



ANNUAL MEETING - JUNE 1972

Extracts from ICES Liaison Committee Report to NEAFC, 1972

Note:

This document only reproduces selected pertinent portions (✓) of the Liaison Committee's Report.

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Executive Secretary, ICNAF.

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A. REVIEW OF NOMINAL CATCHES IN NEAFC AREA 1963 - 1970

1. A general review of the fish production in the Convention Area from 1963-1970 is given in Tables 1-3. The tables, which are based on statistics published in ICES "Bulletin Statistique" show for each NEAFC region the nominal catch of all species combined, the catch in the main fishing areas of (a) demersal species (comprising Pleuronectiformes - flatfishes; Gadiformes - codfishes; demersal Perciformes - redfishes, gurnards, sandeels etc.); (b) pelagic species (all marine fish species not included in the demersal fish group); (c) each of the main species within the demersal and pelagic fish groups. Freshwater and anadromous species, shellfish and the catches by non-member countries are not included in the tables.
2. The main changes in the fish production in each region are summarised below. A map showing the Regions, Subareas and Divisions referred to is given at the end of the Report.

Region 1 (Table 1)

3. The total production of all species combined increased from 1969 to 1970 by about 600 000 tons to 4 245 000 tons.
4. In Subareas I and II there was a large increase in the catch of capelin which went up by more than 500 000 tons to 1 300 000 tons. Among the demersal species the yield of saithe and of Polar cod increased by about 100 000 tons each. The only species showing a substantial decline in yield was cod, for which the 1970 catch of about 950 000 tons was 280 000 tons lower than the catch in 1969.
5. The total catch of all species in Subarea V did not change substantially from 1969 to 1970. The catch of capelin and cod continued to increase.

Region 2 (Table 2)

6. The total catch in Region 2 was about the same in 1970 as in 1969, being just above 4 million tons.

7. In Subarea IV and Division IIIa the mackerel catches declined by 400 000 tons to 322 000 tons, while the herring catch remained at the 1969 level. The total catch of demersal species increased by 300 000 tons reflecting increasing yields of most of the species fished. It should be noted that the yield of haddock, which from 1968 to 1969 rose substantially, increased further in 1970. The Norway pout catch went up by 140.000 tons, and the catch of saithe increased by 60 000 tons.
8. In Subareas VI and VII herring and mackerel catches continued to increase, and there was a marked increase in the catch of "Other Pelagic Fish", mainly horse mackerel, to 80 000 tons.
9. A total catch of 255 000 tons has not been specified in the table. 85 000 tons of these are non-teleost fishes. 170 000 tons are recorded as unsorted and unidentified species and 147 000 tons of these were caught in Subarea IV and Division IIIa, mainly by two countries. At its meeting in 1971 the Council recommended that countries which submit statistics of total catch (quantity) of unsorted unidentified fishes for publication in "Bulletin Statistique" should specify those species of fish which form the main component of such catches.

Region 3 (Table 3)

10. There have only been slight changes in the yield of the different species caught in Region 3. The pilchard catches continued to decline, while the yields of mackerel and horse mackerel were higher than in any year since 1963.
11. The figures in Table 3 are only given as an indication of the main changes in the fish production in Region 3, because of the inadequacies of the reported statistics mentioned in last year's Report.

B. NOTE ON THE COMMUNIQUE FROM THE SPECIAL MEETING AT THE LEVEL OF MINISTERS

12. The Liaison Committee has noted that at the NEAFC Special Meeting in Moscow in December 1971, the Ministers agreed on the importance of:

- a. extending the range and scope of fisheries research,
- b. increasing cooperation in joint scientific programmes,
- c. improving the supply of statistics by Member Countries to the scientific bodies concerned.

It wishes to draw the attention of the Commission to some important points which concern ICES in its capacity as the advisory body of NEAFC and which will be considered by the Council at its next Statutory Meeting.

13. In order to achieve the necessary improvement of the stock assessments, it is essential to greatly improve the coverage, accuracy and speed of reporting of national statistics and to extend substantially the biological sampling programmes. In this connection it should be noted that the amount of biological sampling differs considerably between countries and is far from proportional to the quantity of fish caught by the individual countries. Also, the type of data used up till now in assessments must be augmented by other information in order to permit more accurate estimation of stock size and recruitment.

14. With the rapid changes in the fisheries and with the introduction of catch regulation, the comparability of the present abundance indices will become less and less precise. They are based on long established national patterns of fishing. Closed seasons, closed areas or quotas will disrupt these patterns, making it essential to obtain estimates of stock size independent of catch and effort data, for example by means of acoustic surveys and tagging experiments.

15. Another essential requirement for management is a reliable estimate of future recruitment to the fishery. For some stocks this is already monitored by means of larval, 0-group and groundfish surveys. These surveys require high investments in time and effort by research vessels. Provisions must be made for considerable increase in such investments and for the expansion of international cooperation in these types of research activities if scientific management of the stocks is to become a reality.

C. REGION 1 FISHERIES

C.1 North-East Arctic Fisheries

C.1.1 Cod

16. Nominal catches of cod have fallen from 876 000 tons in 1970 to 617 000 tons in 1971. The catch in 1971 was heavily dependent on the 1963 and 1964 year classes which, as they matured, led to a big increase in the proportion of the total catch taken in Division IIa (Norwegian Sea). The 1965-1968 year classes are very weak and a consequent reduction in the abundance of 3-6 year old cod has led to poor catches and a reduction in fishing effort in the Barents Sea/Bear Island cod fishery. Fishing mortality on the stock as a whole in 1971 was close to $F = 0.5$ on fully recruited age groups. As stated in earlier reports, this is the level giving the long-term maximum yield per recruit. Estimates of recruitment in the immediate future remain close to those given in 1970. The 1970 year class is very rich and the 1971 year class is above average.

17. On the assumption that fishing mortality in 1972 and 1973 remains at the 1971 level ($F = 0.5$) catches in these years have been estimated as 425 000 tons for 1972 and 380 000 tons for 1973.

18. Although estimates of future catch weight made in earlier years left room for improvement, the estimates of catch numbers and stock size are considered reasonably accurate at the present time. The cod fishery has developed much as expected in the years 1968-1971. The strong 1963 and 1964 year classes will continue to contribute a major part of the catch in the Norway Coast fishery in 1972, and to a lesser extent in 1973, but the Barents Sea/Bear Island fishery will continue very poor indeed until 1974/75 when the 1970 and 1971 year classes make a substantial contribution to the catches.

19. The following comparison between the estimated average biomass of different age groups in 1950-1959, and that expected at the beginning of 1973 shows how the resource has become reduced in recent years by the combined effects of heavy fishing and poor recruitment.

Weight of the stock in thousand tons				
Age Groups	3-4	5-7	8+	Total
Average for 1950-59	2 411	2 735	1 350	6 496
1973	2 090	90	614	2 794

The spawning stock will become very small indeed by the mid-1970's raising the attendant risks of continuing poor recruitment if the effects of a stock and recruitment relationship become significant.

20. It is clear that the immediate and perhaps long-term future of the cod resource depends critically on the level of exploitation of the 1970 year class, especially since it can be expected that the Barents Sea/Bear Island fisheries will become dominant again in 1973/74. One single year class, even if very rich, cannot by itself rebuild a stock, but it may sustain the resource until the strength of the 1971 and later year classes becomes evident, and the overall risks to the continuity of the stock as a whole of heavily exploiting the 1970 year class can be properly assessed.

21. Of the estimated yield of 380 000 tons in 1973, 80 000 tons is expected to be taken from this 1970 year class if, in the absence of abundant older age groups, fishing concentrates in areas where it is most numerous. If the capture of 3 year olds in 1973 could be prevented, this would decrease the yield by 80 000 tons in that year and it would increase the expected number of 4 year olds by some 150 million fish, representing a potential yield of 170 000 tons (equivalent to that of the total recruitment of 4 year olds in the 1965-1969 year classes).

22. In order to rebuild the spawning stock it is advisable that the 1970 year class should not be heavily exploited when it reaches fishable size. This could be achieved by:

- a) a regulation of the age at first capture, combined with
- b) an overall regulation of fishing mortality.

In the absence of overall regulation of fishing mortality, the year class would still be vulnerable to heavy exploitation whenever the fish

become liable to capture and this might nullify any benefits that had been achieved by a) above. If it is considered that protection of the 1970 year class and of the stock as a whole could best be ensured by the regulation of the allowable catch, then so far as possible this should be allocated to regions of the fishery according to the relative abundance of different parts of the stock.

C.1.2 Haddock

23. Contrary to expectation, haddock landings increased in 1971 to 113 000 tons. The fishery on fully recruited age groups followed the expected trend, but catches of 4 year old haddock from the newly recruited 1967 year class were greater than expected. This year class is stronger than previously estimated, but also fishing is believed to have concentrated upon haddock to a greater extent in 1971. As a result, fishing mortality on haddock may not have declined much. Estimates of recruitment in the immediate future remain close to those given in 1970. The 1969 year class is rich and both the 1970 and 1971 year classes are above average.

24. On the assumption that fishing mortality in 1972 and 1973 remains at the 1971 level ($F = 0.6$) catches in these years have been estimated as 127 000 tons for 1972 and 122 000 tons for 1973. An additional estimate has been made by assuming that F is reduced to a level giving the long-term maximum yield per recruit, viz. $F = 0.3$. If this level is reached in 1972, the corresponding catch will be 59 000 tons in 1972 and 80 000 tons in 1973. If the mortality rate remains at 0.6 in 1972, but is reduced to 0.3 in 1973, the catch in 1973 will be 62 000 tons.

C.1.3 Capelin

25. There has been a dramatic increase in the capelin landings in the north-east Arctic fishing areas from about 0.7 million tons in 1969 to 1.3 million tons in 1970 and 1.6 million tons in 1971. By far the main part of these catches is taken by Norwegian purse seiners, when the capelin concentrate for spawning. Up till 15 February 1972 the Norwegian landings were 600 000 tons, which is about 200 000 tons more than the catch obtained by the same date in 1971.

26. Norwegian acoustic surveys show that the stock size in 1971 was about half the stock size in 1970. Preliminary estimates of the spawning stock in 1972 show that the stock is now considerably smaller than in 1971, being about 1.9 - 3.7 million tons. Larval surveys show that great fluctuations in year class strength occur within the capelin stock.

C.2 Atlanto-Scandian Herring

27. The Liaison Committee has noted that negotiations concerning regulation of the fishery on the Atlanto-Scandian herring stock have taken place outside the framework of NEAFC. In this connection the Committee wishes to inform the Commission that the statement concerning Norwegian spring spawners in the Report presented at the Ninth Meeting of the Commission is still valid, viz.:

"In view of the present critical state of the stock, it is concluded that in order to increase recruitment to the adult fisheries and to allow the recovery of the Norwegian spring spawning stock as a whole, it would be advisable to reduce the exploitation rate of immature herring to the lowest practicable level, much lower than has been the case in recent years. The adjustment of this exploitation rate should be made relative to the estimates of year class strength derived from the international 0-group surveys rather than by arbitrary catch adjustments".

It should be added that the most recent surveys indicate that the stocks still show no signs of recovery.

C.3 North-West Arctic Fisheries

28. At the Commission's Ninth Meeting the Liaison Committee reported on the results of an assessment of Icelandic cod and haddock stocks carried out by the Council's North-Western Working Group. Following the objections of the Icelandic Delegate to some of the conclusions of the Report being based only on trawling effort data when other gears were also in use, the Chairman of the Liaison Committee invited the Icelandic scientists to submit more detailed data on these other fisheries for consideration by the Liaison Committee. This has been done.

29. In the Report to the Ninth Meeting it was stated that the total catch of cod had increased from 1967 to 1969, in spite of a reduction in fishing effort. The Working Group had no data which allowed it to make a precise estimate of the actual fishing effort in terms of a standard unit. The total international fishing effort for each year up to 1969 was therefore estimated by raising the English effort data by the ratio between the English catch and the total international catch. The estimate so derived is nothing but an index which gives the total effort in terms of the English trawler ton hours necessary to account for the total catch in each year. It was on the basis of this index that a decrease in total effort of about 35% was regarded as having taken place between 1966 and 1969.

30. This technique, which is commonly used to obtain an index of the total effort, was chosen because:

- a) the English data were the only ones which were comparable between years for a long time period,
- b) effort data were not available for all countries and fisheries,
- c) the available effort data were not comparable between countries and gear.

31. National effort data for certain years for the United Kingdom, Germany and Iceland were available to the Working Group. From 1966 to 1969 the English effort had decreased by about 50%, and the German effort had decreased by about 10%, while the Icelandic estimates of their trawl effort showed an increase of about 60%.

32. The new Icelandic effort data submitted to the Liaison Committee are based on a conversion of effort by trawl, gill-net and long-line and by size category of vessels into a standard unit which expresses the effort as days fishing. These data show an increase in the total Icelandic effort of about 50% from 1966 to 1969. The details of the method of conversion have not been examined by the Liaison Committee.

33. It should be noted that the main conclusions of the Report of the North-Western Working Group are based on assessments which are completely independent of effort data. In the tabulation of changes in yield for different levels of "effort" in the Working Group's Report and in the Report of the Liaison Committee to the Ninth Meeting of NEAFC, the term "effort" refers to the fishing mortality rate.

34. When reporting on the effect of the proposed closure to trawling of an area off the north-east coast of Iceland, the Working Group estimated the proportion of fishing in that area on the basis of trawl catches and concluded that, in terms of the average for the 1965-1969 period, this fishery accounted for 6.1% of the total landings in the non-spawning fishery, the Icelandic share being 0.8%. The new information from Iceland indicates that in recent years the Icelandic catch figures for that area are larger than the figures presented by Iceland at the Working Group meeting. In the absence of concrete, detailed Icelandic data the Liaison Committee is not able to reassess the effect of a closure.

D. REGIONS 2 AND 3 FISHERIES

D.1.1 Herring fisheries in Region 2

35. At NEAFC's Special Meeting on Herring held in Moscow in December 1971 the Liaison Committee presented a new assessment of the North Sea herring fisheries including a prognosis of the development in catch and stock size for the period 1972-1975. The prognosis provided answers to some of the questions on which NEAFC asked for advice at its Ninth Meeting.

36. Due to the very restricted facilities and time available to the North Sea Herring Assessment Working Group at the meeting held immediately prior to the 1971 Statutory Meeting of ICES, it was necessary for the Group to meet at the end of January 1972 in order to make a critical review of its previous work, to make further considerations of the NEAFC questionnaire, and to collect preliminary catch statistics for 1971.

37. The Liaison Committee has appraised the recent report of the Working Group, and accordingly submits the following statement to the Commission:

Total Catch Limits

38. The previous prognosis was based on certain assumptions and estimates of the population parameters. In the present prognosis these parameters have been updated, e.g. the recruitment strength of the 1969 year class, which earlier was set at average (as are all subsequent year classes), was now assessed as being 50% above average.

39. From catch and effort data it was thought to be more realistic to use an adult fishing mortality of $F = 1.0$ in 1970 rather than $F = 0.7$ as used in the previous prognosis. Minor corrections to growth parameters and national catch figures were also introduced.

40. The present prognosis of the development in catch and biomass at different sets of values of fishing mortalities of juvenile and adult herring (Table 4) does not differ markedly from the one presented at the NEAFC Special Meeting on Herring.

41. In Table 4 the columns refer to specific fishing mortalities of juvenile (i.e. 1-ringed) herring from $F = 0.0$ to $F = 0.7$. Each row refers to a fishing mortality of adult herring from $F = 0.0$ to $F = 1.5$. At each intersection of rows and columns three figures are given. The upper figure is the expected catch in 1972, the middle figure gives the percentage change of the 1975 catch as compared with 1972, and the lower figure is the biomass of the stock in weight as at 31 December 1975 expressed as a percentage of the biomass as at 1 January 1972.

42. Entering the table at the calculated 1970 values of fishing mortalities ($F = 1.0$ for adults and $F = 0.5$ for juveniles) the expected total catch in 1972 is 638 thousand tons. If that level of fishing intensity is sustained, the catch in 1975 should decline by 14%, i.e. to about 550 thousand tons, and the biomass of the herring stock would be reduced by 8% over the 4 year period, all assuming average recruitment.

43. The new prognosis is thus compatible with the Committee's statement at the Moscow meeting: "Without a reduction in fishing effort it is expected that the stock will not recover and that catch as well as stock size may continue to decline".

Differential Catch Limits by Category

44. The fisheries for juvenile herring (15-22 cm) are mainly exploiting the 1-ringers (2 year old herring). Estimates of the effects of differential catch limits for this category can therefore be obtained from the table.

45. At constant average recruitment the upper row of Table 4, corresponding to an adult $F = 0.0$, indicates the catch of 1-ringed herring at different juvenile fishing mortalities in anyone year. They represent at the same time the yearly catch quotas to be applied in order to achieve the corresponding fishing mortalities.

46. As an example, a 60% reduction in juvenile mortality, e.g. from 0.5 to 0.2 could be achieved by a reduction of catch from 111 thousand tons to 51 thousand tons. With a sustained level of fishing mortality of 1.0 for the adults, the total catch in 1972 would be 578 thousand tons including 51 thousand tons of juvenile herring. In 1975 the predicted total catch would be 10% higher, i.e. about 636 thousand tons. This total would still only include 51 thousand tons of juvenile herring so the entire increase would benefit the adult fisheries.

Differential Catch Limits by Season

47. If fishing on herring is confined to the second half of the year, there will be an increase in average weight of the individual fish caught. If a catch quota in weight was enforced, then the conservation effect would be greater in the first half of the year than in the second.

48. Assuming that the same number of herring is caught in the second half of the year as would otherwise have been taken over the whole year, it has been estimated that, in the current range of fishing mortalities, the gain in weight could be of the order of 20-30%. However, if, as seems likely, closure of the fishery during the first half of the year would result in a decrease in the number of 1-ringers caught, there would be an additional increase in the subsequent gain in weight of the overall catch.

The Development of the Fishery in 1971

49. The preliminary catch figures for 1971 show an overall reduction of 100 000 tons compared with 1970. It should, however, be noted that past experience indicates that preliminary catch figures tend

to be too low. The catch of juvenile herring increased by about 100 000 tons, due to the entry of the comparatively good 1969 year class, while the catch of adult herring was reduced by about 200 000 tons.

50. The westward change in distribution of the fisheries, apparent in 1970, was continued in 1971 when a high proportion of the Norwegian, Faroese and Icelandic catches derived from west of 4°W.

51. It is too early to assess the effect of the closed periods in 1971. This will be considered by the Working Group when more detailed information is available.

D.1.2 The Bløden Tagging Experiment

52. As reported to the Commission in 1971 the ICES Working Group on the Bløden Herring Tagging Experiment met in 1971 to make a first assessment of the tagging data and to prepare the timetable for the remaining studies.

53. Two meetings were held in the spring and autumn of 1971. A first assessment of the data revealed that a marked migration of herring from the central to the north-western North Sea had taken place in the course of the experiment. Due to this complication, it was decided to apply a newly developed mathematical model which embraces parameters representing migration and dispersion. It was also realised that, with the relatively large number of tags returned from the north-western North Sea, the scope and outcome of the experiment could possibly be enlarged to determine the fishing rate and size of that part of the adult stock.

54. The amount of data and the complexity of the calculations involved have necessitated the use of a computer with a large capacity, which has been made available by the Marine Laboratory, Aberdeen. The computer analysis is being carried out during 1972 and the Working Group will meet as soon as possible after it has been completed.

D.2 North Sea Mackerel Stock and Fishery

55. In the last Report of the Liaison Committee, recent information on the state of the mackerel stock and fishery was presented to the Commission according to its request at the Eighth Meeting. From data

Table 1. Nominal catch (in 000's metric tons) by Subareas and main species in NEAFC Region 1.

	1963	1964	1965	1966	1967	1968	1969	1970
Total Nominal Catch in Region 1 ^{x)}	3 403	3 429	3 900	4 386	4 125	3 679	3 677	4 245
Subareas I and II (North-East Arctic)								
<u>Pelagic Fish</u>								
Herring	716	870	1 169	1 520	1 627	700	62	62
Capelin	35	20	222	389	408	538	680	1 314
Others	4	4	9	7	6	8	4	4
Total Pelagic Fish	755	894	1 400	1 916	2 041	1 246	746	1 380
<u>Demersal Fish</u>								
Cod	805	468	480	557	619	1 102	1 224	944
Haddock	145	87	106	130	95	156	146	85
Polar Cod	140	243
Saithe	149	198	186	203	181	110	133	236
Redfish	42	66	40	35	24	18	30	29
Flatfish	28	53	43	37	33	32	52	83
Others	52	64	59	56	52	56	60	74
Total Demersal Fish	1 221	936	914	1 018	1 004	1 474	1 785	1 694
Total Catch of all Species	1 976	1 830	2 314	2 934	3 045	2 720	2 531	3 074
Subarea V (Iceland and Faroe)								
<u>Pelagic Fish</u>								
Herring	531	640	628	492	145	37	30	19
Capelin	1	9	50	125	97	78	171	192
Others	1	1	-	1	1	1	-	-
Total Pelagic Fish	533	650	678	618	243	116	201	211
<u>Demersal Fish</u>								
Cod	433	460	421	381	371	414	443	503
Haddock	131	118	117	79	73	69	70	66
Saithe	61	82	82	78	97	98	144	142
Redfish	93	103	120	110	100	103	88	80
Flatfish	24	23	28	26	41	33	38	33
Others	64	55	58	47	53	61	69	53
Total Demersal Fish	806	841	826	721	735	778	852	877
Total Catch of all Species	1 339	1 491	1 504	1 339	978	894	1 053	1 088
Subarea XIV (East Greenland)								
Total Catch of all Species	63	81	58	80	60	40	50	40

x) Including non-teleost fish, unsorted and unidentified species.

Table 2. Nominal catch (in 000's metric tons) by Subareas and main species in NEAFC Region 2.

	1963	1964	1965	1966	1967	1968	1969	1970
Total Nominal Catch in Region 2 x)	2 571	3 005	3 471	3 638	3 912	4 262	4 043	4 071
Subarea IV and Div. IIIa (North Sea and Skagerrak)								
<u>Pelagic Fish</u>								
Herring	965	1 206	1 469	1 191	1 069	1 139	838	834
Mackerel	73	115	208	530	931	821	739	322
Sprat	78	76	79	111	76	70	69	58
Others	10	7	14	9	10	7	9	19
Total Pelagic Fish	1 126	1 404	1 770	1 841	2 086	2 037	1 655	1 233
<u>Demersal Fish</u>								
Cod	129	136	194	235	270	303	212	239
Haddock	65	199	223	270	169	140	640	673
Whiting	117	113	125	175	122	174	216	195
Norway Pout	180	97	68	65	194	486	151	290
Saithe	30	58	73	90	76	102	109	172
Sandeel	184	132	141	180	209	201	115	195
Plaice	125	133	110	109	115	126	135	145
Other Flatfish	49	36	43	58	66	61	49	38
Others	34	46	53	42	39	33	35	27
Total Demersal Fish	913	950	1 030	1 224	1 260	1 626	1 662	1 974
Total Catch of all Species	2 039	2 354	2 800	3 065	3 346	3 663	3 317	3 207
Subareas VI and VII (west and south of British Isles)								
<u>Pelagic Fish</u>								
Herring	83	90	90	131	143	142	192	230
Mackerel	27	27	22	46	39	40	45	65
Sprat	4	7	8	5	4	8	8	14
Others	12	14	7	6	6	5	21	80
Total Pelagic Fish	126	138	127	188	192	195	266	389
<u>Demersal Fish</u>								
Cod	20	35	41	41	48	45	46	29
Haddock	10	44	43	41	29	25	33	41
Whiting	36	39	47	45	53	44	39	28
Hake ^{xx)}	25	20	42	15	17	18	13	14
Flatfish	23	29	32	37	33	30	32	31
Others	48	48	74	40	50	60	86	77
Total Demersal Fish	162	215	279	219	230	222	249	220
Total Catch of all Species	288	353	406	407	422	417	515	609

x) Including non-teleost fish, unsorted and unidentified species.

xx) The hake statistics are unreliable. Part of the catch is reported by landing port and not by fishing area.

Table 3. Nominal catch (in 000's metric tons) by main species in NEAFC Region 3.

	1963	1964	1965	1966	1967	1968	1969	1970
<u>Total Nominal Catch in Region 3^{x)}</u>	794	890	899	811	824	780	766	785
<u>Pelagic Fish</u>								
Pilchard	220	252	225	215	199	164	151	136
Mackerel	27	29	56	44	56	43	49	82
Horse Mackerel	117	125	116	100	116	138	136	163
Others	148	181	226	162	162	126	117	107
Total Pelagic Fish	512	587	623	521	533	471	453	488
<u>Demersal Fish</u>								
Hake ^{xx)}	102	105	75	89	98	89	83	100
Others	93	98	108	108	111	118	111	108
Total Demersal Fish	195	203	183	197	209	207	194	208
<u>Grand Total</u>	707	790	806	718	742	678	647	696

x) Including non-teleost fish, unsorted and unidentified species.

xx) The hake statistics are unreliable. Part of the catch is reported by landing port and not by fishing area.

Table 4. Prognosis for North Sea Herring. - Initial catch levels (1972) and percentage increase in catch and biomass 1972-75.

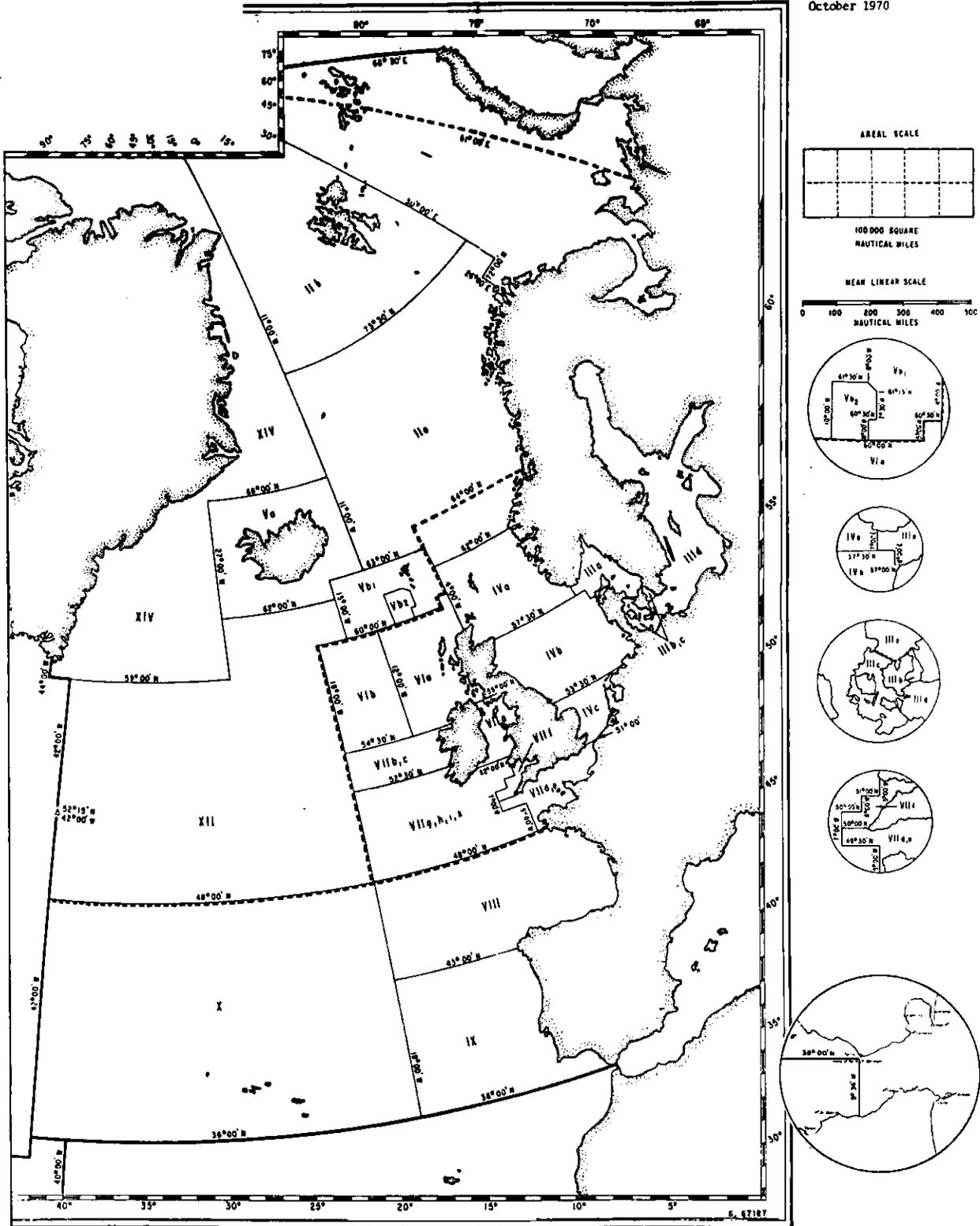
		Juvenile mortalities (1-ringers)							
F		.0	.1	.2	.3	.4	.5	.6	.7
Adult mortalities (2-ringers and older)	.0	0	27	51	73	93	111	127	142
		-	0	0	0	0	0	0	0
		392	359	329	302	277	255	235	217
	.1	79	105	130	152	172	190	206	221
		243	164	120	90	73	59	49	41
		300	272	247	224	203	184	167	152
	.2	150	177	201	223	243	261	277	292
		196	148	115	92	74	61	50	41
		231	208	186	166	149	133	118	105
	.3	215	242	266	288	308	326	342	357
		158	123	97	77	62	50	40	32
		180	159	141	124	109	95	82	71
	.4	273	300	324	346	366	384	401	416
		128	100	78	61	48	37	28	21
		141	123	107	92	79	67	56	46
	.5	327	353	378	400	419	438	453	469
	103	80	62	47	35	25	17	10	
	110	95	80	68	56	45	36	27	
.6	375	406	426	448	468	486	502	517	
	83	63	47	34	24	15	7	1	
	87	73	60	49	38	29	21	13	
.7	419	445	470	492	511	529	546	561	
	67	50	35	24	14	6	-1	-7	
	68	56	44	34	25	16	9	2	
.8	458	485	509	531	551	569	586	600	
	54	38	25	15	6	-2	-8	-14	
	54	42	32	23	14	7	0	-7	
.9	494	521	545	567	587	605	622	636	
	43	29	17	7	-1	-8	-14	-19	
	42	31	22	13	6	-1	-8	-13	
1.0	527	554	578	600	620	638	654	669	
	34	21	10	1	-7	-14	-19	-24	
	32	22	14	6	-1	-8	-13	-19	
1.1	556	583	607	629	649	667	684	699	
	26	14	4	-5	-12	-18	-23	-28	
	24	15	7	0	-7	-13	-18	-23	
1.2	583	610	634	656	676	694	711	725	
	20	8	-1	-9	-16	-22	-27	-31	
	17	9	2	-5	-11	-17	-22	-27	
1.3	608	634	659	681	701	719	735	750	
	14	3	-6	-13	-20	-25	-30	-34	
	12	4	-3	-9	-15	-20	-25	-29	
1.4	630	657	681	703	723	741	757	772	
	10	-1	-9	-16	-23	-28	-33	-36	
	7	0	-7	-13	-18	-23	-28	-32	
1.5	650	677	701	723	743	761	777	792	
	6	-4	-12	-19	-25	-30	-35	-39	
	3	-4	-10	-16	-21	-26	-30	-34	

Upper figure: catch 1972 (1 000 tons)

Middle figure: increase in catch 1972-75 (%)

Lower figure: increase in biomass 1972-75 (% in weight).

October 1970



ICES and NEAFC Fishing Areas