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REPORT OF THE WORKING GROUP ON FISH STOCKS AT THE FAROES

Charlottenlund, 30 April-2 May 1979

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1. PARTICIPANTS

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2. TERMS OF REFERENCE

At the 66th Statutory Meeting, it was decided (C.Res.1978/2:38) that the Working Group on Fish Stocks at the Faroes should meet at Charlottenlund to:

a) assess TACs for 1980 for cod and haddock,

b) further assess the effective mesh sizes in current use and to estimate the effects of further increases in mesh size for these species.

3. COD STOCKS

3.1. Introduction

In this report the two cod stocks are treated separately. Assessments have been performed for the larger Plateau stock in Sub-division Vb1 (Coop.Res.Rep., No.86) for some years, but no separate assessments have been made on the Bank stock due to lack of data. In this report some basic data will be given for the Bank stock.

Table 3.2 shows clearly the great changes in the landings and fishing effort at the Faroes from 1973 to 1978 (see also Table 6.1). There have been two changes in legal mesh size during the period, from 105 to 120 mm from 1 January 1974, and from 120 to 135 mm from 1 January 1978. A closed area system has been imposed during the period. No restrictions have been put on landings from Faroese vessels in 1979, but there are certain areas closed to trawlers and gillnetters especially on the cod spawning grounds. EEC vessels have a quota of cod in the total Faroe area of 2 500 tonnes in 1979. As the Faroe Bank has been closed to trawling within the 200 m depth contour, this means that most of the 2 500 tonnes will have to be taken on the Plateau. Besides this, the only permitted foreign catch of cod in the Faroe area is a moderate amount of by-catch in the Norwegian fixed gear fishery.

3.2. The Faroe Plateau Stock

3.2.1. Landings and changes in the fisheries

From 1972, there was a trend of increasing landings of cod from the Faroe Plateau (Table 3.1, Figure 3.1.A) resulting mainly from the recruitment of the abundant 1972-3-4 year classes. The landings reached a maximum level of 40 000 tonnes in 1976 and subsequently declined to 35 000 tonnes in 1977, and to 26 000 tonnes in 1978.

In 1977, there appears to have been an overall increase in fishing effort, an increase in Faroese fishing outweighing a decline in fishing by other countries. As a result, the landings by Faroese vessels were maintained at the 1976 level in 1977 but landings by other countries declined. In 1978, fishing effort by Faroese trawlers increased but effort by other Faroese vessels and foreign vessels declined resulting in an estimated net reduction of fishing effort on cod of about 25% compared with 1977.

3.2.2. Age composition

Age compositions of landings were updated for 1977 and new provisional data were available for 1978 (Table 3.3). Age composition data were provided by England, Faroe, France (1977 only) and Scotland, representing 97% and 99% respectively of the landings for 1977 and 1978.

Last year it was noticed that for the Faroese landings in 1977 the sums of products of numbers landed x average weight at age did not agree with the landed weight. An adjustment was therefore made to the estimated numbers in the Faroese age composition. This discrepancy occurred again in the 1978 data and the Group concluded that the weight at age data used in earlier reports are now inappropriate and should be changed (see below). A consequence of this change is that uncorrected age compositions have been used for Faroese landings in both 1977 and 1978.

3.2.3. Weight at age

As mentioned above, the weight-at-age data used in earlier reports provided a good fit when sums of products of numbers landed x average weight at age were compared with landed weights for years up to 1976. Serious discrepancies were observed with Faroese landings in 1977 and again in 1978. The reason for this is not clear but it may be associated with a larger proportion of the catch being taken relatively early in the year when a lower average weight would be expected. Faroese catches now account for 92% of the cod landings so weight-at-age data appropriate for the Faroese fishery now need to be used. Consequently, new weight-at-age data were adopted for the current assessment based on mean length-at-age data in Faroese landings in 1978 converted to weight by the relationship $w = 13 \times 10^{-5}$. The resultant smoothed data are given in Table 3.8.

3.2.4. Fishing mortality

To obtain estimates of fishing mortality (F) for 1978 as input values for Virtual Population Analysis (VPA), the Group considered what changes there may have been to the exploitation pattern and also to the overall level of F. Last year the Group made an adjustment to the exploitation pattern in the catch prognosis to allow for the effects of the new minimum trawl cod-end mesh size of 135 mm which came into effect in 1978.

The same exploitation pattern was used this year in the VPA input for 1978. To determine the overall level of F, the Group examined the effort data for the various fleets (Table 3.2) and compared the effort in 1978 with the average for the period 1973-75. This indicated an overall increase in effort on cod in 1978 of about 20% compared with 1973-75. F values for VPA input for 1978 were then estimated for age groups 5-9 which were 20% lower than the equivalent values in 1973-75 and F values for the younger age groups were determined on the basis of the exploitation pattern. Table 3.4 gives the input F values used for 1978 and values for earlier years calculated by VPA. A comparision of fishing effort data indicated a reduction from 1977 to 1978 of about 25% and this is reflected in the differences in the F values in the VPA for these two years.

3.2.5. Stock size and recruitment

Estimates of numbers at each age in each year in the stock are given in Table 3.5. Recruitment data as stock number of each year class at age 2 from VPA are summarised in Table 3.6 and Figure 3.1.C. Average recruitment (year classes 1957-72) has been about 16 x 10^6. Catches in recent years have benefitted from the recruitment of three successive abundant year classes, those of 1972, 73 and 74. For the most recent years, no reliable estimates of year class strength are available. Fishing by United Kingdom vessels is now at such a low level that their catches of 1 and 2-year-old fish per unit effort is unlikely to provide reliable estimates. Scottish trawl surveys do not adequately sample the youngest cod age groups which are at least partially unavailable in the inshore areas. 0-group survey data (Table 3.7) indicate that the 1976 year class is abundant, that of 1977 poor and the 1978 year class to be about average, but it is too early to know if these surveys give a reliable index of abundance.

Spawning stock size estimates have been calculated from the VPA stock numbers (Table 3.5) and the weight-at-age data (Table 3.8). These are summarised in Table 3.6 and Figure 3.1.B.

The estimates of spawning stock biomass for cod given in this report are not comparable with those given in earlier reports because of the revised weight at age used this year. The spawning stock reached a high level in the years 1976-78 when the abundant 1972-74 year classes recruited to the spawning stock. If none of the more recent year classes are particularly abundant, the expectation is that the spawning stock will become reduced in the foreseeable future.

3.2.6. Yield per recruit

A new yield-per-recruit curve (Figure 3.1.D.) has been calculated using the revised weight-at-age data and the exploitation pattern given in Table 3.8. Using the old weight-at-age data, the yield per recruit curve given in last year's report had a value of F_{max} = 0.40. The revision of the weight-at-age data has resulted in a new curve with a value of F_{max} = 0.30. An indication of long-term average yield can be obtained from yield per recruit and average recruitment:

$\bar{R}_2$	F	Yw/R kg	Yield tonnes
16 x 10^6	0.55 = F_{78}	1.37	22 000
	0.3 = F_{max}	1.45	23 200

3.2.7. Catch predictions and management options

Catch predictions were prepared for the years 1979-81 on the basis of data given in Table 3.8. The strengths of recruiting year classes are not known and average recruitment ($\bar{R}$ at 2 years = 16 x 10^6) has been assumed for year classes 1975 and later. Currently spawning stock biomass is at a high level due to three abundant year classes. Although the level is expected to decline, it is not expected to approach a level low enough for remedial action in the form of a reduction in fishing mortality to be necessary on grounds of safeguarding the spawning stock. Current (1978) fishing mortality is estimated to be F = 0.55 on age groups subject to maximum exploitation. The TAC recommended for 1979 was 26 000 tonnes and it is estimated that to take this catch in 1979 will require a fishing mortality of F = 0.52, so this value of F has been used in the catch predictions for 1979. The value of F_{max} = 0.3 on the new yield per recruit curves is below current levels of F. Two catch predictions were prepared. In one, fishing mortality is reducing towards F_{max} from F = 0.52 in 1979 to F = 0.45 in 1980 and F = 0.35 in 1981. The second catch prediction indicates the effects of maintaining fishing mortality at F = 0.52 from 1979 to 1981. The results of these catch predictions are given in Table 3.9.

The first option gives a trend of reducing catches from 26 000 tonnes in 1979 to 18 000 tonnes in 1981. The spawning stock biomass is reduced to 59 000 tonnes in 1980 and remains at this level in 1981. In the second option catches are also reducing but the reduction is less severe. The catch in 1981 would be 23 000 tonnes compared with 18 000 tonnes in the first option. In the second option, the reduction in spawning stock continues to the beginning of 1981. The predicted catches quoted here are for the Plateau stock only. Any recommendation for a TAC for the total Faroe area will require an allowance for catches which might be taken on Faroe Bank. In earlier years, 2 000 tonnes were added to the predicted catch for Faroe Plateau. Provisional data on landings from the Faroe Bank for 1978 are 5 455 tonnes.

3.3. Faroe Bank Stock

3.3.1. Landings and changes in the fisheries

Landings by country for 1968-78 are given in Table 3.10. Before 1973, some countries were not able to separate their catches on the Faroe Bank from those on the Faroe Plateau. The total catch figures for the Faroe Bank before 1974 are therefore underestimates.

Trawling on the Faroe Bank was prohibited early in 1978. Catches were stable from 1974 to 1977, averaging 2 140 tonnes. In 1978, catches were up to 5 455 tonnes. Chiefly as a result of sharply increased effort, Faroese landings rose from 851 tonnes in 1977 to 4 194 tonnes in 1978 (longline 2 399, trawl 1 030, gillnet 433, handline 241, and other gears 91 tonnes).

3.3.2. Catch per unit effort

Data on catch of cod per unit effort for the Faroe Bank are available from England for the years 1946-76 (Table 3.11, Figure 3.2). The values approximate a periodical pattern with peaks in 1946, 1955 and 1967. After 1967, there is a clear downward trend.

There is good correlation (r = 0.90) between the English catches of cod per unit effort on the Faroe Bank and on the Faroe Plateau. This correlation may to some extent have been induced by inaccurate reporting from boats fishing both on the Bank and on the Plateau during the same trip. However, this would be expected to have a similar effect on the haddock data which show a poor correlation (r = 0.39). The data therefore suggest that the biomass of cod stocks on the Faroe Bank and Faroe Plateau follows a similar trend.

On average, the catch per unit effort for cod on the Faroe Plateau is 1.27 higher than that on the Bank. Taking into account that the area of the Plateau is about four times that of the Bank, this would suggest that the exploitable biomass of the Bank stock might be about one fifth of that on the Plateau.

3.3.3. Weight at age

Cod on the Faroe Bank have a faster growth rate than those on the Plateau. This is shown in the mean length-at-age and mean weight-at-age data for Faroese landings in 1978, given in Table 3.12.

4. THE HADDOCK STOCKS

4.1. Introduction

In former reports, the Group has treated the haddock in the Faroe area as a single stock, although Scottish tagging data (Coop.Res.Rep., No.86) show that the haddock on the Faroe Bank are a separate stock. The idea that the Plateau and Bank haddock are separate is also supported by their different growth characteristics (Table 4.1). Although in the present report the Group has been unable to make assessments for the Bank and Plateau stocks separately, due to insufficient data, the landings from the two areas are shown separately in Tables 4.2 and 4.3, and the combined catches in Table 6.2 and Figure 4.1.

4.2. Landings and Changes in the Fisheries

Total landings from the Faroe Plateau decreased from 24 600 tonnes in 1977 to 16 300 tonnes in 1978 (Table 4.2). Landings and effort by foreign vessels were very much lower than in former years (Table 4.4). There was also a large decrease in effort by Faroese longlines, relative to 1977. This was due to very severe weather conditions during the last quarter of the year, which greatly curtailed the activities of the smaller vessels in the longline fleet. Catch rates of longliners were unaffected, however, and remained at the high level of 1977.

Landings by country for 1968-78 from the Faroe Bank are given in Table 4.3. The landings in 1974-77 averaged 1 800 tonnes. As for cod, Faroese effort increased in 1978 and Faroese landings rose from 273 tonnes in 1977 to 2 544 tonnes in 1978 (longline 2 160, trawl 434 and other gears 49 tonnes). Total landings in 1978 were up to 2 979 tonnes.

4.3. Age Composition

The age composition data for 1977 were revised and provisional data for 1978 were calculated (Table 4.5). Age compositions were available for the Faroese, Scottish and English fisheries accounting for 99% of the

catches. The percentage age composition of catches of other countries was assumed to be the same as for the combined Scottish and English fisheries.

4.4. Weight at Age

Weight at age was calculated from the 1978 Faroese catches (Table 4.1) for the Plateau and Bank stock separately. As for cod, the values were lower than the data used in earlier Working Group reports. This could be due to a change in the seasonal distribution of the fishery; the major part of the Faroese haddock fishery normally takes place in the last part of the year, but bad weather interfered with fishing during the last months of 1978.

As the differences were small, the Group agreed to use the weight-at-age data given in earlier reports.

4.5. Fishing Mortality

The exploitation pattern used for the VPA was the same as that used in the prognosis in the 1978 Working Group report (Table 4.8). (This differed from the values used in earlier years, in order to take into account the increase in mesh size, effective from 1 January 1978.) In order to estimate changes in the overall level of F, fishing effort in 1978 was compared with mean values for the period 1973-75. It was estimated that $Effort_{78} = Effort_{73-75} + 30\%$. The mean value of F for age groups 4-9 during the period 1973-75 was 0.27 and an F of 0.35 (0.27 x 1.3) was used as the input value for the fully exploited age groups in 1978. Input F values for 1978 and calculated values for earlier years are given in Table 4.6. Using these data, a mean value of F = 0.358 for age groups 4-9 was obtained for 1977. This was only 2% lower than the 1978 figure, whereas from the comparison of levels of fishing effort in the two years, a substantially larger reduction had been expected.

4.6. Stock Size and Recruitment

Data from the 0-group surveys for the five most recent year classes suggest the 1978 year class may be of above average strength, whereas the others are average or below average (Table 4.9). As for cod, it is too early to say whether these surveys provide a reliable index of year class strength.

The routine Scottish demersal trawling surveys also indicate that the year classes of 1975, 1976 and in particular 1977, were weak (Table 4.9). The Group decided that because the correlation between research vessel estimates of the year class strength and the year class strength from the VPA is rather weak, average estimates of recruitment are to be used for the prognosis. Figure 4.1.B shows the spawning stock biomass from the VPA and the prognosis.

4.7. Catch Predictions and Management Options

The data used for the catch predictions are given in Table 4.8. It was assumed that recruitment would be average, and a value of 23×10^6 recruits at age 3, calculated from VPA, was used in the prognosis for year classes 1974 and onwards.

Two runs were made. For both, the fishing mortality input for 1979 was 0.37, which is that required to arrive at the TAC recommended for 1979.

In the first run the objective was to maintain the fishing mortality at the 1979 level in 1980 and 1981. A second run was made, in which F was allowed to increase to $F_{max.} = 0.55$ in 1980 and 1981. The two sets of predictions are given in Table 4.10.

4.8. Faroe Bank Haddock

Data on catch of haddock per unit effort on the Faroe Bank were available for England for the years 1955-76 (Table 4.11, Figure 4.2). The trend has been increasing since 1970. Although common trends can be seen, there is generally a poor correlation ($r = 0.39$) between the English catches of haddock per unit effort on the Bank and on the Plateau.

5. MESH ASSESSMENTS

5.1. Introduction

The Group made estimates of effective mesh sizes in 1977 (Report of the Faroe Working Group 1977).

The computer program used then has now been improved and uses a least square iteration routine to fit calculated catch curves to observed ones, thus estimating the effective meshes in use. This should be a more objective method than the rather subjective one used in the last assessments. (A description of the new method by Sparre, Hoydal and Rørvik is in press.)

Catches in numbers by 5 cm length groups for four Faroese gears and English and Scottish trawls were available to the Group for the years 1974-77. This was the period when the legal mesh size 120 mm (synthetic) was in effect. An average of four years' data should dampen out year class variations to a greater extent than the two years' series used in 1977.

It should, however, be noted that the period 1974-77 was a period with large changes in the activity of the different fishing fleet units. Further, there was an increase in the enforcement activity by the Faroese authorities making it probable that legal mesh sizes would be used by a greater proportion of vessels.

5.2. Cod

The Group tried to fit calculated catch curves to observed catches in 5 cm length groups. Input figures are given in Table 5.1.

The best fits calculated by the program are given in Figure 5.1. The least square iteration routine in fact stopped after some iterations not reaching the minimum objective for the sum of least squares. As a result of this, the estimates of effective mesh sizes came out as nonsense, making it impossible to proceed with an assessment of the effects of changes in mesh sizes by this method.

One problem with the Faroe Plateau cod is the difficulty of assessing the recruitment pattern. In these runs a recruitment ogive with a 50% point at 60 cm and a 75% at 70 cm was assumed.

Further, the area closures and changes in the fishery pattern as a whole during the period 1974-77 are likely to have introduced variance into the data, which accounts for the failure to assess the effective mesh sizes.

5.3. Haddock

Input values to the Faroe haddock mesh assessment are given in Table 5.2.

The least square iteration routine produced fits of calculated to observed catch curves. These fits are given in Figure 5.2.

The effective mesh sizes in use estimated by the 1974-77 data were:

Faroese trawl	109 mm
Scottish trawl	105 mm
English trawl	107 mm

Thus, for haddock it was possible to proceed with mesh assessments, the results of which are given in Table 5.3.

These results indicate that the increase to 135 mm introduced on 1 January 1978 is likely to result in an initial loss for the trawlers of about 40-50%, and a long-term loss of about 18 to 26%. For the longline, the long-term gain will be 43% and for the total fishery the long-term gain will be 9%.

With increases to larger meshes (155 and 175), haddock in the short and long term would be reduced to an insignificant by-catch in the trawl fishery and the longline vessels would get the corresponding benefits.

In the total catch, however, there is still a long-term gain by increasing the mesh size to 155 mm (10%).

Comparing the assessments given in the 1977 Report of the Group to the present assessment, the difference in the estimates of effective mesh sizes between the two assessments should be born in mind.

6. EXPLOITATION OF OTHER STOCKS IN THE FAROE AREA

6.1. Exploitation of other Demersal Stocks in the Faroe Area

Demersal fisheries in the Faroe area is at present performed by:

France - fishing mainly for saithe and blue ling.
Federal Republic of Germany - fishing mainly for redfish.
USSR - performing experimental fishery at depths greater than 700 m. Catches of grenadiers, blue ling, smoothheads and other species are reported.
UK - fishing mainly for cod, saithe and haddock.

Apart from the cod and haddock fishery, Faroese trawlers for the first time on record have landed significant amounts of blue ling and redfish, and saithe landings have increased sharply.

Catches of selected species in ICES Division Vb are given in Tables 6.1 to 6.12.

Table 3.1. Faroe Plateau Cod. Nominal catches by countries, 1968-78 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	13 763*)	1 260	1 556	686*)	-	5 620	7 394	-	30 279
1969	15 718*)	2 557*)	395	483	-	5 286	11 231	-	35 670
1970	15 245	2 616*)	443	238*)	-	2 236	8 259	-	29 037
1971	12 754	1 426*)	580	881*)	-	2 753	7 757	-	26 151
1972	12 143	1 462*)	451	266*)	-	2 159	5 175	-	21 656
1973	10 434	1 752*)	310	115	419*)	3 935	5 675	-	22 640
1974	12 541	465	292	446	320	2 879	7 516	20	24 479
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	39 871
1977	28 177	1 450	332	864	-	809	3 292	2	34 926
1978**)	24 078	168	71	243	-	515	1 460	-	26 535

*) Vb_2 included. **) Preliminary data.

Table 3.2. Cod. Faroe Plateau Stock. Total catch (tonnes, live weight), effort (x 10^{-3}) and catch per unit effort 1973-78.

	1973			1974			1975			1976			1977			1978		
	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue
Faroes																		
Trawl (hrs)	2 482	33	7.5	3 303	39	8.5	6 381	64	10.0	7 555	50	15.1	7 707	85	9.1	12 254	103	11.9
Longline (1 000 hooks)	2 842	44	6.5	2 655	50	5.3	6 012	77	7.8	11 085	105	10.6	11 062	141	7.9	7 900	118	6.7
Gillnet (nets)	876	12		2 530	33		2 932	33		3 316	61		3 225	74		2 214	48	
Handline (No. per day)	1 424	13		3 462	25		4 600	25		5 602	32		4 922	44		1 670	12	
Others or not known	2 810	-		591	-		2 683	-		944	-		591	-		40	-	
Scotland																		
Trawl (hrs)	5 614	51	11.0	7 437	81	9.2	7 748	73	10.6	5 365	70	7.7	3 278	51	6.4	1 426	15	9.3
England																		
Trawl (hrs)	3 936	35	11.3	2 919	25	11.5	2 539	25	10.2	2 181	25	8.8	812	13	6.1	518	7	7.9

Table 3.3. Faroe Plateau Cod. Input catch data for the VPA.

AGE	1961	1962	1963	1964	1965	1966
1	1223	815	1181	122	162	53
2	3093	4424	4110	2033	852	1337
3	2686	2500	3958	3021	3230	970
4	1331	1255	1280	2300	2564	2080
5	1066	855	662	630	1416	1339
6	232	481	284	350	363	606
7	372	93	204	158	155	197
8	78	94	48	79	48	104
9	29	22	30	41	63	33

AGE	1967	1968	1969	1970	1971	1972
1	127	34	68	35	78	44
2	1609	1529	878	402	328	875
3	2690	3322	3106	1163	757	1176
4	860	2663	3300	2172	821	810
5	1706	945	1538	1685	1287	596
6	847	1226	477	752	1451	1021
7	309	452	713	244	510	596
8	64	105	203	300	114	154
9	27	11	92	44	179	25

AGE	1973	1974	1975	1976	1977	1978
1	211	284	92	13	40	46
2	719	2460	3248	1552	817	459
3	3111	1538	4600	6002	3621	1443
4	1586	2036	1821	4310	4751	2927
5	705	1035	2318	1227	2750	3237
6	384	477	790	842	1027	1078
7	312	250	233	317	1211	306
8	227	207	174	103	358	183
9	121	125	92	70	93	78

Table 3.4. Faroe Plateau Cod. Fishing mortalities from VPA.

AGE	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	.05	.04	.05	.01	.01	.00	.01	.00	.01	.00
2	.34	.27	.26	.11	.12	.09	.08	.10	.13	.06
3	.51	.50	.41	.30	.25	.20	.25	.24	.31	.25
4	.49	.48	.52	.45	.45	.26	.27	.41	.39	.38
5	.57	.69	.51	.53	.55	.46	.35	.55	.44	.36
6	.48	.55	.52	.56	.66	.49	.59	.45	.60	.40
7	.96	.36	.48	.62	.52	.97	.50	.74	.52	.71
8	.76	.70	.32	.34	.38	.80	1.05	.31	.91	.43
9	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50
MEAN F FOR AGES >= 5 AND <= 9 (WEIGHTED BY STOCK IN NUMBERS)	.62	.61	.49	.53	.56	.50	.42	.51	.50	.40

AGE	1971	1972	1973	1974	1975	1976	1977	1978
1	.00	.00	.01	.01	.00	.00	.00	.00
2	.03	.05	.06	.10	.11	.08	.11	.04
3	.16	.15	.24	.19	.28	.29	.27	.30
4	.28	.26	.31	.25	.35	.47	.39	.37
5	.41	.33	.38	.35	.50	.42	.63	.51
6	.60	.66	.37	.47	.49	.34	.77	.55
7	.53	.53	.43	.44	.45	.37	1.18	.55
8	.90	.30	.40	.58	.62	.36	.95	.55
9	.50	.50	.40	.40	.55	.55	.65	.55
MEAN F FOR AGES >= 5 AND <= 9 (WEIGHTED BY STOCK IN NUMBERS)	.51	.48	.39	.40	.50	.39	.77	.52

AGE-NATURAL MORTALITY

1	2	3	4	5	6	7	8	9
.20	.20	.20	.20	.20	.20	.20	.20	.20

Table 3.5. Faroe Plateau Cod. Stock size in numbers from VPA.

AGE	1961	1962	1963	1964	1965	1966
1	26449	25393	27697	10039	22225	27915
2	11897	20551	20055	21610	8109	18050
3	7329	6962	12847	12722	15860	5871
4	3740	3594	3460	6967	7701	10080
5	2689	1870	1818	1687	3642	4006
6	665	1247	767	895	817	1714
7	654	336	591	374	420	344
8	160	204	192	301	165	205
9	81	61	83	114	175	92

AGE	1967	1968	1969	1970	1971	1972
1	21020	9944	8978	14190	24867	15839
2	22807	17095	8110	7289	11586	20289
3	13572	17221	12617	5849	5605	9190
4	3934	8692	11110	7539	3742	3907
5	6382	2447	4727	6135	4223	2326
6	2079	3693	1158	2491	3510	2302
7	861	945	1924	521	1364	1576
8	107	428	370	937	209	660
9	75	31	256	122	498	70

AGE	1973	1974	1975	1976	1977	1978
1	33931	43732	27034	10232	14403	25401
2	12928	27590	35549	22050	8365	11756
3	15821	9936	20370	26176	16653	6112
4	6464	10154	6750	12542	16035	10378
5	2470	3867	6482	3891	6406	8865
6	1369	1389	2237	3230	2085	2786
7	973	776	710	1123	1888	791
8	756	517	411	372	635	473
9	402	416	238	181	212	202

Table 3.6. Faroe Plateau Cod. Estimates of spawning stock biomass at the beginning of each year and strength of 2-year-old fish of each year class.

Year/Year class	Spawning stock biomass '000 tonnes (age groups ≥4)	Year class strength (millions)
1960		20.6
1961	23.5	20.0
1962	21.6	21.6
1963	20.7	8.1
1964	27.8	18.1
1965	34.6	22.8
1966	43.4	17.1
1967	41.3	8.1
1968	48.1	7.3
1969	56.2	11.6
1970	53.7	20.3
1971	47.1	12.9
1972	37.5	27.6
1973	39.6	35.5
1974	48.8	22.1
1975	50.5	
1976	60.2	
1977	76.2	
1978	67.8	

Table 3.7. Faroe Plateau Cod. Indices of year class strength from 0-group surveys.

Year class	No./30 min.
1974	2 472
1975	2 718
1976	6 758
1977	1 646
1978	4 088
Average	3 536

Table 3.8. Faroe Plateau Cod. Input data for catch prediction.

Age	Average weight (kg) (Values used in earlier assessments are given in brackets)	Relative F*	Stock 1979 x 10^{-3}
1	0.38		
2	1.07 (1.06)	0.077	16 000
3	1.36 (1.89)	0.54	12 557
4	2.07 (2.92)	0.69	7 580
5	2.97 (4.07)	0.92	5 693
6	4.05 (5.30)	1	4 403
7	5.30 (6.58)	1	1 316
8	6.69 (7.85)	1	374
9	8.22 (9.08)	1	223
10+	11.50 (10.27)	1	95

*) Exploitation pattern

Table 3.9. Faroe Plateau Cod. Catch predictions (natural mortality 0.2).

Year	F	Yield (tonnes)	Spawning stock biomass (tonnes)
Option 1			
1979	0.52	26 000	63 000
1980	0.45	22 000	59 000
1981	0.35	18 000	59 000
Option 2			
1979	0.52	26 000	63 000
1980	0.52	24 000	59 000
1981	0.52	23 000	56 000

Average recruitment 16 000 x 10^{-3} fish at age 2.

Table 3.10. Faroe Bank Cod. Nominal catches by countries, 1968-78 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep. of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	*	1 259	6	-	-	1 476	1 130	-	3 871
1969	*	*	8	-	-	1 431	1 018	-	2 457
1970	-	*	-	*	-	1 471	1 531	-	3 002
1971	-	*	-	*	-	732	1 345	2	2 079
1972	-	*	-	*	-	860	1 308	-	2 168
1973	2 842	*	-	-	*	1 144	1 081	-	5 067
1974	696	86	-	-	-	829	503	40	2 154
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	28	-	160	-	2	1 071	-	5 455

*) Catches included in Vb_1. **) Preliminary data.

Table 3.11. Faroe Bank Cod. English effort and catch per unit effort 1946-76 (motor trawlers).

Year	Effort (hours trawling)	Cpue (tonnes/100 h.)	Year	Effort (hours trawling)	Cpue (tonnes/100 h.)
1946	5 941	25.4	1962	17 677	7.9
1947	16 210	23.8	1963	13 054	7.3
1948	8 636	15.7	1964	15 722	11.0
1949	5 900	15.0	1965	11 588	10.1
1950	12 089	15.8	1966	10 759	13.1
1951	28 202	12.6	1967	5 070	17.5
1952	24 590	10.6	1968	6 924	21.2
1953	11 269	13.9	1969	9 403	15.2
1954	16 657	15.0	1970	9 479	15.5
1955	17 534	19.5	1971	5 272	14.1
1956	22 266	14.7	1972	7 588	11.3
1957	15 975	12.2	1973	11 104	10.3
1958	27 635	12.2	1974	8 828	9.0
1959	20 174	12.6	1975	8 519	8.8
1960	43 981	11.9	1976	10 718	8.2
1961	10 913	7.5			

Table 3.12. Faroe Cod. Length and weight at age data in catch 1978.

Age	Cod Vb_1		Cod Vb_2	
	Length cm	Weight kg	Length cm	Weight kg
1	33.6	0.38		
2	47.5	1.07	55.0	1.66
3	51.4	1.36	70.8	3.55
4	58.9	2.04	86.5	6.47
5	66.7	2.97	95.7	8.76
6	75.2	4.25	101.6	10.49
7	82.8	5.68	107.4	12.39
8	85.2	6.19	109.4	13.09
9	96.7	9.04	114.4	14.97
10	101.8	10.55	114.0	14.82
11	114.2	14.89	114.0	
12	109.5	13.13	121.2	
13	110.2	13.38	115.9	
14	120.5	17.50	121.2	
15	120.0	17.28	120.0	

Cod Faroe Bank and Plateau $w = l^3 \times 10^{-5}$

Table 4.1. Faroe Haddock. Length and weight at age data in catch 1978.

Age	Haddock Vb_1		Haddock Vb_2	
	Length cm	Weight kg	Length cm	Weight kg
1	33.0	0.34	38.4	0.54
2	43.2	0.77	48.7	1.10
3	47.4	1.01	53.0	1.41
4	52.4	1.37	61.7	2.23
5	57.5	1.81	67.6	2.93
6	62.5	2.32	72.8	3.67
7	64.4	2.54	78.6	4.61
8	67.6	2.93	82.2	5.28
9	66.9	2.84	83.9	5.61
10	64.7	2.57		
11	71.3	3.44		
12				
13	87.3	6.32		
14	82.0	5.24		

Haddock Vb_1 and Vb_2 $w = l^3 \times 9.5 \times 10^{-6}$

Table 4.2. Faroe Plateau Haddock. Nominal catches by countries, 1968-78 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep. of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	6 751*)	1 143	36	-	-	2 158	5 783	-	15 871
1969	11 122*)	3 314*)	73	-	-	1 549	6 392	-	22 450
1970	11 791	2 006*)	14	-	-	769	5 428	-	20 008
1971	10 488	790*)	19	-	-	1 896	4 949	-	18 142
1972	8 314	2 660*)	24	-	-	844	2 842	-	14 690
1973	4 931	3 508	46		1 190*)	1 510	3 665	-	14 850
1974	4 538	1 242	70	5	685	1 044	5 572	30	13 186
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	705	3 278	26	24 538
**) 1978	15 783	72	7	74	-	46	367	-	16 349

*)Catches including Vb_2. **)Preliminary estimates.

Table 4.3. Faroe Bank Haddock. Nominal catches by countries, 1968-78 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep. of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	*	1 143	-	-	-	287	556	-	1 986
1969	*	*	-	-	-	427	423	-	850
1970	-	*	-	-	-	368	993	-	1 361
1971	-	*	-	-	-	427	813	29	1 269
1972	-	*	1	-	-	527	1 267	-	1 795
1973	1 087	*	-	-	*	916	1 123	-	3 126
1974	273	209	-	-	-	573	500	22	1 577
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**)	2 544	5	-	36	-	-	394	-	2 979

*) Catches are included in Vb_1. **) Preliminary estimates.

Table 4.4. Haddock. Faroe Plateau Stock. Total catch (tonnes, live weight), effort (x 10^{-3}) and catch per unit effort 1973-78.

	1973			1974			1975			1976			1977			1978		
	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue	Catch	Effort	Cpue
Faroes																		
Trawl (No directed fishery)	976	-		935	-		1 688	-		1 333	-		1 506	-		2 833	-	
Longline (1 000 hooks)	3 542	52	6.8	3 430	51	6.7	6 781	72	9.4	10 536	102	10.3	17 799	142	12.5	12 627	101	12.5
Others or not known	413	-		173	-		156	-		801	-		501	-		79	-	
Scotland																		
Trawl (hrs)	3 658	51	7.2	5 555	81	6.9	4 887	73	6.7	6 650	70	9.5	3 267	51	6.4	358	15	2.3
England																		
Trawl (hrs)	1 296	35	3.7	1 086	25	4.3	1 506	25	6.0	1 552	25	6.3	706	13	5.3	47	7	0.7

Table 4.5. Faroe Haddock. Input catch data for the VPA.

AGE	1961	1962	1963	1964	1965	1966
1	941	784	356	46	39	90
2	7932	9631	13552	2284	1368	1081
3	7330	13977	8907	7457	4286	3304
4	5134	5233	7403	3899	5133	4804
5	1937	2361	2242	2360	1443	2710
6	1305	1407	1539	1120	1209	1112
7	838	868	860	728	673	740
8	236	270	257	198	1345	180
9	59	72	75	49	43	54

AGE	1967	1968	1969	1970	1971	1972
1	70	49	95	57	55	43
2	1425	5881	2384	1728	717	750
3	2405	4097	7539	4855	4393	3744
4	2599	2812	4567	6581	4727	4179
5	1785	1524	1565	1624	3267	2706
6	1426	1526	1485	1383	1292	1171
7	631	923	1224	1099	864	696
8	197	230	378	326	222	180
9	52	68	114	68	147	113

AGE	1973	1974	1975	1976	1977	1978
1	663	253	94	40	0	0
2	3039	7446	7493	4671	466	36
3	7944	2562	8060	8013	5402	1128
4	1175	3324	2056	6626	5977	4371
5	2635	400	1363	1207	4403	4049
6	871	799	237	1131	1085	1694
7	969	489	347	298	799	671
8	139	534	234	660	300	495
9	66	67	399	249	242	232

Table 4.6. Faroe Haddock. Fishing mortalities from VPA.

AGE	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	.02	.02	.01	.00	.00	.00	.00	.00	.00	.00
2	.19	.33	.38	.09	.07	.06	.07	.13	.09	.07
3	.42	.59	.57	.38	.24	.24	.19	.27	.26	.27
4	.43	.61	.74	.53	.48	.46	.31	.36	.54	.37
5	.44	.35	.57	.55	.38	.51	.31	.30	.35	.38
6	.60	.67	.41	.64	.62	.56	.56	.48	.53	.59
7	.94	1.08	1.22	.35	1.05	1.01	.73	.89	.93	.99
8	.91	.96	1.21	1.12	2.48	.94	.84	.65	1.25	.69
9	1.00	.80	.80	.80	.80	.80	.80	.80	.80	.80
MEAN F FOR AGES >= 4 AND <= 9 (WEIGHTED BY STOCK IN NUMBERS)	.49	.56	.68	.53	.63	.52	.38	.41	.55	.43

AGE	1971	1972	1973	1974	1975	1976	1977	1978
1	.00	.00	.01	.00	.00	.00	.00	.00
2	.06	.03	.16	.17	.16	.15	.02	.00
3	.25	.45	.44	.20	.28	.25	.26	.07
4	.45	.40	.25	.33	.25	.39	.31	.35
5	.32	.51	.47	.12	.22	.23	.49	.35
6	.59	.18	.30	.26	.10	.28	.33	.35
7	.94	.75	.22	.28	.17	.18	.33	.35
8	.55	.51	.32	.18	.21	.55	.27	.35
9	.80	.60	.35	.25	.20	.35	.40	.35
MEAN F FOR AGES >= 4 AND <= 9 (WEIGHTED BY STOCK IN NUMBERS)	.44	.39	.33	.26	.21	.34	.36	.35

AGE-NATURAL MORTALITY

1	2	3	4	5	6	7	8	9
.20	.20	.20	.20	.20	.20	.20	.20	.20

Table 4.7. Faroe Haddock. Stock size in numbers from VPA.

AGE	1961	1962	1963	1964	1965	1966
1	47486	57939	36275	26946	24123	30416
2	50496	38028	46728	29378	22020	19715
3	23394	34200	22482	26093	21992	16794
4	16231	12578	15497	10436	14669	14150
5	5965	8684	5618	6081	5052	7410
6	3166	3147	4989	2593	2866	2841
7	1490	1425	1319	2704	1122	1266
8	430	474	396	318	1560	321
9	101	142	148	97	85	107

AGE	1967	1968	1969	1970	1971	1972
1	62880	37247	34962	17880	37777	26915
2	24821	51419	30451	28539	14588	30879
3	15166	19036	36798	22781	21806	11296
4	10777	10251	11901	23346	14285	13902
5	7278	6488	5868	5655	13205	7457
6	3640	4355	3942	3398	3172	7876
7	1331	1703	2198	1898	1545	1441
8	379	526	573	711	577	496
9	103	134	225	134	291	274

AGE	1973	1974	1975	1976	1977	1978
1	65007	68912	44820	28103	48537	0
2	21997	52625	56191	36610	22972	39739
3	24605	15272	36378	39255	25765	18387
4	5892	13020	10197	22537	24931	16236
5	7632	3767	7674	6499	12505	15040
6	3681	3887	2723	5056	4235	6292
7	5394	2231	2463	2016	3123	2492
8	559	3544	1387	1704	1382	1839
9	245	333	2421	925	805	862

Table 4.8. Faroe Haddock. Input data for catch prediction.

Age	Average weight (kg)	Relative F	Stock 1979 x 10^{-3}
3	0.73	0.2	23 000
4	1.13	1.0	17 558
5	1.55	1.0	10 029
6	1.97	1.0	8 677
7	2.41	1.0	3 630
8	2.76	1.0	1 438
9	3.07	1.0	1 061
10+	3.55	1.0	497

Table 4.9. Faroe Haddock. Estimates of year class strength.

Year class	VPA (millions of 2-year-old fish)	Scottish surveys (1+/10 hrs)	0-group survey
1956	38.8	-	-
1957	42.8	3 003	
1958	35.2	1 500	
1959	50.5	2 300	
1960	38.0	3 800	
1961	46.7	6 260	
1962	29.4	4 000	
1963	22.0	2 700	
1964	19.7	375	
1965	24.8	68	
1966	51.4	8 000	
1967	30.5	1 500	
1968	28.5	3 500	
1969	14.6	350	
1970	30.9	2 120	
1971	22.0	-	
1972	52.6	3 600*)	
1973	56.2	-	
1974	36.6	3 960	44
1975	(23.0)	1 700	54
1976	(39.7)	805	144
1977		75	26
1978			336

*) Different vessel used for survey.

Table 4.10. Faroe Haddock. Catch predictions (natural mortality 0.2).

Year	F	Yield (tonnes)	Spawning stock biomass (tonnes)
Option 1			
1979	0.37	21 000	87 000
1980	0.37	20 000	85 000
1981	0.37	20 000	84 000
Option 2			
1979	0.37	21 000	87 000
1980	0.55	28 000	85 000
1981	0.55	24 000	75 000

Average recruitment 23 000 x 10^{-3} fish at age 3.

Table 4.11. Faroe Bank Haddock. English catch per unit effort 1955-76 (motor trawlers). (For effort, see Table 3.11.)

Year	Cpue (tonnes/100 h.)	Year	Cpue (tonnes/100 h.)	Year	Cpue (tonnes/100 h.)
1955	10.1	1963	13.1	1971	8.2
1956	12.3	1964	8.6	1972	6.9
1957	13.0	1965	9.6	1973	10.2
1958	9.6	1966	6.1	1974	6.0
1959	5.6	1967	4.7	1975	10.8
1960	7.5	1968	4.3	1976	6.8
1961	6.5	1969	4.5		
1962	9.3	1970	3.9		

Table 5.1. Faroe Cod. Mesh assessment input values. Average 1974-77 data.

NUMBER OF GEARS 6
NUMBER OF LENGTH GROUPS 20
LENGTH GROUPS : MIN. L 25.0 CM. MAX. L 120.0 CM INTERVAL LENGTH 5.0 CM
VON BERTALANFFY PARAMETERS L∞ : 129.90 K1 : 0.1310 TO : -1.21
CONDITION FACTOR : 0.0010CC
NATURAL MORTALITY: 0.2000

OBSERVED LENGTH DISTRIBUTION : LENGTH GROUP	FAROES 1 OTB	2 LL	3 GN	4 LHP	SCOTLAND 5 OTB	ENGLAND 6 OTB	TOTAL
1 25.00 - 30.00	0.0	0.0	0.0	0.0	3.00	0.0	3.00
2 30.00 - 35.00	0.0	2.00	0.0	0.0	59.00	5.00	66.00
3 35.00 - 40.00	14.00	18.00	0.0	5.00	192.00	40.00	269.00
4 40.00 - 45.00	73.00	92.00	2.00	15.00	281.00	68.00	531.00
5 45.00 - 50.00	280.00	267.00	5.00	121.00	308.00	76.00	1057.00
6 50.00 - 55.00	537.00	296.00	21.00	280.00	326.00	102.00	1562.00
7 55.00 - 60.00	440.00	222.00	37.00	260.00	346.00	91.00	1396.00
8 60.00 - 65.00	242.00	190.00	46.00	238.00	290.00	100.00	1106.00
9 65.00 - 70.00	223.00	216.00	89.00	172.00	247.00	83.00	1030.00
10 70.00 - 75.00	173.00	190.00	176.00	140.00	220.00	81.00	980.00
11 75.00 - 80.00	138.00	131.00	181.00	70.00	120.00	55.00	695.00
12 80.00 - 85.00	94.00	98.00	143.00	39.00	85.00	38.00	497.00
13 85.00 - 90.00	44.00	63.00	75.00	25.00	55.00	20.00	282.00
14 90.00 - 95.00	23.00	41.00	37.00	13.00	20.00	1.10	135.10
15 95.00 - 100.00	6.00	21.00	9.00	6.00	12.00	4.00	58.00
16 100.00 - 105.00	2.00	14.00	5.00	5.00	4.00	3.00	33.00
17 105.00 - 110.00	3.00	5.00	6.00	1.00	4.00	1.00	20.00
18 110.00 - 115.00	0.0	3.00	1.00	2.00	1.05	1.00	8.05
19 115.00 - 120.00	1.00	1.00	0.0	0.0	1.00	1.00	4.00
20 120.00 - 125.00	1.00	0.0	0.0	0.0	0.0	0.0	1.00
TOTAL	2294.00	1870.00	833.00	1392.00	2574.05	770.10	9733.14

GEAR PARAMETERS :

GEAR NUMBER :	1	2	3	4	5	6
SELECTION FAC. :	3.68	3.68	3.68	3.68	3.68	3.68
FACTOR (L75/L50) :	1.18	1.14	1.10	1.12	1.18	1.18
L50 % MESH RIGHT :	101.00	101.00	105.00	120.00	101.00	101.00
L75 % MESH RIGHT :	95.00	95.00	95.00	119.70	95.00	95.00
LOG3/(L75-L50) :	-0.18	-0.18	-0.11	-3.66	-0.18	-0.18
L50 % REC. LEFT :	60.00	60.00	60.00	60.00	60.00	60.00
L75 % REC. LEFT :	70.00	70.00	70.00	70.00	70.00	70.00
LOG3/(L75-L50) :	0.11	0.11	0.11	0.11	0.11	0.11
L50 % REC. RIGHT :	120.00	120.00	120.00	120.00	120.00	120.00
L75 % REC. RIGHT :	119.70	119.70	119.70	119.70	119.70	119.70
LOG3/(L75-L50) :	-3.66	-3.66	-3.66	-3.66	-3.66	-3.66
L50 % DISCARDS :	25.00	25.00	25.00	25.00	25.00	25.00
L75 % DISCARDS :	25.50	25.50	25.50	25.50	25.50	25.50
LOG3/(L75-L50) :	2.20	2.20	2.20	2.20	2.20	2.20
TOTAL FISH. MORT. :	0.500					
F FOR EACH GEAR :	0.090	0.110	0.130	0.045	0.090	0.035
FRACTIONS OF FTOTAL :	0.1800	0.2200	0.2600	0.0900	0.1800	0.0700

Table 5.2. Faroe Haddock. Mesh assessment input values. Average 1974-77 data.

NUMBER OF GEARS 4
NUMBER OF LENGTH GROUPS 13
LENGTH GROUPS : MIN. L 15.0 CM. MAX. L 80.0 CM INTERVAL LENGTH 5.0 CM
VON BERTALANFFY PARAMETERS L8 : 82.70 K1 : 0.1490 TO : -1.55
CONDITION FACTOR : 0.001000
NATURAL MORTALITY: 0.2000

OBSERVED LENGTH DISTRIBUTION : LENGTH GROUP			FAROES 1 OTB	FAROES 2 LL	SCOTLAND 3 OTB	ENGLAND 4 OTB	TOTAL
1	15.00 -	20.00	0.0	0.0	0.0	0.0	0.0
2	20.00 -	25.00	4.40	0.0	0.0	0.0	4.40
3	25.00 -	30.00	6.50	0.07	10.00	5.50	22.07
4	30.00 -	35.00	12.30	11.80	140.10	19.00	183.20
5	35.00 -	40.00	12.70	33.40	183.80	37.90	267.80
6	40.00 -	45.00	25.80	88.20	131.70	38.60	284.30
7	45.00 -	50.00	24.80	118.60	100.30	299.00	542.70
8	50.00 -	55.00	15.10	115.90	59.90	19.30	210.20
9	55.00 -	60.00	5.80	63.20	31.60	9.50	110.10
10	60.00 -	65.00	4.80	46.20	17.50	5.70	74.20
11	65.00 -	70.00	3.80	28.10	9.30	3.20	44.40
12	70.00 -	75.00	1.00	7.30	3.40	1.90	13.60
13	75.00 -	80.00	0.20	1.10	1.70	0.70	3.70
	TOTAL		117.20	513.87	689.30	440.30	1760.67

GEAR PARAMETERS :

GEAR NUMBER :	1	2	3	4
SELECTION FAC. :	3.10	3.10	3.10	3.10
FACTOR (L75/L50) :	1.06	1.03	1.05	1.12
L50 % MESH RIGHT :	50.00	82.30	52.00	53.00
L75 % MESH RIGHT :	47.00	82.00	49.00	50.00
LOG3/(L75-L50) :	-0.37	-3.66	-0.37	-0.37
L50 % REC. LEFT :	20.20	20.20	20.20	20.20
L75 % REC. LEFT :	21.00	21.00	21.00	21.00
LOG3/(L75-L50) :	1.37	1.37	1.37	1.37
L50 % REC. RIGHT :	82.00	82.00	82.00	82.00
L75 % REC. RIGHT :	81.00	81.00	81.00	81.00
LOG3/(L75-L50) :	-1.10	-1.10	-1.10	-1.10
L50 % DISCARDS :	20.20	20.20	20.20	20.20
L75 % DISCARDS :	20.50	20.50	20.50	20.50
LOG3/(L75-L50) :	3.66	3.66	3.66	3.66

TOTAL FISH. MORT. :	0.500			
F FOR EACH GEAR :	0.045	0.215	0.175	0.060
FRACTIONS OF FTOTAL :	0.0900	0.4300	0.3500	0.1200

Table 5.3. Haddock. Mesh assessment gains and losses, %.

Year	Faroe trawl	Faroe longline	Scotland trawl	England trawl	Total
Mesh increase from current effective size to 135 mm (synthetic)					
1	-47.6	-	-47.3	-41.3	-23.6
2	-47.6	-	-47.3	-41.3	-23.6
3	-46.7	-	-46.7	-39.4	-23.1
4	-38.6	+5.3	-39.5	-32.4	-16.9
5	-30.1	+14.8	-30.7	-24.6	-7.9
10	-26.2	+37.5	-25.4	-18.4	+5.9
20	-26.2	+43.4	-25.3	-18.4	+8.8
Mesh increase from current effective size to 155 mm (synthetic)					
1	-78.5	-	-76.8	-66.1	-39.0
2	-78.5	-	-76.8	-66.1	-39.0
3	-78.3	-	-76.7	-65.2	-38.8
4	-75.8	+6.3	-75.1	-60.3	-34.0
5	-68.11	+23.3	-67.3	-51.4	-21.6
10	-61.8	+67.9	-58.2	-42.0	+4.6
20	-61.8	+79.4	-58.1	-41.9	+10.2
Mesh increase from current effective size to 175 mm (synthetic)					
1	-93.5	-	-93.0	-81.8	-47.8
2	-93.5	-	-93.0	-81.8	-47.8
3	-93.4	-	-93.0	-81.3	-47.7
4	-93.0	+5.4	-92.8	-78.9	-43.6
5	-90.8	+25.9	-91.2	-73.3	-32.3
10	-86.5	+88.5	-85.1	-64.8	+1.4
20	-	-	-	-	-

Tables 6.1 - 6.12. Nominal catches in ICES Division Vb by country and species, 1960-78 (tonnes).

Table 6.1. Cod.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Others	Total
1960	8 723	-	451	-	-	13 476	16 300	-	39 220
1961	9 521	-	417	168	-	3 891	12 954	-	26 951
1962	6 751	100	301	505	-	5 521	11 052	-	24 230
1963	7 428	720	376	147	-	4 558	10 875	60	24 164
1964	8 888	989	1 162	333	-	5 845	7 791	50	25 058
1965	9 948	1 538	854	419	-	5 470	7 868	180	26 277
1966	7 957	1 120	669	314	-	4 871	7 855	132	22 918
1967	7 835	871	845	650	-	7 996	8 546	63	26 806
1968	13 763	2 519	1 180	686	-	7 096	8 524	-	33 768
1969	15 718	2 557	447	476	-	6 717	12 249	-	38 164
1970	15 245	2 616	225	238	-	3 707	9 790	-	31 821
1971	12 754	1 426	337	881	-	3 485	9 102	-	27 985
1972	12 143	1 462	262	266	-	3 019	6 483	-	23 635
1973	13 276	1 752	305	115	419	5 079	6 756	-	27 702
1974	13 237	551	292	446	320	3 708	8 019	60	26 633
1975	22 986	1 409	458	1 353	432	3 287	8 619	145	38 689
1976	28 959	1 607	247	1 283	496	3 056	6 403	78	42 129
1977*)	29 028	1 669	332	963	-	818	4 072	2	36 884
1978*)	28 272	196	71	403	-	517	2 531	-	31 990

Table 6.2. Haddock.

1960	7 772	-	6	-	-	7 298	10 943	-	26 019
1961	8 454	-	22	-	-	2 765	9 590	-	20 831
1962	7 042	166	18	-	-	3 766	16 159	-	27 151
1963	6 336	792	22	-	-	4 655	15 766	-	27 571
1964	6 952	1 866	32	111	-	3 442	7 087	-	19 490
1965	6 673	1 939	8	119	-	3 385	6 355	-	18 479
1966	6 902	2 717	40	-	-	2 867	6 240	-	18 766
1967	5 246	1 091	30	-	-	2 347	4 656	11	13 381
1968	6 751	2 286	31	-	-	2 445	6 339	-	17 852
1969	11 122	3 314	45	-	-	1 976	6 815	-	23 272
1970	11 791	2 006	6	-	-	1 137	6 421	-	21 361
1971	10 488	790	1	-	-	2 323	5 762	29	19 393
1972	8 314	2 666	25	-	-	1 371	4 109	-	16 485
1973	6 018	3 508	46	-	1 190	2 426	4 788	-	17 976
1974	4 811	1 451	70	5	685	1 617	6 072	52	14 763
1975	8 757	2 277	173	56	544	2 426	6 078	383	20 694
1976	12 714	2 542	22	20	448	2 284	8 000	181	26 211
1977*)	20 079	700	49	57	5	709	3 928	26	25 553
1978*)	18 327	77	7	110	-	46	761	-	19 328

*) Preliminary estimates.

Table 6.3. Saithe.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Others	Total
1960	685	-	2 583	-	-	6 437	2 140	-	11 845
1961	929	-	2 219	-	-	4 230	2 214	-	9 592
1962	2 494	620	985	-	-	3 724	2 631	-	10 454
1963	2 431	2 207	1 471	-	-	3 178	3 463	-	12 750
1964	1 338	6 458	6 294	+	-	4 329	3 309	-	21 728
1965	1 000	8 565	3 611	-	-	5 265	3 794	-	22 235
1966	1 167	9 967	4 772	2 498	-	3 321	3 581	66	25 372
1967	2 242	5 555	6 119	-	-	3 536	3 996	193	21 641
1968	2 629	424	7 532	-	-	5 123	4 778	-	20 486
1969	4 835	7 899	4 775	378	-	4 303	5 346	-	27 536
1970	2 694	11 036	2 249	1 495	-	3 066	8 608	-	29 148
1971	5 653	10 621	2 251	1 839	-	3 305	7 198	63	30 930
1972	5 646	28 346	3 613	470	-	2 453	6 225	-	46 753
1973	2 973	22 241	9 087	355	4 050	7 527	10 131	-	56 364
1974	3 726	19 428	6 661	1 660	1 925	3 827	8 302	630	46 159
1975	2 517	23 630	5 229	486	815	2 428	4 950	171	40 226
1976	2 560	15 367	2 605	2 232	1 007	3 063	5 860	371	33 065
1977	5 153	17 038	3 086	1 273	-	2 613	5 608	58	34 829
1978*	15 892	8 128	1 088	1 124	-	557	1 349	-	28 138

Table 6.4. Whiting.

1960	-	-	-	-	-	70	403	-	473
1961	222	1 200	-	-	-	50	257	-	1 729
1962	-	-	-	-	-	26	197	-	223
1963	-	-	+	-	-	33	285	-	318
1964	-	-	+	-	-	25	117	-	142
1965	-	1 421[a]	+	-	-	29	97	-	1 547
1966	-	225	-	-	-	28	139	-	392
1967	-	254	1	-	-	31	138	3	427
1968	-	80	1	-	-	46	172	-	299
1969	-	16 991	+	-	-	46	515	-	17 552
1970	-	73	-	-	-	35	251	-	359
1971	150	195	1	-	-	26	166	4	542
1972	-	194	-	-	-	137	139	-	470
1973	384	72	7	-	8	235	394	-	1 100
1974	167	791	3	-	-	89	750	293	2 093
1975	251	1 238	87	-	-	242	973	718	3 509
1976	515	1 659	3	-	-	155	1 160	162	3 654
1977	704	571	6	-	-	137	813	8	2 239
1978*	905	8	-	-	-	?	?	-	

*) Preliminary estimates.

a) Includes Iceland grounds (Va).

Table 6.5. Tusk.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	UK England	UK Scotland	Total
1960	1 306	-	32	734	135	1 260	3 467
1961	1 301	-	29	1 401	67	1 062	3 860
1962	1 902	-	21	1 134	54	1 405	4 516
1963	2 007	-	29	802	28	695	3 561
1964	2 775	-	137	875	30	799	4 616
1965	1 645	-	115	1 565	32	924	4 281
1966	1 488	-	87	1 221	21	482	3 299
1967	2 070	-	109	2 729	18	432	5 358
1968	2 798	-	91	2 906	23	549	6 367
1969	1 454	-	21	1 338	16	412	3 241
1970	1 028	-	19	1 475	11	515	3 048
1971	1 489	-	44	1 872	13	419	3 837
1972	1 918	-	139	2 421	16	386	4 880
1973	3 402	-	134	3 066	36	531	7 169
1974	1 541	-	137	1 841	22	403	3 944
1975	2 166	-	154	1 848	36	344	4 552
1976	2 548	-	70	2 868	29	496	6 011
1977	3 062	-	68	1 839	12	381	5 362
1978*)	2 498	-	-	1 727	-	-	4 225

*) Preliminary estimates.

Table 6.6. Ling.

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Others		Total
									Netherlands	USSR	
1960	520	-	-	895	400	-	629	855			3 299
1961	603	-	-	11	521	-	241	829			2 205
1962	450	387	-	9	326	-	247	572			1 991
1963	365	1 512	-	17	496	-	183	396			2 969
1964	480	2 844	-	48	736	-	322	632			5 062
1965	416	2 618	-	30	832	-	184	388			4 468
1966	416	1 827	-	39	2 115	-	276	496			5 169
1967	736	23	-	60	3 203	-	172	364			4 558
1968	1 209	177	-	68	3 340	-	152	679			5 625
1969	486	195	-	45	1 952	-	225	602			3 505
1970	699	578	-	42	1 737	-	164	883			4 103
1971	752	728	-	46	2 898	-	152	879			5 455
1972	1 572	866	-	74	3 958	-	146	772			7 388
1973	1 428	398	-	167	3 638	11	268	850			6 760
1974	1 004	296	9	131	2 395	4	308	575			4 722
1975	1 281	345	1	94	2 297	2	231	499			4 750
1976	1 500	1 070	-	61	3 116	-	220	579			6 546
1977*)	1 675	780	-	72	2 561	-	62	413	1		5 564
1978*)	1 942	492	-	52	2 781	-	1			745	6 013

Table 6.6.a. Blue Ling.

Year	Faroe Islands	France	German Dem.Rep.	Germany Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Total
1963	-	-	-	478	-	-	-	-	478
1964	-	-	-	2 493	182	-	-	-	2 675
1965	-	-	-	1 612	1 120	-	-	-	2 732
1966	-	-	-	850	430	-	-	-	1 280
1967	-	-	-	1 133	238	-	-	-	1 371
1968	-	-	-	1 858	788	-	-	-	2 646
1969	-	-	-	249	798	-	-	-	1 047
1970	-	-	-	335	2 612	-	-	-	2 947
1971	-	-	-	1 475	557	-	-	-	2 032
1972	-	-	-	2 779	1 203	-	-	-	3 982
1973	51	-	-	2 931	4 003	-	4	-	6 989
1974	43	390	-	1 808	1 554	-	3	-	3 798
1975	18	2 281	-	1 528	2 492	-	1	-	6 320
1976	48	10 475	-	896	1 519	-	+	-	12 938
1977*)	23	6 977	-	870	956	-	4	-	8 830
1978*)	384	3 037	-	663	284	-	-	-	4 368

- Indicates no catch or species not separated.

*) Preliminary estimates.

Table 6.7. Lemon Sole.

Year	Faroe Islands	France	UK England	UK Scotland	Others	Total
1960	-	-	351	1 026	-	1 377
1961	-	-	156	1 009	-	1 165
1962	-	-	187	910	-	1 097
1963	-	-	142	706	-	848
1964	-	27	112	305	-	444
1965	-	42	110	393	-	545
1966	-	49	99	297	-	445
1967	-	14	104	321	-	439
1968	-	20	84	404	-	508
1969	-	-	77	362	2	441
1970	-	-	68	424	-	492
1971	590	-	76	303	-	969
1972	300	-	35	244	-	579
1973	1 190	-	126	393	-	1 709
1974	607	-	137	503	-	1 247
1975	971	-	103	369	1	1 444
1976	813	-	120	312	-	1 245
1977	778	-	33	191	+	1 002
1978*)	744	-	?	?	-	

Table 6.8. Plaice.

1960	64	-	62	209	-	335
1961	83	-	38	194	-	315
1962	26	-	73	164	-	263
1963	4	226	39	130	-	399
1964	11	131	64	99	-	305
1965	6	92	79	143	-	320
1966	1	108	106	161	-	376
1967	7	54	120	172	2	355
1968	102	28	158	170	-	458
1969	192	31	82	181	-	486
1970	288	-	59	205	-	552
1971	143	-	45	173	-	361
1972	130	+	50	111	-	291
1973	139	-	95	134	4	372
1974	89	44	43	115	-	291
1975	178	2	52	143	4	379
1976	113	43	26	97	1	280
1977	183	25	33	125	+	366
1978*)	284	5	?	?	-	

*) Preliminary estimates.

Table 6.9. Halibut.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Total
1960	218	-	58	439	-	686	1 397	2 798
1961	222	-	165	327	-	287	1 237	2 238
1962	137	-	11	299	-	325	1 126	1 898
1963	161	-	10	128	-	241	887	1 427
1964	174	-	63	110	-	239	792	1 378
1965	276	-	35	124	-	292	725	1 452
1966	169	-	36	120	-	248	636	1 209
1967	245	-	57	180	-	178	749	1 409
1968	267	-	64	90	-	130	698	1 249
1969	205	-	18	151	-	124	558	1 056
1970	296	-	10	182	-	74	514	1 076
1971	234	-	14	197	-	92	371	908
1972	212	-	35	155	-	60	256	718
1973	256	-	52	78	5	144	359	894
1974	141	-	54	56	4	105	218	578
1975	162	65	73	75	-	93	207	675
1976	300	-	37	164	-	88	248	837
1977	316	-	34	121	-	18	138	627
1978*)	353	-	-	72	-	?	?	

Table 6.10. Megrim.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	Spain	UK England	UK Scotland	Total
1960	-	-	-	-	-	-	9	21	30
1961	-	-	-	-	-	-	8	17	25
1962	-	-	-	-	-	-	6	19	25
1963	-	-	-	-	-	-	5	26	31
1964	-	50	-	-	-	-	5	20	75
1965	-	47	-	-	-	-	5	17	69
1966	-	237	-	-	-	-	5	14	256
1967	-	212	-	-	-	-	1	6	219
1968	-	250	-	-	-	-	3	6	259
1969	-	312	1	-	-	-	3	8	324
1970	-	99	-	-	-	-	1	9	109
1971	-	37	-	-	-	-	2	9	48
1972	-	38	-	-	-	-	3	10	51
1973	-	-	-	-	-	-	4	11	15
1974	-	-	-	-	-	10	8	12	30
1975	-	6	-	-	-	14	4	8	32
1976	-	8	-	-	-	6	3	11	28
1977	-	61	1	-	-	-	2	7	71
1978*)	-	3	-	-	-	-	?	?	

*) Preliminary estimates.

Table 6.11. Redfish.

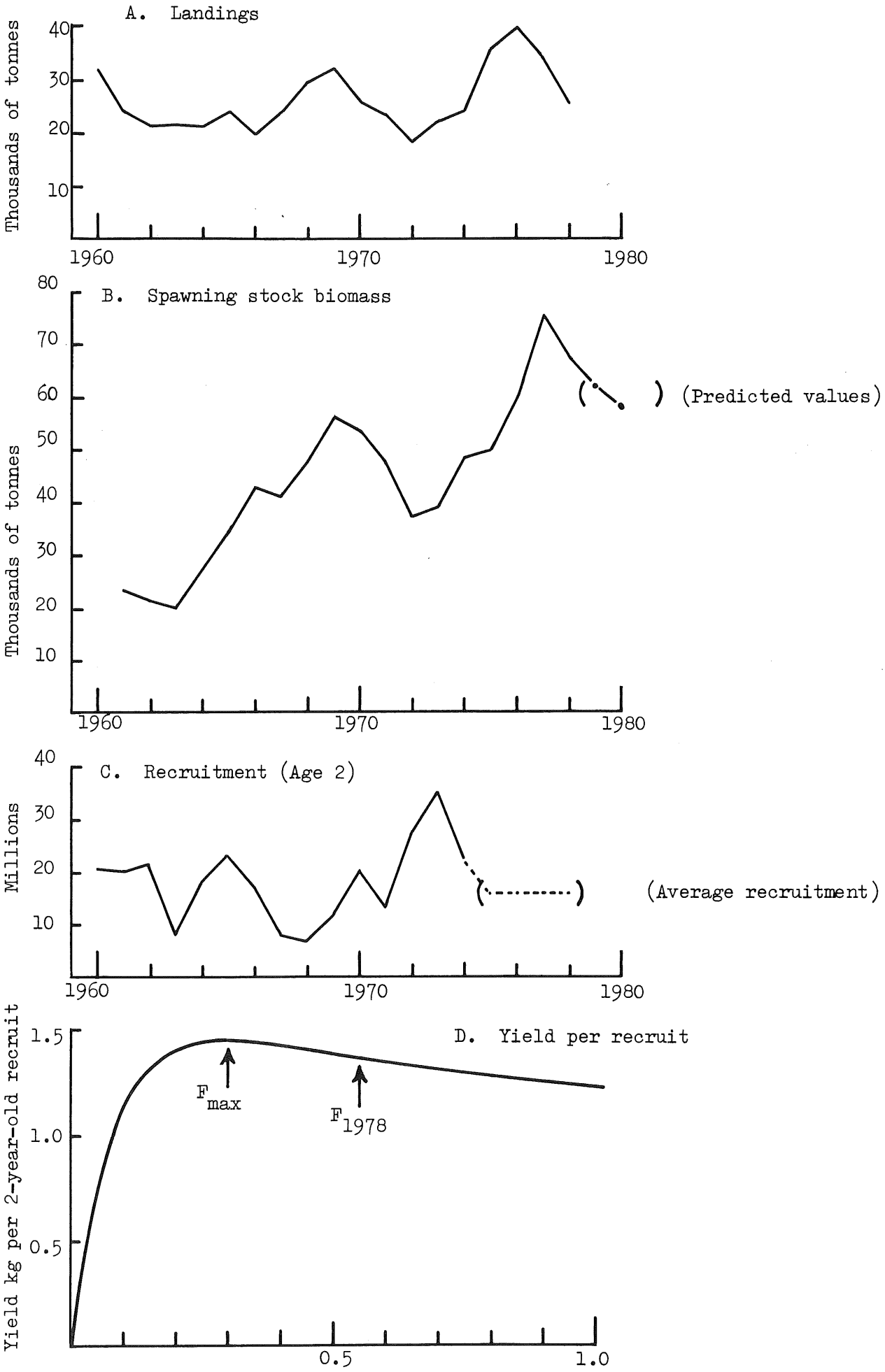
Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.of	Norway	UK England	UK Scotland	Total
1960	-	-	-	2 295	-	276	60	2 631
1961	-	-	-	3 577	-	50	38	3 665
1962	-	-	-	2 237	-	52	49	2 338
1963	1	366	-	2 035	-	31	60	2 493
1964	-	705	-	7 119	-	41	43	7 908
1965	1	582	-	4 864	-	38	27	5 512
1966	-	-	-	3 180	-	8	40	3 228
1967	-	-	-	4 853	-	24	22	4 899
1968	1	-	-	6 613	-	43	10	6 667
1969	5	-	-	1 225	-	13	15	1 258
1970	-	-	-	2 020	-	13	20	2 053
1971	-	-	-	2 479	-	12	12	2 503
1972	-	-	-	4 027	-	40	13	4 080
1973	121	-	-	9 439	-	72	13	9 645
1974	28	300	1	7 328	10	74	24	7 765
1975	9	800	1	7 628	7	18	23	8 486
1976	33	-	-	5 255	17	13	46	5 364
1977	54	1 368	-	5 854	7	78	38	7 399
1978*)	1 525	332	-	6 995	5	1		8 858

Table 6.12. Angler (Monk).

Year	Faroe Islands	France	Germany, Fed.Rep.of	UK England	UK Scotland	Others	Total
1960	-	-	7	314	811	-	1 132
1961	-	-	11	167	695	-	873
1962	-	-	4	179	641	-	824
1963	-	-	2	160	618	-	780
1964	-	-	3	218	347	-	568
1965	-	-	-	212	326	-	538
1966	-	-	-	164	349	-	513
1967	-	-	-	118	308	-	426
1968	-	-	3	159	335	-	497
1969	1	26	1	175	429	-	632
1970	-	10	-	127	542	-	679
1971	-	-	-	132	532	-	664
1972	-	-	3	99	388	-	490
1973	535	-	6	193	414	-	1 148
1974	418	-	22	167	413	40	1 060
1975	456	19	7	125	347	90	1 044
1976	511	123	5	138	360	3	1 140
1977	558	61	4	37	230	2	892
1978*)	910	31	-	-	-	1	942

*) Preliminary estimates.

Figure 3.1. Faroe Plateau Cod.



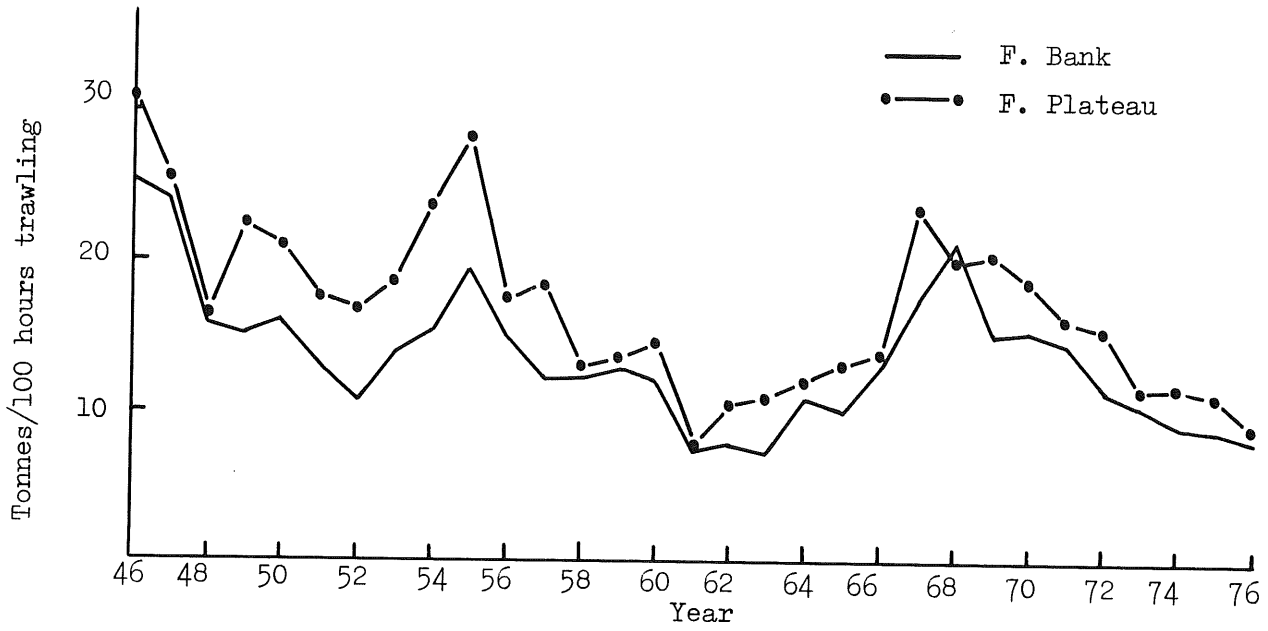
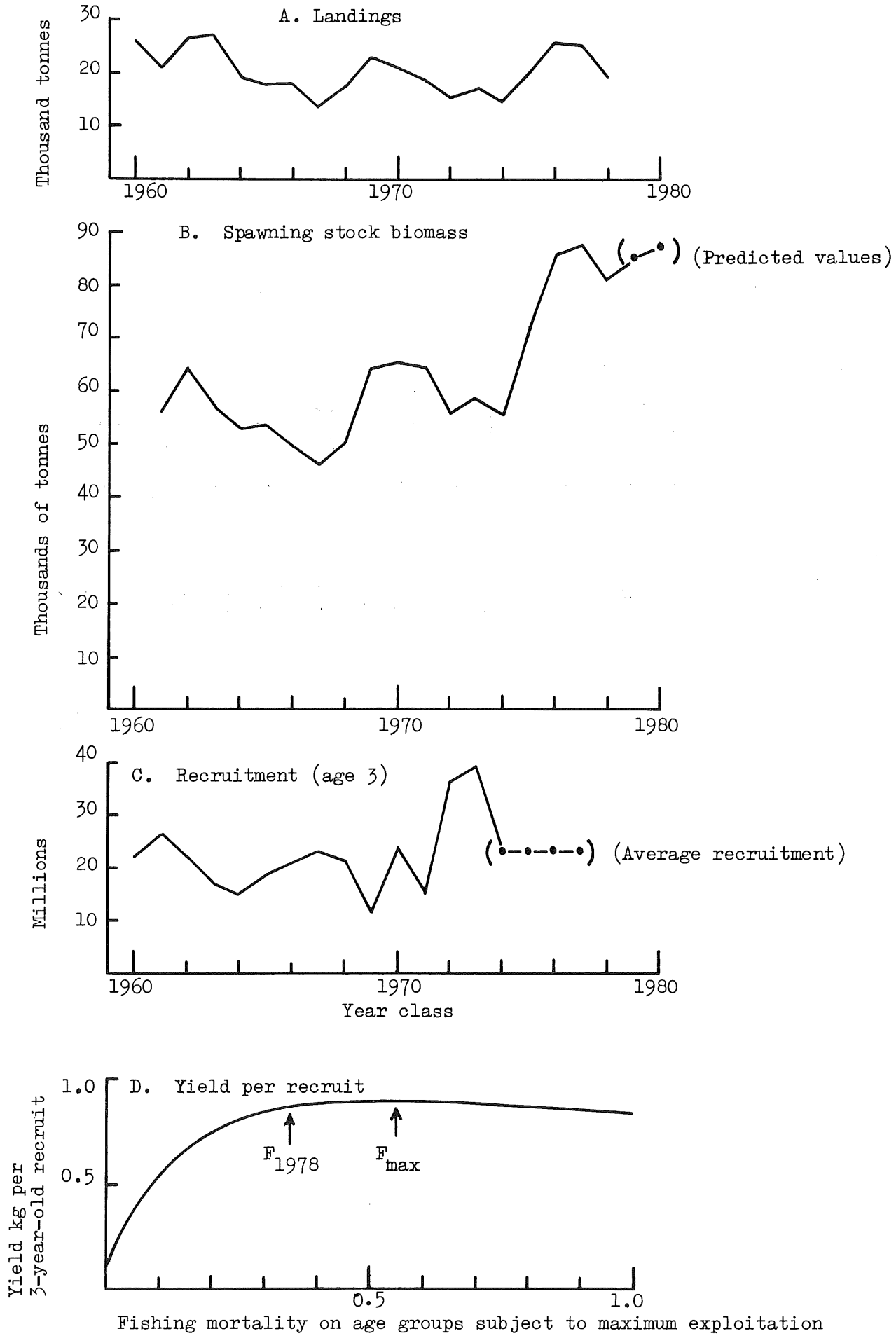


Figure 3.2. Faroe Cod. English catch per unit effort Faroe Bank and Faroe Plateau 1946-76.

Figure 4.1. Faroe Haddock.



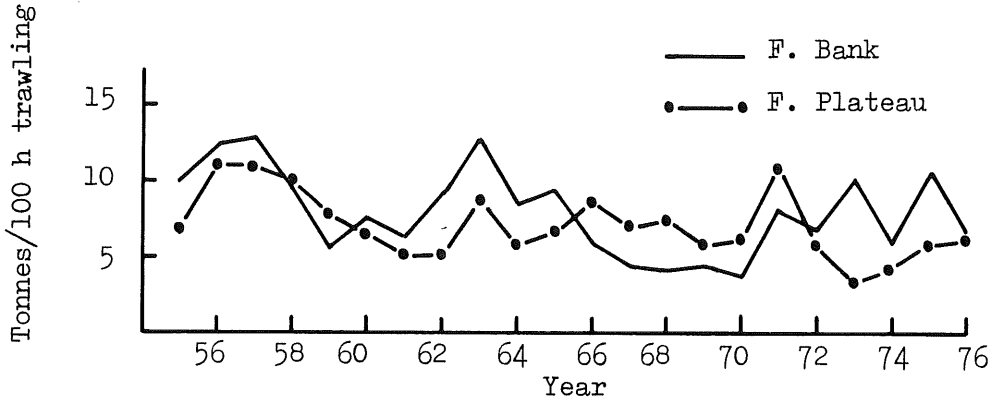


Figure 4.2. Faroe Haddock. English catch per unit effort Faroe Bank and Faroe Plateau 1955-76.

Figure 5.1. Faroe Plateau Cod. 1974-77 data. Calculated fits to observed catch curves. Four Faroese gears, Scottish trawl and English trawl.

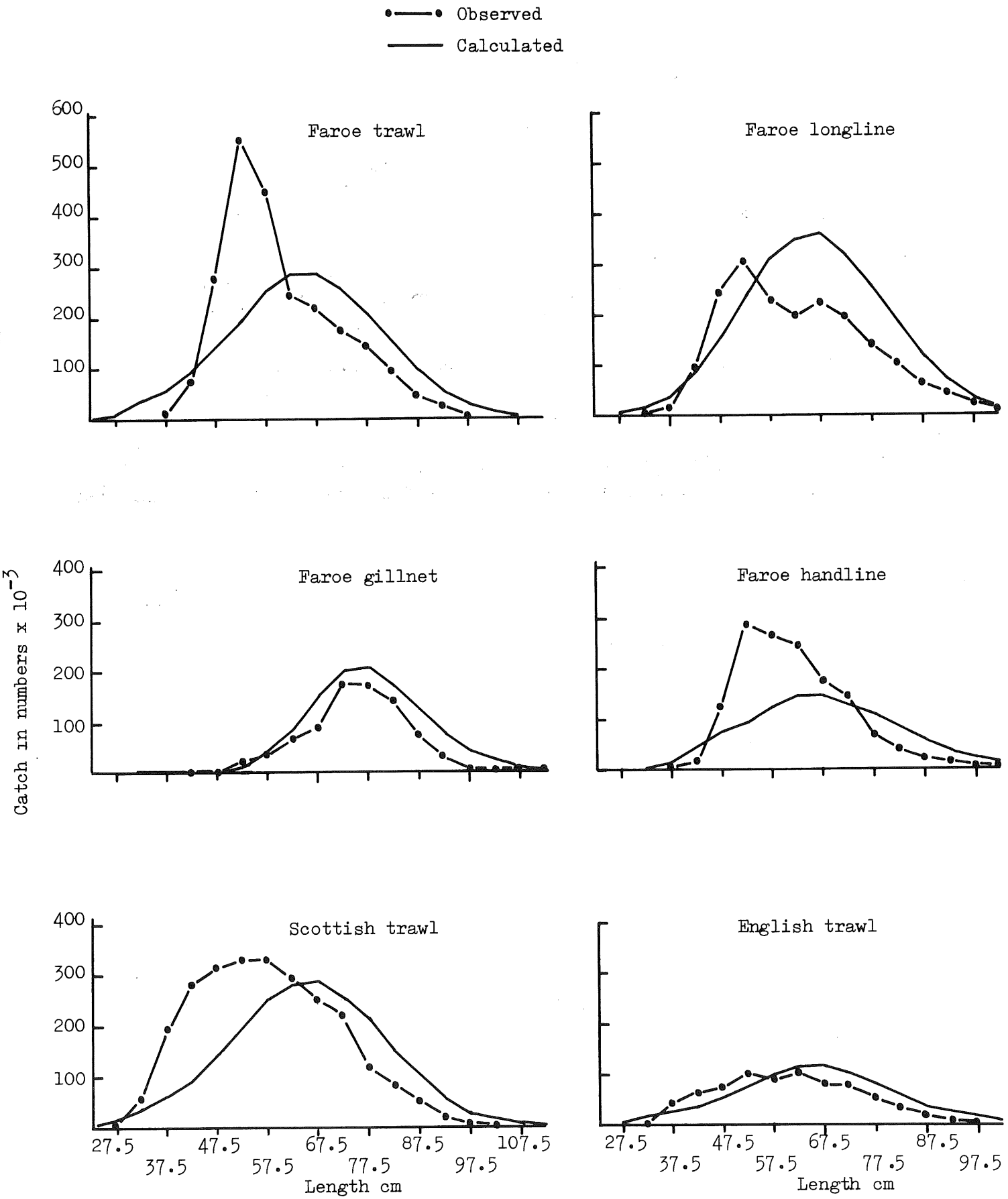


Figure 5.2. Faroe Haddock. 1974-77 data. Calculated fits to observed catch curves. Faroese trawl and longline, Scottish trawl and English trawl.