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Report of ICES Liaison Committee to NEAFC, 1966

Contents

A. Matters arising from the 1965 meeting of NEAFC

A1. No new information concerning the effect on the fisheries in Region 3 of the Commission, of the recommendations passed at the 1965 meeting have been reported to ICES.

A2. No information on any special fishery for dabs has been submitted to the Liaison Committee.

A3. A detailed report on the use of chafers, methods of measuring nets, actual mesh sizes in use, differentials and other matters related to selectivity is given in Section B.

A. 4 Information on the picked dogfish and herring are given in Sections D1-3 and D8 and 9.

Annexes I and II have been omitted here. They are available for reference in the files of the ICNAF Secretariat.

A5. The North-Western Working Group was reconvened, and met in Copenhagen in December 1965; the report of this meeting is attached as Annex I, and summarised in Section C.

A6. The Working Group on Arctic Fisheries has not had a formal working meeting since the last Commission meeting, but the individual scientists have continued their studies, and most met in Rome during the ICES meeting. It was agreed that the evidence suggested that the results of the scientific work in progress would not alter the conclusions in last year's report - that there could be considerable increases in catch and in catch per unit effort with the use of a substantially larger mesh size, and that a reduction in total effort, probably by as much as a half, would not only increase the annual catches of cod (and probably haddock) above what they would otherwise have been, but also very greatly increase the catches per unit effort; larger meshes and smaller effort together would be even more beneficial.

A7. In 1964 the total fishing effort in the North-east Arctic decreased, One year is too short a period for the reduction in effort to have its full effect on the stocks, which thus remained at a very low level, and the total catch fell to only 480,000 tons, the lowest catch (except for the war years) since 1934. It appears that some of the year-classes which will enter the fishery in the near future are below average, so that the stock may not immediately increase even though the total fishing effort remains low, although catches, and more particularly stock, will be larger than they would otherwise have been - the more so when the mesh increases make their full effect on the stock. The important thing is that the effort should not increase again.

A8. Data on discards, length measurements of commercial catches, and the effective selectivity of the gear in use in the Arctic fisheries have been collected and are being analysed by national laboratories. Some have already been reported to ICES, but there is still a great need for further information, especially on discards.

B. Selectivity

B1. Reports of the actual mesh sizes of codends in use as measured with an ICES gauge have been received from most countries, though not all reported detailed measurements of individual codends. The reports received showed that the actual mesh size often differed considerably from the minimum size required by the Commission's recommendations. The results are shown in Table 1.

B2. The largest meshes, relative to the Commission's requirements, are used by vessels fishing for cod and plaice in the North Sea. Two countries (A, B) reported that their seiners engaged in these fisheries used meshes of 100-110 mm. One country (A) reported trawl mesh sizes for various materials (mainly double synthetic) of between 75 and 100 mm, with an average of over 80 mm.

B3. Smaller meshes were reported for trawlers fishing for other protected species (soles, haddock and whiting) in the North Sea. One country (C) reported a mean mesh size of 60 mm from seventeen trawlers (range 47-69 mm). Another country (D) reported average mesh sizes from sixty-four nets of 67 mm (range 57-73 mm) for double synthetic, and 62 mm (range 60-64 mm) for single synthetics. Both these series were made in 1965 or late 1964, using an ICES gauge.

B4. A third country (A) reported routine measurements from seiners fishing for haddock, cod etc. in Region 2, all made with a wedge gauge which showed all nets to have average mesh sizes greater than the

Table 1. Mesh sizes in use by different fleets

Region	Material	Gear	Convention Mesh	Country	Species Fished	Gauge	Mesh Size		Notes
							Mean	Range	
2	-	Seine	70	A	Plaice, Cod	Wedge	-	100-110	
2	-	Seine	70	B	Plaice	ICES	-	100-110	Used at 3 kg pressure
2	Double synthetic	Trawl	75	A	Plaice, Cod	Wedge	80+	75-100	
2	Double synthetic	Trawl	75	C	Sole etc.	ICES	60	47- 69	
2	Double synthetic	Trawl	75	D	Sole	ICES	67	57- 73	
2	Single synthetic	Trawl	70	D	Sole	ICES	62	60- 64	
2	Single synthetic	Seine	70	A	Haddock, Cod etc.	Wedge	71	70- 74	
2	Double manila	Trawl	80	E	Haddock, Cod etc.	Wedge	85	82- 90	
2	Double synthetic	Trawl	75	E	Haddock, Cod etc.	Wedge	77	71- 85	
2	Single synthetic	Trawl	70	E	Haddock, Cod etc.	Wedge	70	70	
2	Single synthetic	Seine	70	E	Haddock, Cod etc.	Wedge	69.5	67- 72	
1	Double polyamide	Trawl	110	G	Cod, Redfish	ICNAF	111	110-117	
1	Double Polyamide	Trawl	110	F	Redfish, Cod	ICES	103	85-117	Includes vessels fishing in the ICNAF areas 1, 2, 3
1	Double Polyethylene	Trawl	120	F	Redfish, Cod	ICES	98	86,110	Two vessels also fishing in ICNAF areas 1, 2, 3
1	Double Polyamide	Trawl	110	A	Cod	Wedge	120		1 net only
1	Double Manila) Double Polypropylene)	Trawl	120	A	Cod	Wedge	c120	71-over 120	Two nets with meshes of 71 and 74 mm. Otherwise no net with mesh less than 109 mm.

Commission's requirements. However, direct comparisons with the ICES gauge showed that, especially when the mesh size was close to the Convention minimum, the measurements recorded with the wedge gauge were larger than those with the ICES gauge. It is therefore likely that, at least for one group of vessels, at one port, whose reported mesh sizes were all at or only very slightly above the Convention mesh, the actual mesh sizes, as measured with an ICES gauge, were rather below the Convention size.

B5.. Another country (E), mainly interested in haddock, whiting and cod, reported on the measurements, with an ICES gauge, of the meshes of trawlers and seiners fishing in Region 2 in 1964 (17 nets) and 1965 (72 nets). The trawlers tended to have nets slightly above the Convention size. Some individual seiners had nets slightly below the Convention size (especially those using courlene in 1964), but the average of all seine nets was almost exactly (within 0.5 mm) at the Convention size.

B6.. Two other countries reported that their vessels, when using a light trawl (single synthetics) used nets of 70 mm, but no actual measurements were reported.

B7. Three countries reported data from Region 1:

(1) For one country (F) the information included measurements from trawlers fishing ICNAF Subareas 1, 2 and 3, as well as the north-west part of Region 1, so that, although the average mesh size of forty-eight codends made of polyamide was 103 mm (range 85-117 mm), this may be an under-estimate of the average mesh size in use in the Commission's area. Two polyethylene codends from ships in the same fleet had mesh sizes of 86 and 110 mm.

(2) Another country (G) reported measurements at sea from twenty-four nets on ten vessels, all using polyamide and fishing in the north-eastern area. The average mesh size, as measured with an ICNAF gauge was 111.4 mm (range 109.8-116.9 mm). The ICNAF gauge is also a pressure gauge, but differs from the ICES gauge in that the standard pressure is applied in thrusting the gauge into the mesh, rather than in directly stretching the mesh. At the 1964 ICNAF meeting the results of the comparisons between the two gauges were studied, and it was agreed that, on the same mesh, the ICNAF gauge would give a reading about 5% greater than the ICES gauge. Therefore the above meshes, if measured with an ICES gauge, would have had an average mesh size of around 105 mm.

(3) A third country (A) reported measurements from forty-eight vessels fishing in Region 1, but did not distinguish between vessels fishing in the north-eastern and north-western parts. Apart from two nets with meshes of 71 and 74 mm (on a vessel normally fishing outside the 110-120 mm area), manila and polypropylene nets had mesh sizes varying from 109 to over 120 mm (no precise measurements were recorded of sizes over 120 mm) with an average of over 117 mm. One polyamide codend had meshes of over 120 mm.

B8. From these observations the Committee has to conclude that there is quite widespread failure to achieve the Commission's requirements. To some extent this is due to the use of meshes so small that they would be undersize on any gauge, but the failure was also demonstrated when the meshes were proved to be undersized as measured with an ICES gauge, although at the time of inspection a gauge had been used which resulted in measurements at or slightly above the minimum size.

B9. The Committee wish to reaffirm the essential nature of the information on the actual mesh sizes in use, both for studying the effects of fishing on the stocks in general, and in particular assessing the probable effects of changing the regulation size; the fact that very often the mesh size in use departs quite widely from the Convention size makes the need for information more essential.

The Committee recommends to the Commission that information on the mesh sizes actually in use should be supplied each year. This information should be submitted by each country for each of its fisheries for which the Commission has recommended a minimum mesh size; the information for each year should be submitted to the Commission by 1st July of the year following, and should be in the form of the actual average mesh sizes for different materials from individual nets (grouped when data are numerous), as measured with an ICES gauge. If a gauge other than the ICES gauge is used this should be stated, and data provided of the calibration of the gauge against the ICES gauge.

B10. Most countries reported on the methods of measuring meshes for enforcement. All considered the mesh size of a codend to be represented by the average of a number of meshes, rather than attempting to enforce the strict wording of the Convention that no mesh should be below the Convention minimum.

B11. Most countries use wedge type gauges for enforcement purposes, sometimes with parallel-sided sections at the respective Convention sizes. Two countries have recently changed to a pressure type of gauge; one uses the ICNAF type, and the other the ICES gauge, but with the pressure set at 3 kg, rather than the ICES standard of 4 kg, because it was considered that 4 kg pressure unduly stretched the light materials used by the fishermen concerned.

B12. The Committee must repeat their previous advice that a uniform standard cannot be achieved by the use of wedge or other non-pressure gauge alone. This is confirmed by the report at the ICES meeting of a difference of up to 5 mm in 70 mm in the size of mesh enforced by two inspectors of the same country, who differed widely in the thrust applied to the wedge gauge. The Committee therefore reaffirm their previous recommendation that, as freedom from personal factors is important, the ICES gauge should be used as the standard.

B13. For international inspection the Committee considers that comparability would be essential, that only a small number of gauges would be needed, and that the cost should be a minor consideration.

The Committee therefore recommends the use of the ICES gauge for international inspection.

B14. It may also be noted that the use of the ICES gauge for inspection, either national or international, need not preclude the use of the flat gauge for court proceedings. Any net whose average mesh size, as measured on the ICES gauge, is less than the required size will certainly have many meshes, if not the majority, which the flat gauge of the required size will not pass "easily" through, whatever force is considered as reasonable, so that the strict legal requirement that no mesh should be less than the required size will not be satisfied.

B15. Consideration both at the ICES meeting and later was given to the need for a simpler gauge, reasonably free from personal bias, for fishermen and others to use, but the Committee has no definite suggestions to make for such a gauge at present. However, individual differences can be reduced if the operators concerned have the regular opportunity to compare their measurements, e. g. with a flat gauge, with measurements made with the ICES gauge.

B16. Chafers: No extensive new data on the effect of chafers were made available to the Committee. Preliminary results for cod in the Greenland area, reported verbally at the ICES meeting, of experiments with double topside chafers of very large mesh suggested that even when fitted tightly they do not reduce the selectivity greatly. Chafers with mesh sizes of four times the codend mesh reduced the selectivity by 4%; chafers with mesh sizes of twice the codend mesh reduced the selectivity by 6%. In contrast, similar tight chafers of the same mesh size as the codend reduced the selectivity by 23%. Attention should also be drawn to reports from the USSR to ICNAF that covers of similar mesh applied tightly and matched by lacing along the sides and middle were said to have no effect on mesh selection. These results were obtained under carefully controlled conditions and the Committee could not be certain that under commercial conditions, with less careful rigging, the effect on selectivity would be the same.

B17. Differentials: Further information on selectivity of polypropylene for haddock, cod and whiting was supplied. The results, both for different hauls in the same experiments, and for different experiments were, as usual, highly variable. They were in agreement with earlier suggestions that polypropylene is only slightly more selective than manila.

B18. Selectivity data were available from two ships fishing close together with similar gear. Significant differences of up to 10% in selectivity were found. Other experiments suggested that the precise rigging of the trawl can influence the selectivity. These results confirm previous conclusions, (a) that it is extremely difficult to measure the selectivity of a fishing unit (ship plus net plus method of fishing) with any very great precision - better than 3 or 4 per cent, and (b) that therefore only large "differentials" deserve recognition. (See relevant table in Part II of the 1964 Liaison Committee Report). Further, the true selectivity of a fishing unit may well change due to changes in, for example, the rigging of the gear even though the material of the codend does not change.

C. North-Western Working Group (see Annex I)

General

C1. The main demersal fish in the landings from the area considered (Faroes, Iceland and East Greenland) is cod, which made up over 50% of the landings - nearly half a million tons out of a total of 940,000 tons in 1964. The other main species were redfish (15%), haddock (13%) and coalfish (9%). The effect of changes in minimum mesh size on the landings of all these were considered; where data permitted the effect of changes in total effort were also considered.

C2. In assessing the effect of mesh increases the group confirmed the widespread use of chafers; these, as concluded in the 1964 Liaison Committee Report, reduce the effective selectivity of the nets by some 20%, so that the effective mesh in use at Iceland and East Greenland is equivalent to about that of 100 mm manila without chafers. Assessments have been made of the effects of increasing the effective mesh size from 100 mm in 10 mm steps up to 140 mm, and, for the cod at Iceland, to 160 mm. The effect of increasing the minimum mesh size required will depend on the extent of the future use of chafers and the degree to which they restrict selectivity. For example, if chafers with the same degree of restriction continue to be used an increase in the minimum mesh size to 130 mm (manila) would increase the effective mesh size to about 110 mm; the use of non-restrictive, or no chafers, without changing the required mesh size, would increase the effective mesh size to 120 mm.

C3. As in previous reports the assessments in this report compare future catches, with increased mesh size or changed effort, with catches that would have been taken in the future with unchanged mesh size and effort. The actual levels of the catches in the future may also differ from the present catches for other, environmental, reasons independent of fishing (e.g. good or poor year-classes), but these will generally not alter the benefit from, e.g. a mesh increase.

Iceland

C4. Iceland cod: The cod fisheries consist of two main groups; the major share of the catch is taken in the spawning fisheries for mature fish by a wide variety of gears; a slightly smaller share is taken by the fisheries for immature fish, mainly caught by trawl. The total amount of fishing on the cod stocks has increased since the war to six or more times the 1946 level. The total landings at first also increased and reached a maximum in 1954; they have since declined. The catch per unit effort has steadily declined. (Annex I, Figures 1 and 2, Appendix Tables 1, 2, 3).

C5. These statistics suggest that the cod stocks are heavily fished. More detailed information from the spawning fishery shows that 70% of the mature fish die each year, and four-fifths of these deaths are due to fishing. (Annex I, Figure 3). Fishing is probably less heavy on the immature fish.

C6. Cod mesh assessments: (Annex I, Table 2). Following the use of larger effective meshes the total catch would increase for mesh sizes up to at least 160 mm, at which there may be a 10% gain at the current level of effort. Because the trawlers take less than half the catch, but suffer all the initial loss, the catches of those trawlers fishing for the smaller cod will only increase for mesh sizes up to 130 mm; for larger meshes the benefits to these trawlers will decrease, and for a 160 mm mesh there may even be small long-term losses. (As usual these estimates, which make no allowance for adjustments in fishing practice, e.g. shifting from small fish grounds by the trawlers, give an under-estimate of the long-term catches of the trawlers.) The non-regulating gears, catching mainly spawning fish, will of course benefit from any increase in mesh size, but there will be a delay of four to five years before any benefit from the changes in trawl mesh appear in the spawning fishery.

C7. No precise estimate was made of the long-term effects of changes in fishing effort, but a reduction of say a quarter in effort may cause a slight increase in average total catch. It would certainly lead to an increase in catch per unit of effort. The benefits would be greater if there were also an appropriate increase in mesh size.

C8. Iceland haddock: Since 1946 the haddock catches have increased, reaching a maximum in 1962 nearly twice the maximum catch before 1946. The total effort has probably been increasing even faster - at about the same rate as the effort on cod. The catch per unit effort has declined greatly since 1946, but is still about the same as in the 1930s, despite a probable doubling of effort. (Annex I, Figure 4).

C9. This improvement in total catch, and in catch per unit effort at a given level of effort, is believed to be due to a large extent to better protection of the young fish, through closure to fishing of certain nursery grounds where small fish are particularly abundant, and the use, following the 1946 Convention, of a substantially larger mesh (c. 100 mm compared with c. 70 mm). It may be noted that the increase is of the same order as the predicted increase for the Faroes haddock for a change from 75 mm to 110 mm, at the discard rate of 60% by

numbers. This discard rate, equal to 20% or less by weight, is a not unlikely estimate for the pre-war fishery at Iceland.

C10. Iceland haddock mesh assessments: (Annex I, Table 4)

Changes in mesh size up to about 140 mm will make very little difference to the long-term total yield. The non-regulatory gears (lines, purse seines etc.) will gain (possibly up to 20% for 140 mm trawl mesh) but this will be at the expense of the trawlers; however the loss to the trawlers will be small (not more than 6%) for meshes up to 130 mm. These estimates of the long-term yields are slight under-estimates because no allowance has been made for discards, though these are known to be few. The immediate losses to the trawlers will be 2-3% when changing from 100 mm to 110 mm, with losses of about 5% for each 10 mm increase thereafter up to 140 mm.

C11. Moderate changes in fishing effort (say up to 25% decrease or increase) will have little effect on the average total landings.

C12. Iceland Saithe (Coalfish): Coalfish are probably less heavily fished than cod or haddock, though the stock is showing signs of the effect of fishing (Annex I, Appendix Table 8). The use of larger meshes, up to 140 mm, will cause immediate losses of up to 14%, but these will very probably turn into long-term gains; however, these gains cannot be assessed quantitatively.

C13. Iceland and East Greenland Redfish: (Annex I, Appendix Tables 9, 11): The catch per day of German trawlers has declined, though it is not yet possible to make any estimates of the state of the redfish stocks. There is also uncertainty concerning the selection of redfish, especially under commercial conditions of large catches and long tows. A realistic value of the selection factor for sizes of catches occurring in the commercial fishery gives estimates of quite small immediate losses in total catch for increases in mesh size (less than 10% for a 140 mm mesh size), much if not all of which would be made up in the long-term. There is no information to add to the previous conclusion that meshing of redfish would not be a serious problem in the commercial fisheries for mesh sizes up to 130 mm.

C14. East Greenland cod: This fishery has developed too recently to make confident assessments about the state of this stock. The fish are large, and increases in mesh size up to 140 mm will have negligible effects on the catches.

Faroes

C15. Faroes: General: Assessments have been made of the effects on the landings of changes in mesh-size, but no specific assessments were made of the effects of changes in fishing effort. However, both cod and haddock were shown to be heavily fished. Therefore it would be expected that further increases in effort would not give any substantial increase in the average long-term total catch, and might decrease it; conversely a moderate decrease in effort would not be expected to cause any appreciable decrease in catch, and might increase it.

C16. The recent extension of the fishery limits at Faroes make precise assessments of the effect of possible regulations more difficult. For cod there appears to be considerable movement of fish across the limit lines, and the effect of the limits is to reduce slightly the mortality caused by the trawlers. Haddock also show some movement across the limit lines.

C17. Faroes Cod: (Annex I, Tables 5 and 6). For cod, an increase in mesh size from the present effective 75 mm to 130 mm at the present fishing intensity would increase the total landings, reaching a long-term gain of 5-9% with a 130 mm mesh. The trawlers would have immediate losses of up to 5% for English trawlers and 10% for Scottish. The English landings would increase with increasing mesh size up to at least 130 mm. The landings by Scottish trawlers, which fish on grounds containing slightly smaller fish, would probably reach their maximum with a mesh size of about 120 mm, and may even have a small long-term loss with 130 mm.

C18. The expected benefits for cod are rather greater than those predicted in the previous report of the North-western Working Group; this is due to allowance being made for discards, and the greater estimates used of the proportion E of total deaths which are due to fishing. (The fishing effort has increased, and also the previous report used, as a lower limit, too small a value of E.)

C19. Faroes haddock: (Annex I, Tables 7 and 9). The previous report concluded that possibly very large gains in haddock catches could be expected from increasing the mesh size at Faroes at the current intensity of fishing. Much of these assessed gains, however, was due to the high rate of discarding of small haddock in the 1950s (estimated as 30-60% by numbers). It appears that the recent discard rate has been lower, and rates of 10% and 30% by numbers (much less by weight) have been used in the calculations.

C20. The long-term total landings of haddock by all gears will benefit with increased mesh size up to at least 110 mm; with a discard rate of 30% this gain would be substantial (probably over 30%). The total landings with larger mesh sizes, up to 130 mm, would be expected to differ little from the landings with a 110 mm mesh; they may be a little smaller, or possibly up to 5% greater.

C21. While the long-liners would benefit from any increase in mesh size, the long-term landings of trawlers would be expected to benefit following increases of mesh size only up to 100 mm. The long-term gains to the trawlers might be substantial (5-30%) but the immediate loss to the trawlers' catch would be about 10%. Further increases in mesh size would cause immediate losses of 10-15% for each 10 mm increase in mesh size up to 130 mm. Such further increases beyond 100 mm will reduce the long-term gain to Scottish trawlers, which may suffer a loss (compared with landings with the present mesh) for 120 mm or 130 mm meshes. Long-term landings by English trawlers will increase following a change from 100 to 110 mm, but further increases in mesh will reduce the gains.

C22. Faroes saithe (coalfish): (Annex I, Table 10). Increases of mesh size will have little effect on coalfish landings, which will benefit slightly for meshes up to at least 130 mm. For a 130 mm mesh there will be a gain of about 1% for English trawlers, and about 5% for the German and Faroese fisheries.

C23. Faroes redfish: Mesh increases up to 130 mm will have negligible effects on the redfish fishery.

D. Matters Arising at the 1965 ICES Meeting (see Annex II)

D1. Picked dogfish: Contributions from Norway and England showed that the stocks of picked dogfish between the Norwegian coast and the coast of Scotland are heavily fished. The small number of young that a

female produces is, under the present high mortality rates, not sufficient to maintain the stock. Unless protective action is taken to ensure a better expectation of life for the females, the stock will decline continuously until it is no longer economic to fish for these dogfish.

D2. A minimum landing size of 70 cm is now in force in Norway. This probably does not give sufficient protection to the females to prevent the decline in the stock continuing. The precise minimum size for females necessary to ensure the maintenance of the breeding stock depends greatly on the amount of fishing. The high rate of fishing which appears to exist among a stock of dogfish apparently confined to the Norwegian coast would require a minimum size well above 80 cm. The male dogfish grows more slowly than the female and the optimum size at first capture for males is therefore smaller than for females, but cannot be determined precisely.

D3. Food consumption of predatory fish: In two papers presented at the ICES meeting comparisons were made of the value of the yield of predatory fish (in these papers, dogfish and whiting) with the value of the potential catch from the prey fishes consumed (herring, Norway pout, etc.). These showed that the potential catches are likely to be of the same order in terms of value, from either the prey fish or from their predators. Therefore, when there is substantial fishing on both the prey fish and the predatory fish which feed on them, then the best system of management to obtain the optimum yield from the stocks as a whole may require a careful balance between the different fisheries.

D4. At present there is insufficient data about the information required to make such a balance. The data required include the relative values of the two types of fish, the fishing rates on the two stocks, the cost of fishing for the two species (the cost of taking a certain proportion of the two species may be appreciably different, especially when different gears are used) and, especially, the food conversion rates of the predator (how many grammes of prey fish have to be eaten to produce one gramme of predator - this almost certainly will vary with the size and maturity of the predator).

D5. The Committee therefore had no specific advice to make on this subject, but noted that the problem is likely to become more pressing with the growing development of industrial fisheries, mainly on prey species, and that any solution will require a greatly widened field of research, at sea, on the commercial fish markets and, especially, in the laboratory.

D6. The Committee, therefore, decided to recommend that ICES promote more intensified research in all aspects of predator/prey relationships; in particular the quantitative relations in food chains which include the commercial species, and the influence of predators (vertebrates and invertebrates) on the young stages of commercial fish as a background for fisheries management.

D7. North Sea cod: A paper on the Scottish cod fishery, which is concentrated in the area close to the Scottish east and north coasts showed that the fishing rate on this stock of cod is very high.

D8. Herring: The expansion of the herring fisheries in the northern part of the North Sea continued in 1965. A new feature was the large increase in the use of purse-seiners, which after a successful winter season in the north-eastern North Sea extended their activities in summer to the Shetland area, where large catches were made; in the autumn of 1965 the fishery in the north-eastern North Sea was resumed.

D9. These fisheries have developed very rapidly, so that much of the necessary biological information is not yet available. A special day has been allotted to discussion of these problems and analysis of the results of intensified research programs at the 1966 meeting of ICES.

D10. Stock and recruitment: In previous advice to the Commission it has generally been assumed that conservation measures will not significantly alter the number of young fish reaching a fishable size. Evidence is accumulating that suggests that fishing can reduce some stocks to such an extent that the number of recruits is significantly reduced. If this is so, then the loss in catch by fishing too hard or with too small a mesh may become very large, and the benefits from conservation measures, especially from reducing effort, will be greater than predicted. These problems are being intensively investigated especially in the herring in the Southern Bight of the North Sea, and in the Arcto-Norwegian cod, and ICES is organizing a symposium on the subject of recruitment.

D11. Salmon: Although perhaps not of immediate concern to NEAFC, reference should be made to the possible problem of salmon fishing at sea created by the development of a commercial salmon fishery off Greenland and the consequent recovery there of salmon tagged as smolts in various countries around the North Atlantic. This has been noted by ICNAF and a preliminary research program adopted by the representatives of member countries. ICES in turn endorsed this program and proposed the creation of a joint ICNAF/ICES Working Party to assess available information and develop the program accordingly.

E. Other Matters

Danish Annex IV Whiting Fishery

The catches of this fishery in 1965 were slightly less than in 1964. Less than 5% of the catches were Annex II species other than whiting.

F. Publications

The reports of the Liaison Committee for 1963, 1964 and 1965 have been published in Series B of the ICES Co-operative Research Reports. The reports of the Sole and Coalfish Working Groups have been published in Series A of Co-operative Research Reports.

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