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Extracts from ICES Liaison Committee's Report to NEAFC, 1973

Note: Only three sections of the Liaison Committee's Report are reproduced in full: Sections A, B.3 and D. Some of the remaining sections relating to cod, redfish, herring, mackerel and capelin are briefly summarized from the viewpoint of the state of the stocks. A complete copy of the Report with Annexes is available at the ICNAF Secretariat for reference.

Assistant Executive Secretary

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PREPARATION OF THE LIAISON COMMITTEE'S REPORT

The Committee informed the Commission at its last meeting that in order to achieve improvements in stock assessment it is essential to greatly improve the coverage, accuracy and speed of reporting national statistics, to extend substantially the biological sampling programmes, and to monitor recruitment by means of larval, 0-group and groundfish surveys. In preparing its present Report, the Committee has noted that the work of various ICES Working Groups is being seriously hindered by lack of the most recent statistical data.

The groups require the data from the most recent calendar year and some countries cannot provide these before the end of February. Thus, if meaningful assessments are to be provided, the groups and the Liaison Committee should meet in March, not in February as at present. This would entail the Liaison Committee's Report's reaching the Commissioners less than 60 days before the Commission's annual meeting.

It is also becoming more and more difficult to find time for Working Group meetings in the first two months of the year. As many as 7-10 meetings are involved at a time when a number of scientists are also engaged in the mid-term meetings of ICNAF.

It would seem, therefore, that some re-adjustment of the Commission's and the Council's timetables is called for, and the Council would welcome the early opportunity to discuss this matter with representatives of the Commission.

A. REVIEW OF NOMINAL CATCHES IN NEAFC AREA 1964 - 1971

1. A general review of the fish production in the Convention Area from 1964 - 1971 is given in Tables 1-3. The tables, which are based on statistics published in ICES "Bulletin Statistique", show for each NEAFC region (i) the nominal catch of all species combined, (ii) the catch in the main fishing areas of (a) demersal species (comprising Pleuronectiformes - flatfishes; Gadiformes - codfishes; demersal Percomorphs - 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 ICES 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, Sub-areas and Divisions referred to is given at the end of the Report. It should be noted that data for 1971 for Finland and Spain are not included in Tables 1-3, as they have not been submitted. Information is only available regarding the total Spanish catches in each region. They were 14 000 tons in Region 1 and 590 000 tons in Region 3. It should be noted that the grouping of catches in Regions, Sub-areas and Divisions does not necessarily accord with the patterns of distribution of individual stocks.

Region 1 (Table 1)

3. The total production of all species combined was 4 200 000 tons in 1971, which was at about the same level as in 1970.
4. In Sub-areas I and II the catch of capelin in 1971 remained at the high level of about 1 400 000 tons to which it rose between 1969 and 1970. Herring catches are still negligible. Catches of cod, which fell by about 300 000 tons from 1969 to 1970, decreased by a further 200 000 tons in 1971 to 724 000 tons. The catches of Polar cod again showed a substantial increase from 243 000 tons in 1970 to 348 000 tons in 1971. Saithe catches were also high in 1971 - above 200 000 tons - even if there was a slight decrease from last year's figure.
5. There were no substantial changes in the catch of any of the species from Sub-area V, and the total catch was the same as in 1970.

Region 2 (Table 2)

6. The total catch in Region 2 was about the same as in 1970, showing only a slight decrease to just under 4 000 000 tons.

7. In Sub-area IV and Division IIIa both herring and mackerel catches decreased by about 100 000 tons from the 1970 level to 735 000 tons of herring and 243 000 tons of mackerel. The reported catches of sprat, however, rose from 58 000 tons to 100 000 tons and the catch of cod went up by 100 000 tons. There were also large increases in the catches of both Norway pout and sandeels. The former rose from 290 000 tons to 385 000 tons, and the latter from 195 000 tons to 404 000 tons. The catch of haddock, on the other hand, decreased substantially from a level of 650 000 tons in 1969 and 1970 to only 260 000 tons in 1971.

8. In Sub-areas VI and VII the total catch increased by 100 000 tons to 709 000 tons, herring and mackerel forming the main component of this increase.

9. The catches in Region 2, which were not specified in the corresponding table in last year's Report, contained 147 000 tons of unsorted and unidentified species caught mainly in Sub-area IV and Division IIIa. The corresponding figure for 1971 is 137 000 tons.

Region 3 (Table 3)

10. Since the Spanish catches, which make up the major part of the fisheries carried out in Region 3, have not been reported for 1971, Table 3 does not give any indication of trends in the fisheries in that area.

B. REGION 1 FISHERIES

B.1 North-East Arctic Fisheries

B.1.1 Arcto-Norwegian Cod

Preliminary data indicate that the 1972 nominal catch decreased to 643,000 tons from 705,000 tons in 1971. With $F = 0.63$ (1971 level), catches in 1973 and 1974 are estimated to be 500,000 and 650,000 tons respectively. As a result of relatively poor recruitment in 1965-68, the spawning stock will continue to decrease to a very low level in the mid-1970's (1/40 of the stock size in the 1940's). Since an annual yield of 800,000 tons might be expected from an optimum level of spawning stock as existed in the early 1950's, to maintain such a stock size fishing mortality on fully recruited age-groups would have to be greatly reduced (to $F = 0.26$ compared with the present $F = 0.63$).

B.2 Effects of Increase in Mesh Size

B.2.1 Arcto-Norwegian Cod

Assuming the most recent pattern of fishing and fishing mortality, with $M = 0.3$, the mesh assessments show a 30% increase in mature stock biomass per recruit for a mesh size corresponding to an age at first capture of 5 years, but only a slight increase in total yield per recruit.

B.2.3 Iceland Cod

An increase in mesh size from 130 to 140 mm (manila) would in the long term result in an increase in the total yield of the stock.

B.2.4 Redfish

Selection experiments at East Greenland have shown that the selection factor for Sebastes marinus decreases with increasing catches. In big catches there is nearly no selection. A further problem is the meshing which, according to the most recent observations, takes place during hauling. It depends on the mesh size and the length composition of the catches. The number of meshed redfish increases with increasing mesh size up to a size which corresponds to the most frequent length of the redfish. If the mesh size is then increased still further, the number of meshed fish decreases. If these findings hold true for Division IIa, where fishing for Sebastes marinus also takes place, meshing is at its greatest with the mesh size now in force and with a modal length of Sebastes marinus of 40.6 cm. An increase in mesh sizes in Division IIa would therefore decrease the rate of meshing. In other divisions an increase in mesh size would tend to increase somewhat the rate of meshing.

B.3 ICES/ICNAF Assessment of North Atlantic Cod Stocks

24. An ICES/ICNAF Working Group on Cod Stocks in the North Atlantic met in 1972 and integrated assessments for the various cod stocks with estimates of fishing effort and fleet structure through the decade 1960-70. This showed that the progressive increase in the range and mobility of the fleets, through technological improvement, has increased their overall efficiency to the level where all the available cod resources can be fully exploited by the fleet which was deployed on cod in 1970.

25. The data assembled were incorporated in a model which permits appraisal of the interaction between fisheries. Considering selected North Atlantic stocks as a single fishery unit, using the 1970 ratio of mobile to non-mobile effort, and assuming that recent recruitment levels are maintained, the Working Group concluded that:-

- a. There is a probability that spawning stocks as low or lower than the present could lead to a recruitment failure and consequently to a very large drop in total catch. Taking this into account, and to some extent the economic benefits implied by an improved catch per unit effort, a desirable level of fishing mortality (effort) would be approximately half the present level. This would not affect the average long-term yield.
- b. If such a reduction were achieved in a single year, then, given average recruitment, the cod catch would recover close to the current level after a transitional period of five years.
- c. The same benefit could be achieved by a phased reduction involving less immediate disturbance to the catch, though it would perhaps take ten years to realise the full benefits.

- d. If the displaced fishing effort remained fishing and could be redeployed on lightly exploited species, there would be an increase in the total catch of all species and a less severe immediate loss.

26. This conclusion applies to the North Atlantic cod resources as a whole; the effect on individual resources of a 50% reduction of fishing mortality would vary. But, if regulation of fishing mortality is applied to one or more stocks in the North Atlantic, it is now possible from the model to judge more exactly the effects that the diversion of fishing effort might have on other unregulated cod stocks.

27. The Report has been published as ICES "Cooperative Research Report", No.33.

B.5 Atlanto-Scandian Herring

The stock is still in a very critical state and shows no signs of improvement at all.

B.6 Capelin

The capelin catches reached 1,870,000 tons in 1972, of which 1,600,000 were caught in the Barents Sea and the remainder in Iceland. The Barents Sea adult stock in 1972 was estimated by acoustic surveys and observations on egg production to be about 10,000,000 tons. Calculations indicate that the 1973 spawning stock will be greater than in 1972. Also the Iceland stock is believed to be at a high level and the 1972 year-class is estimated to be the strongest for several years.

C. REGIONS 2 AND 3 FISHERIES

C.1.1 North Sea Herring

The 1972 catch of about 500,000 tons is very close to that of 1971. The fishery is very dependent on young fish, with about 70% of the 1971 and 1972 catches consisting of juveniles and maturing first time spawners. The I-group constituted over 50% by number of the 1971 and 1972 catches. There is an indication that the fishing mortality on adults was $F = 0.7$ in 1972 compared with $F = 1.0$ for earlier years. However, the maximum sustainable yield, with no fishing on juveniles, is obtained at $F = 0.4$.

Biomass estimates of the adult stock (2-group and older) fished in the North Sea indicate a preliminary estimate of about 400,000 tons in 1972, an 87% reduction from the 3,000,000 tons of adults estimated for the late 1940's.

C.2 North Sea Mackerel

The mackerel catch declined from 740,000 tons in 1969 to less than 200,000 tons in 1972, and the mature stock is estimated to have declined from 3,500,000 tons in 1965 to 500,000 tons in 1971. There was an increase in spawning stock to about 1,200,000 tons in 1972 due to the very strong 1969 year-class. The 1970 and 1971 year-classes are both poor and insignificant recruitment can be expected in 1973 and 1974. The maximum sustainable yield may be obtained at a level of 30% annual fishing mortality. It is estimated at 350,000 tons per year, maintaining a spawning stock of about 1,200,000 tons. A minimum legal size of 30 cm is found to be justified at the level of fishing mortality giving the maximum sustainable yield.

D. NORTH ATLANTIC SALMON

89. At its meeting in March 1972 the Joint ICES/ICNAF Working Party on North Atlantic Salmon reviewed the latest information available about the long-line fishery for salmon in the Norwegian Sea and made further assessments of its effects. They also discussed and approved the final plans for the International Salmon Tagging Experiment to be conducted by member countries of ICES and ICNAF at West Greenland in 1972.

90. The regulatory measures which were adopted by NEAFC at its Annual Meeting in 1970, and which came into force on 1 January 1971, affected the catches in 1971 in several respects. These measures included a closed season, closed areas, a minimum size for salmon caught and a minimum hook size.

91. The catch in the Norwegian Sea in 1971 (estimated at 488 metric tons) was about half that in 1970 (estimated at 958 metric tons) and the fishing effort was lower in 1971. On the basis of Danish catch data, the proportion of one-sea-winter fish (15-20% of the catch, 15% of the landings) was found to be higher in 1971 than in 1970, when they formed 10% of the catch. The application of a closed season and, probably, closed areas, were factors affecting this change. No commercial salmon fishing was conducted near the Faroes in 1971.

92. The records for 1971 indicate that, as in previous years, most of the salmon fished in the Norwegian Sea originated from and returned to Norwegian rivers, though some recaptures were recorded from rivers in the U.S.S.R. During the spring of 1969, 1970 and 1971 a total of 666 salmon were tagged near the Faroes. 29 recaptures have been reported; 15 in Scotland, 5 in Norway, 5 in Ireland, 2 at West Greenland and 1 each in England and Wales and the U.S.S.R. Most of the recaptures were made in the year of tagging.

93. Assessments were again made of the effect of the Norwegian Sea fishery on the total yield (Norwegian Sea plus home waters) and on home water stocks and catches. The former indicated that in 1971, as in 1970, the Norwegian Sea fishery resulted in a larger catch of two-sea-winter salmon than would have been taken in its absence. As the long-line catch in 1971 was substantially less than that in 1970 and 1969, the estimated losses to home-water stocks and catches were correspondingly smaller.

It was estimated that, in 1971, the loss to home-water stocks was about 400 metric tons, and the loss to the home-water catch between about 200 and about 300 metric tons.

94. In the course of the International Salmon Tagging Experiment at West Greenland, carried out during August, September and October 1972, 2 364 salmon were tagged and up to 19 January 1973 124 recaptures had been recorded, all in Greenland waters.

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

	1964	1965	1966	1967	1968	1969	1970	1971 ^{xx)}
Total Nominal Catch in Region 1 ^{x)}	3 429	3 900	4 386	4 125	3 679	3 677	4 245	4 193
Sub-areas I and II (North-East Arctic)								
<u>Pelagic Fish</u>								
Herring	870	1 169	1 520	1 627	700	62	62	21
Capelin	20	222	389	408	538	680	1 314	1 392
Others	4	9	7	6	8	4	4	3
Total Pelagic Fish	894	1 400	1 916	2 041	1 246	746	1 380	1 416
<u>Demersal Fish</u>								
Cod	468	480	557	619	1 102	1 224	944	724
Haddock	87	106	130	95	156	146	85	80
Polar Cod	140	243	348
Saithe	198	186	203	181	110	133	236	211
Redfish	66	40	35	24	18	30	29	44
Flatfish	53	43	37	33	32	52	83	108
Others	64	59	56	52	56	60	74	80
Total Demersal Fish	936	914	1 018	1 004	1 474	1 785	1 694	1 595
Total Catch of all Species	1 830	2 314	2 934	3 045	2 720	2 531	3 074	3 011
Sub-area V (Iceland and Faroes)								
<u>Pelagic Fish</u>								
Herring	640	628	492	145	37	30	19	14
Capelin	9	50	125	97	78	171	192	183
Others	1	-	1	1	1	-	-	1
Total Pelagic Fish	650	678	618	243	116	201	211	198
<u>Demersal Fish</u>								
Cod	460	421	381	371	414	443	503	481
Haddock	118	117	79	73	69	70	66	66
Saithe	82	82	78	97	98	144	142	165
Redfish	103	120	110	100	103	88	80	84
Flatfish	23	28	26	41	33	38	33	29
Others	55	58	47	53	61	69	53	64
Total Demersal Fish	841	826	721	735	778	852	877	889
Total Catch of all Species	1 491	1 504	1 339	978	894	1 053	1 088	1 087
Sub-area XIV (East Greenland)								
Total Catch of all Species	81	58	80	60	40	50	40	63

^{x)}Including non-teleost fish, unsorted and unidentified species

^{xx)}Not including catches by Finland and Spain

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

	1964	1965	1966	1967	1968	1969	1970	1971 ^{xxx)}
Total Nominal Catch in Region 2x)	3 005	3 471	3 638	3 912	4 262	4 043	4 071	3 960
Sub-area IV and Div. IIIa (North Sea and Skagerrak)								
<u>Pelagic Fish</u>								
Herring	1 206	1 469	1 191	1 069	1 139	838	834	735
Mackerel	115	208	530	931	821	739	322	243
Sprat	76	79	111	76	70	69	58	100
Others	7	14	9	10	7	9	19	38
Total Pelagic Fish	1 404	1 770	1 841	2 086	2 037	1 655	1 233	1 116
<u>Demersal Fish</u>								
Cod	136	194	235	270	303	212	239	339
Haddock	199	223	270	169	140	640	673	260
Whiting	113	125	175	122	174	216	195	126
Norway Pout	97	68	65	194	486	151	290	385
Saithe	58	73	90	76	102	109	172	213
Sandeel	132	141	180	209	201	115	195	404
Plaice	133	110	109	115	126	135	145	133
Sole	12	17	32	34	29	28	20	24
Other Flatfish	24	26	26	32	32	21	18	22
Others	46	53	42	39	33	35	27	32
Total Demersal Fish	950	1 030	1 224	1 260	1 626	1 662	1 974	2 038
Total Catch of all Species	2 354	2 800	3 065	3 346	3 663	3 317	3 207	3 154
Sub-areas VI and VII (west and south of British Isles)								
<u>Pelagic Fish</u>								
Herring	90	90	131	143	142	192	230	295
Mackerel	27	22	46	39	40	45	65	87
Sprat	7	8	5	4	8	8	14	9
Others	14	7	6	6	5	21	80	58
Total Pelagic Fish	138	127	188	192	195	266	389	449
<u>Demersal Fish</u>								
Cod	35	41	41	48	45	46	29	32
Haddock	44	43	41	29	25	33	41	54
Whiting	39	47	45	53	44	39	28	32
Hake ^{xx)}	20	42	15	17	18	13	14	12
Flatfish	29	32	37	33	30	32	31	32
Others	48	74	40	50	60	86	77	98
Total Demersal Fish	215	279	219	230	222	249	220	260
Total Catch of all Species	353	406	407	422	417	515	609	709

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.

xxx) Not including catches by Finland.

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

	1964	1965	1966	1967	1968	1969	1970	1971 ^{xxx)}
Total Nominal Catch in Region 3^{x)}	890	899	811	824	780	766	785	222
<u>Pelagic Fish</u>								
Pilchard	252	225	215	199	164	151	136	93
Mackerel	29	56	44	56	43	49	82	8
Horse Mackerel	125	116	100	116	138	136	163	59
Others	181	226	162	162	126	117	107	22
Total Pelagic Fish	587	623	521	533	471	453	488	182
<u>Demersal Fish</u>								
Hake ^{xx)}	105	75	89	98	89	83	100	22
Others	98	108	108	111	118	111	108	18
Total Demersal Fish	203	183	197	209	207	194	208	40
<u>Grand Total</u>	790	806	718	742	678	647	696	222

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.

xxx) Not including catches by Finland and Spain.

