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Demersal Fish (Northern) Committee

REPORT OF THE WORKING GROUP ON FISH STOCKS AT THE FAROES

Charlottenlund, 9-13 February 1976

1. Participants

Mr D. Armstrong	U.K. (Scotland)
Mr K. Hoydal (Chairman)	Denmark (Faroe Islands)
Mr T. Jakobsen	Norway
Mr J. Janusz	Poland
Mr B.W. Jones	U.K. (England)
Mr K. Kosswig	Germany, Fed. Rep. of
Mr J. Lamolet	France

2. Terms of reference

At the 63rd Statutory Meeting of ICES a resolution (C.Res.1975/2:26) asked the Working Group to:

a) assess TACs for 1977 for cod and haddock;

b) having assessed the effective mesh size in current use, it should estimate the effects of further increase in mesh size for these species;

c) further examine the state of the stocks of Blue Ling, Ling and Redfish. To this end, countries are requested to submit further biological and statistical data on these species.

3. Description of fisheries

The description of the fisheries in the area in last year's report has been supplemented by a description of the French fishery, and this is given in the Appendix to this report.

4. State of the stocks

4.1. Cod (Plateau stock). The assessments have been made only for the Faroe Plateau stock as the data for Faroe Bank are not sufficiently good for a separate assessment to be made for that stock.

Catches from the Faroe Plateau increased to 36 000 tons in 1975 compared with 25 000 tons in 1974. Most of this increase was accounted for by the additional 9 000 tons in the Faroese catch. It is believed that fishing effort rose approximately in proportion to the increase in landings.

4.1.1. Virtual population analysis (VPA). Age compositions of total catches used as input data for the VPA are given in Table 13 (tabulations shown for 1966-1975 only). Calculated values of fishing mortality are shown in Table 14, together with the values assumed for 1975 which were used to initiate the computation. The assumed values for 1975 take into account the increase in fishing effort which has probably given rise to the higher catches in 1975. The corresponding estimates of stock size in the last ten years are given in Table 15. Estimates of year class strength are summarized in Table 16. The strength of recent year classes appear to have been close to the long-term average value.

4.1.2. Stock prognosis and calculations of Total Allowable Catches (TACs). In preparing the prognoses for 1976-78 the Group considered that the increased level of fishing effort in 1975 was likely to be at least maintained and probably further increased in 1976. During 1973 and 1974 fishing mortality rates on cod were close to the level giving maximum yield per recruit for the present exploitation pattern, $(F = 0.45)$.

An increase in fishing mortality above about F = 0.45 on the age groups
subject to maximum exploitation will result in slightly reduced catches
(in the long term), appreciably reduced catch rates, and a reduction in the
size of the spawning stock biomass. The fishery will also become more
dependent on the recruiting year classes and will tend to be subject to
increasing fluctuations from year to year according to the variation in year
class strength of the recruiting year classes. The Working Group considers
that the fishing mortality level should be reduced to F = 0.45 as soon as
possible.

Prognoses have been prepared to show the effect on catches if (a) fishing
mortality is maintained at the 1975 level (F = 0.55) over the period 1976-
78, (b) F = 0.6 during 1976-78, (c) F = 0.65 during 1976-78 (Table 20).
The prognoses are based on the 1975 catch age composition data and
exploitation pattern assumed for 1975 as given in Table 21, where the weight-
at-age data are also shown. The abundance of the recruiting 1975 and 1976
year classes has been taken as 19.5×10^6 which is the average strength for
year classes 1957-73.

The actual catch taken in 1975 and this year's updated estimate of catches
in 1976 are both substantially larger than estimates prepared last year
when it was expected that for these two years the catches would be about
25 000 tons. These differences are due to the increase in the amount of
fishing which was not anticipated at the last meeting of the Group.

The higher catches at the higher levels of fishing are obtained only at the
expense of fishing up the accumulated stock biomass. In all cases catches
will decrease with time and they will tend towards the sustainable yields
which are 26 900 tons (F = 0.55), 26 500 tons (F = 0.6), 26 200 tons
(F = 0.65). If these levels of fishing mortality are maintained in the
long term, the effect on the spawning stock size, assuming that recruitment
is maintained at the average level, will be as shown below:

F	Equilibrium spawning stock biomass (tons)
0.45	66 500
0.55	53 500
0.60	48 000
0.65	44 000

Two further prognoses have been prepared to indicate what catches could be
expected in 1977 and 1978 if a reduction of F to 0.45 was effected over
one year or two years. Both prognoses assume that fishing mortality will
have increased to F = 0.65 in 1976. An immediate reduction in fishing
mortality to F = 0.45 in 1977 will result in a severe reduction in catch
to 25 500 tons compared with a likely catch of 38 000 tons in 1976, with
a subsequent small increase to 26 000 tons in 1978. If the reduction is
spread over two years (F_{76} = 0.65, F_{77} = 0.55, and F_{78} = 0.45) the sequence
of catches will be 38 000 tons, 30 000 tons and 25 000 tons. With the
present exploitation pattern and average recruitment the sustainable yield
at F = 0.45 is 27 500 tons.

The Working Group <u>recommends</u> that fishing mortality is reduced to F = 0.45 and, in order to alleviate difficulties which would result from severe reductions in catch, that this reduction should be spread over two years. In addition to the catch from the Faroe Plateau an allowance of 2 000 tons is made for catches from the Faroe Bank. Accordingly the TACs recommended by the Working Group for the whole of the Faroe area are as follows:

<u>Recommended TACs for Cod</u>

1977	32 000 tons
1978 (subject to revision)	27 000 tons

4.1.3. <u>Spawning stock biomass</u>. Figure 1 shows the trend in observed spawning stock biomass of cod since 1960. The low levels in the early 1960's resulted from high exploitation levels in 1960 and 1961. Subsequently, fishing mortality was reduced and the spawning stock increased in size. Also indicated on the left-hand side of the figure are sizes of the equilibrium spawning stock associated with various specified values of F assuming that recruitment is maintained at an average level. When the spawning stock was at a low level in the early 1960's, there were no clear indications that recruitment was adversely affected. However, if fishing mortality is reduced to, and maintained at, F = 0.45 this should ensure that the spawning stock will be maintained at a high level. The total stock biomass will also be at a relatively high level providing associated economic benefits.

4.2   <u>Haddock</u> (total Division Vb)

<u>Trends in catch and effort</u>

The landings of haddock in 1974 were the lowest recorded in the last 20 years. This seems to reflect the poor recruitment in the late sixties.

Provisional data for 1975 indicate higher catches especially due to increased effort by Faroese long-liners.

4.2.2   <u>Estimates of mortality rates</u>. The Virtual Population Analysis (VPA) of the haddock stock at Faroe was updated by including revised age frequency data for 1974 and provisional data for 1975.

Estimates of the total numbers landed in each age group were available for Faroese, Scottish and English catches. The age composition of the landings by other countries were estimated by raising the combined English and Scottish data (Table 17).

No data for French landings for 1975 were at hand at the beginning of the meeting. It was, therefore, assumed that they were at the same level as in 1974 (1 450 tons) and this figure was used in the raising procedure. Later on the French landing data arrived and showed that this was an underestimate, the provisional figures for 1975 being 2 729 tons. The Group did not have time to rework the VPAs, but this underestimate should not seriously affect the estimates of TACs and the predicted catches.

The array of F at age values for 1975 (last column of Table 18) were estimated from the corresponding array used in 1974 by raising by the ratio 1974 landings:1975 landings. These changes gave rise to increased estimates of mortality rates for 1972 and 1973, especially for the younger age groups (Table 18). Stock sizes for the last ten years are given in Table 19.

4.2.3   <u>Prognosis.</u> Predictions of catches of Faroese haddock under various assumptions about fishing mortality rates are given in Table 20. (The input data for the predictions are shown in Table 21). The Group assumed that the most likely value of the fishing mortality rates in 1975 on the age groups subject to maximum exploitation was F = 1.0. On this basis, assuming no change in F during the next 3 years, catches are expected to increase slightly. The catches thus estimated for 1976 at this Working Group are higher than the corresponding value worked out last year because a higher value of F was used and also because it now appears that the 1972 and 1973 year classes are relatively large, although the estimate of the 1973 year class must be regarded as being less reliable.

The Group was, however, of the opinion that fishing effort, and therefore the value of F, is likely to increase in 1976. The effect on catches over the next 3 years has been estimated for values of F of 1.1 and 1.2, respectively. In both of these cases catches over the next 3 years are expected to increase. However, it was indicated in last year's Report that a value of F of 0.8 would result in a yield close to the maximum obtainable <u>under the present pattern of exploitation.</u> In addition, this value of F should, in the long term, allow the spawning stock of haddock to increase over present levels (see Figure 1).

4.2.4   <u>TACs for haddock.</u> Because of the considerations referred to in the previous section, the Group thought it desirable to estimate a TAC which would tend to restore F to a value of 0.8. Assuming that F in 1976 will be 1.2, the TAC required in 1977 to bring about an immediate reduction to 0.8 would be about 20 000 tons. This value, however, represents a considerable reduction in catch as compared to that expected in 1976.

For this reason the Group considered an alternative possibility of reducing F to 1.0 in 1977 with a second reduction to 0.8 in 1978. In adopting this strategy, reductions in catch from year to year are lessened. The long-term catch with F of 0.8 and assuming an average recruitment of 40×10^6 1 year olds is of the order of 23 000 tons. The Group therefore recommends that the total allowable catch should be set as follows:

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<u>Recommended TACs for Haddock</u>

1977	23 000 tons
1978 (subject to revision)	20 000 tons

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4.3   <u>Blue Ling and Ling</u>

The Federal Republic of Germany, Norway and Faroe Islands split their ling catches by species and from 1974 onwards French data are also submitted. Thus, in 1974, 90% of the ling catches from the Faroes were split by species. Of this quantity blue ling made up about half.

Except for a few German (Federal Republic of) length measurements of blue ling, no biological data on these species have been collected and the knowledge of the stocks is practically nil. The catches have increased after 1971 (Table 6) and German (Federal Republic of) data show a significant increase in catch per effort of blue ling after 1970 (Table 22), perhaps indicating an increase of the stock.

However, the blue ling is only a by-catch in the German (Federal Republic of) fishery for saithe and it is not known how reliable the catch per effort data on blue ling are.

4.4   <u>Redfish</u>

A limited amount of age and length data on redfish was submitted to the Working Group by the representative of the Federal Republic of Germany. These data were considered inadequate for the purposes of stock assessment. Further progress in collecting adequate biological data will be complicated by the fact that, at least in the Federal Republic of Germany, redfish landings are not separated into species (<u>S.</u> <u>marinus</u> and <u>S.</u> <u>mentella</u>). Furthermore, the fishery of the Federal Republic of Germany is seasonal in nature and for this reason it is sometimes impossible to obtain samples.

4.5   It is unlikely that the Working Group will be able to make any progress in the assessments of the stocks of Blue Ling, Ling and Redfish, until adequate data have been collected over a series of years.

5.   <u>Mesh Assessments</u>

Data had been collected for the meeting of the Working Group on length composition of Faroese, Scottish and English landings for 1974 and provisional data for 1975, in order to estimate the effective mesh size in use in the area.

A method of calculating this has been elaborated by Mr K P Andersen of the Danish Institute of Marine and Fisheries Research. Unfortunately, due to illness Mr Andersen could not perform the calculations at this meeting. The calculations will be made later, based on the data brought to the meeting.

Having been unable to estimate the effective mesh size, the Group felt that nothing could be added to the previous mesh change assessments.

Table 1   Catches in ICES Division Vb by country and species
            1960-1975. Metric tons, round fresh.

COD

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	U.K. England	U.K. 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 x)	13 237	551	292 1)	446	320	3 708	8 019 1)	60	26 633
1975 x)	22 691	1 588	250 1)	1 620	432	3 287	7 369 1)	47	/37 284/

Table 2   HADDOCK

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	U.K. England	U.K. Scotland	Others	Total
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 x)	4 811	1 451	70 1)	5	685	1 617	6 072 1)	52	14 763
1975 x)	8 675	2 729	35 1)	44	544	2 426	5 345 1)	448	/20 246/

x) Preliminary estimates

1) Excludes November and December

Table 3   SAITHE

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	U.K. England	U.K. 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 x)	3 726	19 428	6 661	1 660	1 925	3 827	8 302	630	46 159
1975 x)	-	23 201	4 037	829	815	2 405	4 928	401	36 616

Table 4   WHITING

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	U.K. England	U.K. Scotland	Others	Total
1960	-	-	-	-	-	70	403	-	473
1961	222	1 200	-	-	-	50	257	-	1 729
1961	-	-	-	-	-	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

x)   Preliminary estimates.

a)   Includes Iceland grounds (Va).

Table 5   TUSK

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	U.K. England	U.K. 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

Table 6   LING AND BLUE LING

Year	Faroe Isl.	France	German Dem.Rep.	Germany *) (Fed.Rep.)		Norway **)		Poland	U.K. England	U.K. Scotland	Total
1960	520	-		895		400		-	629	855	3 29
1961	603	-		11		521		-	241	829	2 205
1962	450	387		9	B.Ling	326		-	247	572	1 991
1963	365	1 512		17	478	496	B.Ling	-	183	396	3 447
1964	480	2 844		48	2 493	736	182	-	322	632	7 737
1965	416	2 618		30	1 612	832	1 120	-	184	388	7 200
1966	416	1 827		39	850	2 115	430	-	276	496	6 449
1967	736	23		60	1 133	3 203	238	-	172	364	5 929
1968	1 209	177		68	1 858	3 340	788	-	152	679	8 271
1969	486	195	-	45	249	1 952	798	-	225	602	4 552
1970	699	578	-	42	335	1 737	2 612	-	164	883	7 050
1971	752	728	-	46	1 475	2 898	557	-	152	879	7 487
1972	1 572	866	-	74	2 779	3 958	1 203	-	146	772	11 370
1973	1 428	1 012	-	167	2 931	3 638	4 003	11	268	850	14 308
1974	1 477	686	9	131	1 808	2 395	1 554	4	308	575	8 947

* 1960-62. Ling and Blue Ling not separated.

** 1960-63 Ling and Blue Ling not separated.

Table 7.   LEMON SOLE

Year	Faroe Islands	France	U.K. England	U.K. 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	⌐03	-	1 247

Table 8   PLAICE

Year	Faroe Islands	France	U.K. England	U.K. Scotland	Others	Total
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

Table 9   HALIBUT

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	U.K. England	U.K. 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

Table 10   MEGRIM

Year	Faroe Islands	France	Germany (Fed.Rep.)	Norway	Poland	Spain	U.K. England	U.K. 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

Table 11   REDFISH

Year	Faroe Islands	France	German Dem.Rep.	Germany (Fed.Rep.)	Norway	U.K. England	U.K. 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

Table 12   ANGLER (MONK)

Year	Faroe Islands	France	Germany (Fed.Rep.)	U.K. England	U.K. 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

Table 13. Cod (Faroe Plateau).
Total numbers of fish caught at each age x 10^{-3}.

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	53	127	34	68	35	78	44	211	275	60
2	1 337	1 609	1 529	878	402	328	875	719	2 403	2 555
3	970	2 690	3 322	3 106	1 163	757	1 176	3 111	1 539	4 250
4	2 080	860	2 663	3 300	2 172	821	810	1 586	2 052	1 797
5	1 339	1 706	945	1 538	1 685	1 287	596	705	1 035	2 347
6	606	847	1 226	477	752	1 451	1 021	384	477	785
7	197	309	452	713	244	510	596	312	250	231
8	104	64	105	203	300	114	154	227	207	174
9	33	27	11	92	44	179	25	121	125	100

Table 14. Cod (Faroe Plateau).
Estimates of fishing mortality 1966-74 and assumed values for 1975. Natural mortality M = 0.2.

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01
2	0.09	0.08	0.10	0.12	0.07	0.03	0.05	0.07	0.13	0.15
3	0.20	0.25	0.24	0.31	0.24	0.17	0.16	0.24	0.21	0.35
4	0.26	0.27	0.41	0.39	0.38	0.27	0.28	0.33	0.25	0.40
5	0.46	0.35	0.55	0.44	0.36	0.40	0.32	0.41	0.38	0.50
6	0.49	0.59	0.45	0.60	0.40	0.60	0.65	0.35	0.54	0.55
7	0.97	0.50	0.74	0.52	0.71	0.53	0.53	0.42	0.40	0.55
8	0.80	1.05	0.31	0.91	0.43	0.90	0.30	0.40	0.54	0.55
9	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.40	0.40	0.55

Table 15. Cod (Faroe Plateau).
Estimates of stock size (numbers x 10^{-3}).

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	27 915	21 124	10 102	8 599	13 622	24 999	14 426	27 015	24 961	6 652
2	18 050	22 807	17 181	8 240	6 979	11 121	20 397	11 772	21 928	20 188
3	5 871	13 572	17 221	12 687	5 955	5 351	8 809	15 910	8 989	15 787
4	10 080	3 934	8 692	11 110	7 596	3 829	3 699	6 153	10 227	5 974
5	4 006	6 382	2 447	4 727	6 135	4 270	2 397	2 300	3 613	6 527
6	1 714	2 079	3 693	1 158	2 491	3 510	2 341	1 427	1 251	2 029
7	344	861	945	1 924	521	1 364	1 576	1 004	823	597
8	205	107	428	370	937	209	660	756	542	450
9	92	75	31	256	122	498	70	402	416	258

Table 16. Faroe Plateau Cod and Faroe Haddock.
Estimates of year class strength as millions
of 2 year old fish from VPA. Natural mortality
M = 0.2.

Year class	Cod	Haddock
1955	-	34.6
1956	-	38.8
1957	13.1	42.8
1958	14.1	35.2
1959	11.9	50.4
1960	20.6	38.0
1961	20.0	46.7
1962	21.6	29.4
1963	8.1	22.0
1964	18.1	19.4
1965	22.8	24.1
1966	17.2	44.5
1967	8.2	27.2
1968	7.0	23.4
1969	11.1	9.5
1970	20.4	24.3
1971	11.8	17.0

Table 17. Faroe Haddock.
Total numbers of fish caught at each age $\times 10^{-3}$.

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	89.6	69.6	48.8	94.7	56.7	55.1	42.7	663	253	261
2	1 080.8	1 424.9	5 881.4	2 383.8	1 728.2	717.4	750	3 039	7 446	4 714
3	3 303.5	2 405.1	4 096.1	7 539.1	4 855.4	4 392.7	3 744.1	7 944	2 562	8 500
4	4 804.3	2 598.8	2 812	4 567	6 580.8	4 727	4 179.3	1 175	3 324	2 275
5	2 710	1 784.9	1 524.3	1 564.8	1 624.1	3 267.4	2 706.4	2 635	400	1 586
6	1 111.8	1 426.2	1 525.8	1 484.9	1 383	1 292.2	1 170.6	871	799	232
7	739.7	630.5	922.6	1 223.9	1 098.5	863.5	695.7	969	489	357
8	179.8	197.2	230.2	377.9	325.7	222.3	179.6	139	534	243
9	53.5	51.8	68.1	113.9	68	146.7	113.1	66	67	433

Table 18. Faroe Haddock.
Estimates of fishing mortality 1966-74 and assumed
values for 1975. Natural mortality M = 0.2.

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01
2	0.06	0.07	0.16	0.10	0.08	0.09	0.03	0.22	0.15	0.10
3	0.24	0.20	0.28	0.31	0.31	0.32	0.85	0.60	0.29	0.25
4	0.46	0.31	0.37	0.57	0.48	0.56	0.57	0.72	0.55	0.45
5	0.51	0.31	0.30	0.36	0.41	0.48	0.73	0.90	0.58	0.55
6	0.56	0.56	0.48	0.53	0.63	0.68	0.31	0.56	0.77	0.80
7	1.01	0.73	0.89	0.93	0.99	1.09	1.02	0.46	0.72	1.00
8	0.94	0.84	0.65	1.25	0.69	0.55	0.69	0.57	0.50	1.00
9	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.60	0.60	1.00

Table 19. Faroe Haddock.
Estimates of stock size (numbers x 10^{-3}).

Age	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1	29 543	54 480	33 244	28 723	11 660	29 763	20 852	73 729	66 924	28 936
2	19 353	24 107	44 542	27 174	23 431	9 495	24 318	17 034	59 765	54 564
3	16 794	14 870	18 451	31 169	20 099	17 625	7 127	19 233	11 211	42 222
4	14 147	10 778	10 009	11 423	18 743	12 092	10 483	2 500	8 641	6 875
5	7 410	7 276	6 489	5 670	5 266	9 449	5 669	4 843	997	4 099
6	2 840	3 639	4 353	3 942	3 237	2 854	4 807	2 226	1 619	459
7	1 266	1 330	1 703	2 197	1 898	1 414	1 183	2 884	1 043	613
8	320	379	526	573	710	578	391	350	1 493	417
9	106	102	135	225	134	290	274	160	162	744

Table 20. Prognosis for Haddock in area Vb and Cod in Vb_1. (Catch in tons).

(a) Haddock

F constant 1976-78

F	Catch	F	Catch	F	Catch
1976					
1	22 365	1.1	24 125	1.2	25 830
1	24 991	1.1	26 020	1.2	26 892
1	25 057	1.1	25 278	1.2	25 359

Fishing mortality reducing 1976-77 or 1976-77-78

	F	Catch	F	Catch
1976	1.2	25 830	1.2	25 830
1977	0.8	19 523	1.0	23 832
1978	0.8	21 641	0.8	20 028

(b) Cod

F constant 1976-78

F	Catch	F	Catch	F	Catch
1976					
0.55	33 431	0.6	35 835	0.65	38 150
0.55	31 930	0.6	33 136	0.65	34 164
0.55	30 410	0.6	30 819	0.65	31 061

Fishing mortality reducing 1976-77 or 1976-77-78

	F	Catch	F	Catch
1976	0.65	38 150	0.65	38 150
1977	0.45	25 459	0.55	29 946
1978	0.45	26 291	0.45	24 672

All F values given are estimates of fishing mortality on the age groups subject to maximum exploitation (Input data in Table 21).

Table 21. Input data for the prognosis.

COD   ICES Area Vb_1

Age	Average weight (kg)	Relative F [1)	Catch 1975 x 10^{-3}
1	.46	0.02	176
2	1.06	0.27	2 555
3	1.89	0.64	4 250
4	2.92	0.73	1 797
5	4.07	0.91	2 347
6	5.30	1	785
7	6.58	1	231
8	7.85	1	174
9	9.08	1	100
10+	10.27	1	156

HADDOCK ICES Area Vb

Average weight (kg)	Relative F[1)	Catch 1975 x 10^{-3}
0.3	0.01	261
0.47	0.10	4 714
0.73	0.25	8 500
1.13	0.45	2 275
1.55	0.8	1 586
1.97	1	232
2.41	.1	357
2.76	1	243
3.07	1	433
3.55+	1	78

[1) Proportion of F relative to F on age groups subject to maximum exploitation.

Recruitment

Average recruitment 1959-73 =
19 500 assumed for year classes
1974-76 at 1 year old.

Average recruitment 1959-73 =
40 000 assumed for year classes
1975 and 1976.

Table 22. Blue Ling and Redfish catches off Faroe Islands 1963-74 and total
effort from the Federal Republic of Germany's catches per fishing day.

Year	Federal Republic of Germany catch (tons)		Federal Republic of Germany catch (tons) per fishing day		Total catches by all countries (tons)		Total effort for all countries	
	Blue Ling	Redfish	Blue Ling	Redfish	Blue Ling	Redfish	Blue Ling	Redfish
1963	478	2 035	1.0	4.1	478	2 493	-	608
1964	2 493	7 119	1.5	4.3	2 675	7 908	1 783	1 839
1965	1 612	4 864	1.2	3.5	2 732	5 512	2 277	1 575
1966	850	3 180	0.7	2.7	1 280	3 228	1 829	1 196
1967	1 133	4 853	0.8	3.3	1 371	4 899	1 714	1 485
1968	1 858	6 613	1.0	3.5	2 646	6 667	2 646	1 905
1969	249	1 225	0.4	1.8	1 047	1 258	2 618	699
1970	335	2 020	0.6	3.7	2 947	2 053	4 912	555
1971	1 475	2 479	1.9	3.1	2 032	2 503	1 069	807
1972	2 779	4 027	2.2	3.2	3 982	4 080	1 810	1 275
1973	2 931	9 439	1.5	4.8	6 934	9 645	4 623	2 009
1974*	1 808	7 328	1.1	4.4	3 362	7 765	3 056	1 765

* French catches split into ling and blue ling are to hand for 1974, but
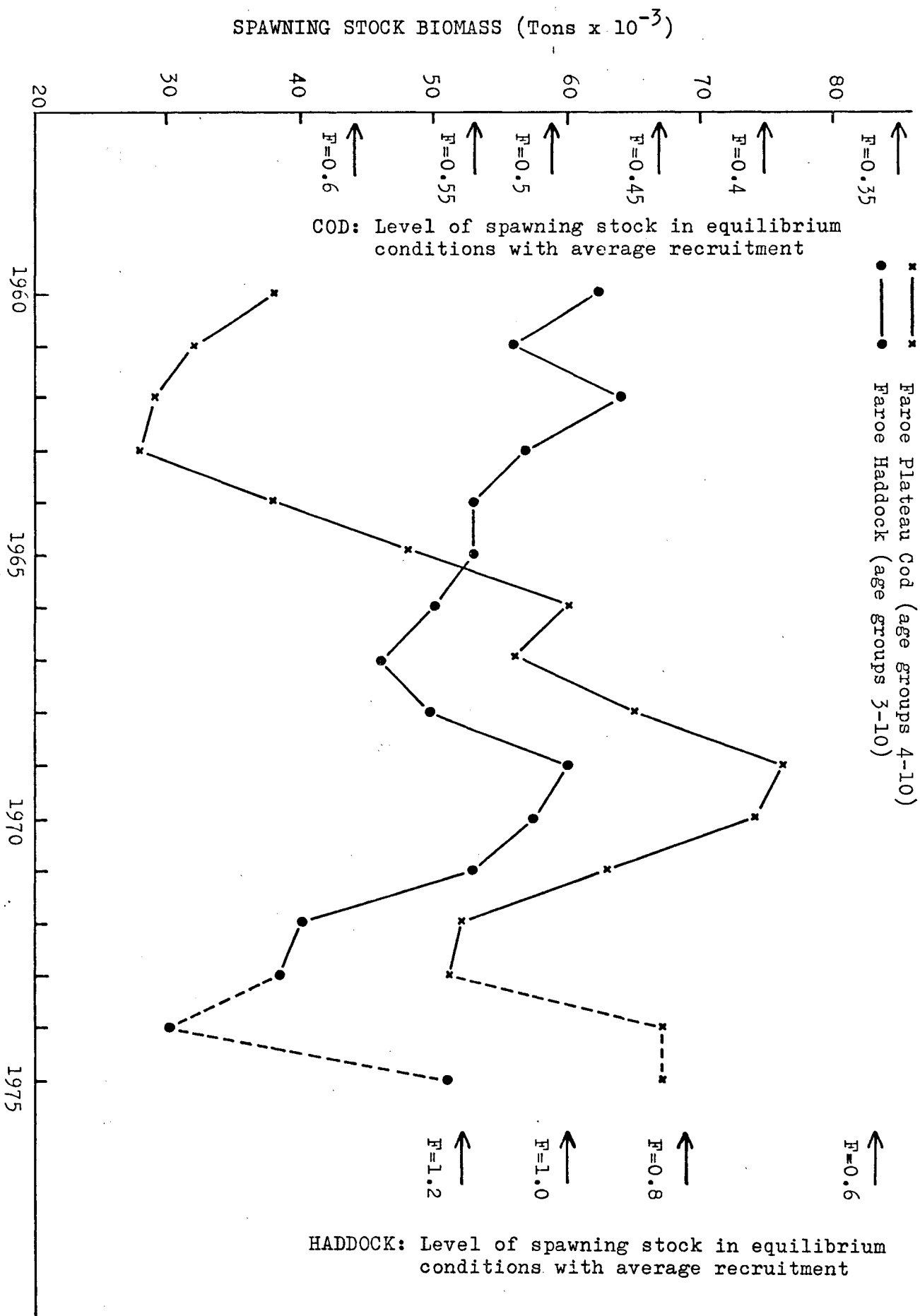are not included in this table (see Appendix Table 1).

Figure 1. Spawning stock biomass 1960-1975.

APPENDIX

Description of Fisheries at the Faroes

The French fishery at Faroe

Estimations made by the "Institut des Pêches maritimes" indicate that there are about 50 trawlers of gross tonnage between 150 and 999 tons fishing the Faroe area regularly. In addition, there are probably about 100 trawlers which fish less regularly at Faroe. The gear generally used is a 35/55 m or 23 m Moisant bottom trawl. Generally, fishing takes place on the Faroe Plateau in the NW, N, NE and E of the Islands according to the availability of the open areas, but during April, May and June it moves a little towards the Faroe Bank (Appendix Tables 1 and 2).

In winter, spring and at the beginning of the summer, as soon as the saithe yields decrease in the ICES Divisions VIa and IVa, the larger trawlers transfer their effort to the Plateau.

Saithe is the main species sought and landings from Faroe constitute a quarter or more of the total French landings of this species. Other demersal species such as cod, haddock, whiting, tusk and plaice are taken in smaller quantities.

Second in importance is the fishery for blue ling, sought in the deep waters around the Faroe Bank, Lousy Bank and in the southwest of the Islands, during the whole of May.

Small quantities of redfish are caught to the east and the west of the Islands, all the year round.

The French statistical system, introduced in 1974, has not been in service sufficiently long to give a description of historical variation of fishing effort. It is known, however, that French fishing effort at Faroe increased in 1975.

Appendix Table 1. France 1974. Fishing effort and landings of selected species. ICES Areas Vb_1 and Vb_2.

Month	Effort[1]		Blue Ling[2]		Ling[2]		Redfish[2]		Haddock[2]		Cod[2]	
	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2
Jan	1 889	-	6	-	3	-	73	-	38	-	23	-
Feb	1 042	120	1	-	1	4	6	-	152	-	26	2
Mar	3 170	79	10	19	20	1	12	-	793	1	102	1
Apr	1 667	217	3	77	7	4	4	-	56	-	13	1
May	4 060	568	203	34	25	37	32	2	53	88	80	46
Jun	2 389	525	-	6	23	21	14	2	30	62	41	18
Jul	2 720	597	3	1	42	51	16	3	54	64	64	19
Aug	773	-	7	-	14	-	11	-	1	-	4	-
Sep	383	10	-	-	4	-	7	-	-	-	1	-
Oct	989	-	16	-	26	-	13	-	10	-	41	-
Nov	836	40	1	-	6	-	47	-	5	-	18	-
Dec	1 672	-	3	-	7	-	58	-	44	-	43	-
Total	21 590	2 156	253	137	178	118	293	7	1 243	215	464	87

[1] Effort in horsepower days x 10^{-2}.

[2] Landings in tonnes round weight.

Appendix Table 2. France 1975. Fishing effort and landings of selected species. ICES Areas Vb_1 and Vb_2. Preliminary data.

Month	Effort[1]		Blue Ling[2]		Ling[2]		Redfish[2]		Haddock[2]		Cod[2]	
	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2	Vb_1	Vb_2
Jan	3 182	-	7	-	7	-	79	-	75	-	110	-
Feb	3 195	-	18	-	-	-	26	-	416	-	207	-
Mar	1 731	-	-	-	10	-	11	-	335	-	45	-
Apr	4 162	175	64	67	32	4	17	-	475	6	106	3
May	3 887	1 102	1 307	557	18	6	12	2	75	45	129	29
Jun	6 461	690	45	50	102	12	52	2	507	84	360	34
Jul	4 310	113	10	-	63	4	65	-	405	13	284	13
Aug	1 291	-	4	-	29	-	28	-	164	-	76	-
Sep	165	10	-	-	4	-	5	-	-	-	8	-
Oct	321	-	2	-	12	-	3	-	6	-	1	-
Nov	602	40	-	-	4	-	14	-	7	-	32	-
Dec	4 465	-	18	-	18	-	90	-	116	-	151	-
Total	33 772	2 130	1 475	774	299	26	402	4	2 581	148	1 509	79

[1] Effort in horsepower days x 10^{-2}.

[2] Landings in tonnes round weight.