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Report of the ICES/ICNAF Joint Working Party on North Atlantic Salmon

Copenhagen, 19-23 March, 1973

CONTENTS

A. INTRODUCTION

1. The ICES/ICNAF Joint Working Party on North Atlantic Salmon met at Charlottenlund, Denmark from March 19-23 1973. The following were present:-

Canada	W H Lear A W May C P Ruggles
Denmark	O Christensen Sv Aa Horsted J Møller Jensen P Kanneworff
England and Wales	I R H Allan A Swain
Faroes	A Reinert
France	R Vibert
Federal Republic of Germany	F Thurow[x]
Ireland	Miss E Twomey
Northern Ireland	K U Vickers
Norway	L Rosseland
Scotland	B B Parrish (Chairman) K A Pyefinch (Rapporteur)
Sweden	P O Larsson
ICES	H Tambs-Lyche J Smed[x]

[x]Attended part of meeting only

2. The Chairman welcomed Mr Larsson (Sweden) and Mr Lear (Canada) who were attending a meeting of the Working Party for the first time. He regretted that Dr A E J Went (Ireland) and Mr W R Munro (Scotland) were unable to be present.

3. The Working Party reviewed the latest information on the West Greenland and Norwegian Sea fisheries and on catches in home waters. It reviewed the International Salmon Tagging Experiment, which had been carried out at West Greenland during August, September and October 1972 and also drew up plans for the full analysis and publication of its results. It also considered future research requirements in relation to its main assessment objectives.

B. WEST GREENLAND FISHERY

1. Statistics and Composition of the Fishery

4. The salmon catches at West Greenland in the years 1960-1971, and the provisional catch for 1972 are shown in Table 1. As in recent years, it was not possible to separate the catch by Greenland vessels into its

drift net and gill net components. The extent of the drift net fishery and the main centres of the gill net fishery are shown in Figure 1.

5. The provisional catch in 1972 at 2,032 metric tons was about three-quarters of the catch in 1971 and was the lowest catch recorded since 1968. For the 1971 catch, though complete separation into drift net and gill net components was not possible, it was concluded that the former was, almost certainly, the larger. In 1972, though the drift net catch was probably larger than that taken by gill nets, the difference between the two components was probably less.

6. On the basis of the catches made by the research vessels participating in the international tagging experiment, the age composition of the exploited salmon stock was very similar to that of previous years, 94% of the fish sampled consisting of one-sea-winter fish which had migrated to sea as two- or three-year old smolts. This indicates that most of the fish if surviving and returning to home waters would do so as two-or-more-sea winter salmon.

7. The length composition of the exploited stock was also similar to that of previous years but a preliminary analysis of the research vessel catches suggests that there was an increase in the average length between August and September, a steady improvement in condition as the season advanced and, possibly, a trend towards an increase in average length from south to north in August. The sex ratio (3.1 females:1 male) was the same as in 1971.

8. The table below shows the number of vessels (excluding Greenland registered vessels) which have taken part in the West Greenland drift net fishery each year since 1965.

	Number of vessels				
Year	Denmark	Faroe	Norway	Sweden	Total
1965	0	1	1	0	2
1966	0	1	1	0	2
1967	4	4	3	0	11
1968	10	2	4	1	17
1969	15	6	11	2	34
1970	13	7	10	1	31
1971	11	3	8	0	22
1972	12	4	8	0	24

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9. These data show that the number of non-Greenlandic vessels taking part in this fishery in 1972 was slightly greater than in 1971 but, as it was reported that only five of the eight Norwegian vessels fished regularly, the effective number of vessels participating was probably about the same as in 1971. The catch, however, was substantially less; in 1971 the catch from non-Greenlandic vessels was 1,240 metric tons, whereas in 1972 it was only 726 metric tons. This was due to a marked decrease in catch rates after August. This followed a deterioration in weather conditions, involving gale force winds, and was associated with a decrease in the surface sea temperature from 4.5°C to 2.0°C. These factors may well have affected the abundance and/or the availability of salmon. So far as can be ascertained, however, there was no corresponding decline in the gill net catch which was distributed fairly uniformly over the season.

10. Following the decrease in the fishery after August some exploratory commercial fishing surveys were made in the following areas outside that usually exploited in the West Greenland salmon fishery. The following four areas were fished:

(a) northwest of Disko (70°15'N 55°10'W) and in Umanak fjord (71°00'N 53°30'W) during early September.

(b) the Labrador Sea between latitude 59°40'N and 60°30'N and between longitude 45°15'W and 54°10'W, during late September.

(c) Davis Strait (60°N 63°30'W, 62°55'N 59°40'W, 62°N 60°W, 61°15'N 61°50'W and 66°30'N 57°30'W), during late September and early October.

(d) coastal waters in East Greenland between latitude 62°41'N and 65°29'N during late September and early October.

11. None of these areas produced catch rates which were commercially satisfactory. The highest catch rate (7 salmon/100 nets) was obtained in the Labrador Sea, and in the other regions the catch rates were less than 4 salmon/100 nets.

2. Home waters Origin and Destination of Salmon in West Greenland Stock

(a) Tag Recaptures

12. Recaptures at West Greenland in 1972 of salmon tagged as natural or hatchery reared smolts in home waters are given in Tables 2 and 3, along with those in previous years (the figures in these Tables for previous

years, presented in earlier reports, have been revised and brought up to date in the light of the most recent recapture data). The recapture data show that, in 1972, as in previous years, the exploited stock at West Greenland comprised a mixture of salmon of North American and European origin.

13. Recaptures in home waters in 1972 of salmon tagged from research vessels during the course of the fishery at West G eenland in 1971 are given in Table 5 together with those from previous experiments. These and the recapture data in Tables 2 and 3 provide further evidence that the major part of the exploited stock at West Greenland is composed of salmon originating from rivers in Canada, Great Britain and Ireland.

(b) Other Studies

14. Investigations on biochemical characters and parasite fauna (as biological tags) were continued in 1972 in relation to the identification of national components in the salmon catch at West Greenland.

15. Further studies on blood serum protein (transferrin) polymorphism have been made in England on the samples collected in the West Greenland area in the period 1970-1972, but although a proportion of the samples can be identified as originating from the western or eastern Atlantic, an adequate marker for the identification of the major part of the samples has yet to be found by this method.

16. Further work on the parasite Anisakis sp. carried out in Canada during 1972 has indicated that because of (a) the high degree of mixing of different stocks of salmon along the western seaboard of the Atlantic, (b) the existence of a geographical cline in the abundance of Anisakis larvae in the fish and (c) the wide and apparently random annual variations in larval numbers per fish in both American and European stocks and between sampling stations, the use of data on incidence of infestation of this parasite is not feasible for stock identification purposes. The studies made have, however, very considerably increased the knowledge of the morphology and morphometric variations of the larval stages of this parasite in salmon and marine fish. Studies of morphometric and biochemical variations in Anisakis itself are now being conducted in relation to the identification of areas of home waters origin of the salmon at West Greenland.

3. International Tagging Experiment at West Greenland

(a) Conduct of Experiment

17. The International Salmon Tagging Experiment, the objectives and plans for which were given in previous reports, was conducted at West Green-

land in the period 30 July-16 October 1972. In accordance with the plans, tagging was undertaken from five research vessels ("Adolf Jensen" and "Tornaq", Denmark; "A T Cameron", Canada; "Scotia", UK; and "Cryos", France) and eight commercial drift net vessels (3 Danish, 3 Faroese and 2 Norwegian). A total of 2,364 salmon were liberated, 811 from the research vessels and 1,553 from the commercial vessels, the tagging period and numbers tagged from each vessel being as follows:-

Research Vessels	No. tagged	Commercial Vessels	No. tagged
"A Jensen" (2 Aug-15 Oct)	333	"Polarlaks" (Denmark) (5 Aug-9 Oct)	250
"Tornaq" (2-19 Aug and 13-16 Oct)	4	"Silpha" (Denmark) (4 Aug-4 Oct)	101
"A T Cameron" (9Aug-22 Sep)	219	"Susi-Ann" (Denmark) (30 Jul-16 Oct)	215
"Scotia" (10-28 Aug)	127	"Bakur" (Faroes) (3 Aug-8 Oct)	288
"Cryos" (25 Aug-23 Sep)	128	"Hvitanes" (Faroes) (16 Aug-28 Sep)	141
Total	811	"Leikur" (Faroes) (1 Aug-5 Oct)	422
		"Eldorado" (Norway) (13 Aug-4 Oct)	33
		"Ulla" (Norway) (4 Aug-5 Oct)	103
		Total	1,553

18. The total number tagged was therefore some 600 less than the target of 3,000 set for the experiment, due partly to the withdrawl of one research vessel ("Cirolana") from the experiment and the curtailment of of the participation of another ("Scotia"), and partly to the sharp decline in drift net catch rates and working conditions after August (see para.9). Under these circumstances, the number of liberations achieved was up to expectation, and the Working Party wishes to record its warm appreciation of the efforts made by all concerned in the experiment. This applies particularly to the crews of the commercial fishing vessels taking part, and to the scientific personnel working aboard them. It also wishes to acknowledge the valuable coordinating role played throughout the experiment by the staff of the Danish Research Institute.

19. In addition to the tagging of salmon, material and data were collected during the course of the experiment relevant to the Working Party's work. These included (a) length and weight measurements and scale samples for age determination, (b) catch and fishing effort

data for both commercial and research vessels, (c) blood samples and parasites for studies of stock identification and mixing, (d) temperature observations for studies of the hydrographic conditions at West Greenland during the fishing season, (e) information on the by-catch of other species in the drift net fishery.

20. Although at the time of the Working Party meeting some accounts were still outstanding, the funds supplied by the participating countries were sufficient to meet all expenses of the experiment, and provide a sufficient amount to cover the cost of a future publication of its scientific results (see para. 26) and other necessary expenses, including limited travel which will be incurred in relation to the analysis of data.

(b) Local recaptures of tags at West Greenland

21. Up to 20 March 1973, a total of 151 recaptures of fish tagged during the experiment had been reported from the fishery at West Greenland in 1972, of which 37 were taken close to the tagging locality, within 2 days of release. The distribution of the recaptures in relation to the area tagged (see Figure 1 for definition of areas) is given in the following Table.

Local recaptures from the 1972 Greenland Tagging Experiment

		Area Tagged						
		I	II	III	IV	V	VI	Total
Area recaptured	I	15	2	2				19
	II		9	3				12
	III	2	11	20	5	1		39
	IV	1	1	14	10	2		28
	V		5		4	16	2	27
	VI						5	5
	NK	2	5	5	2	7		21
	Total	20	33	44	21	26	7	151

22. These data show that of 130 returns for which the precise area of recapture is known, 75 came from the vicinity of release, 38 from areas to the south of the tagging area and 17 from areas to the north.

23. Over 90% of the Greenland recaptures so far reported have been taken in drift nets, the remainder coming from inshore set gill nets. This could indicate a relatively small interchange from offshore to inshore areas. However, final conclusions in this respect must await completion of tag reporting and analysis of the distribution of fishing relative to areas

of tag liberation.

24. Up to 20 March 1973 four home waters returns had been reported from the experiment; 1 from Ireland, 2 from Scotland and 1 from France (see Table 5).

(c) Tagging Mortality

25. Results of a short term tagging mortality experiment conducted by Canadian observers during the course of the main tagging experiment, in which tagged salmon were held in recovery tanks aboard ship for 6-55 hours following tagging, indicated a survival rate of 100% for fish classed as "good" and 53% survival for fish classed as "fair". Combined results of experiments by Danish and English observers on the other hand, in which tagged fish were held in a keep net for periods of one to three days, indicated a 72% survival rate for "good" fish and 39% survival for "fair" fish.

(d) Plans for analysis of data from the tagging experiment, plus other data relating to the fishery at West Greenland and the assessment of its effects on home water salmon stocks and fishery yields.

26. The Working Party agreed that the various individual Working Party members who had participated in the tagging experiment should assume the responsibility of working up and reporting on its results. It was also agreed that the analyses of various aspects of the Working Party's work at West Greenland should be reviewed, and where appropriate revised and updated in the light of these results. In all cases these analyses should include relevant information obtained prior to 1972. The results of the analyses should be presented in the form of scientific papers, for detailed consideration at the next meeting of the Working Party in spring 1974, and with a view to them being subsequently published in a special volume of the ICES Rapports et Proces Verbaux or the ICNAF Research Bulletin.

27. The following assignment of responsibilities for specific analyses and reporting was agreed (names underlined refer to members of Working Party who will take lead in initiating joint analyses):-

1. Analysis of Tag Returns from 1972 Experiment (Møller Jensen)
   This analysis will include the estimation of total smolt tags recaptured at Greenland in 1972 in relation to distribution of fishing, as well as the following analyses from the tagging experiment itself:- (a) exploitation rate at West Greenland,

(b) size of exploited stock, (c) tagging mortality, (d) estimation of tag reporting rate, (e) movements within the fishing area and growth during the fishing season, (f) natural mortality between West Greenland and home waters.

2. Analysis of Smolt Tag Returns (Ruggles and Swain)

This will involve a critical review of North American and European smolt tagging experiments, with respect to distribution of tagging, types of smolt (natural and hatchery reared) etc, with a view to determining the relevance of various experiments in analyses of stock origins and mixing at Greenland. This will be conducted initially for experiments relating to recaptures at West Greenland in 1972, but earlier material will be included if appropriate.

3. Size and Age Composition of Salmon Stock (Munro and Swain)

This will involve the analysis of size and age data for 1972 and earlier years plus related data such as length-weight relationships, length conversions and average weight of fish in the catch.

4. Gear Selectivity and Efficiency (Lear and Christensen)

This will comprise analyses of data on gear selectivity and efficiency from both commercial and research vessel fishing.

5. Distribution and Abundance of Salmon at West Greenland (Christensen and Lear)

This will involve analysis of catch, effort and catch-per-unit-effort data for 1972 and earlier years to provide information on distribution and changes in fishing effort and salmon stock abundance in area and time.

6. Seabirds (Christensen and Møller Jensen)

The total catch of sea birds caught during the 1972 fishing season will be estimated from data collected aboard research vessels and those commercial vessels having observers on board.

7. Other Species (Christensen and Lear)

This will cover the catches of species other than salmon taken by the drift net fishery in 1972.

8. Hydrographic Conditions at West Greenland in 1972 (ICES Hydrographical Office)

Environmental data collected during the tagging experiment,

including weather data and ice conditions where appropriate, but with particular reference to surface waters and the upper 50 metres will be analysed and a report prepared. This analysis should be made in conjunction with item 5 using the same areas and time periods. A brief review of longer-term environmental and climatic regime in the West Greenland area, and detailed reference to more recent years, will be made as appropriate to put the 1972 data in context. The Working Party noted that countries participating in the tagging experiment should submit 1972 BT data collected at West Greenland to ICES. This should be in the form of readings at each 10 m depth interval to 50 m, plus additional readings between these intervals at characteristic points, ie where abrupt temperature changes occur.

9. Biochemical Studies (Payne and Child)

A joint report to be invited covering an appraisal of the results of work conducted in Canada and the UK in 1972 and earlier years on the use of biochemical characters for determining stock identity and mixing at West Greenland.

10. Parasite Studies (Pippy)

Invited report on same basis as item 9 above.

11. Feeding (Lear)

This will involve the analysis of material collected in 1972 and earlier years on the food and feeding of salmon at West Greenland in relation to local distribution and abundance. Possibly to be combined with item 5 above.

12. Assessment of Effects of Fishing (Horsted, Parrish, May)

This will involve a critical review and updating of earlier assessments of the effects of the West Greenland fishery on home waters salmon stocks and fishery yields in the light of the results of the above analyses.

4. Assessment of Effects of West Greenland Fishery on Home Waters Stocks

28. No new detailed assessment of the effects of the West Greenland fishery on home waters salmon stocks and catches were made by the Working Party, pending the results of the analysis of the data from the international tagging experiment. It is evident, however, that on the

basis of the same method of assessment and values of the population parameters (growth and natural mortality rate between West Greenland and home waters and exploitation rate in home waters) used in previous years (given in previous reports of Working Party) the direct losses to the combined North American and European two-or-more-sea-winter salmon stocks and catches, resulting from the West Greenland fishery in 1972 would be of approximately the same magnitude as in the years 1969-1971, ie losses to the stocks and catches would lie in the ranges 1,100-2,700 metric tons and 650-1, 600 metric tons respectively. As pointed out previously, the upper limit of this range of estimated losses is based on an instantaneous natural mortality rate between West Greenland and home waters of 0.02 per month, which is higher than the estimate of 0.01 per month recently obtained for Baltic salmon. If this latter value is used in the above assessments, the upper limit of the losses to the stocks would be increased to about 3,000 metric tons. It should be noted, however, that the value for Baltic salmon applies to a stock whose sea distribution is much closer to home waters than the stock exploited at West Greenland for which the natural losses might therefore be expected to be greater.

29. The Working Party noted the results of further Canadian investigations of the state of the salmon stocks in the Miramichi river and of the effects of fishing on it. These showed that this stock has declined sharply in recent years, resulting in a marked decrease in egg deposition and subsequent smolt production. Although, as indicated in last year's report the decline in the two-or-more-sea-winter component of this stock commenced before the West Greenland fishery reached a high level, the data suggest that commercial fishing outside the river, including that at West Greenland has been a contributory cause of the recent decline. However, in the absence of a reliable measure of the natural mortality rate occurring between West Greenland and home waters it is not possible to estimate the magnitude of the contribution made by the West Greenland fishery to it. The Working Party noted that Canada has recently introduced regulatory measures prohibiting sea fishing for salmon in the vicinity of the river, thereby eliminating one component of this cause.

30. The Working Party also points out that owing to the predominance of females in the stock of two-or-more-sea-winter salmon and their greater

average fecundity, a catch of this component of the total stock has a greater impact on the egg production potential of the spawning stock than an equivalent catch of grilse, amongst which males predominate.

C. NORWEGIAN SEA FISHERY

1. Long-Line Fishery off the Norwegian Coast in 1972

31. As in 1971 the long-line fishery in the Norwegian Sea (outside Norwegian fishery limits) was pursued principally by Norwegian and Danish vessels in the area between latitudes 68° and 74°N and between the Greenwich meridian and longtidue 18°E. The area fished by Danish vessels is shown in Figure 2. In accordance with the regulations introduced in 1971 fishing was restricted to the period 6 May-30 June.

32. Statistics of catches and the number of vessels participating in the fishery in 1972 are given in Table 6, together with the corresponding data for previous years. The data indicate that the estimated catch in 1972 (516 metric tons) was slightly larger than that taken by approximately the same number of vessels in 1971 (488 metric tons), but it was again much smaller than in 1969 and 1970 immediately before the introduction of the closed season/area and other regulations in 1971.

33. Estimates of catch per unit effort are given below for Danish vessels fishing in the "open" fishing area between latitudes 68-74°N and longitudes 0°-22°E in May and the first half of June in each of the years 1969-72.

Catch-per-unit-effort for Danish long-line vessels, expressed as number of salmon per 1,000 hooks (Figures in brackets refer to the number of salmon caught by the sampled vessels)

	Period	
Year	1-31 May	1-15 June
1969	44 (17,378)	28 (4,721)
1970	41 (10,791)	17 (257)
1971	40 (23,285)	26 (6,584)
1972	42 (31,337)	30 (6,814)

34. As with the data presented in previous reports, these estimates point to a decrease in abundance and/or availability of salmon in the "open" fishing area between May and June, but they suggest that stock abundance remained at approximately the same level during the four years.

35. The catch taken in the long-line fishery in 1972 consisted principally (80-85%) of two-sea-winter salmon; one-sea-winter fish con-

stituted between 8% (Danish samples) and 14% (Norwegian samples) of the catch. These data are in conformity with those of previous years and indicate that the effects on the long-line fishery on the numbers and weight of salmon returning to home waters are mainly confined to the two-or-more-sea-winter component of the total stock.

36. Further recaptures in the long-line fishery in 1972 of salmon tagged as smolts in Norwegian rivers (given in Tables 2 and 3), and in home waters of salmon tagged in the long-line fishery (Table 7), indicate that, as in previous years, the salmon stock exploited in the Norwegian Sea was composed of fish originating from and returning to rivers in Norway, and, to a smaller extent, the USSR. No smolts tagged in other major European salmon producing countries have been recaptured subsequently in the Norwegian Sea fishery (excluding that at the Faroes - see below), and no recaptures of salmon tagged in the long-line fishery have been reported from these countries. These data, and the relatively small numbers of recaptures at West Greenland of salmon tagged as smolts in Norwegian rivers (Tables 2 and 3) suggest that most of the salmon returning to Norwegian and USSR rivers as two-sea-winter-fish have a different sea distribution in their second sea-year to those returning to other major European salmon producing countries and that therefore the effects of the Norwegian Sea long-line fishery will be confined mainly to the Norwegian, USSR, and possibly also to a limited extent, the Swedish west coast stocks.

37. In last year's Report (ICNAF Res. Doc. 72/32 and ICES, C.M. 1972/M:2) results were presented of assessments of the direct effects of the long-line fishery on these home-water stocks and fishing yields. These gave, for the long-line fishery in 1971 an estimated loss of about 400 metric tons in the weight of two-sea-winter salmon returning to home waters, and of 200-300 metric tons to the home water catches. The latest data suggest that the losses resulting from the long-line fishery in 1972 were of about the same magnitude.

2. Long-Line Fishing at the Faroes in 1972

38. In 1972, as in some previous years, a small catch of 9 tons, comprising one- and two-or-more-sea-winter salmon, was taken by 2 Faroese long-line vessels (data given in Table 5), fishing in the vicinity of the Faroe Islands in May and June 1972. Four recaptures of fish tagged as

smolts (two liberated in Norway and one in Scotland) were reported from this catch, bringing the total number of reported smolt recaptures from the Faroes in the years 1968-72 to twenty (9 liberated in Norway, 5 in Sweden (west coast), 4 in Scotland, 1 in Ireland and 1 in Iceland). As shown in Table 8, a further 307 salmon were tagged from research vessel catches at the Faroes in March 1972. Of these 10 subsequent recaptures in home waters (4 in Scotland, 4 in Ireland, 2 in England), and 1 in the West Greenland fishery have been reported. These data provide additional evidence to that reported previously that the salmon stock in the Faroes area is of mixed country origin and subsequent destination, and that it is one of the routes taken by European salmon on their migration to West Greenland.

D. HOME WATERS FISHERIES IN 1972

39. Provisional statistics of salmon catches in home waters, in 1972 (catches of salmon and grilse are given separately for Ireland, Norway, Scotland and Canada) and estimates of catch-per-unit-effort are given in Tables 9 and 10 respectively.

40. These data show that the total catch (salmon and grilse combined) in the main European salmon producing countries were higher in 1972 than in 1971 (provisional combined catches for Ireland + Northern Ireland, Norway, Scotland and England and Wales = 5,516 m. tons, compared with 4,926 m. tons in 1971). This was due principally to an increase in the salmon component of the catch, especially in Norway and Scotland. In contrast, the Canadian catch, especially of salmon, was substantially lower than in 1971. Information on the fisheries in individual countries is summarised below.

41. <u>England and Wales</u> The total reported salmon and grilse catch for 1972, which is provisional at this stage, was 449 metric tons, an increase of 23 metric tons on the 1971 figure. This again was higher than the average catch for the period 1960-1971 and was in fact, the second highest catch for that period.

42. The catch by nets was slightly lower than in 1971 mainly due to a reduction in the catch made by the commercial net fishery in the English north-east coastal area. The net catch for the remainder of the country was the highest since 1967. The total rod catch was also the

highest since 1967, but this may be in part due to the fact that more stringent reporting regulations were introduced in 1972.

43. Sufficient data are not yet available to estimate the proportion of grilse and salmon in the total catch but from what information has been obtained, it would seem that the proportion of grilse in 1972 was similar to that in 1971, ie about 30% of the catch. In both 1971 and 1972 the proportions of grilse in the catches were well below the figure for 1970.

44. Although the total weight of salmon and grilse caught in 1972 was higher than in 1971, the number of fish caught was lower in 1972.

45. Ireland The total catch (salmon plus grilse) was similar to that of previous years. The major component of the catch was grilse. The salmon catch was, however, marginally higher than the 1971 figure. In 1972 there was a substantial increase in the catch by coastal drift nets due to increased fishing effort which resulted in a corresponding reduction in estuarine seine nets, traps and the escapement into fresh water for the rod fishery.

46. Northern Ireland The commercial catch of salmon and grilse in 1972 (including 50% of the Foyle catch) was 232 metric tons which is only slightly less than the 1971 total of 234 metric tons (previously reported as 213 m. tons).

47. Norway The home water catch in Norway increased from 1,171 and 1,208 tons in 1970 and 1971 respectively, to 1,540 tons in 1972.

48. The increased catch was partly due to a higher fishing effort by the drift net fishery in which the number of nets increased from 8,976 in 1971 to 13,600 nets in 1972. On the other hand, there was a decrease in fishing effort by the bag net fishery, in which the number of bag nets decreased from 4,608 in 1971 to 4,100 in 1972.

49. The higher catches in 1972, however, was probably mainly due to a larger salmon stock. The catch per bag net increased from 116 kg in 1971 to 167 in 1972. The salmon catch in 1972 also contained a higher proportion of salmon above 3 kg than in the previous year.

50. Scotland Provisional figures for the total Scottish catch (salmon plus grilse) for 1972 indicate an increase over that for 1971. This was due to an increase in the salmon catch which was provisionally estimated at 955 metric tons. The grilse catch (690 metric tons) was slightly less

than in 1971 but above the long-ter (1952-71) average.

51. Canada The total home water (salmon plus grilse) catch decreased by 309 metric tons (16%) in 1972 from the 1971 level. A portion of this decrease is due to a commercial salmon fishing ban in the most productive fishing areas of New Brunswick and Quebec, including the Miramichi, Restigouche and St John Rivers. In areas where the commercial fishing ban was in effect spawning escapements of early-run large salmon increased, angling catches of large salmon being the highest recorded in recent years; however, the grilse runs in general and the fall run of grilse and large salmon to the Miramichi River in particular remain very low. Spawning escapements into the Miramichi River system are still well below that believed to be necessary for adequate seeding of the river.

E. FUTURE RESEARCH

52. In addition to its consideration of the West Greenland tagging experiment and the preparation of plans for the analysis of its results (see Section B.3), the Working Party reviewed the research in progress, and considered future research requirements on the following important topics of direct relevance to its work.

(a) Smolt Tagging

53. The Working Party considers that the smolt tagging effort in the areas where it is currently being conducted is sufficient and should be continued. It wishes however to draw attention to the need for additional smolt tagging in northern Norwegian and USSR rivers to provide further information on the home waters origin of the salmon stock exploited by the long-line fishery in the Norwegian Sea and on the possible contribution of salmon from these areas to the exploited stock at West Greenland. It also considers that smolt tagging in rivers in the south-western part of the European area, especially in Spain is required, to provide information on their contribution to the West Greenland stock.

(b) Status of Home Waters Stocks, and Stock and Recruitment relationship

54. The Working Party noted the results of recent detailed studies on the changes in spawning stock size and smolt production in important Canadian river systems, and reviewed similar work in progress in other countries. It recommends that members of the Working Party from each of the main salmon producing countries present the results of these studies

to the next meeting of the Working Party, with special reference to the status of and changes in the adult stocks and of changes in smolt production in their main salmon producing river systems.

(c) Grilse-Salmon relationship

55. An important problem, of major relevance to the assessment of the effects of the high seas fisheries in home waters stocks and to the interpretation of changes in them concerns the biological (including genetic) relationship between salmon and grilse. The Working Party noted that research on this problem is currently in progress in some countries, especially Canada, Ireland and Sweden, and it recommends that the workers in these countries be invited to present reports on their work to the next meeting of the Anadromous and Catadromous Fish Committee of ICES.

(d) Exploitation rate in home waters fisheries

56. The Working Party again stressed the importance for its assessment work of information on the rates of exploitation of salmon in the home waters fisheries. It was agreed that the members of the Working Party would report the results of studies of this problem in their countries to the next meeting of the Working Party.

(e) Origin and rates of mixing of salmon in high seas fisheries

57. The Working Party also stressed the importance for its assessment work of accurate measures of the rates of mixing of salmon of different home waters origin in the exploited stocks at West Greenland and in the Norwegian Sea. In addition to smolt tagging, it recommends that the research relating to this problem currently being undertaken in some countries, especially on biochemical characters (of salmon and their parasites) and scale types, should be continued and that the results be reported to its future meetings.

F. NEXT MEETING

58. The Working Party recommends that its next meeting should take place at ICES Headquarters, Copenhagen for the five days 18-22 March 1974 inclusive, and that this be preceded by a two-day meeting of its assessments group, Mr Sv A Horsted, Dr A W May and Mr B B Parrish, on 15 and 16 March.

Table 1. Catches at West Greenland, 1960-72, in metric tons, round fresh weight. (Based on data available at 31 March 1973).

	Drift Net				Gill Net and Drift Net	
Year	Norway	Faroes	Sweden	Denmark	Greenland[d]	Total
1960	0	0	0	0	60	60
1961	0	0	0	0	127	127
1962	0	0	0	0	244	244
1963	0	0	0	0	466	466
1964	0	0	0	0	1539	1539
1965	-[a]	36	0	0	825	861
1966	32	87	0	0	1251	1370
1967	78	155	0	85	1283	1601
1968	138	134	4	272	579	1127
1969	250	215	30	355	1360(385)	2210
1970	270	259	8	358	1244	2146[c]
1971	340	255	0	645	1449	2689
1972[b]	178	147	0	401	1306	2032

a - Figures not available, but catch is known to be less than Faroes

b - Provisional

c - Including 7 metric tons caught on long-line by one of two Greenland vessels in the northern Labrador Sea early in 1970

d - Up to 1968, gill net only, after 1968 gill net and drift net. The figures in brackets for the 1969 catch are an estimate of the minimum drift net catch.

Table 2. Number of natural (wild) smolts tagged in the years 1963-1972 and recaptured in West Greenland and in other areas, including home waters, up to March 1973. Figures in brackets are returns per thousand tagged.

			Recaptures					
				Norwegian	All Other Areas			
Country	Year of Tagging	Number Tagged	West Greenland	Sea and Faroes	Grilse	Salmon	Total	Grand Total
Canada	1963	5,850	11(1.9)	0	70	20(3.4)	90	101
	1964	15,013	9(0.6)	0	204	72(4.8)	276	285
	1965	16,485	73(4.4)	0	175	193(11.7)	368	441
	1966	9,509	25(2.6)	0	120	104(10.9)	224	249
	1967	17,809	17(1.0)	0	121	166(9.3)	287	304
	1968	55,784	132(2.4)	0	1,209	429(7.7)	1,638	1,770
	1969	42,879	84(2.0)	0	374	183(4.3)	557	641
	1970	37,124	141(3.8)	0	291	137(3.7)	428	569
	1971	45,733	58(1.3)	-	416	-	416	474
	1972	24,063	-	-	-	-	-	-
Scotland	1963	10,998	10(0.9)	0	172	92(8.4)	264	274
	1964	9,200	6(0.7)	0	110	66(7.2)	176	182
	1965	9,239	10(1.1)	0	74	49(5.3)	123	133
	1966	15,406	30(1.9)	0	281	39(2.5)	320	350
	1967	21,002	23(1.1)	1	169	71(3.4)	240	264
	1968	15,695	16(1.0)	0	127	32(2.0)	159	175
	1969	15,958	53(3.3)	0	220	60(3.8)	280	333
	1970	32,071	144(4.5)	2[a]	565	157(4.9)	722	868
	1971	20,706	111(5.4)	1	610	5(0.2)	615	727
	1972	19,883	-	-	-	-	-	-

..continued

Table 2 (continued)

Country	Year of Tagging	Number Tagged	Recaptures: West Greenland	Norwegian Sea and Faroes	All Other Areas: Grilse	All Other Areas: Salmon	All Other Areas: Total	Grand Total
England and Wales	1963	9,485	8 (0.8)	0	15	38(4.0)	53	61
	1964	17,129	10(0.6)	0	30	97(5.7)	127	137
	1965	5,873	12(2.0)	0	35	57(9.7)	92	104
	1966	3,219	5(1.6)	0	28	37(11.5)	65	70
	1967	4,118	10(2.4)	0	23	56(13.6)	79	89
	1968	5,790	23(3.9)	0	43	48(8.3)	91	114
	1969	8,611	47(5.4)	0	27	38(4.4)	65	112
	1970	7,320	22(3.0)	0	30	21(2.9)	51	73
	1971	5,619	19(3.4)	-	25	-	25	44
	1972	1,780	-	-	-	-	-	-
Norway	1963	97	0	0	0	4(41.2)	4	4
	1964	1,485	0	0	67	26(17.5)	93	93
	1965	2,178	0	0	40	18(8.3)	58	58
	1966	1,362	0	2	27	16(11.7)	43	45
	1967	3,601	0	4	59	26(7.2)	85	93[x]
	1968	3,562	0	3	106	21(5.9)	127	134[x]
	1969	4,273	3(0.7)	3	83	30(7.0)	113	124[x]
	1970	7,603	2(0.3)	2	224	71(9.3)	295	302[x]
	1971	5,573	0	1	290	-	290	293[x]
	1972	4,445	-	-	-	-	-	-
Iceland	1963	63	0	0	2	0	2	2
	1964	63	0	0	0	1(15.9)	1	1
	1965	8	0	0	0	0	0	0
	1966	83	0	-	-	2(24.0)	2	2
	1967	154	0	-	2	1(6.5)	3	3
	1968	59	0	-	1	1(17.0)	2	2
	1969	15	0	-	-	-	-	-
	1970	16	0	-	-	-	-	-
Ireland	1968	606	0	0	21	0	21	21
	1969	0	0	0	0	0	0	0
	1970	1,552	4(2.6)	0	1	0	1	5
	1971	0	0	0	0	0	0	0
	1972	0	0	0	0	0	0	0
Sweden	1969	885	0	0	69	16(18.0)	85	85
USSR	1969	500	0	0	0	0	0	0
France	1969	2,089	15(7.1)	0	0	4(1.9)	4	19
	1970	3,807	26(6.8)	0	3	10(2.6)	13	39
	1971	4,702	9(4.9)	0	-	-	-	9
	1972	1,982	-	-	-	-	-	-
Greenland	1970	154[b]	7(45.5)	0	0	0	7	7
	1971	136[b]	-	0	0	-	0	0

[x]Including some fish from unknown localities

[a]One from Norwegian Coast and one reported from France as having been received from Norway

[b]Wild parr

Table 3. Number of hatchery-reared smolts tagged in the years 1963-1972 and recaptured in West Greenland and in other areas, including home waters, up to March 1973. Figures in brackets are returns per thousand tagged.

Country	Year of Tagging	Number Tagged	Recaptures: West Greenland	Norwegian Sea and Faroes	All Other Areas: Grilse	All Other Areas: Salmon	All Other Areas: Total	Grand Total
Canada	1963	7,332	4(0.5)	0	133	32(4.4)	165	169
	1964	46,659	9(0.2)	0	101	85(1.8)	186	195
	1965	45,988	67(1.5)	0	379	224(4.9)	603	670
	1966	70,875	70(1.0)	0	238	301(4.3)	539	609
	1967	112,288	68(0.6)	0	278	227(2.0)	505	573
	1968	113,368	189(1.7)	0	302	332(2.9)	634	823
	1969	137,832	256(1.9)	0	366	243(1.8)	609	865
	1970	184,962	194(1.0)	0	294	72(0.4)	366	560
	1971	200,689	92(0.5)	-	133	-	133	225
	1972	212,763	-	-	-	-	-	-
Scotland	1963	6,750	0	0	3	3(0.4)	6	6
	1964	3,000	0	0	7	7(2.3)	14	14
	1965	3,000	0	0	19	0	19	19
	1966	8,000	1(0.1)	0	13	5(0.6)	18	19
	1967	4,451	0	0	1	0	1	1
	1968	5,335	0	0	4	3(0.6)	7	7
	1969	3,694	0	0	1	3(0.8)	4	4
	1970	7,836	9(1.1)	2[a]	33	9(1.1)	42	53
	1971	5,247	2(0.4)	0	36	-	36	38
	1972	12,986	-	-	-	-	-	-
England and Wales	1963	1,970	1(0.5)	0	0	0	0	1
	1964	0	0	0	0	0	0	0
	1965	0	0	0	0	0	0	0
	1966	9,668	0	0	0	1(0.1)	1	1
	1967	18,522	0	0	0	1(0.1)	1	1
	1968	28,266	4(0.1)	0	4	5(0.2)	9	13
	1969	7,420	1(0.1)	0	4	0	4	5
	1970	4,493	3(0.7)	0	0	1(0.2)	1	4
	1971	12,030	9(0.7)	0	9	1(0.1)	10	19
	1972	11,346	-	-	-	-	-	-
Norway	1963	10,999	0	1	88	95(8.6)	183	184
	1964	9,182	0	1	135	87(9.5)	222	223
	1965	8,071	0	13	71	33(4.1)	104	117
	1966	13,812	0	29	403	145(10.5)	548	593[x]
	1967	18,393	2(0.1)	50	229	81(4.4)	310	386[x]
	1968	12,983	0	44	171	103(7.9)	274	343[x]
	1969	16,967	4(0.2)	38	138	68(4.0)	206	260[x]
	1970	18,673	2(0.1)	3	170	81(4.3)	251	263[x]
	1971	16,777	3(0.2)	5	164	-	164	176[x]
	1972	22,472	-	-	-	-	-	-
Iceland	1966	8,367	1(0.1)	1(0.1)	66	14(1.7)	80	82
	1967	10,061	0	0	24	6(0.6)	30	30
	1968	9,985	0	0	45	0	45	45
	1969	7,586	0	0	246	10(1.3)	256	256
	1970	10,014	0	0	1	-	-	1
	1971	11,087	-	-	-	-	-	-
Ireland	1966	15,000	0	0	0	0	0	0
	1967	5,000	1(0.2)	0	1	0	1	2
	1968	222	0	0	1	0	1	1
	1969	7,194	2(0.3)	0	21	1(0.2)	22	24
	1970	3,787	0	1	11	0	11	12
	1971	2,381	0	0	1	0	1	1
	1972	0	0	0	0	0	-	-

[x]Including some fish from unknown localities

[a]Norwegian Coast

..continued/

Table 3 (continued)

Country	Year of Tagging	Number Tagged	Recaptures: West Greenland	Norwegian Sea and Faroes	All Other Areas: Grilse	Salmon	Total	Grand Total
Sweden	1966	11,181	7(0.6)	1	690	193(17.2)	883	891
	1967	4,999	1(0.2)	4	364	62(12.4)	426	431
	1968	4,798	1(0.2)	1	586	37(7.7)	623	625
	1969	7,381	2(0.3)	0	514	9(1.2)	523	525
	1970	5,000	6(1.2)	0	293	18(3.6)	311	317
	1971	4,997	0	-	232	-	232	232
	1972	4,000	-	-	-	-	-	-
USA	1966	82,250	39(0.4)	0	69	168(2.0)	237	276
	1967	80,717	1	0	12	10(0.1)	22	23
	1968	73,730	7(0.1)	0	9	12(0.2)	21	28
	1969	73,418	65(0.9)	0	32	80(1.1)	112	177
	1970	48,190	382(7.9)	0	57	274(5.7)	331	713
	1971	29,905	65(2.2)	-	11	-	11	76
	1972	52,345	-	-	-	-	-	-
Denmark	1965	1,880	0	0	1	2(1.1)	3	3
	1966	4,270	0	3	19	47(11.0)	66	69
	1967	2,696	0	1	13	10(3.7)	23	24
	1968	5,173	1(0.2)	1	36	0	36	38
	1969	3,837	0	0	5	0	5	5
	1970	1,376	0	0	0	-	0	0
USSR	1969	600	-	-	-	-	-	-
France	1972	4,469	-	-	-	-	-	-

Table 4. Number of kelts tagged in the winters 1962/63 - 1971/72 and recaptured in Greenland and in other areas, including home waters, up to the end of 1972.

Country	Winter of Tagging	Number Tagged	Recaptures: Greenland	Other Areas	Total	In year of tagging
Canada[a]	1962-63	653	2	65	67	219
	1963-64	1,518	0	91	91	588
	1964-65	1,995	1	141	142	481
	1965-66	7,169	0	653	653	1,879
	1966-67	7,510	1	688	689	958
	1967-68	3,706	2	399	401	549
	1968-69	3,848	5	165	170	445
	1969-70	4,726	9	207	216	534
	1970-71	5,392	22	401	423	671
	1971-72	5,142	5	310	315	801
	1972-73	6,932	-	-	-	1,310
England and Wales (River Axe only)	1962-63	159	1	12	13	
	1963-64	185	2	10	12	
	1964-65	184	1	11	12	
	1965-66	109[b]	1	7	8	
	1966-67	178[b]	1	11	12	
	1967-68	188	2	6	8	
	1968-69	81	0	3	3	
	1969-70	113	0	12	12	
	1970-71	7	0	0	0	
	1971-72	23	0	1	1	
Faroes	1963-73	103	0	8	8	

.. continued/

Table 4 (continued)

Country	Winter of Tagging	Number Tagged	Recaptures			In year of tagging
			Greenland	Other Areas	Total	
Iceland	1962-63	114	0	14	14	
	1963-64	167	0	9	9	
	1964-65	154	0	5	5	
	1965-66	357	0	15	15	
	1966-67	745	0	75	75	
	1967-68	441	0	17	17	
	1968-69	369	0	19	19	
	1969-70	314	0	21	21	
	1970-71	785	0	105	105	
Ireland	1962-63	2,264	2	31	33	
	1963-64	2,351	2	70	72	
	1964-65	2,695	2	34	36	
	1965-66	2,972	1	40	41	
	1966-67	3,175	0	77	77	
	1967-68	1,034	0	24	24	
	1968-69	498	0	10	10	
	1969-70	1,088	0	28	28	
	1970-71	477	0	39	39	
	1971-72	289	0	15	15	
Scotland	1962-63	413	1	2	3	
	1963-64	134	0	2	2	
	1964-65	233	0	6	6	
	1965-66	1,376	4	19	23	
	1966-67	901	3	18	21	
	1967-68	117	0	3[c]	3	
	1968-69	152	0	1[d]	1	
	1969-70	133	0	1	1	
	1970-71	?	0	1	1	
	1971-72	54	0	1	1	
USA	1962-63	151	1	13	14	
	1963-64	123	1	10	11	
	1964-65	160	0	23	23	
	1965-66	146	2	16	18	
	1966-67	578	5	75	80	
	1967-68	340	5	56	61	
	1968-69	218	1	16	17	
	1969-70	315	1	16	17	
	1970-71	400	2	18	20	
	1971-72	240	1	6	7	
USSR	1968-69	566	0	10	10	
	1969-70	1,147	0	0	0	

a Ascending adults tagged during any year are included in the totals tagged for the corresponding winter (ie those tagged in 1962 are included under 1962-63, those tagged in 1963 under 1963-64 etc).

b In addition, 180 kelts were tagged by the Dee and Clwyd River Authority in 1965-66 and 291 kelts in 1966-67. No recaptures were reported from the first experiment and two (from 'Other Areas') from the second.

c Includes 1 recapture at Faroes.

d Recaptured at Faroes.

Table 5. Recaptures (to March 1973) of fish tagged at West Greenland and in the Labrador Sea.

Year Tagged	Number Tagged	Local Recaptures Number	Days Absence	Distant Recaptures Number	Location
1965	223	3	1, 3, 26	1	Canada (SW Newfoundland)
1966	729	28	1-8 (24) 10-50 (4)	4	Canada (Miramichi - 1) Scotland (River Tweed - 2) (River Spey - 1)
1967	375	6	1-2 (3) not known (3)	4	Canada (Labrador - 1) Ireland (River Slaney - 1) (River Barrow - 1) Scotland (River Tay - 1)
1968	47	4	1-3 (3) 1 month (1)	1	Canada (Labrador)
1969	444	14 3[b]	4-35 days 340-398 days	13	Canada (Labrador - 1) (NE Newfoundland - 4[a]) (Miramichi - 1) England (Taw & Torridge Estuary - 1) (River Wye - 1) Ireland (Waterville - 1) (River Slaney - 1) Scotland (near Montrose - 1) Spain (River Ason - 1) Wales (River Teify -1)
1970	27[c]	0	-	3	Canada (Chaleur Bay - 1) (River St. Jean - 1) (Escuminac - 1)
	224	3	4-22 days	4	Canada (Labrador - 1) (Nova Scotia - 1) Ireland (Dunmore East - 1) Scotland (Solway Firth - 1)
1971	59[c]	0	-	8	Canada (NE Newfoundland - 6) (Chaleur Bay - 2)
	226	5	1-ca30	10	Canada (Newfoundland - 3) (New Brunswick - 1[d]) England (River Taw - 1) (River Walkham - 1) N. Ireland (R. Blackwater, Co. Tyrone - 1) (Torr Head, Co.Antrim - 1) Ireland (Tory Island - 1[e]) Spain (River Sella - 1)
1972	2,364	151		4	Scotland (Near Aberdeen - 1) (Cove Bay, Nr Aberdeen - 1) Ireland (Waterford Harbour - 1) France (Brittany - 1)

a One recaptured in year of tagging

b Recaptured at Greenland in 1970

c Labrador Sea in spring

d Recaptured and released at Millbank research trap on R. Miramichi and subsequently recaptured upstream at Blackville by angling

e Tagged in Labrador Sea 58°09'N 52°26'30"W

Table 6. Catches in the Norwegian Sea long-line fishery and in the drift-net fishery within Norwegian fishery limits, 1965-72. Metric tons, round fresh weight.

Norwegian Sea Long-Line Fishery

Year	Denmark		Faroes		Germany		Norway		Sweden		Total		Drift-net Fishery within Norwegian Fishery Limits
	Number of Vessels	Catch	Number of Vessels	Catch	Number of Vessels	Catch	Number of Vessels[e]	Catch	Number of Vessels	Catch	Number of Vessels	Catch	
1965	1-2	-[a]	0	0	0	0	?	0	0	0	1-2	-[a]	283
1966	10	-[a]	0	0	0	0	"	0	-[a]	-[a]	10+	-[a]	312
1967	22	77	0	0	0	0	"	-[a]	6	-[a]	28+	77+	333
1968	28	177	2	5[b]	0	0	"	100[d]	16	126	46+	408[d]	228
1969	40	413	4	7[c]	5	24	"	450[d]	2	24	51+	918[d]	234
1970	60	481	5	12[b]	4	21	"	420[d]	1	24	70+	958[d]	183
1971	20	162	0	0	2	9	"	300[d]	1	17	23+	488[d,f]	263
1972	20	182	2	9[c]	2	4	?	300[d]	1	20	25+	515	410

a Not known

b Roughly 70% of catch taken in vicinity of Faroes

c All taken in vicinity of Faroes

d Estimated catch

e Precise number unknown, but large numbers of small and medium-sized vessels participated

f Excluding catches discarded because undersized

Table 7 Recaptures of salmon tagged in the long-line fishery in the Norwegian Sea (to March 1973).

Year Tagged	Number Tagged	Year Recaptured	Recaptures			
			Norwegian Sea	Home Waters Norway	Home Waters U.S.S.R.	Total
1968	238	1968	0	5	0	5
		1969	0	0	1	1
		Total	0	5	1	6
1969	932	1969	5	49	6	60
		1970	2	13	2	17
		1971	0	2	0	2
		Total	7	64	8	79
1970	1,118	1970	10	117	8	135
		1971	2	10	3	15
		1972	0	6	0	6
		Total	12	133	11	156
1971	1,824	1971	4	135	17	156
		1972	2	21	5	28
1972	901	1972	2	45	16	63

Table 8. Recaptures of fish tagged in Faroe waters to March 1973.

Year Tagged	Number Tagged	Recaptures					
		Norway	England	Scotland	Ireland	U.S.S.R.	West Greenland
1969	74	1	0	2	0	0	0
1970	233	2	1	5	3	1	1
1971	359	3	1	8	2	0	1
1972	307	1	2	4	4	0	1

Table 9. Catches in home waters, 1960-72 (salmon plus grilse except where shown separately) in metric tons, round fresh weight.

Year	England and Wales			France	Iceland	Ireland[b]			Northern Ireland[b]	Norway			Scotland			Sweden[c]	USSR[e]	Canada			USA
	S	G	T			S	G	T		S	G	T	S	G	T			S	G	T	
1960	-	-	283	50-100	100	-	-	743	139	-	-	1659[f]	950	476	1436	40	1100	-	-	1635	<2
1961	-	-	232	50-100	127	-	-	707	132	-	-	1533[f]	820	376	1196	27	790	-	-	1580	<2
1962	-	-	318	50-100	125	-	-	1459	356	-	-	1935[f]	1015	725	1740	15	710	-	-	1717	<2
1963	-	-	325	50-100	145	-	-	1458	306	-	-	1786[f]	1286	412	1698	16	480	-	-	1848	<2
1964	-	-	307	50-100	135	-	-	1617	377	-	-	2147[f]	1216	698	1914	16	590	-	-	2066	<2
1965	-	-	320	50-100	133	-	-	1457	281	-	-	2000[f]	1042	560	1602	17	590	-	-	2113	<2
1966	-	-	387	50-100	106	-	-	1238	287	-	-	1791	1069	555	1624	17	570	-	-	2356	<2
1967	-	-	420	50-100	146	-	-	1463	449	-	-	1960	1245	888	2133	23	883	-	-	2859	<2
1968	-	-	282	50-100	162	-	-	1413	312	-	-	1514	1020	543	1563	14	827	-	-	2104	<2
1969	264[a]	113[a]	377	50-100	133	(260)[g]	(1470)[g]	1730	267	801	582	1383	987	954	1941	9	360	1546[a]	411[a]	1957	<2
1970	313[a]	214[a]	527	50-100	195	268	1519	1787	297	816	355	1171	802	622	1424	?	?	1468[a]	629[a]	2097	<2
1971	299[a]	127[a]	426	50-100	204	175	1464	1639	234	773	435	1208	715	704	1419	56	?	1440[a]	394[a]	1834	<2
1972[h]	-	-	449	50-100	?	200	1450	1650	232	1040	500	1540	955	690	1645	?	?	1106[a]	419[a]	1525	<2
Angling Catch	Included			Inc.	Inc.	Inc.			Inc.	Inc.			Inc.			Not inc.	Inc.	Not Inc.[d]			Inc.

S - Salmon; G - Grilse; T - Total (Salmon plus Grilse)

a - Estimated
b - Catch in River Foyle allocated on basis of 50% Ireland and 50% Northern Ireland
c - West Coast catch only, from Bulletin Statistique
d - Angling catches (mainly grilse) about 10% additional (by weight)
e - Mainly salmon
f - Including sea trout and sea char catches; less than 5% of total
g - Estimated on basis of 1970 catches
h - Provisional

Table 10. Estimates of catches-per-unit-effort for some home water fisheries. 1960-1972.

Year	Canada (Drift Nets and Traps) lbs	Canada Trap Nets[h]	Canada Drift Nets[h]	Ireland (Open Sea Drift Nets)[b] (numbers)	Ireland (Licences)[c] (lbs)	Foyle Area (Sea Drift Nets)[b] (numbers)	Norway[d] (Bag Nets) (kg)	England and Wales Drift Nets N.E. Area[g] (numbers) Salmon	England and Wales Drift Nets N.E. Area[g] (numbers) Grilse	Scotland (Fixed Engines)[e] (numbers) Salmon	Scotland (Fixed Engines)[e] (numbers) Grilse	Scotland (Net and Coble)[f] (numbers) Salmon	Scotland (Net and Coble)[f] (numbers) Grilse
1960	169			325	950	104	172	84.8	79.8	12.8	20.3	84.1	77.4
1961	159			224	1030	-	158	54.3	46.1	12.3	17.2	60.9	61.4
1962	178			563	2210	297	175	92.8	75.5	14.8	29.6	83.6	134.9
1963	193			456	1940	334	177	49.4	42.7	19.9	21.8	109.3	62.3
1964	266			430	1720	392	195	52.6	58.0	23.2	35.6	98.6	113.8
1965	262			520	1700	361	172	83.6	47.9	17.8	26.6	84.0	99.0
1966	249			516	1250	375	154	66.6	58.9	19.4	30.4	95.0	104.0
1967	300			733	1650	524	154	110.5	90.9	21.6	49.9	130.2	170.4
1968	183			552	1650	482	129	-	-	17.3	29.8	97.9	92.4
1969	159			491	2077	404	137	134.5	166.5	15.9	49.7	123.4	194.5
1970	153	13.3	85.9	422	1899	565	117	170.3	245.3	12.3	35.2	98.9	137.5
1971	80	8.4	50.2	420	1683	353	116	84.1	83.4	11.6	39.9	69.5	118.4
1972	-(i)	-	-	353(i)	1662(i)	344	167(j)	138.3	152.1	-	-	-	-

a - Miramichi area, salmon only. Average of mean monthly catch/unit effort for both types of gear throughout open seasons for each type. Units of effort taken as 1 trap net or 200 fathoms of drift net, as defined in FRB Tech. Rept. No. 29.

b - Salmon and grilse per drift net

c - Pounds salmon and grilse per licence

d - Salmon and grilse per bag net

e - Catch per net per month

f - Catch per crew per month

g - Catch per net licence issued

h - Miramichi area, salmon only, pounds/unit day

i - Local fishery closed in 1972; see footnote a

j - Provisional

APPENDIX

List of Working Papers

No.	Author	Title
No. 1	C P Ruggles and G E Turner	"Recent changes in stock composition of Atlantic salmon (Salmo salar) in the Miramichi River, New Brunswick".
No. 2	Paul F Elson	"Limited Recovery of Depleted Northwest Miramichi Salmon Follows Ban on Local Commercial Fishery".
No. 3	J E Paloheimo and P F Elson	"Re: Greenland fishery for Atlantic salmon and Canadian catches".
No. 4	G E Turner, N E MacEachern and C P Ruggles	"Review of Atlantic salmon stocks in major New Brunswick rivers in 1972".
No. 5	Paul F Elson	"Genetic polymorphism in northwest Miramichi salmon, in relation to season of river ascent and age at maturation and its implications for management of the stocks".
No. 6	C E Wykes	"Size and age composition of the 1968, 1969 and 1970 commercial salmon landings in New Brunswick, Canada".
No. 7	J A Ritter	"Preliminary observations on the influence of smolt size on tag return rate and age at first maturity of Atlantic salmon (Salmo salar)".
No. 8	John H C Pippy	"A critical assessment of the value of Anisakis sp. (Nematoda) as a biological tag in Atlantic salmon".
No. 9	John C Pippy and L S Parsons	"Morphology and morphometric variations of larval Anisakis sp. (Nematoda) from Atlantic salmon (Salmo salar) and Atlantic herring (Clupea harengus)".
No.10	W H Lear	"Distribution and relative abundance of Atlantic salmon at West Greenland and Labrador Sea during August-October 1972".
No.11	W H Lear	"Catches of species other than salmon taken by drift nets at West Greenland during 1972".

No.	Author	Title
No.12		"Canadian commercial salmon landings (metric tons) by provinces, 1952-1972".
No.13		"CANADA. ICES/ICNAF Report. Tables 2-6, giving details of tagging and recaptures.
No.14	W H Lear and R H Payne	"Canadian participation in the International Salmon Tagging Experiment at West Greenland".
No.15	W H Lear and R H Payne	"Estimate of immediate tagging mortality of adult Atlantic salmon".
No.16	A W May	"Oceanic distribution and migration of salmon in the Northwest Atlantic".
No.17		Revision of Tables 3 and 4 listed in ICNAF Res. Doc. 72/73 - giving details of taggings and recaptures of smolts and kelts in the years 1963-73.
No.18	W R Munro	"Report on the Salmon Tagging Cruise by FRS "Scotia", 1 August to 13 September 972".
No.19	W R Munro	"Progress Report on the analysis of age, length and weight data collected during the Internatinnal Salmon Tagging Experiment 1972".
No.20	D.A.F.S. Pitlochry	"Data for up-dating the tables in the report prepared by the Joint Working Party at their 1972 meeting in Dublin".
No.21	A Swain	"Salmon catches for England and Wales".
No.22	A Swain	"England and Wales - Recaptures of Tagged Salmon".
No.23	A R Child	"Analysis of salmon blood samples taken off West Greenland 1970-72".
No.24	J Møller Jensen	"Length composition in samples of commercial salmon catches taken by observers during the International Salmon Tagging Experiment at West Greenland, 1972".
No.25	J Møller Jensen	"Preliminary report on local recaptures from the International Salmon Tagging Experiment at West Greenland, 1972".

No.	Author	Title
No.26	O Christensen	"Danish salmon fishing at West Greenland, 1972".
No.27	O Christensen	"The Danish salmon fishery in the Norwegian Sea in 1972".
No.28	O Christensen	"Comparable values of catch per unit effort in the Danish salmon fishery in the Norwegian Sea 1969-1972".
No.29	A Reinert	"Faroe Contribution: 1. The Faroese offshore fishery for salmon at West Greenland 1972. 2. Monthly distribution of effort... for a Faroese vessel's salmon fishery at West Greenland 1969-72. 3. Recaptures of tagged salmon - Faroes. 4. Percentage weight distribution of salmon caught in Faroe waters in 1972".
No.30	L Rosseland	"Weight increase in salmon tagged and weighed in the Norwegian Sea 1971 and recaptured in 1972".
No.31		"Norwegian Salmon Statistics".
No.32	L Rosseland	"Weight change in salmon tagged and weighed in the Norwegian Sea 1972 and recaptured in home waters the same year".
No.33	L Rosseland	Annual report for the year 1972 - (in Norwegian).
No.34	L Rosseland	"Migrations of salmon tagged in the Norwegian Sea 1969-1972".
No.35		Table giving details of tagging of smolts and parr.
No.36		"K factor for salmon caught in the Norwegian Sea and at some locations at the Norwegian coast 1972".
No.37		Tables giving information on weight, tagging and recapture of salmon (smolts) in Norwegian rivers.

No.	Author	Title
No.38		"List of recaptures reported to ICES, or to the Greenland Fisheries Investigations, up until 15 March 1973".
No.39		Tables giving details of tagging of smolts and kelts and recaptures.
No.40		Table on "Average weight in kg of salmon caught on long line in the Norwegian Sea and at the Norwegian coast 1972".
No.41		Table on "Length distribution of salmon caught in the Norwegian Sea and at some locations at the Norwegian coast 1972".
No.42		Results of tagging experiments with wild and reared smolt, 1966-1969 (Sweden).
No.43	R Vibert	Marquage du saumon atlantique au "Grönland occidental et en Mer du Labrador. N/O Cryos - 20 Août-29 Septembre 1972. Rapport préliminaire de campagne.
No.44		Second Progress Report on the International Salmon Tagging Experiment, West Greenland, 1972.
No.45		Accounts for the "ICES/ICNAF Salmon Tagging Experiment Fund" per 20 March 1973.
No.46		Distribution by areas and periods of effort, catch and catch per unit effort in the Norwegian salmon fishery at West Greenland in 1972.

Fig.1 DISTRIBUTION OF WEST GREENLAND SALMON FISHERY — 1972

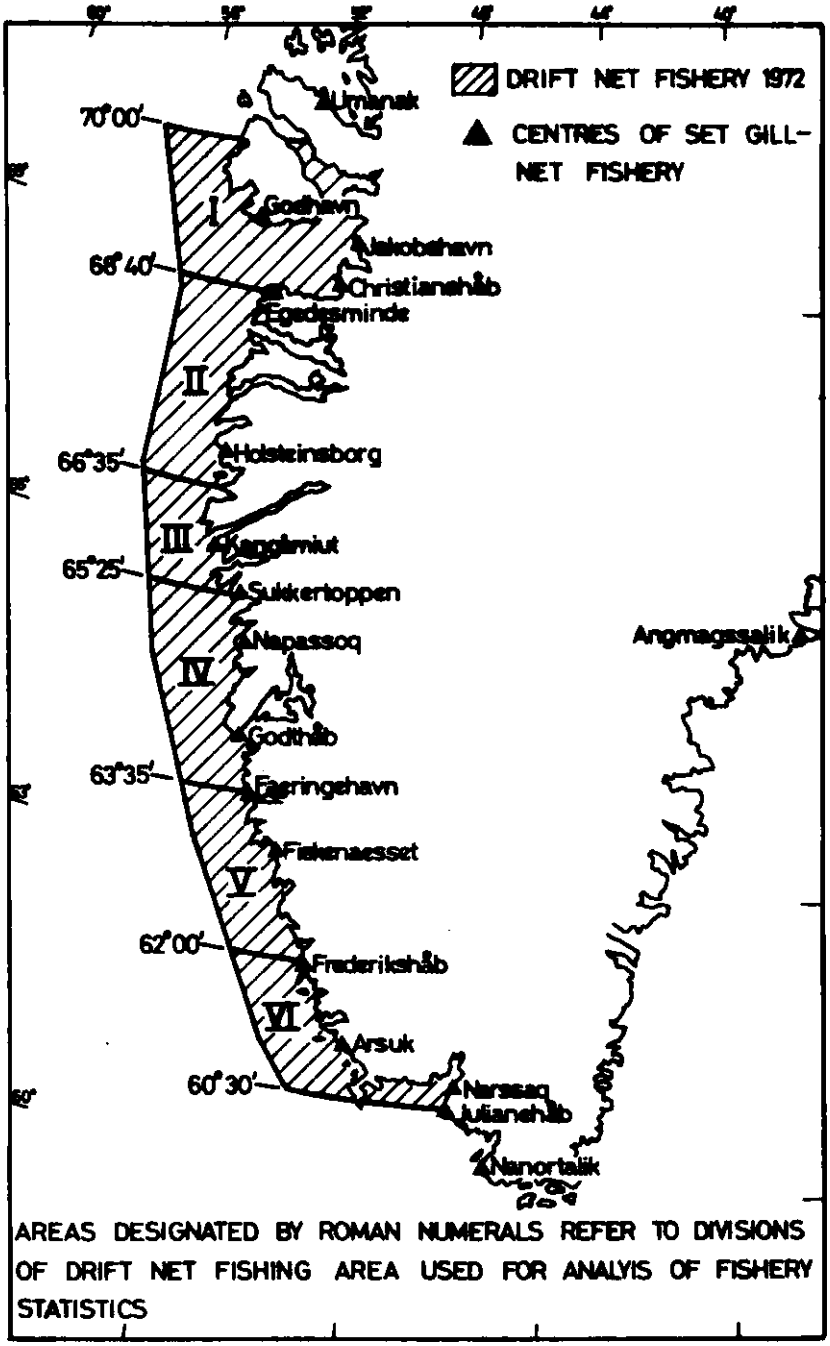
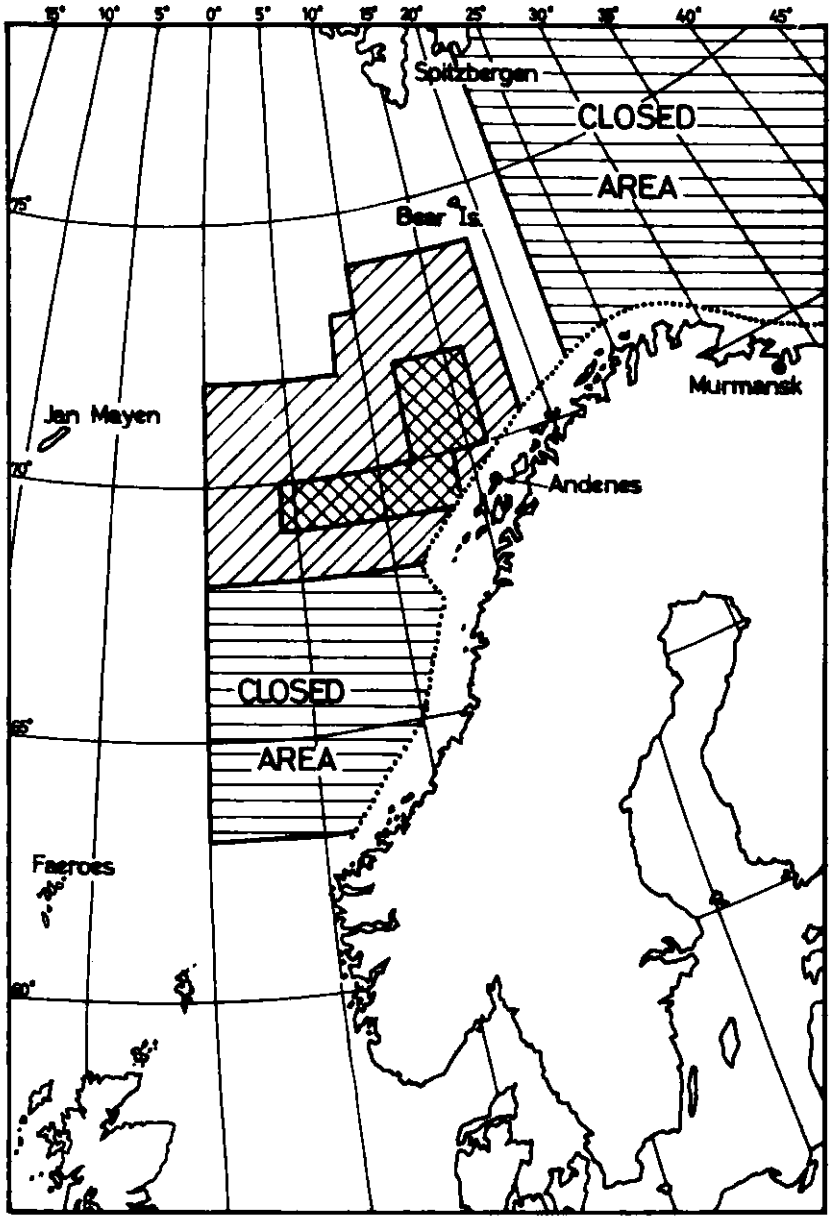


Fig. 2 DISTRIBUTION OF THE DANISH SALMON FISHERY IN THE NORWEGIAN SEA IN 1972



INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

Serial No. 2991
(B.g.14)

ICNAF Summ.Doc. 73/7

ANNUAL MEETING - JUNE 1973

Corrigenda to Report of the ICES/ICNAF Joint Working Party on North Atlantic Salmon, Copenhagen, 19-23 March 1973

submitted by

K.A. Pyefinch
DAFS, Pitlochry, Scotland

Page 6, line 5:	For "were" read "was".
Page 7, para 20, line 4:	"to cover the cost of publishing its scientific results..." reads a little better than "to cover the cost of a future publication of its scientific results..."
Page 8, para 25, line 1:	Insert hyphen between "short" and "term".
Page 10, line 4:	For the sake of conformity "should" might be replaced by "will".
Page 12, para 32, line 4:	The catch quoted in Table 6 is 515 metric tons.
Page 13, para 36, line 7:	A hyphen might be inserted between "salmon" and "producing" and the same addition might be made in line 15.
Page 13, para 38, line 3:	Substitute "Table 6" for "Table 5".
Table 4:	The heading to this table seems to need adjustment as the Canadian data runs through to 1972-73. I also noticed that the Faroes data is recorded as "1963-73". This may be correct and is a summary of their activities; on the other hand, it could be a typing error.
Table 5:	As a date is specifically mentioned in the text, it should presumably also be entered in the table heading which should, I suppose, start "Recaptures (to 20 March 1973) of...."
Table 6:	Footnote "d" should presumably be added to the total long-line catch.
Table 10:	Should footnote "(i)" be added to the Irish figures?
Appendix:	The treatment of the authors' names in the appendix seems to need a little editing as Christian names sometimes appear and sometimes not.

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ANNUAL MEETING - JUNE 1973

Corrigenda to Report of the ICES/ICNAF Joint Working Party on North Atlantic Salmon, Copenhagen, 19-23 March 1973

submitted by

O. Christensen
Danmarks Fiskeri-og Havundersøgelser, Charlottenlund, Denmark

Page 14, line 6: "Of these 10 subsequent recaptures ..." should read "Of these 11 subsequent recaptures.."

Page 14, line 7: After "...2 in England ..." add ", 1 in Norway"