.,	.359,	.374,	1.04,	6, .151,	.833
FLT12: Experimental ,	5885.,	.747,	.592,	.79,	2, .036,	.281
FLT13: Nor bot surv ,	2230.,	.227,	.286,	1.26,	6, .363,	.619
FLT14: Norwegian G. ,	1999.,	.266,	.210,	.79,	3, .264,	.671
F shrinkage mean ,	19393.,	2.00, , , ,			.011,	.094

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
1929.,	.14,	.16,	24,	1.181,	.687

Age 7 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,	2424.,	.279,	.229,	.82,	7, .200,	.889
FLT11: Norwegian Sva,	2260.,	.328,	.161,	.49,	7, .142,	.931
FLT12: Experimental ,	5295.,	.434,	.339,	.78,	3, .087,	.504
FLT13: Nor bot surv ,	4010.,	.213,	.192,	.90,	7, .327,	.624
FLT14: Norwegian G. ,	3784.,	.266,	.242,	.91,	3, .236,	.651
F shrinkage mean ,	11707.,	2.00, , , ,			.009,	.260

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
3411.,	.13,	.10,	28,	.830,	.701

Table 8.11 (Continued)

Age 8 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,	2524.,	.266,	.171,	.64,	8,	.152,	.417
FLT11: Norwegian Sva,	2103.,	.315,	.248,	.79,	8,	.106,	.483
FLT12: Experimental ,	3203.,	.249,	.075,	.30,	4,	.219,	.342
FLT13: Nor bot surv ,	3404.,	.210,	.173,	.82,	8,	.222,	.324
FLT14: Norwegian G. ,	2893.,	.210,	.094,	.45,	3,	.296,	.372
F shrinkage mean ,	4590.,	2.00, , , ,				.005,	.250

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
2911.,	.11,	.07,	32,	.648,	.370

Age 9 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,	2453.,	.271,	.187,	.69,	8,	.101,	.093
FLT11: Norwegian Sva,	2689.,	.320,	.304,	.95,	8,	.070,	.086
FLT12: Experimental ,	2258.,	.234,	.143,	.61,	5,	.188,	.101
FLT13: Nor bot surv ,	1813.,	.190,	.120,	.63,	9,	.281,	.124
FLT14: Norwegian G. ,	1871.,	.177,	.073,	.41,	3,	.356,	.121
F shrinkage mean ,	1326.,	2.00, , , ,				.004,	.167

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
2022.,	.10,	.06,	34,	.647,	.112

Age 10 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,	2088.,	.277,	.184,	.66,	8,	.099,	.251
FLT11: Norwegian Sva,	2338.,	.333,	.242,	.73,	7,	.067,	.227
FLT12: Experimental ,	1206.,	.228,	.198,	.87,	5,	.226,	.402
FLT13: Nor bot surv ,	1460.,	.191,	.131,	.69,	9,	.289,	.343
FLT14: Norwegian G. ,	1249.,	.203,	.133,	.66,	3,	.314,	.390
F shrinkage mean ,	598.,	2.00, , , ,				.006,	.692

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
1416.,	.11,	.08,	33,	.711,	.351

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

Year class = 1985

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	329.,	.293,	.195,	.67,	8,	.044,	.556
FLT11: Norwegian Sva,	427.,	.357,	.139,	.39,	6,	.028,	.454
FLT12: Experimental ,	159.,	.227,	.181,	.80,	5,	.353,	.931
FLT13: Nor bot surv ,	264.,	.238,	.105,	.44,	8,	.169,	.657
FLT14: Norwegian G. ,	186.,	.222,	.139,	.63,	3,	.392,	.839
F shrinkage mean ,	203.,	2.00, , , ,				.014,	.791

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
196.,	.13,	.07,	31,	.546,	.810

Table 8.11 (Continued)

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

Year class = 1984

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	172.,	.328,	.128,	.39,	8, .038,	.529
FLT11: Norwegian Sva,	173.,	.407,	.202,	.50,	5, .024,	.526
FLT12: Experimental ,	91.,	.238,	.183,	.77,	5, .420,	.840
FLT13: Nor bot surv ,	133.,	.235,	.198,	.84,	8, .174,	.642
FLT14: Norwegian G. ,	100.,	.286,	.085,	.30,	3, .318,	.788
F shrinkage mean ,	38.,	2.00,,,,			.027,	1.415

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
102.,	.15,	.08,	30,	.516,	.778

Age 13 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,	25.,	.304,	.207,	.68,	8, .028,	.706
FLT11: Norwegian Sva,	11.,	.397,	.183,	.46,	4, .017,	1.204
FLT12: Experimental ,	24.,	.270,	.210,	.78,	4, .266,	.730
FLT13: Nor bot surv ,	33.,	.301,	.273,	.91,	7, .137,	.586
FLT14: Norwegian G. ,	22.,	.495,	.193,	.39,	3, .441,	.769
F shrinkage mean ,	14.,	2.00,,,,			.113,	1.052

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
23.,	.32,	.09,	27,	.268,	.764

Age 14 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, Scaled, Weights,	Estimated F
FLT09: Norwegian Sva,	13.,	.315,	.166,	.53,	7, .005,	.929
FLT11: Norwegian Sva,	13.,	.659,	.302,	.46,	2, .001,	.960
FLT12: Experimental ,	18.,	.261,	.073,	.28,	5, .506,	.759
FLT13: Nor bot surv ,	15.,	.268,	.261,	.97,	6, .017,	.848
FLT14: Norwegian G. ,	16.,	.291,	.084,	.29,	3, .450,	.822
F shrinkage mean ,	27.,	2.00,,,,			.021,	.567

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N,	Var, Ratio,	F
17.,	.19,	.04,	24,	.195,	.785

Table 8.12

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

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,	1975,	1976,
AGE							
1,	48679,	41645,	40970,	43860,	39019,	37184,	35920,
2,	49420,	41899,	35844,	35263,	37750,	33584,	32004,
3,	45334,	42537,	36062,	30851,	30351,	32492,	28906,
4,	36718,	39018,	36611,	31038,	26553,	26123,	27946,
5,	41121,	31572,	33582,	31083,	26697,	22598,	22174,
6,	47160,	34905,	27100,	27876,	26557,	22128,	18671,
7,	45290,	38001,	25881,	20059,	22957,	20521,	16877,
8,	41612,	29274,	20914,	13365,	13625,	14003,	11614,
9,	25217,	18595,	13801,	12028,	8243,	8167,	8232,
10,	17383,	12395,	10318,	9304,	7986,	5393,	4928,
11,	7545,	8773,	6643,	7272,	6228,	5072,	3107,
12,	3812,	4159,	5043,	4449,	4834,	3855,	2643,
13,	1577,	2121,	2039,	3196,	2783,	2919,	1893,
14,	2991,	786,	857,	1129,	2087,	1715,	1472,
+gp,	756,	372,	341,	564,	845,	1045,	995,
TOTAL,	414614,	346051,	296007,	271337,	256514,	236798,	217382,

Table 10	Stock number at age (start of year)					Numbers*10**-3				
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	34086,	39732,	35942,	34476,	36621,	36834,	36991,	42039,	37803,	27177,
2,	30917,	29338,	34198,	30936,	29674,	31520,	31703,	31838,	36183,	32537,
3,	27547,	26610,	25252,	29434,	26627,	25540,	27130,	27287,	27403,	31143,
4,	24879,	23652,	22831,	21653,	25275,	22302,	21938,	23060,	23486,	23505,
5,	23962,	20713,	19864,	18828,	18382,	20691,	18684,	17758,	19814,	19787,
6,	18315,	18735,	16068,	15039,	15527,	14062,	16599,	14650,	14436,	15923,
7,	13304,	12744,	12795,	10903,	11889,	11586,	10717,	12558,	9179,	9759,
8,	9123,	7554,	7149,	8483,	7839,	8452,	8788,	7507,	7701,	5524,
9,	5355,	5511,	4308,	5008,	6057,	5882,	6154,	5443,	4664,	5192,
10,	4302,	3116,	3343,	3249,	3435,	4765,	3677,	3914,	3697,	3112,
11,	2989,	2579,	1804,	2582,	2357,	2541,	2934,	2026,	2264,	2220,
12,	1826,	1587,	1439,	1278,	1748,	1582,	1409,	1864,	1185,	1379,
13,	1150,	775,	960,	1013,	845,	1152,	896,	760,	1289,	683,
14,	982,	438,	343,	731,	648,	371,	691,	542,	496,	960,
+gp,	457,	331,	388,	391,	266,	157,	219,	290,	259,	748,
TOTAL,	199194,	193516,	186685,	184004,	187190,	187437,	188531,	191535,	189858,	179649,

Table 10	Stock number at age (start of year)					Numbers*10**-3							
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	1997,	GMST	
AGE													
1,	28003,	23259,	23473,	23690,	11233,	7101,	2986,	780,	3249,	96158,	0,	243	
2,	23391,	24102,	20019,	20204,	20390,	9662,	6092,	2570,	672,	2797,	83568,	248	
3,	28005,	20133,	20745,	17231,	17389,	17488,	8297,	5244,	2212,	578,	2400,	241	
4,	26675,	24058,	17324,	17657,	14687,	14606,	14961,	7132,	4513,	1904,	737,	225	
5,	19317,	22555,	20491,	14054,	14462,	10708,	12166,	12669,	6072,	3818,	1594,	203	
6,	15480,	15502,	18572,	15707,	10112,	9375,	8197,	9414,	10327,	4471,	2322,	171	
7,	10611,	10566,	10986,	11854,	8729,	5095,	6960,	6046,	7458,	8005,	1929,	130	
8,	5883,	5819,	6180,	6065,	5896,	3138,	3394,	4499,	4062,	4900,	3411,	85	
9,	3334,	3444,	3064,	3782,	3428,	2890,	1979,	1884,	3127,	2630,	2911,	55	
10,	3422,	2172,	1868,	1894,	2123,	1994,	2154,	1573,	1338,	2339,	2022,	39	
11,	1754,	2177,	1072,	1312,	1167,	636,	1159,	948,	770,	513,	1416,	25	
12,	1419,	1174,	1428,	711,	885,	287,	373,	586,	438,	257,	196,	15	
13,	784,	1034,	720,	1112,	321,	137,	108,	187,	204,	56,	102,	9	
14,	297,	502,	767,	508,	918,	112,	45,	59,	80,	44,	23,	5	
+gp,	33,	168,	153,	232,	1775,	69,	9,	5,	10,	2,	18,		
TOTAL,	168408,	156666,	146861,	136012,	113514,	83296,	68879,	53596,	44533,	128471,	102649,		

Table 8.13

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

Terminal Fs derived using XSA (With F shrinkage)

Table 8 YEAR,	Fishing mortality (F) at age						
	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0000,	.0000,	.0000,	.0000,	.0000,	.0007,	.0000,
4,	.0010,	.0000,	.0137,	.0007,	.0113,	.0139,	.0038,
5,	.0139,	.0027,	.0362,	.0074,	.0377,	.0409,	.0412,
6,	.0659,	.1491,	.1509,	.0442,	.1079,	.1209,	.1889,
7,	.2864,	.4472,	.5109,	.2367,	.3443,	.4193,	.4651,
8,	.6555,	.6020,	.4032,	.3333,	.3619,	.3812,	.6241,
9,	.5602,	.4390,	.2443,	.2596,	.2742,	.3552,	.4989,
10,	.5338,	.4737,	.1999,	.2514,	.3040,	.4014,	.3500,
11,	.4457,	.4036,	.2510,	.2583,	.3295,	.5020,	.3819,
12,	.4361,	.5626,	.3062,	.3189,	.3543,	.5611,	.6820,
13,	.5465,	.7561,	.4413,	.2764,	.3344,	.5349,	.5065,
14,	.5073,	.5301,	.2897,	.2740,	.3206,	.4735,	.4865,
+gp,	.5073,	.5301,	.2897,	.2740,	.3206,	.4735,	.4865,
FBAR 6-10,	.4204,	.4222,	.3018,	.2250,	.2784,	.3356,	.4254,

Table 8 YEAR,	Fishing mortality (F) at age									
	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.0024,	.0032,	.0038,	.0023,	.0272,	.0020,	.0126,	.0000,	.0035,	.0049,
4,	.0333,	.0245,	.0428,	.0138,	.0501,	.0270,	.0614,	.0017,	.0214,	.0462,
5,	.0961,	.1039,	.1282,	.0427,	.1179,	.0703,	.0932,	.0571,	.0686,	.0955,
6,	.2127,	.2313,	.2378,	.0851,	.1428,	.1216,	.1290,	.3176,	.2416,	.2559,
7,	.4159,	.4282,	.2610,	.1799,	.1911,	.1264,	.2060,	.3390,	.3577,	.3560,
8,	.3541,	.4117,	.2059,	.1868,	.1373,	.1673,	.3292,	.3261,	.2442,	.3549,
9,	.3916,	.3498,	.1322,	.2271,	.0901,	.3197,	.3026,	.2366,	.2544,	.2668,
10,	.3238,	.3964,	.1085,	.1707,	.1515,	.3349,	.4462,	.3975,	.3600,	.4236,
11,	.4829,	.4713,	.1946,	.2400,	.2490,	.4393,	.3037,	.3861,	.3458,	.2975,
12,	.7064,	.3530,	.2009,	.2638,	.2670,	.4187,	.4672,	.2190,	.4007,	.4145,
13,	.8157,	.6640,	.1229,	.2976,	.6730,	.3612,	.3527,	.2776,	.1446,	.6839,
14,	.5473,	.4493,	.1522,	.2407,	.2872,	.3765,	.3763,	.3046,	.3023,	.4193,
+gp,	.5473,	.4493,	.1522,	.2407,	.2872,	.3765,	.3763,	.3046,	.3023,	.4193,
FBAR 6-10,	.3396,	.3635,	.1891,	.1699,	.1426,	.2140,	.2826,	.3234,	.2916,	.3314,

Table 8 YEAR,	Fishing mortality (F) at age										FBAR 94-96
	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	
AGE											
1,	.0000,	.0000,	.0000,	.0000,	.0007,	.0032,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0000,	.0000,	.0000,	.0000,	.0035,	.0023,	.0000,	.0000,	.0000,	.0008,	.0003,
3,	.0019,	.0003,	.0112,	.0097,	.0244,	.0061,	.0013,	.0000,	.0000,	.0094,	.0031,
4,	.0177,	.0105,	.0592,	.0496,	.1660,	.0328,	.0163,	.0109,	.0173,	.0270,	.0184,
5,	.0700,	.0443,	.1159,	.1792,	.2835,	.1171,	.1065,	.0544,	.1561,	.3440,	.1848,
6,	.2319,	.1943,	.2990,	.4374,	.5354,	.1478,	.1544,	.0829,	.1048,	.6870,	.2916,
7,	.4507,	.3863,	.4441,	.5484,	.8731,	.2564,	.2864,	.2478,	.2700,	.7015,	.4064,
8,	.3855,	.4914,	.3411,	.4206,	.5630,	.3110,	.4386,	.2137,	.2848,	.3700,	.2895,
9,	.2785,	.4620,	.3310,	.4277,	.3919,	.1442,	.0793,	.1918,	.1404,	.1122,	.1481,
10,	.3022,	.5564,	.2028,	.3340,	1.0556,	.3921,	.6704,	.5649,	.8094,	.3514,	.5752,
11,	.2517,	.2720,	.2605,	.2444,	1.2539,	.3838,	.5324,	.6234,	.9465,	.8096,	.7931,
12,	.1665,	.3389,	.1000,	.6464,	1.7147,	.8297,	.5386,	.9064,	1.8970,	.7782,	1.1939,
13,	.2953,	.1492,	.1981,	.0416,	.9041,	.9707,	.4470,	.6948,	1.3914,	.7642,	.9501,
14,	.2598,	.3573,	.2192,	.2277,	.3744,	1.9557,	.6585,	1.1752,	1.2385,	.7846,	1.0661,
+gp,	.2598,	.3573,	.2192,	.2277,	.3744,	1.9557,	.6585,	1.1752,	1.2385,	.7846,	
FBAR 6-10,	.3298,	.4181,	.3236,	.4336,	.6838,	.2503,	.3258,	.2602,	.3219,	.4444,	

Table 8.14

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

Terminal Fs derived using XSA (With F shrinkage)

Table 12	Stock biomass at age (start of year)						Tonnes
YEAR,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,
3,	9067,	8507,	7212,	6170,	6070,	6498,	5781,
4,	16193,	17207,	16145,	13688,	11710,	11520,	12324,
5,	23316,	17901,	19041,	17624,	15137,	12813,	12573,
6,	34757,	25725,	19973,	20544,	19573,	16308,	13761,
7,	48868,	41003,	27926,	21643,	24770,	22142,	18211,
8,	59131,	41598,	29719,	18992,	19361,	19899,	16503,
9,	46600,	34364,	25504,	22228,	15232,	15092,	15213,
10,	39651,	28273,	23535,	21222,	18216,	12301,	11240,
11,	21781,	25328,	19179,	20994,	17979,	14642,	8971,
12,	12377,	13503,	16375,	14445,	15696,	12518,	8580,
13,	6786,	9128,	8775,	13752,	11977,	12562,	8147,
14,	14747,	3875,	4227,	5567,	10289,	8455,	7257,
+gp,	4379,	2172,	2061,	3389,	5037,	6173,	5892,
TOTALBIO,	337653,	268584,	219672,	200259,	191047,	170925,	144452,

Table 12	Stock biomass at age (start of year)						Tonnes			
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	5509,	5322,	7576,	5887,	5325,	6896,	8410,	8186,	8221,	10589,
4,	10971,	10431,	13699,	10437,	12637,	13827,	9872,	11069,	8925,	11047,
5,	13587,	11744,	17877,	13217,	12132,	14277,	14013,	11188,	11888,	12268,
6,	13498,	13807,	19281,	13114,	13043,	11812,	17263,	14064,	12848,	14649,
7,	14355,	13751,	19193,	12440,	13672,	11934,	14361,	14818,	11014,	12491,
8,	12964,	10735,	12868,	12453,	12229,	11073,	13798,	11486,	14246,	10496,
9,	9897,	10184,	9478,	8904,	12357,	10234,	12124,	12572,	12079,	12876,
10,	9814,	7107,	8693,	7479,	8827,	10673,	10039,	11232,	11757,	9679,
11,	8629,	7734,	5412,	6878,	7025,	7038,	9652,	7009,	8194,	7438,
12,	5928,	5154,	5037,	3893,	5996,	5331,	5947,	7026,	4681,	5129,
13,	4949,	3336,	3935,	3413,	3490,	4977,	4219,	3034,	5773,	2733,
14,	4842,	2159,	1649,	3131,	3031,	1985,	4201,	2357,	2107,	4012,
+gp,	2753,	1957,	2397,	2093,	1599,	917,	1339,	1313,	1250,	3383,
TOTALBIO,	117696,	103421,	127095,	103338,	111363,	110972,	125240,	115354,	112984,	116790,

Table 12	Stock biomass at age (start of year)						Tonnes			
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	8598,	8335,	6431,	4825,	5043,	3847,	2821,	1363,	973,	104,
4,	15311,	13328,	10914,	9711,	8812,	6719,	8079,	3709,	2527,	895,
5,	13696,	16691,	15573,	9978,	11135,	7281,	9611,	9122,	4432,	2940,
6,	15526,	14913,	19129,	16649,	10617,	9093,	8361,	8849,	9708,	4337,
7,	13434,	13197,	14502,	15292,	12046,	6471,	9396,	7679,	9322,	10486,
8,	9901,	9462,	11125,	10310,	10318,	5523,	6380,	7738,	7068,	8527,
9,	8276,	7453,	7415,	7943,	7541,	6387,	4868,	4125,	6536,	5890,
10,	10205,	6293,	5845,	4944,	5519,	5104,	5750,	3965,	3359,	6058,
11,	6221,	7416,	3612,	3767,	3257,	1977,	3977,	2816,	2271,	1687,
12,	5393,	4297,	5783,	2453,	2902,	1029,	1599,	1928,	1461,	1034,
13,	3575,	4392,	3088,	4137,	1247,	525,	547,	719,	780,	268,
14,	1485,	2103,	3450,	2079,	4022,	475,	282,	293,	401,	272,
+gp,	195,	748,	721,	1049,	9387,	330,	79,	31,	85,	12,
TOTALBIO,	111815,	108628,	107588,	93135,	91847,	54761,	61751,	52337,	48924,	42510,

Table 8.15

Run title : Arctic Green.halibut (run: XSAOLE10/X10)

At 25-Aug-97 19:57:04

Terminal Fs derived using XSA (With F shrinkage)

Table 13	Spawning stock biomass at age (spawning time)						Tonnes
YEAR,	1970,	1971,	1972,	1973,	1974,	1975,	1976,
AGE							
1,	0,	0,	0,	0,	0,	0,	0,
2,	0,	0,	0,	0,	0,	0,	0,
3,	0,	0,	0,	0,	0,	0,	0,
4,	810,	860,	807,	684,	585,	576,	616,
5,	5363,	4117,	4379,	4054,	3482,	2947,	2892,
6,	17031,	12605,	9787,	10067,	9591,	7991,	6743,
7,	32253,	27062,	18431,	14285,	16348,	14614,	12019,
8,	46122,	32446,	23181,	14814,	15102,	15521,	12872,
9,	41474,	30584,	22698,	19783,	13557,	13432,	13540,
10,	37669,	26860,	22358,	20161,	17305,	11686,	10678,
11,	21563,	25074,	18987,	20784,	17799,	14496,	8881,
12,	12254,	13368,	16212,	14300,	15539,	12393,	8495,
13,	6718,	9037,	8687,	13615,	11857,	12436,	8065,
14,	14747,	3875,	4227,	5567,	10289,	8455,	7257,
+gp,	4379,	2172,	2061,	3389,	5037,	6173,	5892,
TOTSPB10,	240382,	188060,	151815,	141502,	136491,	120721,	97950,

Table 13	Spawning stock biomass at age (spawning time)						Tonnes			
YEAR,	1977,	1978,	1979,	1980,	1981,	1982,	1983,	1984,	1985,	1986,
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,	549,	522,	685,	522,	632,	691,	494,	553,	446,	552,
5,	3125,	2701,	4112,	3040,	2790,	3284,	3223,	2573,	2734,	2822,
6,	6614,	6766,	9448,	6426,	6391,	5788,	8459,	6891,	6295,	7178,
7,	9474,	9076,	12667,	8210,	9023,	7876,	9478,	9780,	7269,	8244,
8,	10112,	8373,	10037,	9714,	9539,	8637,	10762,	8959,	11112,	8187,
9,	8808,	9064,	8435,	7925,	10998,	9108,	10790,	11189,	10750,	11459,
10,	9323,	6752,	8258,	7105,	8386,	10139,	9537,	10671,	11170,	9195,
11,	8543,	7656,	5358,	6809,	6955,	6967,	9556,	6939,	8112,	7363,
12,	5868,	5103,	4987,	3854,	5936,	5277,	5888,	6956,	4634,	5078,
13,	4899,	3303,	3896,	3379,	3455,	4927,	4177,	3003,	5716,	2706,
14,	4842,	2159,	1649,	3131,	3031,	1985,	4201,	2357,	2107,	4012,
+gp,	2753,	1957,	2397,	2093,	1599,	917,	1339,	1313,	1250,	3383,
TOTSPB10,	74910,	63431,	71929,	62206,	68734,	65597,	77904,	71185,	71596,	70180,

Table 13	Spawning stock biomass at age (spawning time)						Tonnes			
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
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,	766,	267,	327,	486,	441,	336,	808,	371,	253,	89,
5,	3150,	1836,	2180,	1996,	2227,	1456,	3652,	3466,	1684,	1117,
6,	7608,	7605,	10139,	9823,	6264,	5365,	4264,	4513,	4951,	2212,
7,	8866,	8842,	9571,	10704,	8432,	4530,	6108,	4991,	6060,	6816,
8,	7723,	6434,	7676,	7423,	7429,	3976,	4658,	5649,	5160,	6225,
9,	7365,	5962,	5413,	6036,	5731,	4854,	3992,	3383,	5359,	4830,
10,	9695,	5789,	5027,	4202,	4691,	4338,	5232,	3608,	3057,	5513,
11,	6158,	7268,	3467,	3541,	3062,	1858,	3857,	2731,	2203,	1636,
12,	5339,	4297,	5783,	2453,	2902,	1029,	1567,	1889,	1432,	1013,
13,	3539,	4392,	3088,	4137,	1247,	525,	547,	719,	780,	268,
14,	1485,	2103,	3450,	2079,	4022,	475,	282,	293,	401,	272,
+gp,	195,	748,	721,	1049,	9387,	330,	79,	31,	85,	12,
TOTSPB10,	61890,	55544,	56843,	53928,	55835,	29073,	35047,	31645,	31424,	30004,

Table 8.16

Run title : Arctic Green.halibut (run: SVP0LE04/V04)

At 25-Aug-97 20:35:14

Table 16 Summary (without SOP correction)

Traditional vpa using file input for terminal F

	RECRUITS, Age 3	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	FBAR 6-10,
1970,	45092,	335490,	238804,	89484,	.3747,	.4199,
1971,	42271,	266964,	186910,	79034,	.4228,	.4219,
1972,	35877,	218441,	150971,	43055,	.2852,	.3020,
1973,	30703,	199130,	140700,	29938,	.2128,	.2255,
1974,	30207,	189934,	135674,	37763,	.2783,	.2789,
1975,	32358,	169899,	119958,	38172,	.3182,	.3358,
1976,	28776,	143623,	97352,	36074,	.3706,	.4249,
1977,	27432,	117077,	74489,	28827,	.3870,	.3396,
1978,	26509,	102930,	63118,	24617,	.3900,	.3632,
1979,	25150,	126540,	71610,	17312,	.2418,	.1893,
1980,	29312,	102873,	61917,	13284,	.2145,	.1702,
1981,	26475,	110834,	68397,	15018,	.2196,	.1429,
1982,	25371,	110406,	65265,	16789,	.2572,	.2142,
1983,	26948,	124577,	77511,	22147,	.2857,	.2827,
1984,	27113,	114715,	70821,	21883,	.3090,	.3234,
1985,	27241,	112341,	71215,	19945,	.2801,	.2919,
1986,	30914,	116075,	69781,	22875,	.3278,	.3319,
1987,	27780,	111053,	61491,	19112,	.3108,	.3307,
1988,	20002,	107834,	55150,	19587,	.3552,	.4194,
1989,	20657,	106766,	56394,	20138,	.3571,	.3250,
1990,	17181,	92390,	53445,	23183,	.4338,	.4352,
1991,	17311,	91171,	55370,	33320,	.6018,	.6833,
1992,	17343,	54379,	28837,	8599,	.2982,	.2514,
1993,	8227,	61306,	34772,	11933,	.3432,	.3268,
1994,	5217,	51956,	31399,	9189,	.2927,	.2608,
1995,	2207,	48574,	31185,	11043,	.3541,	.3220,
1996,	575,	42225,	29804,	14072,	.4722,	.4444,
Arith.						
Mean	24232,	127019,	81568,	26903,	.3331,	.3281,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),		

Table 8.17

16:31 Tuesday, August 26, 1997

The SAS System

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

Prediction with management option table: Input data

Year: 1997								
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	2400.000	0.1500	0.0000	0.0000	0.0000	0.293	0.0040	0.293
4	737.000	0.1500	0.1000	0.0000	0.0000	0.517	0.0239	0.517
5	1594.000	0.1500	0.3800	0.0000	0.0000	0.740	0.2400	0.740
6	2322.000	0.1500	0.5100	0.0000	0.0000	0.950	0.3787	0.950
7	1929.000	0.1500	0.6500	0.0000	0.0000	1.277	0.5278	1.277
8	3411.000	0.1500	0.7300	0.0000	0.0000	1.733	0.3760	1.733
9	2911.000	0.1500	0.8200	0.0000	0.0000	2.173	0.1924	2.173
10	2022.000	0.1500	0.9100	0.0000	0.0000	2.540	0.7471	2.540
11	1416.000	0.1500	0.9700	0.0000	0.0000	3.070	1.0300	3.070
12	196.000	0.1500	0.9800	0.0000	0.0000	3.550	1.5506	3.550
13	102.000	0.1500	1.0000	0.0000	0.0000	4.140	1.2340	4.140
14	23.000	0.1500	1.0000	0.0000	0.0000	5.390	1.3847	5.390
15+	18.000	0.1500	1.0000	0.0000	0.0000	6.973	1.3847	6.973
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

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
3	3746.000	0.1500	0.0000	0.0000	0.0000	0.293	0.0040	0.293
4	.	0.1500	0.1000	0.0000	0.0000	0.517	0.0239	0.517
5	.	0.1500	0.3800	0.0000	0.0000	0.740	0.2400	0.740
6	.	0.1500	0.5100	0.0000	0.0000	0.950	0.3787	0.950
7	.	0.1500	0.6500	0.0000	0.0000	1.277	0.5278	1.277
8	.	0.1500	0.7300	0.0000	0.0000	1.733	0.3760	1.733
9	.	0.1500	0.8200	0.0000	0.0000	2.173	0.1924	2.173
10	.	0.1500	0.9100	0.0000	0.0000	2.540	0.7471	2.540
11	.	0.1500	0.9700	0.0000	0.0000	3.070	1.0300	3.070
12	.	0.1500	0.9800	0.0000	0.0000	3.550	1.5506	3.550
13	.	0.1500	1.0000	0.0000	0.0000	4.140	1.2340	4.140
14	.	0.1500	1.0000	0.0000	0.0000	5.390	1.3847	5.390
15+	.	0.1500	1.0000	0.0000	0.0000	6.973	1.3847	6.973
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Year: 1999								
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
3	3746.000	0.1500	0.0000	0.0000	0.0000	0.293	0.0040	0.293
4	.	0.1500	0.1000	0.0000	0.0000	0.517	0.0239	0.517
5	.	0.1500	0.3800	0.0000	0.0000	0.740	0.2400	0.740
6	.	0.1500	0.5100	0.0000	0.0000	0.950	0.3787	0.950
7	.	0.1500	0.6500	0.0000	0.0000	1.277	0.5278	1.277
8	.	0.1500	0.7300	0.0000	0.0000	1.733	0.3760	1.733
9	.	0.1500	0.8200	0.0000	0.0000	2.173	0.1924	2.173
10	.	0.1500	0.9100	0.0000	0.0000	2.540	0.7471	2.540
11	.	0.1500	0.9700	0.0000	0.0000	3.070	1.0300	3.070
12	.	0.1500	0.9800	0.0000	0.0000	3.550	1.5506	3.550
13	.	0.1500	1.0000	0.0000	0.0000	4.140	1.2340	4.140
14	.	0.1500	1.0000	0.0000	0.0000	5.390	1.3847	5.390
15+	.	0.1500	1.0000	0.0000	0.0000	6.973	1.3847	6.973
Unit	Thousands	-	-	-	-	Kilograms	-	Kilograms

Notes: Run name : MANHS02
Date and time: 15SEP97:11:55

Table 8.18

The SAS System

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

Prediction with management option table

Year: 1997					Year: 1998					Year: 1999	
F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	F Factor	Reference F	Stock biomass	Sp.stock biomass	Catch in weight	Stock biomass	Sp.stock biomass
0.9055	0.4024	30020	22959	10000	0.0000	0.0000	21966	16582	0	24803	19170
.	0.1000	0.0444	.	16582	1155	23513	17970
.	0.2000	0.0889	.	16582	2215	22330	16875
.	0.3000	0.1333	.	16582	3188	21245	15874
.	0.4000	0.1778	.	16582	4084	20248	14956
.	0.5000	0.2222	.	16582	4910	19330	14113
.	0.6000	0.2666	.	16582	5673	18483	13339
.	0.7000	0.3111	.	16582	6379	17700	12626
.	0.8000	0.3555	.	16582	7033	16976	11968
.	0.9000	0.4000	.	16582	7641	16305	11360
.	1.0000	0.4444	.	16582	8205	15682	10798
.	1.1000	0.4888	.	16582	8730	15103	10277
.	1.2000	0.5333	.	16582	9220	14564	9793
.	1.3000	0.5777	.	16582	9678	14061	9344
.	1.4000	0.6222	.	16582	10106	13592	8926
.	1.5000	0.6666	.	16582	10507	13153	8536
.	1.6000	0.7110	.	16582	10883	12742	8172
.	1.7000	0.7555	.	16582	11236	12357	7832
.	1.8000	0.7999	.	16582	11568	11996	7514
.	1.9000	0.8444	.	16582	11880	11656	7216
.	2.0000	0.8888	.	16582	12175	11336	6936
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : MANHS02
Date and time : 15SEP97:12:51
Computation of ref. F: Simple mean, age 6 - 10
Basis for 1997 : TAC constraints

Table 9.1

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Table 1	Catch numbers at age		
YEAR,	1984,	1985,	1986,
AGE			
0,	0,	0,	0,
1,	1677,	532,	29,
2,	3269,	1602,	10049,
3,	5130,	12979,	6026,
4,	5368,	7924,	11179,
5,	8654,	8689,	7643,
6,	6760,	6800,	4963,
7,	3716,	2251,	2570,
8,	1015,	342,	580,
9,	328,	210,	156,
+9p,	167,	78,	113,
TOTALNUM,	36084,	41407,	43308,
TONSLAND,	77016,	78257,	73302,
SOPCOF %,	100,	100,	100,

Table 1	Catch numbers at age									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
1,	376,	0,	0,	10,	1102,	0,	0,	116,	3031,	317,
2,	1567,	435,	228,	32,	648,	13,	56,	1743,	3283,	6549,
3,	2790,	3297,	2742,	652,	1128,	567,	1138,	1554,	2331,	5476,
4,	8496,	3759,	1865,	1848,	1684,	4295,	3465,	3378,	3912,	3828,
5,	9757,	6504,	3047,	2090,	3416,	5122,	4187,	7243,	7934,	5975,
6,	4049,	6251,	6255,	1437,	2052,	3034,	3506,	3533,	7126,	5377,
7,	2239,	3309,	2191,	2455,	1109,	1542,	3287,	3341,	3089,	3856,
8,	576,	711,	688,	805,	656,	484,	1603,	1037,	959,	1385,
9,	124,	218,	129,	171,	73,	465,	522,	437,	374,	545,
+9p,	88,	67,	30,	40,	30,	94,	459,	405,	254,	206,
TOTALNUM,	30062,	24551,	17175,	9540,	11898,	15616,	18223,	22787,	32293,	33514,
TONSLAND,	63105,	60566,	40601,	29728,	25772,	43027,	60780,	60394,	58243,	62085,
SOPCOF %,	100,	100,	100,	100,	100,	100,	100,	100,	100,	100,

Table 9.2

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Table 2	Catch weights at age (kg)		
YEAR,	1984,	1985,	1986,
AGE			
0,	.0000,	.0000,	.0000,
1,	.0860,	.0860,	.0860,
2,	.3110,	.3110,	.3110,
3,	1.0970,	1.0970,	1.0970,
4,	1.5680,	1.5680,	1.5680,
5,	2.1530,	2.1530,	2.1530,
6,	2.8980,	2.8980,	2.8980,
7,	3.9070,	3.9070,	3.9070,
8,	5.6550,	5.6550,	5.6550,
9,	5.9570,	5.9570,	5.9570,
+gp,	8.2600,	8.2600,	8.2600,
SOPCOFAC,	1.0000,	1.0002,	1.0002,

Table 2	Catch weights at age (kg)									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
0,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
1,	.0860,	.0860,	.0930,	.0890,	.0940,	.0560,	.0890,	.0890,	.0820,	.0930,
2,	.3110,	.3110,	.3200,	.3210,	.2950,	.2950,	.3200,	.3200,	.3010,	.3180,
3,	1.0970,	1.0970,	1.1540,	1.2400,	1.3190,	1.1490,	1.3690,	1.0170,	.7140,	.8170,
4,	1.5680,	1.5680,	1.3670,	1.6510,	1.6020,	1.7990,	1.8060,	1.5750,	1.3070,	1.4420,
5,	2.1530,	2.1530,	1.7680,	1.9770,	2.1830,	2.5030,	2.7420,	2.2380,	1.8130,	1.9980,
6,	2.8980,	2.8980,	2.3160,	3.0650,	2.7000,	3.0980,	3.8480,	3.3690,	2.2640,	2.5240,
7,	3.9070,	3.9070,	4.1490,	4.2940,	3.5990,	4.1030,	4.2760,	4.0240,	3.5680,	3.2410,
8,	5.6550,	5.6550,	6.6020,	6.3750,	5.6480,	5.8860,	5.0330,	5.5610,	4.9490,	5.1830,
9,	5.9570,	5.9570,	7.9980,	7.3310,	4.6850,	5.2860,	5.6000,	5.9610,	5.3230,	5.4750,
+gp,	8.2600,	8.2600,	9.3460,	9.8350,	8.2600,	8.4370,	6.3880,	7.3920,	7.6740,	8.7460,
SOPCOFAC,	.9999,	1.0000,	.9999,	1.0000,	1.0003,	1.0000,	.9999,	1.0000,	1.0001,	1.0001,

Table 9.3

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Table 3	Stock weights at age (kg)		
YEAR,	1984,	1985,	1986,
AGE			
0,	.0070,	.0070,	.0070,
1,	.0820,	.0820,	.0820,
2,	.3210,	.3210,	.3210,
3,	.7580,	.7580,	.7580,
4,	1.4790,	1.4790,	1.4790,
5,	2.1370,	2.1370,	2.1370,
6,	2.8140,	2.8140,	2.8140,
7,	4.7220,	4.7220,	4.7220,
8,	6.6850,	6.6850,	6.6850,
9,	6.9080,	6.9080,	6.9080,
+gp,	9.7230,	9.7230,	9.7230,

Table 3	Stock weights at age (kg)									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
0,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0080,
1,	.0820,	.0820,	.0820,	.0820,	.0820,	.0820,	.0820,	.0820,	.0810,	.0830,
2,	.3210,	.3210,	.3210,	.3210,	.3210,	.3210,	.3210,	.3210,	.3900,	.2520,
3,	.7580,	.7580,	.7580,	.7580,	.7580,	.7580,	.7580,	.7580,	.7910,	.7240,
4,	1.4790,	1.4790,	1.4790,	1.4790,	1.4790,	1.4790,	1.4790,	1.4790,	1.5250,	1.4330,
5,	2.1370,	2.1370,	2.1370,	2.1370,	2.1370,	2.1370,	2.1370,	2.1370,	2.2220,	2.0530,
6,	2.8140,	2.8140,	2.8140,	2.8140,	2.8140,	2.8140,	2.8140,	2.8140,	2.8810,	2.7480,
7,	4.7220,	4.7220,	4.7220,	4.7220,	4.7220,	4.7220,	4.7220,	4.7220,	4.5510,	4.8940,
8,	6.6850,	6.6850,	6.6850,	6.6850,	6.6850,	6.6850,	6.6850,	6.6850,	7.5660,	5.8040,
9,	6.9080,	6.9080,	6.9080,	6.9080,	6.9080,	6.9080,	6.9080,	6.9080,	6.3160,	7.5000,
+gp,	9.7230,	9.7230,	9.7230,	9.7230,	9.7230,	9.7230,	9.7230,	9.7230,	10.2450,	9.2000,

Table 9.4

Run title : Coastal cod (run: XSANCC05/X05)

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Table 5	Proportion mature at age		
YEAR,	1984,	1985,	1986,
AGE			
0,	.0000,	.0000,	.0000,
1,	.0000,	.0000,	.0000,
2,	.0100,	.0100,	.0100,
3,	.1500,	.1500,	.1500,
4,	.4100,	.4100,	.4100,
5,	.6900,	.6900,	.6900,
6,	.8900,	.8900,	.8900,
7,	.9300,	.9300,	.9300,
8,	.9600,	.9600,	.9600,
9,	1.0000,	1.0000,	1.0000,
+gp,	1.0000,	1.0000,	1.0000,

Table 5	Proportion mature at age									
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,
AGE										
0,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
1,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
2,	.0100,	.0500,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
3,	.1500,	.1900,	.1300,	.1500,	.0000,	.0000,	.0200,	.0000,	.0100,	.0300,
4,	.4100,	.4500,	.2900,	.3600,	.4600,	.3300,	.2500,	.4300,	.2000,	.2400,
5,	.6900,	.7200,	.5900,	.7100,	.7400,	.6700,	.5600,	.6800,	.4700,	.5600,
6,	.8900,	.8600,	.9000,	.9200,	.8300,	.8700,	.9100,	.9500,	.6700,	.8000,
7,	.9300,	.9200,	.8700,	.9600,	.9800,	.9400,	.9500,	.9400,	.8500,	.9200,
8,	.9600,	.9500,	.9800,	1.0000,	.9300,	1.0000,	.9600,	1.0000,	.8600,	.9900,
9,	1.0000,	.9800,	1.0000,	1.0000,	1.0000,	1.0000,	.9900,	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 9.5

Lowestoft VPA Version 3.1

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Extended Survivors Analysis

Coastal cod (run: XSANCC05/X05)

CPUE data from file /users/fish/ifad/ifapwork/afwg/cod_coas/FLEET.X05

Catch data for 13 years. 1984 to 1996. Ages 0 to 10.

Fleet,	First,	Last,	First,	Last,	Alpha,	Beta
	year,	year,	age,	age		
FLT1: Norwegian coas,	1992,	1996,	0,	9,	.750,	.880
FLT2: Norwegian Coas,	1993,	1996,	0,	9,	.750,	.880
FLT3: Norwegian Coas,	1994,	1996,	0,	9,	.750,	.880

Time series weights :

Tapered time weighting applied
Power = 3 over 20 years

Catchability analysis :

Catchability dependent on stock size for ages < 1

Regression type = C
Minimum of 3 points used for regression
Survivor estimates shrunk to the population mean for ages < 1

Catchability independent of age for ages >= 7

Terminal population estimation :

Survivor estimates shrunk towards the mean F
of the final 2 years or the 4 oldest ages.

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

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

Prior weighting not applied

Tuning converged after 56 iterations

Table 9.5 (cont'd)

Regression weights

, .976, .990, .997, 1.000, 1.000

Fishing mortalities

Age, 1992, 1993, 1994, 1995, 1996

0,	.000,	.000,	.000,	.000,	.000
1,	.000,	.000,	.001,	.024,	.019
2,	.000,	.001,	.051,	.049,	.067
3,	.012,	.030,	.052,	.090,	.108
4,	.171,	.097,	.117,	.180,	.210
5,	.318,	.251,	.301,	.438,	.459
6,	.342,	.376,	.348,	.549,	.607
7,	.370,	.775,	.758,	.589,	.662
8,	.227,	.842,	.599,	.507,	.578
9,	.299,	.408,	.580,	.449,	.613

XSA population numbers (Thousands)

YEAR ,	0,	AGE 1,	2,	3,	4,	5,	6,	7,
1992 ,	5.73E+04,	5.05E+04,	5.22E+04,	5.12E+04,	3.02E+04,	2.08E+04,	1.16E+04,	5.51E+03,
1993 ,	1.14E+05,	4.69E+04,	4.13E+04,	4.27E+04,	4.14E+04,	2.08E+04,	1.24E+04,	6.74E+03,
1994 ,	1.72E+05,	9.31E+04,	3.84E+04,	3.38E+04,	3.39E+04,	3.08E+04,	1.33E+04,	6.95E+03,
1995 ,	2.22E+04,	1.41E+05,	7.61E+04,	2.99E+04,	2.62E+04,	2.47E+04,	1.86E+04,	7.67E+03,
1996 ,	7.01E+04,	1.82E+04,	1.12E+05,	5.93E+04,	2.23E+04,	1.79E+04,	1.31E+04,	8.81E+03,

Estimated population abundance at 1st Jan 1997

, .00E+00, 5.74E+04, 1.46E+04, 8.61E+04, 4.36E+04, 1.48E+04, 9.29E+03, 5.83E+03, 3.72E+03, 1.60E+03,

Taper weighted geometric mean of the VPA populations:

, 6.91E+04, 5.74E+04, 5.32E+04, 3.93E+04, 2.87E+04, 2.05E+04, 1.19E+04, 5.58E+03, 1.89E+03, 6.61E+02,

Standard error of the weighted Log(VPA populations) :

, .5089, .5197, .3694, .3061, .2874, .2751, .2496, .2876, .5169, .7583,

Table 9.5 (cont'd)

Log catchability residuals.

Fleet : FLT1: Norwegian coas

Age	1992	1993	1994	1995	1996
0	.99.99	.99.99	.99.99	.99.99	.99.99
1	-.05	.99.99	.99.99	.23	-.18
2	.23	.99.99	.99.99	-.09	-.13
3	.36	.99.99	.99.99	-.15	-.21
4	.16	.99.99	.99.99	.02	-.17
5	.25	.99.99	.99.99	-.16	-.09
6	.33	.99.99	.99.99	-.33	.00
7	-.05	.99.99	.99.99	.06	-.01
8	.30	.99.99	.99.99	.00	-.16
9	1.04	.99.99	.99.99	.84	-1.60

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

Age	1	2	3	4	5	6	7	8	9
Mean Log q	-1.9844	-1.8596	-1.3562	-.8841	-.2364	-.3536	-1.1791	-1.1791	-1.1791
S.E(Log q)	.2146	.1947	.3120	.1685	.2170	.3304	.0557	.2413	1.4793

Regression statistics :

Ages with q dependent on year class strength

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

0	.00	.000	.00	.00	0	.00	.00
---	-----	------	-----	-----	---	-----	-----

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

1	.83	4.684	3.48	1.00	3	.05	-1.98
2	1.86	-2.212	-6.25	.87	3	.21	-1.86
3	.84	.221	2.83	.67	3	.36	-1.36
4	.47	26.402	5.78	1.00	3	.00	-.88
5	1.42	-.222	-3.82	.22	3	.43	-.24
6	-3.58	-3.332	42.54	.35	3	.48	-.35
7	.89	.657	2.05	.97	3	.06	-1.18
8	-6.09	-1.247	49.64	.03	3	1.27	-1.14
9	.37	.347	4.99	.24	3	.73	-1.10

Table 9.5 (cont'd)

Fleet : FLT2: Norwegian Coas

Age	1992	1993	1994	1995	1996
0	.99.99	-.46	.99.99	.45	.99.99
1	.99.99	.07	.99.99	-.07	.99.99
2	.99.99	.60	.99.99	.02	-.61
3	.99.99	.11	.99.99	-.11	.00
4	.99.99	.10	.99.99	-.04	-.06
5	.99.99	.70	.99.99	-.35	-.34
6	.99.99	.81	.99.99	-.41	-.38
7	.99.99	1.26	.99.99	-.67	-.57
8	.99.99	.67	.99.99	-1.33	-.87
9	.99.99	-.32	.99.99	-1.29	.99.99

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

Age	1	2	3	4	5	6	7	8	9
Mean Log q	-3.4429	-3.0002	-1.8651	-1.3383	-.9122	-1.0590	-1.0797	-1.0797	-1.0797
S.E(Log q)	.1016	.6077	.1101	.0835	.6012	.6950	1.0848	1.2218	1.3349

Regression statistics :

Ages with q dependent on year class strength

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

0,	.00,	.000,	.00,	.00,	0,	.00,	.00,
----	------	-------	------	------	----	------	------

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

1,	.00,	.000,	.00,	.00,	0,	.00,	.00,
2,	-5.22,	-6.572,	53.84,	.53,	3,	.67,	-3.00,
3,	.85,	.645,	3.17,	.95,	3,	.11,	-1.87,
4,	.79,	6.484,	3.17,	1.00,	3,	.01,	-1.34,
5,	1.19,	-.043,	-.83,	.05,	3,	1.02,	-.91,
6,	-1.07,	-.786,	18.70,	.13,	3,	.83,	-1.06,
7,	-.17,	-1.497,	10.32,	.62,	3,	.15,	-1.08,
8,	.30,	.316,	6.11,	.17,	3,	.42,	-1.59,
9,	.00,	.000,	.00,	.00,	0,	.00,	.00,

Table 9.5 (cont'd)

Fleet : FLT3: Norwegian Coas

Age	1992	1993	1994	1995	1996
0	99.99	99.99	99.99	99.99	99.99
1	99.99	99.99	.13	1.78	-1.90
2	99.99	99.99	-.34	.93	-.59
3	99.99	99.99	-.83	.67	.15
4	99.99	99.99	-.07	-.09	.16
5	99.99	99.99	-.03	-.10	.13
6	99.99	99.99	.20	.45	-.65
7	99.99	99.99	-.35	.28	.07
8	99.99	99.99	-.13	.55	-3.91
9	99.99	99.99	-.74	.49	.31

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

Age	1	2	3	4	5	6	7	8	9
Mean Log q	-4.9545	-2.9582	-2.1995	-1.8754	-1.8282	-2.0251	-1.5315	-1.5315	-1.5315
S.E(Log q)	1.8434	.8160	.7626	.1352	.1168	.5790	.3238	2.7979	.6649

Regression statistics :

Ages with q dependent on year class strength

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

0,	.00,	.000,	.00,	.00,	0,	.00,	.00,
----	------	-------	------	------	----	------	------

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

1,	.38,	3.589,	8.73,	.97,	3,	.26,	-4.95,
2,	.99,	.005,	3.02,	.31,	3,	1.15,	-2.96,
3,	.99,	.006,	2.30,	.19,	3,	1.07,	-2.20,
4,	1.89,	-1.083,	-5.55,	.60,	3,	.25,	-1.88,
5,	1.47,	-1.107,	-2.05,	.85,	3,	.16,	-1.83,
6,	.33,	.998,	7.11,	.69,	3,	.19,	-2.03,
7,	.38,	.725,	6.10,	.58,	3,	.14,	-1.53,
8,	-.08,	-3.426,	8.38,	.91,	3,	.08,	-2.70,
9,	.20,	.684,	5.95,	.42,	3,	.16,	-1.51,

Table 9.5 (cont'd)

Terminal year survivor and F summaries :

Age 0 Catchability dependent on age and year class strength

Year class = 1996

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	1.,	.000,	.000,	.00,	0, .000,	.000
FLT2: Norwegian Coas,	1.,	.000,	.000,	.00,	0, .000,	.000
FLT3: Norwegian Coas,	1.,	.000,	.000,	.00,	0, .000,	.000
P shrinkage mean ,	57409.,	.52,,,			1.000,	.000
F shrinkage mean ,	0.,	.50,,,			.000,	.000

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
57409.,	.52,	.00,	1,	.000,	.000

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

Year class = 1995

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	12154.,	.300,	.000,	.00,	1, .653,	.023
FLT2: Norwegian Coas,	22932.,	.789,	.000,	.00,	1, .094,	.012
FLT3: Norwegian Coas,	2179.,	2.129,	.000,	.00,	1, .013,	.124
F shrinkage mean ,	22318.,	.50,,,			.240,	.013

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
14599.,	.24,	.22,	4,	.918,	.019

Age 2 Catchability constant w.r.t. time and dependent on age

Year class = 1994

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	90346.,	.212,	.183,	.86,	2, .543,	.064
FLT2: Norwegian Coas,	73582.,	.276,	.198,	.72,	2, .318,	.077
FLT3: Norwegian Coas,	69854.,	.862,	.868,	1.01,	2, .033,	.081
F shrinkage mean ,	114894.,	.50,,,			.106,	.050

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
86074.,	.16,	.11,	7,	.718,	.067

Age 3 Catchability constant w.r.t. time and dependent on age

Year class = 1993

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	38002.,	.231,	.059,	.25,	2, .458,	.123
FLT2: Norwegian Coas,	41807.,	.261,	.100,	.38,	3, .365,	.112
FLT3: Norwegian Coas,	70149.,	.616,	.272,	.44,	3, .065,	.068
F shrinkage mean ,	66940.,	.50,,,			.112,	.071

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
43612.,	.16,	.09,	9,	.574,	.108

Table 9.5 (cont'd)

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

Year class = 1992

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	12588.,	.231,	.013,	.06,	2,	.270,	.243
FLT2: Norwegian Coas,	14320.,	.174,	.053,	.31,	3,	.459,	.217
FLT3: Norwegian Coas,	17479.,	.272,	.145,	.53,	3,	.198,	.181
F shrinkage mean ,	21579.,	.50,,,				.073,	.149

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
14826.,	.12,	.07,	9,	.552,	.210

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

Year class = 1991

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N, Weights,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	8894.,	.175,	.030,	.17,	3,	.416,	.475
FLT2: Norwegian Coas,	9202.,	.257,	.179,	.70,	3,	.186,	.462
FLT3: Norwegian Coas,	9174.,	.207,	.149,	.72,	3,	.307,	.463
F shrinkage mean ,	11995.,	.50,,,				.091,	.372

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
9285.,	.12,	.06,	10,	.524,	.459

Age 6 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, Weights,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	5897.,	.192,	.110,	.57,	3,	.385,	.602
FLT2: Norwegian Coas,	5583.,	.268,	.157,	.59,	3,	.173,	.627
FLT3: Norwegian Coas,	4947.,	.206,	.140,	.68,	3,	.302,	.685
F shrinkage mean ,	8510.,	.50,,,				.141,	.452

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
5832.,	.13,	.08,	10,	.649,	.607

Age 7 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, Weights,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	3644.,	.212,	.148,	.70,	3,	.402,	.672
FLT2: Norwegian Coas,	3517.,	.289,	.182,	.63,	3,	.130,	.689
FLT3: Norwegian Coas,	4008.,	.239,	.094,	.39,	3,	.295,	.626
F shrinkage mean ,	3586.,	.50,,,				.174,	.680

Weighted prediction :

Survivors,	Int,	Ext,	N,	Var,	F
at end of year,	s.e,	s.e,	,	Ratio,	
3720.,	.15,	.06,	10,	.423,	.662

Table 9.5 (cont'd)

Age 8 Catchability constant w.r.t. time and age (fixed at the value for age) 7

Year class = 1988

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	1524.,	.195,	.093,	.48,	3,	.597,	.600
FLT2: Norwegian Coas,	1364.,	.637,	.522,	.82,	3,	.044,	.652
FLT3: Norwegian Coas,	1926.,	.329,	.408,	1.24,	3,	.147,	.501
F shrinkage mean ,	1678.,	.50,,,				.212,	.558

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
1602.,	.17,	.10,	10,	.604,	.578

Age 9 Catchability constant w.r.t. time and age (fixed at the value for age) 7

Year class = 1987

Fleet,	Estimated, Survivors,	Int, s.e,	Ext, s.e,	Var, Ratio,	N,	Scaled, Weights,	Estimated F
FLT1: Norwegian coas,	570.,	.250,	.238,	.95,	3,	.422,	.623
FLT2: Norwegian Coas,	446.,	.816,	1.067,	1.31,	2,	.030,	.745
FLT3: Norwegian Coas,	560.,	.403,	.238,	.59,	3,	.185,	.632
F shrinkage mean ,	626.,	.50,,,				.363,	.581

Weighted prediction :

Survivors, at end of year,	Int, s.e,	Ext, s.e,	N, ,	Var, Ratio,	F
583.,	.22,	.12,	9,	.519,	.613

Table 9.6

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Terminal Fs derived using XSA (With F shrinkage)

Table 8	Fishing mortality (F) at age		
YEAR,	1984,	1985,	1986,
AGE			
0,	.0000,	.0000,	.0000,
1,	.0214,	.0112,	.0008,
2,	.0432,	.0255,	.3002,
3,	.1234,	.2409,	.1265,
4,	.1990,	.2848,	.3376,
5,	.4812,	.5715,	.4913,
6,	.9824,	.8992,	.7717,
7,	1.7150,	1.1380,	1.1173,
8,	1.1785,	.7179,	1.1007,
9,	1.1021,	.8403,	.8795,
+gp,	1.1021,	.8403,	.8795,
FBAR 4- 7,	.8444,	.7234,	.6795,

Table 8	Fishing mortality (F) at age										
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	FBAR 94-96
AGE											
0,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,	.0000,
1,	.0085,	.0000,	.0000,	.0001,	.0189,	.0000,	.0000,	.0014,	.0241,	.0195,	.0150,
2,	.0531,	.0121,	.0061,	.0008,	.0114,	.0003,	.0015,	.0515,	.0489,	.0666,	.0556,
3,	.1264,	.1510,	.0986,	.0214,	.0332,	.0123,	.0299,	.0522,	.0902,	.1076,	.0833,
4,	.2642,	.2506,	.1195,	.0892,	.0708,	.1710,	.0971,	.1165,	.1800,	.2100,	.1689,
5,	.5587,	.3323,	.3312,	.1909,	.2366,	.3184,	.2510,	.3014,	.4379,	.4589,	.3994,
6,	.5285,	.8810,	.6218,	.2565,	.2906,	.3418,	.3761,	.3483,	.5494,	.6066,	.5014,
7,	1.0248,	1.1878,	.9290,	.5334,	.3224,	.3704,	.7748,	.7580,	.5886,	.6616,	.6694,
8,	.8278,	1.1806,	.8650,	1.1631,	.2613,	.2266,	.8423,	.5995,	.5068,	.5779,	.5614,
9,	.7421,	.9051,	.6932,	.5403,	.2792,	.2992,	.4080,	.5800,	.4490,	.6126,	.5472,
+gp,	.7421,	.9051,	.6932,	.5403,	.2792,	.2992,	.4080,	.5800,	.4490,	.6126,	
FBAR 4- 7,	.5940,	.6629,	.5004,	.2675,	.2301,	.3004,	.3747,	.3811,	.4390,	.4843,	

Table 9.7

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Terminal Fs derived using XSA (With F shrinkage)

Table 10	Stock number at age (start of year)			Numbers*10**-3
YEAR,	1984,	1985,	1986,	
AGE				
0,	64613,	49982,	60007,	
1,	87640,	52901,	40922,	
2,	85466,	70236,	42830,	
3,	48829,	67015,	56055,	
4,	32877,	35336,	43124,	
5,	25041,	22060,	21761,	
6,	11942,	12671,	10199,	
7,	5008,	3661,	4221,	
8,	1620,	738,	960,	
9,	543,	408,	295,	
+gp,	271,	149,	210,	
TOTAL,	363850,	315158,	280584,	

Table 10	Stock number at age (start of year)					Numbers*10**-3						
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,	1994,	1995,	1996,	1997,	GMST
AGE												
0,	62261,	69546,	94361,	79325,	61620,	57283,	113654,	171721,	22207,	70118,	0,	751
1,	49130,	50975,	56940,	77256,	64946,	50450,	46899,	93052,	140593,	18182,	57409,	589
2,	33477,	39884,	41735,	46618,	63243,	52176,	41305,	38398,	76080,	112365,	14599,	485
3,	25974,	25991,	32260,	33963,	38139,	51193,	42706,	33767,	29860,	59318,	86074,	396
4,	40441,	18741,	18297,	23931,	27217,	30205,	41400,	33935,	26240,	22338,	43612,	302
5,	25191,	25423,	11943,	13292,	17921,	20759,	20843,	30760,	24727,	17944,	14826,	206
6,	10901,	11797,	14930,	7021,	8992,	11582,	12362,	13276,	18630,	13066,	9285,	112
7,	3860,	5261,	4002,	6564,	4448,	5505,	6737,	6949,	7673,	8805,	5832,	49
8,	1131,	1134,	1313,	1294,	3152,	2638,	3112,	2542,	2666,	3487,	3720,	15
9,	262,	405,	285,	453,	331,	1987,	1722,	1097,	1143,	1315,	1602,	5
+gp,	183,	122,	65,	105,	135,	399,	1501,	1006,	769,	491,	801,	
TOTAL,	252810,	249278,	276130,	289822,	290144,	284177,	332242,	426503,	350588,	327431,	237761,	

Table 9.8

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Terminal Fs derived using XSA (With F shrinkage)

Table 14	Stock biomass at age with SOP (start of year)			Tonnes
YEAR,	1984,	1985,	1986,	
AGE				
0,	452,	350,	420,	
1,	7186,	4339,	3356,	
2,	27433,	22549,	13751,	
3,	37011,	50806,	42497,	
4,	48622,	52271,	63791,	
5,	53510,	47150,	46512,	
6,	33604,	35662,	28705,	
7,	23647,	17289,	19937,	
8,	10832,	4934,	6422,	
9,	3749,	2821,	2036,	
+9p,	2635,	1452,	2043,	
TOTALBIO,	248682,	239623,	229471,	

Table 14	Stock biomass at age with SOP (start of year)							Tonnes			
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,		1994,	1995,	1996,
AGE											
0,	436,	487,	660,	555,	431,	401,	796,	1202,	155,	561,	
1,	4028,	4180,	4669,	6335,	5327,	4137,	3845,	7631,	11389,	1509,	
2,	10745,	12803,	13395,	14965,	20307,	16748,	13258,	12326,	29673,	28320,	
3,	19685,	19701,	24451,	25744,	28918,	38803,	32369,	25597,	23621,	42952,	
4,	59805,	27718,	27058,	35395,	40266,	44671,	61226,	50193,	40019,	32015,	
5,	53827,	54329,	25519,	28406,	38310,	44361,	44539,	65738,	54948,	36844,	
6,	30671,	33196,	42008,	19756,	25311,	32590,	34784,	37362,	53678,	35910,	
7,	18222,	24843,	18896,	30993,	21009,	25994,	31811,	32813,	34922,	43100,	
8,	7558,	7581,	8779,	8651,	21080,	17635,	20802,	16992,	20172,	20242,	
9,	1807,	2795,	1969,	3127,	2288,	13728,	11894,	7581,	7217,	9864,	
+9p,	1780,	1189,	636,	1019,	1315,	3880,	14597,	9779,	7879,	4520,	
TOTALBIO,	208563,	188822,	168039,	174948,	204563,	242949,	269922,	267212,	283673,	255836,	

Table 9.9

Run title : Coastal cod (run: XSANCC05/X05)

At 25-Aug-97 20:33:39

Terminal Fs derived using XSA (With F shrinkage)

Table 15	Spawning stock biomass with SOP (spawning time)			Tonnes
YEAR,	1984,	1985,	1986,	
AGE				
0,	0,	0,	0,	
1,	0,	0,	0,	
2,	274,	225,	138,	
3,	5552,	7621,	6375,	
4,	19935,	21431,	26155,	
5,	36922,	32533,	32093,	
6,	29908,	31739,	25548,	
7,	21992,	16079,	18541,	
8,	10399,	4736,	6165,	
9,	3749,	2821,	2036,	
+gp,	2635,	1452,	2043,	
TOTSPB10,	131366,	118639,	119093,	

Table 15	Spawning stock biomass with SOP (spawning time)							Tonnes			
YEAR,	1987,	1988,	1989,	1990,	1991,	1992,	1993,		1994,	1995,	1996,
AGE											
0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
1,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
2,	107,	640,	0,	0,	0,	0,	0,	0,	0,	0,	0,
3,	2953,	3743,	3179,	3862,	0,	0,	647,	0,	236,	1289,	
4,	24520,	12473,	7847,	12742,	18522,	14742,	15307,	21583,	8004,	7684,	
5,	37141,	39117,	15056,	20168,	28349,	29722,	24942,	44702,	25825,	20632,	
6,	27297,	28548,	37807,	18176,	21008,	28353,	31653,	35494,	35964,	28728,	
7,	16947,	22856,	16439,	29754,	20589,	24435,	30220,	30844,	29684,	39652,	
8,	7256,	7202,	8603,	8651,	19605,	17635,	19970,	16992,	17348,	20040,	
9,	1807,	2739,	1969,	3127,	2288,	13728,	11776,	7581,	7217,	9864,	
+gp,	1780,	1189,	636,	1019,	1315,	3880,	14597,	9779,	7879,	4520,	
TOTSPB10,	119807,	118507,	91536,	97499,	111676,	132495,	149112,	166974,	132157,	132407,	

Table 9.10

Run title : Coastal cod (run: SVPNCC04/V04)

At 25-Aug-97 19:58:11

Table 17 Summary (with SOP correction)

	RECRUITS, Age 3	TOTALBIO,	TOTSPBIO,	LANDINGS,	YIELD/SSB,	SOPCOFAC,	FBAR 4- 7,
1984,	48316,	213586,	130857,	77016,	.5885,	1.0153,	.8429,
1985,	66303,	211005,	117490,	78257,	.6661,	1.0072,	.7242,
1986,	55616,	218598,	122512,	73302,	.5983,	1.0448,	.6803,
1987,	25805,	192626,	119080,	63105,	.5299,	1.0082,	.5956,
1988,	25779,	169711,	116599,	60566,	.5194,	1.0022,	.6620,
1989,	31981,	148082,	90713,	40601,	.4476,	1.0017,	.5000,
1990,	33646,	151751,	96650,	29728,	.3076,	1.0004,	.2676,
1991,	37825,	178975,	111988,	25772,	.2301,	1.0119,	.2309,
1992,	50698,	219599,	131261,	43027,	.3278,	1.0001,	.3017,
1993,	42295,	249618,	147677,	60780,	.4116,	1.0002,	.3750,
1994,	33490,	245928,	166860,	60394,	.3619,	1.0095,	.3815,
1995,	29708,	245309,	133640,	58243,	.4358,	1.0218,	.4396,
1996,	59120,	231367,	135618,	62085,	.4578,	1.0354,	.4843,
Arith.							
Mean	41583,	205858,	124688,	56375,	.4525		.4989,
Units,	(Thousands),	(Tonnes),	(Tonnes),	(Tonnes),			

Table 9.11

Coastal cod

19:33 Monday, August 25, 1997

Prediction with management option table: Input data

Year: 1997								
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	86074.000	0.2000	0.0133	0.0000	0.0000	757.667	0.0928	0.849
4	43612.000	0.2000	0.2900	0.0000	0.0000	1479.000	0.1881	1.441
5	14826.000	0.2000	0.5700	0.0000	0.0000	2137.333	0.4449	2.016
6	9285.000	0.2000	0.8067	0.0000	0.0000	2814.333	0.5585	2.719
7	5832.000	0.2000	0.9033	0.0000	0.0000	4722.333	0.7456	3.611
8	3720.000	0.2000	0.9500	0.0000	0.0000	6685.000	0.6253	5.231
9	1602.000	0.2000	1.0000	0.0000	0.0000	6908.000	0.6095	5.586
10+	801.000	0.2000	1.0000	0.0000	0.0000	9722.667	0.6095	7.937
Unit	Thousands	-	-	-	-	Grams	-	Kilograms

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
3	40000.000	0.2000	0.0133	0.0000	0.0000	757.667	0.0928	0.849
4	.	0.2000	0.2900	0.0000	0.0000	1479.000	0.1881	1.441
5	.	0.2000	0.5700	0.0000	0.0000	2137.333	0.4449	2.016
6	.	0.2000	0.8067	0.0000	0.0000	2814.333	0.5585	2.719
7	.	0.2000	0.9033	0.0000	0.0000	4722.333	0.7456	3.611
8	.	0.2000	0.9500	0.0000	0.0000	6685.000	0.6253	5.231
9	.	0.2000	1.0000	0.0000	0.0000	6908.000	0.6095	5.586
10+	.	0.2000	1.0000	0.0000	0.0000	9722.667	0.6095	7.937
Unit	Thousands	-	-	-	-	Grams	-	Kilograms

Year: 1999								
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
3	40000.000	0.2000	0.0133	0.0000	0.0000	757.667	0.0928	0.849
4	.	0.2000	0.2900	0.0000	0.0000	1479.000	0.1881	1.441
5	.	0.2000	0.5700	0.0000	0.0000	2137.333	0.4449	2.016
6	.	0.2000	0.8067	0.0000	0.0000	2814.333	0.5585	2.719
7	.	0.2000	0.9033	0.0000	0.0000	4722.333	0.7456	3.611
8	.	0.2000	0.9500	0.0000	0.0000	6685.000	0.6253	5.231
9	.	0.2000	1.0000	0.0000	0.0000	6908.000	0.6095	5.586
10+	.	0.2000	1.0000	0.0000	0.0000	9722.667	0.6095	7.937
Unit	Thousands	-	-	-	-	Grams	-	Kilograms

Notes: Run name : MANHS03
Date and time: 15SEP97:13:15

Table 9.12

19:33 Monday, August 25, 1997

Coastal cod

Prediction with management option table

Year: 1997					Year: 1998					Year: 1999	
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
1.1900	0.5763	258800	126074	68881	0.0000	0.0000	255638	126905	0	334209	205976
.	0.0500	0.0242	.	126905	3729	329044	201807
.	0.1000	0.0484	.	126905	7376	323999	197744
.	0.1500	0.0726	.	126905	10943	319071	193783
.	0.2000	0.0969	.	126905	14432	314256	189921
.	0.2500	0.1211	.	126905	17844	309551	186157
.	0.3000	0.1453	.	126905	21182	304954	182486
.	0.3500	0.1695	.	126905	24448	300462	178907
.	0.4000	0.1937	.	126905	27644	296071	175416
.	0.4500	0.2179	.	126905	30771	291779	172012
.	0.5000	0.2421	.	126905	33831	287583	168692
.	0.5500	0.2664	.	126905	36827	283482	165453
.	0.6000	0.2906	.	126905	39759	279471	162294
.	0.6500	0.3148	.	126905	42629	275550	159212
.	0.7000	0.3390	.	126905	45439	271715	156205
.	0.7500	0.3632	.	126905	48191	267964	153271
.	0.8000	0.3874	.	126905	50885	264295	150407
.	0.8500	0.4116	.	126905	53523	260706	147613
.	0.9000	0.4358	.	126905	56108	257194	144886
.	0.9500	0.4601	.	126905	58639	253759	142224
.	1.0000	0.4843	.	126905	61119	250397	139626
.	1.0500	0.5085	.	126905	63548	247107	137089
.	1.1000	0.5327	.	126905	65929	243887	134612
.	1.1500	0.5569	.	126905	68262	240735	132194
.	1.2000	0.5811	.	126905	70548	237649	129832
.	1.2500	0.6053	.	126905	72788	234628	127526
.	1.3000	0.6296	.	126905	74984	231670	125274
.	1.3500	0.6538	.	126905	77137	228774	123074
.	1.4000	0.6780	.	126905	79248	225937	120925
.	1.4500	0.7022	.	126905	81317	223159	118825
.	1.5000	0.7264	.	126905	83347	220437	116774
.	1.5500	0.7506	.	126905	85337	217771	114770
.	1.6000	0.7748	.	126905	87289	215159	112811
.	1.6500	0.7991	.	126905	89203	212599	110897
.	1.7000	0.8233	.	126905	91082	210091	109026
.	1.7500	0.8475	.	126905	92924	207633	107198
.	1.8000	0.8717	.	126905	94732	205223	105410
.	1.8500	0.8959	.	126905	96506	202861	103663
.	1.9000	0.9201	.	126905	98247	200546	101954
.	1.9500	0.9443	.	126905	99956	198276	100283
.	2.0000	0.9686	.	126905	101634	196050	98649
-	-	Tonnes	Tonnes	Tonnes	-	-	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes

Notes: Run name : MANHS03
Date and time : 15SEP97:13:15
Computation of ref. F: Simple mean, age 4 - 7
Basis for 1997 : F factors

Table 9.13

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Coastal cod

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
1997	1.1900	0.5763	31974	68932	166382	259277	40949	126080	40949	126080
1998	0.5595	0.2710	17452	37449	147536	256321	48805	127103	48805	127103
1999	0.5595	0.2710	21073	49053	145081	283440	59354	165262	59354	165262
2000	0.5595	0.2710	21290	55161	139823	299142	61476	193507	61476	193507
2001	0.5595	0.2710	20751	58271	135330	314813	59082	213100	59082	213100
2002	0.5595	0.2710	19494	56591	132141	312278	56588	213480	56588	213480
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRNCC03
 Date and time : 25AUG97:21:30
 Computation of ref. F: Simple mean, age 4 - 7
 Prediction basis : F factors

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Coastal cod

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
1997	1.1900	0.5763	31974	68932	166382	259277	40949	126080	40949	126080
1998	0.8060	0.3903	24130	51290	147536	256321	48805	127103	48805	127103
1999	0.8060	0.3903	27141	61495	139101	264554	55222	150464	55222	150464
2000	0.8060	0.3903	25666	63370	129507	260980	53417	161147	53417	161147
2001	0.8060	0.3903	23970	62251	122987	259259	48904	163767	48904	163767
2002	0.8060	0.3903	22223	57848	119176	247468	45658	154432	45658	154432
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRNCC03
 Date and time : 25AUG97:21:30
 Computation of ref. F: Simple mean, age 4 - 7
 Prediction basis : F factors

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Coastal cod

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
1997	1.1900	0.5763	31974	68932	166382	259277	40949	126080	40949	126080
1998	1.4180	0.6867	38543	80139	147536	256321	48805	127103	48805	127103
1999	1.4180	0.6867	36915	78420	126261	225549	46554	120516	46554	120516
2000	1.4180	0.6867	30692	67337	110336	194536	38902	106132	38902	106132
2001	1.4180	0.6867	27136	58647	102871	177247	33074	93003	33074	93003
2002	1.4180	0.6867	25332	52526	99935	164245	30453	81440	30453	81440
Unit	-	-	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes	Thousands	Tonnes

Notes: Run name : SPRNCC03
 Date and time : 25AUG97:21:30
 Computation of ref. F: Simple mean, age 4 - 7
 Prediction basis : F factors

Table 9.14

Coastal cod

Yield per recruit: Summary table

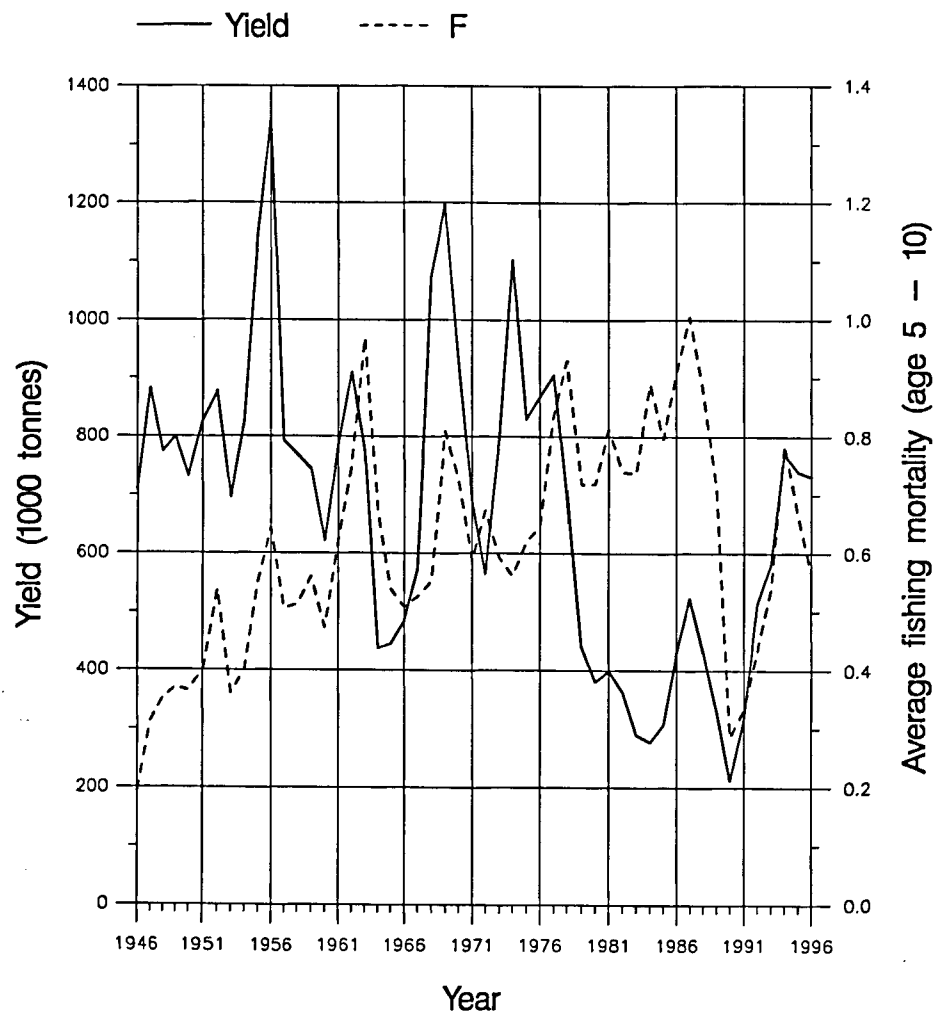
F Factor	Reference F	Catch in numbers	Catch in weight	Stock size	Stock biomass	1 January		Spawning time	
						Sp.stock size	Sp.stock biomass	Sp.stock size	Sp.stock biomass
0.0000	0.0000	0.000	0.000	5.517	24834.234	3.493	21984.179	3.493	21984.179
0.0500	0.0242	0.096	435.012	5.040	20792.324	3.031	17990.108	3.031	17990.108
0.1000	0.0484	0.169	725.594	4.674	17787.085	2.680	15030.253	2.680	15030.253
0.1500	0.0726	0.228	923.334	4.384	15483.407	2.403	12769.677	2.403	12769.677
0.2000	0.0969	0.275	1059.344	4.148	13674.181	2.181	11001.432	2.181	11001.432
0.2500	0.1211	0.315	1153.251	3.952	12224.825	1.998	9591.085	1.998	9591.085
0.3000	0.1453	0.348	1217.884	3.787	11044.316	1.845	8447.749	1.845	8447.749
0.3500	0.1695	0.377	1261.861	3.644	10069.047	1.715	7507.942	1.715	7507.942
0.4000	0.1937	0.402	1291.104	3.521	9253.350	1.603	6726.111	1.603	6726.111
0.4500	0.2179	0.424	1309.754	3.413	8563.677	1.506	6068.813	1.506	6068.813
0.5000	0.2421	0.443	1320.752	3.317	7974.893	1.422	5511.014	1.422	5511.014
0.5500	0.2664	0.461	1326.209	3.231	7467.852	1.347	5033.655	1.347	5033.655
0.6000	0.2906	0.476	1327.656	3.154	7027.744	1.280	4622.012	1.280	4622.012
0.6500	0.3148	0.490	1326.212	3.084	6642.969	1.220	4264.561	1.220	4264.561
0.7000	0.3390	0.503	1322.702	3.021	6304.333	1.166	3952.178	1.166	3952.178
0.7500	0.3632	0.515	1317.731	2.962	6004.471	1.118	3677.565	1.118	3677.565
0.8000	0.3874	0.526	1311.751	2.908	5737.429	1.073	3434.828	1.073	3434.828
0.8500	0.4116	0.537	1305.095	2.859	5498.353	1.033	3219.171	1.033	3219.171
0.9000	0.4358	0.546	1298.010	2.812	5283.253	0.995	3026.654	0.995	3026.654
0.9500	0.4601	0.555	1290.681	2.769	5088.827	0.961	2854.026	0.961	2854.026
1.0000	0.4843	0.563	1283.242	2.729	4912.323	0.929	2698.578	0.929	2698.578
1.0500	0.5085	0.571	1275.792	2.691	4751.435	0.899	2558.045	0.899	2558.045
1.1000	0.5327	0.578	1268.403	2.655	4604.216	0.872	2430.521	0.872	2430.521
1.1500	0.5569	0.585	1261.125	2.621	4469.017	0.846	2314.392	0.846	2314.392
1.2000	0.5811	0.592	1253.994	2.590	4344.433	0.822	2208.288	0.822	2208.288
1.2500	0.6053	0.598	1247.035	2.559	4229.261	0.799	2111.034	0.799	2111.034
1.3000	0.6296	0.604	1240.262	2.531	4122.466	0.778	2021.627	0.778	2021.627
1.3500	0.6538	0.610	1233.684	2.503	4023.153	0.758	1939.199	0.758	1939.199
1.4000	0.6780	0.615	1227.306	2.477	3930.549	0.739	1862.999	0.739	1862.999
1.4500	0.7022	0.620	1221.127	2.452	3843.976	0.721	1792.378	0.721	1792.378
1.5000	0.7264	0.625	1215.145	2.428	3762.847	0.704	1726.767	0.704	1726.767
1.5500	0.7506	0.630	1209.357	2.405	3686.643	0.688	1665.670	0.688	1665.670
1.6000	0.7748	0.634	1203.757	2.383	3614.909	0.672	1608.650	0.672	1608.650
1.6500	0.7991	0.639	1198.338	2.362	3547.244	0.657	1555.325	0.657	1555.325
1.7000	0.8233	0.643	1193.095	2.342	3483.291	0.643	1505.355	0.643	1505.355
1.7500	0.8475	0.647	1188.019	2.322	3422.735	0.630	1458.440	0.630	1458.440
1.8000	0.8717	0.651	1183.103	2.303	3365.294	0.617	1414.314	0.617	1414.314
1.8500	0.8959	0.655	1178.342	2.285	3310.716	0.605	1372.739	0.605	1372.739
1.9000	0.9201	0.659	1173.727	2.267	3258.777	0.593	1333.504	0.593	1333.504
1.9500	0.9443	0.662	1169.251	2.250	3209.273	0.582	1296.418	0.582	1296.418
2.0000	0.9686	0.666	1164.908	2.234	3162.022	0.571	1261.311	0.571	1261.311
-	-	Numbers	Grams	Numbers	Grams	Numbers	Grams	Numbers	Grams

Notes: Run name : YLDNCC03
Date and time : 25AUG97:21:01
Computation of ref. F: Simple mean, age 4 - 7
F-0.1 factor : 0.2997
F-max factor : 0.5973
F-0.1 reference F : 0.1451
F-max reference F : 0.2893
Recruitment : Single recruit

Figure 3.1 A,B

Fish Stock Summary Cod in the North-East Arctic (Areas I and II) 27-8-1997

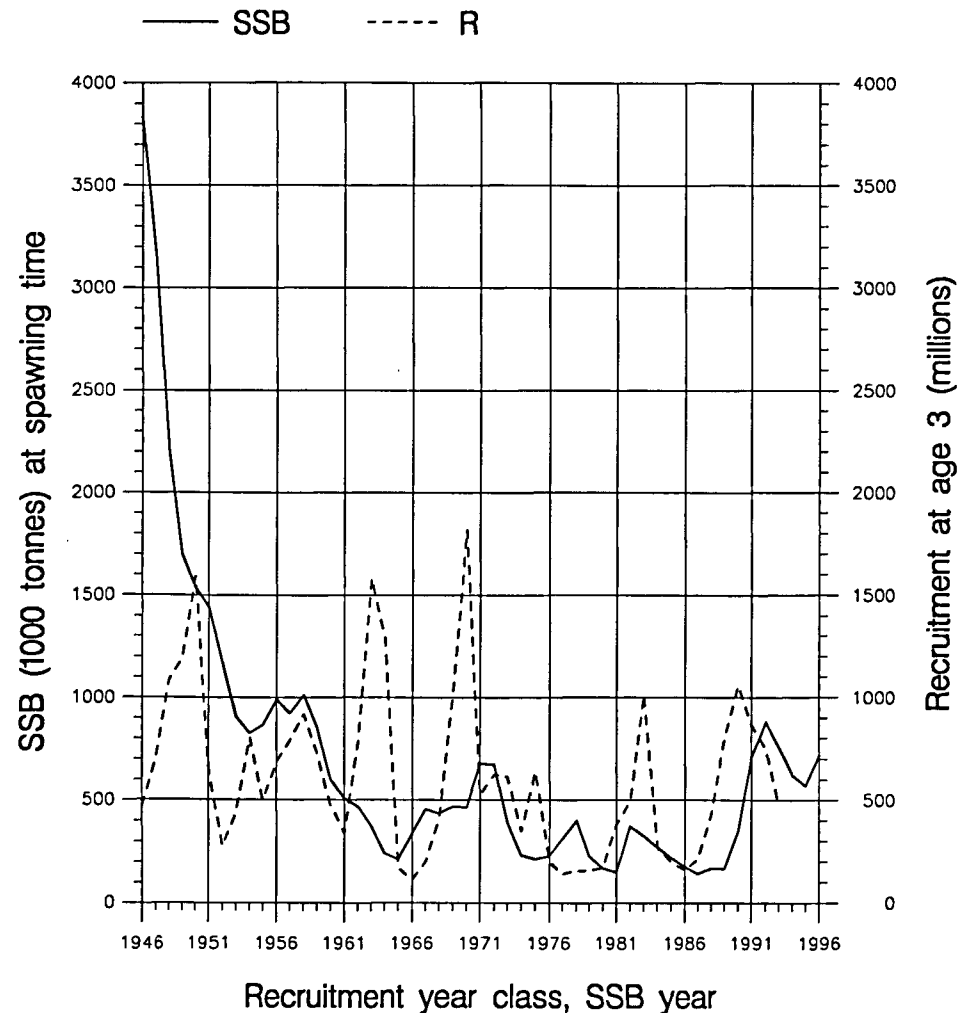
Yield and fishing mortality



(run: SVPBJA08)

A

Spawning stock and recruitment



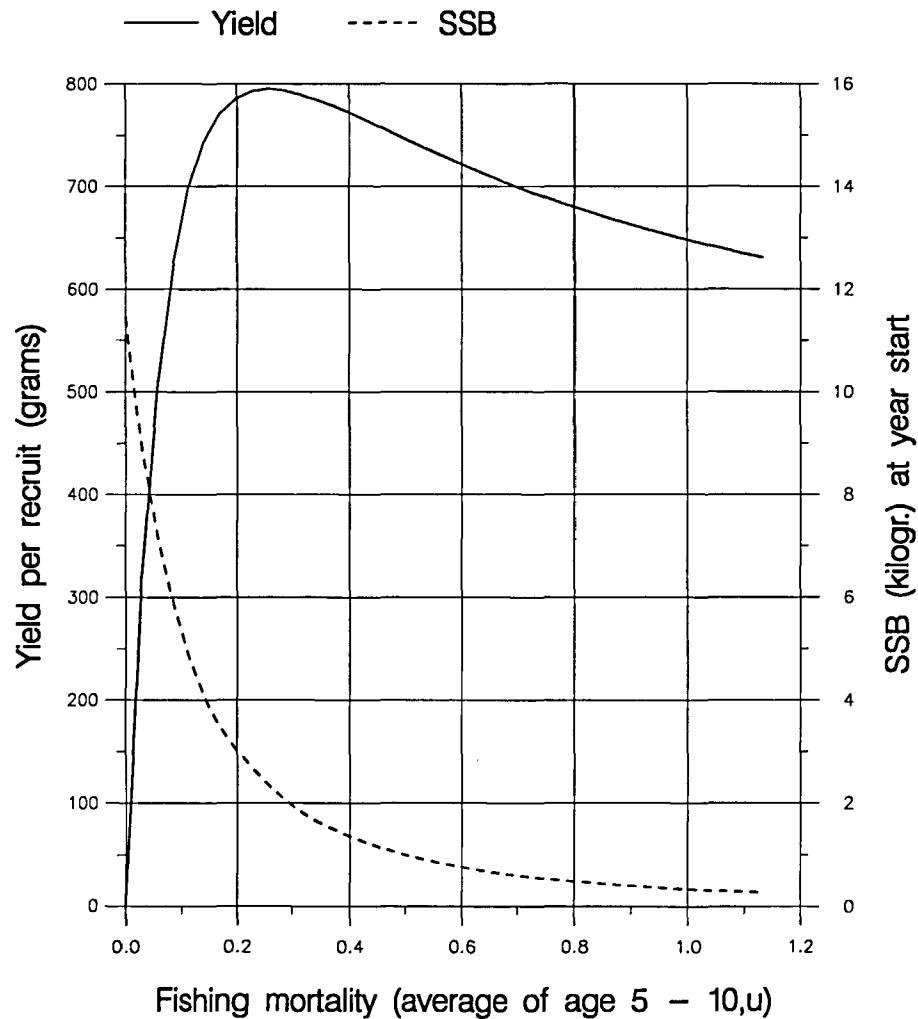
(run: SVPBJA08)

B

Figure 3.1 C,D

Fish Stock Summary **Cod in the North-East Arctic (Areas I and II)** **28-8-1997**

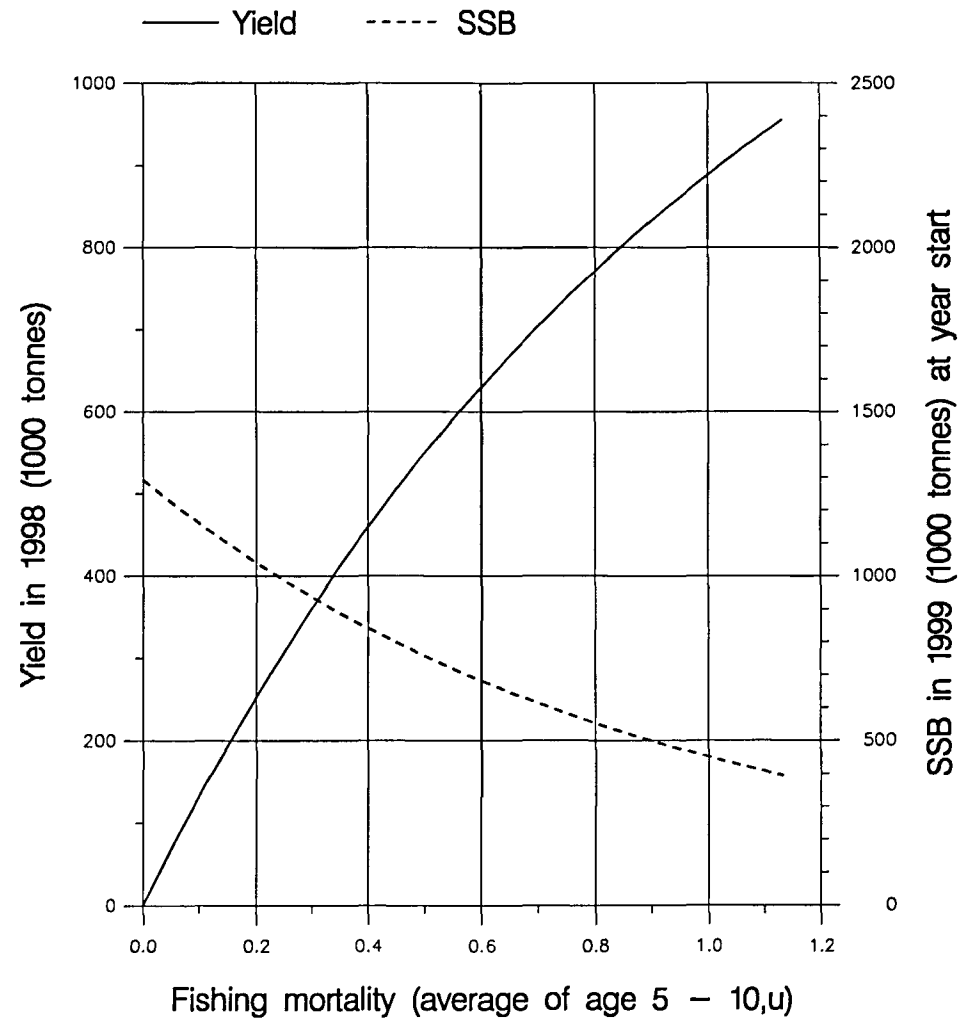
Long term yield and spawning stock biomass



(run: YLDBJA01)

C

Short term yield and spawning stock biomass



(run: MANBJA01)

D

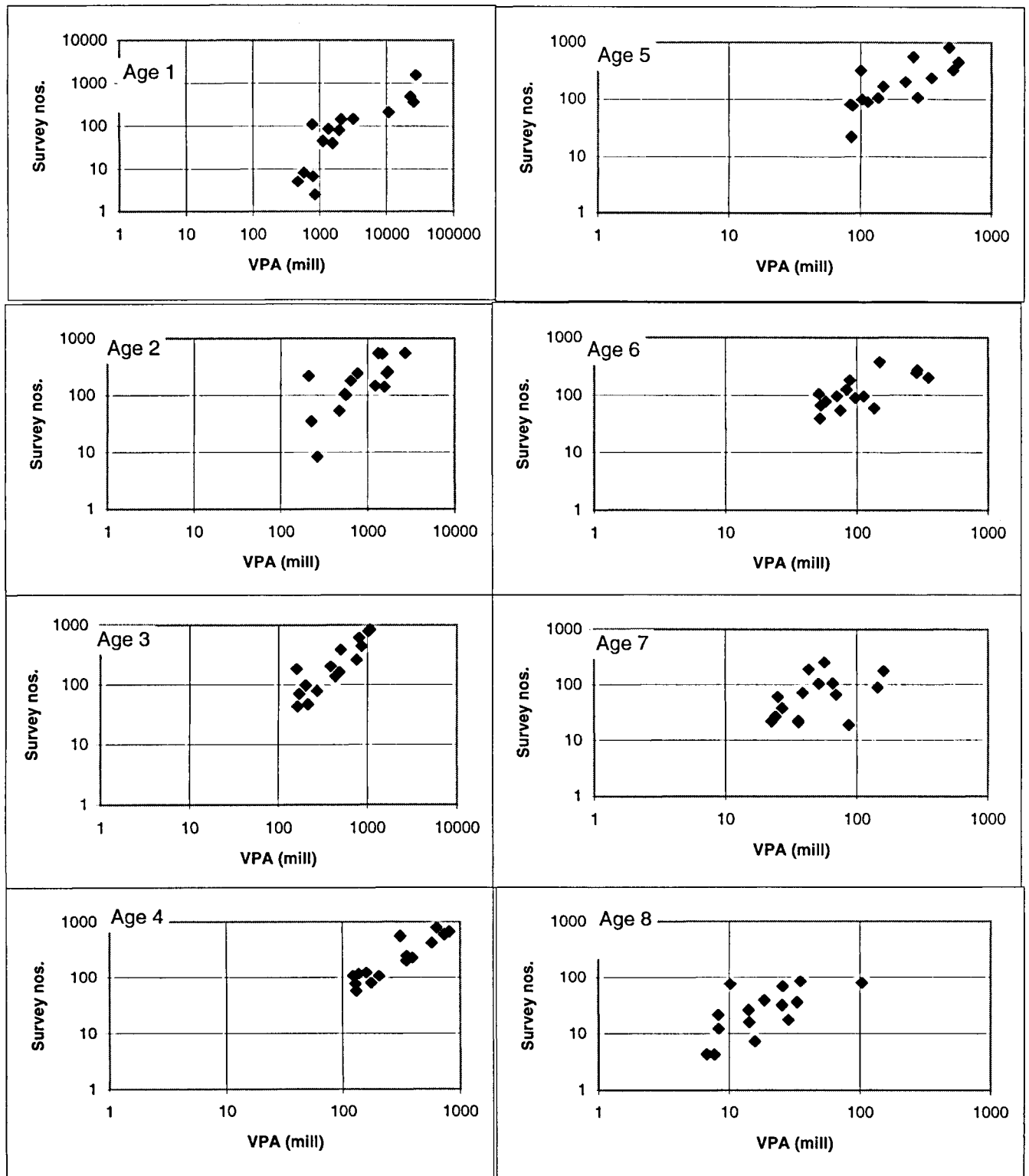


Figure 3.2A (FLT43) NE Arctic Cod abundance index from the Russian trawl acoustic survey plotted against VPA results on stock number at age

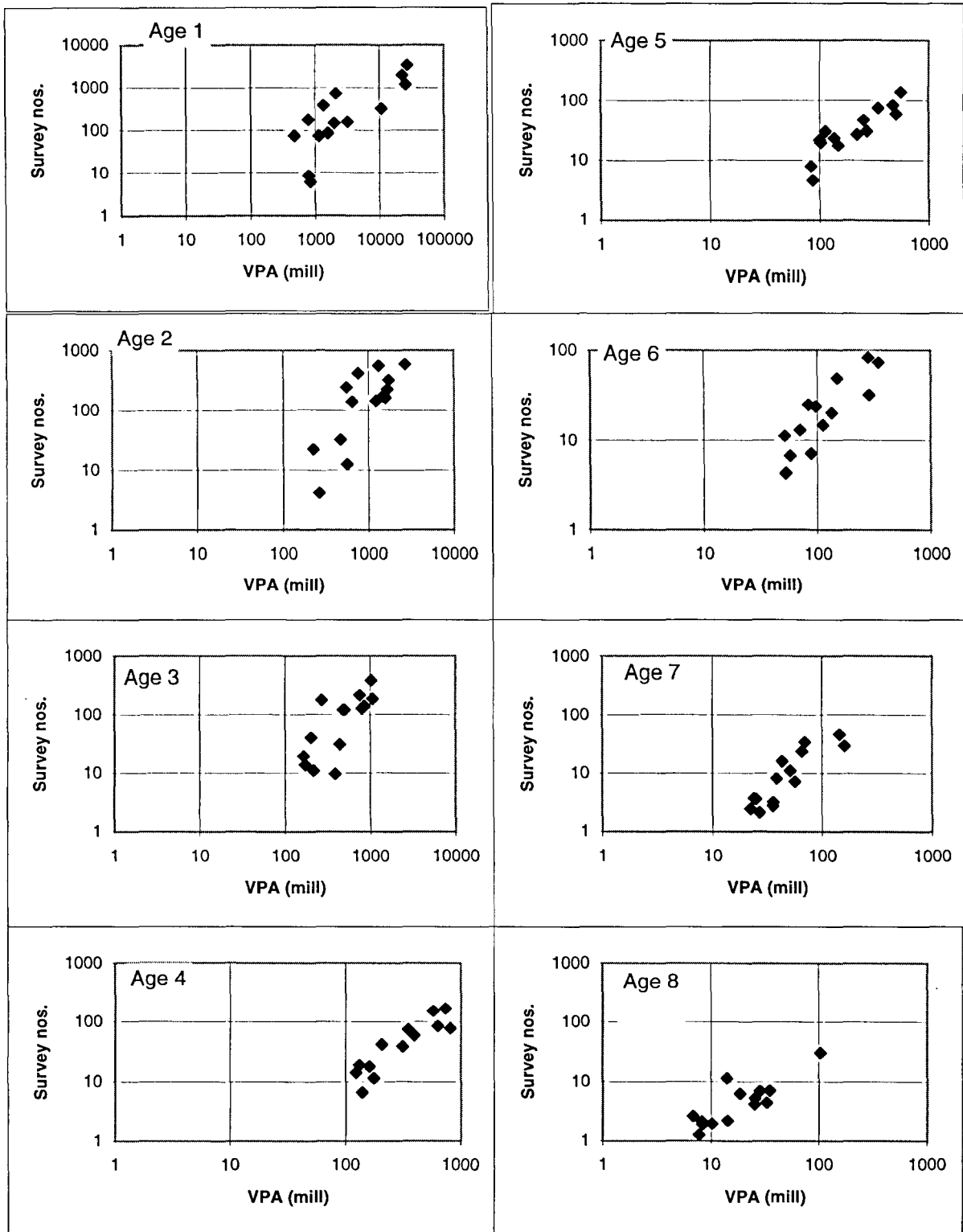


Figure 3.2 B.(FLT45) NE Arctic Cod abundance index from the Norwegian Svalbard bottom trawl survey plotted against VPA results on stock number at age

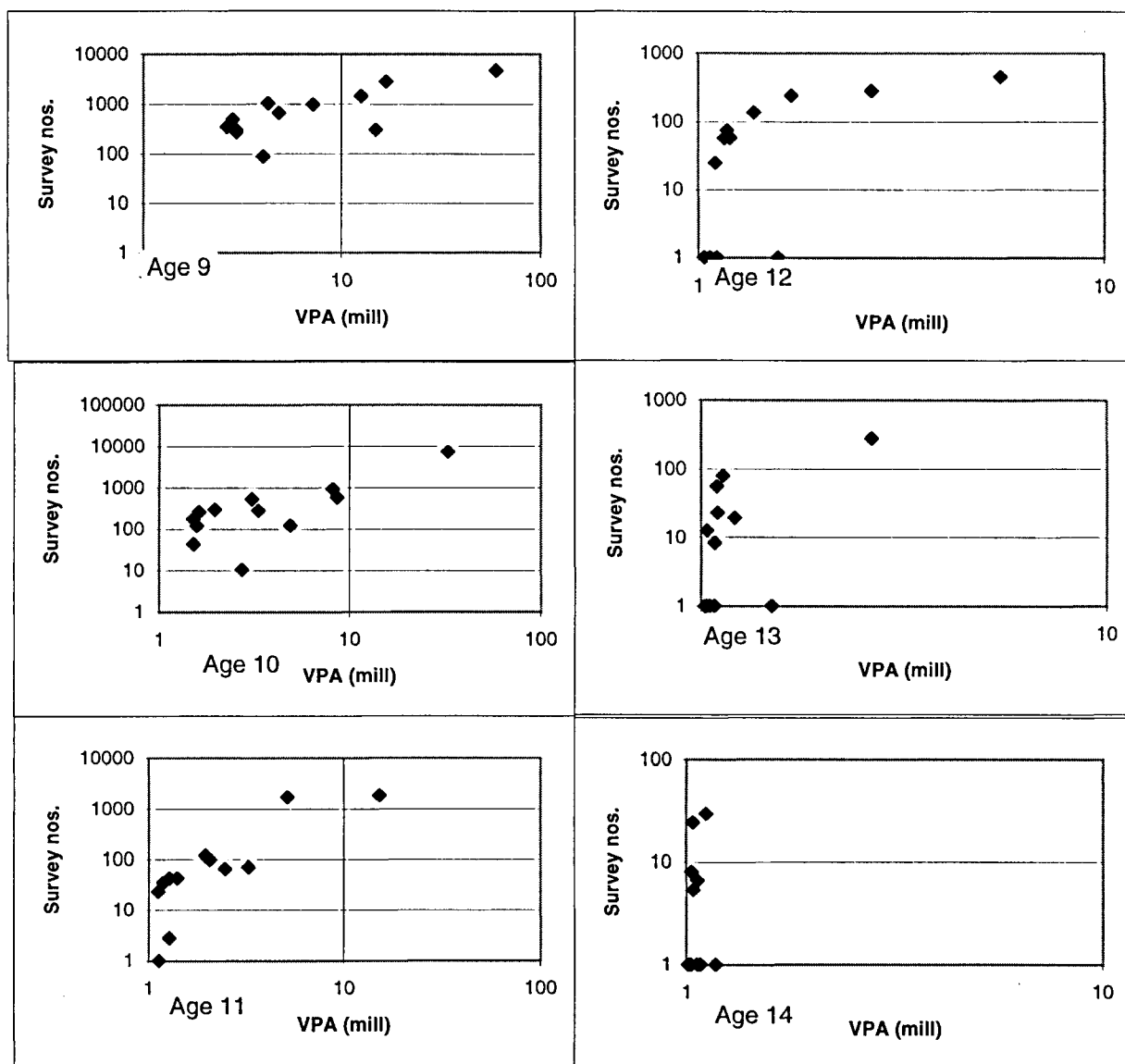


Figure 3.2 C. (FLT52) NE Arctic Cod abundance index from the Norwegian trawl, catch and effort plotted against VPA results on stock number at age

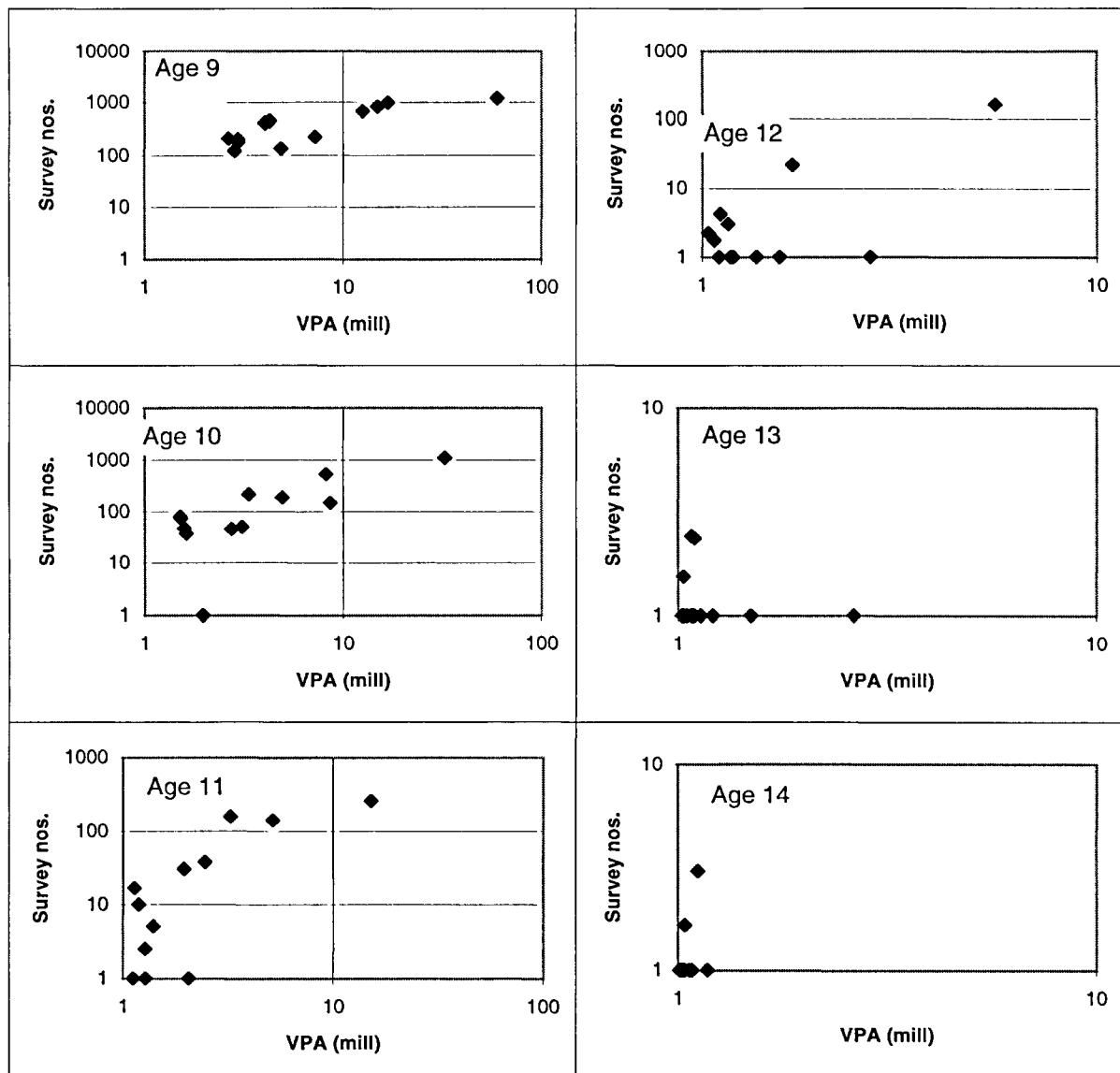


Figure 3.2 D. (FLT 53) NE Arctic Cod abundance index from the Russian trawl, catch and effort commercial fleet plotted against VPA results on stock number at age

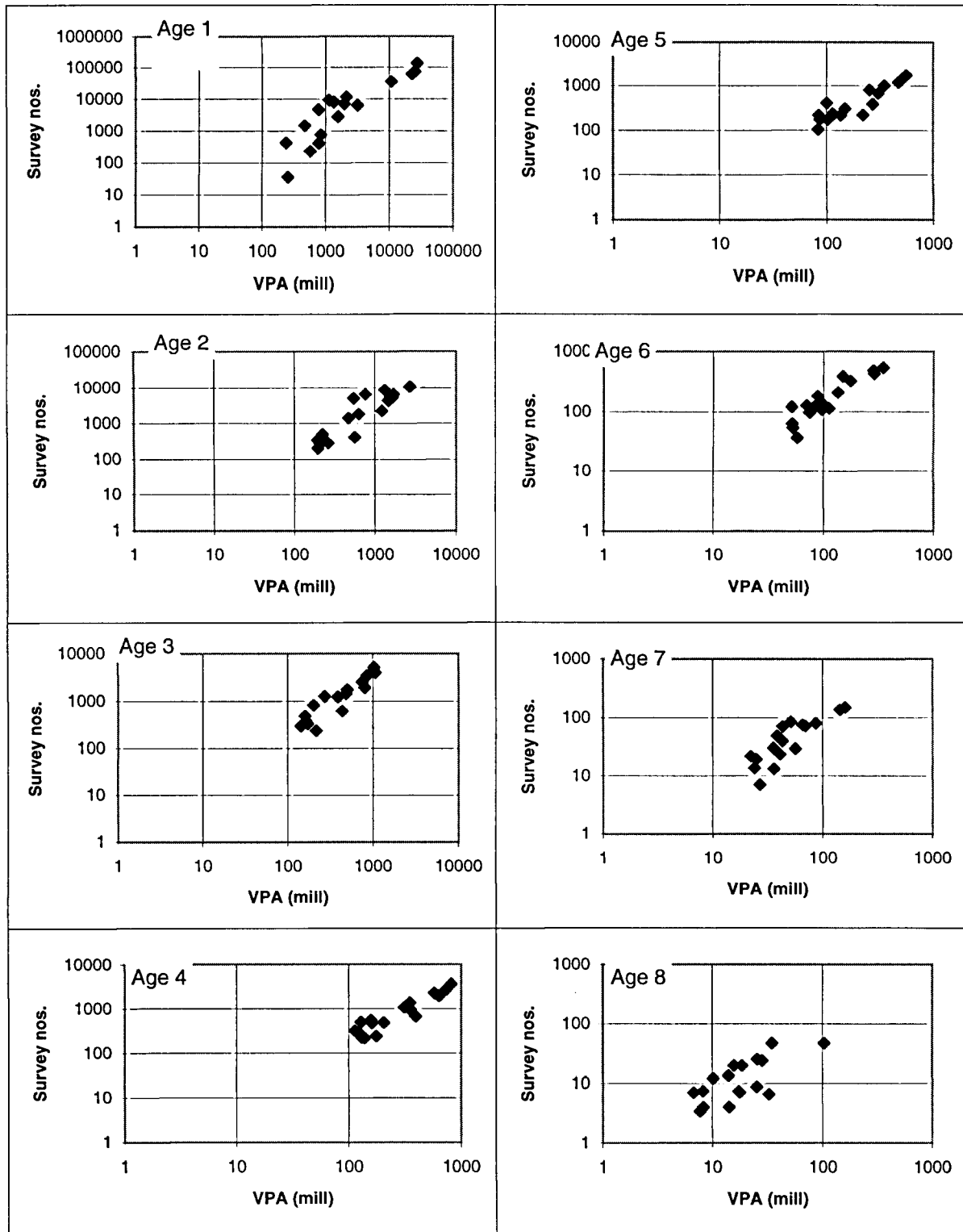


Figure 3.2 E. (FLT 54) NE Arctic Cod abundance index from the Norwegian Barents Sea trawl survey, shifted swept area correctig plotted against VPA results on stock number at age

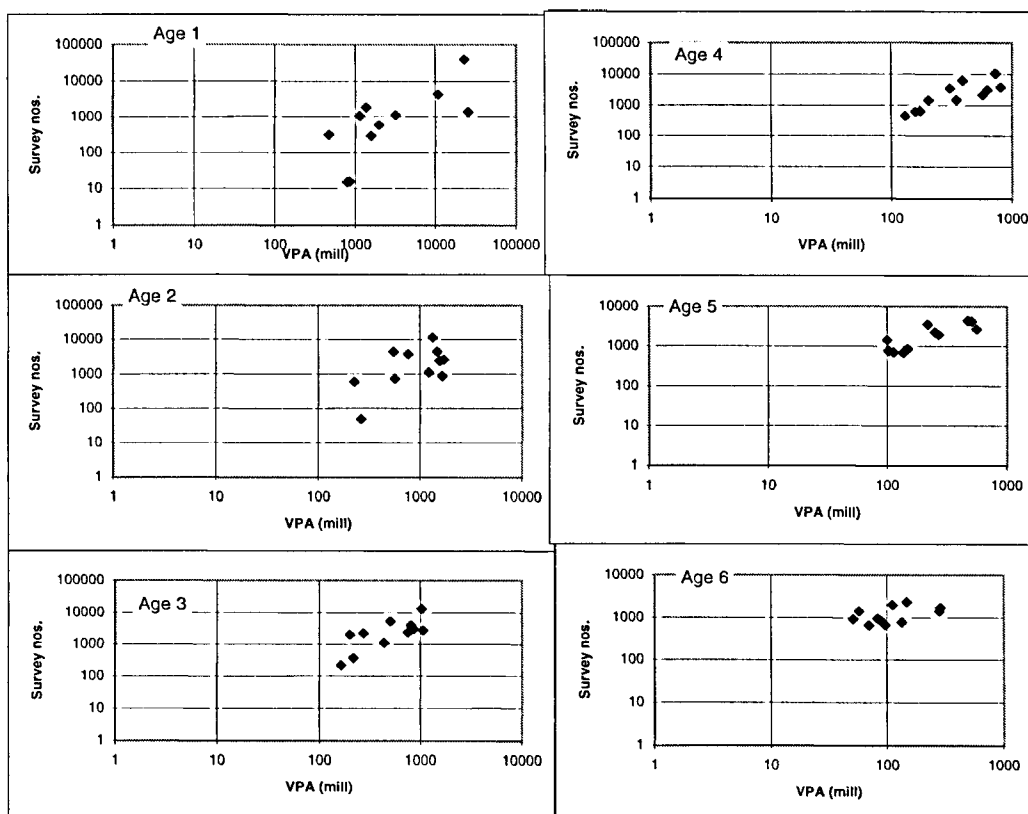


Figure 3.2 F.(FLT59) NE Arctic Cod abundance index from the Russian acoustic survey plotted against VPA results on stock number at age

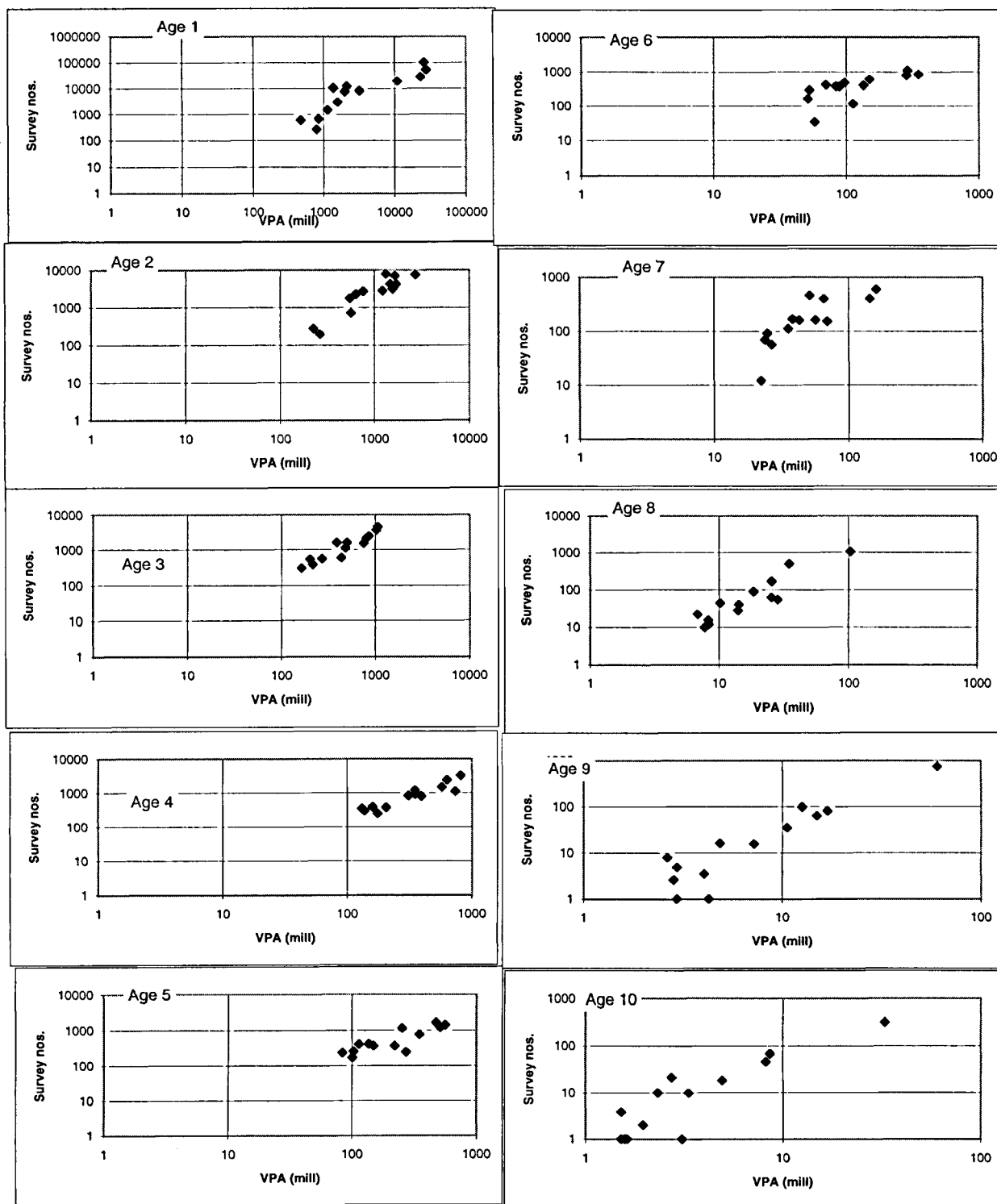


Figure 3.2 G. (FLT61) NE Arctic Cod abundance index from the Norwegian Barents Sea and Lofoten acoustic survey plotted against VPA results on stock number at age

Fig. 3.3 M due to cannibalism vs. capelin biomass

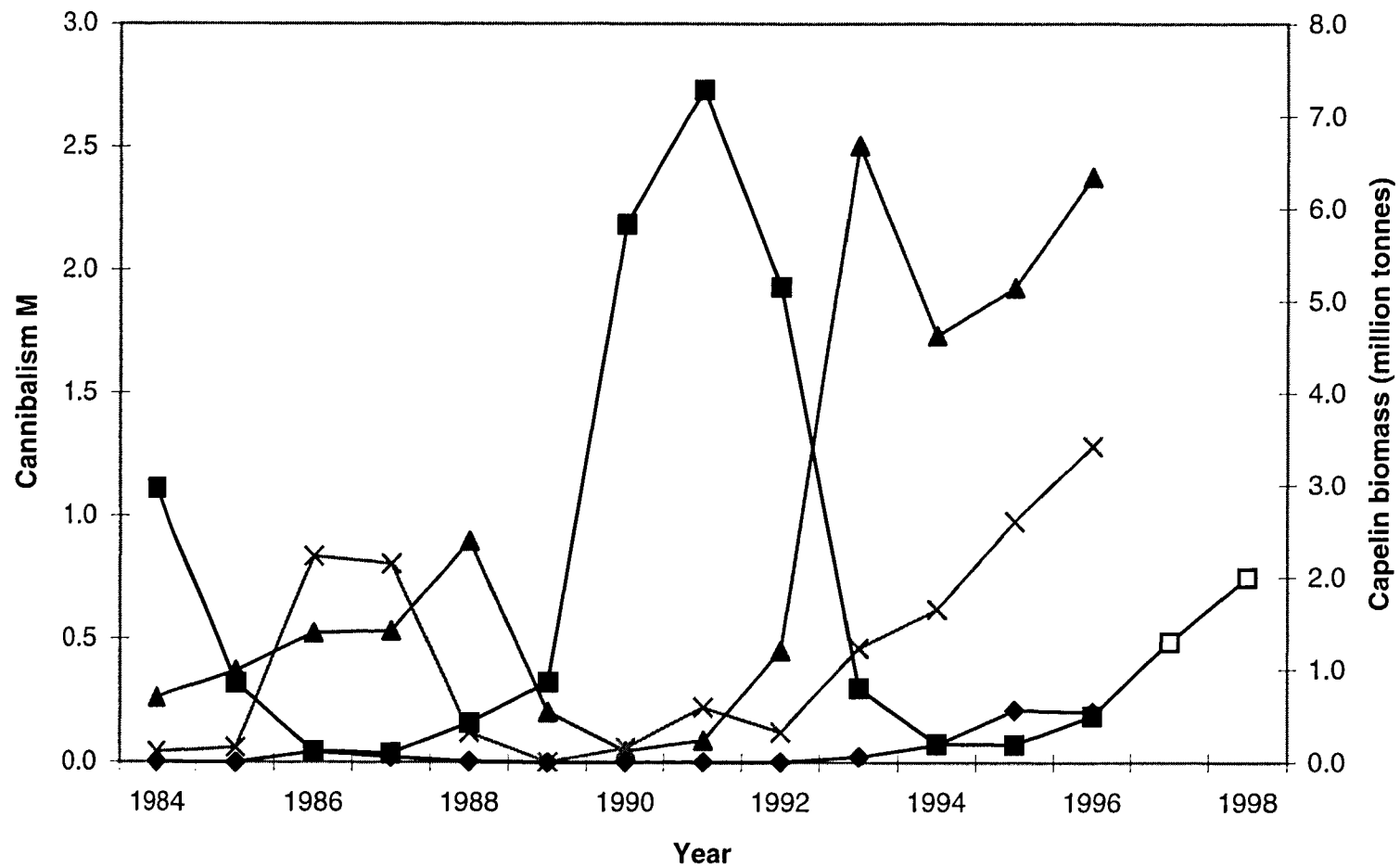


Fig 3.4 Growth NEA cod Barents Sea winter survey

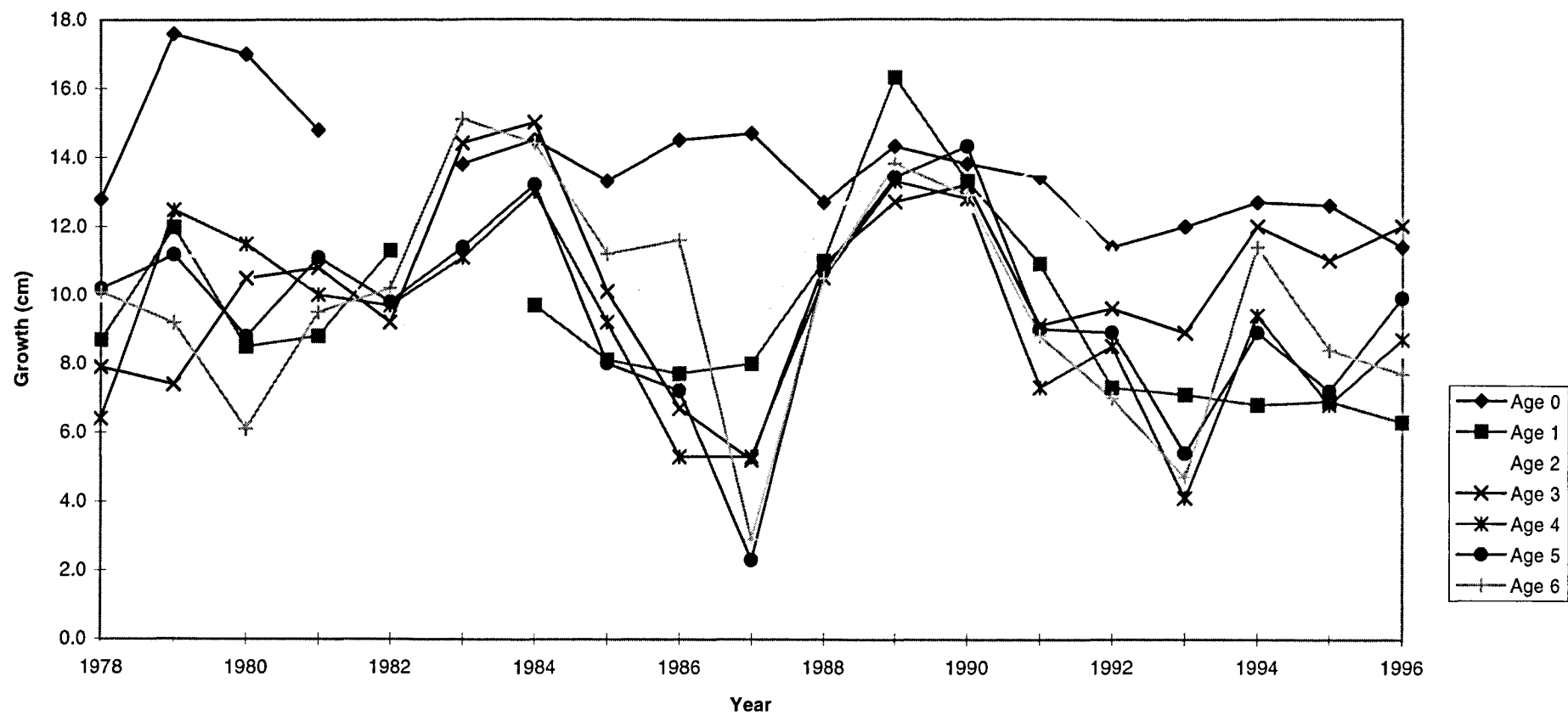


Fig. 3.5A Retrospective analysis NEA cod. qage = 4

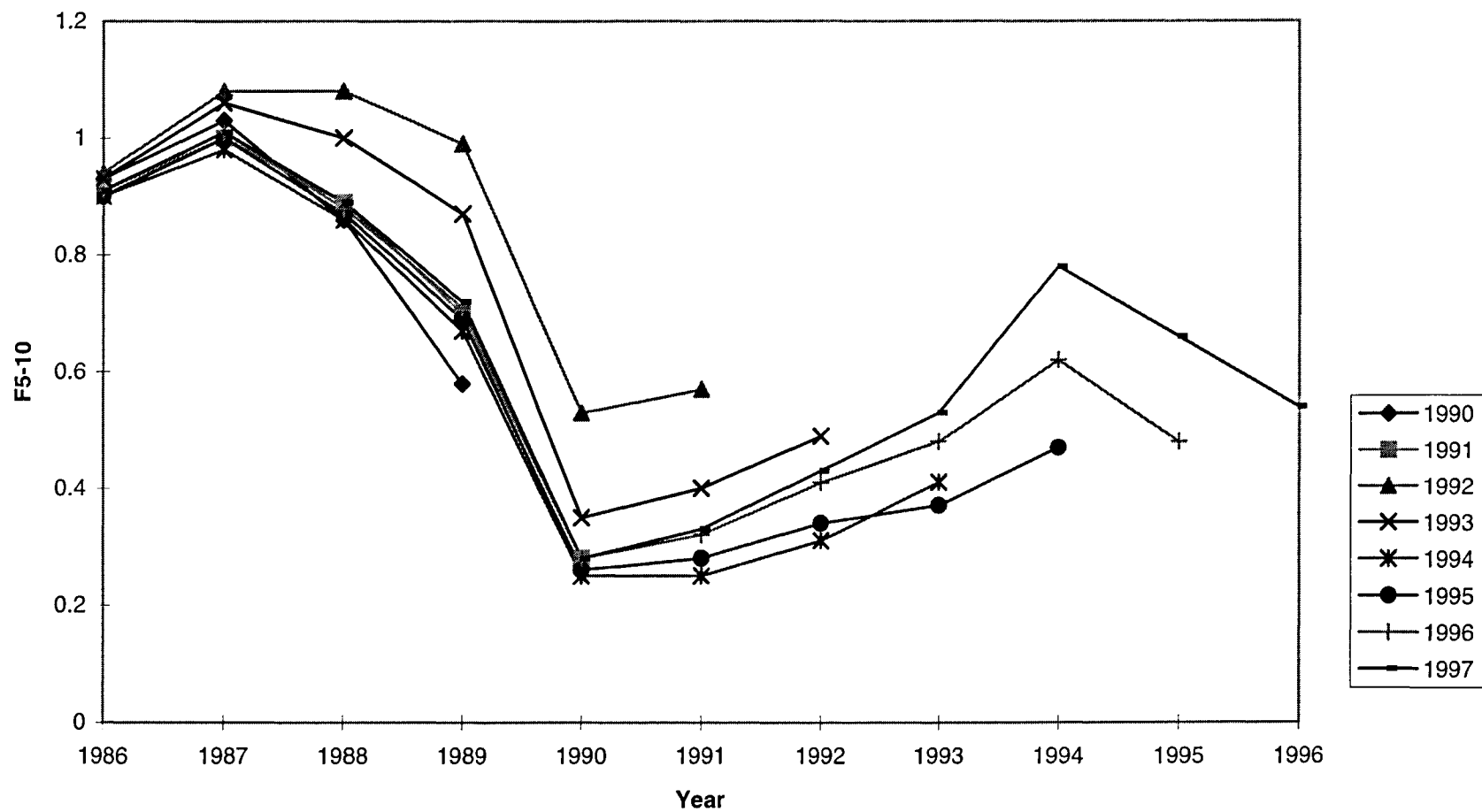


Fig. 3.5B Retrospective analysis NEA cod. qage = 6

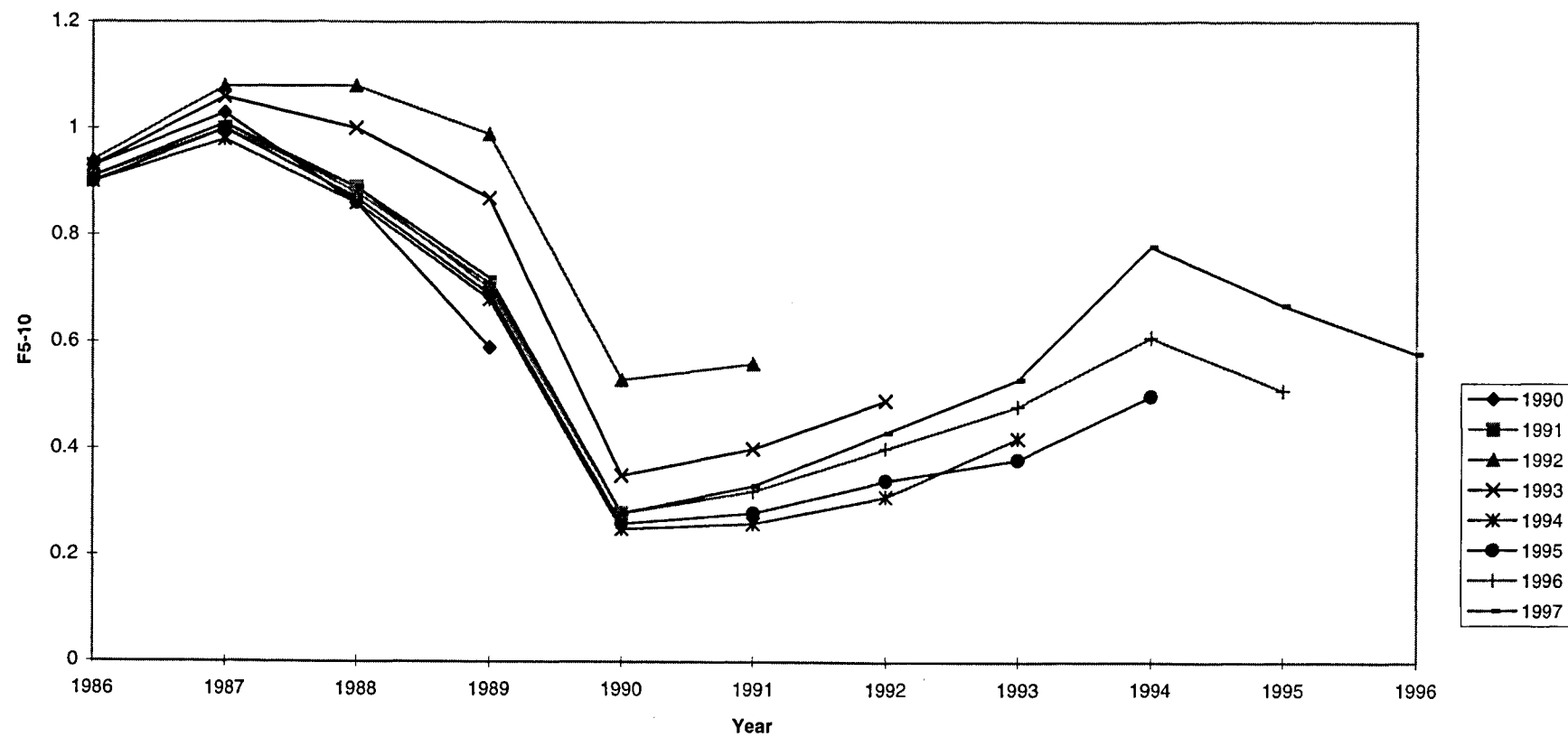


Fig. 3.5C Retrospective analysis NEA cod. qage =8

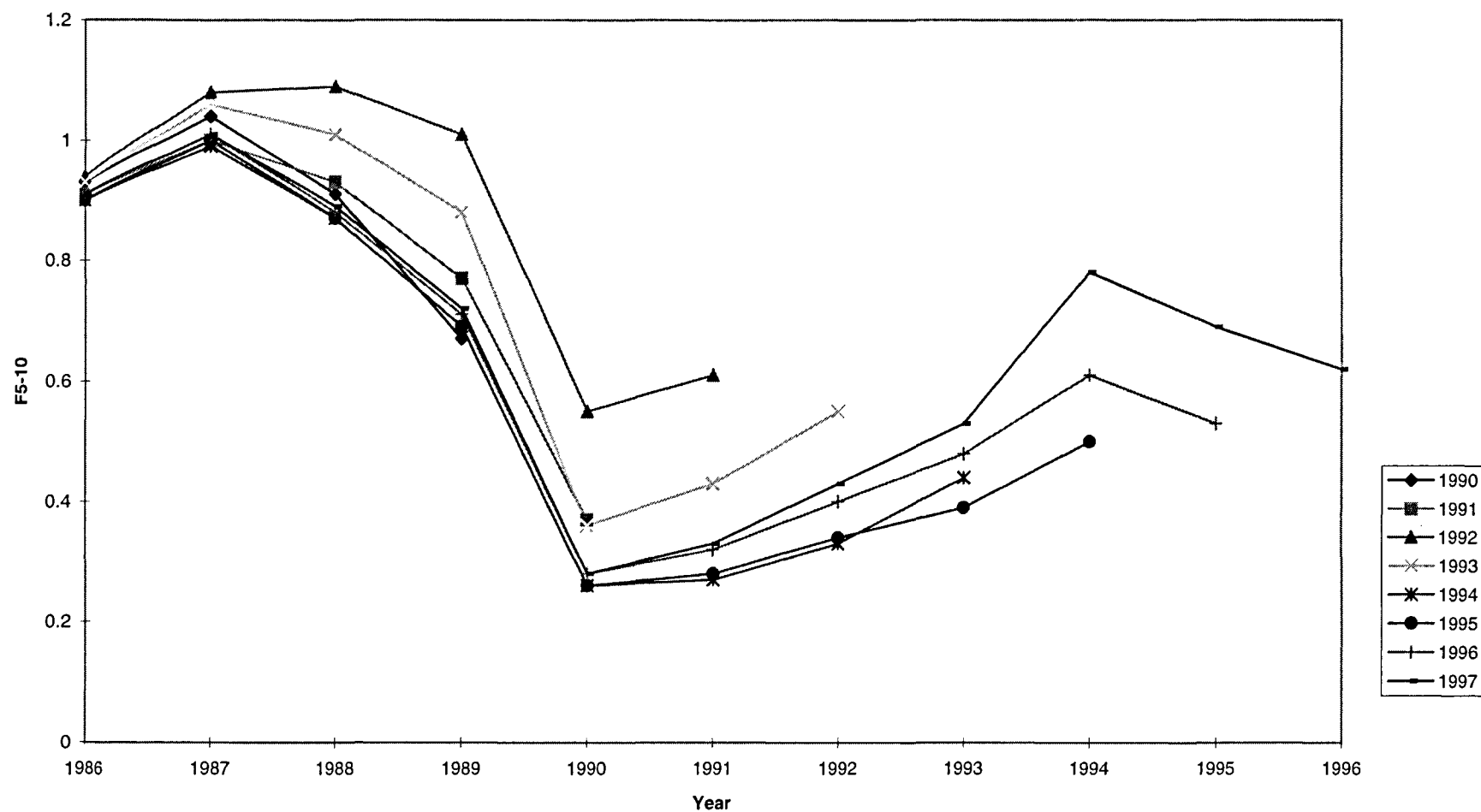


Fig 3.6A NEA cod age 5 Z in VPA vs. survey

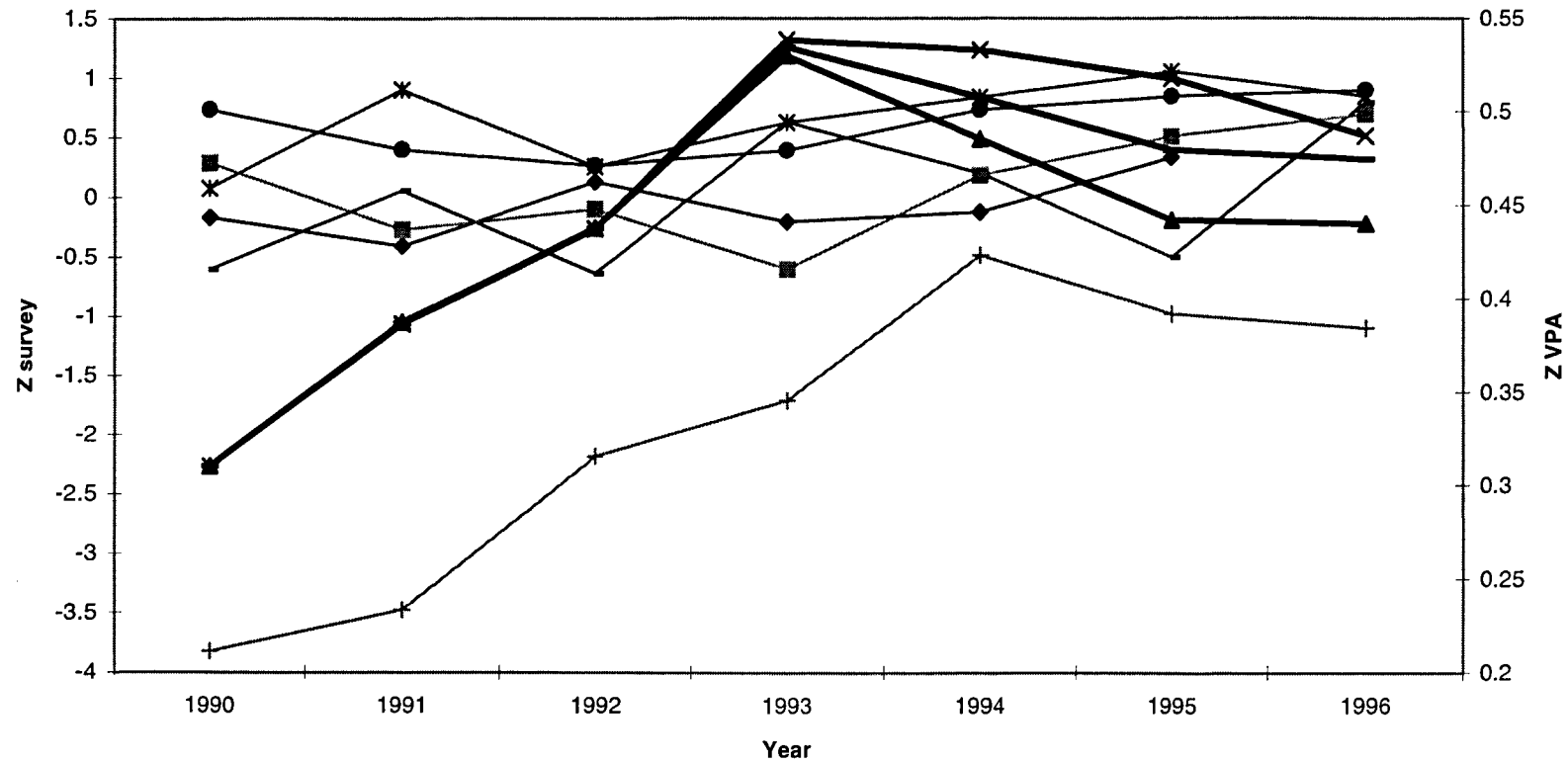


Fig. 3.6B Z age 6 NEA cod in VPA and survey

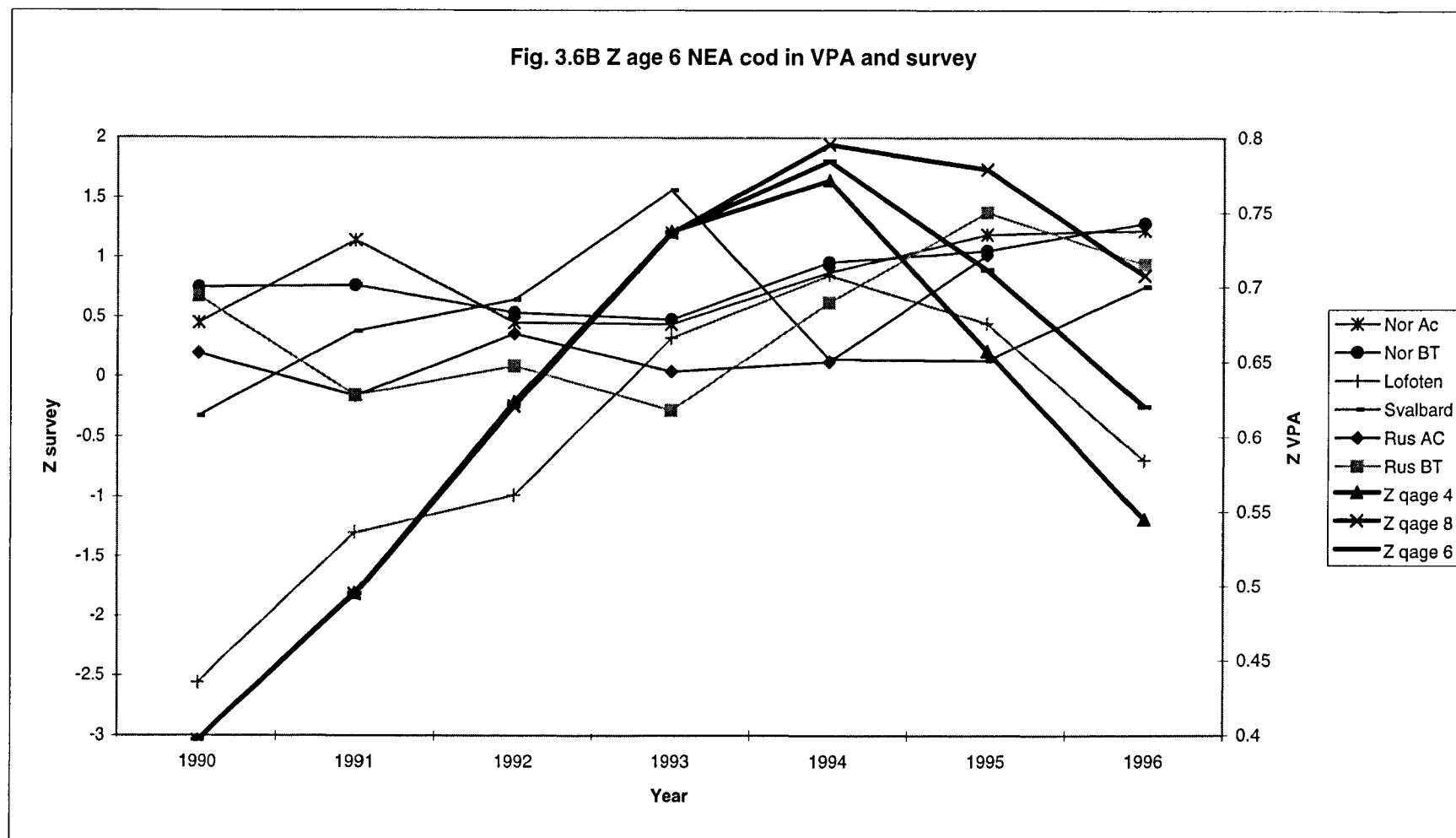


Fig. 3.6C NEA cod age 7 Z VPA and survey

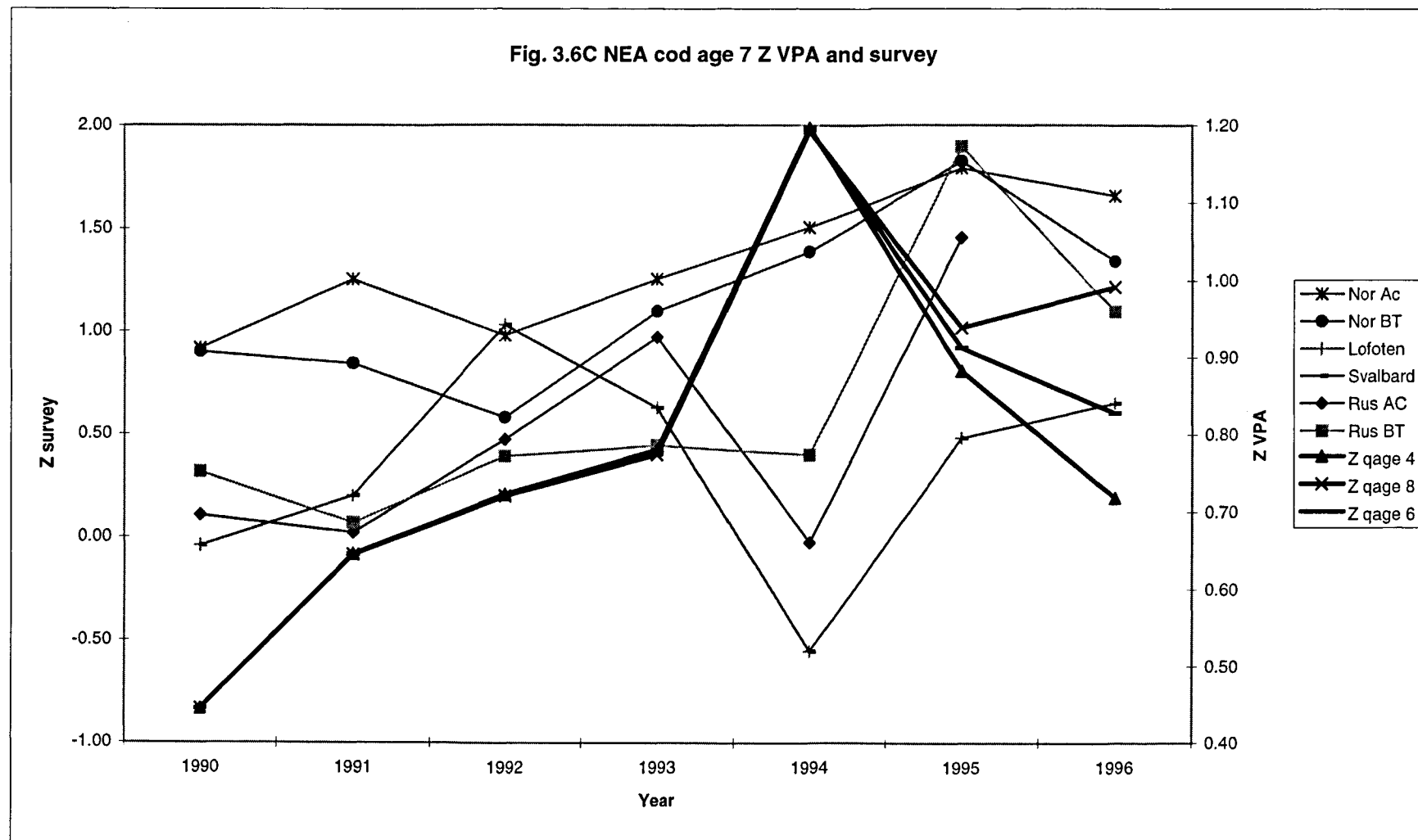
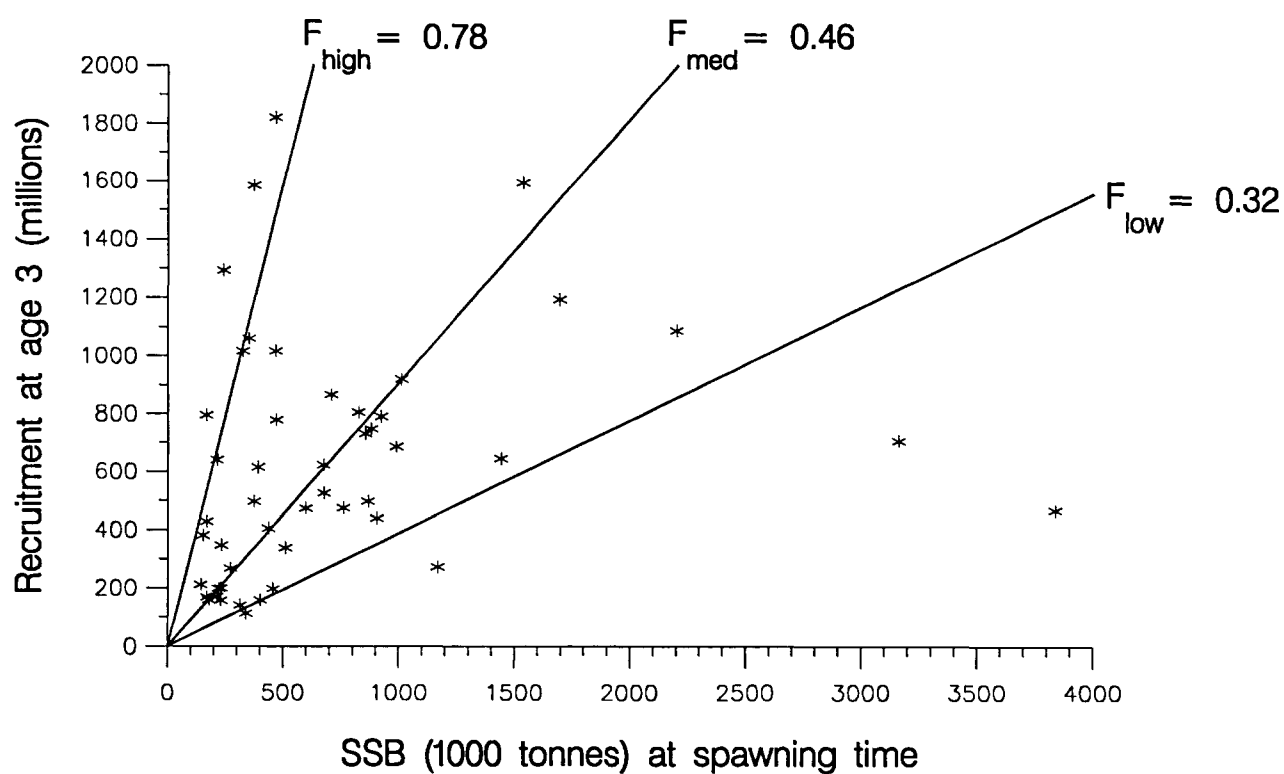


Figure 3.7

Cod in the North-East Arctic (Areas I and II)
27-8-1997

Stock - Recruitment



(run: SVPBJA08)

Figure 3.8: Time trends in effective spawner biomass (ESB) and the VPA estimate of spawning stock biomass multiplied by 0.5 to approximate the biomass of spawning females. VPA estimates of spawner biomass were generated using a stock size dependent catchability for ages less than six years.

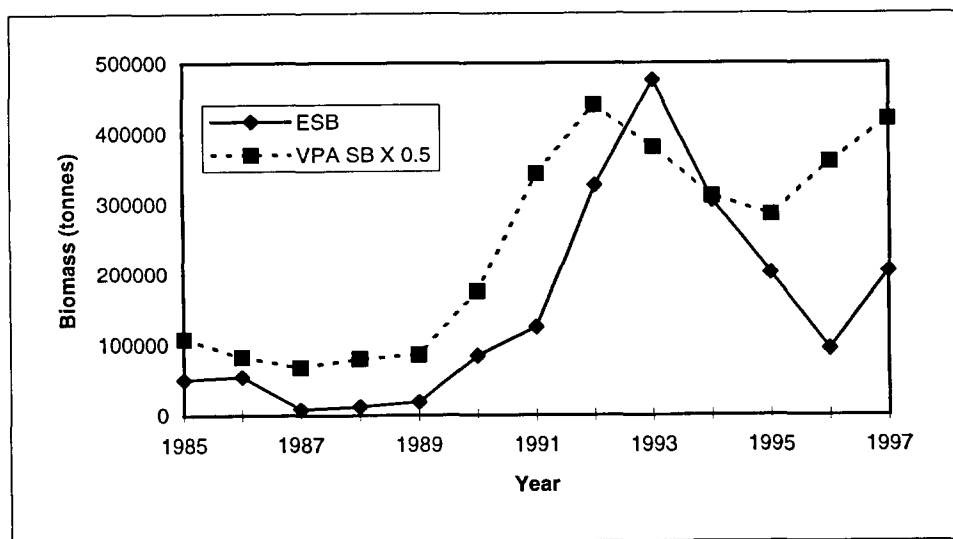


Figure 3.9: Relationship between effective spawner biomass and acoustic abundance of age 1 cod (Barents Sea survey) for time period 1985-96.

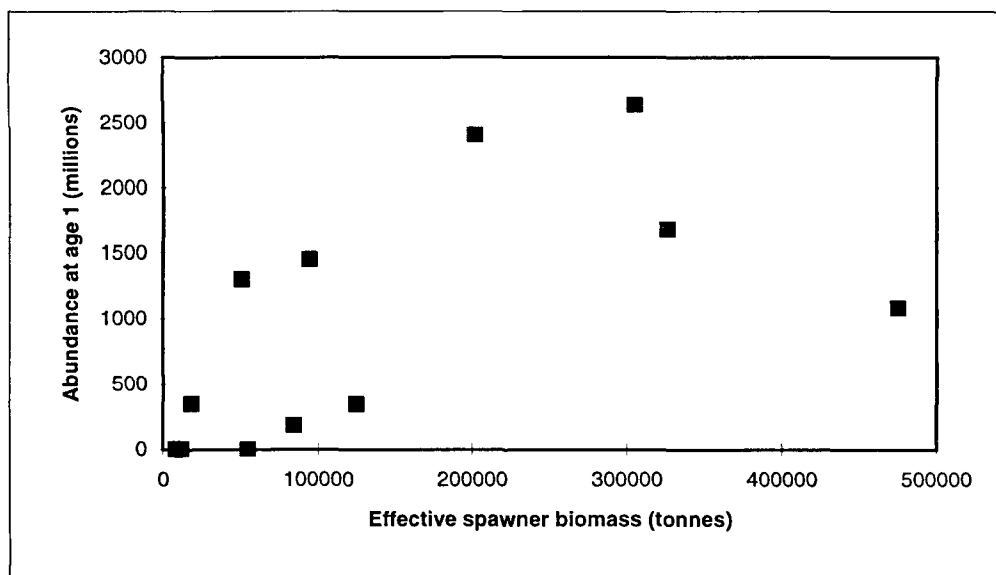


Figure 3.10: Relative fecundity of the stock (dashed line) and effective spawner biomass (solid line) for survey time period (1985-97).

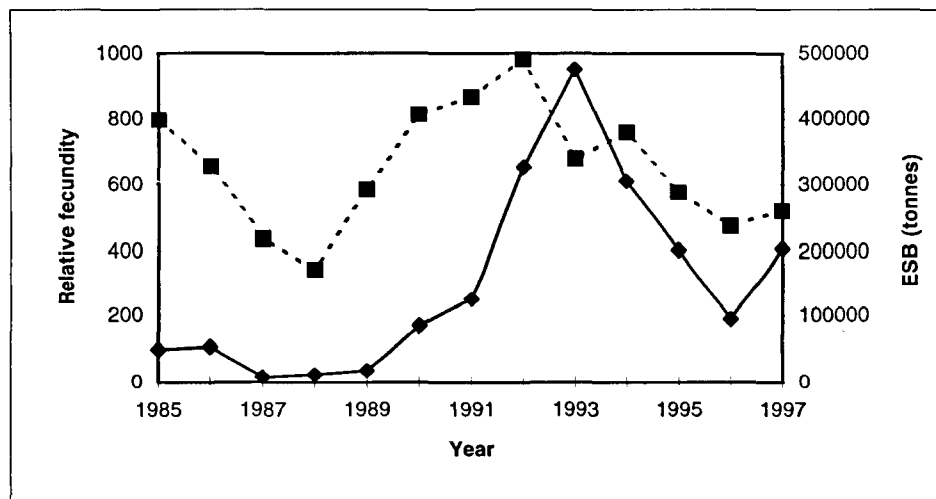


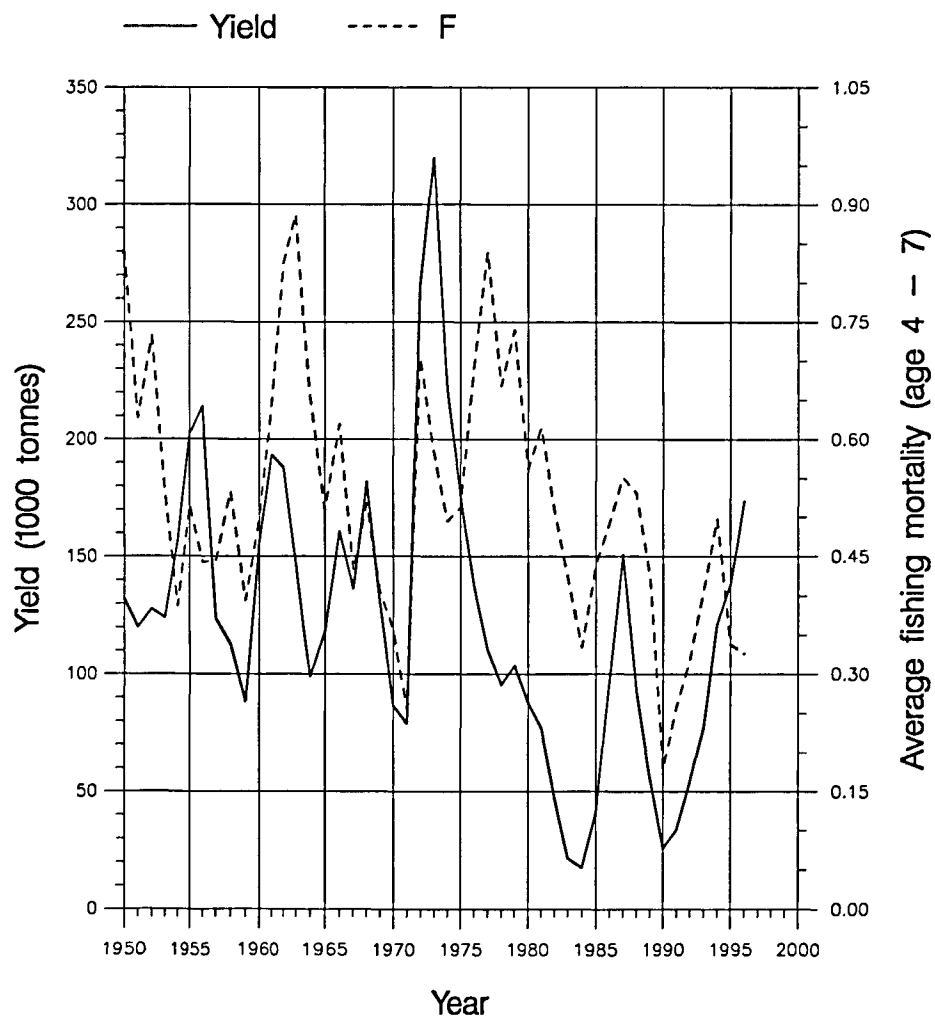
Figure 4.1a,b

Fish Stock Summary

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

27-8-1997

Yield and fishing mortality



Spawning stock and recruitment

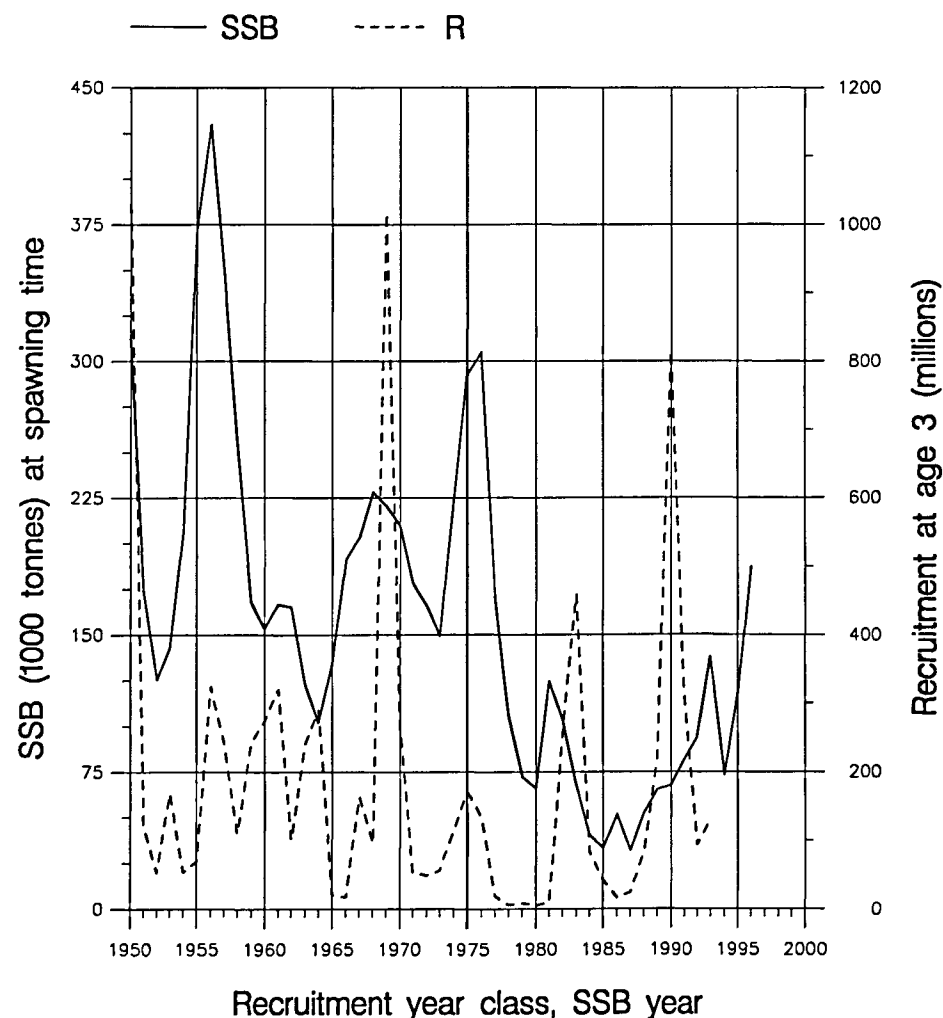
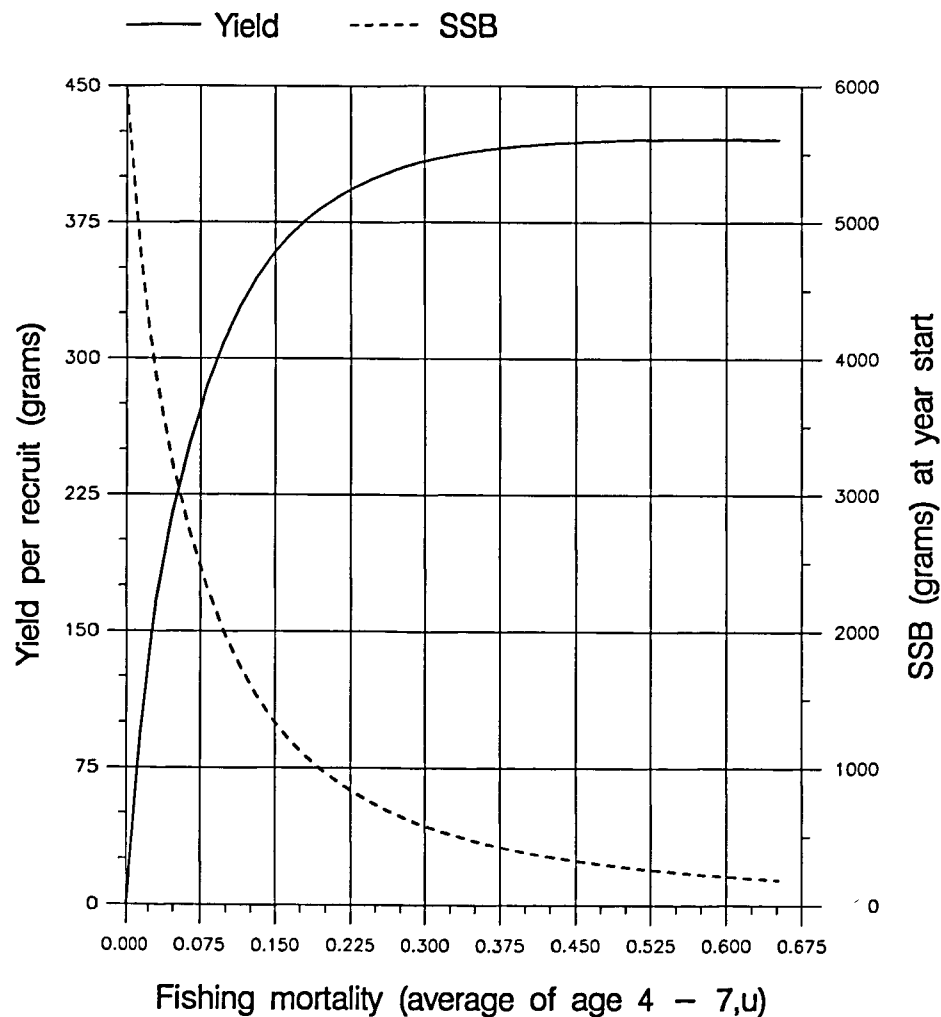


Figure 4.1c,d

Fish Stock Summary Haddock in the North-East Arctic (Areas I and II) 27-8-1997

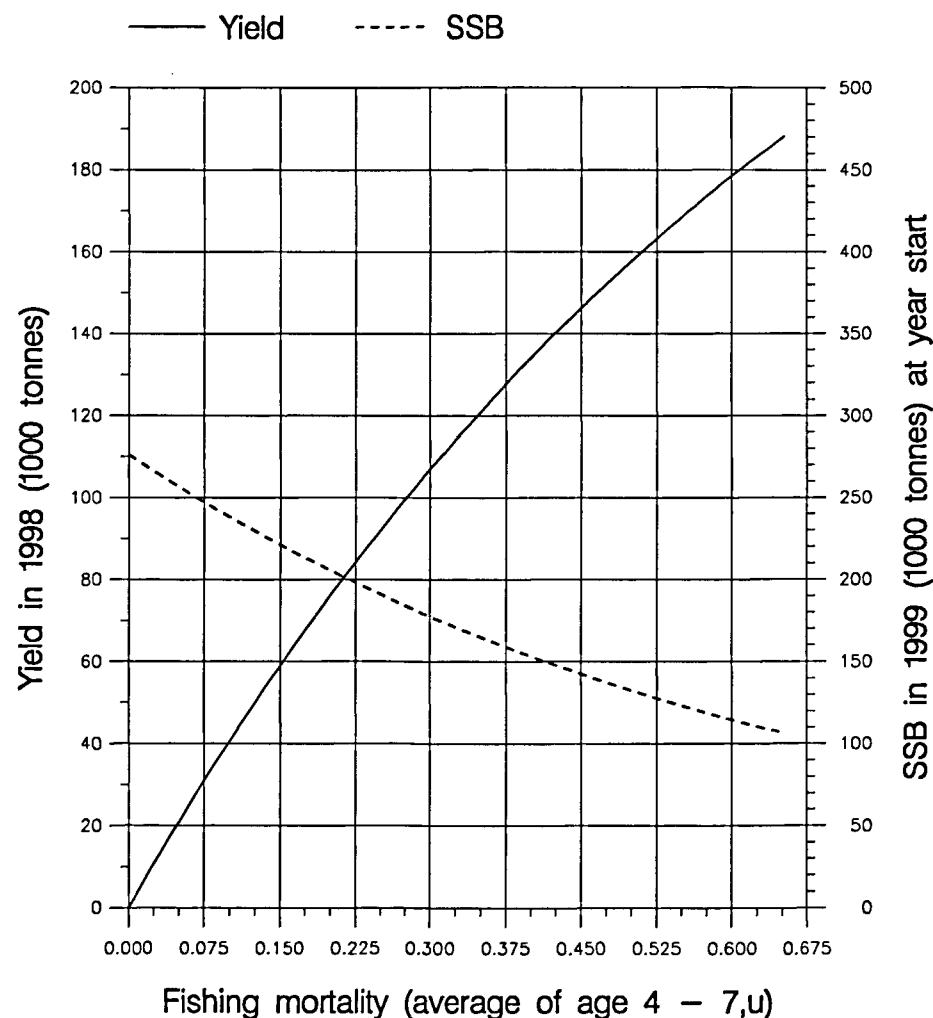
Long term yield and spawning stock biomass



(run: YDLOR02)

C

Short term yield and spawning stock biomass



(run: MANLOR05)

D

Figure 4.2

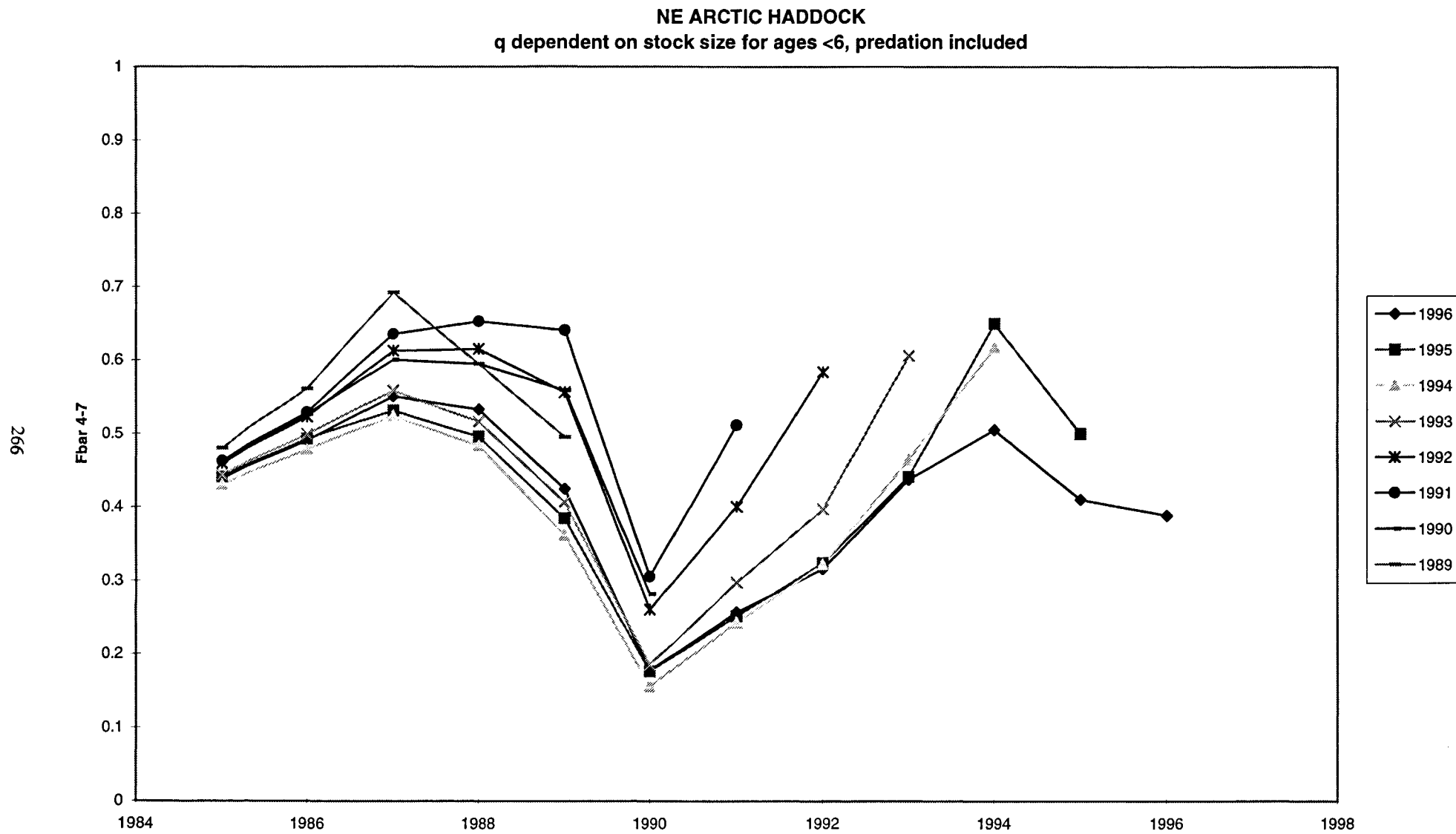
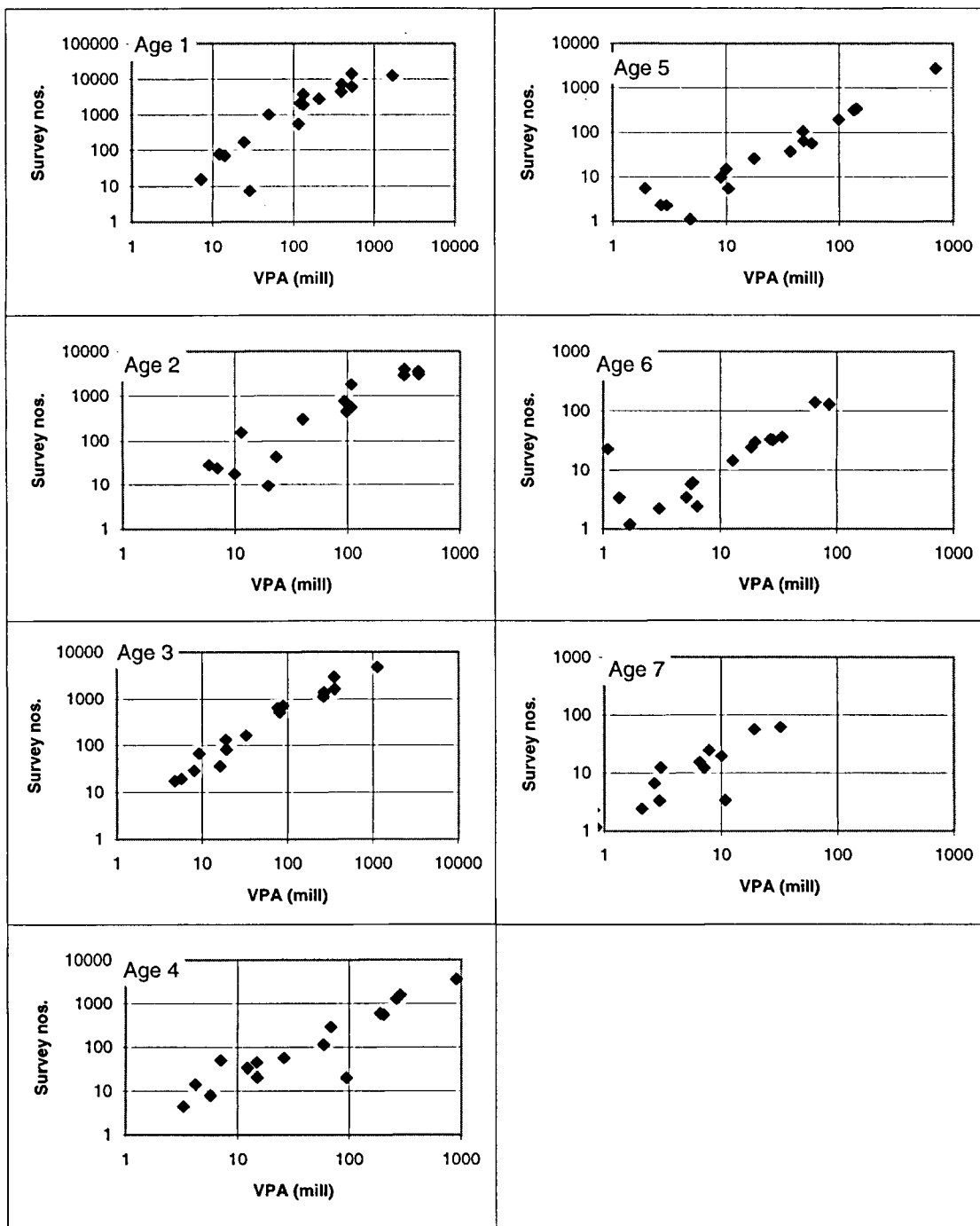
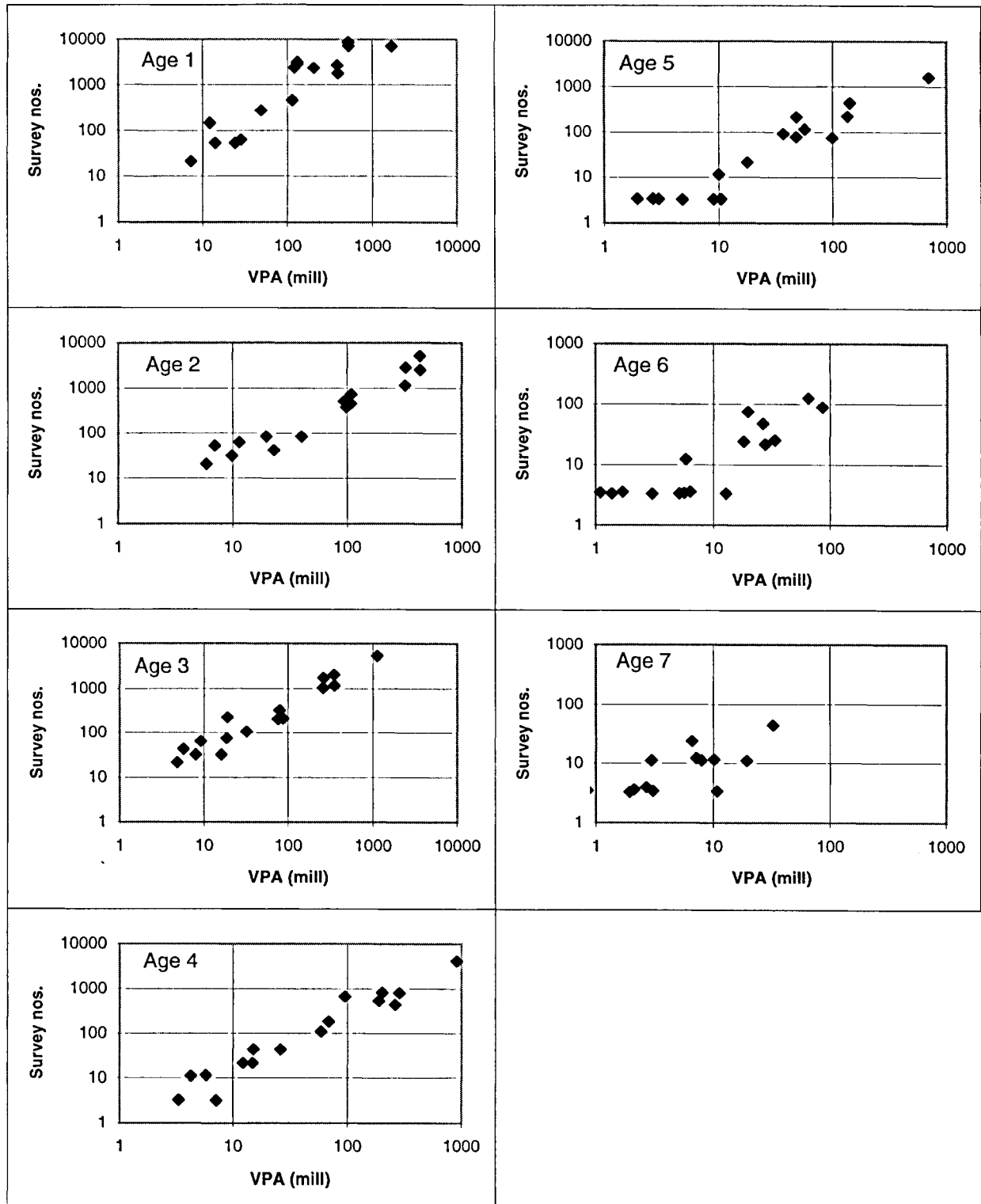


Figure 4.3



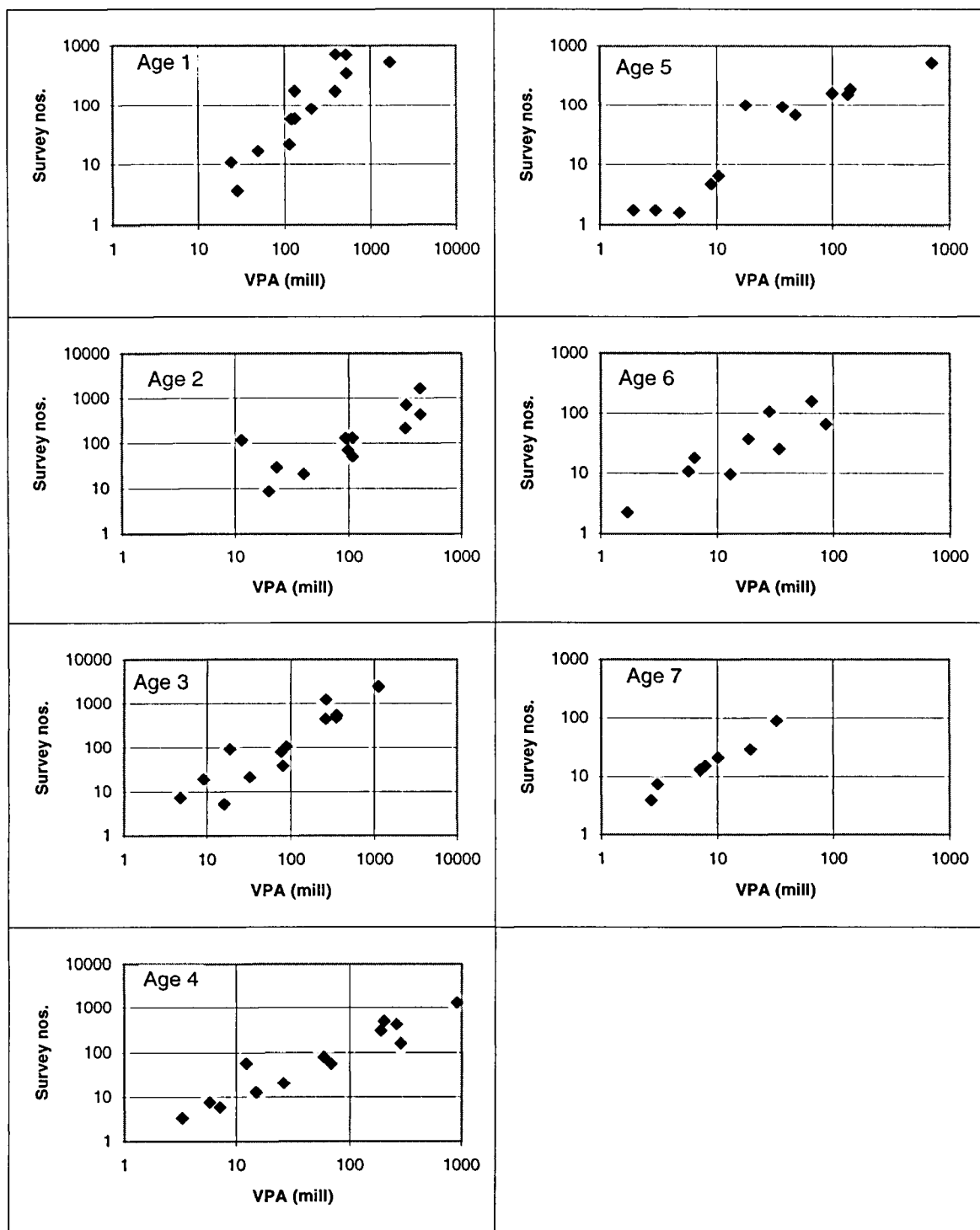
NE Arctic Haddock abundance index from the Norwegian bottom trawl survey plotted against VPA results on stock number at age

Figure 4.3 (Continued)



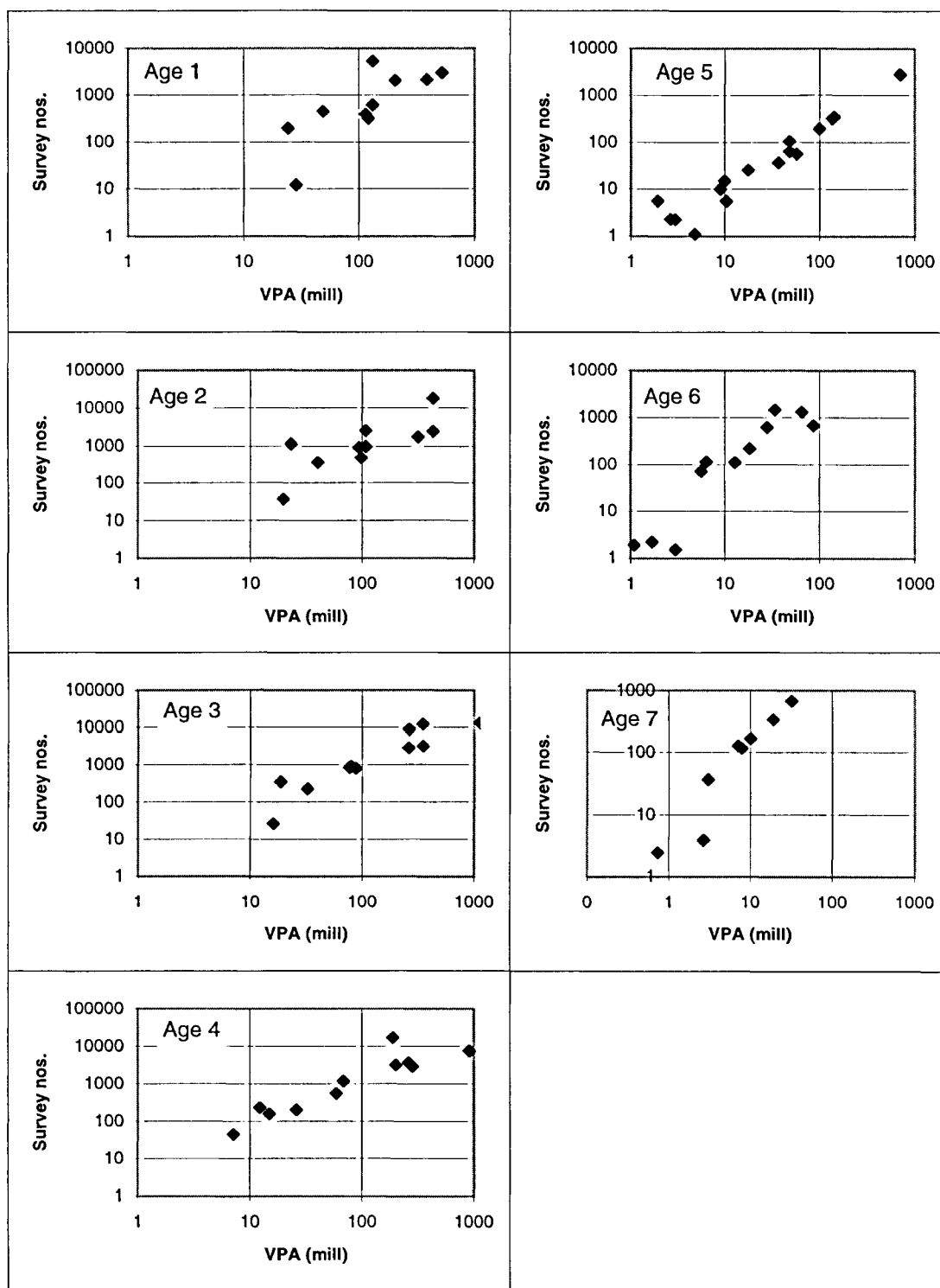
NE Arctic Haddock abundance index from the Norwegian acoustic survey plotted again VPA results on stock number at age

Figure 4.3 (Continued)



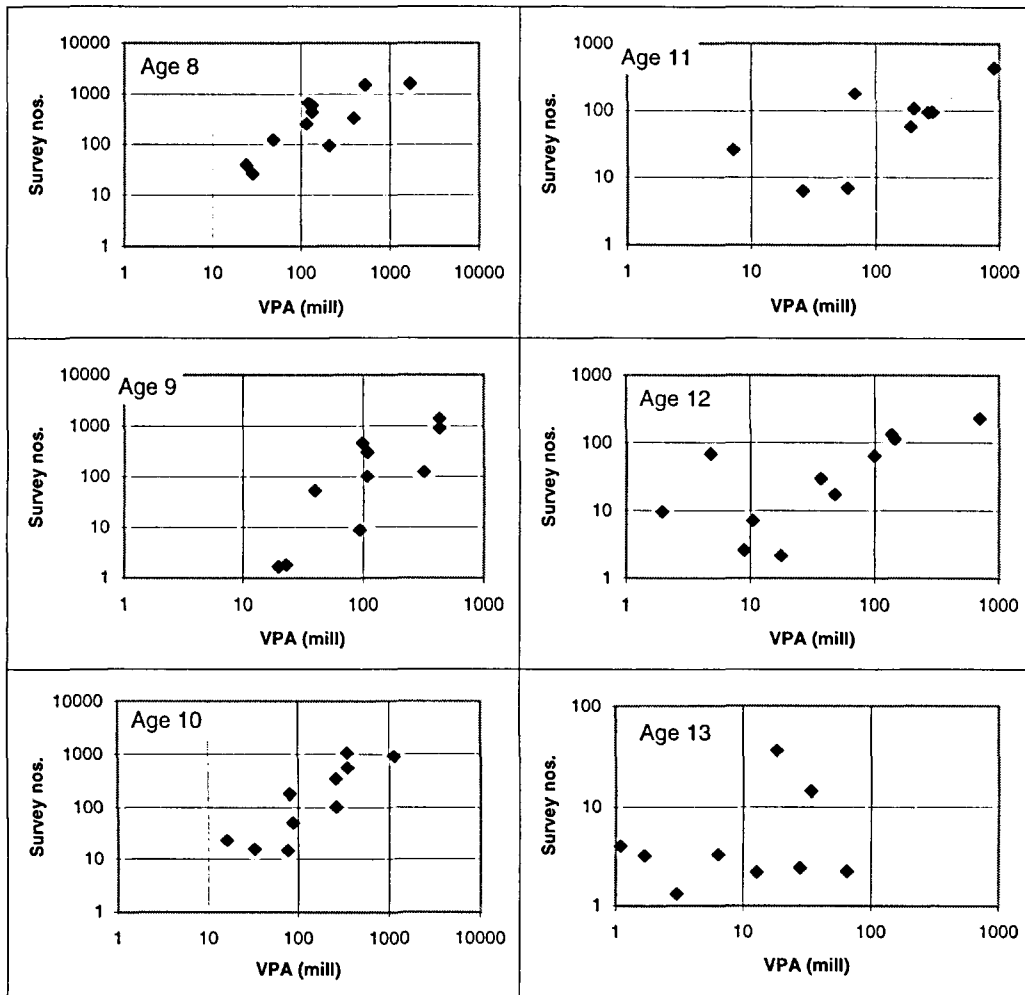
NE Arctic Haddock abundance index from the Russian bottom trawl survey plotted against VPA results on stock number at age

Figure 4.3 (Continued)



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

Figure 4.3 continued



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

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

27-8-1997

Stock - Recruitment

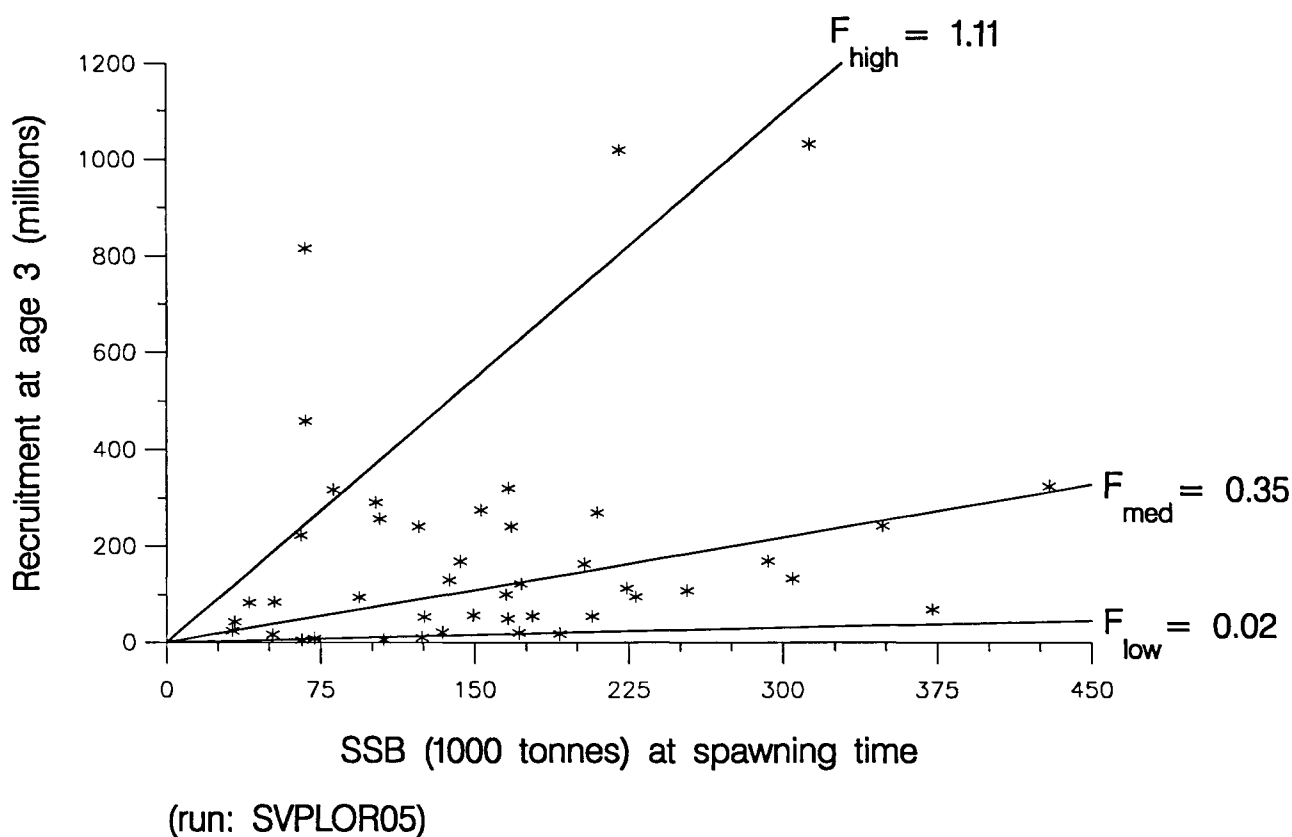
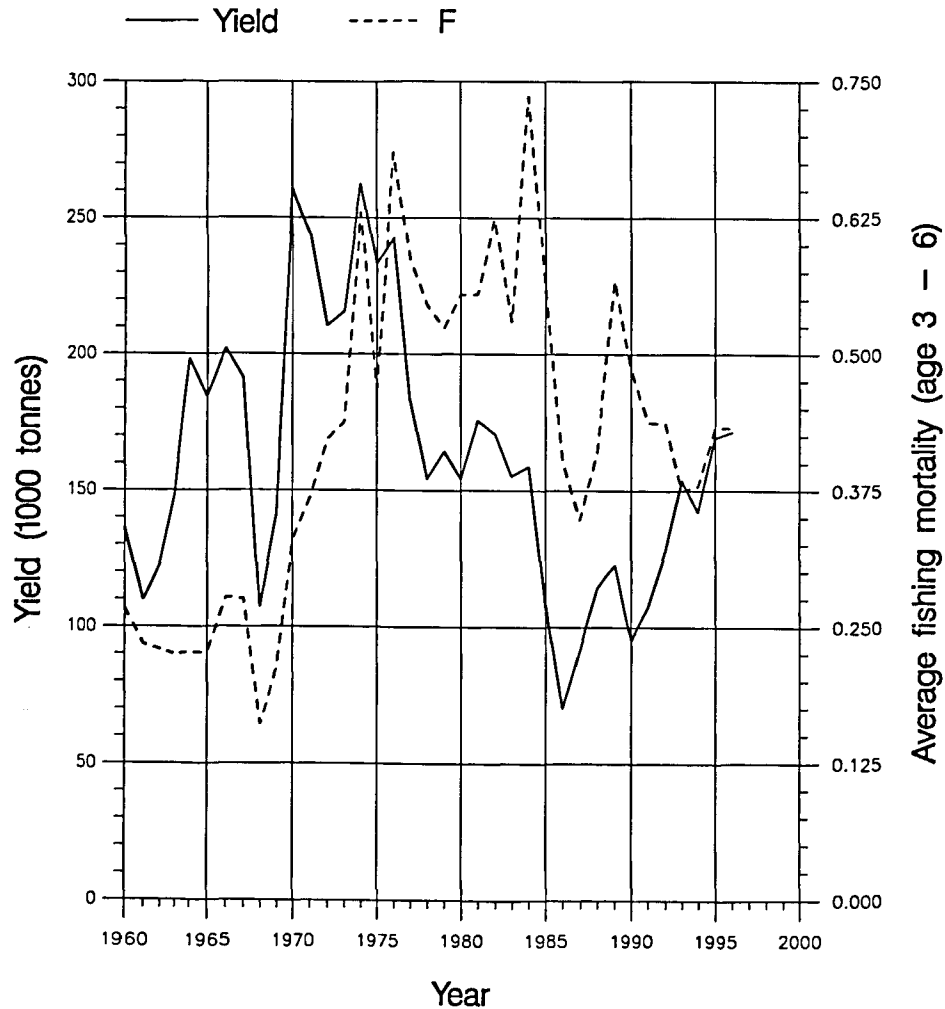


Figure 4.4

Figure 5.1a,b

Fish Stock Summary Saithe in the North-East Arctic (Areas I and II) 25-8-1997

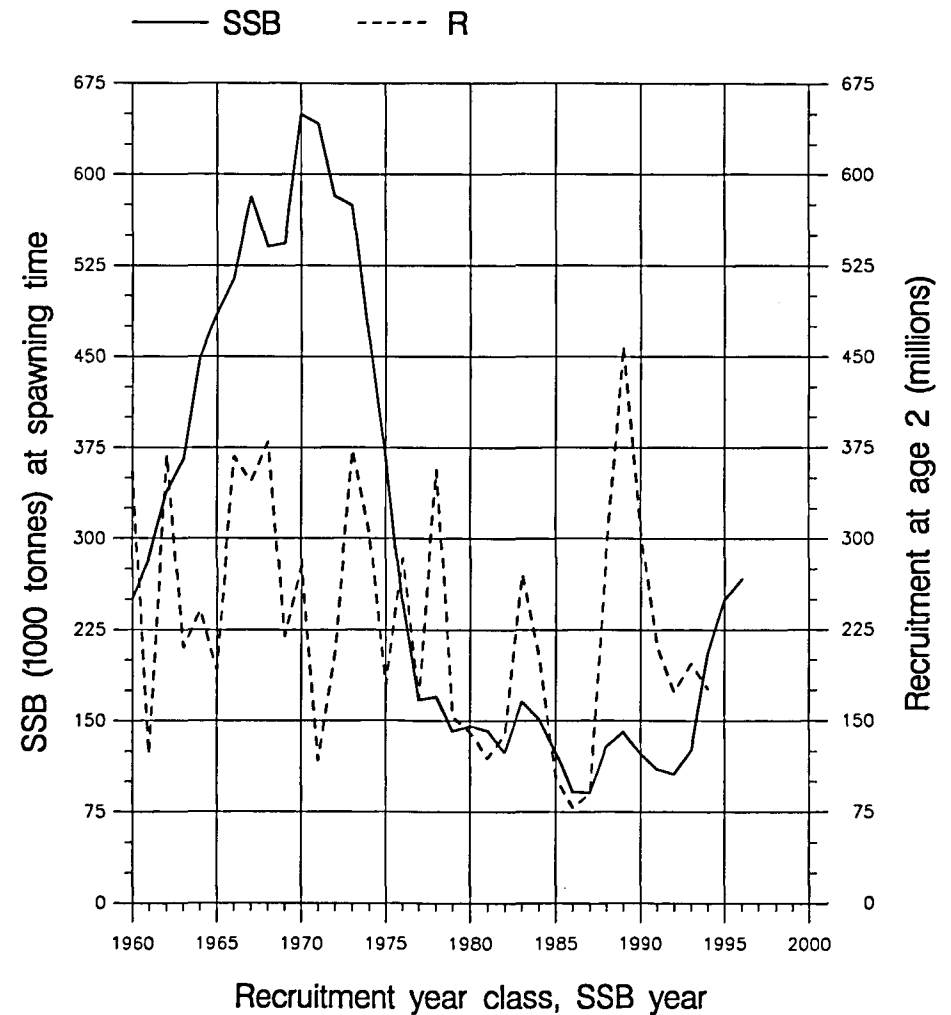
Yield and fishing mortality



(run: XSASME01)

A

Spawning stock and recruitment



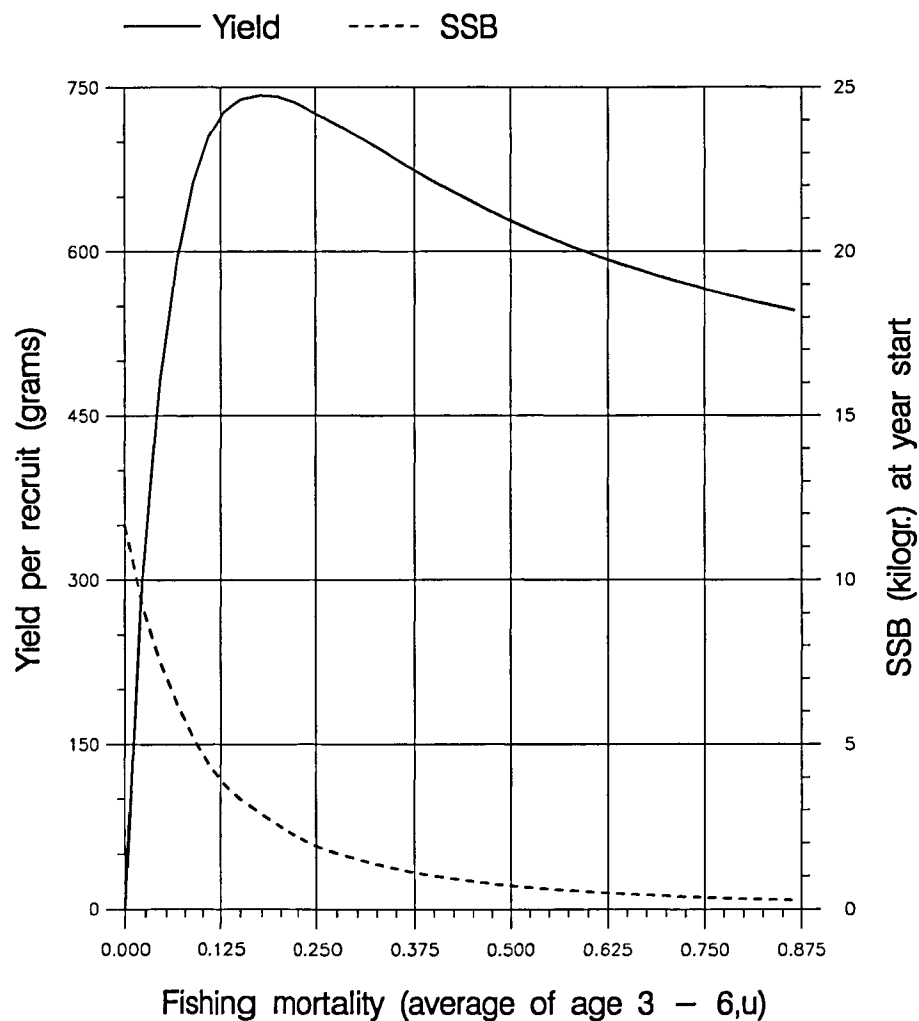
(run: XSASME01)

B

Figure 5.1c,d

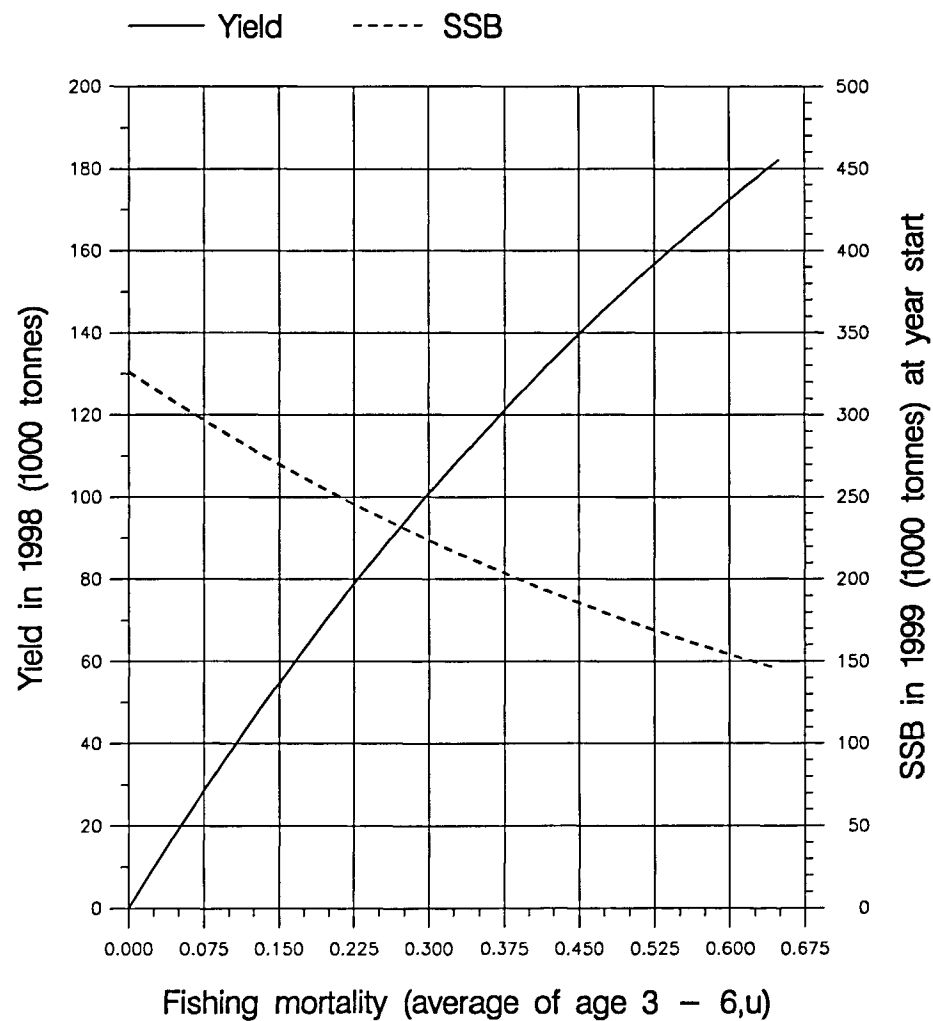
Fish Stock Summary Saithe in the North-East Arctic (Areas I and II) 25-8-1997

Long term yield and spawning stock biomass



(run: YLDSME02) C

Short term yield and spawning stock biomass



(run: MANSME02) D

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

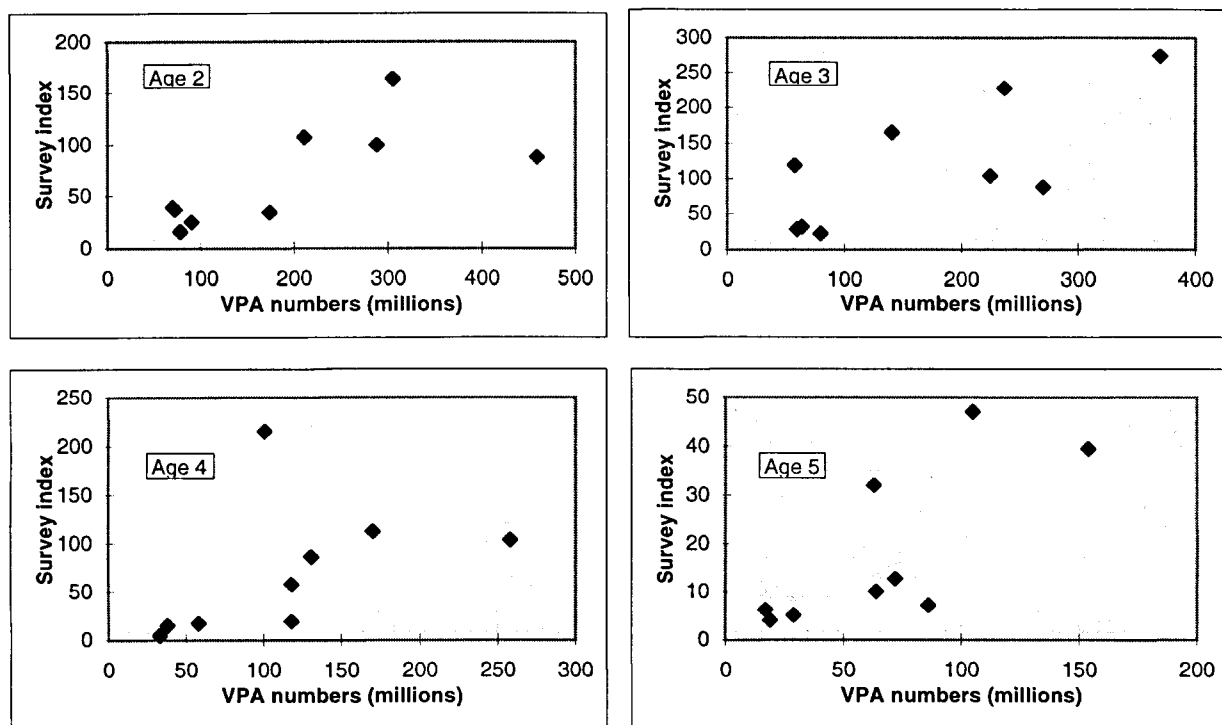


Figure 5.2B. North-East Arctic Saithe - Norwegian purse seine vs VPA

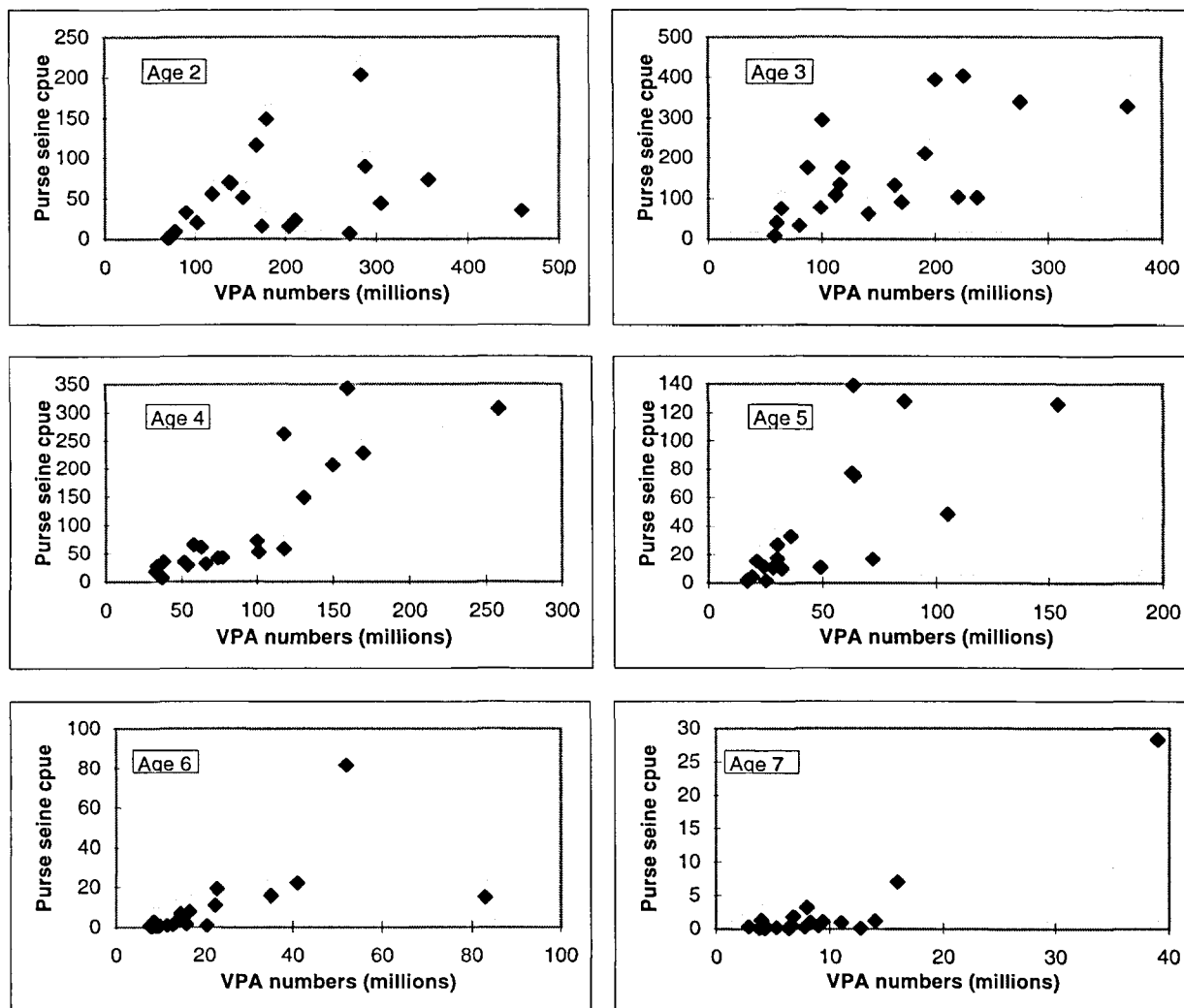


Figure 5.2C. North-East Arctic Saithe - Norwegian trawl vs VPA

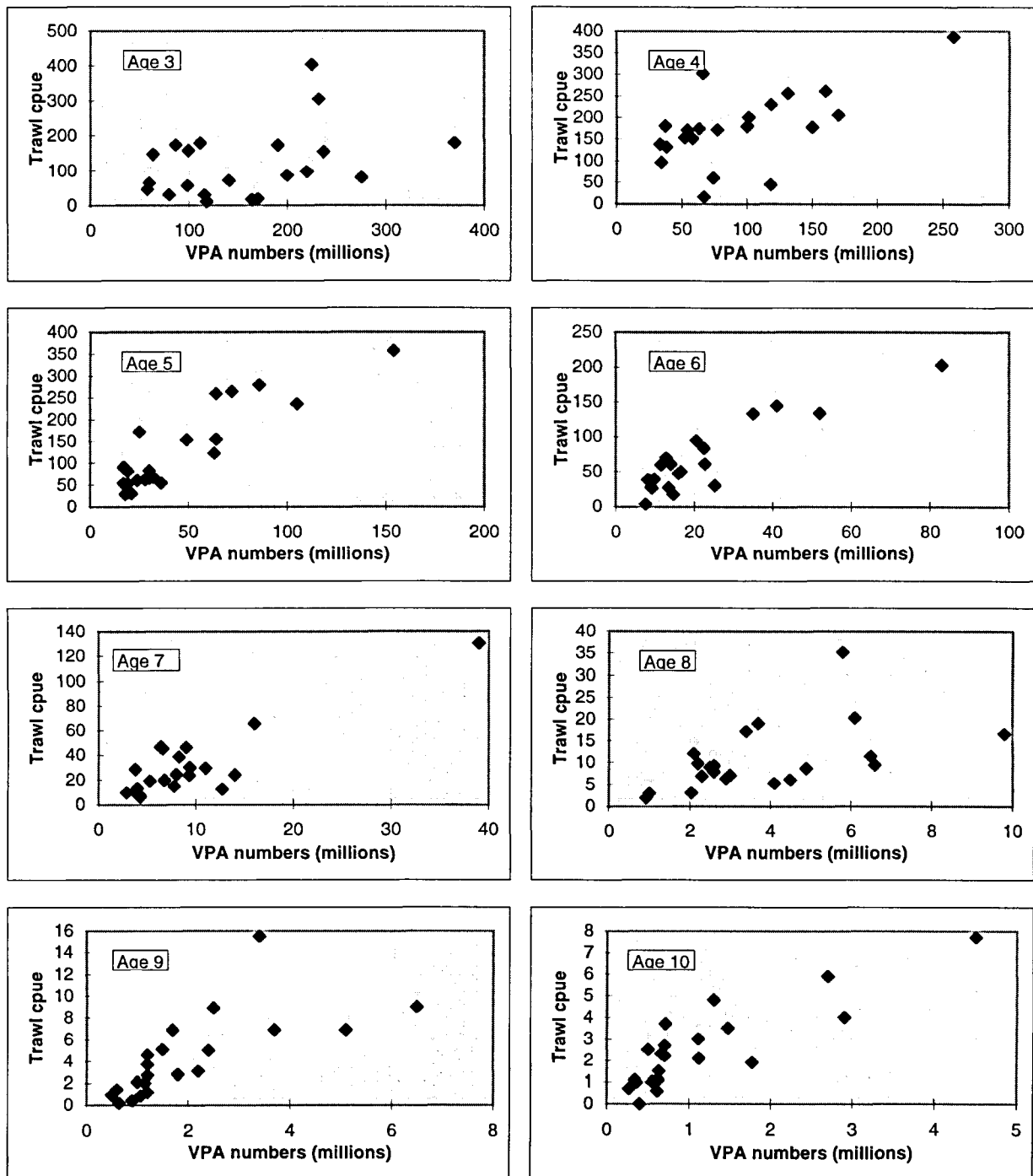


Figure 5.3A. North-East Arctic Saithe - Retrospective analysis

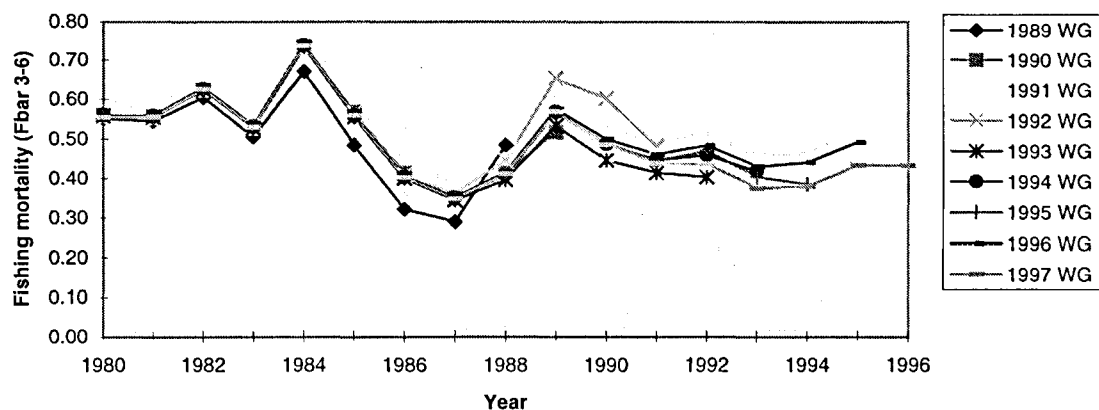


Figure 5.3B. North-East Arctic Saithe - Retrospective analysis

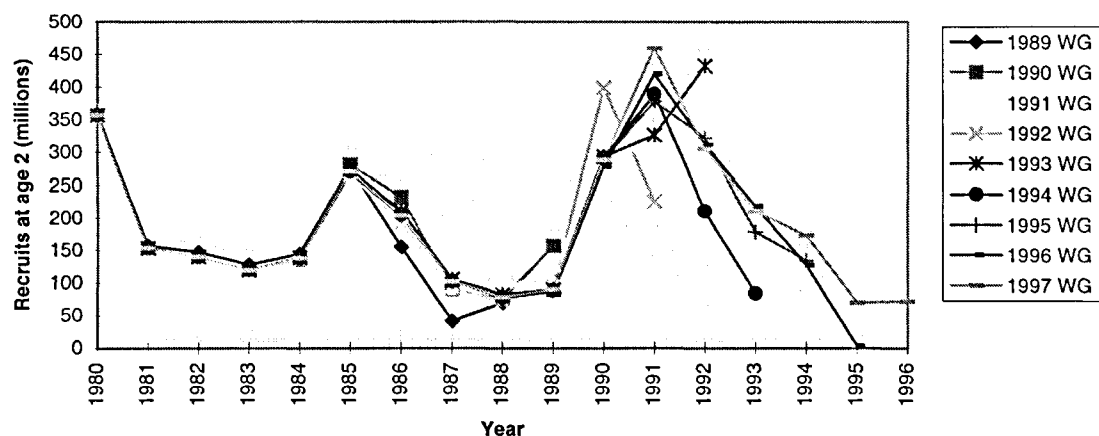
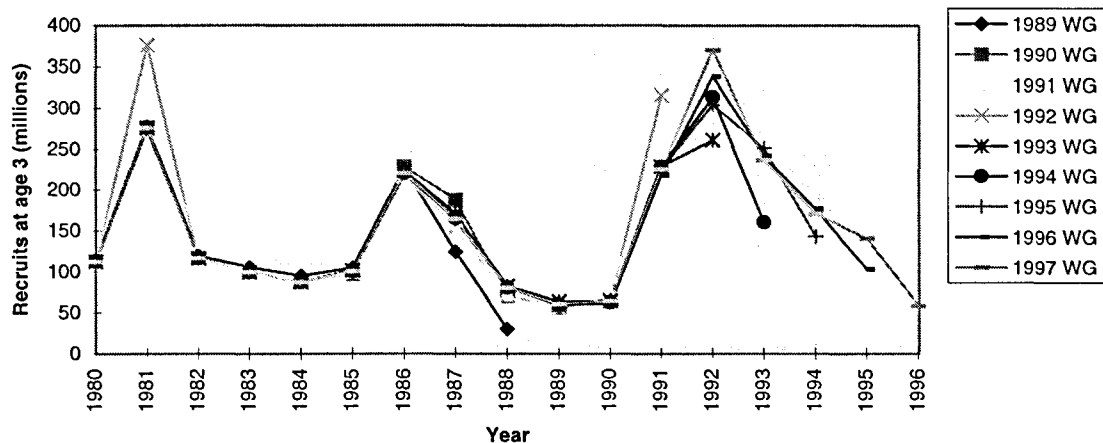


Figure 5.3C. North-East Arctic Saithe - Retrospective analysis



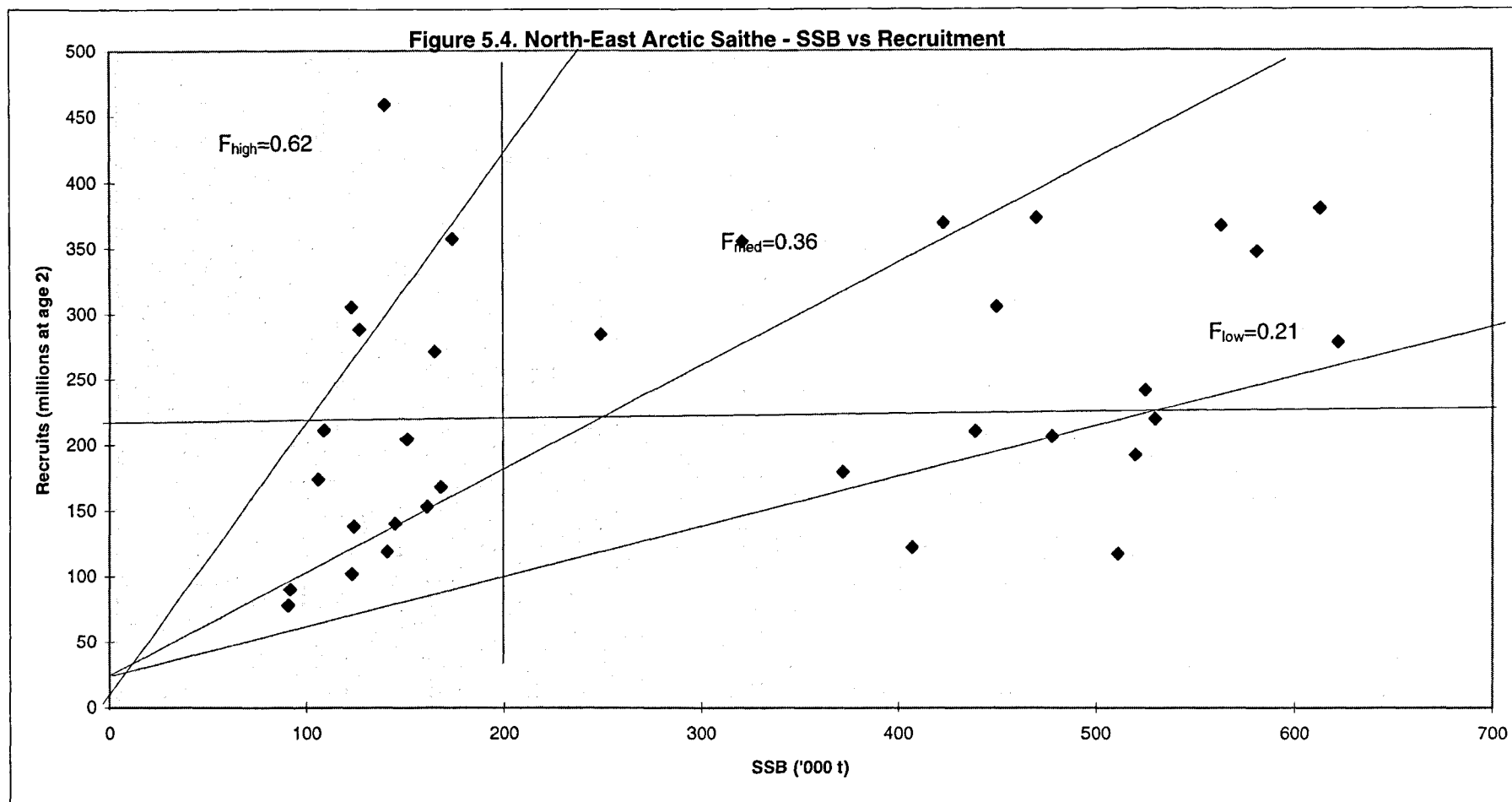


Figure 5.5A Quantiles of the SSB distribution, $F_{01}=0.099$

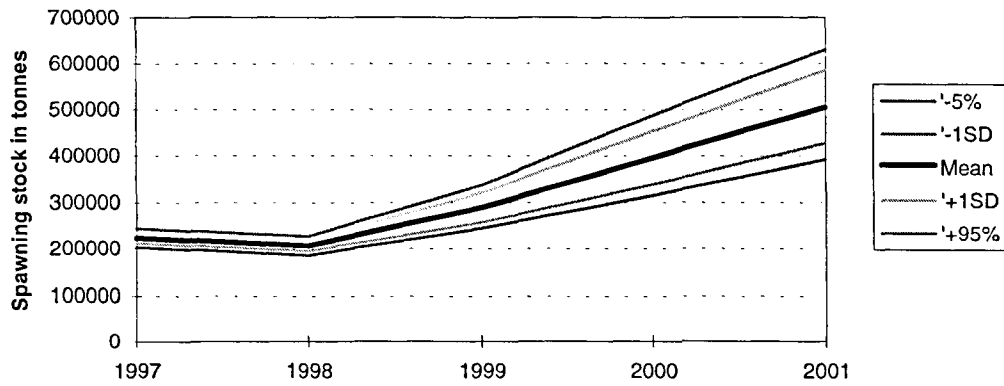


Figure 5.5B Quantiles of the SSB distribution, $F_{max}=0.1778$

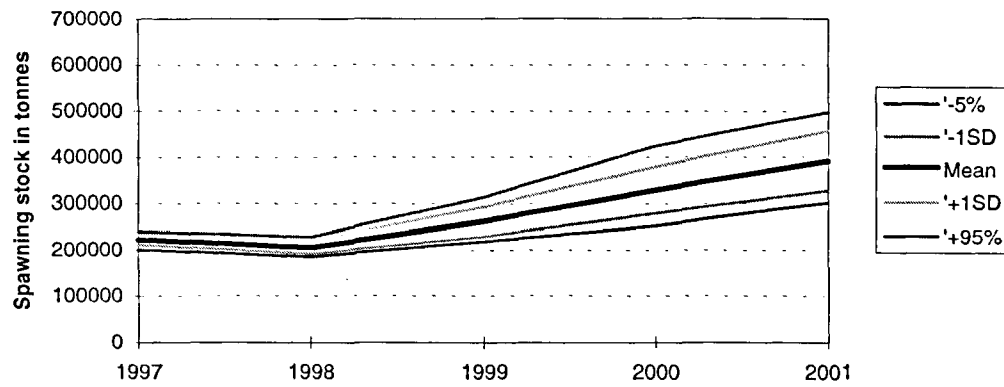


Figure 5.5C Quantiles of the SSB distribution, $F_{med}=0.36$

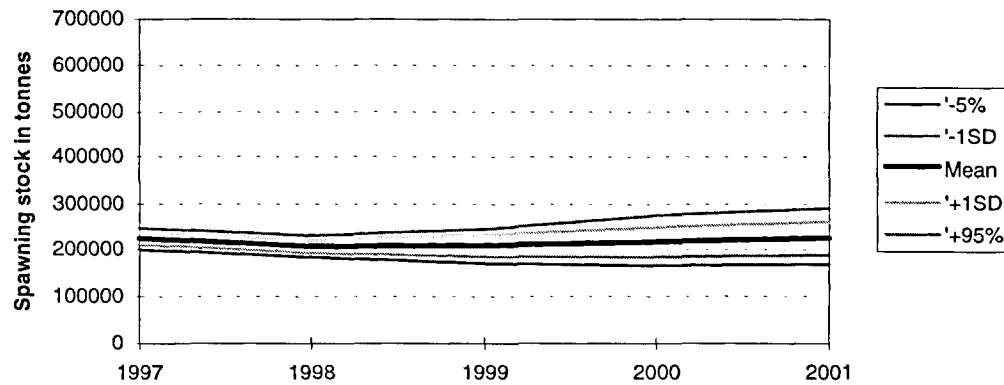


Figure 5.5D Quantiles of the SSB distribution, $F_{sq}=0.4325$

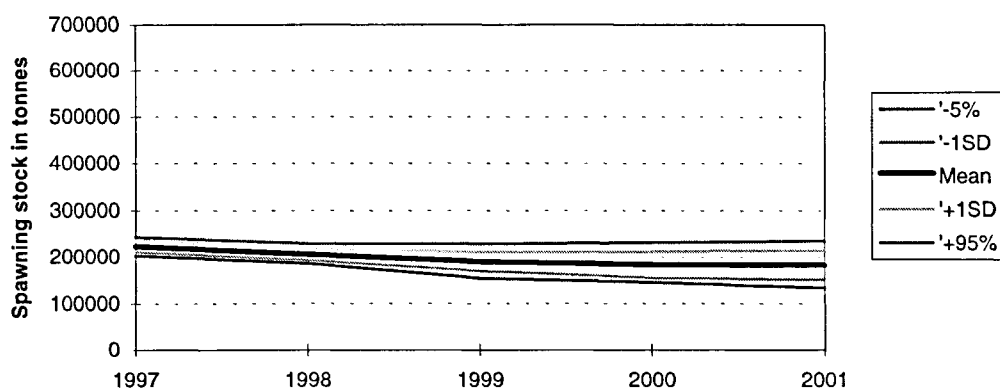
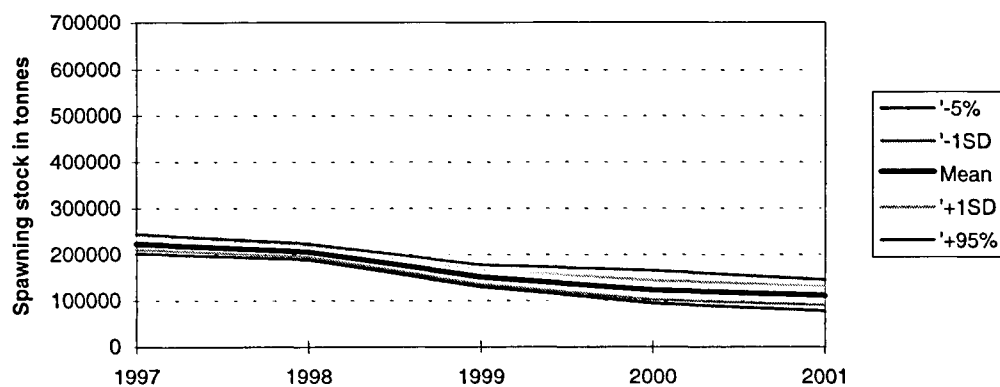


Figure 5.5E Quantiles of the SSB distribution, $F_{high}=0.62$



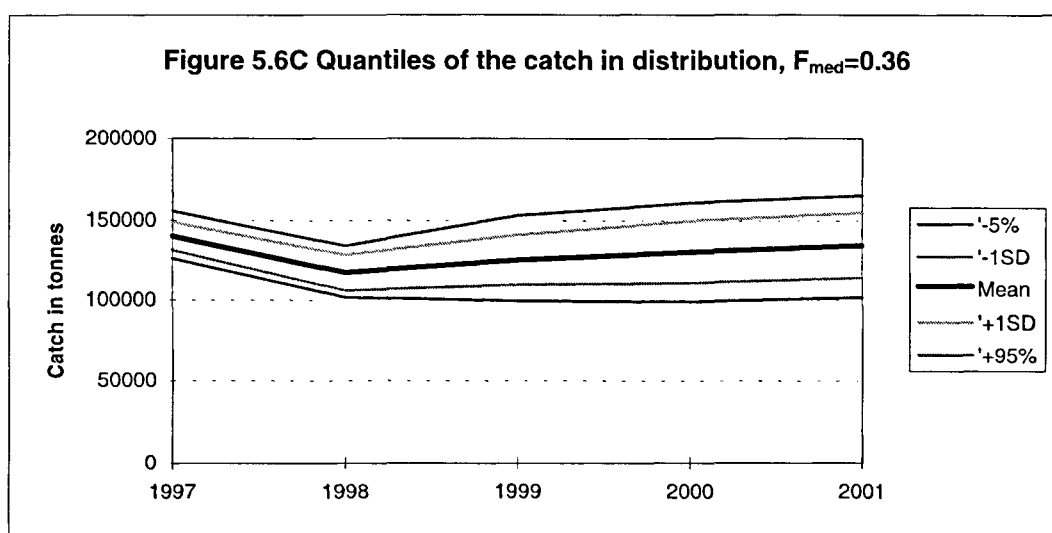
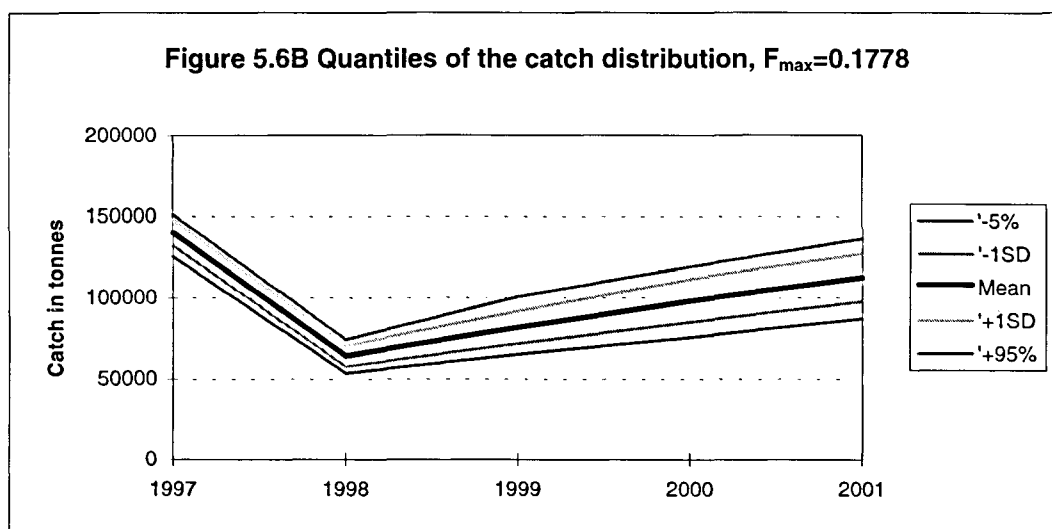
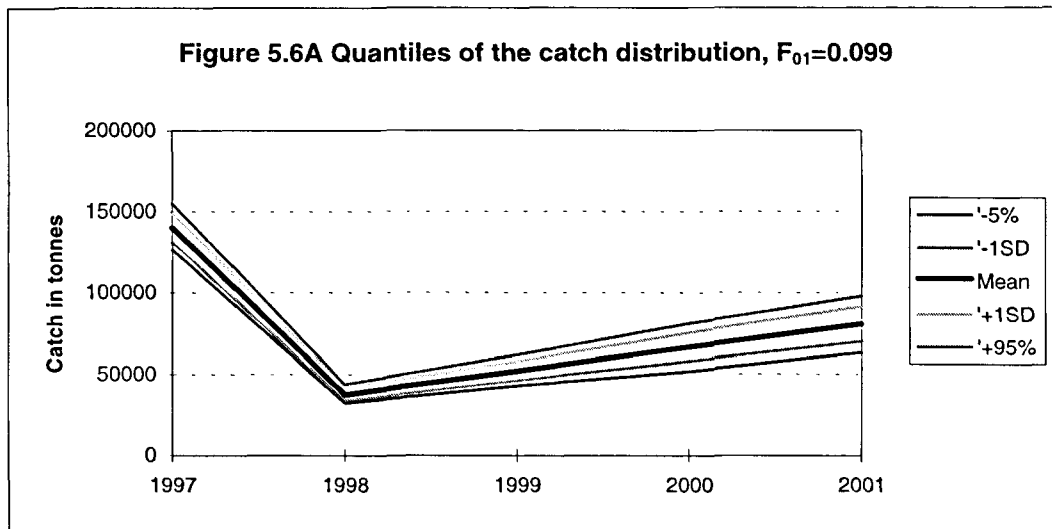


Figure 5.6D Quantiles of the catch distribution, $F_{sq}=0.4325$

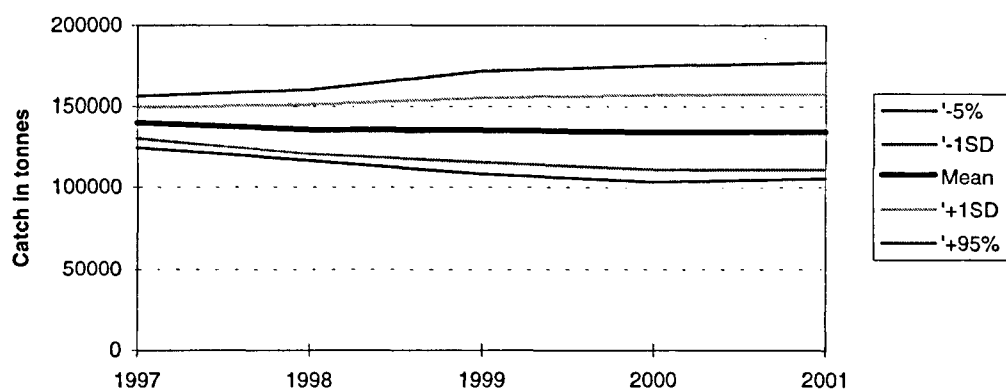


Figure 5.6E Quantiles of the catch distribution, $F_{high}=0.62$

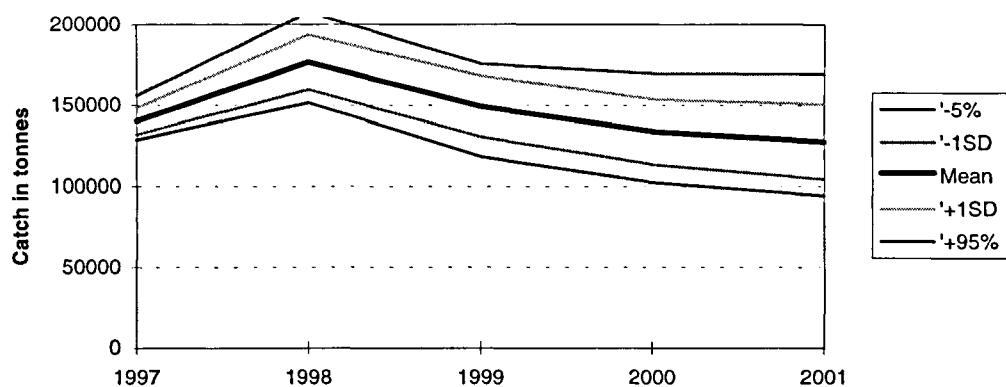


Figure 5.7A Quantiles of the SSB distribution, $F_{\text{new_size}}=0.33$

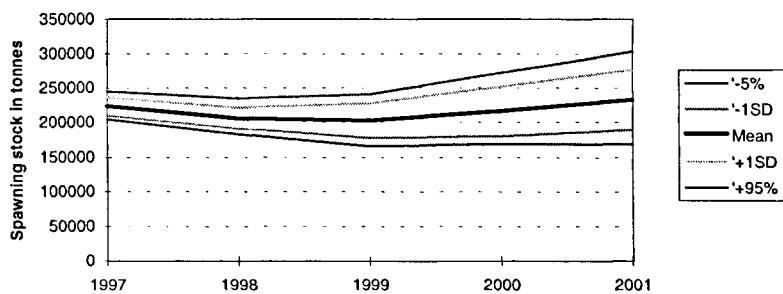


Figure 5.7B Quantiles of the SSB distribution, $F_{\text{new_size}}=0.36$

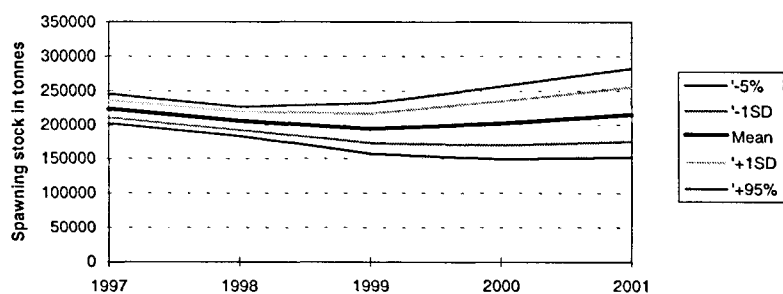


Figure 5.8A Quantiles of the catch in distribution, $F_{\text{new_size}}=0.33$

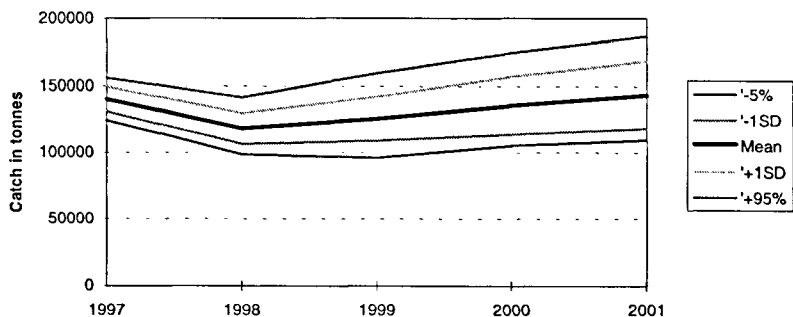


Figure 5.8B Quantiles of the catch indistribution, $F_{\text{new_size}}=0.36$

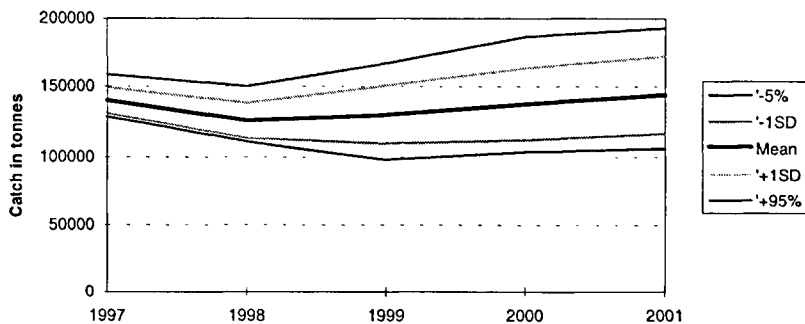


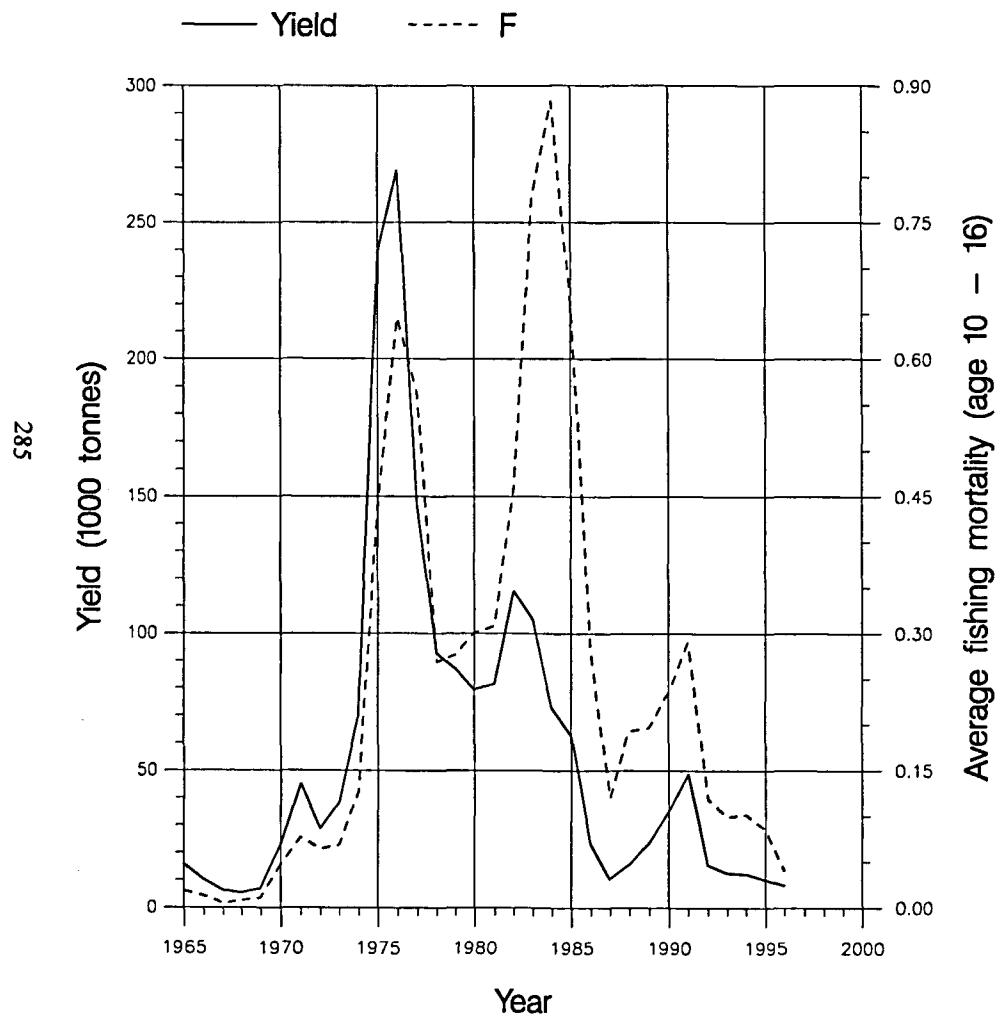
Figure 6.1a,b

Fish Stock Summary

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

26-8-1997

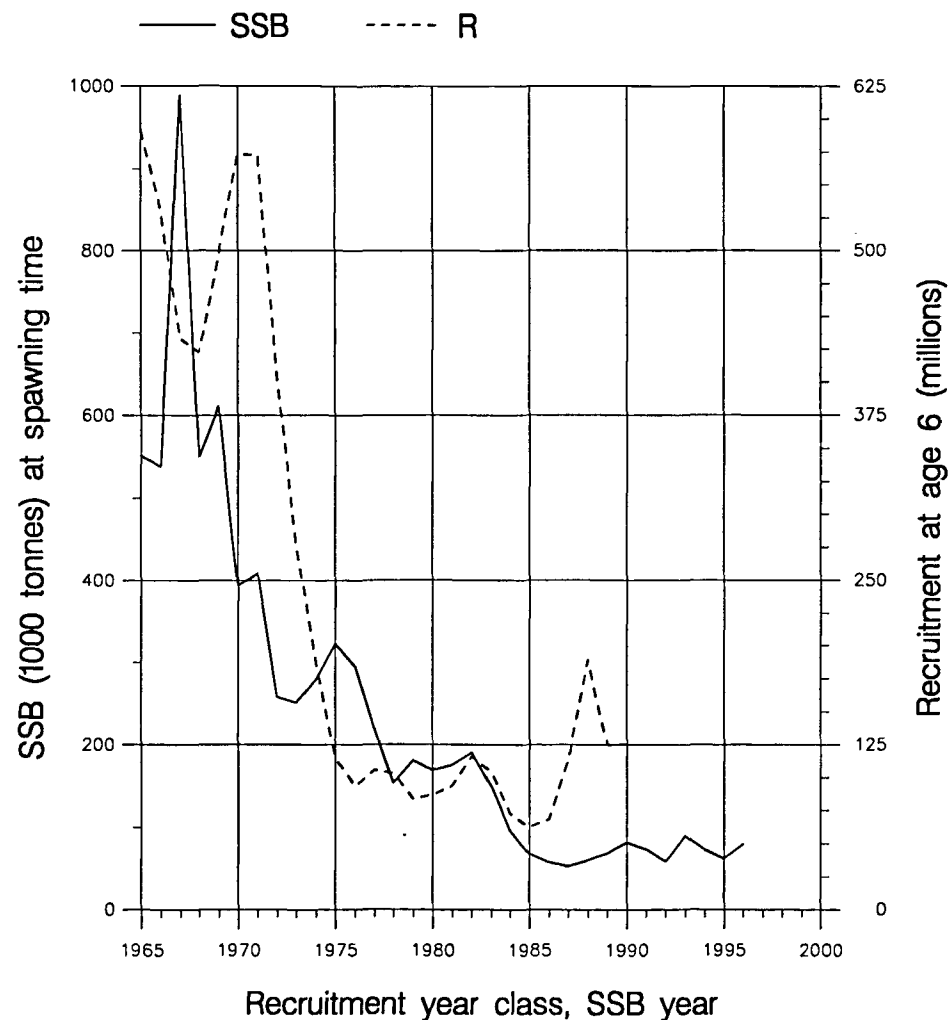
Yield and fishing mortality



(run: SVPKHN01)

A

Spawning stock and recruitment



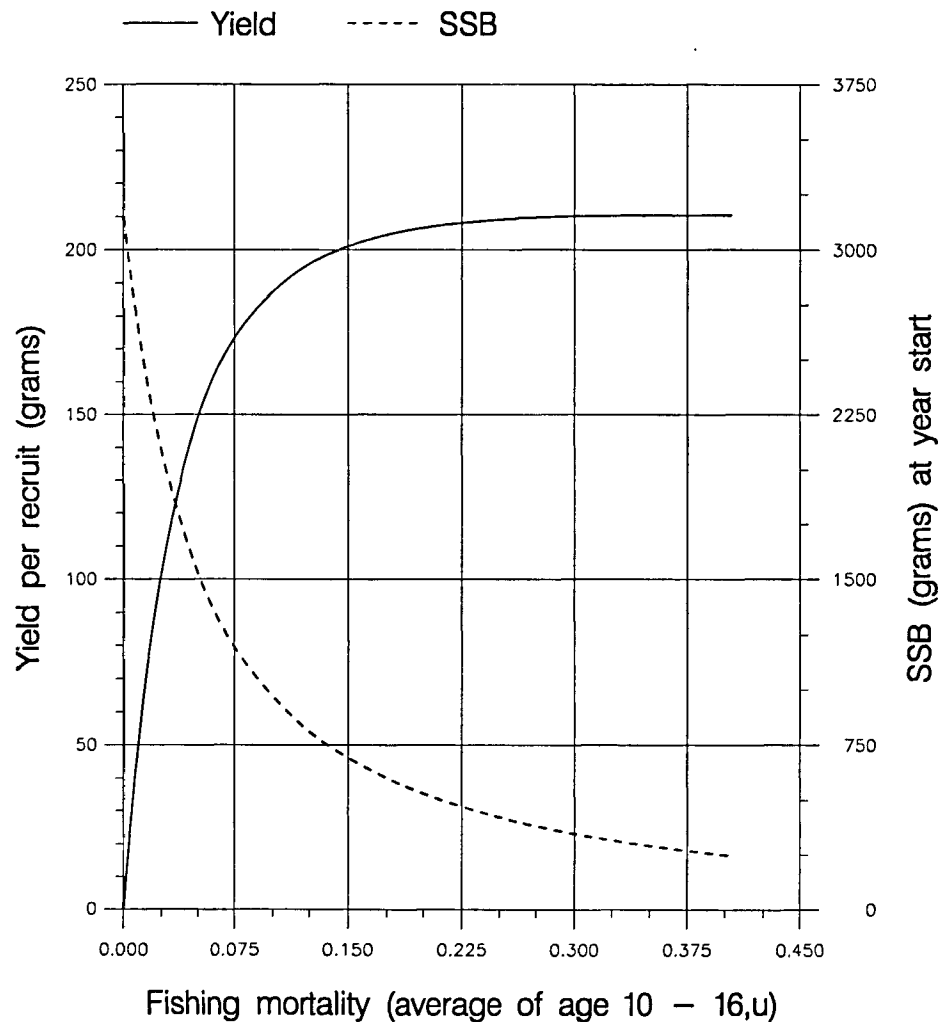
(run: SVPKHN01)

B

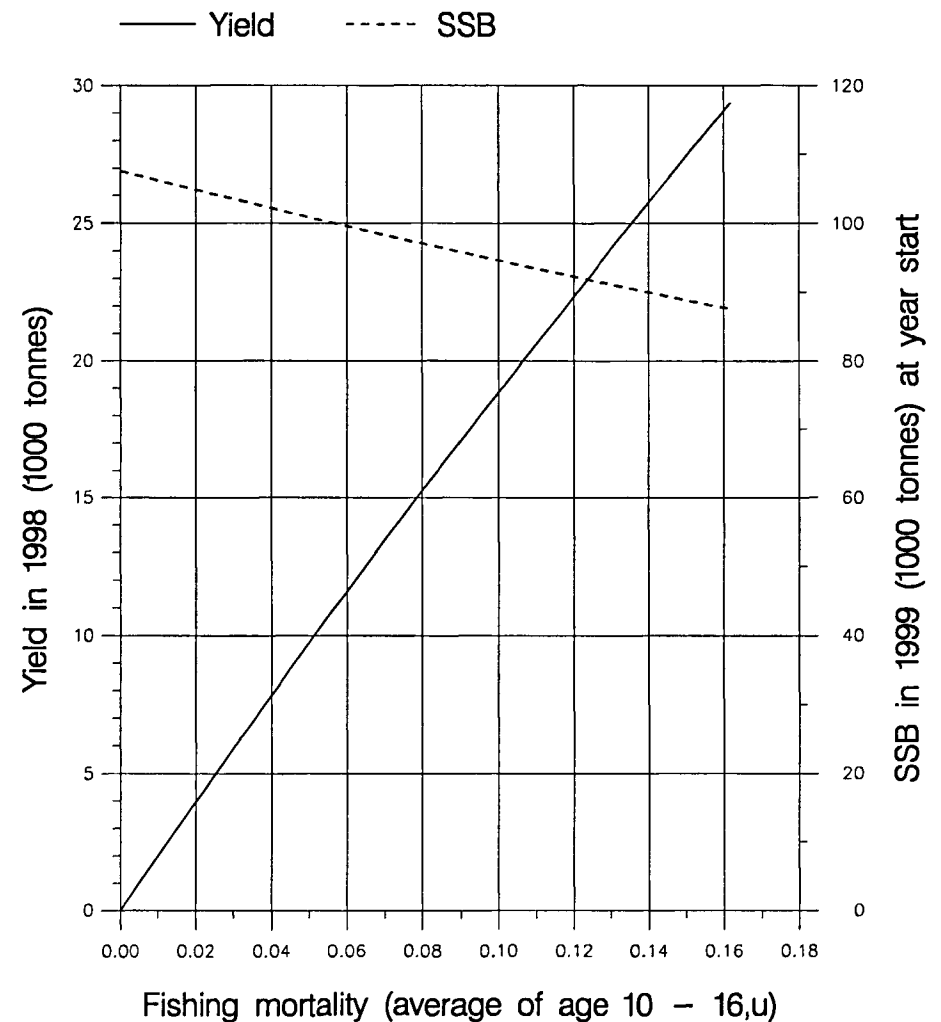
Figure 6.1c,d

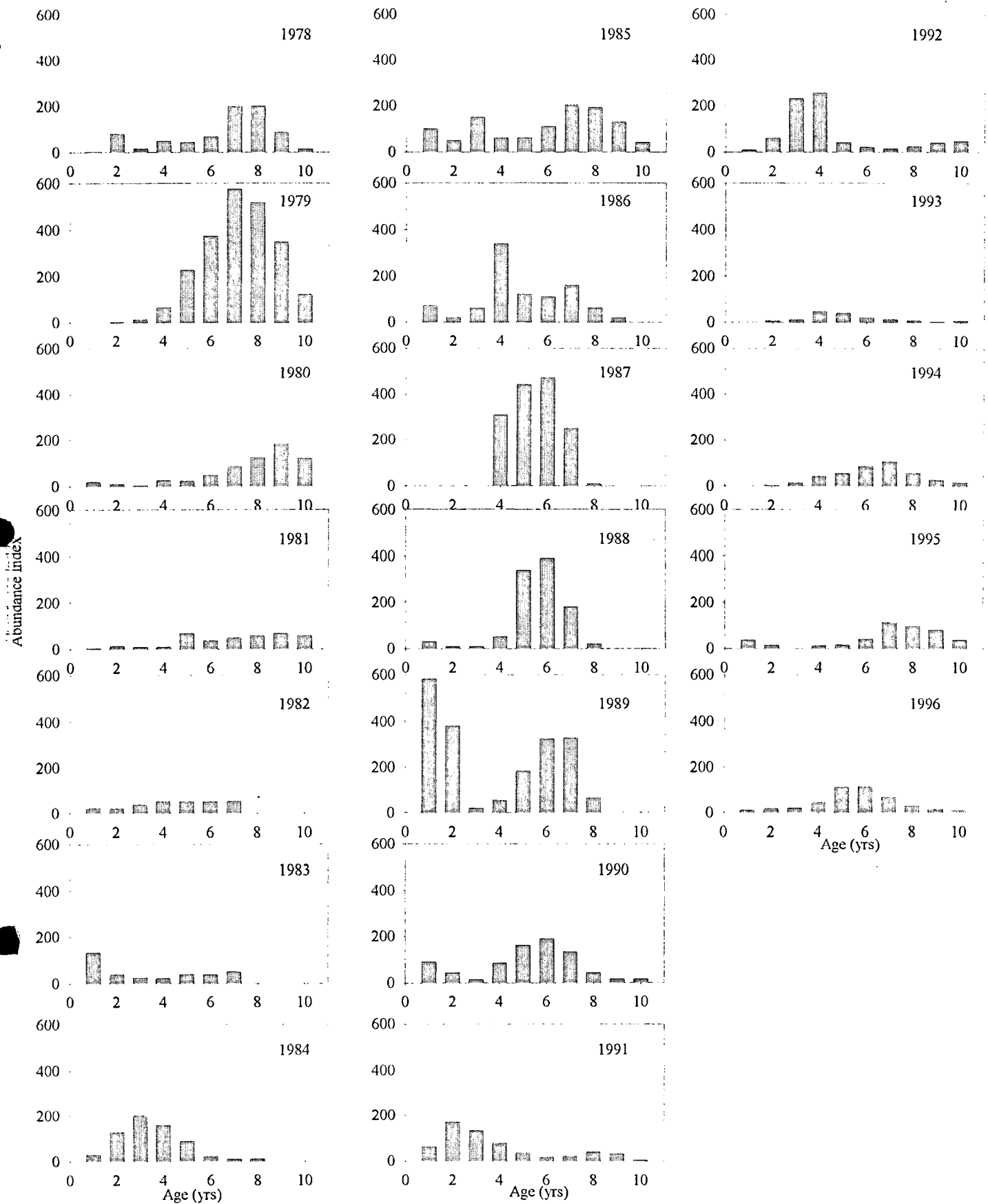
Fish Stock Summary *Sebastes mentella* in the North-East Arctic (Areas I & II) 27-8-1997

Long term yield and spawning stock biomass



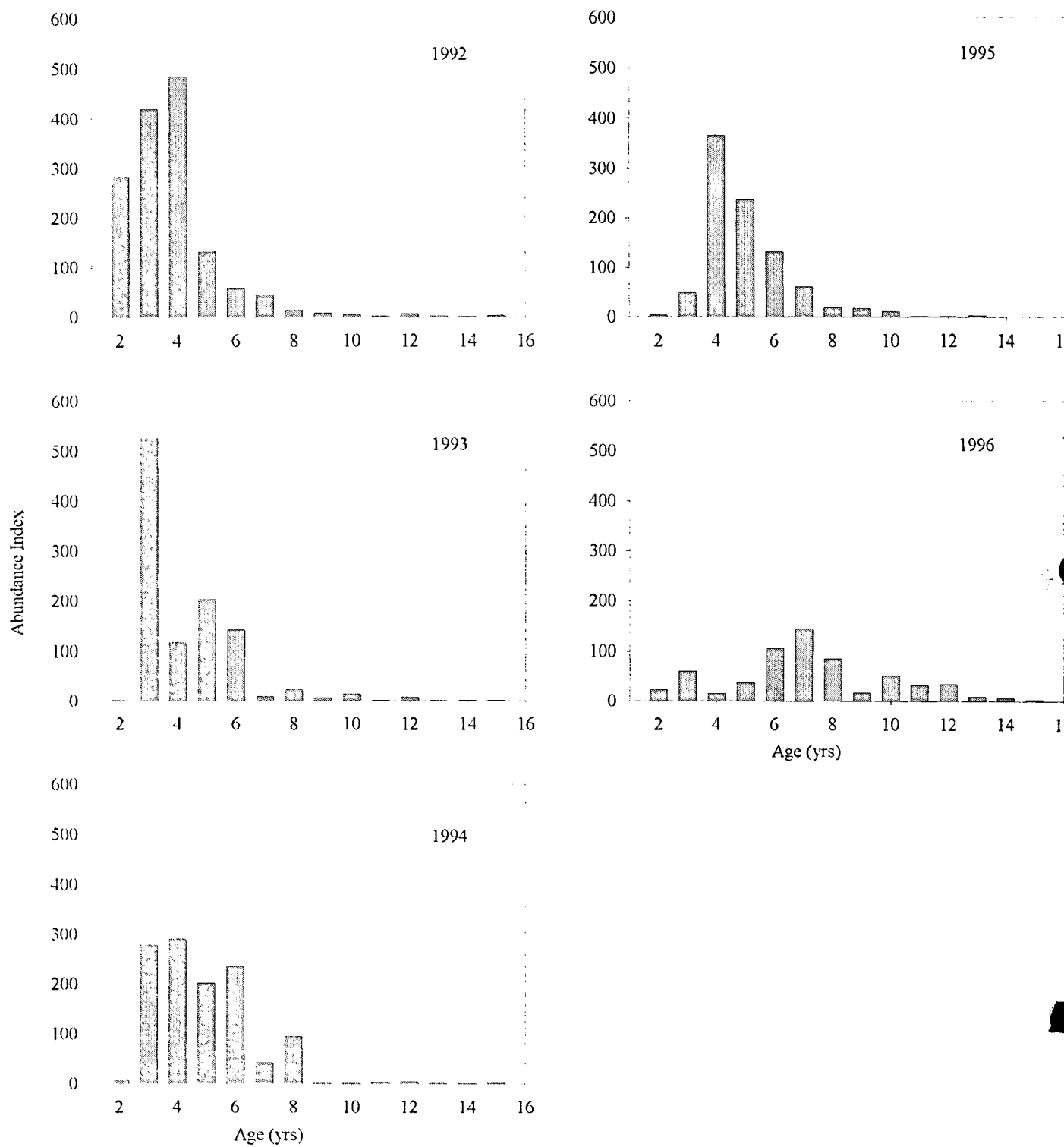
Short term yield and spawning stock biomass





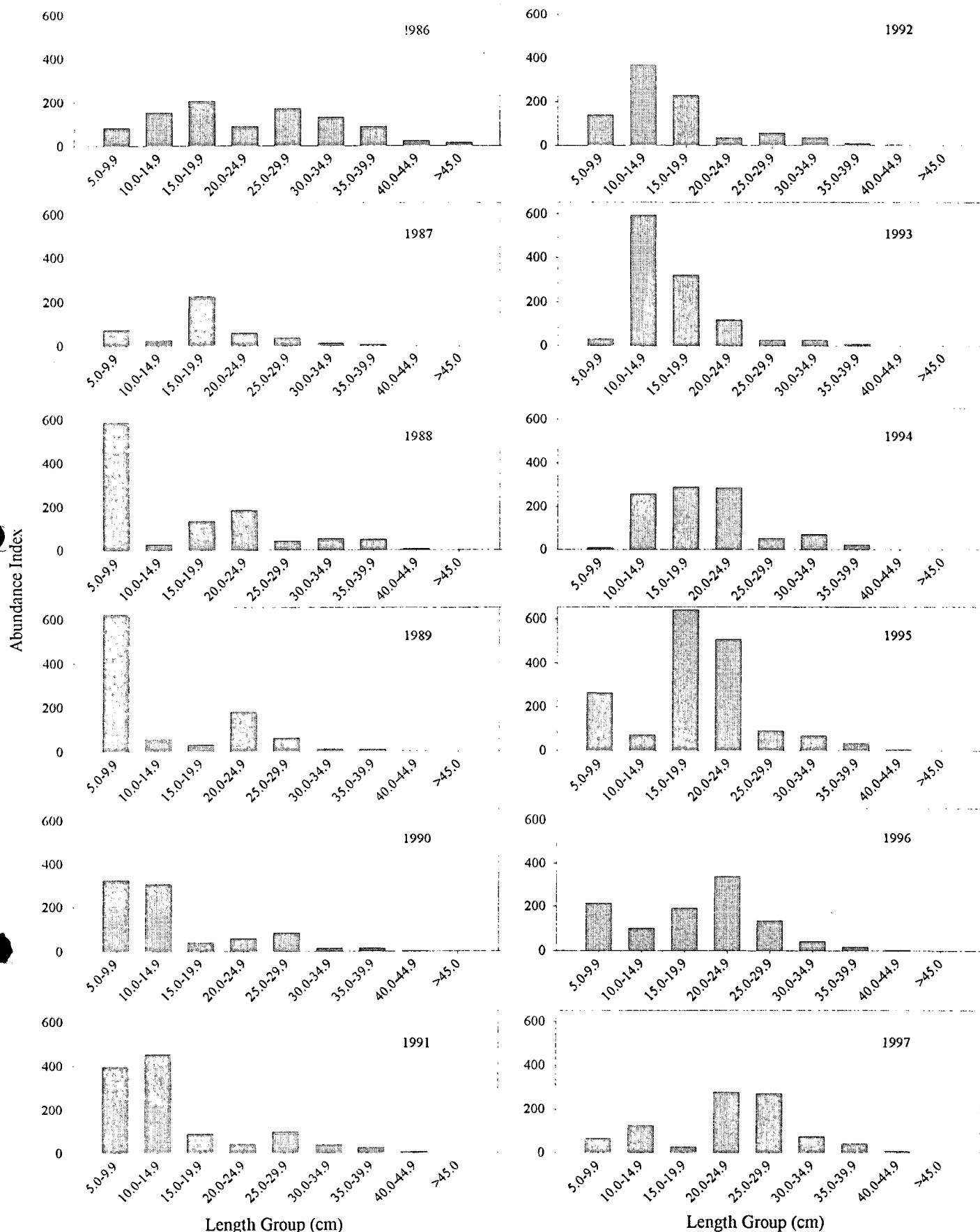
Abundance index at age (nos. per hour trawled) for *Sebastes mentella* from the Russian groundfish surveys during 1978-96.

Figure 6.2A



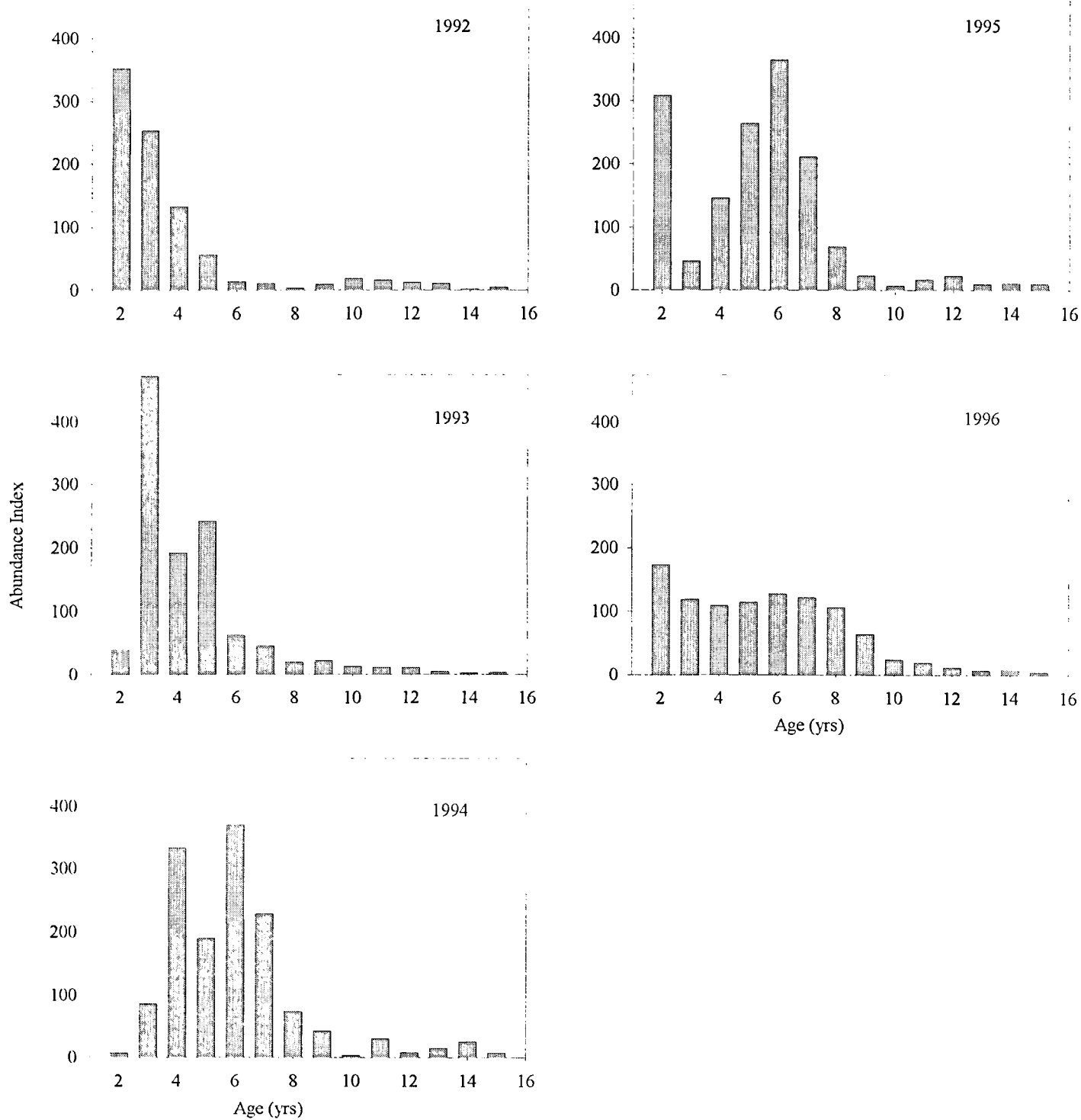
Abundance index at age for *Sebastes mentella* from the Norwegian Svalbard bottom trawl surveys during 1992-96.

Figure 6.2B



Size distribution by length category (cm) of *Sebastes mentella* from Norwegian Barents Sea bottom trawl surveys during 1986-97.

Figure 6.2C



Abundance index at age for *Sebastes mentella* from the Norwegian Barents Sea bottom trawl surveys during 1992-96.

Figure 6.2D

Figure 6.3A. *Sebastes mentella* in Sub-areas I and II. Russian bottom trawl survey vs VPA

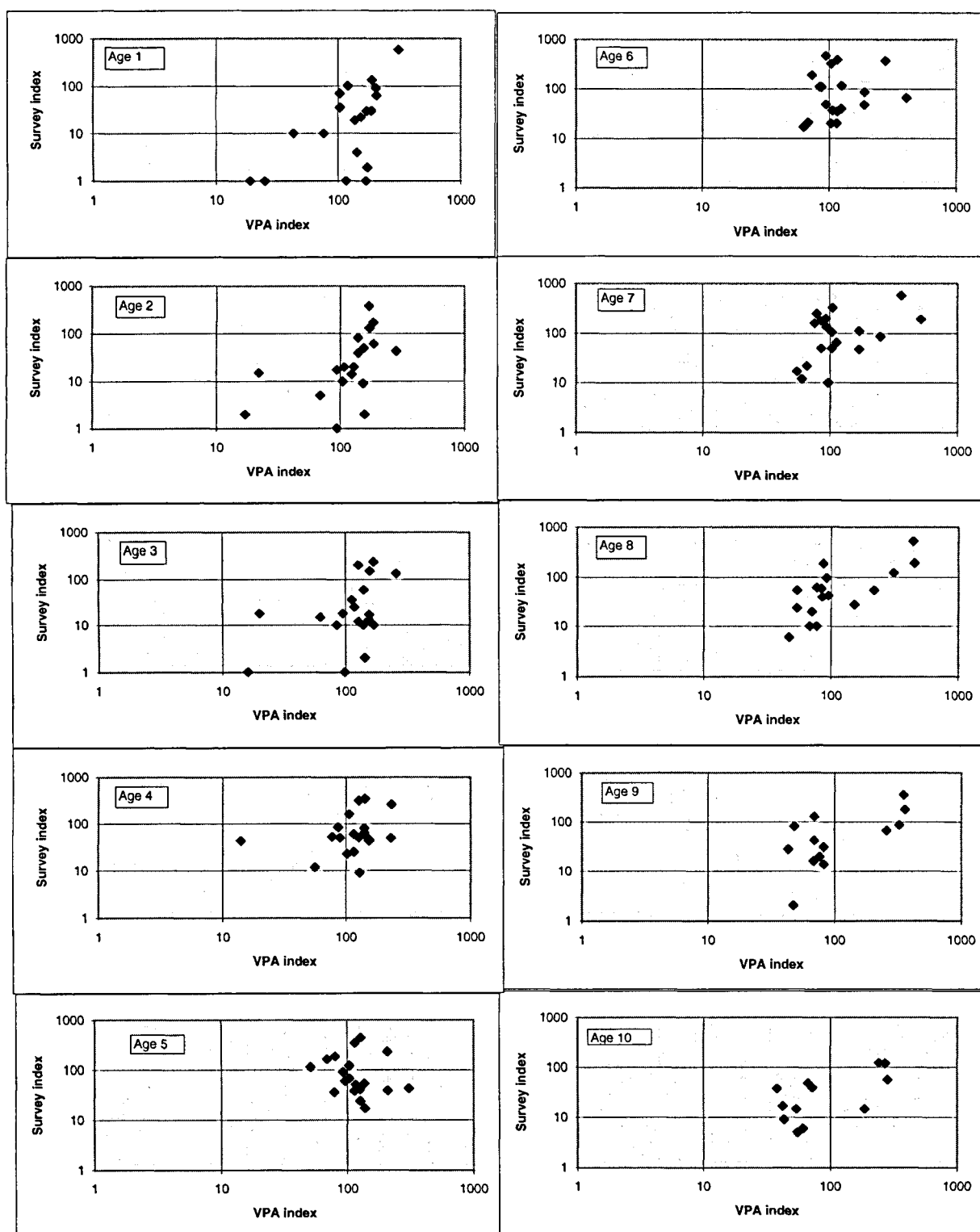


Figure 6.3B. *Sebastes mentella* in Sub-areas I and II. Russian PST trawl survey cpue vs VPA

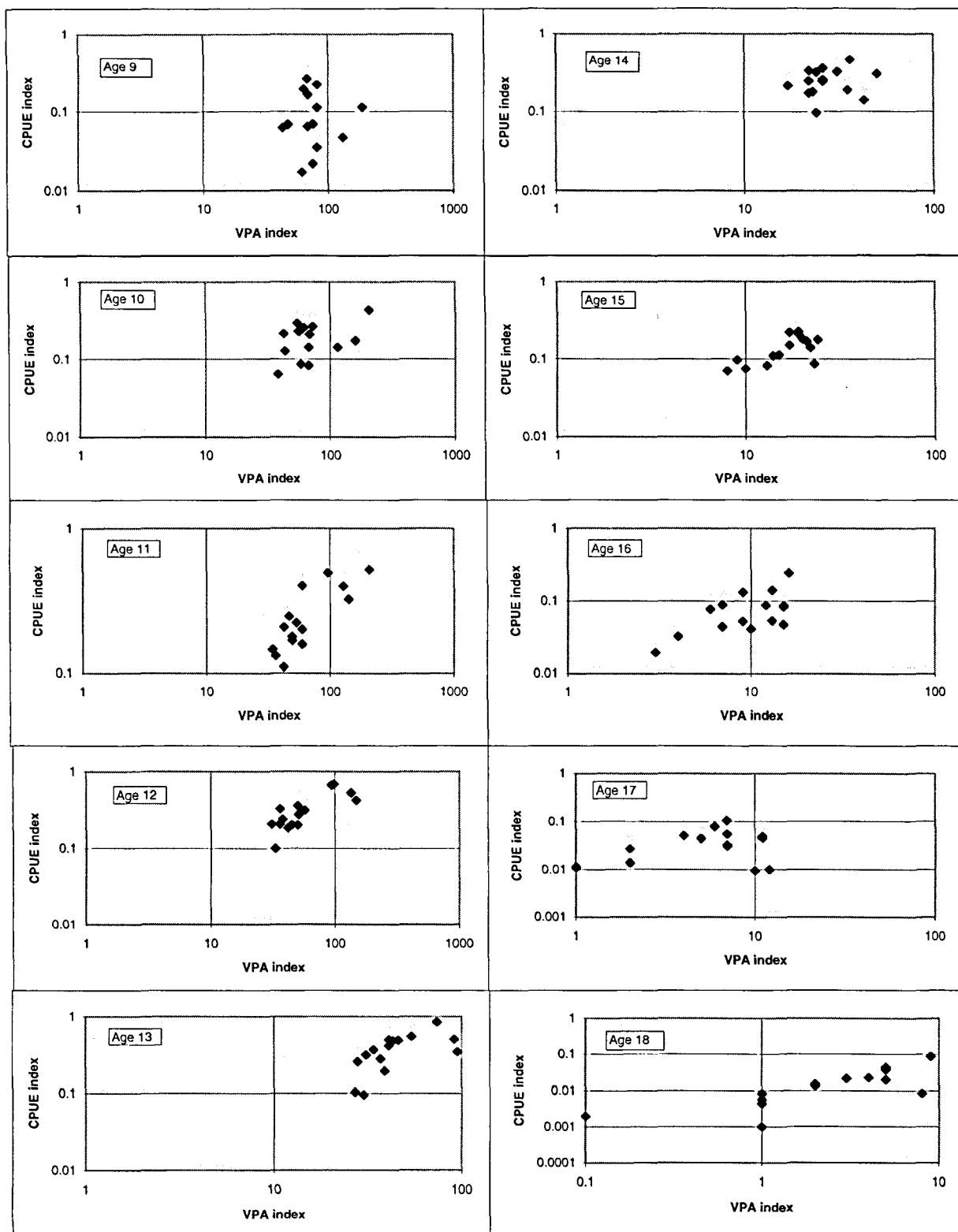


Figure 6.3C. *Sebastes mentella* in Sub-areas I and II. Norwegian bottom trawl survey (Svalbard) vs VPA

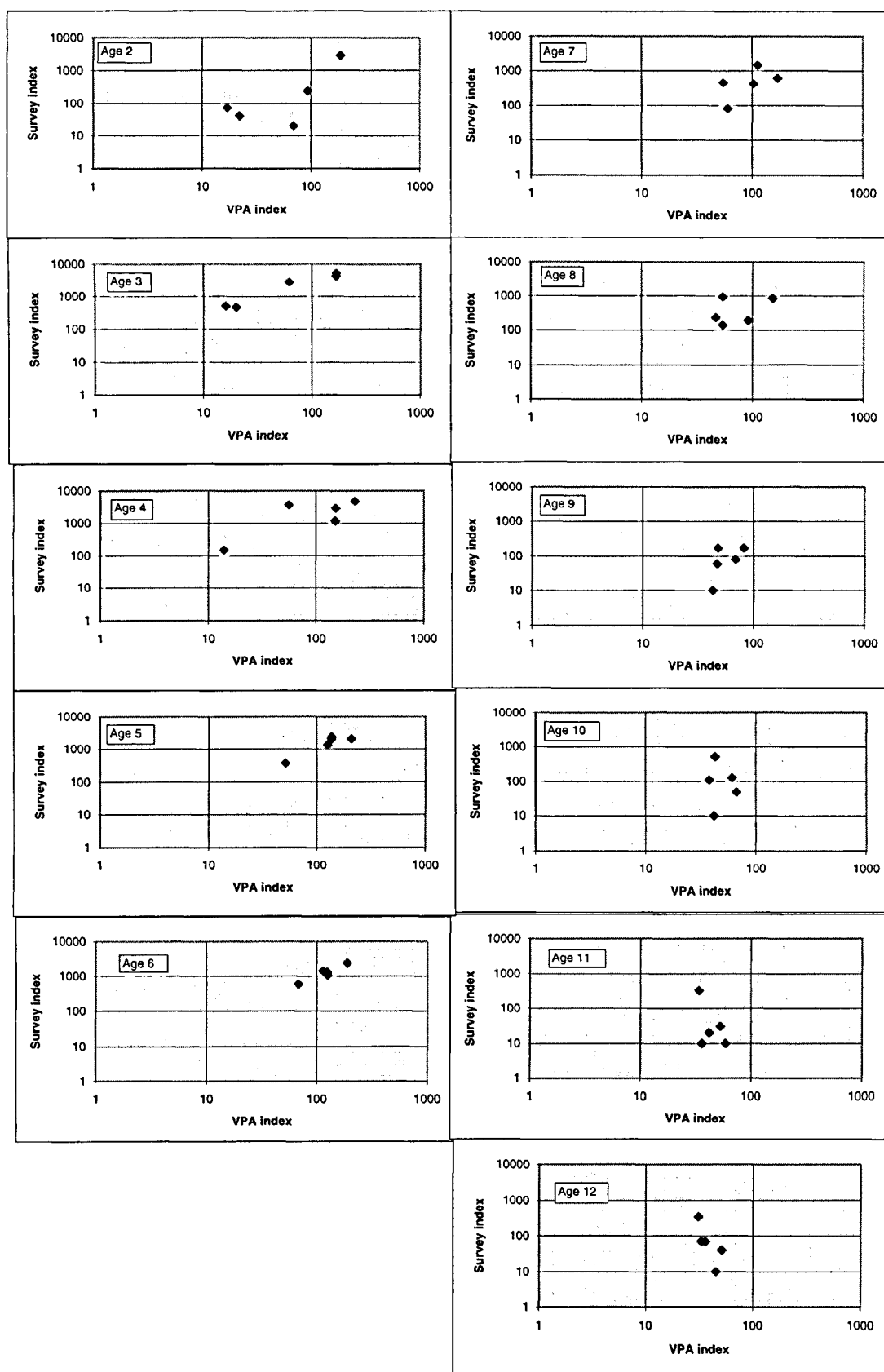
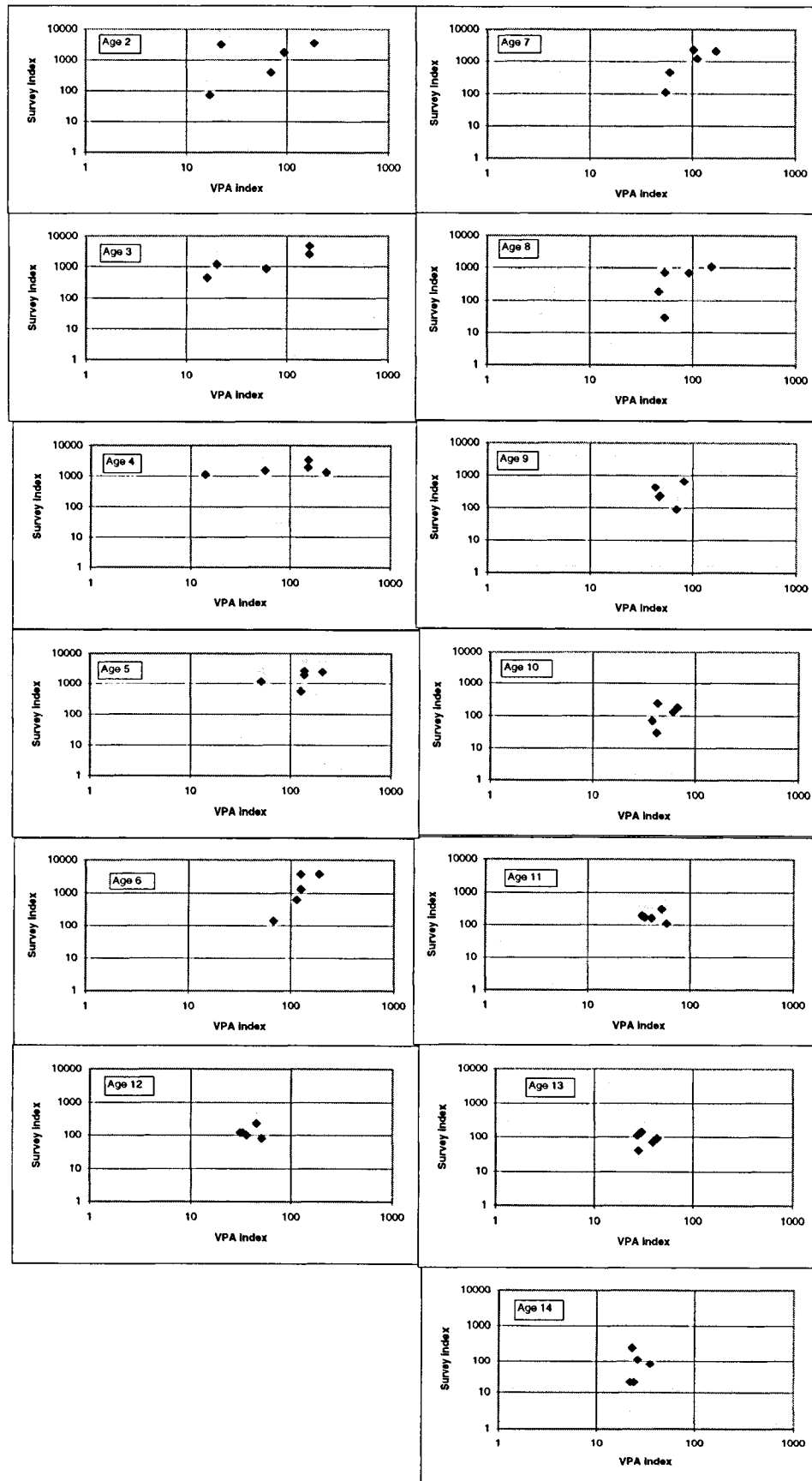
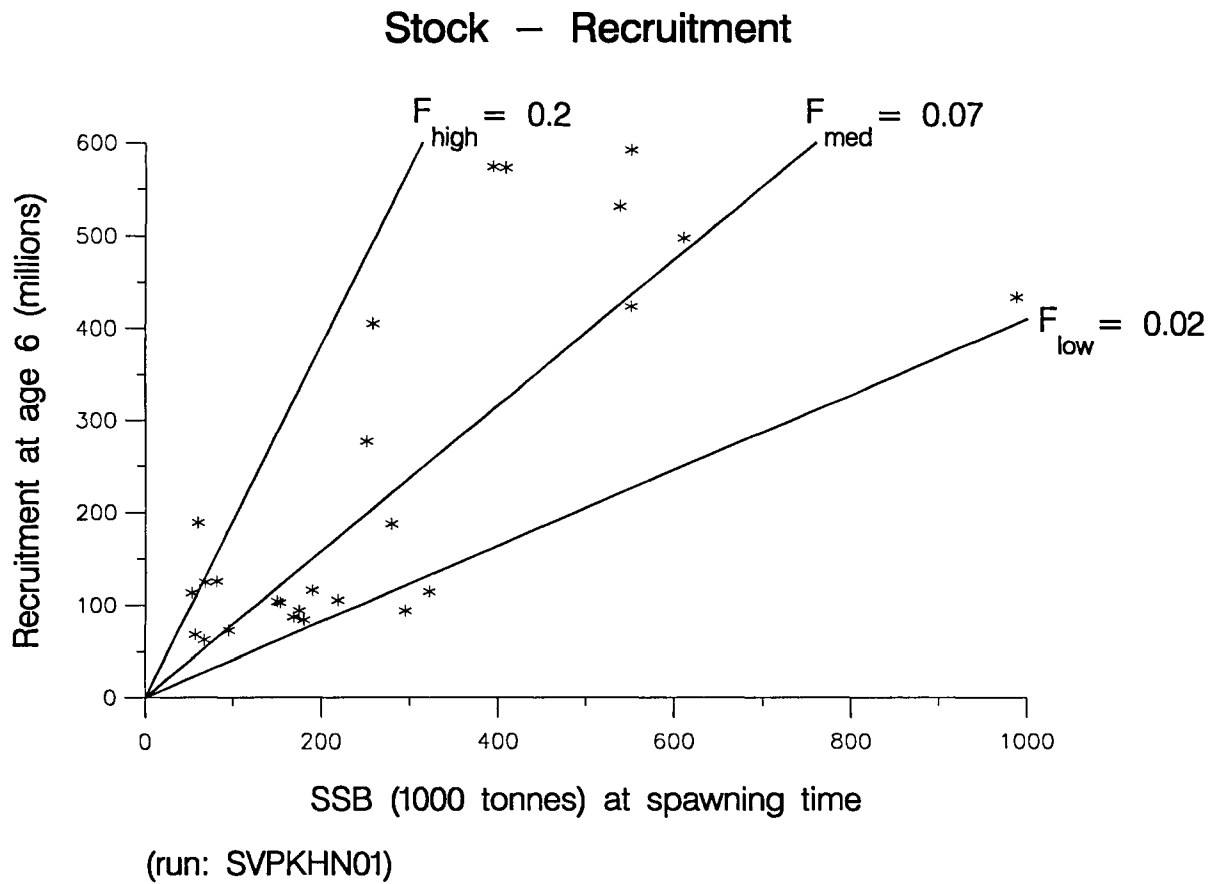


Figure 6.3D. *Sebastes mentella* in Sub-areas I and II. Norwegian bottom trawl survey (Barents Sea) vs VPA



Sebastes mentella in the North-East Arctic (Areas I & II)
26 - 8 - 1997

Figure 6.4



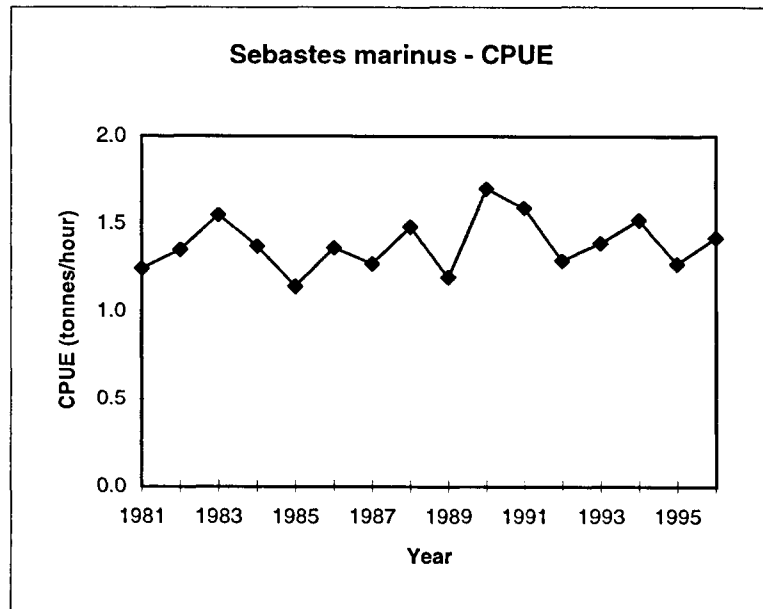
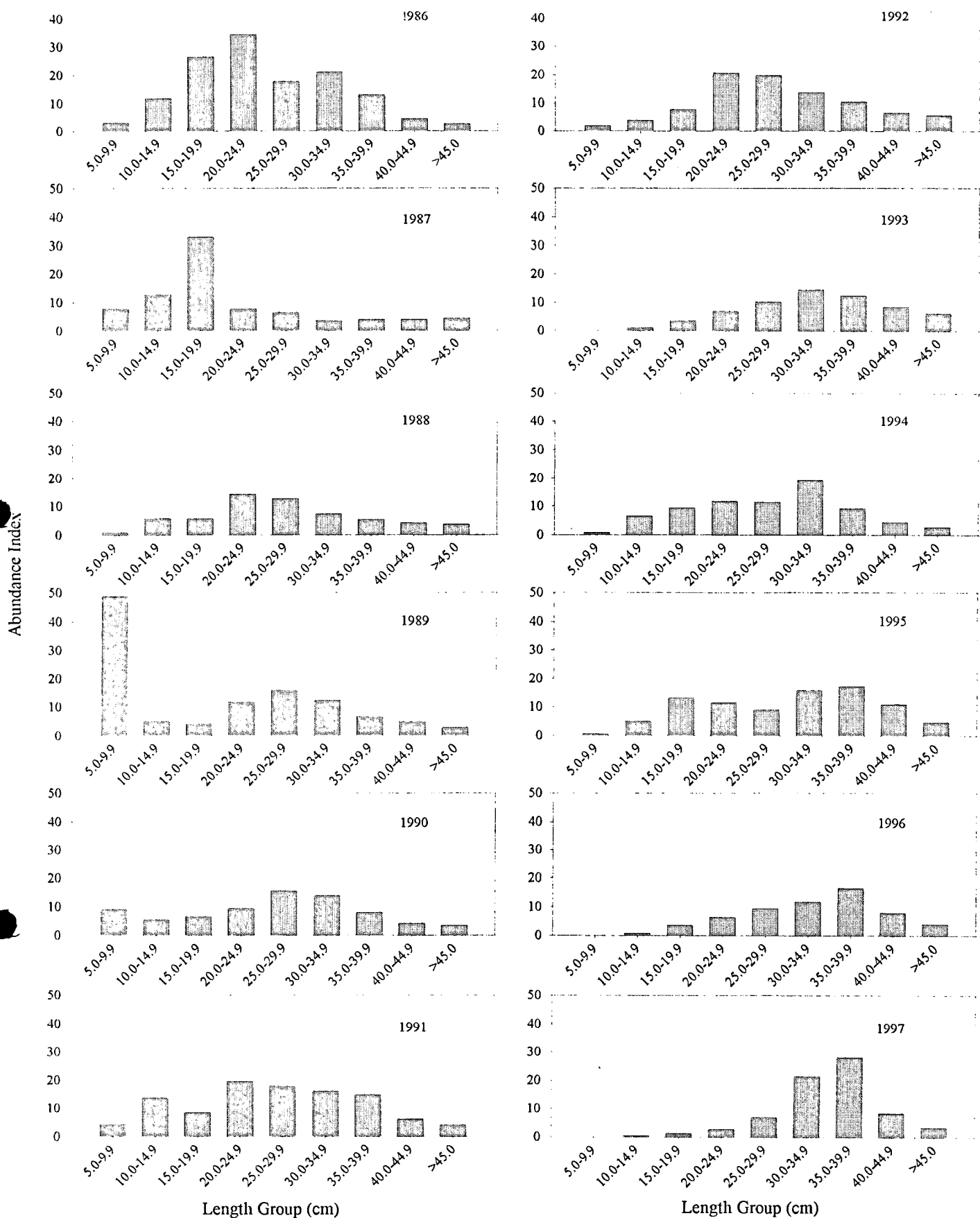
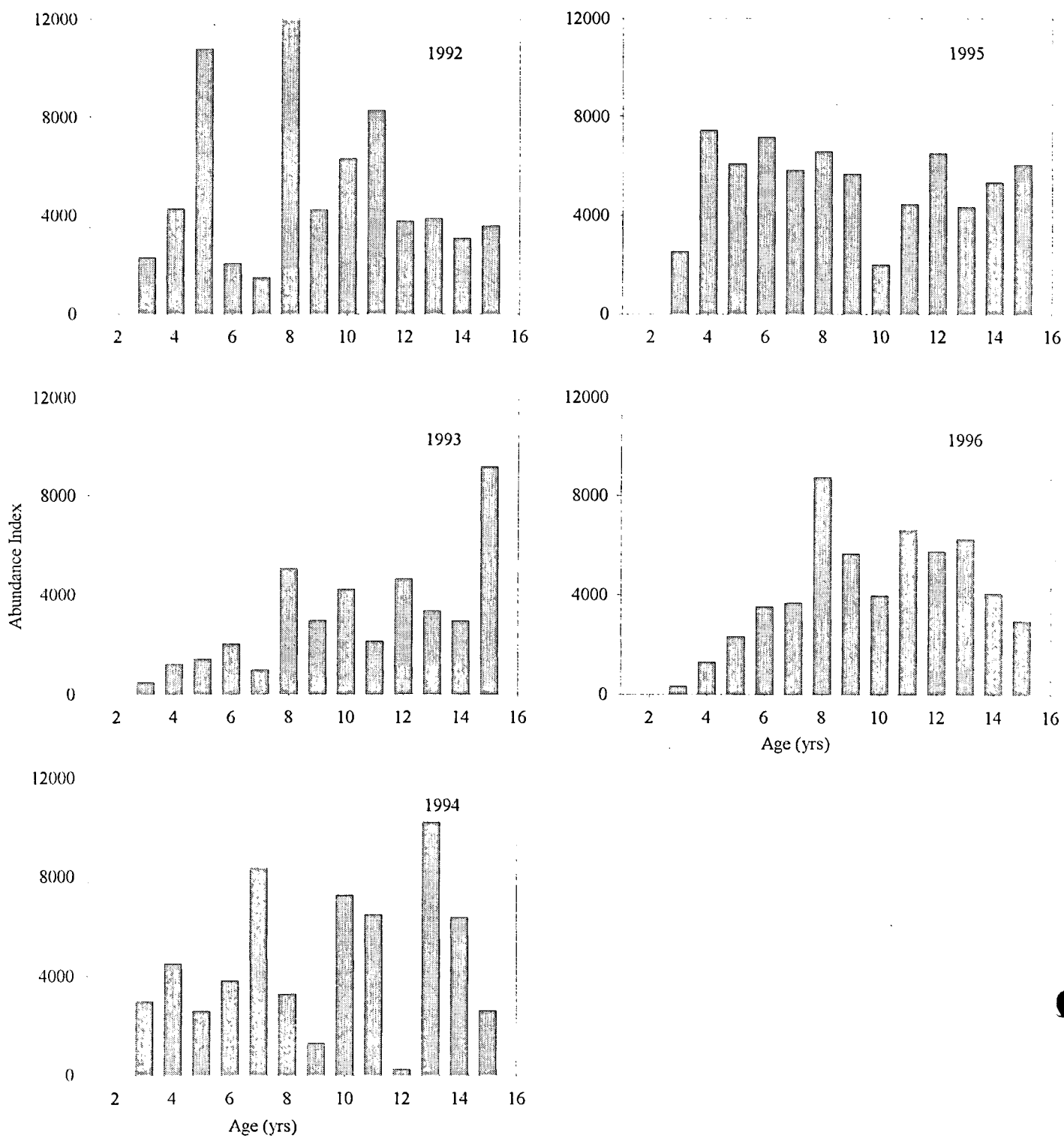


Figure 7.1. Plot of CPUE based on logbook information. Only trips where *S. marinus* composed more than 50% of total catch were included in a GLM-analysis.



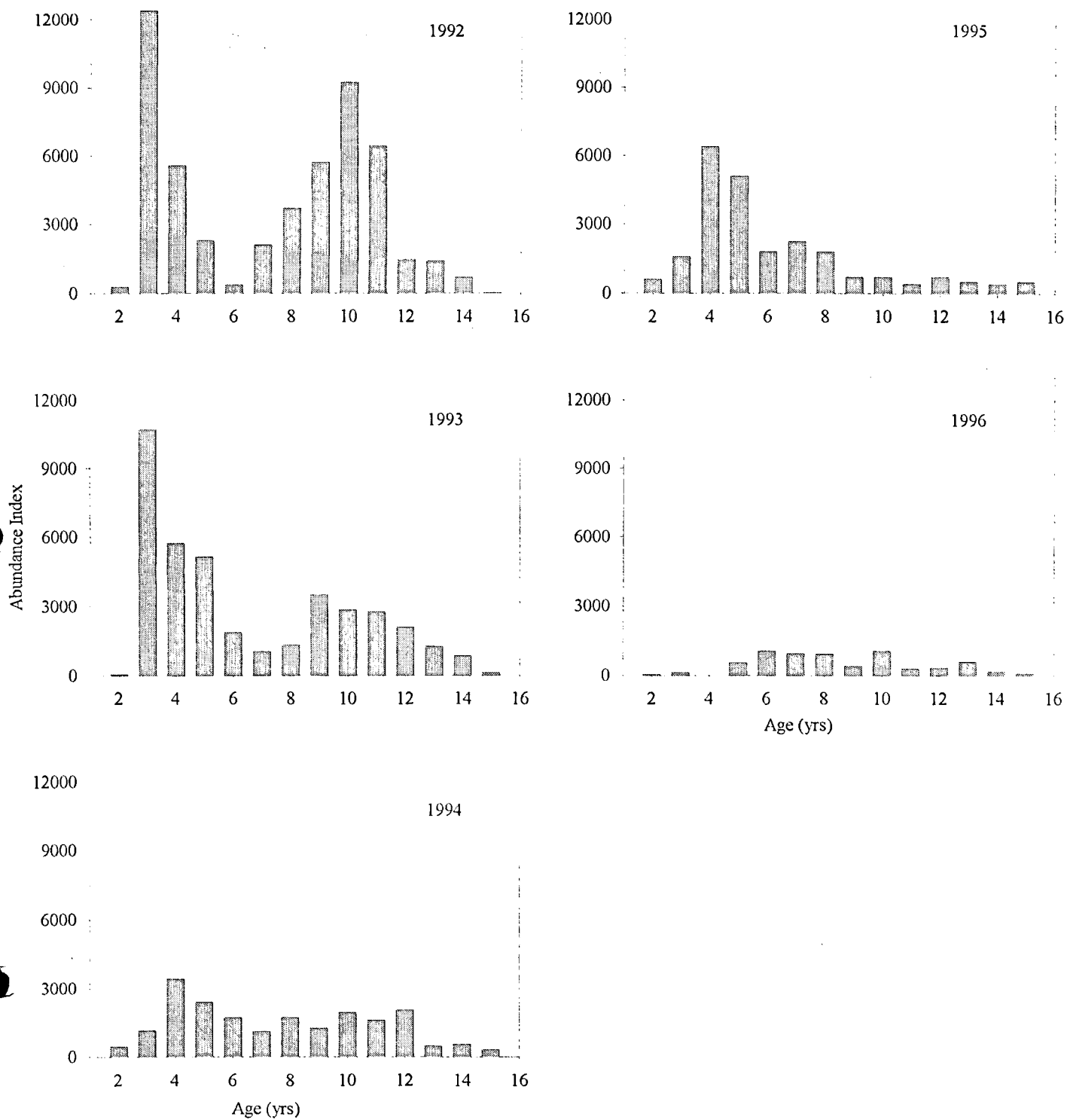
Size distribution by length category (cm) of *Sebastes marinus* from Norwegian Barents Sea bottom trawl surveys during 1986-97.

Figure 7.2



Abundance index at age for *Sebastes marinus* from the Norwegian Barents Sea bottom trawl surveys during 1992-96.

Figure 7.3



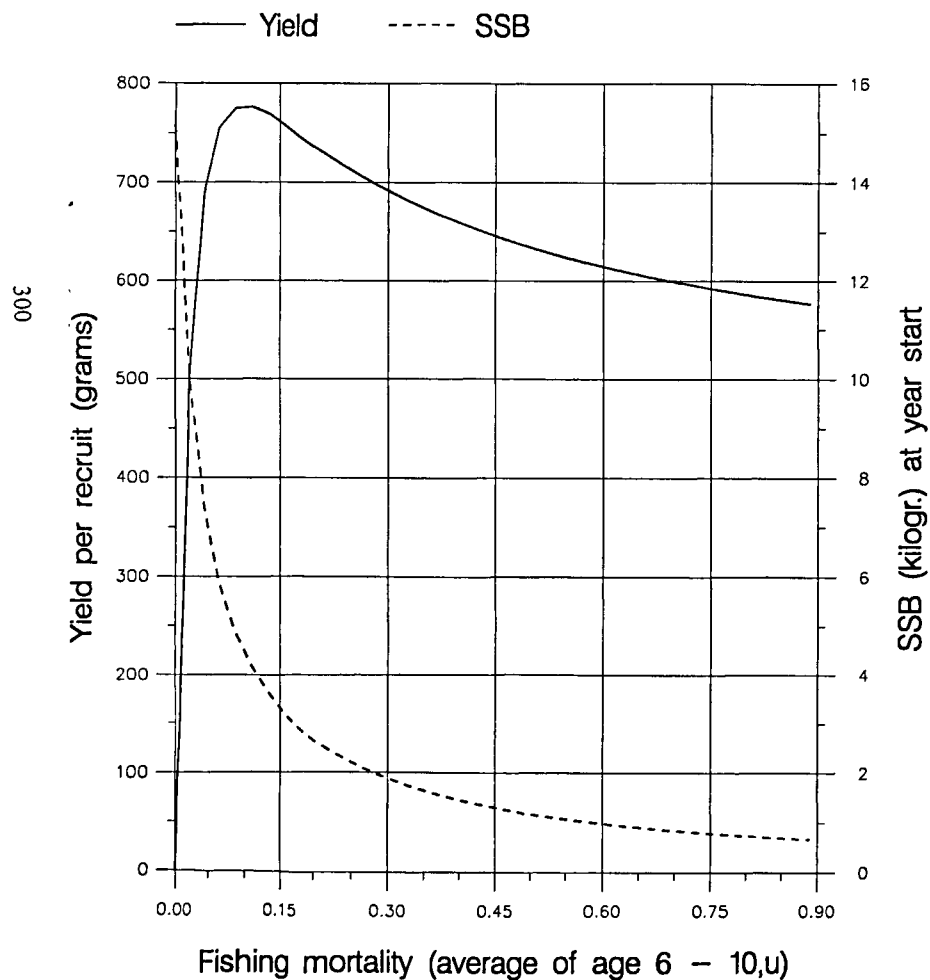
Abundance index at age for *Sebastes marinus* from the Norwegian Svalbard bottom trawl surveys during 1992-96.

Figure 7.4

Figure 8.1

Fish Stock Summary Greenland halibut in the North-East Arctic (Areas I & II) 27-8-1997

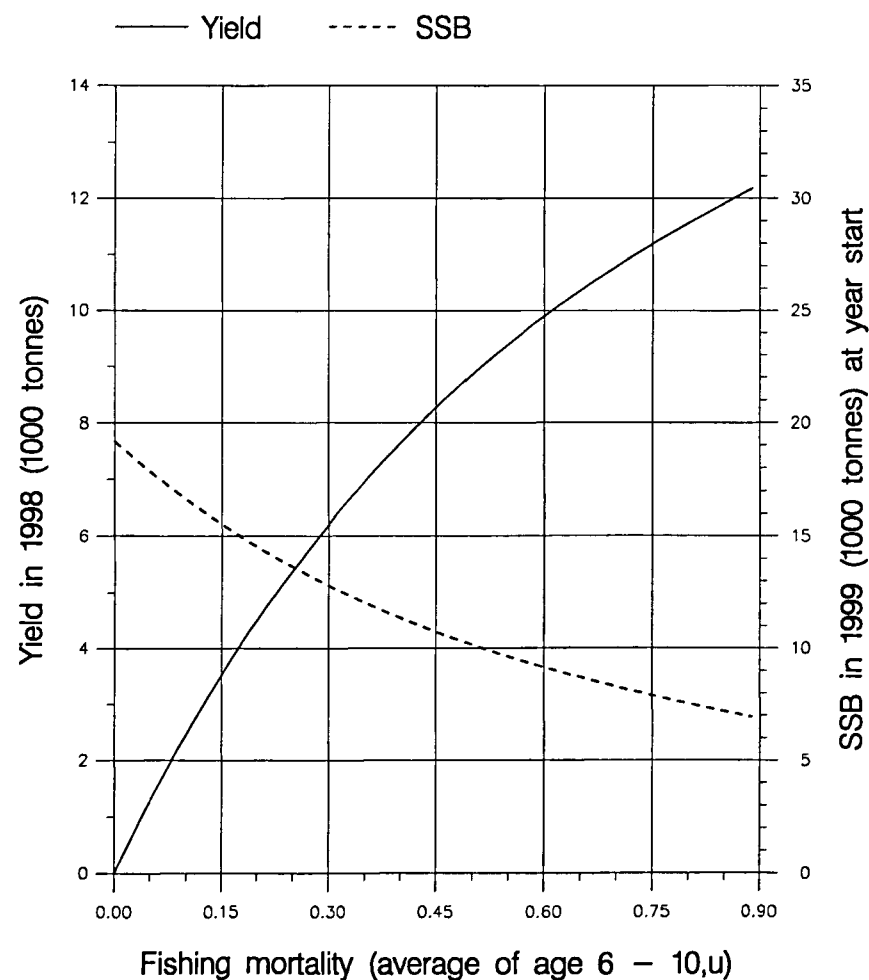
Long term yield and spawning stock biomass



(run: YLDOLE01)

C

Short term yield and spawning stock biomass



(run: MANHS02)

D

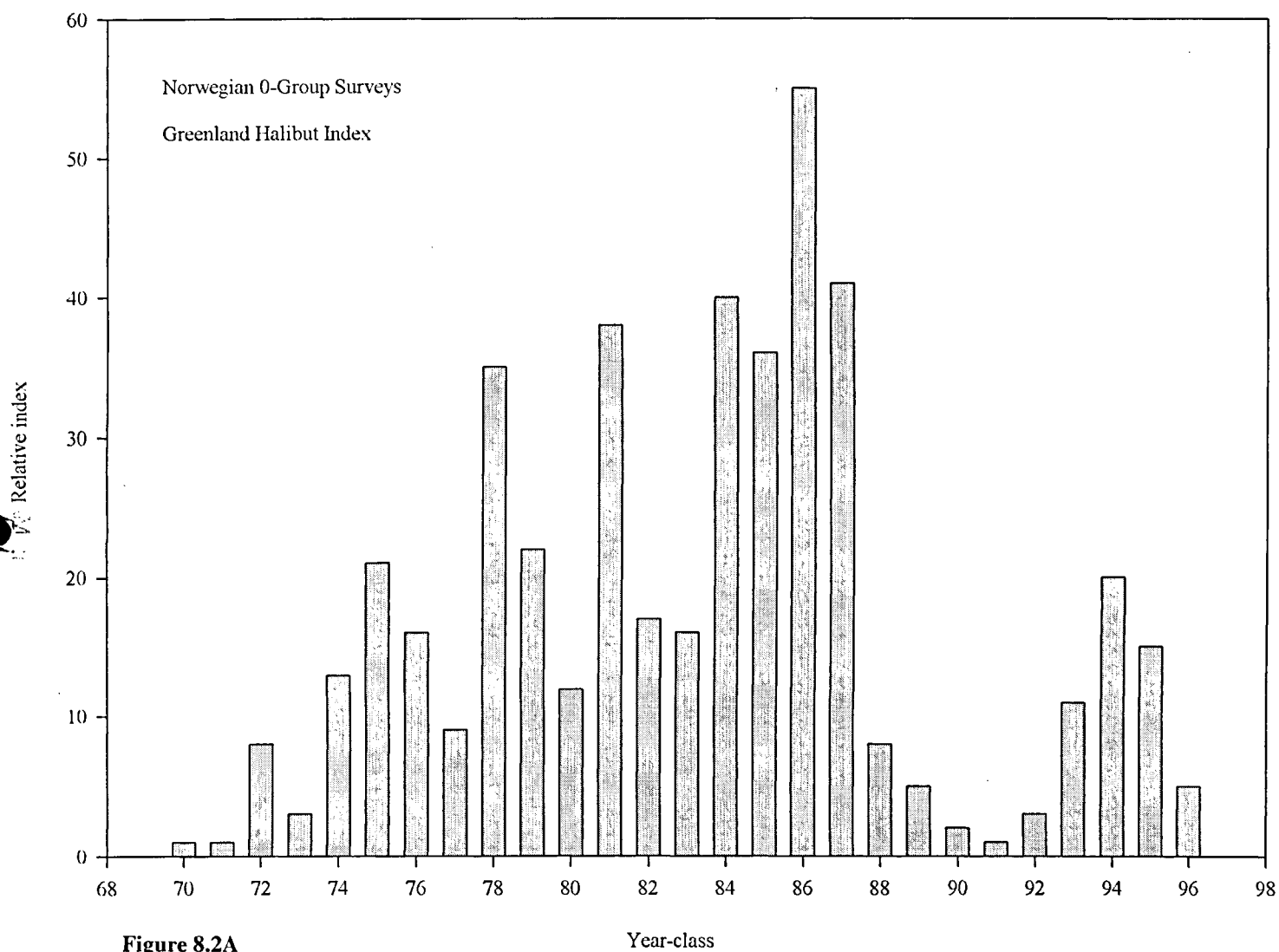


Figure 8.2A

Relative index of year-class strength for Greenland halibut in ICES Regions I and II from Norwegian Pelagic 0-Group surveys during 1970-96.

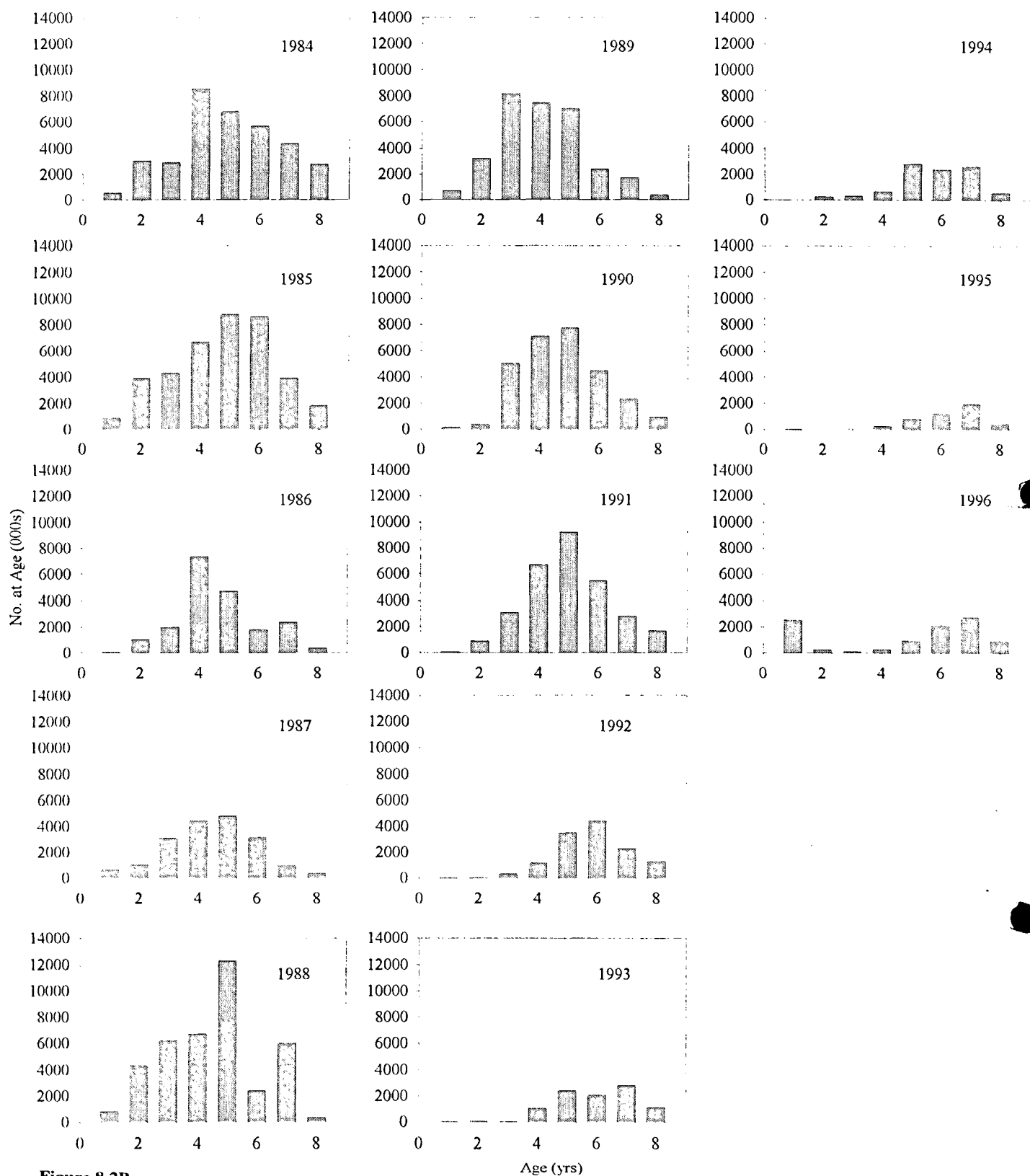


Figure 8.2B

Abundance at age (000s) of Greenland halibut from the Norwegian Svalbard autumn bottom trawl survey from 1984-96. Surveys were conducted in September (1984-88), October (1989-93) and August (1994-96) at a depth range of <100-500 M.

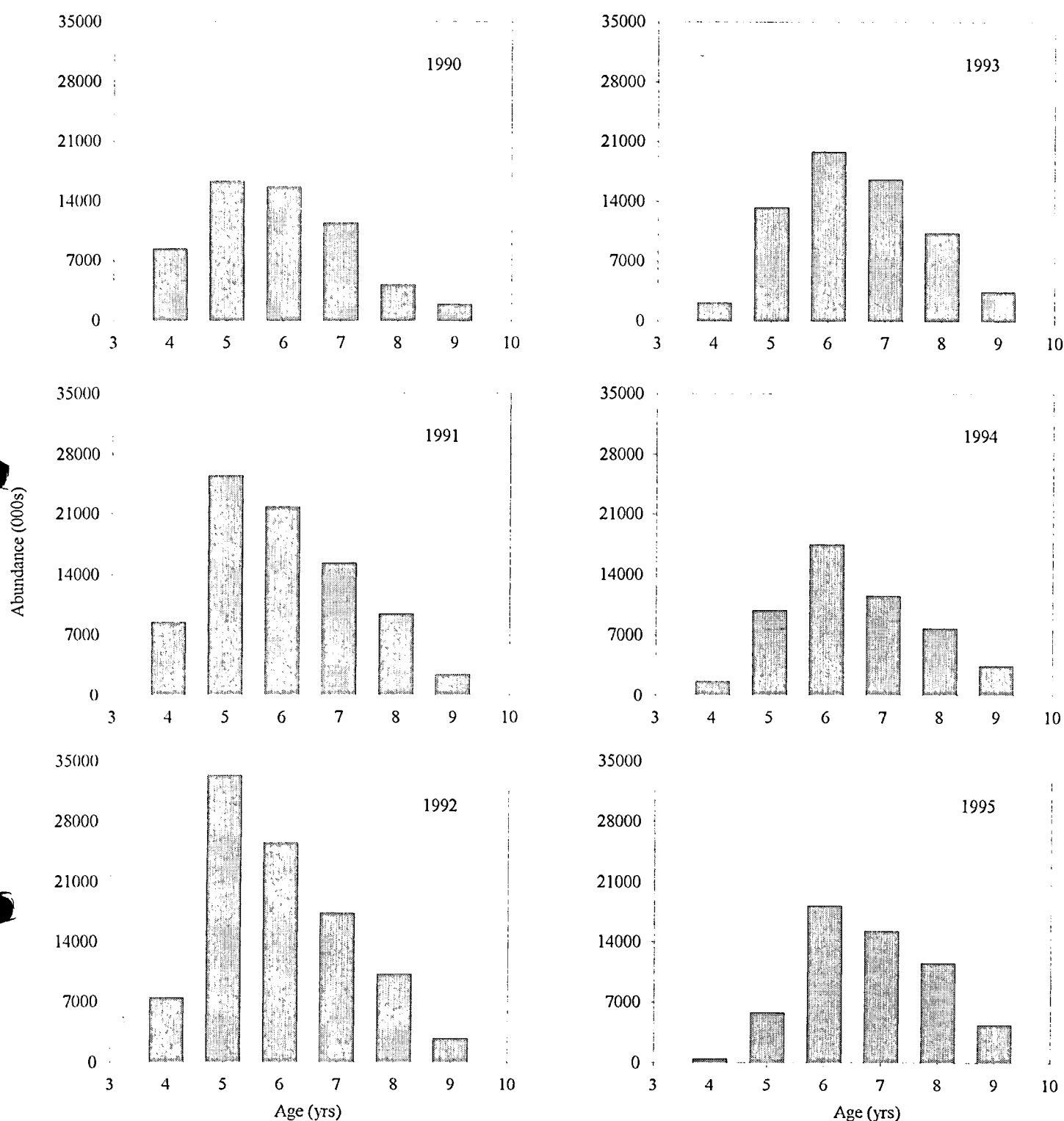


Figure 8.2C

Abundance at age (000s) of Greenland halibut from the Russian Barents Sea bottom trawl survey from 1990-95. The parameters of the 1996 survey were too incompatible with previous years for direct comparison and thus could not be used in calibrating the VPA in the current assessment. Surveys conducted in October-December at a depth range of 100-900 M.

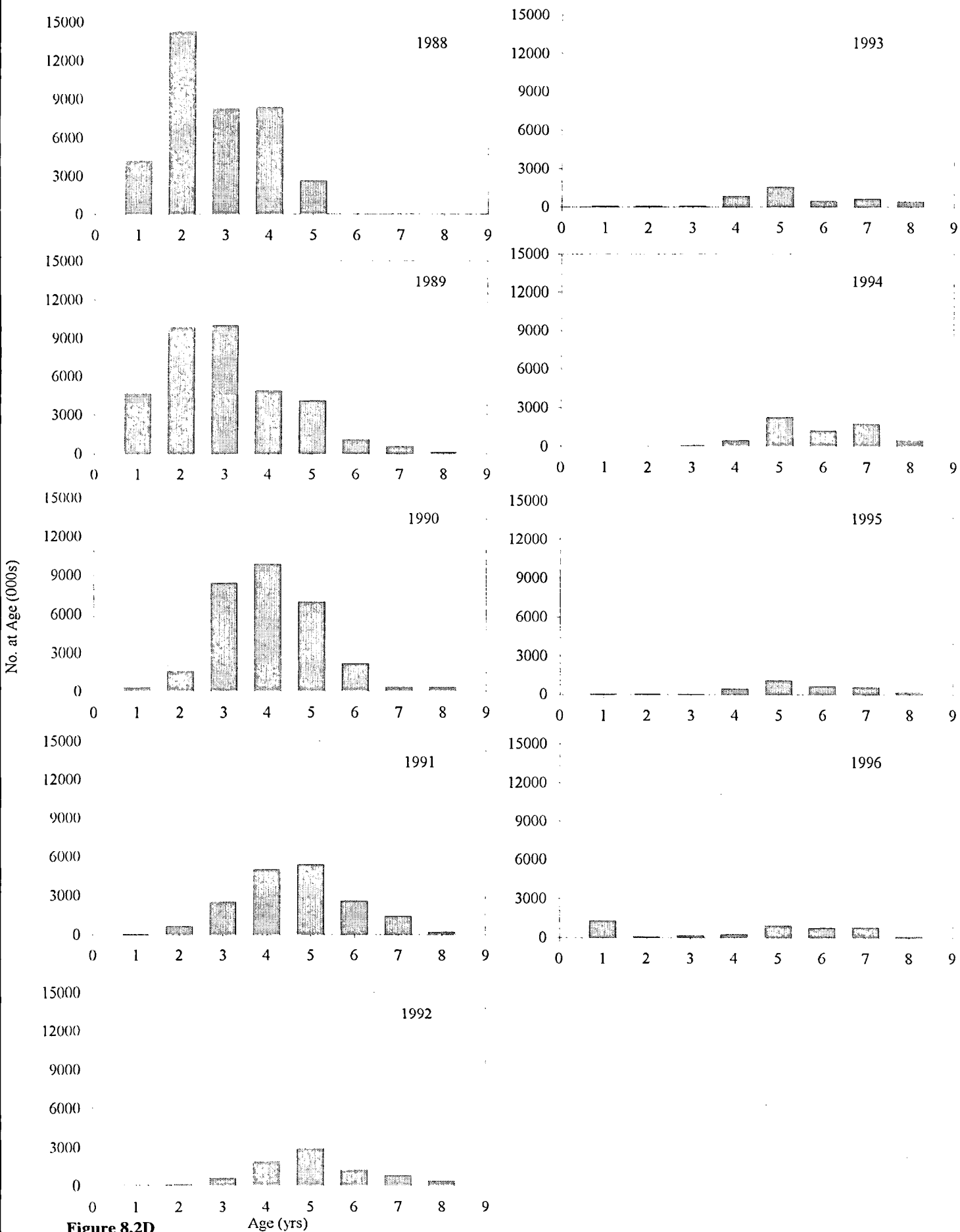


Figure 8.2D

Abundance at age (000s) of Greenland halibut from the Norwegian Svalbard shrimp surveys from 1988-96. Surveys conducted in July-August (1988-92) and June (1993-96) at a depth range of 200-600 M.

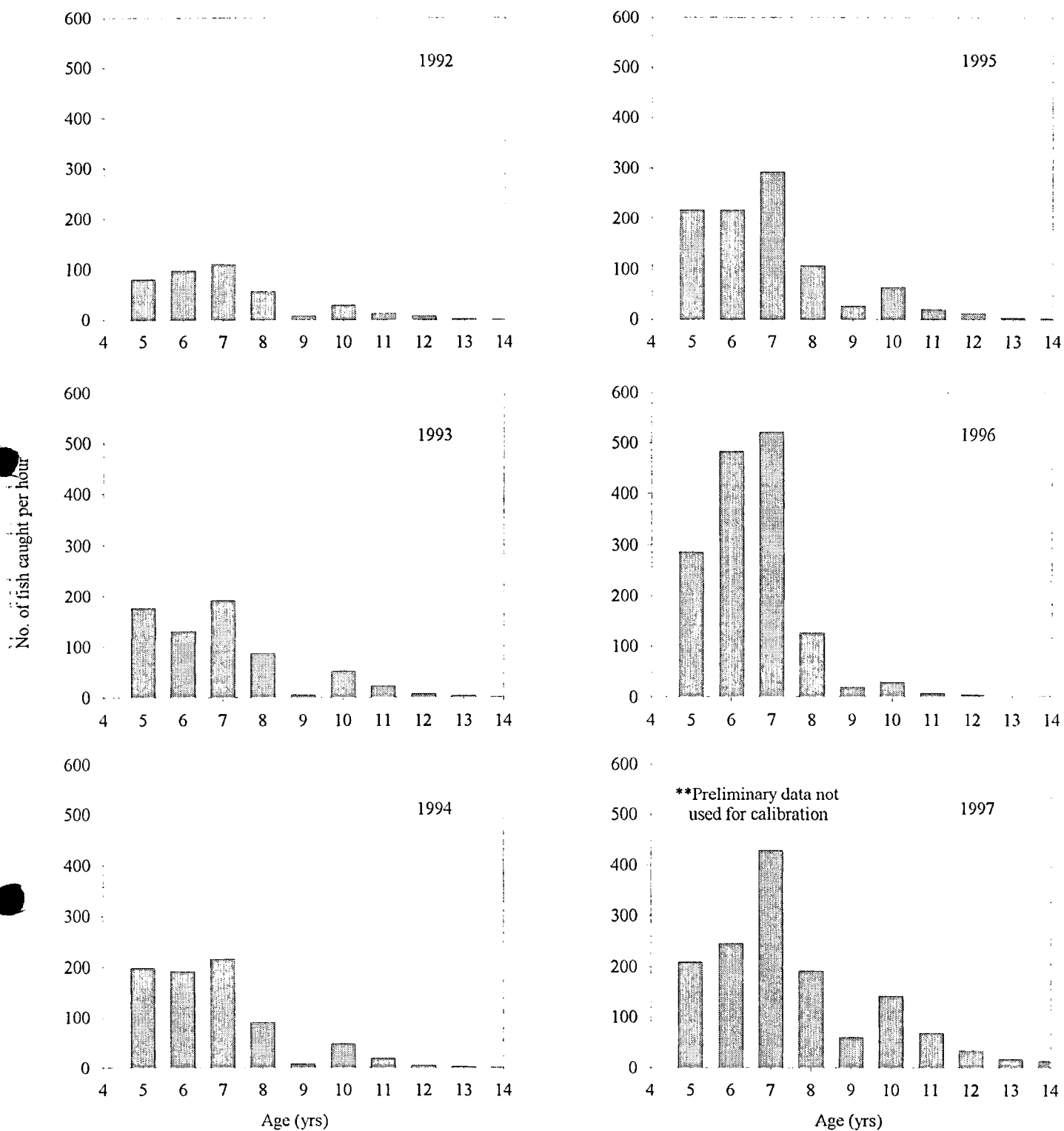
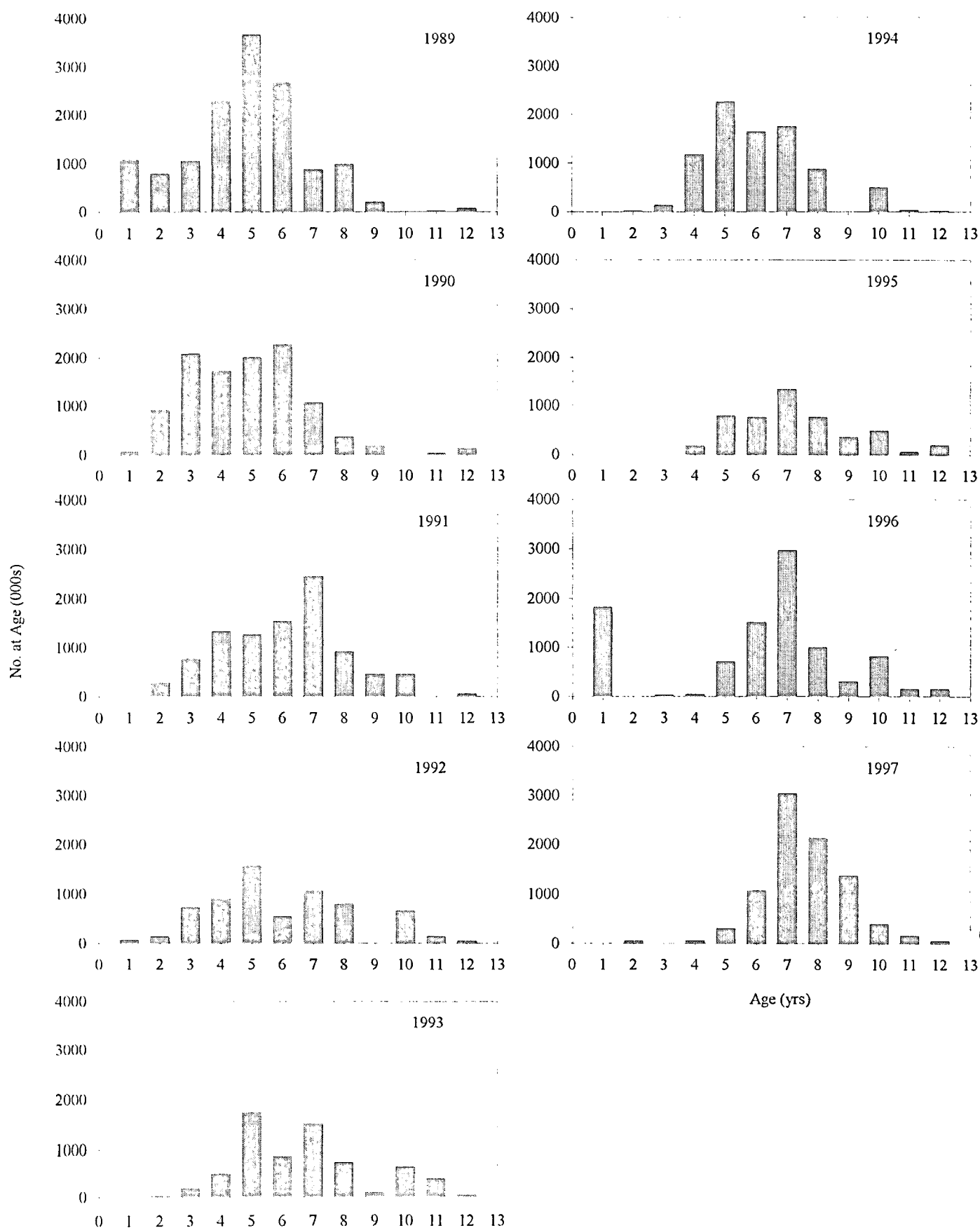


Figure 8.2E

CPUE at age (numbers) of Greenland halibut from a limited experimental commercial fishery by Norway during 1992-97. Fishery conducted in both spring and autumn (1992-93) and spring only (1994-97) at a depth range of 600-900 M but mainly at 700-800 M.

Figure 8.2F



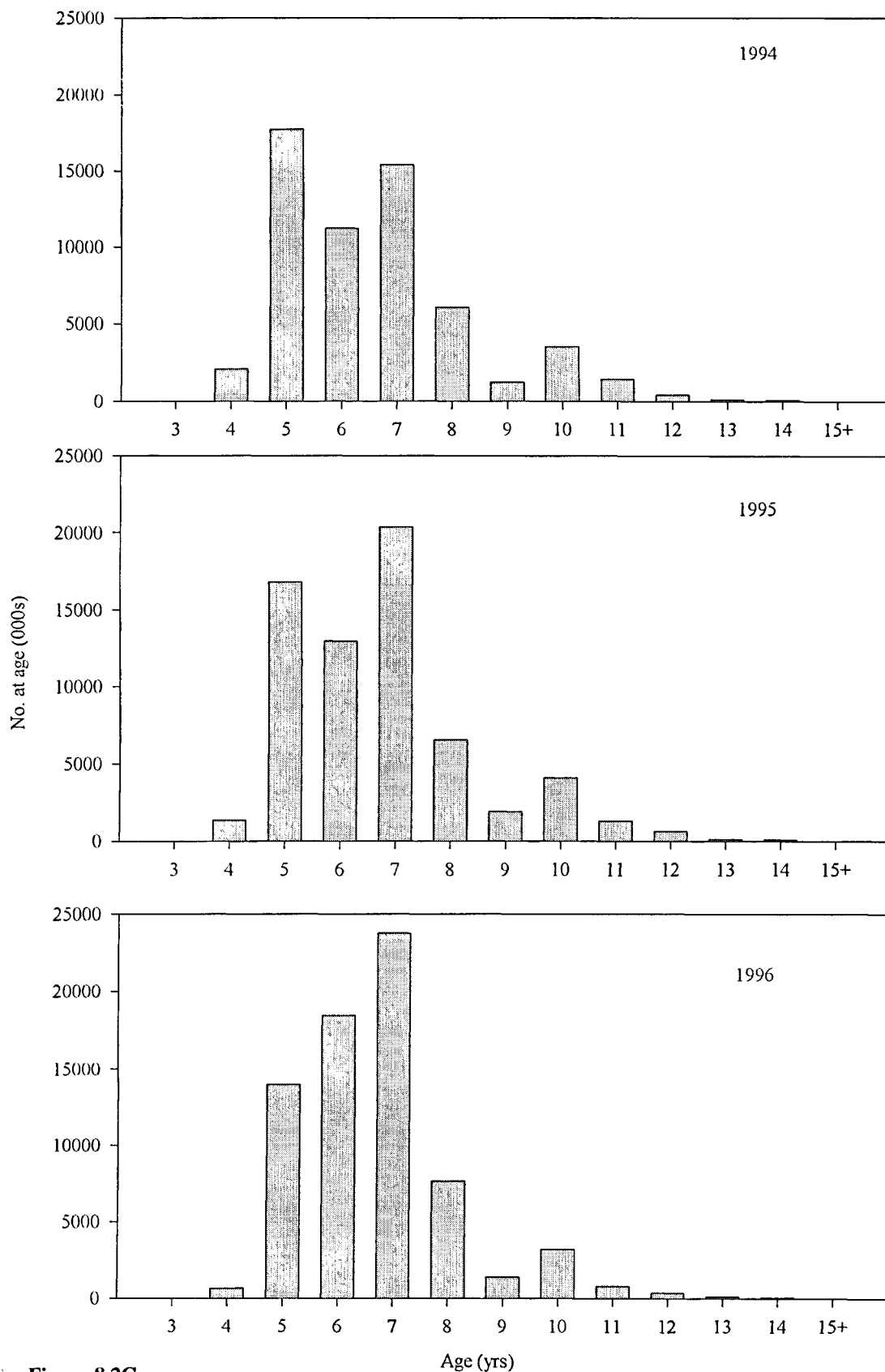


Figure 8.2G

Abundance at age from Norwegian bottom trawl surveys using a commercial vessel along the continental slope in autumn from 68N to 80N at 500-1500 m depth north of 7030'N and 500-1000 m depth south of this latitude.

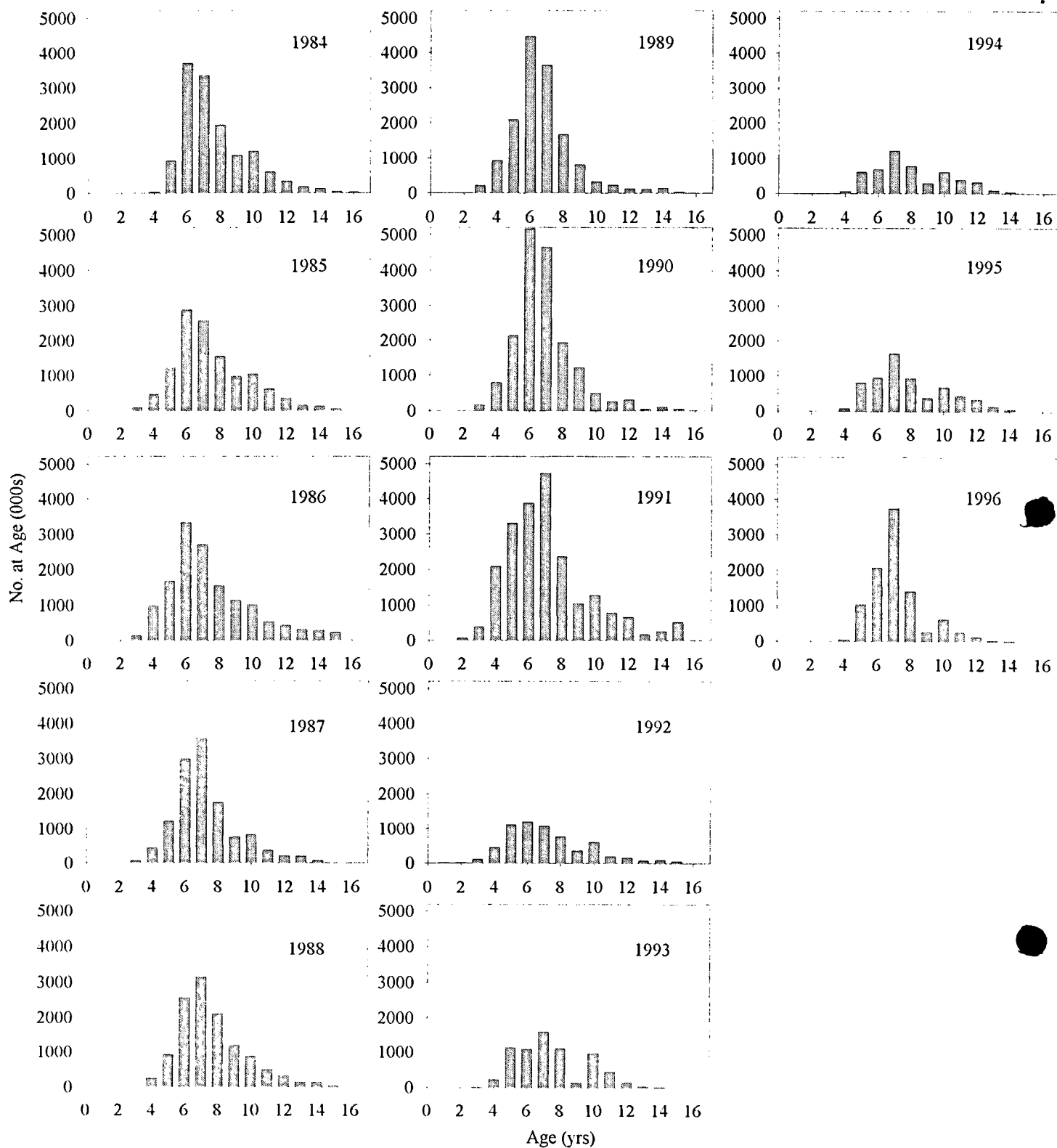
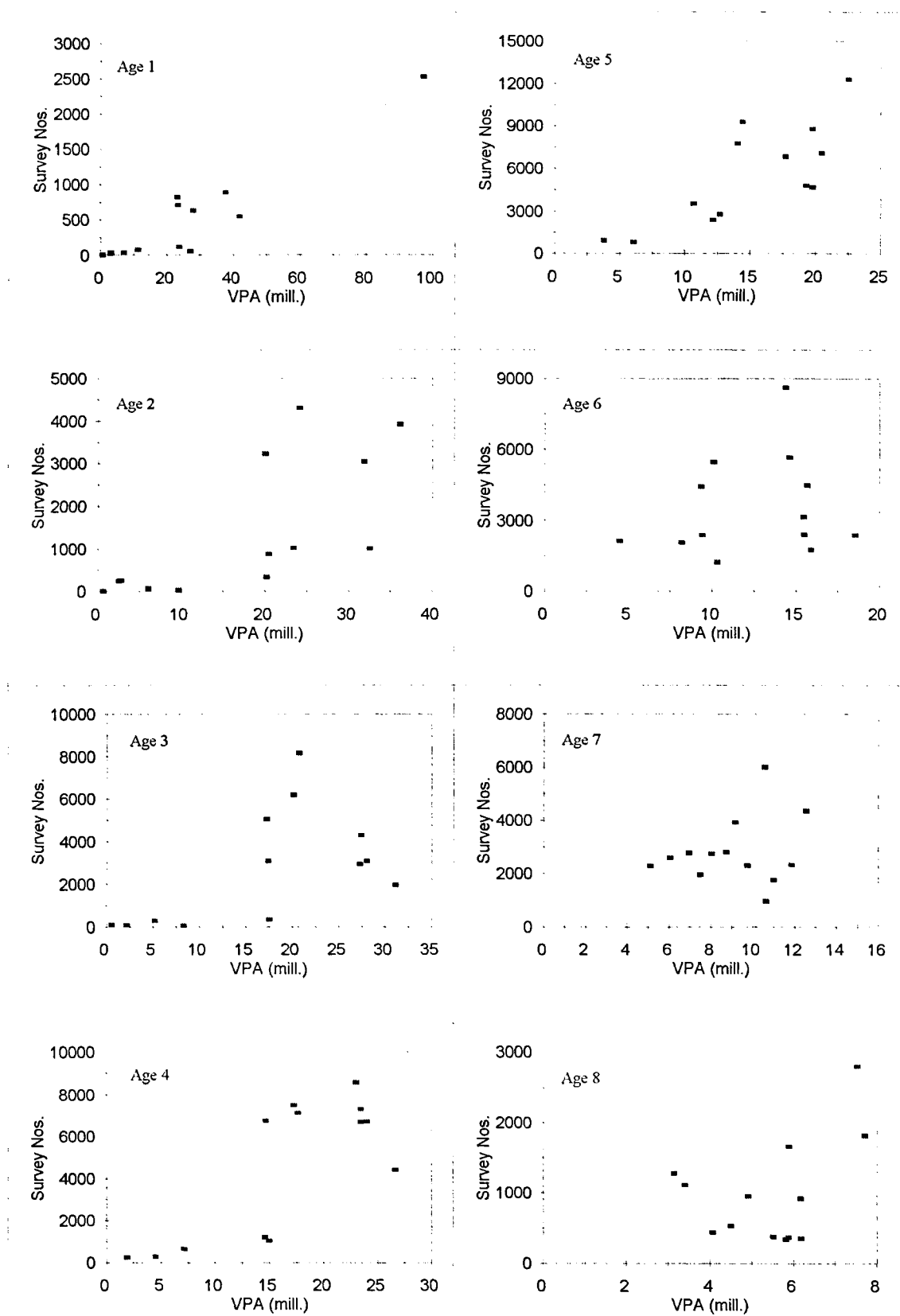


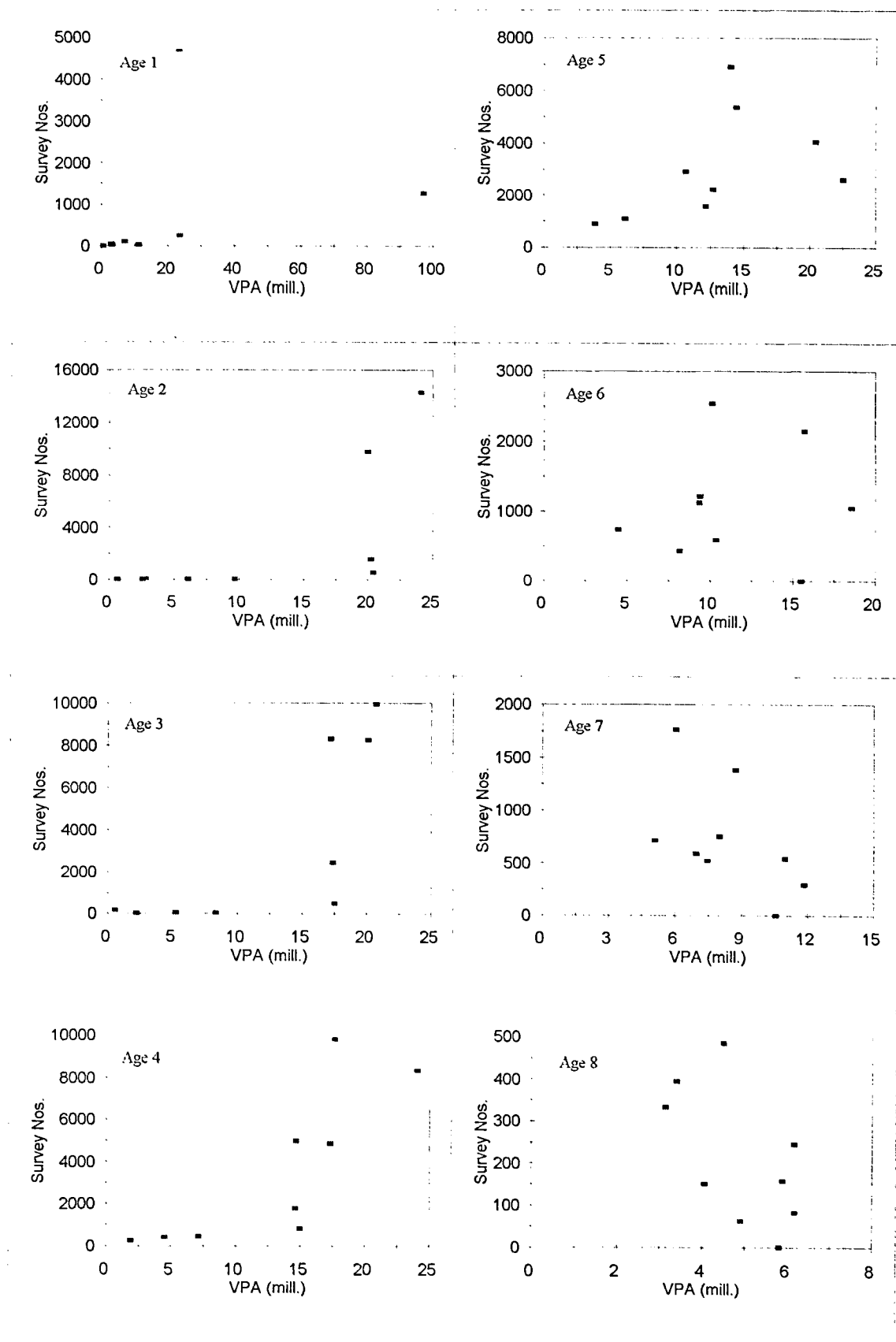
Figure 8.3

Catch numbers at age (000s) of Greenland halibut from the commercial fishery in ICES Regions I and II.



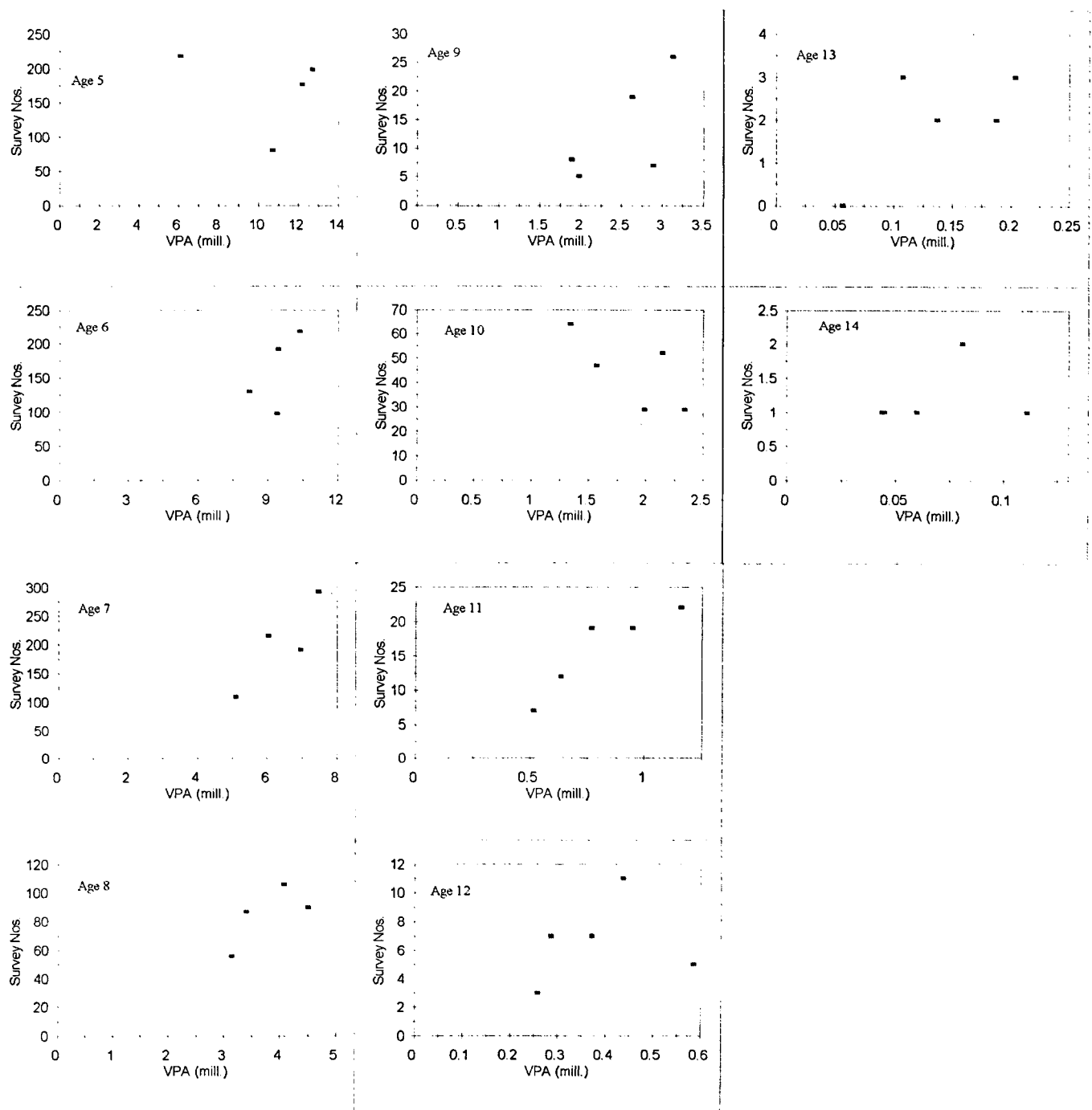
FLT09 - Greenland halibut abundance index from Norwegian Svalbard bottom trawl survey plotted against the final VPA estimate for the years 1984-96.

Figure 8.4A



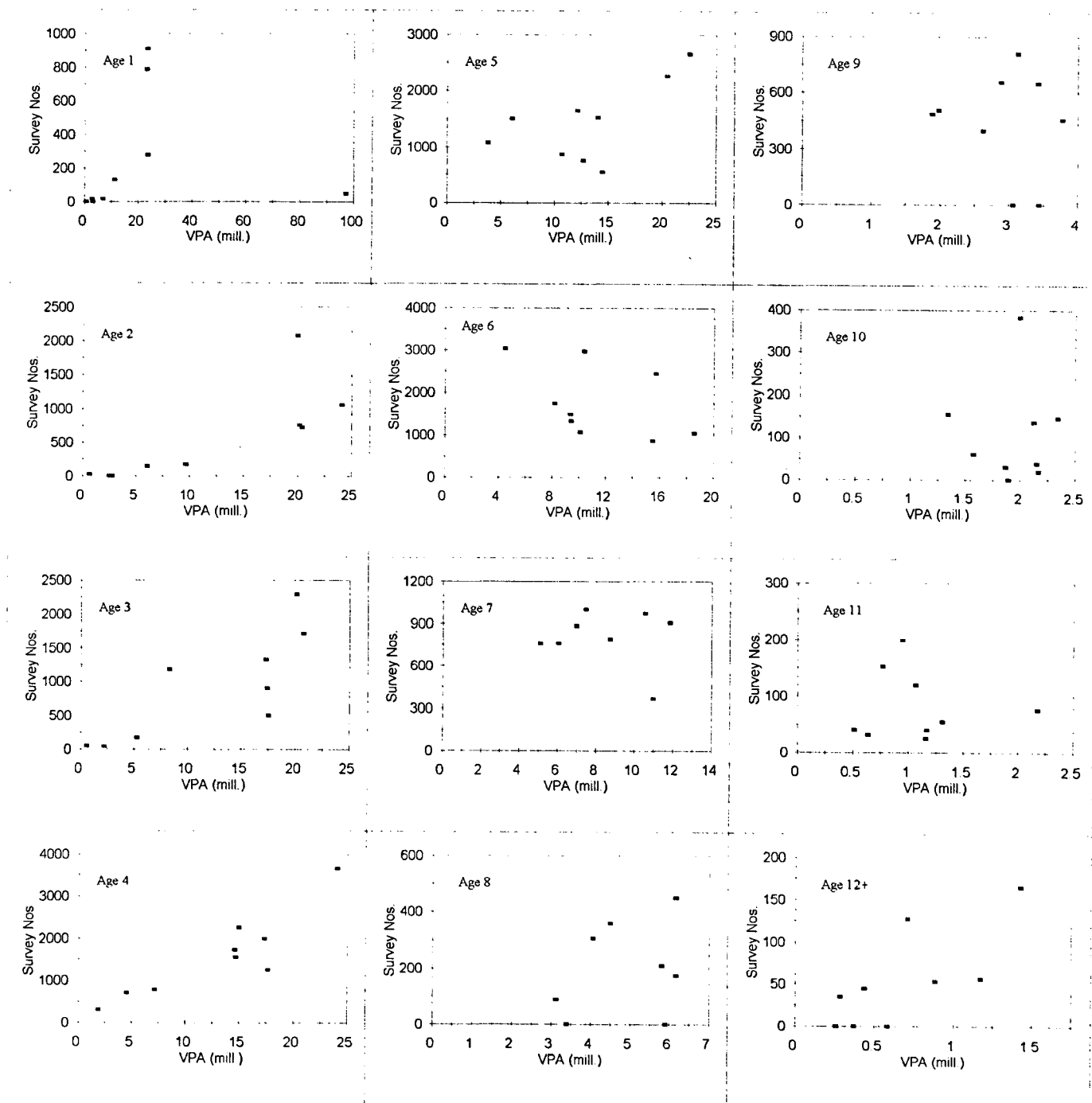
FLT11 - Greenland halibut abundance index from Norwegian shrimp survey plotted against the final VPA estimate for the years 1988-96.

Figure 8.4B



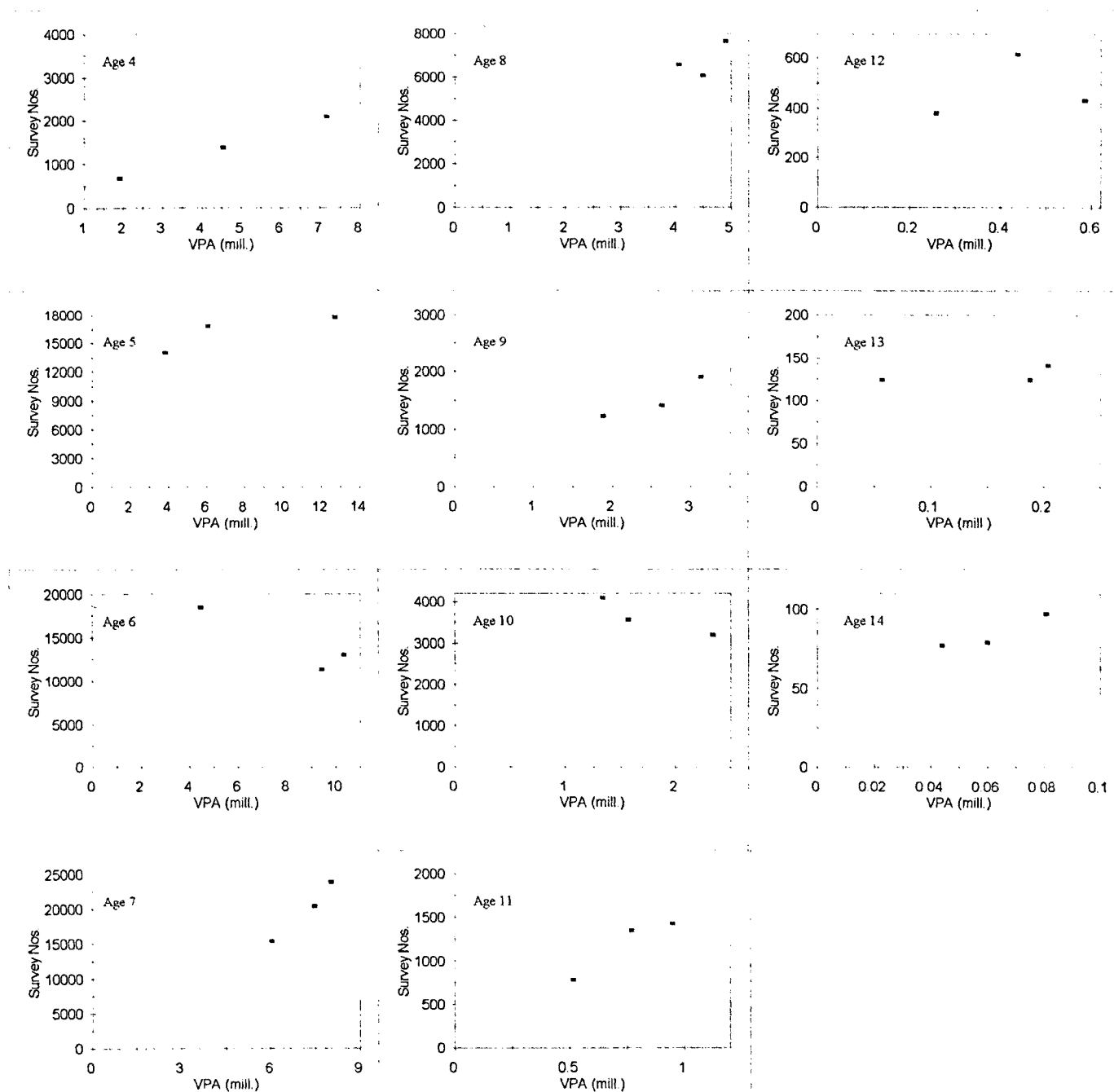
FLT12 - Greenland halibut abundance index from Norwegian experimental fishery plotted against the final VPA estimate for the years 1992-96.

Figure 8.4C



FLT13 - Greenland halibut abundance index from Norwegian Barents Sea (winter) bottom trawl survey plotted against the final VPA estimate for the years 1988-96.

Figure 8.4D



FLT14 - Greenland halibut abundance index from the Norwegian Greenland halibut survey in the Svalbard area plotted against the final VPA estimates for the years 1994-96.

Figure 8.4E

Greenland halibut in the North-East Arctic (Areas I & II)
25 - 8 - 1997

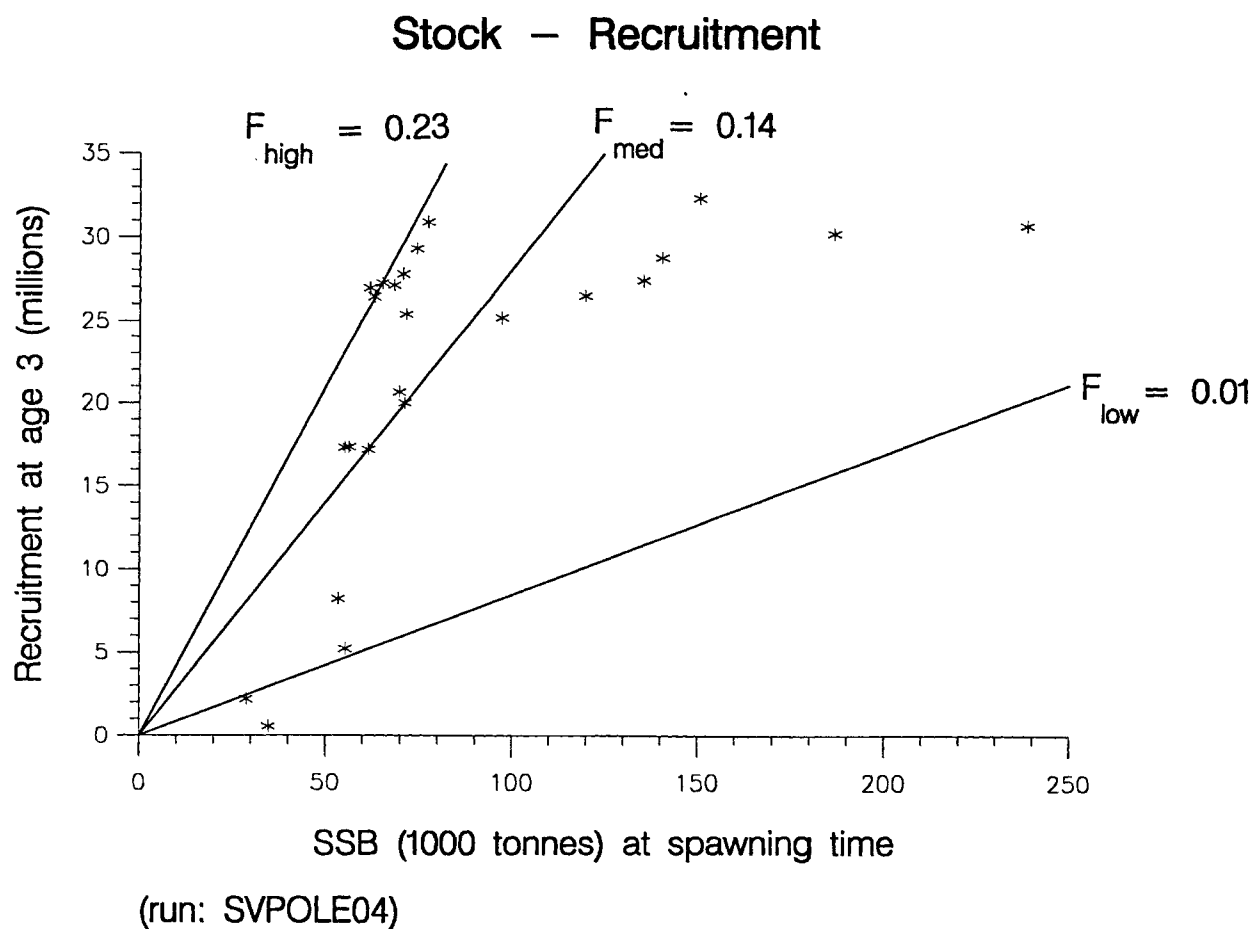


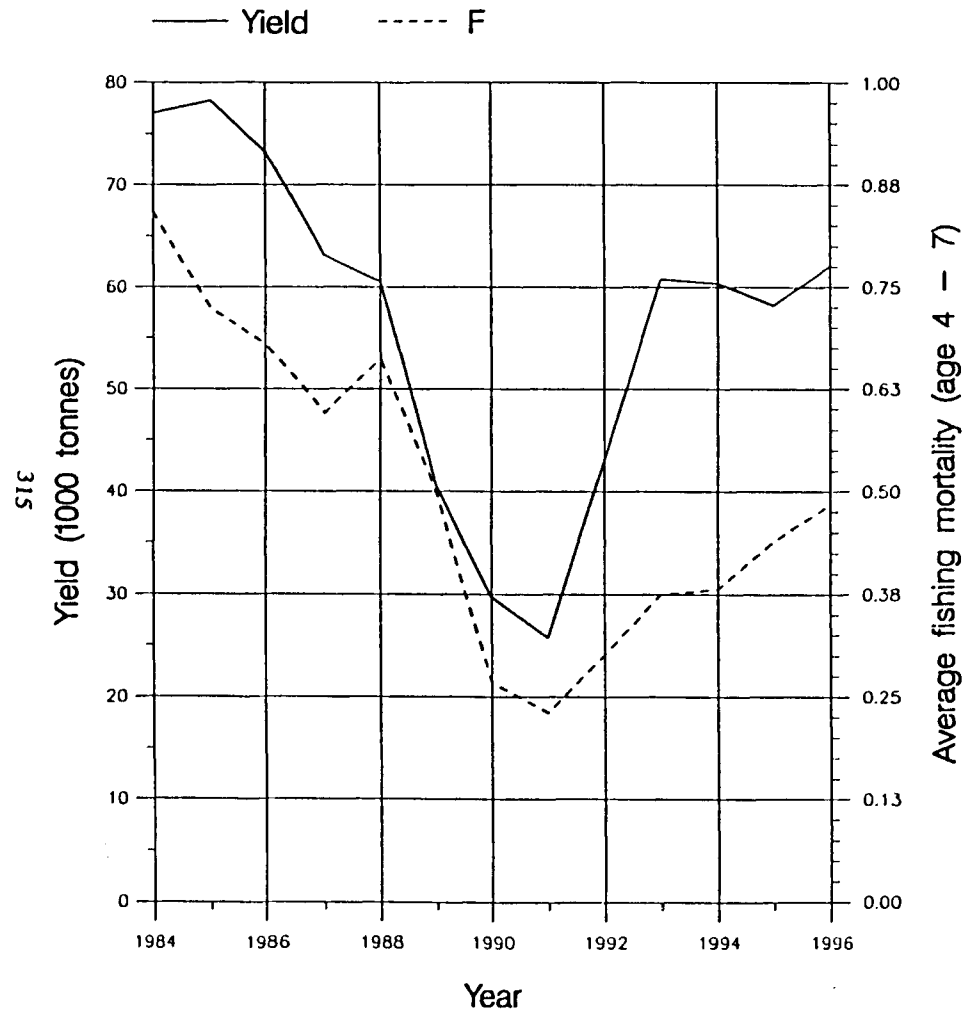
Figure 8.5

Fish Stock Summary

Coastal cod

25 - 8 - 1997

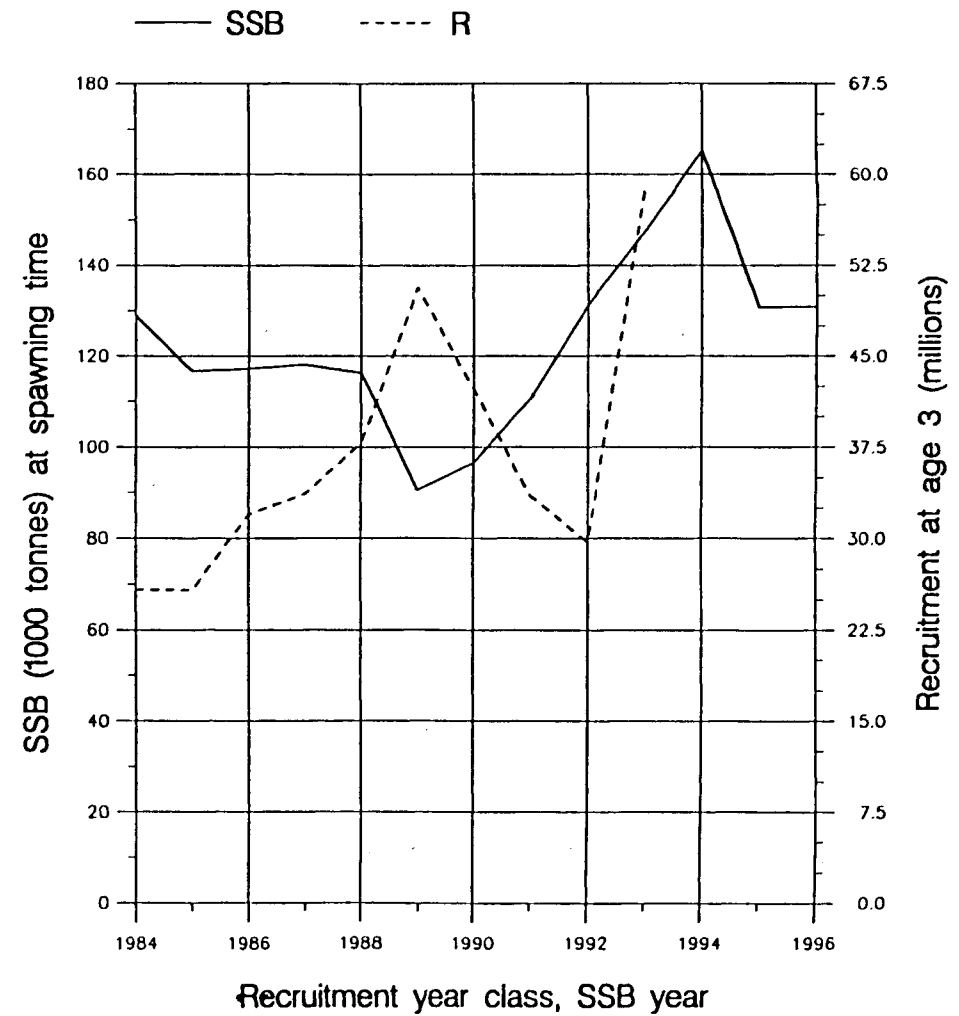
Yield and fishing mortality



(run: SVPNCC04)

A

Spawning stock and recruitment



(run: SVPNCC04)

B

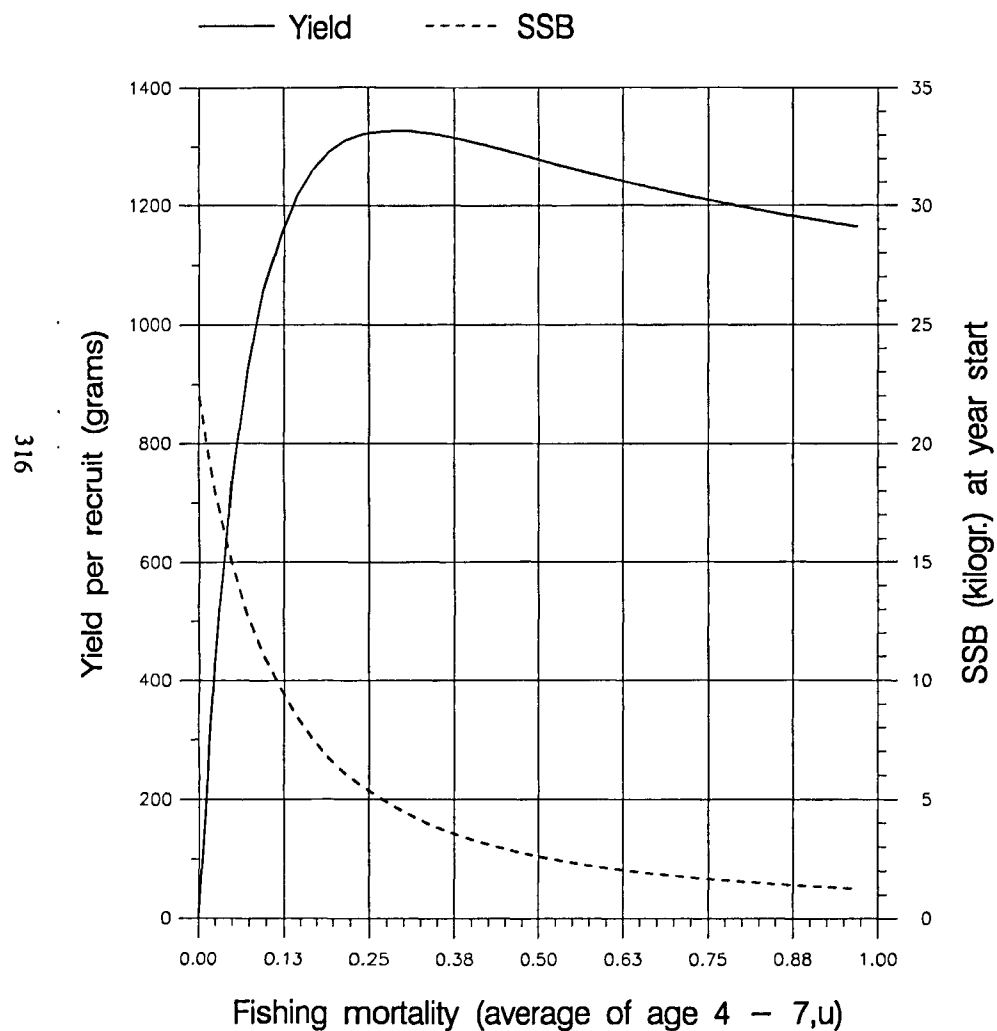
Figure 9.1

Figure 9.2

Fish Stock Summary Coastal cod 25 – 8 – 1997

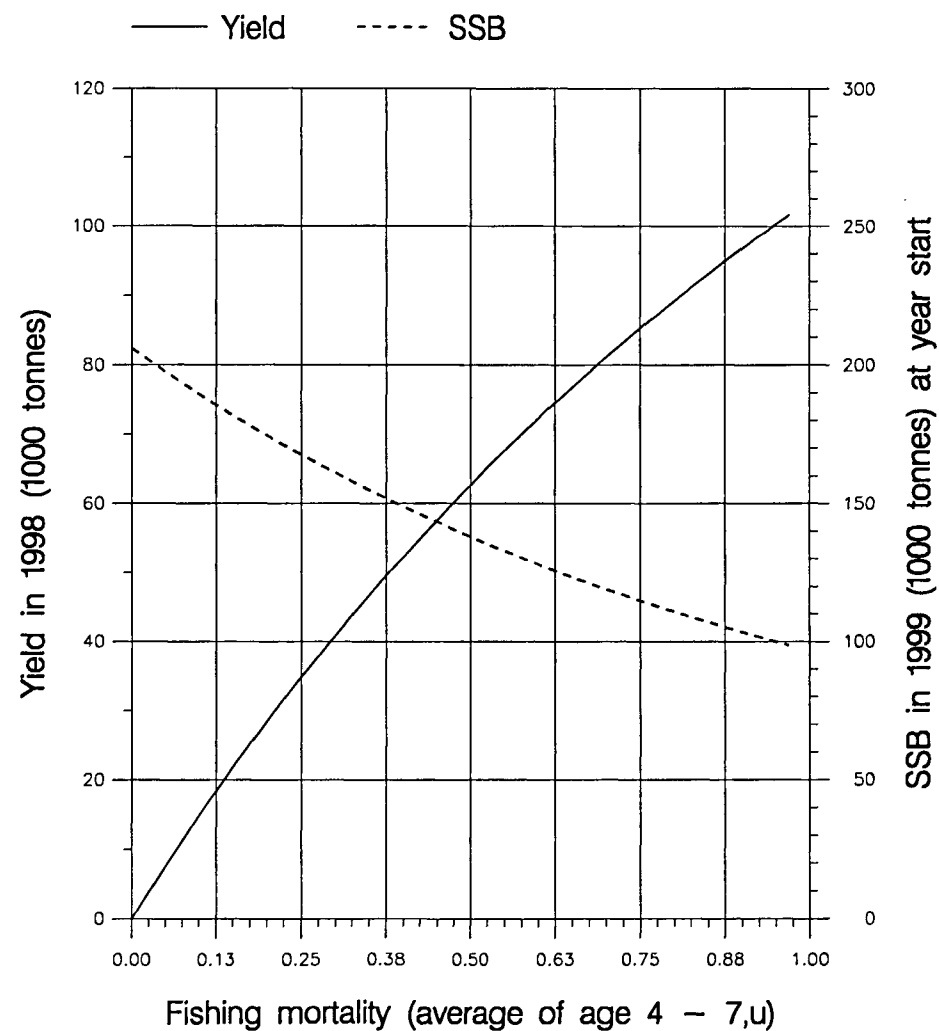
Long term yield and spawning stock biomass

Short term yield and spawning stock biomass



(run: YLDNCC03)

C



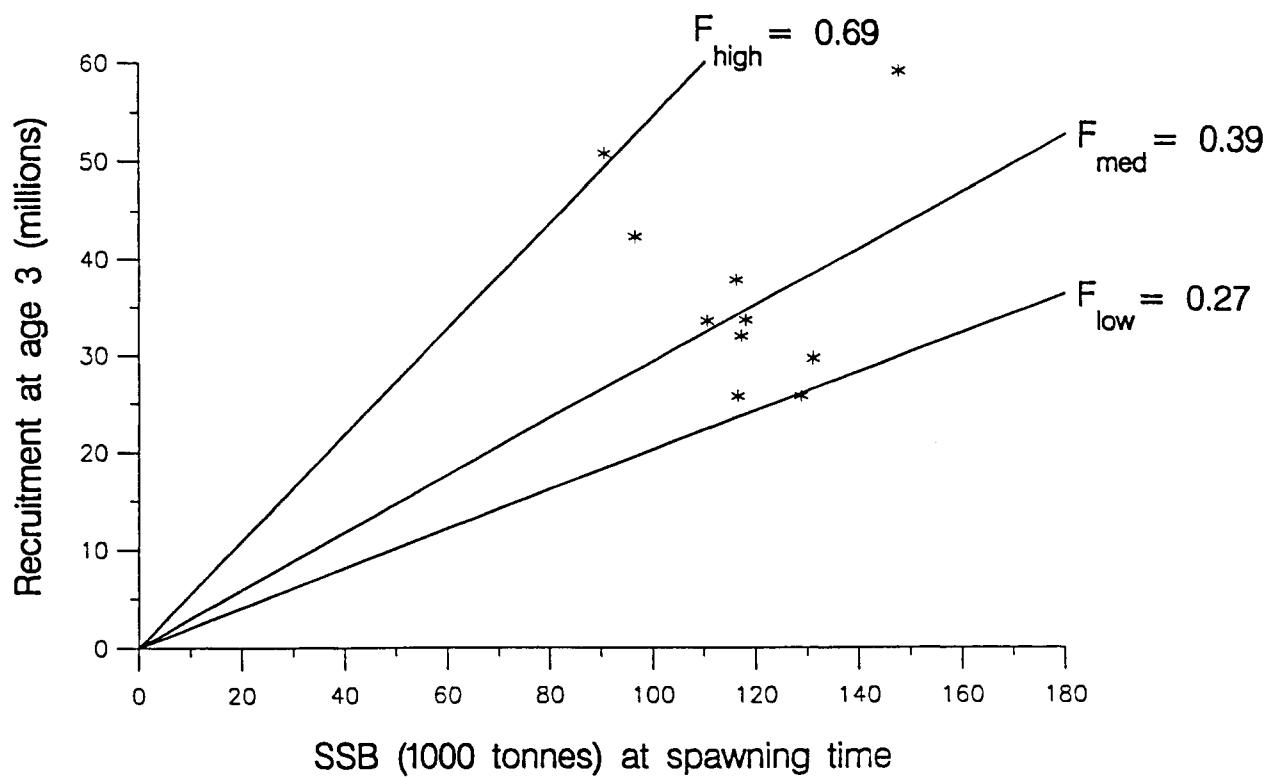
(run: MANHS03)

D

Figure 9.3

Coastal cod
25 - 8 - 1997

Stock - Recruitment



(run: SVPNCC04)

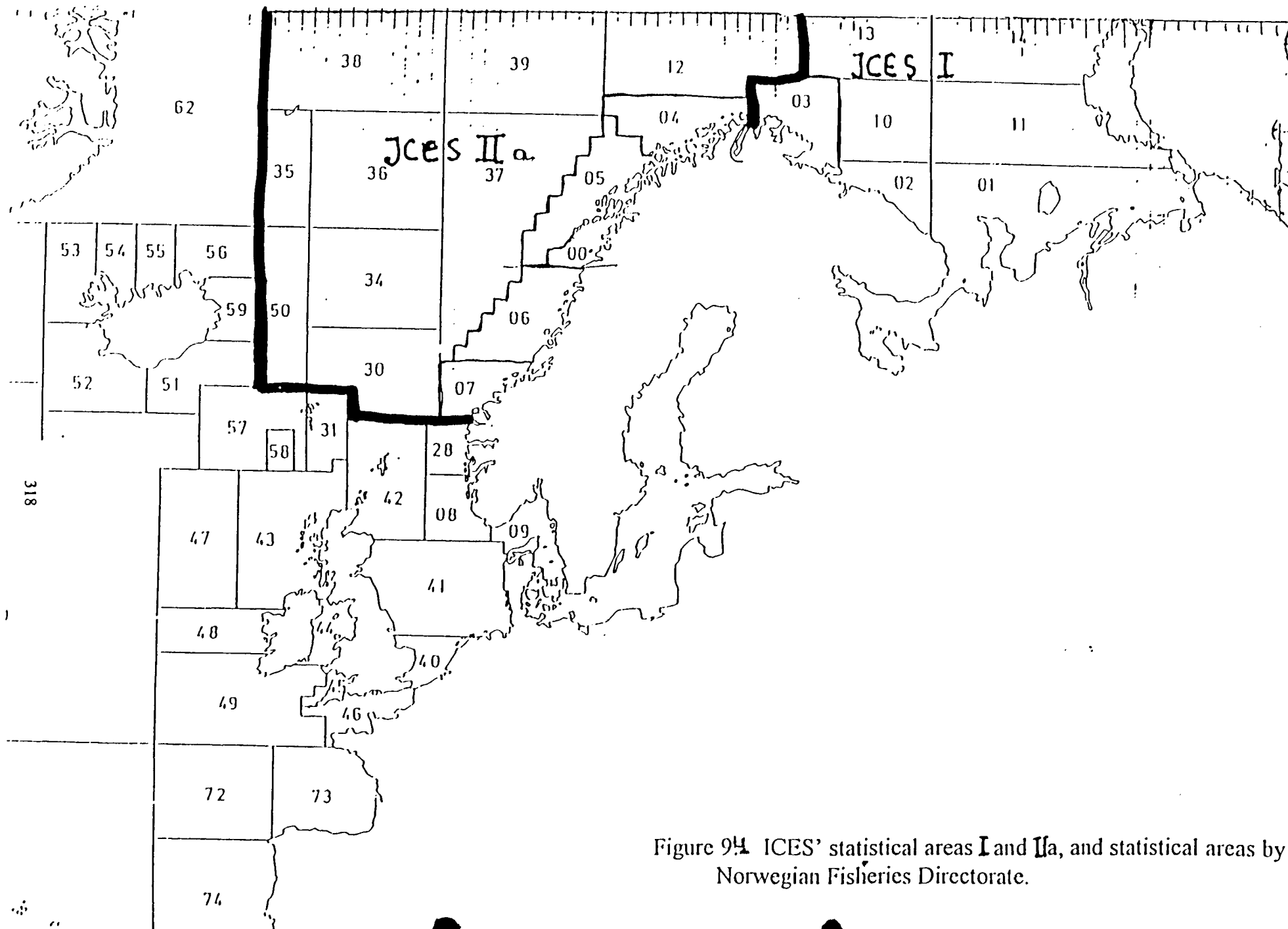


Figure 94 ICES' statistical areas I and IIa, and statistical areas by the Norwegian Fisheries Directorate.

Table A.1 North-East Arctic COD. Catch per unit effort.

Year	Sub-area I			Division IIa			Division IIb		
	Norway ²	UK ³	Russia ⁴	Norway ²	UK ³	Norway ⁵	Norway ²	UK ³	Russia ⁴
1960	-	0.075	0.42	-	0.067	3.0	-	0.105	0.31
1961	-	0.079	0.38	-	0.058	3.7	-	0.129	0.44
1962	-	0.092	0.59	-	0.066	4.0	-	0.133	0.74
1963	-	0.085	0.60	-	0.066	3.1	-	0.098	0.55
1964	-	0.056	0.37	-	0.070	4.8	-	0.092	0.39
1965	-	0.066	0.39	-	0.066	2.9	-	0.109	0.49
1966	-	0.074	0.42	-	0.067	4.0	-	0.078	0.19
1967	-	0.081	0.53	-	0.052	3.5	-	0.106	0.87
1968	-	0.110	1.09	-	0.056	5.1	-	0.173	1.21
1969	-	0.113	1.00	-	0.094	5.9	-	0.135	1.17
1970	-	0.100	0.80	-	0.066	6.4	-	0.100	0.80
1971	-	0.056	0.43	-	0.062	10.6	-	0.071	0.16
1972	0.90	0.047	0.34	1.08	0.055	11.5	0.59	0.051	0.18
1973	1.05	0.057	0.56	0.71	0.043	6.8	0.43	0.054	0.57
1974	1.75	0.079	0.86	0.19	0.028	3.4	1.94	0.106	0.77
1975	1.82	0.077	0.94	1.36	0.033	3.4	1.67	0.100	0.43
1976	1.69	0.060	0.84	1.69	0.035	3.8	1.20	0.081	0.30
1977	1.54	0.052	0.63	1.16	0.044	5.0	0.91	0.056	0.25
1978	1.37	0.062	0.52	1.12	0.037	7.1	0.56	0.044	0.08
1979	0.85	0.046	0.43	1.06	0.042	6.4	0.62	-	0.06
1980	1.47	-	0.49	1.27	-	5.0	0.41	-	0.16
					Russia⁴			Spain⁶	
1981	1.42	-	0.41	1.02	0.35	6.2	(0.96)	-	0.07
1982	1.30	-	0.35	1.01	0.34	6.4	-	0.86	0.26
1983	1.58	-	0.31	1.05	0.38	7.6	(1.31)	0.92	0.36
1984	1.40	-	0.45	0.73	0.27	7.0	1.20	0.78	0.35
1985	1.86	-	1.04	0.90	0.39	5.1	1.51	1.37	0.50
1986	1.97	-	1.00	1.36	1.14	4.1	2.39	1.73	0.84
1987	1.77	-	0.97	1.73	0.67	3.3	2.00	1.82	1.05
1988	1.58	-	0.66	0.97	0.55	2.2	1.61	(1.36)	0.54
1989	1.49	-	0.71	0.78	0.43	3.6	0.41	2.70	0.45
1990	1.35	-	0.70	0.38	0.60	4.8	0.39	2.69	0.80
1991	1.38	-	0.67	0.50	0.90	-	0.29	4.96	0.76
1992	2.19	-	0.79	0.98	0.65	-	3.06	2.47	0.23
1993	2.33	-	0.85	1.74	1.03	-	2.98	3.38	1.00
1994	2.50	-	1.01	1.27	0.86	-	2.82	1.44	1.14
1995	1.57	-	0.59	1.00	1.01	-	2.73	1.65	1.10
1996	-	-	0.74	-	0.99	-	-	1.11	0.85

¹ Preliminary figures.

² Norwegian data - t per 1,000 tonnage*hrs fishing.

³ United Kingdom data - t per 100 tonnage*hrs fishing.

⁴ Russia data - t per hr fishing.

⁵ Norwegian data - t per gillnet boat week in Lofoten.

⁶ Spanish data - t per hr fishing.

Period	Sub-area I	Divisions IIa and IIb
1960-1973	RT	RT
1974-1980	PST	RT
1981-	PST	PST

Vessel type:

RT = side trawlers, 800-1000 HP.

PST = stern trawlers, up to 2000 HP.

Table A2 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
1996	2,404	335	96	70	86	75	21	3	+	+	3,090
1997 ¹	1,453	408	170	53	51	37	22	4	1	+	2,198

¹Adjusted indices

Table A3 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 gear¹. 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 ²	534.1	331.0	311.8	152.6	69.0	14.2	6.9	4.2	2.2	2.1	1430.2
1994 ²	861.8	496.8	276.3	297.6	145.9	46.9	8.8	2.3	1.2	1.2	2138.8
1995 ²	4892.4	503.8	288.2	231.2	249.2	70.4	18.0	2.2	0.7	1.0	6256.8
1996 ²	5788.8	715.5	177.6	116.0	136.9	107.5	24.5	2.9	0.4	0.5	7060.5
1997 ^{2,3}	5036.7	1037.6	243.5	68.1	78.5	56.1	29.7	6.4	1.1	1.0	6558.5

¹1981-1988 back-calculated from bobbins gear.

² Survey covered a larger area.

³ Adjusted indices

Table A4 North-East Arctic COD. Abundance at age (millions) from the Norwegian survey on the cod spawning grounds in Lofoten in March-April.

Year	Age							
	5	6	7	8	9	10	11	12+
1985 ¹	0.70	5.08	7.57	1.33	0.72	0.58	0.27	-
1986 ¹	1.78	2.67	5.27	2.53	0.13	-	0.36	0.07
1987 ¹	8.02	6.35	0.26	1.04	0.03	-	0.03	0.03
1988 ¹	0.57	2.98	1.65	0.05	0.01	0.05	-	-
1989 ¹	0.03	10.41	8.81	1.97	0.34	0.10	-	0.06
1990 ¹	0.09	1.44	22.08	4.04	0.41	0.22	-	-
1991 ¹	0.18	4.11	18.57	22.37	2.50	0.14	0.15	-
1992	1.38	5.81	15.02	16.93	58.41	3.46	1.24	0.18
1993	4.21	12.27	15.56	19.35	22.12	36.34	3.68	0.62
1994	17.81	23.36	8.86	5.90	6.89	2.70	14.24	2.42
1995	4.57	29.06	10.02	2.96	2.16	2.36	1.42	6.82
1996	1.50	12.21	18.61	3.10	0.53	0.24	0.65	1.04
1997	0.38	4.52	24.46	14.65	1.47	0.29	-	0.72

¹ Recalculated from $TS=21.8\log L-74.9$ using average length at age.

Table A5 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 gear¹.

Year	Age									Total
	1	2	3	4	5	6	7	8	9+	
1983	145.0	26.8	10.7	9.5	2.4	1.9	1.0	1.3	0.3	198.9
1984	499.0	113.0	7.3	4.3	4.7	1.8	0.4	0.4	0.4	631.3
1985	239.0	452.0	99.0	28.4	13.6	5.4	1.0	0.4	0.3	839.1
1986	40.9	181.0	297.0	42.8	15.3	2.6	1.0	0.3	0.2	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	0.8	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	314.7
1992	91.8	130.0	105.0	56.0	16.2	7.3	5.7	3.3	8.9	424.2
1993	136.8	131.6	149.9	65.8	30.0	3.4	3.9	2.3	5.4	529.1
1994	68.6	166.5	102.4	56.4	54.1	25.9	5.9	2.3	4.6	486.7
1995	350.8	62.8	115.9	101.5	93.7	47.2	16.0	3.9	1.8	793.6
1996	427.6	178.6	65.1	45.5	46.1	44.2	24.6	3.2	1.1	836.0

¹1983-1988 back-calculated from bobbins gear.

Table A6 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	23.1	32.1	45.9	54.2	64.6	67.6	76.9	-	-
1979	12.8	22.9	33.1	40.0	52.3	64.4	74.7	83.0	-	-
1980	17.6	24.8	34.2	40.5	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	53.9	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
1996	12.6	19.6	28.1	40.9	49.3	61.4	72.3	85.3	-	-
1997 ¹	11.4	18.9	28.0	40.1	49.6	59.2	69.1	80.5	-	-

¹ Adjusted lengths**Table A7** 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	-	-
1996	15	61	206	633	1,059	1,995	3,352	5,512	-	-	-	-
1997 ¹	13	54	197	593	1,090	1,788	2,856	4,650	-	-	-	-

¹ Adjusted weights

Table A8 North-East Arctic COD. Length at age (cm) from the Norwegian survey on the cod spawning grounds in Lofoten in March-April.

Year	Age							
	5	6	7	8	9	10	11	12
1985	59.8	72.0	79.4	88.7	97.6	105.2	114.0	
1986	62.5	70.4	78.9	89.6	85.4		105.8	115.0
1987	58.1	64.3	75.2	85.0	88.0		118.5	116.0
1988	52.2	66.0	71.6	89.4	97.0	119.6		
1989	54.0	58.9	69.8	80.6	96.7	103.0		125.0
1990	58.0	63.6	68.8	79.0	85.7	100.8		
1991	59.0	67.4	72.9	82.3	89.4	104.5	85.0	
1992	65.3	69.9	78.0	83.2	89.3	93.2	102.3	127.0
1993	57.8	65.7	73.5	83.2	88.0	92.5	96.4	110.8
1994	64.2	70.3	81.5	88.4	90.7	95.7	92.7	99.0
1995	61.3	69.6	77.5	84.5	91.7	97.0	98.1	99.2
1996	62.5	67.0	76.4	83.1	93.5	101.7	99.7	102.5
1997	63.4	68.5	74.4	84.0	100.6	106.9		109.7

Table A9 North-East Arctic COD. Weight at age (g) from the Norwegian survey on the cod spawning grounds in Lofoten in March-April.

Year	Age							
	5	6	7	8	9	10	11	12
1985	2,040	3,550	4,690	6,770	8,980	10,750	14,280	
1986	2,220	3,200	4,490	6,440	5,540		10,840	13,480
1987	1,430	1,920	3,400	4,880	5,640		13,150	12,550
1988	1,250	2,580	3,300	5,810	7,270	13,650		
1989	1,300	1,750	2,950	4,730	8,310	9,980		26,000
1990	1,580	2,100	2,490	3,750	4,980	8,910		
1991	2,210	2,570	3,530	5,330	7,070	12,660	5,350	
1992	2,450	2,920	3,930	5,160	6,330	8,010	9,570	17,800
1993	1,690	2,520	3,690	5,280	6,310	7,670	9,550	14,420
1994	2,290	3,240	5,000	6,590	6,900	7,980	7,810	9,490
1995	2,180	3,240	4,880	6,270	7,940	9,960	10,000	10,630
1996	2,250	2,730	4,140	6,010	8,020	10,470	11,170	11,340
1997	2,310	2,840	3,880	5,760	9,950	12,700		13,100

Table A10 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 ¹	45	105	895	422	255	83	44	50	21	2	16	1,939
1986 ¹	60	53	141	980	444	183	56	62	19	-	2	2,000
1987 ²	8	15	170	170	738	99	67	42	20	9	5	1,344
1988 ²	+	+	43	161	106	245	34	10	2	+	+	602
1989 ¹	2	1	4	17	44	56	99	82	20	6	4	335
1990 ¹	29	22	57	29	35	52	46	89	14	2	1	376
1991 ¹	33	44	75	89	51	53	61	45	43	+	+	494
1992 ¹	228	61	333	317	110	45	37	38	29	22	3	1,223
1993 ¹	9	10	45	215	243	136	43	14	14	8	11	783
1994 ¹	215	58	110	208	282	277	120	44	8	4	3	1,332
1995 ¹	255	59	47	86	160	203	100	28	8	2	3	951
1996 ^{1,3}	126	178	124	87	155	232	204	87	16	1	2	1,212
New method												
1995 ¹	2,950	331	75	112	150	180	81	20	6	1	1	3,907
1996 ^{1,3}	13,765	5,869	365	127	63	75	58	23	5	1	+	20,352

¹October-December.

²September-October.

³Area IIb not covered

Table A11 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		
Sub-area I												
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
1995	24.8	7.3	3.8	13.1	30.4	40.5	13.8	3.1	1.1	0.3	0.3	138.5
1996	10.4	12.8	10.4	7.0	11.7	16.9	12.1	5.1	1.1	0.1	0.1	87.7
Division IIa												
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
1995	4.8	1.3	1.0	1.6	6.1	19.6	8.8	2.7	0.7	0.1	0.2	46.9
1996	4.3	15.6	7.1	5.7	9.2	12.4	6.9	1.7	0.4	+	+	63.5
Division IIb												
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
1995	36.0	8.6	7.7	18.3	35.5	21.7	13.6	2.3	0.5	0.1	0.3	144.6
1996	-	-	-	-	-	-	-	-	-	-	-	-
Total (Sub-area I and Divisions IIa and IIb)												
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
1995	24.9	6.4	4.6	12.4	26.7	28.7	12.6	2.7	0.8	0.2	0.3	120.3
1996 ¹	11.2	13.6	13.5	7.7	11.8	13.4	11.2	4.2	0.8	0.1	0.1	87.6

¹ Assuming same area distribution as in 1995

Table A12 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
1995	11.6	19.8	27.6	33.8	45.2	60.5	71.1	83.5	92.9	99.1
1996	10.2	20.0	28.1	36.7	48.7	58.9	70.5	80.0	93.6	102.7

Table A13 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
1995	11	61	180	337	861	1,987	3,298	5,427	7,614	9,787	10,757
1996	7	64	191	436	1,035	1,834	3,329	5,001	8,203	10,898	11,358

Table A14 Abundance indices of 0-group fish in the Barents Sea and adjacent waters in 1965–1996.

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
1995	1,069	148	6	-	220	15	66
1996	1,142	196	59	484	19	5	10

Table A15 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 1965–1996.

Year	Herring ¹			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
1995	0.16	0.07	0.29	2.40	1.97	2.88	0.25	0.13	0.40
1996	0.65	0.47	0.85	2.87	2.53	3.24	0.39	0.25	0.56

¹Assessment for 1965–1984 made by Toresen (1985).

Table A16. The Northeast Arctic cod stock's consumption in 1000 tonnes of main prey species in 1984 - 1996.

Year	Prey species											Total
	Amp hip.	Krill	Shrimp	Cap elin	Herr -ing	Pola rcod	Cod	Had- dock	Red- fish	Gr. hal.	Others	
1984	27	112	439	735	77	15	23	51	370	0	511	2360
1985	168	57	154	1618	180	3	33	47	226	0	1153	3638
1986	1215	106	140	828	132	140	82	109	313	+	659	3726
1987	1063	66	187	225	32	198	24	4	313	+	669	2781
1988	1242	312	129	335	8	91	9	3	224	0	410	2762
1989	829	242	130	588	3	32	8	11	231	0	735	2810
1990	138	88	195	1620	7	6	20	16	243	0	1580	3912
1991	72	83	197	2952	8	12	27	20	319	8	1131	4828
1992	108	170	402	2618	332	103	54	109	197	23	1078	5194
1993	280	766	345	3280	176	298	299	78	105	2	858	6485
1994	651	813	595	1232	168	693	245	55	88	+	772	5313
1995	1126	594	415	717	134	292	454	133	227	2	980	5073
1996	472	1099	384	517	59	67	540	78	151	0	908	4275
Mean	560	346	284	1323	101	149	140	53	230	3	876	4065
%	14	9	7	33	2	4	3	1	6	0	22	100

Table A17 North-East Arctic COD. Results from the Norwegian Bottom trawl survey in the Svalbard Area and the Barents Sea in August-September. Index of number of fish at each age. Rock-hopper gear. Corrected for length-dependent effective spread of trawl.

Year	Age									Total
	1	2	3	4	5	6	7	8	9+	
1990	197.9	27.4	32.1	25.3	38.1	31.3	58.1	5.5	0.9	416.6
1991	391.4	213.6	105.6	31.0	20.2	22.3	20.7	31.3	3.8	839.9
1992	450.1	449.5	240.2	169.7	33.0	17.8	10.0	6.7	12.2	1389.2
1993	453.7	542.1	448.9	123.2	64.6	13.2	7.2	2.4	9.8	1665.1
1994										
1995	1028.7	244.7	234.9	290.7	186.2	69.1	22.6	4.8	2.6	2084.3
1996	2067.5	725.5	164.7	158.3	144.3	82.1	39.0	6.3	1.9	3389.6

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. Back-calculated from bobbins gear to rockhopper gear 1981-1988. 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 ¹	717.5	585.1	467.8	105.6	10.3	0.5	0.5	2.2	1889.5
1994 ¹	587.5	200.3	296.0	448.2	50.8	3.2	0.2	1.1	1587.3
1995 ¹	1271.8	182.0	42.6	153.4	341.6	31.3	2.0	0.5	2025.3
1996 ¹	312.7	265.9	53.2	48.9	149.4	255.9	11.6	1.0	1098.5
1997 ²	1252.6	69.1	78.9	25.4	19.1	49.8	70.6	3.5	1569.0

¹ Extended survey area.

² Survey only in the Norwegian Economic Zone. Indices raised to account for this based on the 1996 distribution.

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

Year	Age										Older	Total
	0	1	2	3	4	5	6	7	8	9		
<u>Sub-area 1</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	+		- 36.6
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	8.0	65.9	146.0	15.9	1.7	0.1	0.2	0.7		- 258.8
1995	9.9	12.7	6.5	4.0	26.8	77.6	7.3	1.0	0.1	0.5		- 146.3
1996	5.0	3.1	5.6	3.4	7.7	62.3	56.5	4.8	0.4	0.6		- 149.3
<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
1995	5.0	8.5	6.3	5.3	6.2	23.9	4.1	0.6	+	0.2		- 60.1
1996 ¹	29.2	4.1	25.0	8.1	4.9	9.1	13.4	1.3	0.4	0.1		- 95.7
<u>Division IIb</u>												
1983	22.1	9.9	0.2	0.1	+	+						0.1 32.4
1984	2.2	14.3	1.8	-	-	-	-					+
1985	1.4	10.2	61.4	5.1	+	+	+	-				+
1986	+	0.2	3.1	7.2	1.4	-	-	+	+			-
1987	-	-	0.1	0.7	1.4	0.5	+	-	-	-		-
1988	0.2	-	-	+	0.3	1.1	0.2	-	+	-		-
1989	0.7	0.1	0.2	+	0.1	0.3	0.6	0.1	+	-		-
1990	12.9	5.4	0.8	+	+	0.2	0.1	0.1	+	-		-
1991	20.0	22.9	6.2	0.4	0.1	0.1	0.1	+	+	-		-
1992	13.3	9.1	69.8	13.9	0.5	+	+	0	+	+		-
1993	0.7	0.9	1.9	24.7	1.9	0.2	+	+	+	+		-
1994	0.4	1.7	1.7	2.3	15.7	2.7	0.8	0.2	+	+		-
1995	0.1	0.4	0.4	0.8	0.6	1.6	0.4	+	+	+		-
1996 ²	1.3	0.6	0.5	0.3	0.2	0.4	0.5	0.3	-	-		-
<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	+	+	+			+
1987	0.3	0.9	1.7	8.3	22.5	5.7	+	+	-	+		-
1988	1.3	0.3	0.7	1.7	4.0	7.6	0.8	+	+	+		-
1989	2.2	1.8	2.4	0.4	1.4	4.1	8.1	1.1	0.1	+		-
1990	44.8	14.3	10.6	7.3	4.2	7.3	7.4	5.7	0.3	0.1		-
1991	16.7	42.9	17.6	6.2	0.9	0.3	0.6	1.8	1.5	0.2		-
1992	16.4	28.2	128.6	34.6	5.0	0.4	0.6	0.9	0.8	0.1		-
1993	3.5	4.8	35.7	198.5	35.6	4.8	0.8	0.4	0.4	-		-
1994	9.1	4.9	5.8	44.2	101.4	11.6	1.5	0.1	0.1	0.5		-
1995	6.4	7.2	4.2	3.1	12.3	37.0	4.0	0.5	0.1	0.3		-
1996 ³	6.0	2.3	5.7	2.8	4.9	36.2	33.4	2.9	0.3	0.3		-

¹ Limited area coverage

² No coverage. Estimates based on 1983-1996 distribution.

³ Including the Division IIb estimates.

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
1996	249	229	44	31	76	150	8	1	0	+	788
1997 ¹	779	32	60	20	14	49	46	3	0	+	1002

¹ Survey only the in the Norwegian Economic Zone. Indices raised to account for this based on the 1996 distribution.

Table B4 North-East Arctic HADDOCK. Results from the Russian trawl acoustic survey in the Barents Sea and adjacent waters in the autumn 1985-1995. Index of number of fish at age.

Year	Age											Total
	0	1	2	3	4	5	6	7	8	9	Older	
1985 ¹	194	434	1,468	636	3	1	+	-	-	-	1	2,737
1986 ¹	34	37	208	917	910	2	+	+	+	-	+	2,109
1987 ²	6	16	29	62	197	61	+	-	-	+	12	383
1988 ²	2	1	3	18	83	301	46	-	-	-	+	454
1989 ¹	41	32	94	2	14	35	67	9	1	+	-	295
1990 ¹	594	176	75	28	17	23	43	44	4	1	-	1,004
1991 ¹	240	368	143	65	11	4	7	21	17	2	+	878
1992 ¹	199	245	758	218	35	3	4	7	6	+	+	1,475
1993 ¹	20	26	199	1,076	228	31	5	2	3	2	3	1,595
1994 ¹	118	51	39	252	591	76	9	+	1	1	3	1,141
1995 ¹	163	170	79	72	230	404	41	5	1	1	3	1,168
1996 ¹	685	223	273	89	60	196	174	14	1	1	1	1,717

¹October-December.

²September-October.

Table B5 North-East Arctic HADDOCK. Length data (cm) from Norwegian surveys in January-March and Russian surveys in October-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	-	-	-
1996	15.4	21.6	28.6	38.0	42.1	46.8	55.3	-	-	-
1997 ¹	16.1	21.4	27.6	36.6	40.4	47.7	50.4	-	-	-
<u>Russia</u>										
	0	1	2	3	4	5	6	7	8	9
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	17.0	20.7	28.1	35.4	46.7	62.0	-	68.0	-	-
1987	12.1	21.5	27.8	32.3	37.3	48.6	-	-	-	-
1988	13.7	23.2	29.7	33.7	39.3	46.2	51.2	-	-	-
1989	14.9	22.2	26.5	38.5	44.5	49.3	53.0	57.7	64.1	-
1990	17.0	24.5	30.9	40.4	50.6	53.2	55.7	59.7	63.8	67.7
1991	17.2	24.2	30.5	39.7	53.4	55.4	58.3	60.5	62.7	70.2
1992	16.0	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
1995	15.5	22.5	28.5	33.3	39.7	49.9	54.8	63.1	66.3	69.5
1996 ²	15.8	22.8	28.4	33.7	42.0	48.7		63.4	69.3	72.0

¹ Length adjusted to account for combined coverage , based on 1994 lengths by area.

² Limited area coverage.

Table B6 North-East Arctic HADDOCK. Weight data (g) from Norwegian surveys in January-March and Russian surveys in October-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	2,510	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	-	-	-	
1996	30	92	224	557	745	1,017	1,783	-	-	-	
1997 ¹	35	91	200	469	650	1,076	1,327	-	-	-	
	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	-	3,100	-	-	
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	2,716	-	
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	4,200
1993	31	96	217	535	1,077	1,493	2,094	2,509	2,374	2,621	3,160
1994	27	106	205	337	841	1,602	2,256	2,913	2,934	3,033	3,163
1995	28	95	196	345	628	1,234	1,908	2,430	2,815	3,323	3,479
1996 ²	30	103	209	347	743	1,152	1,650	2,442	3,218	3,333	4,648

¹ Weights adjusted to account for limited coverage, based on 1996 weights by area.

² Limited area coverage.

Table B7 Landings of Coastal haddock in:

A) Norway in Division IIa -areas 06 and 07 (in '000 tonnes).

Data from the Norwegian Directorate of Fisheries Statistique (ICES 1973)

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
6	4	3	4	6	6	5	3	3	2
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
*)	*)	*)	*)	10	6	2	2	2	6
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
5	5	2	3	4	4	4	3	4	5
1990	1991	1992	1993	1994	1995	1996			
3	4	6	5	6	6	5			

*) No data

B) Russian/USSR data in Division I (in '000 tonnes)(ICES 1975).

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
17	24	27	20	14	13	15	17	22	9
1970	1971	1972	1973	1974					
10	7	47	50	9					

Table B8 Length (cm) at age (year) for haddock from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)												
	0	1	2	3	4	5	6	7	8	9	10	11	12+
03 East Finnmark		20.0	29.0	35.5	44.5	51.3	56.2						
04 West Finnmark/Troms		21.0	33.0	40.2	48.5	52.2	54.2	60.0					
05 Lofoten/Vesterålen		26.5	35.5	42.9	47.0	51.8	56.3	63.0					
00 Vestfjord		26.0		41.1	45.1	52.8	60.0	58.0					
06 Nordland		23.3	30.4	39.6	47.4	55.2	58.9	64.3					
07 Møre		27.6	37.0	43.3	47.8	54.1	58.8	59.0					

Table B9 Weight (gram) at age (year) for haddock from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)												
	0	1	2	3	4	5	6	7	8	9	10	11	12+
03 East Finnmark		85	252	449	951	1,396	1,811						
04 West Finnmark/Troms		95	390	748	1,277	1,589	1,760	2,280					
05 Lofoten/Vesterålen		190	456	850	1,130	1,457	1,868	2,445					
00 Vestfjord		185		743	985	1,576	2,403	2,240					
06 Nordland		136	281	676	1,128	1,837	2,179	2,615					
07 Møre		218	548	881	1,197	1,644	2,243	2,068					

Table B10 Percent mature at age for haddock at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)												
	0	1	2	3	4	5	6	7	8	9	10	11	12+
03 East Finnmark	-	-	-	-	5	39	75	100	100	100	100	100	100
04 West Finnmark/Troms	-	-	-	2	30	85	92	98	100	100	100	100	100
05 Lofoten/Vesterålen	-	-	-	25	44	70	96	96	100	100	100	100	100
00 Vestfjord	-	-	-	25	58	67	94	100	100	100	100	100	100
06 Nordland	-	-	-	-	50	83	100	90	100	100	100	100	100
07 Møre	-	-	-	22	67	95	100	100	100	100	100	100	100
Average	-	-	-	12	42	73	93	97	100	100	100	100	100

Table B11 Estimated number (x1000) of haddock at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	2,188	23,481	9,716	10,928	13,412	2,337	-	-	-	-	-	-	62,062
04 West Finnmark/Troms	-	7,124	16,413	8,376	9,639	17,001	8,176	354	80	-	-	-	-	67,163
05 Lofoten/Vesterålen	2,794	2,145	1,340	12,272	11,422	9,516	5,656	410	35	18	-	-	-	45,608
00 Vestfjord	-	81	-	5,003	6,879	3,375	1,189	540	-	-	-	-	-	17,067
06 Nordland	-	64,486	16,423	19,267	15,877	4,622	1,402	399	-	-	-	-	-	122,476
07 Møre	-	4,867	1,976	1,472	6,019	1,785	452	192	13	13	-	-	-	16,789
Total	2,794	80,891	59,633	56,106	60,764	49,711	19,212	1,895	128	31	-	-	-	331,165

Table B12 Estimated biomass (tonnes) of haddock at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	211	3,934	4,551	9,909	17,685	3,896	-	-	-	-	-	-	40,186
04 West Finnmark/Troms	-	622	6,201	6,656	11,083	25,038	13,650	1,250	462	-	-	-	-	64,962
05 Lofoten/Vesterålen	46	335	712	10,771	12,845	14,038	11,832	1,052	179	101	-	-	-	51,911
00 Vestfjord	-	15	-	3,909	7,152	5,488	2,818	1,179	-	-	-	-	-	20,561
06 Nordland	-	6,769	3,924	12,760	16,971	7,659	3,060	1,025	-	-	-	-	-	52,168
07 Møre	-	947	854	1,311	7,053	2,989	950	426	55	55	-	-	-	14,640
Total	46	8,899	15,625	39,958	65,013	72,897	36,206	4,932	696	156	-	-	-	244,428

Table B13 Estimated spawning stock number (x1000) of haddock at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	-	-	-	503	5,164	1,753	-	-	-	-	-	-	7,419
04 West Finnmark/Troms	-	-	-	184	2,921	14,383	7,555	347	80	-	-	-	-	25,469
05 Lofoten/Vesterålen	-	-	-	3,068	5,060	6,680	5,430	392	35	18	-	-	-	20,682
00 Vestfjord	-	-	-	1,251	3,962	2,275	1,122	540	-	-	-	-	-	9,150
06 Nordland	-	-	-	-	7,939	3,818	1,402	359	-	-	-	-	-	13,517
07 Møre	-	-	-	327	4,015	1,690	452	192	13	13	-	-	-	6,702
Total	-	-	-	4,830	24,399	34,010	17,714	1,830	128	31	-	-	-	82,940

Table B14 Estimated spawning stock biomass (tonnes) of haddock at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	-	-	-	456	6,809	2,922	-	-	-	-	-	-	10,187
04 West Finnmark/Troms	-	-	-	146	3,358	21,182	12,613	1,225	462	-	-	-	-	38,986
05 Lofoten/Vesterålen	-	-	-	2,693	5,690	9,855	11,359	1,005	179	101	-	-	-	30,881
00 Vestfjord	-	-	-	977	4,120	3,699	2,660	1,179	-	-	-	-	-	12,635
06 Nordland	-	-	-	-	8,486	6,326	3,060	923	-	-	-	-	-	18,794
07 Møre	-	-	-	291	4,704	2,831	950	426	55	55	-	-	-	9,312
Total	-	-	-	4,107	26,814	50,701	33,564	4,757	696	156	-	-	-	120,795

Table C.1 North-East Arctic SAITHE. Norwegian purse seiners taking part in the saithe fishery. Data given are: number of vessels, catch in tonnes, catch per vessel.

Year	Vessel length (m)								
	<=19.9			20.0-24.9			>=25.0		
	Number	Catch	C/V	Number	Catch	C/V	Number	Catch	C/V
1977	208	21,398	103	66	25,324	384	19	5,655	298
1978	184	16,288	89	72	21,224	295	19	6,094	321
1979	250	21,224	85	72	27,057	376	25	9,122	365
1980	269	21,243	79	96	27,551	287	39	10,234	262
1981	312	25,984	83	89	29,108	327	23	7,354	320
1982	308	30,228	98	98	35,969	367	23	9,303	404
1983	222	19,925	90	80	28,348	354	12	5,524	460
1984	168	8,834	53	69	20,668	300	15	6,713	448
1985	90	4,150	46	57	18,328	322	16	8,391	524
1986	55	1,281	23	43	3,581	83	21	2,643	126
1987	106	9,084	86	46	16,766	364	15	8,185	546
1988	120	13,111	109	48	20,413	425	13	8,981	691
1989	195	14,993	77	61	23,000	377	13	10,466	805
1990	89	2,533	28	53	13,360	257	19	8,406	442
1991	122	8,726	72	56	20,378	364	19	9,797	516
1992	100	7,076	71	49	14,783	302	20	5,020	251
1993	48	6,110	127	45	19,502	433	19	7,433	391
1994	76	9,086	120	39	14,579	374	18	5,672	315
1995	67	3,502	52	34	8,290	244	19	10,108	532
1996 ¹	105	12,441	118	37	16,459	495	21	17,931	854

¹ Preliminary

Table C.2 North-East Arctic SAITHE. Catch, effort, and catch per unit effort for Norwegian trawlers directing for saithe.

Year	Catch ¹ (t)	Effort ¹ (h)	CPUE ¹ (kg/h)
1976	12,982	21,615	601
1977	15,583	29,308	532
1978	12,506	27,094	462
1979	16,609	24,258	685
1980	27,618	39,290	703
1981	43,682	49,191	888
1982	30,358	33,164	915
1983	38,846	37,856	1,026
1984	56,128	60,282	931
1985	29,260	39,894	733
1986	20,897	25,037	835
1987	8,631	11,860	728
1988	16,589	21,034	789
1989	28,753	40,813	705
1990	28,445	42,689	666
1991	26,362	35,680	739
1992	42,785	43,885	975
1993	47,468	46,613	1,018
1994	54,402	57,612	944
1995	72,846	76,732	949
1996 ²	39,662	43,851	904

¹ Including only days with more than 50% saithe on trips with more than 50% saithe in the catches.

² Preliminary.

Table C.3 North-East Arctic SAITHE. Norwegian effort indices.

Year	Purse seine ¹	Trawl ²	Combined ³
1976	-	36.8	-
1977	206	52.7	351
1978	214	51.3	355
1979	199	42.7	316
1980	215	57.4	373
1981	203	71.0	398
1982	213	58.2	373
1983	161	57.7	320
1984	124	85.5	359
1985	98	63.7	273
1986	96	45.2	220
1987	94	30.1	177
1988	103	50.4	242
1989	131	59.8	295
1990	96	60.4	262
1991	107	51.5	249
1992	90	57.6	248
1993	76	68.0	266
1994	78	78.7	294
1995	90	106.4	383
1996	105	74.5	310

¹ No. of vessels 20-24.9 m. length.

² Hours trawling ('000).

³ Trawl indices scaled up to give the same average for 1977-1990 as the purse seine indices (i.e. x 2.75) before adding the two.

Effort indices for both categories were raised to represent total Norwegian landings for the gear.

Table C.4 North-East Arctic Saithe. Acoustic abundance indices from Norwegian surveys in October-November. In 1985 - 1987 the area was incomplete.

Year	Age					Total
	2	3	4	5	6+	
1985	3.1	4.9	2.4	0.5	0.0	10.9
1986	19.5	40.8	3.6	1.8	1.8	67.5
1987	1.8	22.0	48.4	1.8	1.7	75.7
1988	15.7	22.5	19.0	7.1	0.6	64.9
1989	24.8	28.4	17.0	10.1	12.4	92.7
1990	99.6	31.9	14.7	5.1	7.4	158.7
1991	87.8	104.0	4.6	4.0	7.1	207.5
1992	163.5	273.6	57.5	6.2	8.8	509.6
1993	106.9	227.7	103.9	12.7	3.2	454.4
1994	34.4	87.8	112.4	39.5	10.0	284.1
1995	38.7	165.2	87.0	46.8	20.0	357.7
1996	37.0	118.9	214.7	32.1	19.3	422.0

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

Year	Canada	Denmark	Faroe Islands	France	Germany ⁴	Greenland	Iceland	Ireland	Netherlands	Norway	Portugal	Russia ⁵	Spain	UK (E & W)	UK (Scotl)	Total
1984	-	-	-	2,970	7,457	-	-	-	-	18,650	1,806	69,689	25	716	-	101,313
1985	-	-	-	3,326	6,566	-	-	-	-	20,456	2,056	59,943	38	167	-	92,552
1986	-	-	29	2,719	4,884	-	-	-	-	23,255	1,591	20,694	-	129	14	53,315
1987	-	+	450 ³	1,611	5,829	-	-	-	-	18,051	1,175	7,215	25	230	9	34,595
1988	-	-	973	3,349	2,355	-	-	-	-	24,662	500	9,139	26	468	2	41,494
1989	-	-	338	1,849 ¹	4,245	-	-	-	-	25,295	340	14,344	5 ²	271	1	46,688
1990	-	37 ³	386	1,821 ¹	6,741	-	-	-	-	34,090	830	18,918	-	333	-	63,156
1991	-	23	639	804 ¹	981	-	-	-	-	49,463	166	15,354	1	336	13	67,767
1992	-	9	58	1,301 ¹	530	614	-	-	-	23,451	977	4,335	16	479	3	31,773
1993	8 ³	4	152	956 ¹	685	15	-	-	-	18,226	1,040	7,573	65	734	1	29,424
1994 ¹	-	28	26	721 ³	1026	6	4	3	-	19,783	985	6,220	34	259	13	29,108
1995 ¹	-	-	30	651 ³	692	7	1	5	1	15,620	936	6,985	67	252	13	25,260
1996 ¹	-	-	35 ³	393 ³	618	36	-	2	-	20,506	480	1,641	408	305	121	24,545

¹Provisional figures.

²Working Group figure.

³As reported to Norwegian authorities.

⁴Includes former GDR prior to 1991.

⁵USSR 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 (Scotl)	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 ¹	111	-	500 ²	134	6	1,342
1990	+	41	25	554 ¹	47	-	483 ²	369	6	1,525
1991	5	29	144	914 ¹	213	2	415 ²	43	38	1,803
1992	4	22	23	1,960 ¹	170	1	232 ²	65	122	2,599
1993	28	14	4	1,211 ¹	33	1	281 ²	138	70	1,780
1994 ¹	4	13	1	n.a.	324	8	306 ²	38	66	760
1995 ¹	16	12	65	n.a.	80	16	268	46	241	744
1996 ¹	20	16	n.a.	n.a.	74	41	390	37	146	724

¹ Provisional figures.

² Working Group figure.
n.a. = not available.

Table D3. *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 ¹	PST ²	Freezer trawler	Factory trawler FVS IV (FAO code 090)	RT ¹	PST ²
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	-	-	-	60,909
1992	-	0.60	-	-	-	25,983
1993	-	1.00	-	-	-	12,623
1994	-	0.74	-	-	-	16,539
1995	-	0.80	-	-	-	12,715
1996 ³	-	0.80	-	-	-	10,108

¹Side trawlers, 800-1000 HP.-

²Stern trawlers. Data from spring fishery only.

³Provisional figure set by the Working Group.

Table D4. *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 6.8).

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	2.4
1985	107.0	7.0	-	1.0	5.2	16.2	1.7	1.7	0.6	2.8	3.8	0.3
1986	2.0	-	1.0	1.8	8.4	3.6	2.1	1.2	5.6	8.2	0.9	-
1987	-	3.0	37.9	1.3	8.0	4.1	2.0	10.6	9.6	1.4	-	-
1988	4.0	58.1	4.3	13.3	25.8	3.9	8.6	11.2	2.8	-	-	-
1989	8.7	9.0	17.0	23.4	4.6	5.4	4.0	6.6	-	-	-	-
1990	2.5	6.3	6.1	1.0	4.3	1.7	11.5	-	-	-	-	-
1991	0.3	1.0	0.5	1.5	1.2	11.3	-	-	-	-	-	-
1992	0.6	+	0.2	0.1	4.3	-	-	-	-	-	-	-
1993 ¹	-	+	1.5	1.8	-	-	-	-	-	-	-	-
1994	0.3	3.5	1.7	-	-	-	-	-	-	-	-	-
1995	2.8	1.0	-	-	-	-	-	-	-	-	-	-
1996 ²	+											

¹ - Not complete area coverage of Division IIb.

² - Area surveyed restricted to Subarea I and Division IIa only.

Table D5. *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
1995	4	50	365	237	132	61	19	17	11	+	1	3	0	0	900
1996	23	46	15	37	105	144	84	17	51	32	34	9	6	2	605

Table D6. *Sebastes mentella*¹. Abundance indices from the bottom trawl surveys in the Barents Sea in the winter 1986-1997 (numbers in millions). The area coverage was extended from 1993.

Year	Length group (cm)									Total
	5.0-9.9	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	>45.0	
1986	81.3	151.9	205.4	87.7	169.2	129.8	87.5	23.6	13.8	950.2
1987	71.8	25.1	227.4	56.1	34.6	11.4	5.3	1.1	0.1	432.9
1988	587.0	25.2	132.6	182.1	39.6	50.1	47.9	3.6	0.1	1068.2
1989	622.9	55.0	28.4	177.1	58.0	9.4	8.0	1.9	0.3	961.0
1990	323.6	304.5	36.4	55.9	80.2	12.9	12.5	1.5	0.2	827.7
1991	395.2	448.8	86.2	38.9	95.6	34.8	24.3	2.5	0.2	1126.5
1992	139.0	366.5	227.1	34.6	55.2	34.4	7.5	1.8	0.5	866.6
1993	30.8	592.7	320.2	116.3	24.2	25.0	6.3	1.0	+	1116.5
1994	6.9	258.6	289.4	284.3	51.4	69.8	19.9	1.4	0.1	981.8
1995	263.7	71.4	637.8	505.8	90.8	68.8	31.3	3.9	0.5	1674.0
1996	213.1	100.2	191.2	337.6	134.3	41.9	16.6	1.4	0.3	1036.6
1997 ²	64.1	122.2	24.8	277.9	271.9	70.9	39.8	5.1	0.2	877.0

¹ - Includes unidentified *Sebastes* specimens, mostly less than 15 cm.

² - Adjusted indices to account for not covering the Russian EEZ in Subarea I.

Table D7. *Sebastes mentella* in Sub-areas I and II. Preliminary Norwegian bottom trawl indices (numbers in millions) from the annual Barents Sea survey in February. The area coverage was extended from 1993 onwards.

Year	Age														Total
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1992	351	252	132	56	14	11	3	9	18	16	12	11	2	5	892
1993	38	473	192	242	62	45	19	22	13	11	10	4	2	3	1,136
1994	7	85	332	189	370	228	73	42	3	30	8	14	25	7	1,413
1995	308	45	146	264	364	211	69	23	7	17	23	9	11	10	1,507
1996	173	119	109	114	128	122	106	64	24	19	12	7	8	4	1,009

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 1992-1997. Abundance indices in millions.

Year	Period of survey	Age																			Total		Area of survey	
		1-4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21+	Numbers	Biomass t 10 ³	SSN	SSB	in n.m. ²
1992	April	29	27	27	37	36	50	78	39	34	40	44	43	28	17	13	4	7	3	566	218	191	114	25300
1993	April	31	15	13	6	6	20	56	56	38	28	29	27	19	12	7	3	1	2	396	150	151	90	23500
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	23300
1996		No Data																						
1997	Apr-May	86	6	24	102	150	53	48	24	20	26	36	28	11	9	4	2	1	+	630	170	111	58	22400

Table D9. *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	1997
7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018
8	0.000	0.000	0.000	0.000	0.000	0.046	0.000	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	0.027
10	0.017	0.182	0.028	0.074	0.131	0.174	0.092	0.133	0.055	0.130
11	0.132	0.278	0.125	0.178	0.300	0.138	0.169	0.364	0.111	0.312
12	0.377	0.616	0.297	0.473	0.688	0.358	0.396	0.480	0.368	0.281
13	0.822	0.821	0.562	0.684	0.714	0.470	0.452	0.696	0.587	0.566
14	0.795	0.926	0.760	0.716	0.824	0.637	0.761	0.925	0.696	0.736
15	0.862	0.938	0.855	0.794	0.848	0.762	0.939	0.962	0.729	0.831
16	0.875	1.000	1.000	1.000	1.000	1.000	0.886	0.953	0.789	0.958
17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.977	1.000	0.950
18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table D10. Output statistics from the GLM-analysis of S.marinus CPUE.

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General Linear Models Procedure
Class Level Information

Class	Levels	Values
YEAR	16	1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996
AREA	5	3 4 5 6 7
MONTH	12	1 2 3 4 5 6 7 8 9 10 11 12

Number of observations in data set = 548

General Linear Models Procedure

Dependent Variable: CPUE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	30	43.85757395	1.46191913	2.90	0.0001
Error	517	260.19060178	0.50327002		
Corrected Total	547	304.04817573			
	R-Square	C.V.	Root MSE	CPUE Mean	
	0.144245	95.07681	0.70941527	0.74614964	

Source	DF	Type I SS	Mean Square	F Value	Pr > F
YEAR	15	12.77180862	0.85145391	1.69	0.0488
AREA	4	18.41899679	4.60474920	9.15	0.0001
MONTH	11	12.66676854	1.15152441	2.29	0.0098

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YEAR	15	13.19713030	0.87980869	1.75	0.0391
AREA	4	22.03041791	5.50760448	10.94	0.0001
MONTH	11	12.66676854	1.15152441	2.29	0.0098

Parameter	Estimate	T for H0: Parameter=0	Pr > T	Std Error of Estimate
INTERCEPT	0.6865895501 B	3.69	0.0002	0.18609778
YEAR 1981	-.1823392379 B	-1.00	0.3158	0.18158611
1982	-.0666315545 B	-0.32	0.7469	0.20635677
1983	0.1344019710 B	0.71	0.4766	0.18868981
1984	-.0499455210 B	-0.30	0.7631	0.16559124
1985	-.2787572977 B	-1.76	0.0793	0.15853761
1986	-.0570032176 B	-0.36	0.7199	0.15885447
1987	-.1514265904 B	-0.93	0.3516	0.16241985
1988	0.0624472642 B	0.18	0.8558	0.34346645
1989	-.2259092667 B	-1.31	0.1915	0.17271284
1990	0.2796810164 B	1.68	0.0929	0.16611980
1991	0.1718278607 B	1.04	0.2997	0.16552910
1992	-.1301114036 B	-0.76	0.4492	0.17181573
1993	-.0316460233 B	-0.18	0.8592	0.17828707
1994	0.1007376294 B	0.57	0.5686	0.17660484
1995	-.1473516498 B	-0.80	0.4265	0.18517257
1996	0.0000000000 B	.	.	.
AREA 3	0.4441845119 B	4.12	0.0001	0.10768613
4	0.1179583733 B	1.14	0.2567	0.10388100
5	-.0477236268 B	-0.48	0.6339	0.10014710
6	-.1942506609 B	-1.80	0.0721	0.10777128

Table D10 (Continued)

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General Linear Models Procedure

Dependent Variable: CPUE

Parameter	Estimate	T for H0: Parameter=0	Pr > T	Std Error of Estimate
AREA 7	0.0000000000 B	.	.	.
MONTH 1	0.1941638035 B	1.12	0.2624	0.17307558
2	0.2872697191 B	1.74	0.0829	0.16534503
3	0.2537068032 B	1.59	0.1135	0.16002232
4	0.1625715550 B	1.04	0.2991	0.15639880
5	0.1908214755 B	1.22	0.2244	0.15688590
6	0.0195056301 B	0.12	0.9052	0.16373909
7	-.2273903350 B	-1.34	0.1817	0.17002449
8	-.0503823987 B	-0.30	0.7649	0.16837148
9	-.0077335294 B	-0.05	0.9601	0.15452166
10	-.1039650295 B	-0.66	0.5067	0.15646399
11	-.1237983097 B	-0.77	0.4407	0.16045693
12	0.0000000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

General Linear Models Procedure

Level of YEAR	N	-----CPUE-----	
		Mean	SD
1981	29	0.57551724	0.46942660
1982	19	0.72631579	0.61012030
1983	25	0.91520000	1.30718247
1984	42	0.76785714	0.66636083
1985	52	0.50134615	0.22195238
1986	51	0.75254902	0.71328772
1987	46	0.67760870	0.59064629
1988	5	0.77200000	0.22208107
1989	36	0.58861111	0.55055376
1990	42	1.07857143	1.67442392
1991	42	0.91738095	0.74281291
1992	36	0.65222222	0.30266541
1993	31	0.75129032	0.44367963
1994	32	0.87250000	0.45409961
1995	27	0.66407407	0.40503807
1996	33	0.79242424	0.48058578

Table D11. *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).¹

Year	Catch (t) as basis for the analysis	% of total international catch	CPUE (t/hour)	Effort hours trawling
1981	1,315	6.3	1.24	16,795
1982	2,014	12.3	1.35	12,123
1983	1,588	8.3	1.55	12,426
1984	3,960	14.0	1.37	20,715
1985	3,086	10.5	1.14	25,863
1986	4,502	14.9	1.36	22,208
1987	2,168	9.0	1.27	18,958
1988	4,349	16.8	1.48	17,505
1989	3,044	13.1	1.19	19,514
1990	3,589	12.8	1.70	16,516
1991	4,943	25.9	1.59	11,984
1992	2,265	14.0	1.29	12,550
1993	1,426	8.4	1.39	12,179
1994	1,241	7.3	1.52	11,217
1995	928	6.2	1.27	11,831
1996 ²	1,553	9.4	1.42	11,632

¹ Only including trips with more than 50% *S. marinus* in the catches, and analysed by a GLM-analysis.

²Provisional figures.

Table D12. *Sebastes marinus*. Abundance indices from the bottom trawl surveys in the Barents Sea in the winter 1986-1997 (numbers in millions). The area coverage was extended from 1993.

Year	Length group (cm)									Total
	5.0-9.9	10.0-14.9	15.0-19.9	20.0-24.9	25.0-29.9	30.0-34.9	35.0-39.9	40.0-44.9	>45.0	
1986	3.0	11.7	26.4	34.3	17.7	21.0	12.8	4.4	2.6	133.9
1987	7.7	12.7	32.8	7.7	6.4	3.4	3.8	3.8	4.2	82.5
1988	1.0	5.6	5.5	14.2	12.6	7.3	5.2	4.1	3.7	59.2
1989	48.7	4.9	4.3	11.8	15.9	12.2	6.6	4.8	3.0	112.2
1990	9.2	5.3	6.5	9.4	15.5	14.0	8.0	4.0	3.4	75.3
1991	4.2	13.6	8.4	19.4	18.0	16.1	14.8	6.0	4.0	104.5
1992	1.8	3.9	7.7	20.6	19.7	13.7	10.5	6.6	5.8	90.3
1993	0.1	1.2	3.5	6.9	10.3	14.5	12.5	8.6	6.3	63.9
1994	0.7	6.5	9.3	11.7	11.5	19.4	9.1	4.4	2.8	75.4
1995	0.6	5.0	13.1	11.5	9.1	15.9	17.2	10.9	4.7	88.0
1996	+	0.7	3.5	6.4	9.4	11.7	16.6	7.9	3.9	60.1
1997 ¹	-	0.4	1.3	2.7	6.9	21.4	28.1	8.4	3.3	73.0

¹ - Adjusted indices to account for not covering the Russian EEZ in Subarea I.

Table D13. *Sebastes marinus* in Sub-areas I and II. Preliminary Norwegian bottom trawl indices (numbers in thousands) from the annual Barents Sea survey in February. The area coverage was extended from 1993 onwards.

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
1995	2,540	7,450	6,090	7,150	5,820	6,590	5,670	2,000	4,440	6,500	4,320	5,330	6,030	69,930
1996	310	1,300	2,340	3,520	3,660	8,720	5,650	3,960	6,590	5,730	6,230	4,070	2,950	55,030

Table D14. *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
1995	600	1,600	6,400	5,100	1,800	2,200	1,800	700	700	400	700	500	400	500	23,400
1996	40	110	+	560	1,050	940	930	400	1,050	280	320	590	160	70	6,500

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

Year	Fish ² <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 ¹	1.4	712	3,232	8,158	7,493	7,069	2,374	1,753	353	744	31,888
1990 ¹	0.4	115	336	5,050	7,130	7,730	4,490	2,330	918	544	28,643
1991 ¹	0.1	71	877	3,080	6,720	9,270	5,450	2,800	1,660	524	30,452
1992 ¹	+	33	30	338	1,190	3,520	4,420	2,280	1,280	474	13,565
1993 ¹	+	25	60	51	1,049	2,369	2,056	2,772	1,114	665	10,161
1994 ¹	+	4	238	296	652	2,775	2,371	2,593	531	844	10,304
1995 ¹	+	35	+	70	259	798	1,225	1,953	434	504	5,299
1996 ¹	2.6	2520	250	90	250	930	2120	2740	950	850	10700

¹ New standard trawl equipment (rockhopper gear and 40 meter sweep length).

² In millions.

Table E2. GREENLAND HALIBUT in Sub-area I and II. Abundance indices from bottom trawl surveys in the Barents Sea in winter 1989-1996 (in thousands). A: Restricted area surveyed every year; B: Enlarged area (includes the restricted one) surveyed since 1993.

A

Year	Age													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13+	
1989	1078	788	1056	2284	3655	2655	864	971	210	-	19	76	56	13712
1990	66	907	2071	1716	1996	2262	1046	365	175	-	30	119	165	10918
1991	-	279	755	1323	1257	1526	2440	906	450	457	-	55	127	9575
1992	63	128	719	897	1554	543	1069	791	-	648	135	40	53	6640
1993	-	17	168	502	1730	868	1490	758	88	655	382	31	35	6724
1994	-	16	142	1178	2259	1644	1750	885	-	506	38	25	-	8443
1995	-	-	-	168	786	749	1331	760	359	486	60	199	-	4898
1996	1816	-	28	40	709	1510	2964	1000	307	808	154	152	45	9533
1997	-	21	-	21	233	699	1913	1228	741	244	64	41	-	5205

B

Year	Age													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13+	
1993	-	17	279	1002	3129	2818	3895	1632	309	1406	616	31	35	15169
1994	-	16	152	1482	3768	2698	3420	1615	-	1171	135	25	-	14482
1995	-	-	-	216	2824	6229	10624	2727	1250	1902	172	718	57	26761
1996	3149	-	28	102	1547	3043	4991	1599	472	1211	317	250	72	16782
1997	-	65	-	122	528	2452	5148	3737	1483	510	233	171	66	14515

Table E3. GREENLAND HALIBUT in Sub-area I and II. Russian autumn bottom trawl surveys: Abundance of males and females at different age (numbers in thousands).

Age	1990		1991*		1992		1993**		1994		1995		1996***	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females
≤3	2289	531	1078	344	451	234	78	36	38	11		19		
4	4455	3905	3799	4656	4991	2470	1488	678	841	763	284	183	1581	1014
5	7775	8476	11236	14172	20425	12916	9832	3485	6814	3054	4556	1203	10575	
6	9069	6552	10821	11021	15456	10042	15040	4711	12136	5414	13743	4479	27508	2000
7	5988	5405	6067	9167	9001	8271	11759	4768	7505	4028	11483	3813	28864	5256
8	1599	2521	2107	7312	4724	5454	5827	4478	3575	4171	7297	4242	17200	3773
9	529	1382	415	1954	808	1912	1144	2226	791	2610	1359	3034	10076	3274
10	331	827	174	1037	139	1123	393	1475	325	1551	428	985	87	638
11		307	38	617	45	893	154	749	79	526		529	2	449
12		198		142		318	127	392	63	331		312	3	165
13		58		95		67		103		114		84		
14		36		16				111		114		11		
≥15				26				111		57		32		
Total	32035	30198	35735	50559	56040	43700	45842	23323	32167	22744	39150	18926	1350	101
Mean age	5.64	6.11	5.73	6.28	5.82	6.40	6.37	7.29	6.33	7.26	6.68	7.55		

* Age distribution based on length distribution from 1991 and length-at-age data from 1990 and 1992 combined.

** Age distribution based on length distribution from 1993 and length-at-age data from 1992 and 1994 combined.

*** Survey covered half of standard area. Non-standard trawl equipment used.

Table E4 GREENLAND HALIBUT in Sub-area I and II. 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 ¹	4,163	14,278	8,259	8,354	2,594	144				37,792
1989 ²	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 ³	39	54	50	814	1,572	433	589	395	512	4,458
1994 ³	0	13	43	446	2,214	1,218	1,764	485	797	6,980
1995 ³	24	26	31	407	1,081	592	521	151	159	2,992
1996 ³	1267	67	162	250	882	741	753	63	5	4190

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

²An 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.

³An 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.

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Table E6 GREENLAND HALIBUT in Sub-areas I and II

Results from a research programme using trawlers in a limited commercial fishery 1992-1995. All areas combined. Spring and autumn combined

Catch in number on age (%)							CPUE (N) on age						
	1992	1993	1994*	1995*	1996*	1997**		1992	1993	1994*	1995*	1996*	1997**
1							1						
2							2						
3	0.1			0.1		0.0	3	0			1	0	0
4	4.6	4.2	3.2	0.7	0.5	0.9	4	19	30	26	7	7	11
5	19.1	25.0	24.7	22.5	19.5	24.8	5	80	176	198	218	286	302
6	23.0	18.4	23.8	22.6	31.6	22.9	6	97	130	191	218	463	279
7	25.9	27.1	26.8	30.2	35.6	30.5	7	109	191	215	292	521	372
8	13.3	12.4	11.2	11.0	8.7	10.1	8	56	87	90	106	127	123
9	1.7	0.7	1.0	2.7	1.3	2.6	9	7	5	8	26	19	32
10	6.8	7.4	5.9	6.6	2.0	5.0	10	29	52	47	64	29	61
11	2.9	3.1	2.4	2.0	0.5	1.9	11	12	22	19	19	7	23
12	1.7	1.0	0.6	1.1	0.2	0.8	12	7	7	5	11	3	10
13	0.5	0.4	0.2	0.3	0.0	0.3	13	2	3	2	3	0	4
14	0.2	0.2	0.1	0.2	0.1	0.2	14	1	1	1	2	1	2
15	0.1					0.0	15	0					0
Mean individual weight (kg)							CPUE (kg) on age						
	1992	1993	1994*	1995*	1996*	1997**		1992	1993	1994*	1995*	1996*	1997**
1							1						
2							2						
3	0.26			0.40		0.39	3	0			0	0	0
4	0.50	0.53	0.52	0.47	0.48	0.45	4	10	16	13	3	4	5
5	0.71	0.76	0.73	0.70	0.74	0.69	5	57	134	145	152	211	209
6	0.96	0.98	0.95	0.94	0.94	0.88	6	93	127	182	205	435	245
7	1.29	1.33	1.28	1.24	1.23	1.15	7	140	254	276	362	641	428
8	1.77	1.85	1.79	1.71	1.66	1.55	8	99	162	161	182	211	191
9	2.00	2.28	2.23	2.03	2.00	1.87	9	14	11	18	53	38	59
10	2.46	2.65	2.55	2.50	2.50	2.34	10	70	138	121	160	73	142
11	3.10	3.43	3.37	3.28	3.16	2.95	11	38	75	65	63	23	68
12	3.86	4.32	4.22	3.71	3.70	3.46	12	28	30	20	39	11	34
13	4.44	5.18	5.01	4.62		4.52	13	9	15	8	13	0	17
14	6.00	6.44	6.29	5.59		5.47	14	5	9	5	11	0	13
15	5.22						15	2					0
Overall mean individual weight (kg)				1992	1993	1994*	1995*	1996*	1997**				
CPUE (kg round weight per trawlhour)**				1.35	1.38	1.27	1.29	1.12	1.16				
CPUE (number fish per trawlhour)**				567	973	1020	1247	1640	1412	* Preliminary			
Catch (in tonnes)				420	705	803	967	1464	1219	*) Only in spring			
				695	862	811	368	436	301	**) Average for freezer- and factorytrawler			

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 ¹	1	197	-	5	-	224
1990	-	10	30 ¹	3	29	-	4	-	46
1991	-	48	291 ¹	1	216	-	2	-	267
1992	1	15	416 ¹	3	625 ¹	-	-	1	645
1993	1	-	78 ¹	1	863 ¹	-	10	+	875
1994	+	103	-	4	724	-	6	-	833
1995	+	706	-	2 ¹	460 ¹	-	52	283	1503
1996				1	2015		105	159	2280

¹ Provisional figures

**Table F.1 Landings of Norwegian Coastal cod in Division IIa
-(areas 00, 05, 06 and 07, (Figure 9.4) (in '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	1995	1996	*) No data		
24	25	35	44	48)	39	32**)	**) Provisional data		

Table F.2 Length (cm) at age (year) for Norwegian coastal cod from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)											
	0	1	2	3	4	5	6	7	8	9	10	11 12+
03 East Finnmark		18.7	29.3	40.4	50.6	56.8	60.3	70.7	92.0			
04 West Finnmark/Troms		19.6	29.1	43.8	43.8	53.4	65.5	73.3	82.0	87.0		
05 Lofoten/Vesterålen		19.0	33.9	40.5	50.7	58.7	68.2	86.8		115.0		
00 Vestfjord			29.3	41.4	54.1	63.7	68.1	77.7	90.8		111.0	
06 Nordland			33.1	41.9	50.3	57.5	64.3	84.4			118.0	
07 Møre		25.0	36.4	51.1	56.5	62.7		89.0				
Total												

Table F.3 Weight (gram) at age (year) for Norwegian coastal cod from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)											
	0	1	2	3	4	5	6	7	8	9	10	11 12+
03 East Finnmark		54	221	610	1,205	1,816	2,221	3,732	7,190			
04 West Finnmark/Troms		65	234	807	1,490	2,069	2,941	4,132	5,683	5,770		
05 Lofoten/Vesterålen		60	401	665	1,321	2,072	3,064	6,211		16,960		
00 Vestfjord			267	713	1,669	2,600	3,107	4,780	7,545		15,707	
06 Nordland			355	736	1,199	1,774	2,478	5,816			15,560	
07 Møre		160	556	1,431	1,867	2,549		7,548				
Total												

Table F.4 Percent mature at age for Norwegian coastal cod at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)											
	0	1	2	3	4	5	6	7	8	9	10	11 12+
03 East Finnmark	-	-	-	-	2	16	60	82	67	100	100	100
04 West Finnmark/Troms	-	-	-	10	53	78	84	95	100	100	100	100
05 Lofoten/Vesterålen	-	-	-	-	8	62	81	100	100	100	100	100
00 Vestfjord	-	-	-	6	14	25	79	60	100	100	100	100
06 Nordland	-	-	-	-	15	65	100	100	100	100	100	100
07 Møre	-	-	-	-	32	92	96	100	100	100	100	100
Average	-	-	-	3	21	56	83	89	94	100	100	100

Table F.5 Estimated number (x1000) of Norwegian coastal cod at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	1,099	5,393	5,673	1,933	2,254	1,213	180	30	2	2	-	-	17,779
04 West Finnmark/Troms	-	641	6,941	4,002	3,619	5,350	3,537	1,148	453	40	3	-	-	25,734
05 Lofoten/Vesterålen	-	-	1,722	4,090	1,306	1,072	696	398	-	-	-	-	-	9,284
00 Vestfjord	-	-	715	3,086	2,660	1,922	905	438	263	-	-	-	-	9,989
06 Nordland	-	-	2,410	5,485	2,220	1,506	466	957	-	200	-	-	-	13,244
07 Møre	-	16	197	479	644	410	-	59	8	-	-	-	-	1,813
Total	-	1,756	17,378	22,815	12,382	12,514	6,817	3,180	754	242	5	-	-	77,843

Table F.6 Estimated biomass (tonnes) of Norwegian coastal cod at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	88	993	3,286	2,265	3,863	2,518	668	194	14	14	-	-	13,903
04 West Finnmark/Troms	-	54	1,514	3,335	5,407	10,649	9,839	4,368	2,306	270	32	-	-	37,774
05 Lofoten/Vesterålen	-	-	720	2,870	1,569	2,373	2,338	2,527	-	-	-	-	-	12,397
00 Vestfjord	-	-	177	2,377	4,593	5,004	2,842	2,090	1,834	-	-	-	-	18,917
06 Nordland	-	-	871	3,951	2,714	2,755	1,194	5,495	-	2,846	-	-	-	19,826
07 Møre	-	3	111	702	1,191	1,043	-	414	42	-	-	-	-	3,506
Total	-	145	4,386	16,521	17,739	25,687	18,731	15,562	4,376	3,130	46	-	-	106,323

Table F.7 Estimated spawning stock number (x1000) of Norwegian coastal cod at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	-	-	-	39	356	728	147	20	2	2	-	-	1,294
04 West Finnmark/Troms	-	-	-	384	1,900	4,146	2,978	1,085	453	40	3	-	-	10,989
05 Lofoten/Vesterålen	-	-	-	-	107	667	566	398	-	-	-	-	-	1,738
00 Vestfjord	-	-	-	191	380	471	713	263	263	-	-	-	-	2,282
06 Nordland	-	-	-	-	340	982	466	957	-	200	-	-	-	2,945
07 Møre	-	-	-	-	207	377	-	59	8	-	-	-	-	651
Total	-	-	-	576	2,972	6,999	5,451	2,909	744	242	5	-	-	19,898

Table F.8 Estimated spawning stock biomass (tonnes) of Norwegian coastal cod at age from the Norwegian coastal survey during the autumn 1996.

Area	Age (year)													Total
	0	1	2	3	4	5	6	7	8	9	10	11	12+	
03 East Finnmark	-	-	-	-	45	610	1,511	547	129	14	14	-	-	2,871
04 West Finnmark/Troms	-	-	-	320	2,839	8,253	8,284	4,128	2,306	270	32	-	-	26,432
05 Lofoten/Vesterålen	-	-	-	-	129	1,476	1,901	2,527	-	-	-	-	-	6,032
00 Vestfjord	-	-	-	147	657	1,226	2,239	1,254	1,834	-	-	-	-	7,358
06 Nordland	-	-	-	-	415	1,796	1,194	5,495	-	2,846	-	-	-	11,747
07 Møre	-	-	-	-	382	959	-	414	42	-	-	-	-	1,797
Total	-	-	-	468	4,467	14,320	15,130	14,365	4,311	3,130	46	-	-	56,236

Table F.9 Estimated number at age of Norwegian coastal cod in each area from the Norwegian coastal surveys from 1992-1996

03 East Finnmark																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	3,641	3,990	9,139	5,633	4,801	3,318	625	266	653	439	302	-	33	-	-	32,840
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	700	6,113	2,405	1,172	2,353	1,786	760	296	42	13	-	-	-	-	-	-	15,640
1996	-	1,099	5,393	5,673	1,933	2,254	1,213	180	30	2	2	-	-	-	-	-	17,779
04 West Finnmark/Troms																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	1,953	4,658	6,797	5,210	8,987	3,994	387	508	494	97	178	-	-	-	6	33,269
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	89	14,233	6,458	4,071	5,729	8,127	4,370	1,022	417	467	130	16	-	-	-	-	45,129
1996	-	641	6,941	4,002	3,619	5,350	3,537	1,148	453	40	3	-	-	-	-	-	25,734
05 Lofoten/Vesterålen																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	1,091	695	2,221	3,952	4,828	5,151	2,659	1,323	203	35	188	320	325	93	-	-	23,085
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	1,368	3,487	2,806	2,091	2,995	3,039	1,000	479	113	-	76	-	115	-	-	-	17,569
1996	-	-	1,722	4,090	1,306	1,072	696	398	-	-	-	-	-	-	-	-	9,284
00 Vestfjord																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	1,608	571	544	1,452	3,215	4,726	2,642	1,651	683	208	140	96	41	-	4	34	17,613
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	343	1,175	1,861	1,130	1,319	222	22	63	-	-	-	-	-	-	6,135
1996	-	-	715	3,086	2,660	1,922	905	438	263	-	-	-	-	-	-	-	9,989
06 Nordland																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	125	726	1,355	1,723	4,158	3,994	1,585	973	168	48	96	105	35	109	72	4	15,276
1995	-	4,284	7,262	2,036	928	739	1,899	706	362	36	14	16	212	-	-	-	18,494
1996	-	-	2,410	5,485	2,220	1,506	466	957	-	200	-	-	-	-	-	-	13,244
07 More																	
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	5	10	416	502	1,676	1,817	944	312	139	44	12	-	17	24	-	-	5,913
1995	-	590	917	3,088	1,770	1,398	202	449	202	202	-	-	-	-	-	-	8,818
1996	-	16	197	479	644	410	-	59	8	-	-	-	-	-	-	-	1,813

TUNING DATA - NORWEGIAN COASTAL COD

Table F.10 Abundance indices of Norwegian Coastal cod from the autumn coastal surveys 1992-1996

FLEET NR.	YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	TOTAL
FLEET-1	1992	-	5,594	8,648	15,936	10,843	13,788	7,312	1,012	774	1,147	536	480	-	33	-	6	66,109
FLEET-1	1995	789	20,346	8,863	5,243	8,082	9,913	5,130	1,318	459	480	130	16	-	-	-	-	60,768
FLEET-1	1996	-	1,740	12,334	9,675	5,552	7,604	4,750	1,328	483	42	5	-	-	-	-	-	43,513

FLEET NR.	YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	TOTAL
FLEET-2	1993	2,825	1,369	3,183	6,115	9,386	11,639	6,001	3,635	887	259	397	522	441	165	4	38	46,866
FLEET-2	1995	1,368	3,487	3,149	3,266	4,856	4,169	2,319	701	135	63	76	-	115	-	-	-	23,705
FLEET-2	1996	-	-	2,437	7,176	3,966	2,994	1,601	836	263	-	-	-	-	-	-	-	19,273

FLEET NR.	YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	TOTAL
FLEET-3	1994	5	633	1,152	1,331	3,764	3,197	1,368	483	251	60	38	-	41	57	-	-	12,380
FLEET-3	1995	-	4,874	8,179	5,124	2,698	2,137	2,101	1,155	564	238	14	16	212	-	-	-	27,312
FLEET-3	1996	-	16	2,607	5,964	2,864	1,916	466	1,016	8	200	-	-	-	-	-	-	15,057