

tot. 4/1 Assess

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PART 2

REPORT OF THE NORTH-WESTERN WORKING GROUP

Copenhagen, 1-8 May 1990

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Table 7.1 Faroe Plateau COD. Nominal catches (t) by countries, 1974-1988, as reported to ICES.

Year	Faroe Islands	France	Germany, Fed. Rep.	Norway	Poland	UK		Denmark	Others	Total
						England	Scotland			
1974	12,541	567 ¹	292	446	320	2,879	7,516	-	20	24,581
1975	22,608	1,531	408	1,353	432	2,538	7,815	-	90	36,775
1976	28,502	1,535	247	1,282	496	2,179	5,491	-	67	39,799
1977	28,177	1,450	332	864	-	811	3,291	-	2	34,927
1978	24,076	213 ¹	71 ³	245	-	518	1,460	-	2	26,585
1979	21,774	117 ¹	23 ³	274	-	263	661	-	-	23,112
1980	19,966	40 ¹	- ³	127	-	13	367	-	-	20,513
1981	22,616	47	- ³	240	-	-	60	-	-	22,963
1982	21,387	10	-	90	-	-	2 ⁴	-	-	21,489
1983	37,916	13	128	76	-	-	- ⁴	-	-	38,133
1984	36,914	34	9	22	-	-	- ⁴	-	-	36,979
1985	39,422	29	5	28	-	-	- ⁴	-	-	39,484
1986	34,492	4	8	83	-	-	- ⁴	8	-	34,595
1987	21,303	17	12	21	-	8	- ⁴	30	-	21,391
1988	25,500 ^{1,2}	17	5	163	-	-	- ⁴	10	-	25,695
1989 ²	23,000 ¹	-	7	410	-	-	-	-	-	23,417

¹ Sub-division Vb₂ included.

² Preliminary.

³ Working Group Data.

⁴ Included in Sub-division Vb₂.

Working Group figures (t):

1987	22,712
1988	25,274
1989	23,418

Table 7.2 Faroe Bank COD. Nominal catches (t) by countries, 1974-1988, as reported to ICES.

Year	Faroe Islands	France	Germany, Fed.Rep.	Norway	UK England	UK Scotland	Denmark	Others	Total
1974	696	- ¹	-	-	829	503	-	40	
1975	378	81	50	-	749	804	-	55	2,117
1976	457	72	+	1	877	912	-	11	2,330
1977	851	219	-	99	9	780	-	-	1,958
1978	4,194	- ¹	-	183	2	1,071	-	-	5,450
1979	1,273	- ¹	-	33	-	677	-	-	1,983
1980	724	- ¹	-	54	85	340	-	-	1,203
1981	975	-	-	120	-	134	-	-	1,229
1982	2,184	-	-	16	-	152 ³	-	-	2,352
1983	2,284	-	-	17	-	66 ³	-	-	2,367
1984	2,189	-	-	11	-	16 ³	-	-	2,216
1985	2,913	-	-	23	-	25 ³	-	-	2,961
1986	1,836	-	-	6	-	63 ³	-	-	1,905
1987	3,409	-	-	23	-	47 ³	-	-	3,479
1988	- ¹	-	-	94	-	37 ³	-	-	131
1989	- ¹	-	-	- ¹	-	12 ³	-	-	12

¹ Catches included in Sub-division Vb₁.

² Preliminary.

³ Catches including Sub-division Vb₁.

Working Group figures (t):

1987	1,931
1988	1,369
1989	461

Table 7.3 SUM OF PRODUCTS CHECK

COD IN THE FAROE PLATEAU
CATEGORY: TOTAL

CATCH IN NUMBERS	UNIT: thousands									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	41	16	5	80	37	0	0	11	0	0
2	1129	646	1139	2149	4396	998	210	273	555	2373
3	2263	4137	1965	5771	5234	9484	3586	1446	2313	2282
4	1461	1981	3073	2760	3487	3795	8462	2772	2120	2321
5	895	947	1286	2746	1461	1669	2373	3273	1618	1190
6	807	582	471	1204	912	770	907	862	2375	1089
7	832	487	314	510	314	872	236	238	536	1057
8	339	527	169	157	82	309	147	72	183	233
9	42	123	254	104	34	65	47	73	36	64
10+	18	55	122	102	66	80	38	28	27	10
TOTAL	7827	9501	8798	15583	16023	18042	16006	9048	9763	10619
A) SOP	19399	22075	21485	39389	38209	41603	35990	23559	25115	23957
B) NOMIN.	20513	22963	21489	38133	36979	39484	34595	22712	25274	23418
(B/A) %	106	104	100	97	97	95	96	96	101	98

Table 7.4 VIRTUAL POPULATION ANALYSIS

COD IN THE FAROE PLATEAU

MEAN WEIGHT AT AGE OF THE STOCK	UNIT: kilogram									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	.430	.750	.715	.690	.743	.743	.743	.489	.000	.000
2	.927	1.080	1.280	1.338	1.195	.905	1.099	1.093	1.061	1.010
3	1.432	1.470	1.413	1.950	1.888	1.658	1.459	1.517	1.749	1.597
4	2.220	2.180	2.138	2.403	2.980	2.626	2.046	2.160	2.300	2.201
5	3.105	3.210	3.107	3.107	3.679	3.400	2.936	2.766	2.914	2.934
6	3.539	3.700	4.012	4.110	4.470	3.752	3.786	3.908	3.109	3.468
7	4.392	4.240	5.442	5.020	5.488	4.220	4.899	5.461	3.976	3.750
8	6.100	4.430	5.563	5.601	6.466	4.739	5.893	6.341	4.896	4.682
9	7.603	6.690	5.216	8.013	6.628	6.511	9.699	8.509	7.087	6.140
10+	9.668	10.000	6.707	8.031	10.981	10.981	8.815	9.811	8.287	9.156

Table 7.5

DISAGGREGATED Qs
 LOG TRANSFORMATION
 NO explanatory variate (Mean used)
 Fleet 1 ,Magnus Heinasson , has terminal q estimated as the mean
 FLEETS COMBINED BY ** VARIANCE **

Regression weights
 , 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000,
 Oldest age F = 1.000*average of 5 younger ages. Fleets combined by variance of predictions
 Fishing mortalities

Age,	82,	83,	84,	85,	86,	87,	88,	89,
2,	.058,	.096,	.097,	.061,	.020,	.030,	.096,	.082,
3,	.222,	.461,	.356,	.312,	.319,	.188,	.372,	.693,
4,	.358,	.553,	.564,	.474,	.507,	.436,	.460,	.795,
5,	.388,	.631,	.647,	.585,	.621,	.374,	.493,	.511,
6,	.404,	.775,	.443,	.876,	.747,	.482,	.513,	.739,
7,	.688,	1.056,	.469,	1.033,	.747,	.443,	.633,	.454,
8,	.547,	.923,	.465,	1.241,	.471,	.536,	.736,	.634,
9,	.477,	.787,	.518,	.842,	.618,	.454,	.567,	.627,

Log catchability estimates

Age 2 Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-12.71,	-12.08,	-12.13,	-12.04,	-12.72,	-12.67,	-11.57,	-12.27

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
,	q	,	F	F	,	Slope	,	Intrcpt
1	-12.27	.431	.0005	.0821	.000E+00	.000E+00	-12.274	.144
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.082	.431	0.000	.431	0.000				

(cont'd)

Table 7.5 (cont'd)

Age 3

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-11.34,	-9.77,	-10.36,	-10.24,	-9.65,	-9.75,	-9.19,	-10.04

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt	
1	-10.04	.679	.0043	.6928	.000E+00	.000E+00	-10.045	.226
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.693	.679	0.000	.679	0.000				

Age 4

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-9.65,	-9.25,	-9.81,	-9.75,	-8.76,	-8.87,	-8.63,	-9.25

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt	
1	-9.25	.491	.0097	.7946	.000E+00	.000E+00	-9.246	.164
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.795	.491	0.000	.491	0.000				

Age 5

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-8.97,	-9.17,	-9.82,	-9.72,	-8.62,	-8.79,	-8.61,	-9.10

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt	
1	-9.10	.490	.0112	.5114	.000E+00	.000E+00	-9.099	.163
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.511	.490	0.000	.490	0.000				

(cont'd)

Table 7.5 (cont'd)

Age 6

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-8.80,	-9.21,	-10.14,	-10.10,	-8.48,	-8.97,	-8.93,	-9.23

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-9.23	.634	.0098	.7389	.000E+00	.000E+00	-9.234	.211
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.739	.634	0.000	.634	0.000			

Age 7

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-8.86,	-9.35,	-9.89,	-9.98,	-7.87,	-9.83,	-8.88,	-9.24

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-9.24	.749	.0098	.4540	.000E+00	.000E+00	-9.236	.250
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.454	.749	0.000	.749	0.000			

Age 8

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-8.31,	-9.48,	-10.98,	-9.65,	-8.64,	-8.63,	-9.53,	-9.32

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-9.32	.887	.0090	.6335	.000E+00	.000E+00	-9.319	.296
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.634	.887	0.000	.887	0.000			

Table 7.6

Title : COD IN THE FAROE PLATEAU
 At 15.37.43 05 MAY 1990
 from 80 to 89 on ages 2 to 9
 with Terminal F of .638 on age 4 and Terminal S of 1.000

Initial sum of squared residuals was 62.105 and
 final sum of squared residuals is 5.872 after 71 iterations

Matrix of Residuals

Years	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89		WTS
Ages											
2/ 3	.126	.155	.214	.098	.679	-.078	-.812	-.458	.077	.000	.292
3/ 4	.107	.112	.014	-.044	.278	-.185	-.090	-.161	-.031	.000	.843
4/ 5	-.017	-.181	.034	-.394	.249	-.285	.166	.337	.090	.000	.505
5/ 6	-.053	.052	-.059	.017	.106	-.191	.193	.082	-.147	.000	1.000
6/ 7	-.075	-.126	-.311	.134	-.598	.269	.418	.139	.149	.000	.396
7/ 8	-.330	.104	.269	.392	-.834	.652	.051	-.273	-.032	.000	.282
8/ 9	.190	-.263	.047	.087	-.635	.736	-.472	.128	.181	.000	.304
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WTS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Fishing Mortalities (F)											
F-values	80	81	82	83	84	85	86	87	88	89	
	.3946	.4223	.3822	.6619	.4725	.5381	.4713	.3664	.5197	.6380	
Selection-at-age (S)											
S-values	2	3	4	5	6	7	8	9			
	.1169	.6461	1.0000	1.1175	1.2761	1.4034	1.2563	1.0000			

Table 7.7a

Title : COD IN THE FAROE PLATEAU
At 15.37.44 05 MAY 1990
SEPERABLE FISHING MORTALITIES

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
2	.046	.049	.045	.077	.055	.063	.055	.043	.061	.075
3	.255	.273	.247	.428	.305	.348	.304	.237	.336	.412
4	.395	.422	.382	.662	.473	.538	.471	.366	.520	.638
5	.441	.472	.427	.740	.528	.601	.527	.409	.581	.713
6	.504	.539	.488	.845	.603	.687	.601	.468	.663	.814
7	.554	.593	.536	.929	.663	.755	.661	.514	.729	.895
8	.496	.531	.480	.832	.594	.676	.592	.460	.653	.802
9	.395	.422	.382	.662	.473	.538	.471	.366	.520	.638
$\bar{F}_{(3-7)u}$.430	.460	.416	.721	.514	.586	.513	.399	.566	.694

Table 7.7b VIRTUAL POPULATION ANALYSIS

COD IN THE FAROE PLATEAU

	FISHING MORTALITY COEFFICIENT			UNIT: Year-1	NATURAL MORTALITY COEFFICIENT = .20					
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
2	.054	.052	.058	.097	.103	.061	.023	.028	.064	.075
3	.237	.287	.220	.458	.358	.333	.323	.220	.341	.402
4	.367	.337	.358	.545	.559	.480	.561	.446	.575	.682
5	.426	.432	.382	.631	.632	.576	.633	.441	.511	.758
6	.497	.545	.398	.752	.443	.832	.726	.498	.672	.789
7	.412	.641	.649	1.021	.445	1.036	.668	.421	.672	.734
8	.546	.501	.481	.812	.434	1.097	.474	.440	.671	.710
9	.393	.390	.483	.623	.406	.741	.469	.459	.412	.527
10+	.393	.390	.483	.623	.406	.741	.469	.459	.412	.527
(3- 7)U	.388	.448	.401	.682	.487	.651	.582	.405	.554	.673

Table 7.8 VIRTUAL POPULATION ANALYSIS

COD IN THE FAROE PLATEAU

STOCK SIZE IN NUMBERS UNIT: thousands

BIOMASS TOTALS UNIT: tonnes

ALL VALUES ARE GIVEN FOR 1 JANUARY

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1980-87
2	23494	14060	22247	25642	49663	18487	10066	11025	9815	36268	0	21836
3	11767	18216	10928	17187	19055	36696	14235	8052	8780	7535	27553	17017
4	5215	7598	11195	7179	8898	10901	21524	8433	5291	5111	4122	10118
5	2829	2958	4441	6406	3407	4164	5524	10049	4419	2435	2111	4972
6	2255	1514	1573	2482	2790	1483	1916	2401	5293	2168	932	2052
7	2698	1123	718	865	958	1466	528	759	1194	2211	804	1139
8	881	1462	484	307	255	503	426	221	408	499	867	567
9	142	418	725	245	112	135	137	217	117	170	200	266
10+	61	187	348	240	217	167	111	83	88	27	95	177
TOTAL NO	49342	47536	52661	60553	85354	74002	54468	41242	35404	56425		
SPS NO	14080	15260	19485	17724	16636	18819	30167	22164	16808	12621		
TOT. BIOM	85857	89524	100684	125134	156870	137201	106751	87874	75567	86495		
SPS BIOM	47227	47561	56765	57312	61546	59628	74918	63609	49797	37831		

Table 7.9

List of input variables for the ICES prediction program.

COD FAROE PLATEAU

The reference F is the mean F for the age group range from 3 to 7

The number of recruits per year is as follows:

Year	Recruitment
1990	19000.0
1991	19000.0
1992	19000.0

Data are printed in the following units:

Number of fish: thousands
 Weight by age group in the catch: kilogram
 Weight by age group in the stock: kilogram
 Stock biomass: tonnes
 Catch weight: tonnes

age	stock size	fishing pattern	natural mortality	maturity ogive	weight in the catch	weight in the stock
2	19000.0	.08	.20	.00	1.055	1.055
3	27553.0	.41	.20	.00	1.621	1.621
4	4122.0	.64	.20	1.00	2.220	2.220
5	2111.0	.71	.20	1.00	2.871	2.871
6	932.0	.81	.20	1.00	3.495	3.495
7	804.0	.89	.20	1.00	4.396	4.396
8	867.0	.80	.20	1.00	5.306	5.306
9	200.0	.64	.20	1.00	7.245	7.245
10+	95.0	.64	.20	1.00	9.085	9.085

Table 7.10 Management options for 1991 and 1992 for FAROE COD in Division Vb₁.

1990				Management option for 1991 and 1992	1991			1992			1993		
Stock biom. (2+)	SSB	F (3-7)	Catch (2+)		Stock biom. (2+)	SSB	F (3-7)	Catch (2+)	Stock biom. (2+)	SSB	Catch (2+)	Stock biom. (2+)	SSB
94	29	0.69	29	F _{0.1}	115	70	0.17	12	132	87	15	144	99
				F = 0.8F ₈₉	97	53	0.56	27	95	51	27	93	49
				F _{max}	104	60	0.39	22	109	64	24	110	66
				F = F ₈₉	91	48	0.69	30	86	43	28	83	39
				F = 1.2F ₈₉	86	43	0.83	32	79	36	28	75	32

Weights in '000 t.

Table 8.1 Faroe Plateau HADDOCK. Nominal catches (t) by countries, 1974-1989, as reported to ICES.

Year	Faroe Islands	France	Germany,		Poland	UK		Denmark	Others	Total
			Fed.Rep.	Norway		England	Scotland			
1974	4,538	1,461 ¹	70	5	685	1,044	5,572	-	30	13,405
1975	8,625	2,173	120	56	544	1,505	4,896	-	383	18,302
1976	12,670	2,472	22	20	448	1,551	6,671	-	181	24,035
1977	19,806	623	49	46	5	707	3,278	-	26	24,540
1978	15,539	71 ¹	8	91	-	48	367	-	-	16,124
1979	11,259	50 ¹	2	39	-	35	212	-	-	11,597
1980	13,633	31 ¹	4	9	-	6	434	-	6	14,123
1981	10,891	113	+	20	-	-	85	-	-	11,109
1982	10,319	2	1	12	-	-	1 ³	-	-	10,335
1983	11,898	2	+	12	-	-	3 ³	-	-	11,912
1984	11,418	20	+	10	-	-	3 ³	-	-	11,448
1985	13,597	23	+	21	-	-	3 ³	-	-	13,641
1986	13,359	8	1	22	-	-	3 ³	1	-	13,391
1987	13,954	22	1	13	-	2	3 ³	8	-	14,000
1988	11,500 ^{1,2}	14	-	54 ¹	-	-	3 ³	4	-	11,572
1989 ²	14,000 ¹	-	-	125 ¹	-	-	-	-	-	14,125

¹ Catches including Sub-division Vb₂.

² Preliminary.

³ Catches included in Sub-division Vb₂.

⁴ Catches as reported to the Faroese Coastal Guard Service.

Working Group figures (t):

1987	13,891
1988	11,759
1989	14,768

Table 8.2 Faroe Bank HADDOCK. Nominal catches (t) by countries, 1974-1989, as reported to ICES.

Year	Faroe	France	Germany,	Norway	UK	UK	Denmark	Others	Total
	Islands		Fed.Rep.		England	Scotland			
1974	273	- ¹	-	-	573	500	-	22	1,368
1975	132	125	53	-	921	1,182	-	-	2,413
1976	44	70	+	-	733	1,329	-	-	2,176
1977	273	77	-	11	4	650	-	-	1,015
1978	2,643	- ¹	-	39	-	394	-	-	3,076
1979	716	- ¹	-	-	-	105	-	-	821
1980	690	- ¹	-	8	152	43	-	-	893
1981	1,103	-	-	7	-	14	-	-	1,124
1982	1,553	-	-	1	-	48	-	-	1,602
1983	967	-	-	2	-	13 ³	-	-	982
1984	925	-	-	5	-	+ ³	-	-	930
1985	1,474	-	-	3	-	25 ³	-	-	1,502
1986	1,050	-	-	10	-	26 ³	-	-	1,086
1987	832 ₁	-	-	5	-	45 ³	-	-	832
1988	- ₁	-	- ²	43 ₁	-	15 ³	-	-	58
1989	- ₁	-	-	- ₁	-	26	-	-	26

¹ Catches included in Sub-division Vb₁.

² Preliminary.

³ Catches including Sub-division Vb₁.

Working Group figures (t):

1987	969
1988	527
1989	204

Table 8.3 SUM OF PRODUCTS CHECK

HADDOCK IN THE FAROE REGION
CATEGORY: TOTAL

	CATCH IN NUMBERS									
	UNIT: thousands									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	0	0	0	0	25	0	0	0	0	0
2	143	74	539	441	1195	985	230	283	661	66
3	58	455	934	1969	1561	4553	2549	1715	448	1584
4	3724	202	784	383	2462	2196	4452	3859	2485	686
5	2583	2586	298	422	147	1242	1522	2968	3063	2908
6	2496	1354	2182	93	234	169	738	1112	2159	2665
7	1568	1559	973	1444	42	91	39	528	479	2061
8	660	608	1166	740	861	61	130	83	152	564
9	99	177	1283	947	388	503	71	48	18	138
10+	86	36	214	795	968	973	712	334	129	85
TOTAL	11417	7051	8373	7234	7883	10773	10443	10930	9594	10757
A) SOP	14991	11254	12922	12217	11685	14341	14275	14911	12671	14907
B) NOMIN.	14123	11109	11936	12894	12378	15143	14477	14860	12286	14909
(B/A) %	94	99	92	106	106	106	101	100	97	100

Table 8.4 VIRTUAL POPULATION ANALYSIS

HADDOCK IN THE FAROE REGION

	MEAN WEIGHT AT AGE OF THE STOCK									
	UNIT: kilogram									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	.300	.300	.000	.300	.359	.359	.359	.359	.000	.000
2	.643	.452	.700	.470	.681	.528	.608	.605	.501	.580
3	.713	.725	.896	.740	1.011	.859	.887	.831	.781	.779
4	.941	.957	1.150	1.010	1.255	1.391	1.175	1.126	.974	.923
5	1.157	1.237	1.444	1.320	1.812	1.777	1.631	1.462	1.363	1.207
6	1.493	1.651	1.498	1.660	2.061	2.326	1.984	1.941	1.680	1.564
7	1.739	2.053	1.829	2.050	2.059	2.440	2.519	2.173	1.975	1.746
8	2.095	2.406	1.887	2.260	2.137	2.401	2.583	2.347	2.344	2.086
9	2.465	2.725	1.961	2.540	2.368	2.532	2.570	3.118	2.248	2.424
10+	3.310	3.250	2.856	3.040	2.686	2.686	2.922	2.933	3.295	2.514

Table 8.5

DISAGGREGATED Os
 LOG TRANSFORMATION
 NO explanatory variate (Mean used)
 Fleet 1 ,Magnus Heinasson , has terminal q estimated as the mean
 FLEETS COMBINED BY ** VARIANCE **

Regression weights
 , 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000, 1.000,
 Oldest age F = 1.000*average of 5 younger ages. Fleets combined by variance of predictions
 Fishing mortalities

Age,	82,	83,	84,	85,	86,	87,	88,	89,
1,	.000,	.000,	.000,	.000,	.000,	.000,	.000,	1.000,
2,	.004,	.002,	.000,	.000,	.000,	.002,	.001,	.000,
3,	.042,	.017,	.007,	.001,	.001,	.002,	.004,	.002,
4,	.037,	.022,	.027,	.012,	.002,	.001,	.004,	.007,
5,	.016,	.025,	.010,	.017,	.010,	.001,	.001,	.005,
6,	.026,	.006,	.018,	.015,	.012,	.009,	.001,	.001,
7,	.024,	.022,	.003,	.008,	.004,	.011,	.005,	.001,
8,	.019,	.023,	.016,	.006,	.015,	.011,	.004,	.007,
9,	.025,	.020,	.015,	.012,	.009,	.007,	.003,	.004,

Log catchability estimates

Age 1								
Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1,	-.21.24,	-.15.07,	-.14.97,	-.12.60,	-.13.02,	-.14.47,	-.15.54,	-.1.62

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCP1	SE
, q	, F	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt
1	,-13.57	, 5.834,	.0000	,1.0000,	.000E+00,	.000E+00,	,-13.566,	1.945
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
1.000	5.83	0.000		0.000	5.83		0.000	

(cont'd)

Table 8.5 (cont'd)

Age 2

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1	-20.37	-12.08	-14.66	-15.16	-13.02	-13.71	-13.35	-14.29

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-14.58	2.687	.0000	.0000	.000E+00	.000E+00	-14.582	.896
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.000	2.69	0.000	2.69	0.000			

Age 3

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1	-10.64	-12.15	-13.26	-15.38	-15.56	-14.50	-13.26	-13.21

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-13.50	1.746	.0001	.0014	.000E+00	.000E+00	-13.495	.582
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.001	1.75	0.000	1.75	0.000			

Age 4

Fleet,	82,	83,	84,	85,	86,	87,	88,	89
1	-11.74	-12.70	-13.08	-14.31	-15.90	-16.32	-14.34	-13.73

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-14.02	1.648	.0001	.0052	.000E+00	.000E+00	-14.015	.549
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.005	1.65	0.000	1.65	0.000			

(cont'd)

Table 8.5 (cont'd)

Age 5									
Fleet,	82,	83,	84,	85,	86,	87,	88,	89	
1	,-13.37,	-12.80,	-14.51,	-14.55,	-14.68,	-16.47,	-16.37,	-14.35	

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	,-14.64	, 1.354,	.0000	, .0040,	.000E+00,	.000E+00,	-14.637,	.451
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.004	1.35	0.000	1.35	0.000			

Age 6									
Fleet,	82,	83,	84,	85,	86,	87,	88,	89	
1	,-11.94,	-18.14,	-14.11,	-17.85,	-15.19,	-15.22,	-16.93,	-15.30	

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	,-15.59	, 2.171,	.0000	, .0009,	.000E+00,	.000E+00,	-15.586,	.724
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.001	2.17	0.000	2.17	0.000			

Age 7									
Fleet,	82,	83,	84,	85,	86,	87,	88,	89	
1	,-12.30,	-12.93,	-17.93,	-14.25,	-17.65,	-19.29,	-15.13,	-15.32	

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	,-15.60	, 2.642,	.0000	, .0010,	.000E+00,	.000E+00,	-15.598,	.881
	Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio			
	.001	2.64	0.000	2.64	0.000			

(cont'd)

Table 8.5 (cont'd)

Age	82	83	84	85	86	87	88	89
Fleet	11.89	13.02	14.29	15.02	15.98	17.44	16.78	14.60

SUMMARY STATISTICS

Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE Slope	INTRCPT	SE Intrcpt
	q		F	F				
1	-14.88	1.973	.0000	.0054	.000E+00	.000E+00	-14.877	.658
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)	Variance ratio		
	.005	1.97	0.000		1.97	0.000		

Table 8.6

Title : HADDOCK IN THE FAROE REGION
 At 19.05.37 08 MAY 1990
 from 80 to 89 on ages 1 to 9
 with Terminal F of .250 on age 4 and Terminal S of 1.000

Initial sum of squared residuals was 322.616 and
 final sum of squared residuals is 24.852 after 56 iterations

Matrix of Residuals

Years	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89		WTS
Ages											
1/ 2	.628	-.635	-1.209	-2.211	.891	-.416	-.311	-1.803	1.152	-3.915	.001
2/ 3	.011	-.670	-.202	-.163	.040	.297	-.461	.459	.689	.001	1.000
3/ 4	-1.085	.292	.937	-.149	.017	.250	.101	-.480	.116	.001	1.000
4/ 5	-.100	-.178	.006	.389	.410	-.043	.286	-.527	-.243	.001	1.000
5/ 6	.112	.312	.477	-.051	-.483	.040	.124	-.513	-.016	.001	1.000
6/ 7	-.283	.266	-.487	-.062	.386	.771	-.064	-.207	-.321	.001	1.000
7/ 8	.643	.659	-.172	.112	-.486	-.604	-.714	.653	-.090	.001	1.000
8/ 9	.701	-.681	-.558	-.075	.115	-.711	.729	.617	-.137	.001	1.000
	.000	.000	.000	.000	.000	.000	.000	.000	.000	-3.912	
WTS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		

Fishing Mortalities (F)

	80	81	82	83	84	85	86	87	88	89
F-values	.1990	.1724	.3096	.2556	.2095	.2269	.2154	.2805	.1909	.2500

Selection-at-age (S)

	1	2	3	4	5	6	7	8	9
S-values	.0010	.1097	.5255	1.0000	1.0744	1.0864	.8678	1.0793	1.0000

Table 8.7a

Title : HADDOCK IN THE FAROE REGION
At 19.05.37 08 MAY 1990
SEPERABLE FISHING MORTALITIES

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.022	.019	.034	.028	.023	.025	.024	.031	.021	.027
3	.105	.091	.163	.134	.110	.119	.113	.147	.100	.131
4	.199	.172	.310	.256	.209	.227	.215	.280	.191	.250
5	.214	.185	.333	.275	.225	.244	.231	.301	.205	.269
6	.216	.187	.336	.278	.228	.247	.234	.305	.207	.272
7	.173	.150	.269	.222	.182	.197	.187	.243	.166	.217
8	.215	.186	.334	.276	.226	.245	.233	.303	.206	.270
9	.199	.172	.310	.256	.209	.227	.215	.280	.191	.250
F(4-8)u	.203	.176	.316	.261	.214	.237	.220	.286	.195	.256

Table 8.7b VIRTUAL POPULATION ANALYSIS

HADDOCK IN THE FAROE REGION

	FISHING MORTALITY COEFFICIENT					NATURAL MORTALITY COEFFICIENT = .20				
	UNIT: Year ⁻¹									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000
2	.029	.022	.034	.023	.027	.028	.010	.048	.034	.027
3	.033	.122	.409	.169	.108	.136	.092	.100	.099	.106
4	.190	.155	.319	.292	.328	.217	.191	.197	.205	.216
5	.255	.196	.358	.283	.174	.274	.230	.188	.236	.391
6	.215	.206	.252	.180	.251	.309	.259	.262	.203	.333
7	.207	.202	.223	.263	.115	.146	.108	.299	.172	.304
8	.305	.116	.228	.264	.248	.244	.319	.349	.131	.314
9	.199	.124	.378	.293	.216	.224	.496	.186	.118	.169
10+	.199	.124	.378	.293	.216	.224	.496	.186	.118	.169
(4- 8)U	.234	.175	.276	.257	.223	.238	.222	.259	.190	.312

Table 8.8 VIRTUAL POPULATION ANALYSIS

HADDOCK IN THE FAROE REGION

STOCK SIZE IN NUMBERS UNIT: thousands

BIOMASS TOTALS UNIT: tonnes

ALL VALUES ARE GIVEN FOR 1 JANUARY

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1980-87
1	4652	21560	25666	60365	48861	30038	8183	26798	3295	0	0	28265
2	5475	3809	17652	21013	49423	39982	24593	6700	21940	2698	0	21081
3	1954	4354	3051	13966	16806	39385	31845	19927	5230	17367	2149	16411
4	23638	1548	3154	1660	9661	12352	28142	23773	14769	3878	12790	12991
5	12626	15999	1085	1878	1015	5697	8137	19032	15989	9854	2557	8184
6	14206	8014	10771	621	1158	699	3548	5292	12909	10335	5458	5538
7	9214	9384	5342	6856	424	738	420	2241	3333	8626	6067	4327
8	2759	6132	6280	3498	4314	310	522	309	1360	2297	5210	3015
9	604	1655	4473	4092	2198	2758	199	311	178	977	1374	2037
10+	525	339	746	3435	5485	5334	1992	2161	1277	602	1091	2502
TOTAL NO	75652	72804	78220	117384	139345	137292	107580	106544	80281	56632		
SPS NO	65525	47435	34902	36006	41061	67272	74804	73046	55046	53934		
TOT. BIOM	89398	85509	68941	86303	114570	118510	108251	107999	87322	70462		
SPS BIOM	84482	77319	56584	58318	63372	86616	90360	94325	76330	68897		

Table 8.9

List of input variables for the ICES prediction program.

FAROE HADDOCK - FINAL

The reference F is the mean F for the age group range from 4 to 8

The number of recruits per year is as follows:

Year	Recruitment
1990	22000.0
1991	22000.0
1992	22000.0
1993	22000.0

Data are printed in the following units:

Number of fish: thousands
 Weight by age group in the catch: kilogram
 Weight by age group in the stock: kilogram
 Stock biomass: tonnes
 Catch weight: tonnes

age	stock size	fishing pattern	natural mortality	maturity ogive	weight in the catch	weight in the stock
1	22000.0	.00	.20	.00	.359	.359
2	18831.0	.03	.20	.00	.562	.562
3	2149.0	.13	.20	1.00	.797	.797
4	12790.0	.25	.20	1.00	1.008	1.008
5	2557.0	.27	.20	1.00	1.344	1.344
6	5458.0	.27	.20	1.00	1.728	1.728
7	6067.0	.22	.20	1.00	1.965	1.965
8	5210.0	.27	.20	1.00	2.259	2.259
9	1374.0	.25	.20	1.00	2.597	2.597
10+	1091.0	.25	.20	1.00	2.914	2.914

Table 8.10 Management options for 1991 and 1992 for FAROE HADDOCK in Division Vb₁.

1990				Management option for 1991 and 1992	1991			1992			1993		
Stock biom. (1+)	SSB	F ₍₄₋₈₎	Catch (1+)		Stock biom. (1+)	SSB	F ₍₄₋₈₎	Catch (1+)	Stock biom. (1+)	SSB	Catch (1+)	Stock biom. (1+)	SSB
76	58	0.26	12	F _{0.1}	74	56	0.21	9	75	57	9	75	57
				F = 0.8F ₈₉			0.20	9	75	57	9	75	57
				F _{max}			0.58	21	62	44	16	55	37
				F = F ₈₉			0.26	11	73	55	10	72	54
				F = 1.2F ₈₉			0.31	12	71	53	12	69	51

Weights in '000 t.

Table 9.1 Nominal catch (tonnes) of Blue Ling in Division Va, 1979-1989, as reported to ICES.

BLUE LING Va											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	85	183	220	224	1,195	353	59	69	75	403 ¹	403
Iceland	2,019	8,133	7,952	5,945	5,117	3,122	1,407	1,774	1,693	1,093	2,587
Norway	98	229	64	402	402	31	7	8	8	7	5
Total	2,202	8,399	8,401	6,233	6,714	3,506	1,473	1,851	1,776	1,371	2,995

¹ Preliminary.

Table 9.2 Nominal catch (tonnes) of Blue Ling in Division Vb, 1979-1989, as reported to ICES.

BLUE LING Vb ₁											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	1,072	1,187	1,481	2,761	3,933	6,453	4,038	4,799	2,872 ¹	4,131 ¹	3,002
France	2,683 ²	2,427 ²	371	843	668	515	1,193	2,578	3,246	3,036	1,671
Germany, Fed.Rep.	691	5,905	2,867	2,538	222	214	217	197	142 ¹	49	51
Norway	331	304	167	121	256	105	140	85	81	94	227
Total	4,777	9,824	4,886	6,263	5,079	7,287	5,588	7,659	6,341	7,310	4,951

¹ Preliminary.

² Includes Sub-division Vb₂.

BLUE LING Vb ₂											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	14	36	48	128	463	757	396	81	197 ¹	2,220 ¹	1,046
Germany, Fed.Rep.	-	-	-	-	1	-	+	-	-	-	-
Norway	87	159	93	66	182	50	70	41	90	72	95
Total	101	196	141	194	646	807	466	122	287	2,292	1,141

¹ Preliminary.

Table 9.3 Nominal catch (tonnes) of Blue Ling in Sub-area VI, 1979-1989, as reported to ICES.

BLUE LING VIa											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987 ¹	1988	1989 ¹
Faroe Islands	-	-	-	-	-	-	56	-	-	10 ¹	3
France	3,064	2,124	3,338	3,430	5,233	3,653	5,670	7,628	9,389	6,605 ¹	7,383
Germany, Fed.Rep.	993	773	335	79	11	183	5	7	44	2	2
Norway	2	10	11	16	118	45	75	50	51	29	142
UK (Engl. & Wales)	279	-	-	99	13	5	2	2	13	2	-
UK (Scotland)	-	-	1	+	-	-	-	1	+	1	-
Total	4,338	2,907	3,685	3,624	5,375	3,886	5,808	7,688	9,497	6,649	7,530

¹Preliminary.

BLUE LING VIb											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987 ¹	1988	1989 ¹
Faroe Islands	4	-	-	-	-	133	11	1,845	-	1,462 ¹	739
France	652	3,827	534	263	243	3,281	7,263	2,141	10	499	-
Germany, Fed.Rep.	187	5,526	3,944	554	38	-	31	39	356 ¹	38 ¹	22
Norway	28	8	5	13	50	43	38	66	76	42	217
UK (Engl. & Wales)	-	-	-	-	-	-	+	7	62	9	-
UK (Scotland)	-	+	-	1	2	-	-	1	10	14	-
Total	871	9,361	4,483	831	333	3,457	7,343	4,099	514	2,064	978

¹Preliminary.²Includes Division VIa.

Table 9.4 Nominal catch (tonnes) of Blue Ling in Sub-area XIV, 1979-1989, as reported to ICES.

BLUE LING XIVb											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	-	-	-	-	-	-	-	-	-	4	3
Germany, Fed.Rep. ²	1,026 ²	746 ²	1,206 ²	1,946 ²	621 ²	537	314	150	199	219	57
Greenland ²	-	-	-	-	-	-	-	-	-	3	-
Total	1,026	746	1,206	1,946	621	537	314	150	199	226	60

¹Preliminary.²Includes Division XIVa.

Table 9.5 BLUE LING in Sub-area VI and Division Vb.
 Total international effort and catch per unit of effort
 estimated from French catch and effort data for the
 years 1974-1985 and 1988-1989.

Year	France		International		CPUE
	Catch in 1000 t	Effort in mill. hrs	Catch in 1000 t	Effort in mill. hrs	Kgs per 1000 hrs
1974	8.0	71.8	5.6?	-	111.4
1975	3.9	75.3	7.0	135.2	51.8
1976	4.1	89.9	19.2	421.0	45.6
1977	10.0	93.5	17.8	166.4	107.0
1978	6.4	82.4	13.0	167.4	77.7
1979	3.6	76.3	10.1	214.1	47.2
1980	3.2	68.1	22.3	474.6	47.0
1981	3.2	67.2	13.2	277.2	47.6
1982	3.2	61.9	10.9	210.8	51.7
1983	4.2	63.6	11.5	174.1	66.0
1984	5.6	64.1	15.4	176.3	87.4
1985	7.3	72.4	19.2	190.4	100.8

1988	6.6	132.9	18.3	368.5	49.7
1989	7.4	133.4	14.6	263.2	55.5

Table 9.6 BLUE LING in Division Vb.
Age composition ('000) in Federal Republic of Germany landings,
1980-1989.

Year	Age																Total
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+		
1980		3	3	67	45	57	83	61	118	134	171	141	174	150	212	1,419	
1981	2	5	39	82	100	78	74	57	72	80	68	52	20	8	29	766	
1982	3	27	90	101	92	100	55	55	44	30	34	11	9	23	682		
1983	+	2	4	6	7	4	5	4	5	4	4	3	2	2	1	53	
1984	1	2	4	7	6	5	6	4	5	5	4	3	2	2	3	59	
1985	+	1	3	8	10	8	8	5	6	6	5	3	3	2	5	73	
1986	+	2	8	8	5	4	5	3	3	3	2	2	1	1	2	49	
1987	+	1	1	5	6	4	3	3	3	2	1	2	2	1	+	34	
1988	+	1	1	2	1	1	1	1	1	1	1	+	+	+	+	10	
1989	-	1	1	4	3	2	1	+	1	+	+	+	+	+	-	13	

Table 9.7 BLUE LING in Sub-area XIV.
Age composition ('000) in Federal Republic of Germany landings,
1980-1989.

Year	Age																Total
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+		
1980	-	+	13	16	22	25	22	18	19	22	12	12	10	6	8	205	
1981	4	15	27	35	46	36	45	36	42	43	31	23	14	14	18	429	
1982	1	17	41	94	162	127	13	58	40	25	15	8	4	1	+	706	
1983	1	9	31	57	46	33	24	16	8	5	3	1	1	+	-	235	
1984	1	10	28	43	40	25	18	16	11	8	4	3	1	1	+	209	
1985	1	4	12	21	17	15	11	9	7	5	3	2	1	+	+	108	
1986	1	1	6	9	7	6	5	3	4	2	1	-	-	-	-	45	
1987	+	1	6	14	11	8	8	6	5	4	2	1	1	+	+	67	
1988	+	2	18	22	12	8	5	2	2	1	-	1	-	-	+	73	
1989	1	2	5	7	3	1	1	1	+	+	-	+	-	-	-	21	

Table 9.8 BLUE LING in Division VIa.
 French age compositions by quarters for the years 1988 and 1989,
 catch weight (t) and fishing effort.

Age	1988					1989				
	1Q	2Q	3Q	4Q	Whole year	1Q	2Q	3Q	4Q	Whole year
5										
6							3			4
7	11	19	3	2	34	28	23	2	1	54
8	34	93	15	9	150	36	62	4	3	105
9	56	192	34	19	301	95	221	15	12	343
10	70	225	39	22	356	115	255	18	15	403
11	23	100	20	11	153	95	240	18	16	368
12	33	123	24	14	194	60	161	12	11	244
13	20	87	19	10	136	97	120	10	9	235
14	23	102	22	13	160	65	129	10	9	214
15	12	41	9	5	67	23	44	3	3	73
16	12	56	12	7	87	22	27	2	2	54
17	10	61	14	8	93	9	9	1	1	19
18	9	43	11	6	68	2	7	1	1	9
19	8	24	6	3	42	2	5			8
20	8	16	4	2	31	1	5			8
21	2	3	1		6	7	6			13
22	2	14	4	2	21					
23	4	10	4	1	19					
24		3	1		4					
25+		7	2							
Catch wt.	1,179	4,089	857	481	6,605	2,329	4,418	337	299	7,383
Fish.eff.	51,427	30,458	23,850	27,167	132,902	34,387	36,847	27,114	35,074	133,422

Table 9.9 BLUE LING in Division VIa.
French mean weights at age by quarters for the years 1988 and 1989, catch weight (t) and fishing effort.

Age	1988					1989				
	1Q	2Q	3Q	4Q	Whole year	1Q	2Q	3Q	4Q	Whole year
5										
6							1,500			
7	2,040	1,984	1,984	1,984	2,002	1,707	1,851	1,851	1,851	1,777
8	2,133	2,142	2,143	2,143	2,140	2,092	2,256	2,261	2,266	2,201
9	2,785	2,784	2,827	2,824	2,791	2,641	2,683	2,697	2,709	2,673
10	2,649	2,706	2,752	2,749	2,702	3,008	3,054	3,097	3,132	3,046
11	3,217	3,203	3,263	3,259	3,217	3,521	3,593	3,648	3,689	3,581
12	3,242	3,249	3,322	3,318	3,262	4,026	3,888	3,956	4,005	3,931
13	3,603	3,774	3,860	3,855	3,766	4,881	4,315	4,369	4,406	4,554
14	3,870	3,870	3,944	3,940	3,886	5,098	4,536	4,620	4,678	4,717
15	4,193	3,947	4,022	4,018	4,006	5,431	4,909	4,973	5,016	5,078
16	4,225	3,662	3,665	3,665	3,741	6,655	5,338	5,411	5,458	5,885
17	4,870	4,607	4,722	4,716	4,662	6,998	6,663	6,863	6,994	6,839
18	5,532	5,032	5,156	5,149	5,125	4,354	6,685	6,793	6,862	6,327
19	7,142	5,086	5,182	5,177	5,509	3,279	3,279			3,279
20	8,444	7,731	7,798	7,795	7,928	3,731	3,731			3,731
21	7,940	6,357	6,557		6,780	5,926	5,051			5,497
22	4,303	4,438	4,441	4,441	4,429					
23	6,813	4,821	4,873	4,870	5,303					
24		4,760	4,760		4,760					
25+		4,329	4,334							
Catch wt.	1,179	4,089	857	481	6,605	2,329	4,418	337	299	7,383
Fish. eff.	51,427	30,458	23,850	27,167	132,902	34,387	36,847	27,114	35,074	133,422

Table 10.1 Nominal catch (tonnes) of Ling in Division Va, 1979-1989, as reported to ICES.

LING Va											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Belgium	508	445	196	116	128	103	59	88	157	134	-
Faroe Islands	536	607	489	524	644	450	384	556	675 ¹	619 ¹	614
Iceland	3,759	3,149	3,348	3,733	4,256	3,304	2,980	2,946	4,161	5,098	5,187
Norway	399	423	415	612	115	21	17	4	6	10	5
UK (Engl. & Wales)	-	-	-	-	-	+	+	-	-	-	-
Total	5,202	4,624	4,448	4,985	5,143	3,878	3,440	3,594	4,999	5,861	5,806

¹Preliminary.

Table 10.2 Nominal catch (tonnes) of Ling in Division Vb, 1979-1989, as reported to ICES.

LING Vb ₁											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Denmark	-	-	-	-	-	-	-	4	16	4 ²	1,974
Faroe Islands	1,919	1,734	1,274	2,099	2,365	2,666	2,911	2,406	2,598	2,045 ¹	-
France	304 ²	49	13	16	155	11	40	123	384	53	-
Germany, Fed. Rep.	18	12	1	3	5	6	3	6	8	4	-
Norway	2,716	1,538	1,135	2,495	1,580	935	1,317	1,604	1,051	884	1,414
UK (Engl. & Wales)	23	1	-	-	-	-	-	-	1	1	-
UK (Scotland)	279 ²	90	4	-	- ³	- ³	-	-	-	-	-
Total	5,259	3,424	2,427	4,613	4,105	3,618	4,271	4,143	4,058	2,991	3,388

LING Vb ₂											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	205	87	126	271	140	155	279	177	343 ¹	175 ¹	59
Norway	734 ²	873	1,641	1,119	1,166 ³	631 ³	638	636	948	1,284	1,328
UK (Scotland)	- ²	121	24	94	48 ³	4 ³	2	1	1	5	-
Total	939	1,086	1,791	1,484	1,354	790	919	814	1,306	1,464	1,387

¹Preliminary.²Included in Sub-division Vb₁.³Includes Sub-division Vb₁.

Table 10.3 Nominal catch (tonnes) of Ling in Sub-area VI, 1979-1989, as reported to ICES.

LING VIa											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988 ¹	1989 ¹
Belgium	-	-	-	4	-	1	4	-	4	4	-
Denmark	-	44 ²	-	1	-	-	-	-	1	+	-
Faroe Islands	4	-	-	20	-	-	-	-	-	-	-
France	2,990	3,092	3,820	5,049	5,362	5,757	6,061	4,620	4,338	5,118	-
Germany, Fed.Rep.	5	1	-	-	-	14	8	6	2	6	-
Ireland	40	34	44	34	62	49	81	255	287	-	-
Norway	2,778	2,932	2,150	4,499	5,943	4,667	4,779	5,426	3,842	3,392	3,722
Spain	566 ²	-	-	461	604	720	388	620	975	-	-
UK (Engl. & Wales)	73	85	123	201	78	101	130	151	507	1,075	-
UK (N.Ireland)	-	-	-	-	+	+	-	+	6	53	-
UK (Scotland)	234	207	379	188	236	341	510	284	574	874	4
Total	6,690	6,398	6,516	10,460	12,285	11,650	11,961	11,362	10,536	10,522	-

¹ Preliminary.² Includes Division VIb.

LING VIb											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988 ¹	1989 ¹
Faroe Islands	368	236	4	123	204	153	24	6	-	144 ¹	13
France	7	3	5	13	8	34	140	24	4	8	-
Germany, Fed.Rep.	-	-	+	-	-	-	-	-	2	-	-
Norway	1,776	1,096	1,083	1,711	2,315	2,345	1,973	2,157	1,933	1,253	3,542
Spain	- ²	620	590	1,911	1,889	986	2,381	2,762	4,036	-	-
UK (Engl. & Wales)	39	+	8	4	26	28	75	109	151	94	-
UK (Scotland)	203	235	184	80	4	29	127	127	164	223	-
Total	2,393	2,190	1,874	3,842	4,446	3,575	4,720	5,185	6,290	1,722	-

Table 10.4 Nominal catch (tonnes) of Ling in Sub-area XIV, 1979-1989, as reported to ICES.
(Data from Bulletin Statistique.)

LING XIVb											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	-	-	13	-	-	-	-	17	-	-	-
Germany, Fed.Rep.	952 ²	208 ²	298 ²	8 ²	1 ²	6	1	2	1	3	-
Total	952	208	311	8	1	6	1	17	1	3	-

¹ Preliminary.² Includes Division XIVa.

Table 10.5 LING. Estimated total international effort and catch per unit of effort derived from the Norwegian long-line fisheries in Divisions Vb, VIa and VIb in the years 1983-1989.

Division	Norway		Total international		CPUE
	Landings (t)	Hooks x 10 ⁻³	Landings (t)	Hooks x 10 ⁻³	Kg per hooks x 10 ⁻³
1983					
Vb	2,746	17,929	5,459	35,643	153,160
VIa	5,871	32,500	12,285	68,006	180,646
VIb	2,315	15,857	4,446	30,454	145,992
Sum	10,932	66,286	22,190	134,549	164,922
1984					
Vb	1,566	10,429	4,408	29,356	150,158
VIa	4,155	17,714	11,650	49,667	234,560
VIb	2,160	18,786	3,575	31,093	114,979
Sum	7,881	46,929	19,633	116,909	167,935
1985					
Vb	1,953	13,357	5,190	35,496	146,216
VIa	4,779	27,714	11,961	69,363	172,440
VIb	1,973	17,571	4,720	42,035	112,287
Sum	8,705	58,642	21,871	147,336	148,443
1986					
Vb	2,239	13,214	5,123	30,235	169,442
VIa	5,426	54,857	11,250	113,738	98,912
VIb	2,157	41,929	5,185	100,789	51,444
Sum	9,822	10,000	21,558	241,436	89,291
1987					
Vb	1,999	15,143	4,058	30,741	132,008
VIa	3,842	22,286	10,536	61,115	172,395
VIb	1,933	19,714	6,290	64,150	98,052
Sum	7,774	57,143	20,884	153,508	136,045
1988					
Vb	2,168	20,643	2,991	28,479	105,023
VIa	3,392	22,500	10,522	69,795	150,756
VIb	1,253	10,786	1,722	14,823	116,169
Sum	6,813	53,929	15,235	120,594	126,333
1989 ¹					
Vb	2,742	28,698	4,842	50,677	95,547
VIa	3,722	38,567	10,856	112,489	96,507
VIb	3,542	22,653	3,880	24,815	156,359
Sum	10,006	89,918	19,578	175,936	111,279

¹Estimated total international landings.

Table 11.1 Nominal catch (tonnes) of Tusk (Cusk) in Division Va, 1979-1989, as reported to ICES.

TUSK Va											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	2,050	2,873	2,624	2,410	4,046	2,008	1,885	2,811	2,638	3,757 ¹	3,908
Iceland	3,558	3,089	2,827	2,804	3,469	3,430	3,068	2,549	2,984	3,078	2,376
Norway	845	928	1,025	666	772	254	111	21	19	20	10
UK (Engl.& Wales)	-	-	-	-	-	-	+	-	-	-	-
Total	6,453	6,890	6,476	5,880	8,287	5,692	5,064	5,381	5,641	6,855	6,294

¹Preliminary.

Table 11.2 Nominal catch (tonnes) of Tusk (Cusk) in Division Vb, 1979-1989, as reported to ICES.

TUSK Vb ₁											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Denmark	-	-	-	-	-	-	-	+	2	+ ¹	-
Faroe Islands	3,652	4,629	2,028	4,056	3,416	4,355	4,994	3,531	3,771 ¹	3,253	3,060
France	34	24	14	14	15	25	34	24	54	81	-
Germany, Fed.Rep.	36	23	7	12	11	16	10	15	13	8	-
Norway	1,943	1,713	1,472	1,432	1,074 ₃	897 ₃	1,200	966	942	1,143	1,827
UK (Scotland)	252 ²	145	-	-	-	-	-	-	-	-	-
Total	5,918	6,534	3,521	5,514	4,516	5,293	6,238	4,536	4,782	4,485	4,887

¹Preliminary.

²Includes Sub-division Vb₂.

³Included in Sub-division²Vb₂.

TUSK Vb ₂											
Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Faroe Islands	225	88	38	92	34	39	294	94	411 ¹	201 ¹	82
Germany, Fed.Rep.	-	-	-	-	-	-	+	-	-	-	-
Norway	422	975	1,276	660	861	640 ₃	775	590	1,256	1,067	1,237
UK (Scotland)	-	213	15	125	73 ³	2 ³	+	+	+	+	-
Total	647	1,276	1,329	877	968	681	1,069	684	1,667	1,262	1,319

¹Preliminary.

²Included in Sub-division Vb₁.

³Includes Sub-division Vb₁.

Table 11.3 Nominal catch (tonnes) of Tusk (Cusk) in Sub-area VI, 1979-1989, as reported to ICES.

Country	TUSK VIA											
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹	
Faroe Islands	3	-	-	-	-	-	-	-	-	-	-	4
France	296	241	322	355	418	514	767	608	627	724	-	-
Germany, Fed.Rep.	3	4	1	-	-	1	1	+	+	1	-	-
Ireland	-	-	-	-	-	-	-	-	-	-	-	-
Norway	460	652	802	1,052	1,733	1,305	1,609	1,873	1,238	1,310	1,456	-
UK (Engl. & Wales)	4	+	1	7	1	5	1	2	9	30	-	-
UK (Scotland)	8	14	94	+	2	1	1	4	7	13	-	-
Total	774	912	1,220	1,830	2,404	1,826	2,379	2,487	1,882	2,078	-	-

¹ Preliminary.

² Includes Division VIb.

Country	TUSK VIb											
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹	
Faroe Islands	282	196	1	159	188	53	48	106	-	159 ¹	31	
France	5	-	1	3	3	4	3	9	2	4	-	
Norway	680	503	568	468	1,080	960	944	952	1,385	601	1,537	
UK (Engl. & Wales)	30	-	+	-	3	+	6	8	6	8	-	
UK (Scotland)	178	214	181	101	22	+	14	16	15	34	-	
Total	1,175	913	752	2,829	3,198	1,017	1,015	1,091	1,408	806	-	

¹ Preliminary.

² Included in Division VIa.

Table 11.4 Nominal catch (tonnes) of Tusk (Cusk) in Sub-area XIV, 1979-1989, as reported to ICES.

Country	TUSK XIVb											
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ¹	
Faroe Islands	-	-	110	-	74	-	-	33	13	19	-	
Germany, Fed.Rep.	27 ²	13 ²	10 ²	10 ²	11 ²	5	4	33 ²	13 ²	19 ²	-	
Total	27	13	120	10	85	63	4	33	13	21	-	

¹ Preliminary.

² Includes Division XIVa.

Table 11.5 TUSK. Estimated total international effort and catch per unit of effort derived from the Norwegian long-line fisheries in Division Vb, VIa and VIb in the years 1983-1989.

Division	Norway		Total international		CPUE
	Landings t	Hooks x 10 ⁻³	Landings t	Hooks x 10 ⁻³	Kgs per hooks x 10 ⁻³
1983					
Vb	1,935	17,929	5,484	50,813	107,926
VIa	1,718	32,500	2,404	45,477	52,862
VIb	1,080	15,857	3,198	46,954	68,109
Sum	4,733	66,286	11,086	155,260	71,403
1984					
Vb	1,537	10,429	5,974	40,535	147,378
VIa	1,170	17,714	1,826	27,646	66,049
VIb	868	18,786	1,017	22,011	46,205
Sum	3,575	46,929	8,817	115,741	76,179
1985					
Vb	1,972	13,357	7,307	49,493	147,638
VIa	1,735	27,714	2,379	38,001	62,604
VIb	944	17,571	1,015	18,893	53,725
Sum	4,651	58,642	10,701	134,923	79,312
1986					
Vb	1,556	13,214	5,287	44,899	117,754
VIa	1,873	54,857	2,473	72,430	34,143
VIb	952	41,929	1,091	48,051	22,705
Sum	4,381	110,000	8,851	222,235	39,827
1987					
Vb	2,198	15,143	6,449	44,430	145,150
VIa	1,238	22,286	1,882	33,879	55,551
VIb	1,385	19,714	1,408	20,041	70,255
Sum	4,821	57,143	9,739	115,436	84,367
1988					
Vb	2,205	20,643	5,747	53,803	106,816
VIa	1,310	22,500	2,078	35,691	58,222
VIb	601	10,786	806	14,465	55,720
Sum	4,116	53,929	8,631	113,086	76,323
1989 ¹					
Vb	3,064	28,698	6,295	58,960	106,767
VIa	1,456	38,567	2,228	59,016	37,753
VIb	1,537	22,653	1,614	23,788	67,850
Sum	6,057	89,918	10,137	150,487	67,361

¹ Estimated total international landings.

Table 12.1 Nominal catches of oceanic *Sebastes mentella* in Sub-areas XII and XIV by countries.

Country	1982	1983	1984	1985	1986	1987	1988	1989 ¹
Bulgaria	-	-	2,961	5,825	11,385	12,270	8,455	4,546
Faroe Islands	-	-	-	-	-	-	1,090	-
German Dem.Rep.	-	155	989	5,438	8,574	7,023	16,848	6,796
Iceland	-	-	-	-	-	-	-	2,722
Japan	-	-	-	-	-	-	-	307
Poland	581	-	239	135	149	25	-	112
USSR	59,914	60,079	60,643	60,273	84,994	71,469	65,026	22,700
Total	60,495	60,234	64,832	71,671	105,102	90,787	91,419	37,183

¹ Provisional data.

Table 12.2 Catches per unit effort and total efforts for the oceanic-type *S. mentella* in Sub-areas XII and XIV.

Year	CPUE (t/h)		Total effort (hours)	
	Bulgaria	USSR(BMRT)	A	B
1982	-	1.99	-	30,400
1983	-	1.60	-	37,646
1984	1.25	1.48	39,934	43,805
1985	1.85	1.68	35,775	42,661
1986	2.04	1.35	61,268	77,853
1987	1.22	1.10	61,716	82,537
1988	1.22	1.00	72,583	91,419
1989	0.82	1.00	27,073	37,183

A = Based on Bulgarian and USSR weighted mean effort and raised to the total catch.

B = Based on USSR CPUE.

Table 12.3 S. mentella and oceanic-type S. mentella abundance and biomass estimates from ichthyoplankton surveys in April-May 1988-1989.

Year	Area surveyed ('000 sq. miles)	Abundance at actual sex ratio (millions)	Biomass at actual sex ratio ('000 t).
1982	88.0	662	421.3
1983	148.0	1,944	1,198.0
1984	96.0	1,428	957.0
1985	100.0	1,169	687.0
1986	170.0	2,834	1,692.2
1987	114.0	1,032	645.1
1988	175.0	3,535	1,923.0
1989	190.0	1,621	871.0

Table 12.4 Oceanic type S. mentella abundance and biomass estimates from trawl acoustic surveys in June-July 1988-1989.

Year	Area surveyed ('000) sq.miles)	Abundance at actual sex ratio (millions)	Biomass at actual sex ratio ('000 t)
1982	40.0	790	560.0
1983	50.0	960	700.0
1984	40.0	660	526.0
1985	71.0	1,122	700.0
1986	74.3	2,003	1,180.0
1987	215.0	1,951	1,120.0
1988	163.0	1,510	956.0
1989	148.1	1,610	918.0

Table 12.5 SUM OF PRODUCTS CHECK

SEBASTES MENTELLA, OCEANIC TYPE
CATEGORY: TOTAL

CATCH IN NUMBERS	UNIT: thousands							
	1982	1983	1984	1985	1986	1987	1988	1989
8	35	472	119	29	168	6242	26	10
9	1069	1021	457	346	822	9172	425	133
10	2388	1900	1117	846	2769	5226	1734	749
11	5431	3063	4787	2832	7497	7422	4795	3217
12	9693	6771	12459	13116	24574	11831	20130	8562
13	10483	8794	20150	31492	53690	31014	41826	16345
14	11492	13137	20782	27335	35316	29962	33837	15061
15	15041	16356	26241	31056	33218	28444	27453	9626
16	13818	14464	14227	10536	11496	15855	11154	5167
17	11480	12450	4498	3551	4227	5972	5809	2889
18	8300	9490	2318	705	1842	1852	1633	744
19	4912	4832	258	215	598	1439	556	197
20	3404	5600	358	42	98	777	132	80
21	921	2592	279	13	168	257	29	11
22+	223	223	106	69	110	125	39	1
TOTAL	98690	101165	108156	122183	176593	155590	149578	62792
A) SOP	60482	62301	73017	71539	102396	88456	91340	39612
B)NOMIN.	60495	60234	64832	71671	105102	90787	91413	37183
(B/A) %	100	97	89	100	103	103	100	94

Table 12.6 SUM OF PRODUCTS CHECK

SEBASTES MENTELLA, OCEANIC TYPE
CATEGORY: TOTAL

MEAN WEIGHT AT AGE IN THE CATCH	UNIT: kilogram							
-----	1982	1983	1984	1985	1986	1987	1988	1989
8	.245	.266	.282	.231	.270	.268	.274	.341
9	.341	.332	.309	.295	.325	.298	.316	.378
10	.376	.333	.356	.329	.348	.341	.367	.427
11	.413	.382	.425	.376	.385	.386	.402	.466
12	.452	.407	.477	.432	.432	.432	.463	.518
13	.498	.447	.561	.503	.509	.503	.537	.562
14	.545	.511	.649	.575	.597	.570	.614	.630
15	.590	.569	.747	.666	.697	.657	.713	.715
16	.650	.638	.873	.771	.822	.801	.801	.805
17	.732	.703	.953	.862	.900	.915	.892	.888
18	.788	.783	.978	.911	.960	.983	.968	.953
19	.843	.854	1.005	1.022	1.010	1.073	1.044	1.033
20	.896	.904	1.113	1.077	1.133	1.178	1.145	1.190
21	.953	.954	1.121	1.077	1.154	1.240	1.145	1.255
22+	1.053	1.140	1.223	1.077	1.102	1.305	1.079	1.255

Table 12.7 Maturity-at-age data for oceanic-type *S. mentella* from USSR catches. The bulk of the fish mature at the ages of 13-17 years.

Age	Percentage of mature fish		
	Males	Females	Males and Females
6	-	-	-
7	-	-	-
8	-	-	-
9	25.2	2.2	18.1
10	43.6	26.7	34.6
11	76.5	35.8	60.2
12	93.8	53.7	76.4
13	94.4	97.4	96.1
14	96.7	98.9	98.1
15	96.6	98.8	98.0
16	98.0	98.9	98.5
17	100.0	99.1	99.3
18	100.0	100.0	100.0
19	100.0	100.0	100.0
20	100.0	100.0	100.0
21	100.0	100.0	100.0
22	100.0	100.0	100.0
23	100.0	100.0	100.0
24	100.0	100.0	100.0
25	100.0	100.0	100.0
No. of specimens analysed	6,543	8,511	15,054

Table 12.8 Oceanic-type *S. mentella*. Tuning analysis.

DISAGGREGATED Qs
 LOG TRANSFORMATION
 NO explanatory variate (Mean used)
 Fleet 1, Series. ** Mentella, has terminal q estimated as the mean
 FLEETS COMBINED BY ** VARIANCE **

Regression weights
 , 1.000, 1.000, 1.000, 1.000, 1.000, 1.000,
 Oldest age F = 1.000*average of 5 younger ages. Fleets combined by variance of predictions
 Fishing mortalities

Age,	84,	85,	86,	87,	88,	89,
9,	.002,	.002,	.004,	.037,	.003,	.002,
10,	.007,	.005,	.016,	.027,	.008,	.005,
11,	.026,	.019,	.046,	.048,	.028,	.016,
12,	.083,	.082,	.200,	.085,	.160,	.058,
13,	.178,	.275,	.489,	.368,	.422,	.169,
14,	.300,	.344,	.497,	.492,	.764,	.235,
15,	.825,	.857,	.797,	.847,	1.024,	.448,
16,	.990,	.841,	.809,	1.026,	.861,	.466,
17,	.921,	.632,	.878,	1.247,	1.286,	.497,
18,	1.772,	.305,	.702,	1.138,	1.380,	.467,
19,	1.306,	.702,	.407,	2.042,	1.216,	.510,
20,	1.163,	.667,	.719,	1.260,	1.153,	.478,

Log catchability estimates

Age 9	84,	85,	86,	87,	88,	89
Fleet,						
1,	-16.71,	-16.83,	-16.59,	-14.34,	-17.13,	-16.32

SUMMARY STATISTICS						
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE
, q	, F	, F	, F	, F	, Slope	, Intrcpt
1	-16.32	1.086	.0022	.0022	.000E+00	.000E+00
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio	Intrcpt	
.00?	1.09	0.000	1.09	0.000	-16.319	.410

cont'd.

Table 12.8 cont'd.

Age 10

Fleet,	84,	85,	86,	87,	88,	89
1	-15.62,	-15.88,	-15.17,	-14.63,	-16.05,	-15.47

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-15.47	.552	.0052	.0052	.000E+00	.000F+00	-15.470	.209
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)	Variance ratio		
	.005	.552	0.000		.552	0.000		

Age 11

Fleet,	84,	85,	86,	87,	88,	89
1	-14.25,	-14.46,	-14.11,	-14.06,	-14.76,	-14.33

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-14.33	.274	.0162	.0162	.000E+00	.000E+00	-14.330	.104
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)	Variance ratio		
	.016	.274	0.000		.274	0.000		

Age 12

Fleet,	84,	85,	86,	87,	88,	89
1	-13.09,	-12.98,	-12.63,	-13.50,	-13.03,	-13.05

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-13.05	.298	.0584	.0584	.000E+00	.000E+00	-13.046	.113
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)	Variance ratio		
	.058	.298	0.000		.298	0.000		

cont'd.

Table 12.8 cont'd.

Age 13						
Fleet,	84,	85,	86,	87,	88,	89
1	-12.32	-11.78	-11.74	-12.03	-12.05	-11.98

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt
1	-11.98	.229	.1689	.1689	.000E+00	.000E+00	-11.985	.087
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.169	.229	0.000	.229	0.000				

Age 14						
Fleet,	84,	85,	86,	87,	88,	89
1	-11.80	-11.55	-11.72	-11.74	-11.46	-11.66

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt
1	-11.66	.137	.2349	.2349	.000E+00	.000E+00	-11.655	.052
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.235	.137	0.000	.137	0.000				

Age 15						
Fleet,	84,	85,	86,	87,	88,	89
1	-10.79	-10.64	-11.25	-11.20	-11.17	-11.01

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
, q	, F	, F	, F	, F	, Slope	, Slope	, Intrcpt	, Intrcpt
1	-11.01	.266	.4483	.4483	.000E+00	.000E+00	-11.009	.101
Fbar	SIGMA(int.)	SIGMA(ext.)	SIGMA(overall)	Variance ratio				
.448	.266	0.000	.266	0.000				

cont'd.

Table 12.8 cont'd.

Age 16

Fleet,	84,	85,	86,	87,	88,	89
1	-10.60	-10.66	-11.24	-11.00	-11.34	-10.97

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-10.97	.321	.4664	.4664	.000E+00	.000E+00	-10.969	.121
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)		Variance ratio	
.466		.321	0.000		.321		0.000	

Age 17

Fleet,	84,	85,	86,	87,	88,	89
1	-10.68	-10.94	-11.15	-10.81	-10.94	-10.91

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-10.91	.171	.4971	.4971	.000E+00	.000E+00	-10.905	.065
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)		Variance ratio	
.497		.171	0.000		.171		0.000	

Age 18

Fleet,	84,	85,	86,	87,	88,	89
1	-10.02	-11.67	-11.38	-10.90	-10.87	-10.97

SUMMARY STATISTICS								
Fleet	Pred.	SE(q)	Partial	Raised	SLOPE	SE	INTRCPT	SE
	q		F	F		Slope		Intrcpt
1	-10.97	.605	.4666	.4666	.000E+00	.000E+00	-10.968	.229
Fbar		SIGMA(int.)	SIGMA(ext.)		SIGMA(overall)		Variance ratio	
.467		.605	0.000		.605		0.000	

Table 12.9

Title : SEBASTES MCNTELLA, OCEANIC TYPH
 At 08.41.04 08 MAY 1990
 from 82 to 89 on ages 9 to 19
 with Terminal F of .410 on age 15 and Terminal S of 1.200

Initial sum of squared residuals was 101.589 and
 final sum of squared residuals is 30.486 after 52 iterations

Matrix of Residuals

Years	82/83	83/84	84/85	85/86	86/87	87/88	88/89		WTS	
Ages										
9/10	.143	.628	-.151	-.992	-1.116	2.253	-.757	.007	.334	
10/11	.712	.036	-.722	-.854	-.014	.912	-.564	.005	.617	
11/12	.592	-.294	-.147	-.692	.649	-.038	-.369	.002	.692	
12/13	.910	-.288	-.364	-.264	.529	-.648	.125	.000	.713	
13/14	-.049	-.702	-.383	.376	.647	-.174	.284	-.001	.841	
14/15	-.127	-.500	-.428	.293	.228	-.052	.582	-.002	1.000	
15/16	-.464	-.415	.134	.738	-.097	-.077	.178	-.002	.965	
16/17	-.532	.469	.468	.503	-.387	-.223	-.300	-.002	.857	
17/18	-.697	.723	.669	-.009	-.529	-.258	.099	-.002	.716	
18/19	-.589	2.407	.937	-.713	-1.329	-.583	-.133	-.002	.310	
	.000	.000	.000	.000	.000	-.001	-.001	.002		
WTS	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Fishing Mortalities (F)										
F-values	82	83	84	85	86	87	88	89		
	.5901	.6368	.6875	.5759	.9012	.9917	.9424	.4100		
Selection-at-age (S)										
S-values	9									
	.0064									
S-values	10	11	12	13	14	15	16	17	18	19
	.0135	.0368	.1202	.3172	.4970	1.0000	1.2088	1.4684	1.5490	1.2000

Table 12.10 Oceanic-type Sebastes mentella.
Separable fishing mortalities.

	1982	1983	1984	1985	1986	1987	1988	1989
9	.004	.004	.004	.004	.006	.006	.006	.003
10	.008	.009	.009	.008	.012	.013	.013	.006
11	.022	.023	.025	.021	.033	.036	.035	.015
12	.071	.077	.083	.069	.108	.119	.113	.049
13	.187	.202	.218	.183	.286	.315	.299	.130
14	.293	.316	.342	.286	.448	.493	.468	.204
15	.590	.637	.698	.576	.901	.992	.942	.410
16	.713	.770	.831	.696	1.089	1.199	1.139	.496
17	.867	.935	1.010	.846	1.323	1.456	1.384	.602
18	.914	.986	1.065	.892	1.396	1.536	1.460	.635
19	.708	.764	.825	.691	1.081	1.190	1.131	.492
F (13-17),u	.503	.572	.618	.517	.809	.891	.846	.368

Table 12.10.b VIRTUAL POPULATION ANALYSIS

SEBASIES MENTELLA, OCEANIC TYPE

	FISHING MORTALITY COEFFICIENT					NATURAL MORTALITY COEFFICIENT = .10			
	UNIT: Year-1								
	1982	1983	1984	1985	1986	1987	1988	1989	
9	.005	.005	.002	.001	.004	.028	.004	.003	
10	.012	.009	.006	.004	.013	.025	.006	.008	
11	.034	.018	.025	.017	.044	.040	.026	.012	
12	.087	.049	.084	.080	.178	.082	.132	.053	
13	.138	.095	.179	.280	.474	.316	.404	.135	
14	.225	.228	.301	.347	.511	.468	.593	.221	
15	.492	.504	.829	.860	.811	.896	.923	.295	
16	.578	1.115	.990	.851	.817	1.073	.989	.381	
17	.675	1.486	1.217	.630	.904	1.284	1.499	.663	
18	.676	2.048	1.220	.535	.699	1.235	1.548	.682	
19	.705	.967	.230	.283	1.079	2.006	1.642	.687	
20+	.705	.967	.230	.283	1.079	2.006	1.642	.687	
(13-17)U	.421	.686	.703	.594	.703	.808	.882	.359	

Table 12.11 VIRTUAL POPULATION ANALYSIS

SEBASTES MENTELLA, OCEANIC TYPE

STOCK SIZE IN NUMBERS UNIT: thousands

BIOMASS TOTALS UNIT: tonnes

ALL VALUES ARE GIVEN FOR 1 JANUARY

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1982-89
9	250167	219673	224348	243773	246955	348649	115851	53336	0	212844
10	204387	225344	197797	202564	220246	222672	306752	104422	48134	210523
11	171163	182666	202093	177912	182483	196654	196514	275912	93773	198175
12	122794	149712	162371	178311	158289	157992	170885	173255	246597	159201
13	85580	101899	129029	135082	148879	119895	131715	135504	148630	123448
14	59801	67480	83847	97620	92353	83862	79074	79545	107085	80448
15	40507	43203	48591	56157	62415	50127	47503	39533	57681	48505
16	32919	22409	23605	19186	21492	25101	18509	17076	26641	22537
17	24450	16711	6648	7940	7412	8590	7768	6228	10553	10718
18	17655	11268	3423	1780	3826	2717	2153	1572	2903	5549
19	10145	8127	1315	915	944	1720	715	414	719	3037
20+	9393	14153	3787	528	593	1385	257	193	277	3786
TOTAL NO	1028959	1062645	1086855	1121768	1145887	1219364	1077697	886990		
SPS NO	587353	620752	647004	668161	680423	664930	655736	616428		
TOT. BIOM	457633	437898	502007	468722	499596	499145	485337	459035		
SPS BIOM	293069	283720	341780	316703	334452	313800	326986	336277		

Table 12.12

List of input variables for the ICES prediction program.

S. MENTELLA OCEANIC TYPE

The reference F is the mean F for the age group range from 13 to 17

The number of recruits per year is as follows:

Year	Recruitment
1990	213000.0
1991	213000.0
1992	213000.0
1993	213000.0

Data are printed in the following units:

Number of fish: thousands
 Weight by age group in the catch: kilogram
 Weight by age group in the stock: kilogram
 Stock biomass: tonnes
 Catch weight: tonnes

age	stock size	fishing pattern	natural mortality	maturity ogive	weight in the catch	weight in the stock
9	213000.0	.00	.10	.18	.331	.331
10	192000.0	.01	.10	.35	.378	.378
11	93773.0	.02	.10	.60	.418	.418
12	246597.0	.05	.10	.76	.471	.471
13	148630.0	.13	.10	.96	.534	.534
14	107085.0	.20	.10	.98	.605	.605
15	57681.0	.41	.10	.98	.695	.695
16	26641.0	.50	.10	.99	.802	.802
17	10553.0	.60	.10	.99	.898	.898
18	2903.0	.63	.10	1.00	.968	.968
19	719.0	.49	.10	1.00	1.050	1.050
20+	277.0	.49	.10	1.00	1.171	1.171

Table 12.13 Management options for 1990-1993 for oceanic-type S. mentella in Sub-areas XII and XIV.

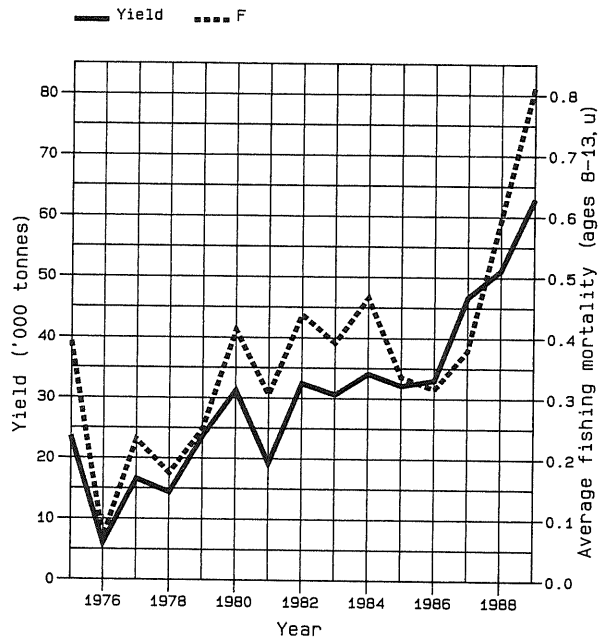
1990			Management	1991			1992			1993			
Stock biom. (3+)	F SSB	F (13-17)	option for 1991 and 1992	Stock biom. (3+)	F SSB	F (13-17)	Stock biom. (9+)	Catch (9+)	SSB	Catch (9+)	Stock biom. (9+)	SSB	
<u>Option A</u>													
517	364	.847	104	$F_{91}=F_{88}$	488	339	.847	88	465	311	88	452	298
				F_{max}	488	339	.373	50	516	360	60	534	377
<u>Option B</u>													
517	364	.368	54	$F_{91}=F_{89}$	542	392	.368	66	555	399	73	561	403

Weights in '000 t.

Figure 3.1

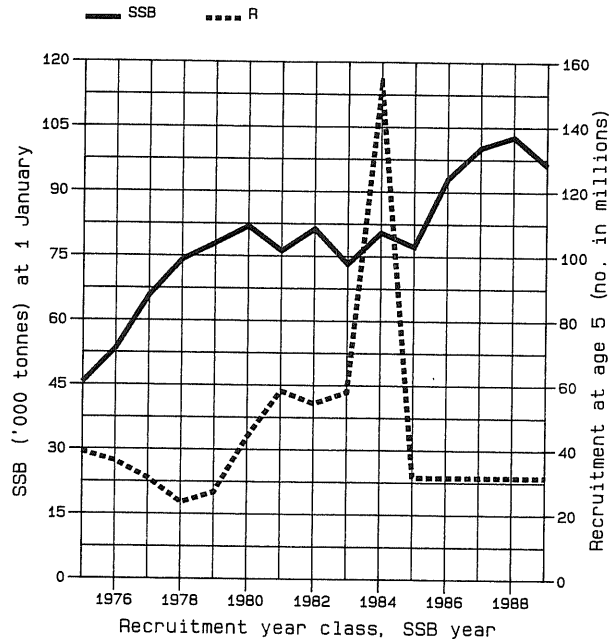
FISH STOCK SUMMARY
STOCK: Greenland Halibut in Areas V and XIV
14-05-1990

Trends in yield and fishing mortality (F)



A

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



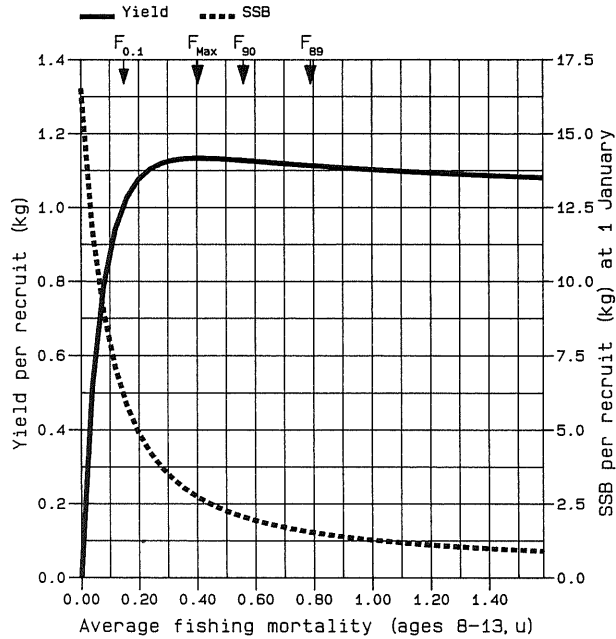
B

(cont'd)

Figure 3.1 (cont'd)

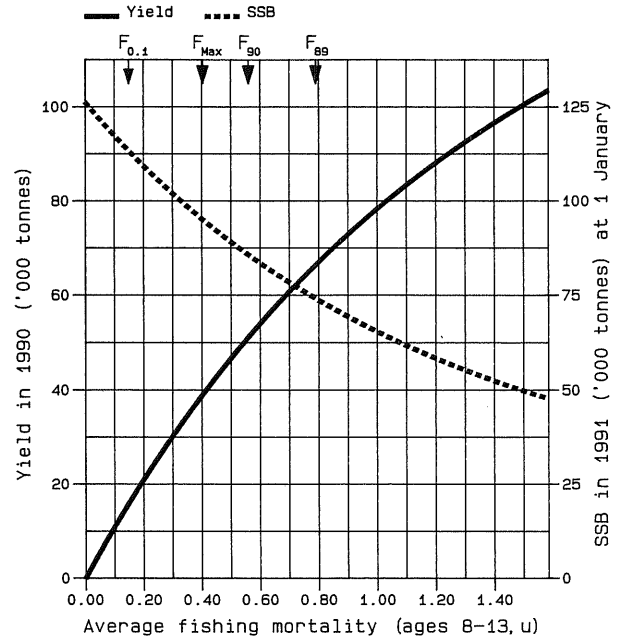
FISH STOCK SUMMARY
STOCK: Greenland Halibut in Areas V and XIV
14-05-1990

Long-term yield and spawning stock biomass



C

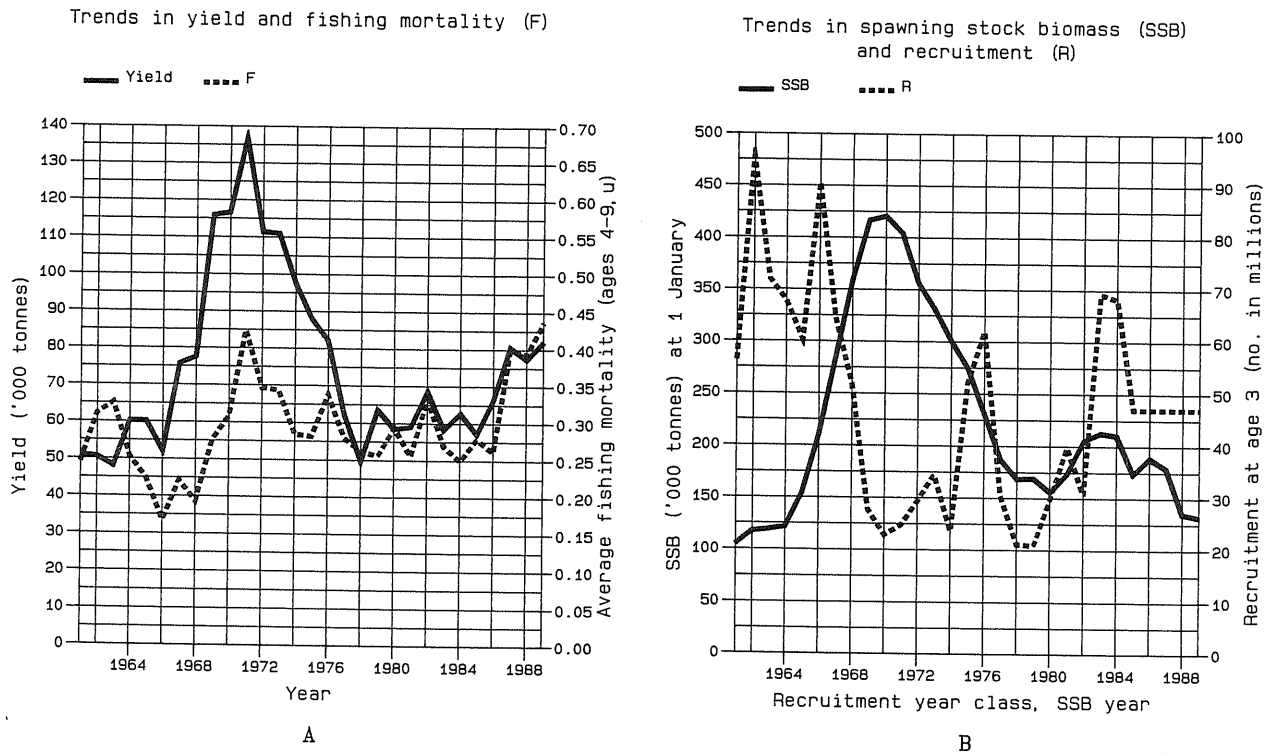
Short-term yield and spawning stock biomass



D

Figure 4.1

FISH STOCK SUMMARY
STOCK: Icelandic Saithe
15-05-1990

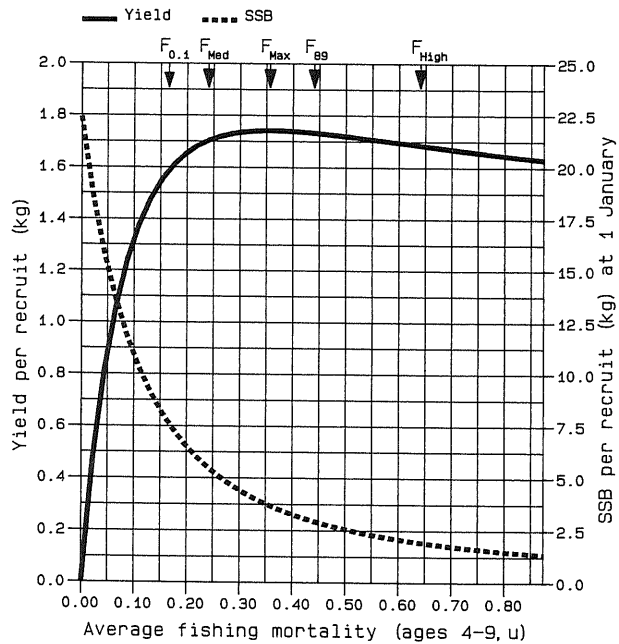


(cont'd)

Figure 4.1 (cont'd)

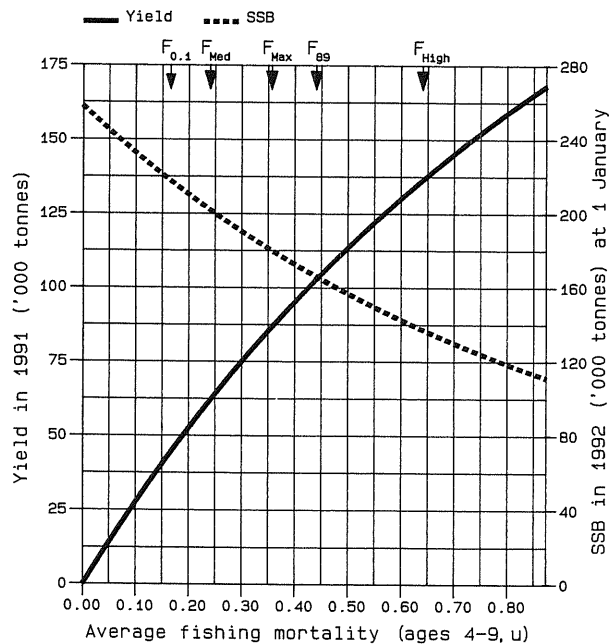
FISH STOCK SUMMARY
 STOCK: Icelandic Saithe
 15-05-1990

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass



D

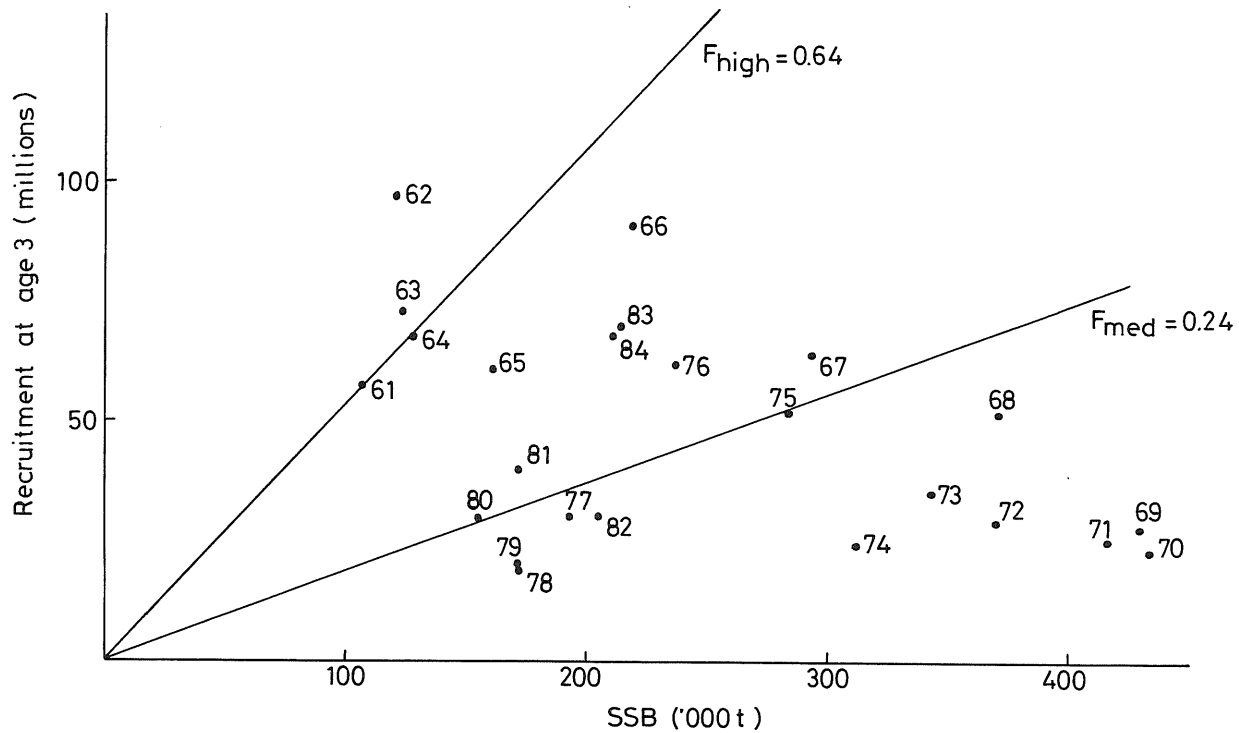
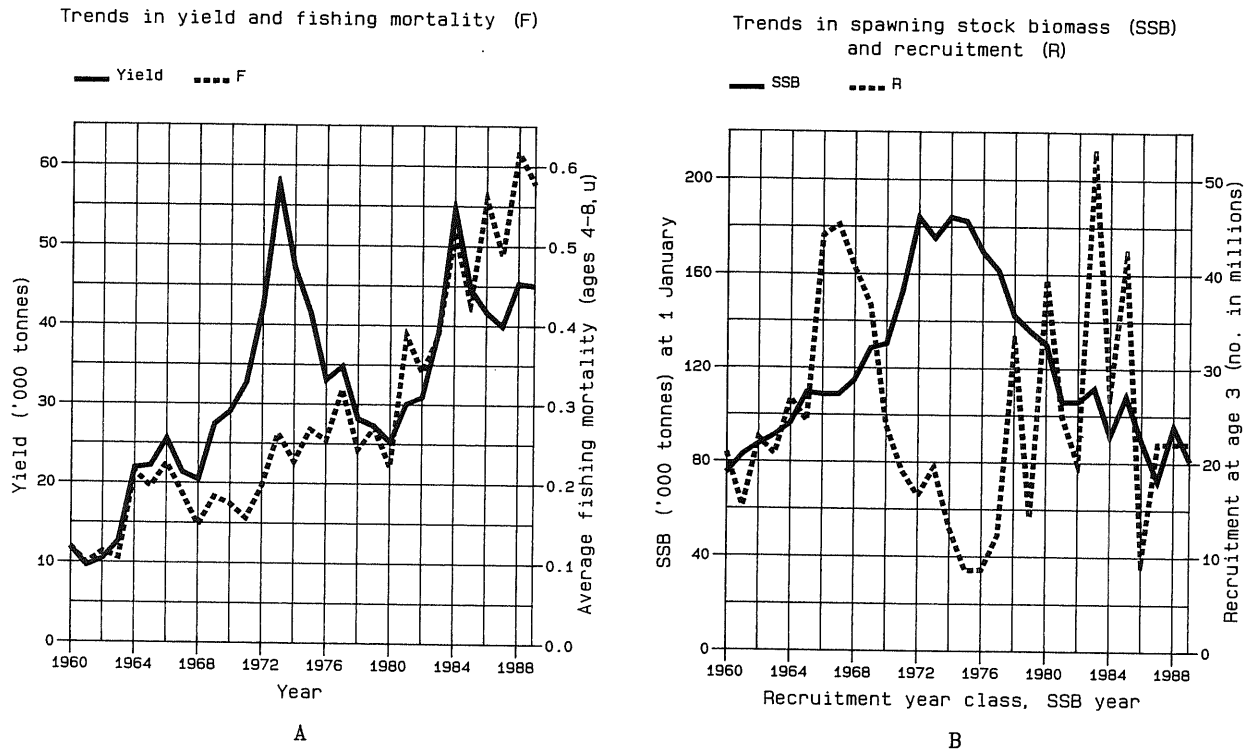


Figure 4.2 Stock-recruitment relationship for Icelandic SAITHE.

Figure 6.1

FISH STOCK SUMMARY
STOCK: Faroe Saithe
15-05-1990

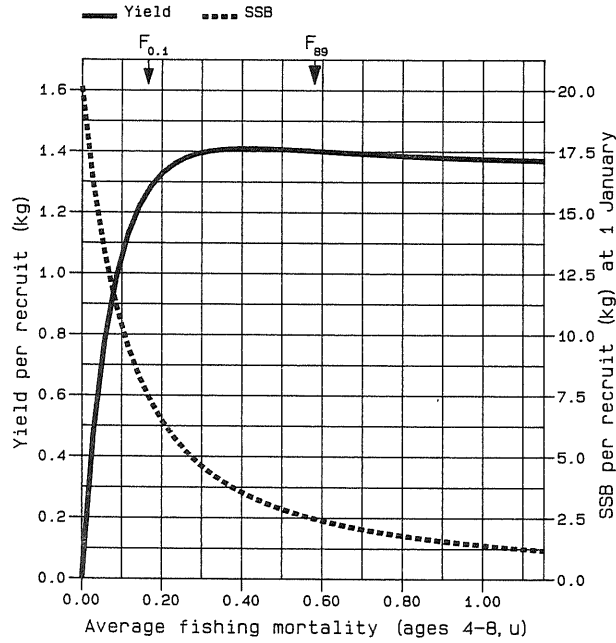


(cont'd)

Figure 6.1 (cont'd)

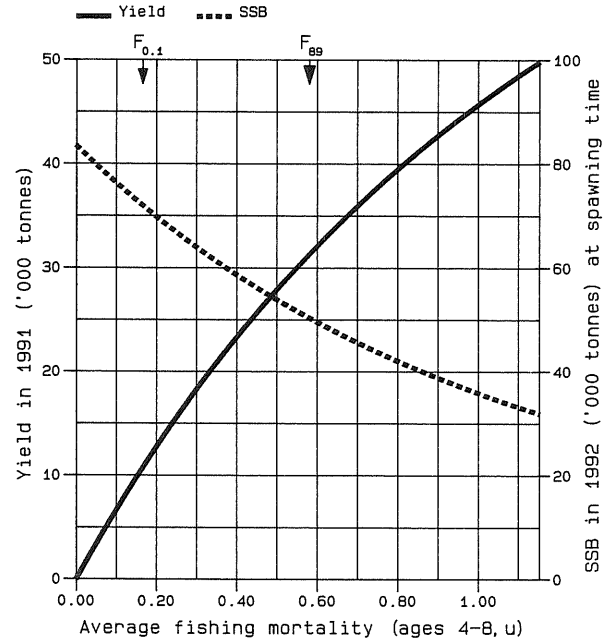
FISH STOCK SUMMARY
 STOCK: Faroe Saithe
 15-05-1990

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass



D

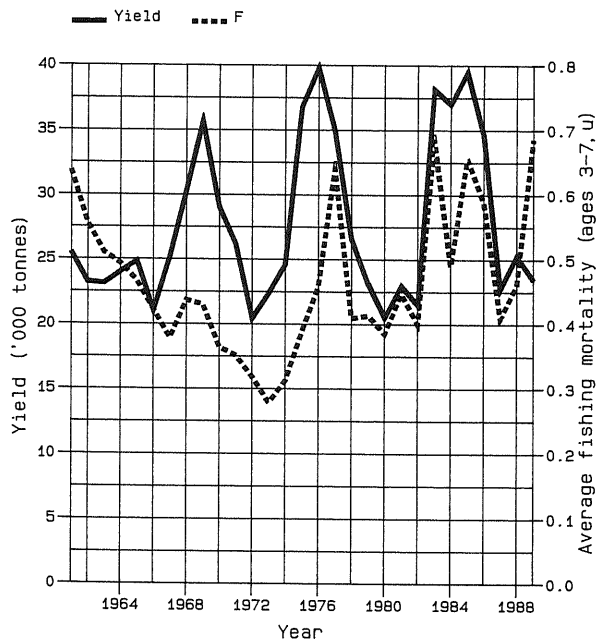
Figure 7.1

FISH STOCK SUMMARY

STOCK: Cod in the Faroe Plateau

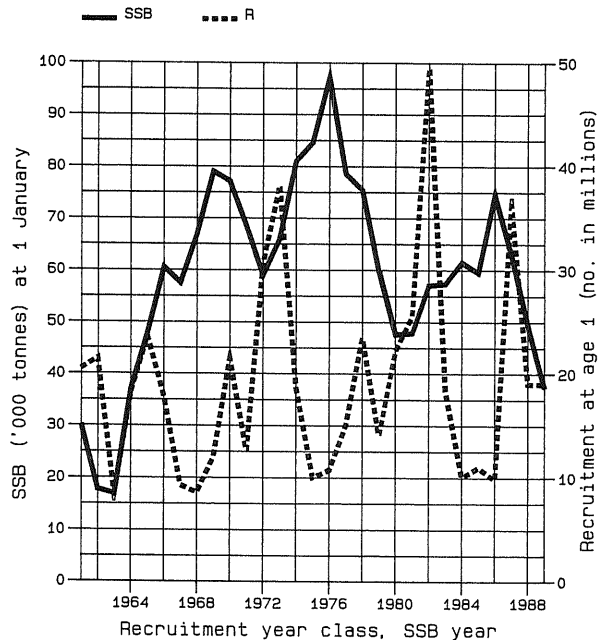
16-05-1990

Trends in yield and fishing mortality (F)



A

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



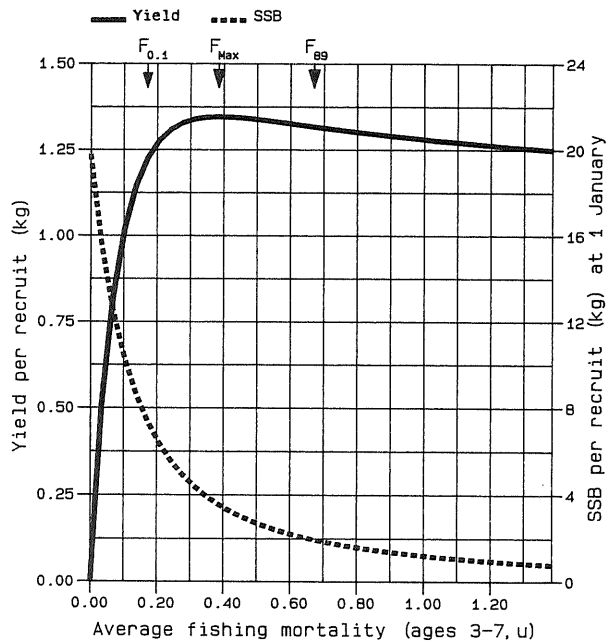
B

(cont'd)

Figure 7.1 (cont'd)

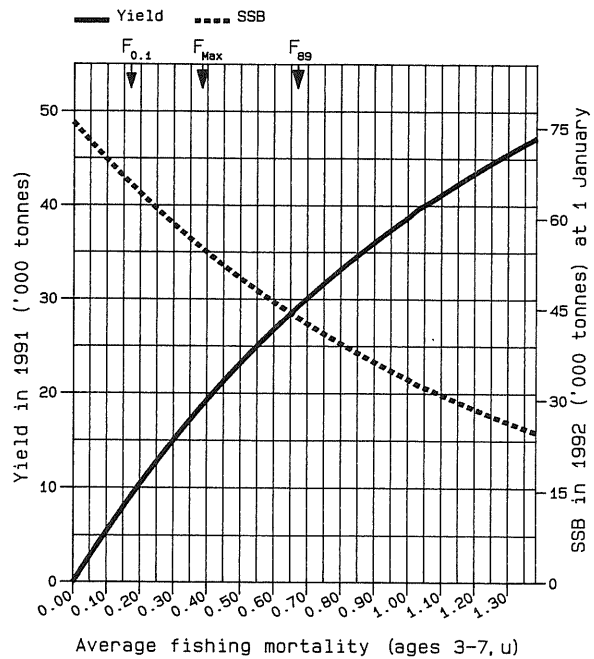
FISH STOCK SUMMARY
STOCK: Cod in the Faroe Plateau
16-05-1990

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass



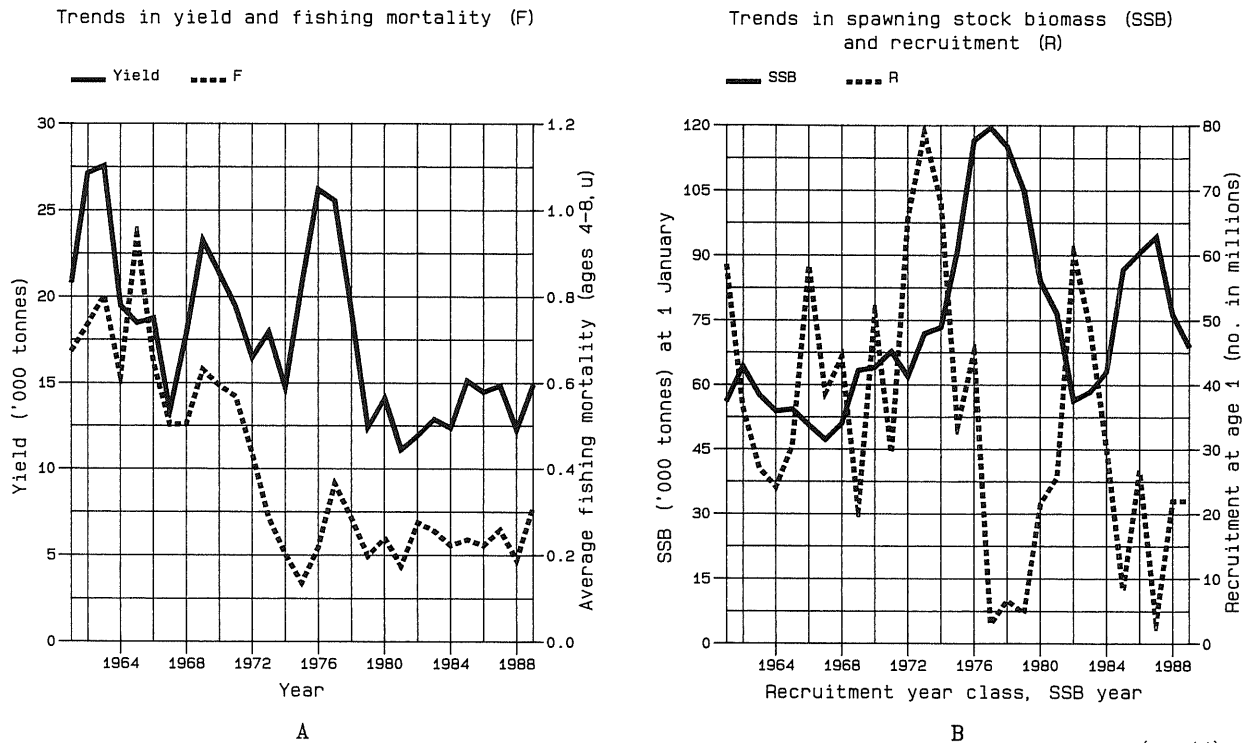
D

Figure 8.1

FISH STOCK SUMMARY

STOCK: Haddock in the Faroe Region

16-05-1990



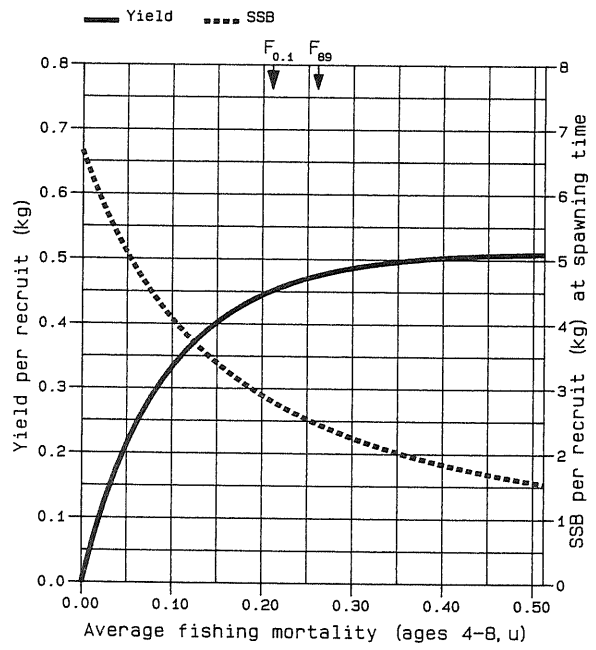
(cont'd)

Figure 8.1 (cont'd)

FISH STOCK SUMMARY

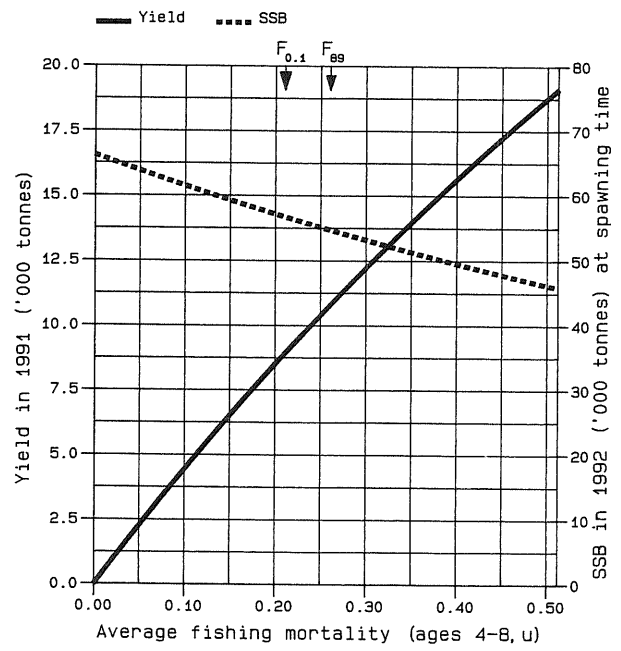
STOCK: Haddock in the Faroe Region
16-05-1990

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass



D

AGE COMPOSITION FOR BLUE LING, 1988 AND 1989 FROM THE FRENCH TRAWL FISHERIES

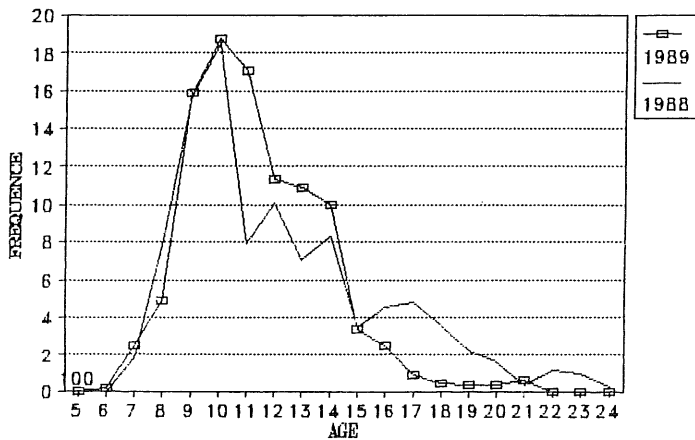


Figure 9.1

Groundfish Surveys Faroes 1983-89

Blue ling, CPUE per year (kg/hour)

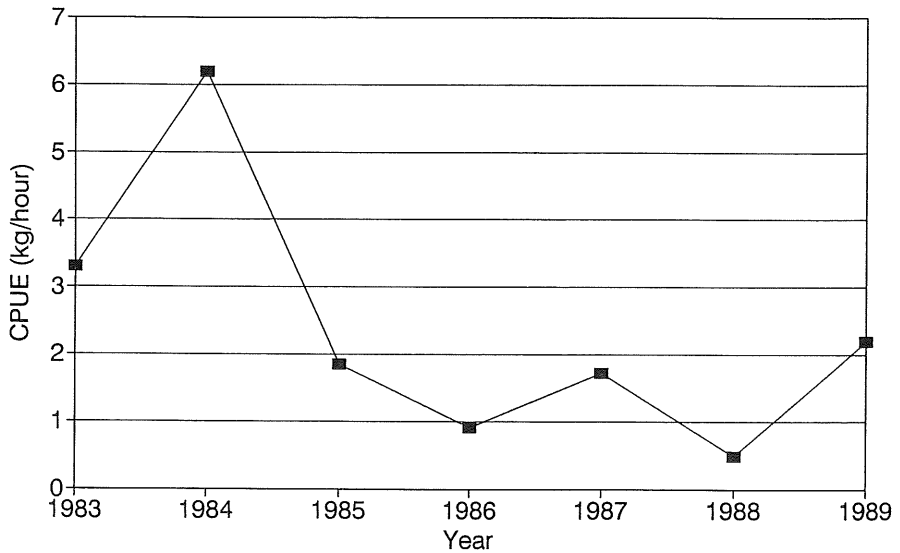


Figure 9.2

CATCH PER UNIT OF EFFORT, AND TOTAL
EFFORT. LING VB.

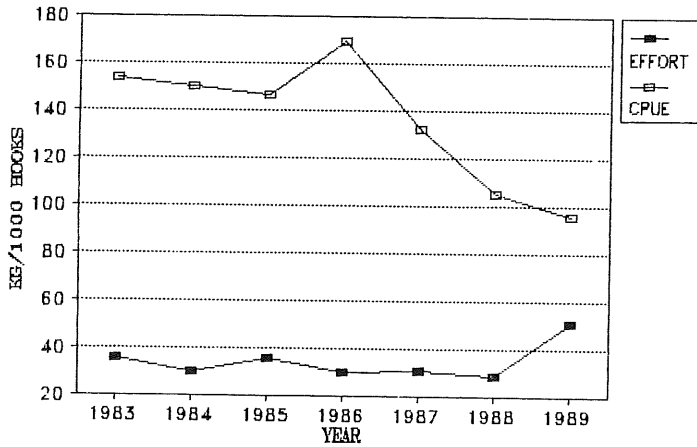


Figure 10.1

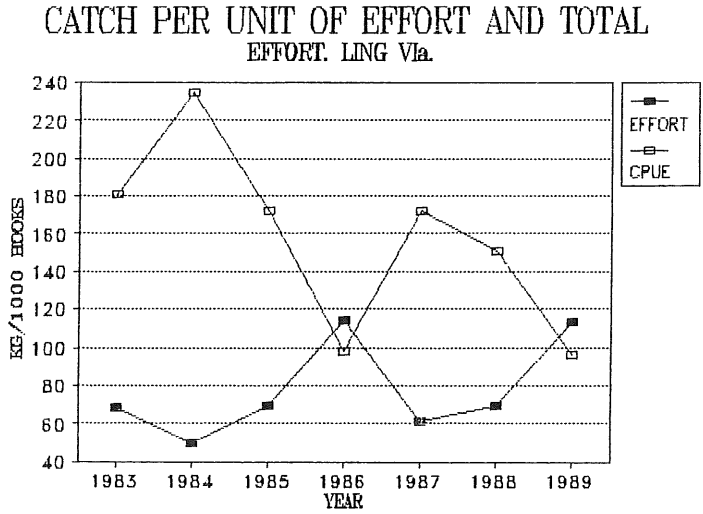


Figure 10.2

CATCH PER UNIT OF EFFORT AND TOTAL
EFFORT. LING VIB.

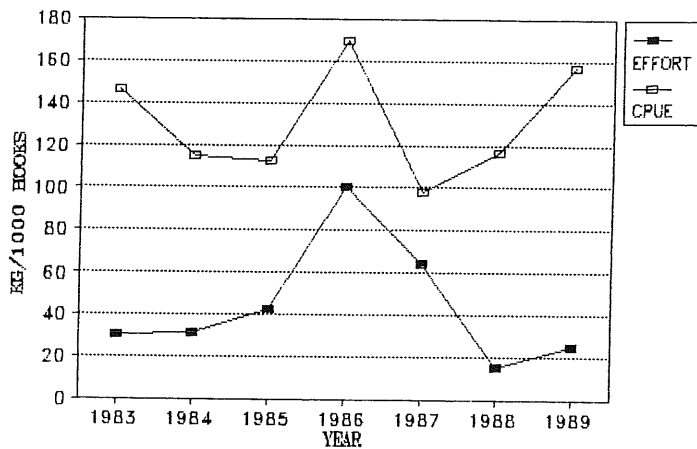


Figure 10.3

CATCH CURVE, LING VB. 1989
From the Norwegian Longline fisheries

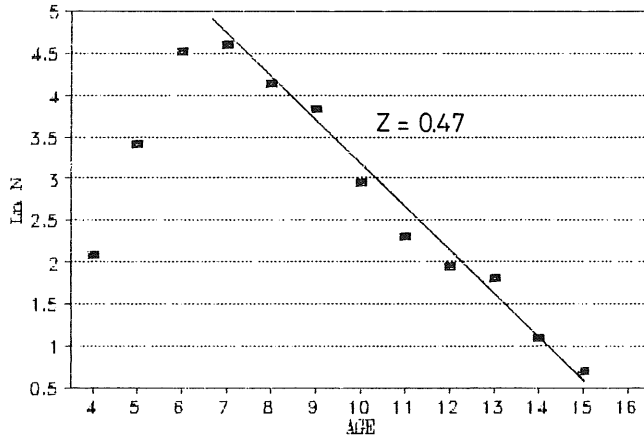


Figure 10.4

CATCH CURVE, LING, VIa. 1989.
From the Norwegian longline fisheries.

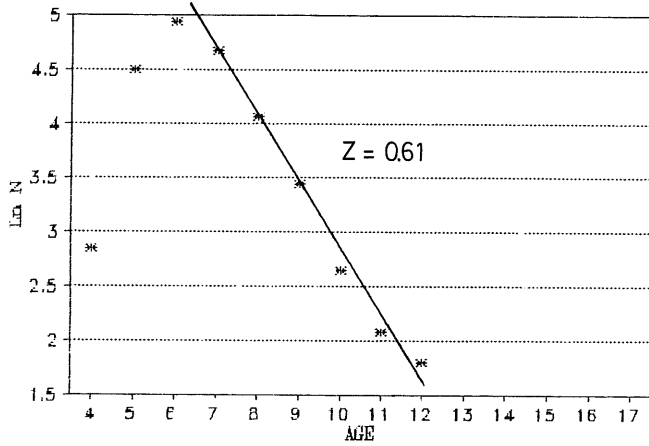


Figure 10.5

Groundfish Surveys Faroes 1983-89

Ling, CPUE per year (kg/hour)

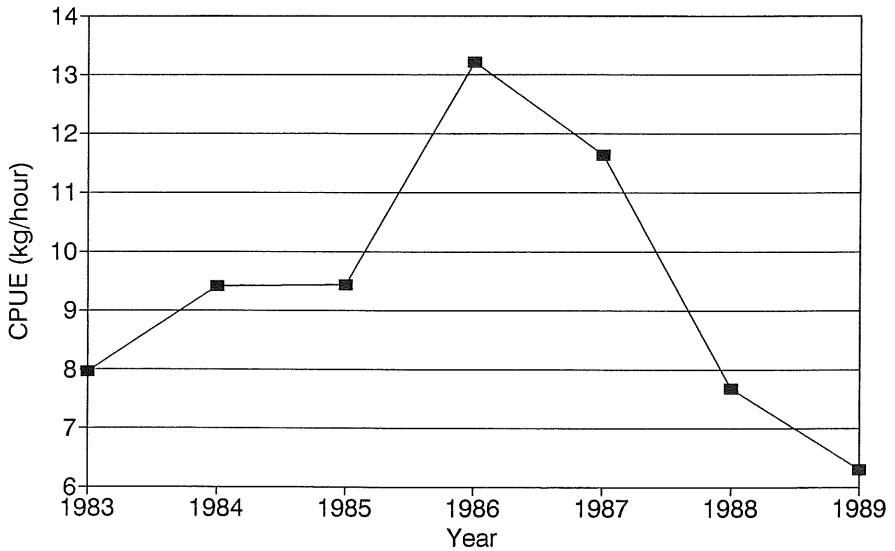


Figure 10.6

CATCH PER UNIT OF EFFORT AND TOTAL
EFFORT. TUSK Vb.

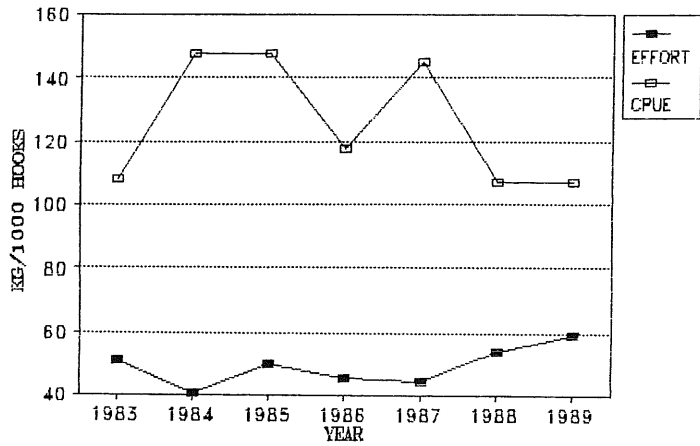


Figure 11.1

CATCH PER UNIT OF EFFORT AND TOTAL
EFFORT. TUSK VIa.

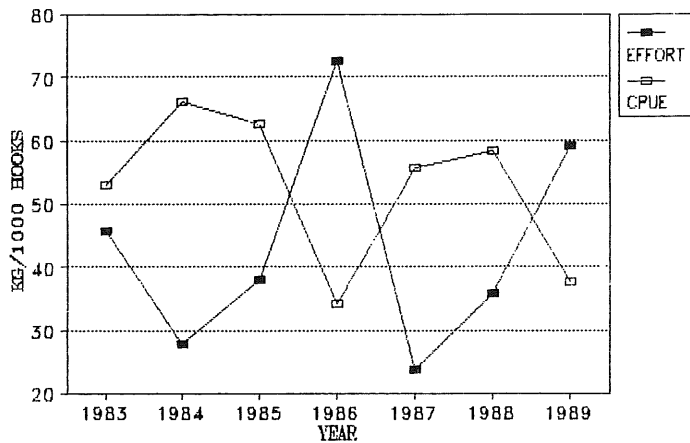


Figure 11.2

CATCH PER UNIT OF EFFORT AND TOTAL
EFFORT. TUSK VIB

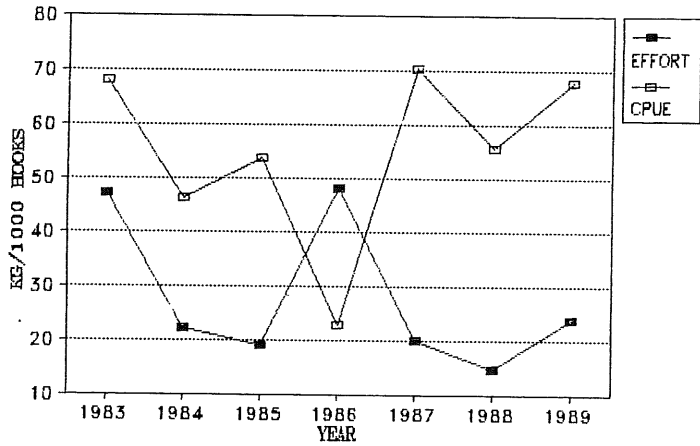


Figure 11.3

Groundfish Surveys Faroes

Tusk, CPUE (Kg/hour) per year

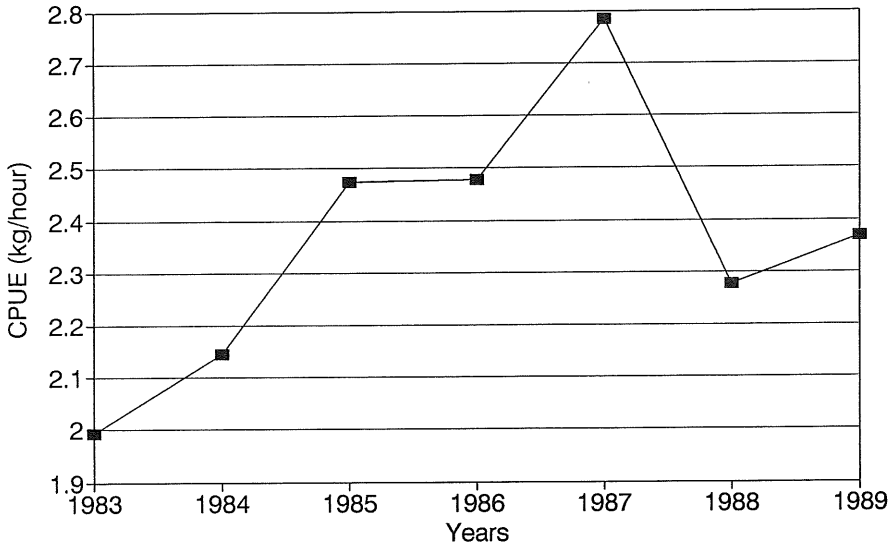


Figure 11.4

Figure 12.1

FISH STOCK SUMMARY

STOCK: *Sebastes Mentella*, Oceanic Type

16-05-1990

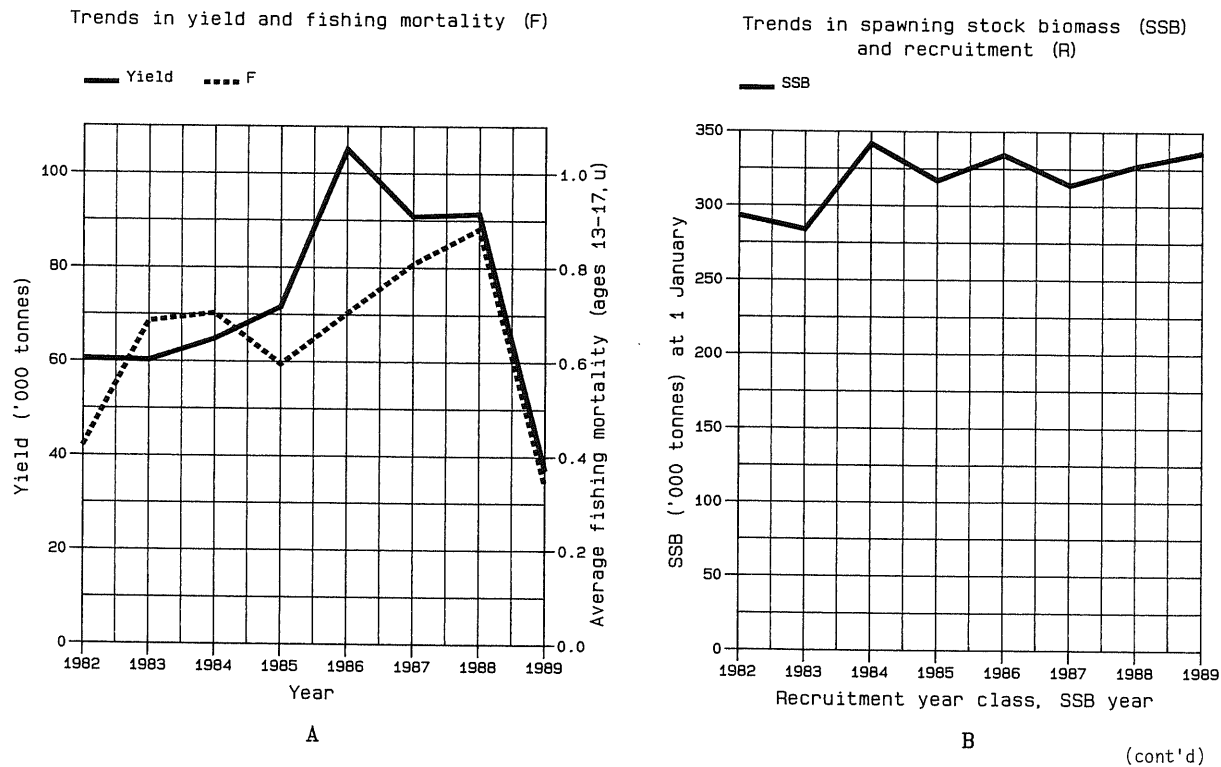
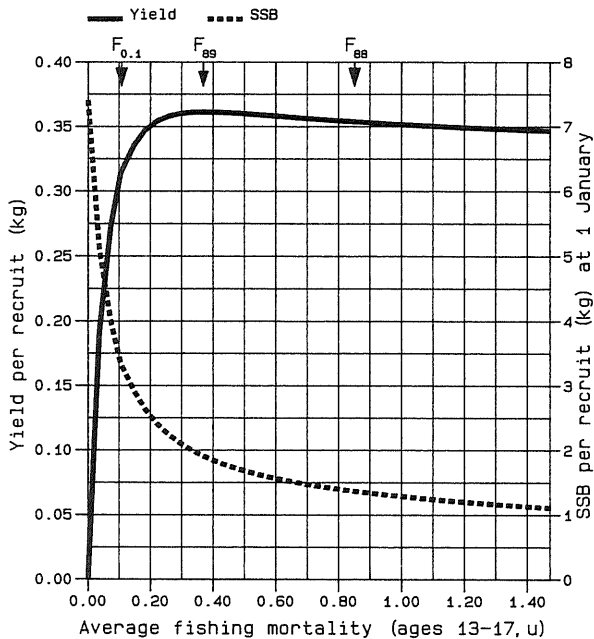


Figure 12.1 (cont'd)

FISH STOCK SUMMARY
 STOCK: *Sebastes Mentella*, Oceanic Type
 16-05-1990

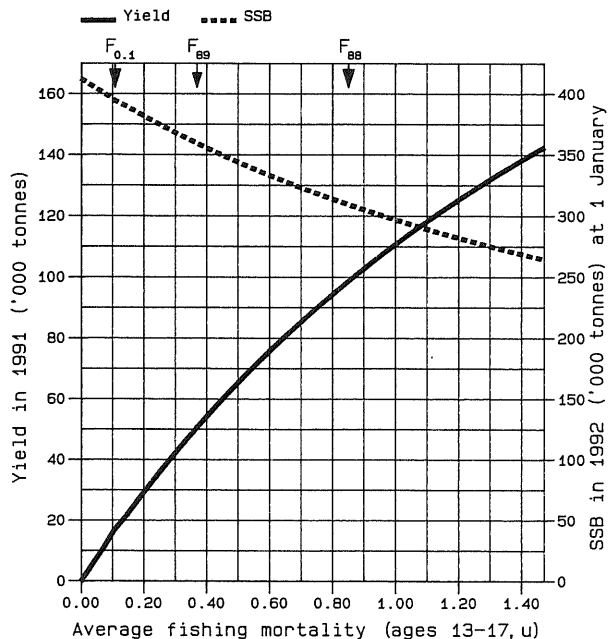
Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass

Assumes $F_{90} = F_{88}$



D

(cont'd)

Figure 12.1 (cont'd)

FISH STOCK SUMMARY
STOCK: *Sebastes Mentella*, Oceanic Type
16-05-1990

