REPORT OF THE

SECOND ANNUAL MEETING

OF THE

NORTH AMERICAN COMMISSION

OF THE

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

21 - 22 February 1985, Boston, USA
and
3 - 7 June 1985, Edinburgh, UK

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

ORGANISATION POUR LA CONSERVATION DU SAUMON DE L'ATLANTIQUE NORD

NORTH AMERICAN COMMISSION

LA COMMISSION NORD-AMERICAINE

CHAIRMAN: DR GEORGES NADEAU (CANADA)

RAPPORTEUR: MR TED LILLESTOLEN (USA)

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NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)25

REPORT OF THE SECOND ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION

EDINBURGH
17 AUGUST 1985

NAC (85)25

REPORT OF THE SECOND ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION OF THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 21-22 FEBRUARY 1985, COPLEY PLAZA HOTEL, BOSTON, USA AND 3-7 JUNE 1985, DRAGONARA HOTEL, EDINBURGH, UK

1. OPENING OF THE MEETING

1.1 The meeting was opened on 21 February 1985 at 1030 hours by Dr Georges Nadeau (CANADA), Chairman of the North American Commission. Opening statements were given by Ambassador Edward E Wolfe of the US Department of State (Annex 1), the head of the Canadian delegation (Annex 2), as well as the representative of the European Community (EC) (Annex 3).

1.2 The list of participants is given in Annex 4.

2. ADOPTION OF THE AGENDA

2.1 The Commission adopted the agenda after making one change to the draft agenda. Item 10 became item 8. Items 8 and 9 became items 9 and 10.

2.2 With respect to item 8, the Commission directed the scientists of the US and Canadian delegations to develop the recommendations for scientific research and advice that would be considered by the Commission.

2.3 The agenda is attached, NAC (85)21, (Annex 5).

3. NOMINATION OF A RAPPORTEUR

3.1 The Commission nominated Mr Ted I Lillestolen (US) as rapporteur for the meeting.

4. APPROVAL OF DRAFT REPORT OF THE LAST MEETING

4.1 The Commission approved the Draft Report of the First Annual Meeting (including the meeting held in Ottawa, Canada on May 3-4, 1984 and Edinburgh, Scotland on May 25, 1984), NAC (84)40.

5. REVIEW OF THE 1984 FISHERY

5.1 The Canadian representative reviewed the 1984 Canadian Atlantic Salmon Management Plan. Based on the 1984 Plan an average reduction in catch of about 10 to 13% was expected in the Newfoundland commercial salmon fishery (includes Labrador). Tables are attached, NAC (85)4, (Annex 6). Upon review of the actual 1984 catch, a reduction of about 46% was realized (Table 1 of Annex 6). It was noted that other factors in addition to the plan probably contributed to the significant reduction.

5.2 The total 1984 Canadian Atlantic salmon catch was 1,107 tonnes, which is the lowest level since 1960 and approximately one-half of the average catch of the past twenty years (Table 2 of Annex 6).

5.3 The 1984 homewater fishery regulations appeared to have had a direct impact on the improved survival to spawning. On the Restigouche River, 75% of the homewater returns potentially survived to spawn versus 38% in 1983. On the Miramichi River, it was 83% compared to 10% in 1983 and on the St John River it was 78% compared to 38% in 1983.

5.4 The US representative reviewed the 1984 United States catch statistics which only involved recreational rod and reel fishing, NAC (85)5, (Annex 7). The total catch in Maine was 637 fish and in the Merrimack and Connecticut Rivers it was 6 and 4 respectively. It was noted that the total Maine catch was up from the 1983 catch of 356 fish but was still significantly lower than the 1980 catch of 1,300 fish.

5.5 The 1984 run size was 3,413 fish, up from 2,633 fish in 1983 but lower than the 1980 run size of 6,637 salmon, NAC (85)6, (Annex 8).

5.6 The US representative stated that the United States does not have a directed commercial salmon fishery; directed recreational salmon fishing is prohibited on the Merrimack and Connecticut Rivers, and in Maine rivers a limit of one (1) fish per day and five (5) per season is allowed.

6. REVIEW OF THE ACFM REPORT FROM ICES

6.1 The ICES representative, Chairman of the ACFM Committee, presented the scientific advice from ICES, NAC (85)2, (Annex 9) and the appended Report of the Meeting of the Working Group on North Atlantic Salmon in response to the request posed by NASCO's Council in 1984.

6.2 The Canadian representative noted two points with respect to the report. The first pertained to a point of information comparing the estimated total number of Canadian salmon harvested (Table 23 of the Working Group

Report) which was about 500,000 fish, and the estimated number of salmon of US origin (Table 5 of the Working Group Report) intercepted in Newfoundland, which ranges from approximately 1,000 to 3,000 fish (excluding 1979). The second point pertained to the non-availability of relevant data (dating back to 1966) at the time of the Working Group meeting to fully and completely address all the questions posed by the Commission. The Canadian representative noted that, although it is quite clear from the information from ICES that some US origin salmon are intercepted in Canadian waters, not enough data were used in the analyses to definitively determine when, where and to what extent. Although data exist for the years dating back to 1966, only 1980 and combined 1981 and 1982 data were used in some of the detailed analysis (Working Group Report, section 2.4).

6.3 The ICES representative noted that the Working Group addressed all questions posed by NASCO but was unable to answer all questions completely due to the non-existence and, in some cases, non-availability of relevant data at the time of the meeting. He noted that the data used were the only data provided by the US and deferred further response to the US delegation. He considered that the ICES analysis was based on incomplete data regarding area and season of capture and could not be relied on to make generalizations.

6.4 The US representative noted that, although data dating back to 1966 were available, there was insufficient time to prepare the data in the format that could be used to carry out the analyses. It was determined that in the time allowable, only the data for 1980 and 1981-82 could be processed. However, he stated that he believed the data presented in Tables 3,4, and 5 of the Working Group Report did respond to the questions and was sufficient to support regulatory recommendations.

6.5 The Canadian representative questioned whether 1980 was, in fact, a typical year.

6.6 The US representative responded that the United States intends to provide all the available data when they are in the format that can be used to carry out the additional analyses. Availability of the data cannot be determined at this time. It was further noted, that, even though all the information was not available at the Working Group meeting, the results provided by ICES are still valid and should be used when considering interception of US origin salmon.

The following were discussed at the Second Annual Meeting of NASCO held in Edinburgh, Scotland from June 3-7, 1985.

6.7 The ICES representative, Chairman of the ACFM Committee, presented the report of the special meeting of the Working Group on North Atlantic Salmon NAC (85)17, Annex 10, which was convened at the Atlantic Sea-Run Salmon Commission, Bangor, Maine, USA, from May 6-8, 1985.

This special meeting was convened to review the areal and seasonal distribution of Canadian catches of US origin salmon in Canadian fisheries dating back to 1970.

6.8 The US representative asked whether the data, although being presented on a monthly basis, were put together by standardized week. The ICES representative responded in the affirmative.

6.9 The Canadian representative noted that 59% of the US tag returns were for the years 1973, 1974 and 1979 and asked whether this uneven recovery rate would affect the determination of statistical recovery rates.

6.10 The ICES representative noted that it does not affect the statistical recovery rates and referred to the report which states that the variability is largely a result of changes in survival from stocking to recovery.

6.11 The Canadian representative referred to Table 9 of the Working Group Report and asked whether the 1984 returns (referred to as the 1983 release) indicate a lower recovery rate from previous years.

6.12 The US representative pointed out that the 1984 returns only include one sea-winter salmon and do not take into consideration returns of two sea-winter salmon, which is indicated in the table as 'recoveries incomplete'. This was confirmed by the Chairman of the Working Group, Dr Doubleday (CA).

6.13 The Canadian representative referred to Figure 5 of the Working Group Report and asked whether the table shows that very few tags are returned for the month of September when compared to other months.

6.14 The ICES representative noted that although the number of tags recovered for the month of September is low in relationship to the average total recovered for the year (3.3% as referred to in Table 3), he noted that the catch was also low.

6.15 The Canadian representative referred to Table 1 of the Working Group Report of the March 1985 meeting which was convened to discuss questions related to the North-East Atlantic and West Greenland Commission areas. He noted the increase in the US nominal catch of salmon in home waters from 1.3 tonnes in 1983 to 2.0 tonnes in 1984 and the considerable decrease in the Canadian nominal catch for the same period. He asked why there was an increase in the US catch.

6.16 The US representative responded that the increase in the US catch was due to the benefits of the US enhancement and restoration program.

6.17 The Canadian representative asked whether there was a correlation between the catches and the tag returns.

6.18 The ICES representative referred to the report which states that there was no statistically significant relationship found between annual catch in a Statistical Area and tag recoveries in that Area for the corresponding smolt class.

7. REVIEW AND DISCUSSION OF PROPOSED MANAGEMENT MEASURES

7.1 The Canadian representative noted that the 1985 Canadian Atlantic Salmon Management Plan is not yet finalized but would, most likely, continue the major elements of the 1984 Plan. Canada is aware of its responsibilities under the Convention to minimize the interception of US origin fish, taking into account the various relevant factors mentioned in Article 9 of the Convention.

7.2 The US representative responded that, based on the findings from the ICES Report, the proposal submitted to the North American Commission last year, which included a total allowable catch (TAC) and area closures of the Newfoundland commercial fishery for the months of June and July, is still valid and would significantly reduce Canadian interceptions of salmon of US origin.

7.3 The Canadian representative responded that the proposal submitted by the United States in 1984 was unacceptable. Canada did not consider that a TAC was the appropriate management tool in the circumstances. Canada was, however, prepared to consider time and area closures. With respect to the US proposal dealing with season closure of the Newfoundland fishery in June and July, the Canadian representative noted that the economic dependence on that particular fishery by the fishermen of that area is quite significant, and that the major part of their income from salmon is obtained during the period in question. He further noted that these considerations need to be taken into account as provided in Article 9(g). Canada submitted data, NAC (85)7, (Annex 11) on the distribution of the net fishing income for the east coast of Newfoundland.

7.4 The US representative acknowledged the concerns of Canada but maintained that the problem of Canada's interception of US fish must be addressed. If the United States is to continue its salmon restoration program, it must expect to achieve a rate of interception which is at least comparable to that experienced by the other party governments. Considering Canada's position with respect to the original US proposal, the United States submitted a new proposed management measure, NAC (85)8, (Annex 12). This proposal requests that Canada put into effect a closure of the Newfoundland fishery from September 1 to December 31 in addition to the measures implemented under the 1984 Canadian Atlantic Salmon Management Plan.

7.5 The Canadian representative noted that the management measures already taken by Canada in 1984 would reduce the interception of salmon of US origin to some extent and that this impact should be further assessed. He noted the latest proposal and stated that the Canadian authorities would seriously take it under consideration. However, it was further noted that such consideration would require the examination of all existing data including the US tag return data broken down by month, year, and statistical area back to 1966 (later revised to 1970) as well as the available 1984 tag return data which will be used to determine in greater detail the impact of the 1984 management measures. It was noted that this data would be considered in conjunction with the 1984 Canadian catch data, which will also be broken down by time and statistical area. (The Canadian data will be provided to the United States in the near future.) The Canadian representative indicated that this analysis would have to be available by mid-May in order to permit consideration of such a proposal in 1985.

7.6 The US representative acknowledged some concern with respect to the conditions that would have to be met before the US proposal is considered. The United States reiterated its position that, although ICES noted there were data deficiencies, there were enough data to reach certain conclusions. The United States considers these findings sufficient grounds for action to be taken in 1985 to deal with the problem. The US representative did agree to attempt to provide the data requested but questioned whether there was sufficient time for the scientists to review it.

7.7 The Commission agreed to request specific information from ICES, NAC (85)9, (Annex 13).

The following was discussed at the Second Annual Meeting of NASCO, held in Edinburgh, Scotland, from June 3-7, 1985.

7.8 The Canadian representative noted that Canada would consider the US management proposal in the light of the review of the US data, but further noted that the 1985 Canadian Atlantic Salmon Management Plan contains measures that were not in effect in 1984, that would in effect reduce the interception of US origin salmon. The additional measures include the closure of the commercial salmon fishery in the Maritimes and removal of 683 part time fishermen from the fishery in Newfoundland and Labrador.

7.9 The US representative asked if Canada had estimated the reduction in catch as a result of the change in effort.

7.10 The Canadian representative could not quantify the reduction in catch but based on preliminary and tentative calculations , which were provided to the United States, it is believed that the 1984 and additional 1985 management measures could reduce the interception of US salmon by 26%.

7.11 Following the preliminary review by US scientists of the Canadian figures, the US representative questioned some of the assumptions and relationships used by the Canadians and suggested that this be further reviewed by ICES. This suggestion was agreed to by Canada (refer to NAC (85)22 (g), Annex 14).

7.12 With respect to the US management proposal, the Canadian representative regretted to reject the proposal at this time, in light of the inaction in the West Greenland Commission to adopt effective management measures. A formal statement was provided by the Canadian representative and is attached as (NAC (85)18 ,Annex 15).

7.13 The US representative regretted the Canadian response and noted its position that the actions or reactions of our Commission should not be linked to the actions or reactions of another Commission. A formal statement by the US representative responding to the Canadian position was provided and is attached as (NAC (85)19, Annex 16).

8. WORKING GROUP REPORT ON STOCKING OF PACIFIC SALMONIDS

8.1 The Report of the Working Group on the introductions of non-indigenous salmonids in the Great Lakes and Atlantic seaboard was submitted to the Commission, NAC (85)10, (Annex 17). It was noted that the report is preliminary and would require further work.

8.2 The Canadian representative noted that this issue is one of considerable importance to Canada and must be studied in greater detail. Based on the submitted report, the Canadian representative tabled further questions:

(1) What is the present magnitude and distribution of non-indigenous salmonid introductions in the northeastern USA?

(2) What is the intention of the states and/or federal government concerning continuation, expansion or termination of existing programs?

(3) What scientific assessments exist and what studies are in progress or planned to determine:

(a) the potential effect on native Atlantic salmon populations in adjacent areas of Canada from Pacific salmonid introductions in the northeastern USA; and

(b) the impact of such introductions on:

(i) genetic integrity,

(ii) disease control, and

(iii) competition for food and space?

(4) What recommendations should the North American Commission be considering to address Canada's concerns regarding existing or future programs for the introduction of non-indigenous salmonids in the northeastern USA?

8.3 The US representative undertook to provide to the Commission information on the extent of the US introductions. He also noted that further work needed to be done by the Working Group. It was pointed out that the issue of disease needs to be considered from a broad perspective.

8.4 The Commission agreed that the Report should be reviewed further by the delegations and requested the Working Group to provide the Commission with more specific questions in dealing with this issue.

8.5 The ICES representative noted that there is an ICES Working Group dealing with this issue and provided the Commission with its terms of reference, NAC (85)11, (Annex 18).

The Commission noted that it should consider the work that is taking place within this Working Group.

8.6 Consideration of this agenda item was deferred to a future meeting.

9. REVIEW OF THE EFFECTS OF ACID RAIN ON ATLANTIC SALMON

9.1 The Canadian representative restated its concerns with respect to the effects of acid rain on Atlantic salmon and submitted a draft proposal to establish a joint working group to review the issue, NAC (85)23, (Annex 19).

9.2 The US representative agreed to review this proposal.

9.3 Consideration of this agenda item was deferred to a future meeting.

10. RECOMMENDATIONS TO THE COUNCIL CONCERNING REQUEST TO ICES FOR SCIENTIFIC RESEARCH AND SCIENTIFIC ADVICE

10.1 The Commission reviewed and accepted the document 'Questions from NASCO to ICES, June 1985' (NAC (85) 22, Annex 14) and agreed to forward it to the Council for proper action.

11. DATE AND PLACE OF NEXT MEETING

11.1 The Canadian representative issued an invitation to host the next meeting of the Commission in Canada in February 1986. The specific location and dates of the meeting will be determined at a later date.

12 OTHER BUSINESS

12.1 The Commission adopted the proposal to amend Rule 15 of the Rules of Procedure, (NAC (85) 24, Annex 20).

12.2 The Commission adopted the proposal dealing with election of officers, (NAC (85)20, Annex 21).

12.3 The Commission accepted the resignation of the Vice-Chairman, Mr R A Buck. The Commission elected Dr Frank Carlton (US) as the new Vice-Chairman to serve for the remainder of his predecessor's term of office.

13 CONSIDERATION OF THE DRAFT REPORT OF THE MEETING

13.1 The Commission agreed that the draft report would be circulated to the Chairman and heads of delegations by mail.

14 ADOPTION OF A PRESS RELEASE

14.1 The Commission did not issue a press release.

ANNEX 1

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

OPENING STATEMENT MADE BY
THE HONOURABLE EDWARD E WOLFE, JR,
DEPUTY ASSISTANT SECRETARY OF STATE
FOR OCEANS AND FISHERIES AFFAIRS, US DEPARTMENT OF STATE

BOSTON
February 1985

Mr. Chairman, distinguished delegates, ladies and gentlemen ...

On Behalf of the United States, I would like to welcome each of you to the Second Annual Meeting of the North American Commission of the North Atlantic Salmon Conservation Organization (NASCO). This is the first meeting of the Organizationn to take place in the United States since the Convention entered into force in October 1983. As you know, we worked very hard to establish the Organization, and we believe that only through it will we develop the scientific knowledge and foster the spirit of cooperation and understanding among States of origin and host States necessary to the conservation, restoration, enhancement and rational management of salmon stocks in the North Atlantic Ocean.

We are encouraged by the progress made in NASCO during its first full year of existence. In a short time, the members were able not only to set up the new Organization, but also to move forward with substantive issues. We are particularly encouraged that, in the first year of the Organization, the West Greenland Commission, acting on the best available scientific information, reached agreement on a regulatory measure responsive to current problems affecting the stocks.

This action was significant in that it marked the first change in more than a decade in the agreed level of interceptions off West Greenland. More importantly, it marked the first time that States of origin and host States sat down together in a multilateral forum to adopt a regulatory measure based on solid

scientific advice. We believe that this precedent is a good one, and we hope that it will influence the other Commissions to come to terms with the very real problems for which they are responsible. We are convinced that all parts of the Organization must pull together for the benefit of this noble resource. We view your presence here today as evidence of your commitment to this goal.

Let me conclude by saying that the United States is firmly committed to the restoration of Atlantic salmon and continues to expend enormous resources toward this end. Despite our contributions, we are acutely aware that our efforts alone are insufficient. We need the cooperation and understanding of all those in whose waters our salmon are found, and we are prepared to work diligently with them toward equitable arrangements that will both protect the salmon and reward the conservation efforts of those whose cooperation we so fervently seek.

I wish you the best of luck in your endeavors here in Boston this week.

ANNEX 2

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

OPENING STATEMENT MADE BY
MR L S PARSONS,
HEAD OF THE CANADIAN DELEGATION

BOSTON
February 1985

Opening Statement by Mr. L.S. Parsons
Head of the Canadian Delegation

On behalf of the Canadian delegation, I wish to express our pleasure to be in the historic city of Boston and our gratitude to the United States delegation for inviting us here for this second meeting of the North American Commission of NASCO.

The year 1984 was an historic one for all of us here, as it was the year in which NASCO came to life. The Organization experienced some "teething" problems in its infancy and for a time many of us, both in the Canadian and U.S. delegations, feared that it might be short-lived. In the end, however, some tentative steps were taken toward fulfilling NASCO's conservation mandate. We all recognize, of course, that much remains to be done.

With respect to the North American Commission area, this meeting marks an important step in the long road towards restoring the health of our salmon resource. It is the first occasion on which we have scientific evidence regarding the origin and composition of the stocks and the impact which the various fisheries in the Commission area have on these stocks. We hope that the ICES scientific evidence and advice will enable us to make some progress in carrying out the functions of the Commission.

At our 1984 meeting, we agreed that this meeting should be scheduled sufficiently early to allow for the views of the U.S. side to be taken into account in the formulation of Canada's 1985 Atlantic Salmon Management Plan. I want to assure the Commission, Mr. Chairman, that we on the Canadian side are interested in hearing the scientific advice, as well as the views of the U.S. delegation regarding the implications of the analyses that have been done to date. At the same time, we hope that the Commission will give due attention to other concerns which my delegation will be raising in regard to the long term well-being of the Atlantic salmon, such as acid rain and the introduction of non-indigenous species.

By working together, the process of restoring Atlantic salmon stocks was begun in 1984. We in the Canadian delegation believe that it is only through continuing discussion and cooperation, among all member states of NASCO, that progress can be achieved. We look forward, in particular, to the work of the North American Commission, and hope that this meeting will be productive and fruitful for both parties, but most especially for the Atlantic salmon.

ANNEX 3

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

OPENING STATEMENT BY THE REPRESENTATIVE OF THE
EUROPEAN ECONOMIC COMMUNITY

On behalf of the European Economic Community I wish to express our appreciation to our American hosts on the choice of Boston, a historic and friendly city, as the location for this meeting of the North American Commission.

Since the matter of participation under Articles 11.2 and 10.4 by Contracting Parties at Commission meetings has been referred by the Council in May 1984 to a Working Party, the Community does not intend to raise the matter now in this forum.

The Community wishes however to underline that it maintains its position, as expressed in previous NAC meetings, with regard to its rights under Article 11.2 of the Convention. It trusts that the Working Party in question will report to the meeting of the NASCO Council in June next in order that a mutually satisfactory solution may be found.

Procedural questions must be resolved without delay and not be allowed to divert attention from the real work of NASCO, namely the conservation and rational management of salmon in the North Atlantic through multilateral co-operation between the Contracting Parties within NASCO.

Finally the Community looks forward to assisting at a constructive and positive meeting of the North American Commission.

BOSTON
FEBRUARY 1985

ANNEX 4

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
SECOND ANNUAL MEETING OF THE
NORTH AMERICAN COMMISSION
21-22 FEBRUARY 1985, COPLEY PLAZA HOTEL, BOSTON, MASS, USA
3-7 JUNE 1985, DRAGONARA HOTEL, EDINBURGH, UK

LIST OF PARTICIPANTS

* Denotes Head of Delegation

NAME	
CANADA	
*MR L S PARSONS	Representative Atlantic Fisheries Service, Dept of Fisheries and Oceans
DR G A NADEAU	Representative Faculte des Sciences de l'Education, Universite Laval
MR E McCURDY	Representative Newfoundland Fishermen, Food and Allied Worker's Union
MR I BRUCE	Dept of External Affairs
DR W M CARTER	Atlantic Salmon Federation
DR W G DOUBLEDAY	Dept of Fisheries and Oceans
MR H W GOUDIE	Dept of Fisheries of Newfoundland
MR S GREENE	Canadian Consulate
MR D MEERBURG	Dept of Fisheries and Oceans
MR K E ROESKE	Dept of Fisheries and Oceans
MR C A WHALEN	Dept of Fisheries and Oceans of Newfoundland Region

UNITED STATES OF AMERICA

*MR A E PETERSON	Representative National Marine Fisheries Service
MR R A BUCK	Representative Restoration of Atlantic Salmon in America Incorporated
DR F E CARLTON	Representative National Coalition for Marine Resource Conservation
MR E E WOLFE	Deputy Assistant Secretary of State for Oceans and Fisheries Affairs
DR V ANTHONY	National Marine Fisheries Service
MR S APOLLONIO	New England Fishery Management Council
MR J BOREMAN	National Marine Fisheries Service
MR D EGAN	Connecticut River Atlantic Salmon Commission
MR D GOLDTHWAITE	US Fish and Wildlife Service
DR P GOODYEAR	US Fish and Wildlife Service
MS A LANGE	National Marine Fisheries Service
MR T I LILLESTOLEN	Office of International Fisheries Affairs
MR H LYMAN	National Coalition for Marine Conservation
MR G H MANUEL	Atlantic Sea Run Salmon Commission
MR A L MEISTER	Atlantic Salmon Commission
MR A W NEILL	National Marine Fisheries Service
MR G RADONSKI	Sport Fishing Institute
MR D A REIFSNYDER	Office of Oceans and Fisheries Affairs, Dept of State
MR G R ROBINSON	Dennys River Sportsmans Club
MR A STOUT	Atlantic Salmon Federation
MR J E WEAVER	US Fish and Wildlife Service

EEC(+)

MR J SPENCER	Representative Fisheries Directorate-General, EEC Commission

DENMARK IN RESPECT OF FAROE ISLANDS AND GREENLAND

MR J MOELLER-JENSEN	Ministry of Greenland

ICES

MR O ULLTANG	ACFM

SECRETARIAT

DR M L WINDSOR	Secretary, NASCO

(+)NOTE 1: Under Article 11, paragraph 2 of the Convention for the Conservation of Salmon in the North Atlantic Ocean the EEC has the right to submit and vote on proposals for regulatory measures concerning salmon stocks originating in the territories referred to in Article 18 of the same Convention.

NOTE 2: Not all participants were present at both the Boston and the Edinburgh meetings.

ANNEX 5

NAC (85)21

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
SECOND ANNUAL MEETING OF THE
NORTH AMERICAN COMMISSION
21-22 FEBRUARY 1985, COPLEY PLAZA HOTEL, BOSTON, MASS, USA
3-7 JUNE 1985, DRAGONARA HOTEL, EDINBURGH, UK

AGENDA

1. Opening of the meeting
2. Adoption of the agenda
3. Nomination of a rapporteur
4. Approval of draft report of last meeting
5. Review of the 1984 fishery
6. ACFM Report from ICES on salmon stocks (November 1984), NAC (85)2
7. Review and discussion of proposed 1985 Canadian and US salmon management measures as they relate to the mandate of the Commission
8. Recommendations to the Council concerning request to ICES for scientific research and scientific advice
9. Report of Working Group on stocking of Great Lakes and Atlantic seaboard with Pacific salmonids
10. Effects of acid rain on Atlantic salmon
11. Date and place of next meeting
12. Other business
13. Consideration of draft report of meeting
14. Adoption of press release

ANNEX 6

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)4

IMPACT OF 1984 MANAGEMENT PLAN ON NEWFOUNDLAND COMMERCIAL SALMON FISHERIES

BOSTON
February 1985

(Revised February 13, 1985)

e 1

IMPACT OF 1984 MANAGEMENT PLAN ON NEWFOUNDLAND COMMERCIAL SALMON FISHERIES

1978-82 Avg. Catch (Tonnes)	1983 Catch (Tonnes)	1984 Catch (Tonnes)	Reduction Expected Original Plan (%)	Reduction Expected Final Plan (%)	* Actual Reduction %
257	191	121.8	2.9-5.8	1.4-2.8	52.6
166	125	125.6	6.9-14.6	4.4-9.0	24.3
70	58	60.4	20.8-33.5	15.2-24.6	13.7
57	30	35.4	20.5-36.9	15.7-28.3	37.9
45	23	19.7	37.2-57.5	32.8-50.4	56.2
40	24	32.4	25.6-43.4	21.4-35.5	19.0
17	9	12.3	5.5-11.0	2.3-4.5	27.6
36	22	27.7	13.9-22.1	9.1-14.0	23.1
21	13	13.0	13.3-20.2	6.8-12.2	38.1
33	31	18.1	22.9-32.6	15.2-21.2	45.2
79	53	0.0	59.6-67.8	100.0	100.0
26	20	24.6	7.7-17.1	0.0-6.2	5.4
14	13	18.1	4.3-9.9	0.0-3.3	(29.3)
20	30	24.4	3.0-7.2	0.0-4.5	(22.0)
16	7	8.7	0.1-0.3	0.0	45.6
607	367	266.9	0.1-0.2	0.0	56.0
1,504	1,016	809.0	9.3-14.2	9.8-12.9	46.2
895	649	542.1	15.5-23.7	16.4-21.6	39.4

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= indicate an increase from average rather than a reduction.

(Revised February 13, 1985)

TABLE 2 Canadian Atlantic Salmon Catches (Tonnes)

(Information provided to the International Council for Exploration of the Sea (ICES)).

Year	Grilse	Salmon	Total
1960	-	-	1636
1961	-	-	1583
1962	-	-	1719
1963	-	-	1851
1964	-	-	2069
1965	-	-	2116
1966	-	-	2359
1967	-	-	2863
1968	-	-	2111
1969	-	-	2202
1970	761	1562	2323
1971	510	1482	1992
1972	558	1201	1759
1973	783	1651	2484
1974	950	1589	2539
1975	912	1573	2485
1976	785	1712	2506
1977	662	1883	2545
1978	320	1225	1545
1979	582	705	1287
1980	917	1763	2680
1981	818	1619	2437
1982	716	1082	1798
1983	513	911	1424
1984	475	632	1107

The 1984 total catch of salmon (1107 tonnes) is:

- 42.5% below the previous 5 year mean (1925.2t)
- 47.8% below the previous 10 year mean (2119.6t)
- 48.0% below the previous 15 year mean (2130.4t)
- 49.1% below the previous 20 year mean (2176.3t)

For the MSW (multi-sea-winter) salmon only, the catch in 1984 of 632 tonnes is:

- 48.1% below the previous 5 year mean (1217.0t)
- 55.1% below the previous 10 year mean (1407.1t)
- 56.7% below the previous 14* year mean (1426.3t)

*the 14 year mean was the extent of available data on the division of catch into salmon and grilse.

NOTE: ALL CATCH FIGURES FOR 1984 ARE PRELIMINARY

(Revised February 13, 1985)

Table 3 NOMINAL CATCHES (PROVISIONAL) OF ATLANTIC SALMON IN CANADA FOR 1984 (IN KG ROUND FRESH WEIGHT)

	GRILSE	% of Total	SALMON	% of Total	TOTAL	% of Total
QUEBEC						
R	4,058	0.9	37,772	6.0	41,830	3.8
C	1,499	0.3	60,628	9.6	62,127	5.6
Total	5,557	1.2	98,400	15.6	103,957	9.4
NFLD.						
R	74,607	15.7	3,227	0.5	77,834	7.0
C	364,464	73.0	462,736	73.2	809,200	73.1
Total	421,071	88.7	465,963	73.7	887,034	80.1
MARITIMES						
R	30,894	6.5	1,847	0.3	32,741	3.0
C	14,851	3.1	40,738	6.5	55,589	5.0
Total	45,745	9.6	42,585	6.8	88,330	8.0
NATIVE FOOD FISHERY (ALL AREAS)	2,124	0.5	24,994	4.0	27,118	2.5
TOTAL	474,497	100.0	631,942	100.0	1,106,439	100.0

R = Recreational (TOTAL = 152,405 KG OR 13.8%)
C = Commercial (TOTAL = 926,916 KG OR 83.8%)

NOTE: ALL CATCH FIGURES FOR 1984 ARE PRELIMINARY

(Revised February 13, 1985)

TABLE 4 A COMPARISON OF THE OVERALL 1983 AND 1984 ATLANTIC SALMON FISHERIES* (IN TONNES)

AREA	GRILSE		SALMON		TOTAL	
	83	84	83	84	83	84
QUEBEC						
R	4.2	4.0	46.6	37.8	50.8	41.8
C	6.4	1.5	88.1	60.6	94.5	62.1
TOTAL	10.6	5.5	134.7	98.4	145.3	103.9
NEWFOUNDLAND						
R	55.8	74.6	8.0	3.2	63.8	77.8
C	401.5	346.5	615.0	462.7	1016.5	809.2
TOTAL	457.3	421.1	623.0	465.9	1080.3	887.0
MARITIMES						
R	29.5	30.9	37.5	1.9	67.0	32.7
C	15.6	14.9	115.8	40.7	131.4	55.6
TOTAL	45.1	45.8	153.3	42.6	198.4	88.3
NATIVE	?	2.1	?	25.0	?	27.1
TOTAL	513.0	474.5	911.0	613.9	1424	1106.4

*Numbers may not add directly due to rounding process.

R = Recreational
C = Commercial

NOTE: ALL CATCH FIGURES FOR 1984 ARE PRELIMINARY

(Revised February 13, 1985)

TABLE 5 IMPACT OF 1984 SALMON MANAGEMENT PLAN ON MSW SALMON

		PREDICTED		ACTUAL 1984		
Fishery	Average Canadian Catch of MSW Salmon for the year 1978-83 (tonnes)	Average Canadian Reduction of MSW Salmon catches, if 1984 Plan had been in effect for 1978-83 (tonnes)	Reduction (%)	1984 Catch (tonnes)	Reduction From Average (tonnes)	Reduction %
Recreational	130.6	91.9	70.4	42.9	87.7	67.2
Mainland Commercial	206.1	104.0	50.5	101.4	104.7	50.8
Newfoundland Commercial	880.7	117.5	13.3	462.7	418.0	47.5
TOTAL	1,217.4	313.4	25.7	607.0	610.4	50.1

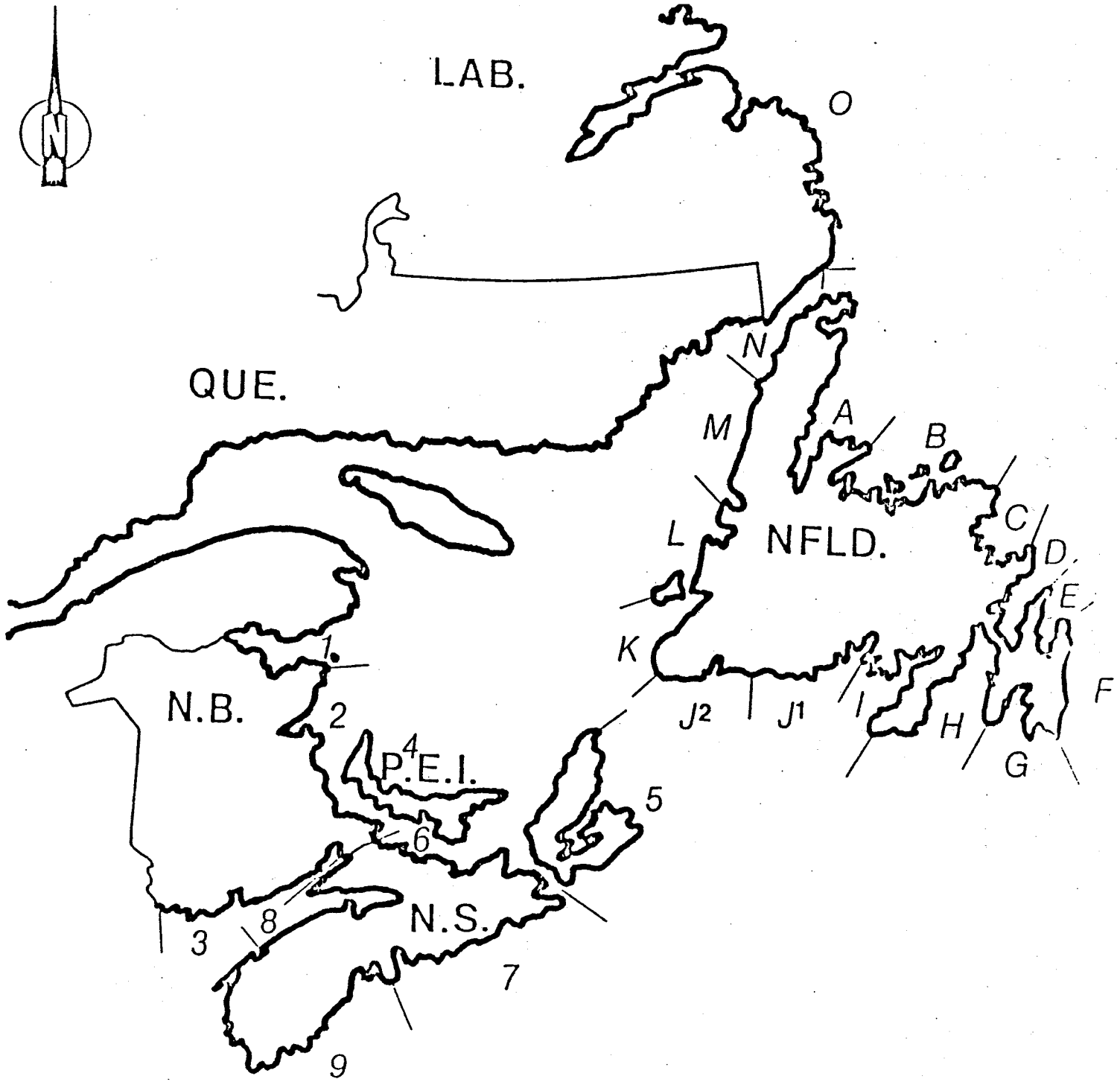
NOTE: ALL CATCH FIGURES FOR 1984 ARE PRELIMINARY

TABLE 6 Number of licensed commercial salmon fishermen by Statistical Area, 1975, 1983 and 1984. Percent change 1975-84 and 1983-84 in number licensed is also shown.

Statistical Area	Licensed salmon fishermen 1975	1983	1984[a]	% Change 1983-84	1975-84
A	769	614	539	-12	-30
B	1,399	1,033	890	-14	-36
C	765	479	394	-18	-49
D	596	383	316	-17	-47
E	635	356	277	-22	-56
F	314	239	199	-17	-37
G	103	68	58	-15	-44
H	388	250	201	-20	-48
I	226	149	128	-14	-43
J	393	267	91	-66	-77
K	181	113	87	-23	-52
L	140	82	65	-21	-54
M	185	122	95	-22	-49
N	158	107	100	- 7	-37
O[b]	729	801	725	- 9	- 1
Insular Nfld.	6,252	4,262	3,440	-19	-45
Prov. (Nfld. + Lab.)	6,981	5,063	4,165	-18	-40

[a]Excludes individuals who participated in license buy back.
[b]Includes salmon/charr licenses in Section 53.

NOTE: FIGURES FOR 1984 ARE PRELIMINARY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Canadian Atlantic Fisheries
Scientific Advisory Committee

CAFSAC Advisory Document 84/22

Advice on the Management of Atlantic Salmon from the Major New Brunswick River Systems

At its meeting of November 28-29, 1984, CAFSAC considered available data and analyses concerning the status of salmon stocks in the Saint John, Miramichi, and Restigouche river systems and forecasts of their status in 1984. The following advice is given.

Saint John River

In 1984, there were major changes in homewater fisheries, no commercial fishery was allowed and the recreational fishery was restricted to grilse only. Estimated catches were 2,300 large salmon and 400 grilse in the native fishery, and 2,400 grilse in the sports fishery. Rough estimates of the by-catch of large salmon and grilse in non-salmon commercial fisheries were 900 and 200 respectively.

Estimated total returns in 1984 were 17,500 large salmon and 17,500 grilse, 50% and 30% respectively above forecasted returns. It was estimated that target spawning requirements were exceeded by 60% above Mactaquac Dam and by 20% below the dam.

Returns in 1985 of wild large salmon originating above Mactaquac Dam were forecast from an historical relationship from 1973 to 1983 between wild grilse returns and wild large salmon returns in the following year. Large salmon returns in 1985 below Mactaquac Dam were forecast based on their average ratio to those produced above Mactaquac (1970-83). Grilse returns in 1985 from production above Mactaquac were forecast from an historical relationship between egg densities on Tobique River (1968-78) and the subsequent production of wild grilse above Mactaquac Dam. Wild grilse returns produced below Mactaquac were forecast using the historical relationship (1970-84) between grilse returns above Mactaquac Dam and grilse returns below. Returns of hatchery - reared grilse and salmon were forecast from mean home river returns rates and numbers of smolts released.

There is a forecast surplus beyond spawning requirements of 8,000 grilse and 4,400 salmon for stocks originating from above Mactaquac Dam, and a surplus of 1,700 grilse (and no large salmon) for stocks originating below the dam.

Restigouche River

Target spawning requirements were changed slightly from the previous year due to a computational error. The revised values are 12,200 large salmon and 2,600 grilse, and the former values were 12,800 large salmon and 2,500 grilse. The total estimated catch was 2,800 large salmon and 8,000 grilse, down from the 1983 catch of 7,700 large salmon but up from the 1983 harvest of 2,300 grilse. The catches are shown in the following table:

Fishery	1984 Salmon	1984 Grilse	1983 Salmon	1983 Grilse
Commercial traps				
New Brunswick	889	5,819	1,773	1,319
Quebec	0	0	2,342	85
Native				
Cross Point	1,081	173	1,216	32
Eel River Bar	213	1	260	-
Recreational	590*	1,990	2,069	899
TOTAL	2,773	7,983	7,660	2,335

*In Quebec only

Homewater returns in 1984 were estimated from two methods. The first method, based on an angling exploitation rate of 20% was considered optimistic. According to this method, the target spawning escapement has been reached. The second method which related angling catches to spawning escapement using subsequent parr densities indicated that less than 50% of the target was achieved.

The forecast returns of large salmon in 1985 was based on a newly analysed relationship between sport catch of grilse at Kedgwick Lodge and total returns of large salmon to Restigouche River in the following year. The 1985 forecast return of large salmon is roughly equal to the target spawning requirements. Grilse returns in 1985 will be predominantly from the 1981 year-class; fry and parr densities of this year-class were average. Based on the average, the 1985 return of 9,000 grilse was forecast.

There is no forecast surplus of large salmon in 1985 beyond spawning requirements, even with no harvest in homewaters. There could be a surplus of 6,000 grilse.

Miramichi River

In 1984 there were major changes in commercial and recreational salmon fishing regulations, no commercial fishery was allowed and the recreational fishery was restricted to grilse only. Estimated catches were 10,700 grilse in the sport fishery and 300 large salmon and 400 grilse in the Native fishery for a total of about 300 large salmon, and 11,000 grilse. The 1983 catches were 19,500 large salmon and 10,300 grilse.

Homewater returns in 1984 were estimated from two methods, one using directly estimated efficiency of the Millbank Trap and the other relating subsequent parr density to Millbank Trap catches. Both methods indicated that the required spawning escapement of 13,400 large salmon and 38,500 grilse was not obtained. At best, only 50% of the target egg deposition was achieved. Both methods, however, depend on counts of salmon and grilse at Millbank Trap. The efficiency of Millbank Trap has not been measured since 1973 and may have changed in recent years.

The forecast of large salmon returns in 1985 was based on an historical relationship between counts of grilse at Millbank Trap and large salmon returns to Miramichi River in the following year. Because the 1984 catch of grilse at Millbank was one of the lowest on record, the 1985 return of large salmon is forecast to only approximately meet spawning requirements given the wide confidence limits associated with the forecast. Because of average parr densities in 1982-83, there is no reason to forecast a 1985 grilse return different from the 1980-84 average of about 42,000.

There is no forecast surplus of large salmon, but target spawning requirements are likely to be met if there is no change in the homewater fisheries in 1985, namely, no increase in exploitation from 1984 levels, and control is excerised over illegal fisheries.

Impact of 1984 management plan

Homewater returns and spawning escapements in 1984 should have been influenced by changes in distant (intercepting) and in homewater fishery regulations. No data were available to quantify effects of reduction in distant fisheries on homewater returns. Reduction in homewater fisheries, however, appeared to improve survival to spawning: on Restigouche River, 75% of homewater returns potentially survived to spawn, compared to 38% in 1983; on Miramichi River, it was 83% compared to 10% in 1983; and on Saint John River, it was 78% compared to 38% in 1983.

CAFSAC had no basis to quantify the impact of changes in distant fisheries on homewater returns. Such impacts were ignored in forecasts of 1985 returns.

Target spawning escapements

Target spawning escapements have been estimated based on deposition of 2.4 eggs per square meter of rearing habitat. Studies which are underway suggest that this target is lower than the spawning escapement giving maximum production.

ANNEX 7

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)5

KNOWN BRIGHT ATLANTIC SALMON CATCHES FROM MAINE RIVERS, 1948-1984

BOSTON
February 1985

KNOWN BRIGHT ATLANTIC SALMON CATCHES FROM MAINE RIVERS, 1948-1984

YEAR	ST. CROIX	DENNYS	EAST MACHIAS	MACHIAS	PLEASANT	NARRA-GUAGUS	UNION	PENOB-SCOT	DUCK-TRAP	SHEEP-SCOT	SACO	OTHERS	TOTAL
1948		79				110		16					205
1949		63				94		14					171
1950		39				35		9					83
1951		31				53		2					86
1952		39				39		35					113
1953		39	10	4		98		16					167
1954		104	15	9		60		3		6			197
1955		35		22		27		2		32			118
1956		89	9	28	20	60				2			208
1957		34	2	32	10	27				2			107
1958		99	17	101	13	84				16			330
1959		133	87	48	12	167		2		22			471
1960	2	48	14	44	24	21				10			163
1961	2	104	18	130	45	110	2			13		2	426
1962	1	54	7	76	14	62				14			228
1963		62	2	68	22	47				10			211
1964		14	40	78	2	31				20			185
1965		22	12	58	10	38				20			160
1966		32	4	93	15	38				40		2	224
1967		42	8	75	10	56				30			221
1968		3	10	32		109		13		10			177
1969		30	0	45	2	23		7		5			112
1970		49	1	45	1	58		1		6			161
1971		19		45	1	32		3		30			130
1972		61	4	65	1	139		4		20			294
1973		41	6	35	2	71	55	15		20		3	248
1974		49	2	36	30	65	25	26		20		1	254
1975		40	30	51	8	113	12	73		11		20	358
1976	1	20	20	25	1	35	30	55		10		5	202
1977		26	25	25	3	134	50	188		24		4	479
1978		75	60	105	16	135	10	360		35		25	821
1979		38	25	65	8	58	10	136		8		19	367
1980		190	62	80	5	119	29	842		30		22	1379
1981		129	85	53	23	78	32	725		15		10	1150
1982		40	33	59	19	85	10	914		15		15	1190
1983		28	8	18		93	6	163	1	15	1	23	356
1984		69	47	35	1	71		382		22		10	637
TOTAL	6	2069	663	1685	318	2675	271	4006	1	533	1	161	12389

1984 Catches

Merrimack River 106 total
6 Rod & reel

Connecticut River 92 total
4 rod & reel

Pawcatuck River 20 trap catches

ANNEX 8

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)6

ESTIMATED TOTAL RUN SIZE IN USA RIVERS

BOSTON
February 1985

ESTIMATED TOTAL RUN SIZE IN USA RIVERS

YEAR	MAINE RIVERS	MERRIMACK	PAWCUTUCK	CONNECTICUT	TOTAL
1962	2362				2362
1963	1655				1655
1964	1284				1284
1965	1170				1170
1966	1671				1671
1967	1462				1462
1968	1223				1223
1969	848				848
1970	1140				1140
1971	968				968
1972	2029				2029
1973	1419				1419
1974	1782			1	1783
1975	2644			3	2647
1976	1575			2	1577
1977	2283			7	2290
1978	4509			83	4592
1979	2185			58	2243
1980	6462			175	6637
1981	5999			522	6521
1982	5810	17	39	70	5936
1983	2442	114	38	39	2633
1984	3185	110	26	92	3413

ANNEX 9

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)2

ACFM REPORT FROM ICES ON SALMON STOCKS (NOVEMBER 1984)

EDINBURGH
January 1985

CONSEIL INTERNATIONAL
POUR L'EXPLORATION DE LA MER

INTERNATIONAL COUNCIL
FOR THE EXPLORATION OF THE SEA

November 1984

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

COUNCIL

SCIENTIFIC ADVICE TO NASCO FROM ICES

CONTENTS

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NORTH ATLANTIC SALMON

B. THE SALMON FISHERIES IN THE NORTH ATLANTIC

B.3 SALMON IN THE NORTH AMERICAN COMMISSION AREA

B.3.1 Request from NASCO

This advice and the appended Report of Meeting of the Working Group on North Atlantic Salmon respond to questions posed by the Council of the North Atlantic Salmon Conservation Organisation (NASCO) in relation to the North American Commission of NASCO. The questions posed are found in Appendix I of the Working Group report. The report should be consulted for detailed responses to NASCO's request. In this text all tables (and numbered figures) referred to are found in the Working Group Report.

B.3.2 Estimates of catches of salmon originating in the rivers or artificial production facilities of one party of the North American Commission of NASCO and taken in the fisheries of another party.

B.3.2.1 Wild Smolt Production in U.S.A. Rivers

Seven rivers in Maine are currently self-sustaining and supporting salmon fisheries, and another five have minor populations. The total smolt rearing area for these rivers is an estimated 19 700 units (1 unit = 100 m^2). Estimates of the number of smolts in fresh water produced per unit range from 2 to 9. The accuracy of the production estimates was questioned, but 2.4 and 5.5 smolts/unit were considered reasonable bounds consistent with estimates for other North American rivers with wild salmon populations. Additional production of smolts is expected from escapement of spawners in several other Maine rivers during 1981-84. The only river outside of Maine with known wild smolt production is the Pawcatuck River in Rhode Island; current production in this river is considered minor.

B.3.2.2 History, Description, and Analysis of the U.S.A. Hatchery and Tagging Program

Since 1966, about 1 250 000 tagged Atlantic salmon smolts have been released in the U.S.A. An additional 590 000 smolts were tagged with coded wire nose tags and released in southern New England. In addition, more than 10 000 adult Atlantic salmon were tagged during the period 1962-1982 while entering four Maine rivers on their spawning migration. During the period 1962-1984, more than 8.5 million hatchery-reared smolts were released in the U.S.A. rivers, with an additional 6.3 million juvenile Atlantic salmon (fry and parr) released in headwater areas of numerous New England rivers. U.S.A. hatchery production has increased dramatically in recent years. Fry stocking increased from 50 000 fry in 1968 to over 1.2 million fry in 1984. Parr stocking increased from approximately 55 000 parr per year in the 1960s to over 300 000 parr per year in 1981-1984. Smolt stocking increased from

an average of close to 160 000 smolts per year in the 1960s to an average of approximately 850 000 smolts per year in the 1980s.

U.S.A. tagged salmon released in Maine during 1966-1982 have been recaptured in East Greenland, West Greenland, Labrador, Newfoundland, Nova Scotia, Bay of Fundy, and homewaters. The highest proportion of tag returns in non-U.S.A. fisheries has been from 1-SW (one sea-winter) fish (91.6%), while the highest proportion of homewater returns have been from 2-SW fish (94.5%). The bulk of recaptures of 1-SW and MSW (multi sea-winter) other than at homewaters have been from NAFO Sub-area 1 (West Greenland (56%) and Newfoundland (40%)). Within Newfoundland, 26% have been from Labrador and 63% have been from Statistical Areas A-D. U.S.A. salmon caught in Nova Scotia comprise only 3% and New Brunswick only 1% of the total. The bulk of recaptures of post kelts (77%) has been from Newfoundland, 14% from West Greenland, 9% from Nova Scotia, and 19% from New Brunswick.

Marine recoveries of 1-SW and MSW salmon tagged in Maine, 1966-1983, are detailed by month or recovery in the Working Group report. Most of the U.S.A. tag recoveries from Labrador occurred in July-September, whereas a substantial number (30%) of the recoveries from insular Newfoundland were in the fall months. These recoveries indicate that most Maine salmon migrate north along the outer coast of Newfoundland in the spring to summer feeding areas in the Davis Strait-Labrador Sea area. A few fish may utilize a migration route that passes up the west coast of Newfoundland through the Strait of Belle Isle. They return during the fall to overwinter off Newfoundland and some return to northern feeding grounds next spring while others return to homewaters. Since these migration routes reflect only tag returns from fisheries and, since salmon fisheries occur close to shore, little is known of the offshore movements of salmon. Recovery of one salmon possessing a U.S.A. tag in research fishing on the Grand Banks suggest that some salmon may be far enough offshore to avoid being caught in coastal salmon fisheries during at least part of their migration.

B.3.2.3 Multivariate Analysis of Origin of Salmon Caught Near Twillingate

A paper originally presented to ICES in 1978 applied a multivariate analysis of four scale measurements to estimate the composition of samples of salmon caught near Twillingate, Newfoundland. The analysis involved a reference set of scales from different smolt classes than those appearing on the Twillingate samples. The analysis is now considered inconclusive with regard to determination of stock origin of the Twillingate catch because it was later found that variations between years on the scale characters are greater than variations between stocks for a given year.

B.3.2.4 Estimation of Harvest of U.S.A. Origin Fish in Canadian and Greenland Waters

The harvest (in numbers) of U.S.A. origin salmon in non-U.S.A. fisheries was estimated using returns of tags from fish tagged as smolts in the U.S.A. and returns of adult salmon to U.S.A. waters.

Resultant estimates of harvest of the 1966-1981 smolt classes of Maine origin salmon at Greenland, Newfoundland, and other Canadian provinces, are given in Table 5. The estimated harvest in Greenland ranged from 80 to 5 370 fish annually, peaking in 1970. The Newfoundland harvest ranged from an estimated 243 to 7 837 fish annually, peaking in 1980. The estimated harvest for other Canadian provinces ranged from 28 to 926 fish, peaking in 1968, and the combined harvest in non-U.S.A. fisheries ranged from 1 442 to 10 169 fish, peaking in 1980.

Figure B.3.1 (this report) shows the harvest at Greenland and in Canada of 1-SW salmon of Maine origin and run sizes of 2-SW salmon in Maine rivers from 1967-83. A smolt class harvested at Greenland and in Canada in year i + 1 as 1-SW fish also appears as the run of 2-SW fish in Maine in year i + 2. The estimated total harvest at Greenland and in Canada has fluctuated widely from year to year, with a range of about 1 500 to 10 000 pieces.

In the early 1970s most of this harvest was taken at Greenland while after 1976 the majority was harvested in Canada. There is a positive correlation between harvest at sea in year i + 1 and run size in year i + 2. Since no tagged Maine salmon were released in 1978, there is no estimate of the 1979 harvest.

More detailed analyses were performed on the 1980 and the pooled 1981-82 tag return data from Newfoundland and Labrador. Approximately 90% of tags of immature fish reported from Newfoundland and Labrador were from Statistical Areas A-D and 0 (Labrador). See page 6 of the Working Group report.

The pattern of estimated harvest of U.S.A. origin salmon in these areas is compared to the pattern of Canadian commercial catch statistics for the same area in Tables 6 and 7.

In light of the data deficiencies that exist for the reporting of tags and in Canadian commercial catch statistics, the comparisons were made on a relative basis. Thus, data for each cell were divided by the appropriate grand total. The relation between U.S.A. origin fish and Canadian commercial catches was consistent between the two tables. In both tables, there was an increasing proportion of U.S.A. fish relative to Canadian catches later in the year. Most U.S.A. origin salmon in both tables were caught during June and July. The harvest of U.S.A. origin salmon declined consistently from July to September in both tables. In Newfoundland (Areas A-D), the catch of U.S.A. origin salmon increased markedly during October-December. Both tables also show that a small proportion (<1%) of the total Newfoundland and Labrador commercial catch occurs during the period September-December yet a large proportion (16-40%) of the harvest of U.S.A. origin salmon occurred during this period. These results are also consistent with the tag returns as reported in Table 3. The return of Canadian grilse to their natal streams prior to these months may increase the relative fraction of U.S.A. origin fish in Canadian waters. Other explanations might be that catches are underestimated during the fall, or that some dates of recapture imputed from postmarks are later on in the year than actual dates of recaptures.

Comparisons of Tables 6 and 7 indicate that there are annual variations in the proportion of total tag returns and catches prior to and after September in each of Statistical Areas A, B, C, D and O, as well as annual variations in proportion of tag returns and catches between individual areas.

Negative values in the estimated U.S.A. catches reflect the allocation procedures used for tags without Area of capture. In particular, they suggest that the assumption of a uniform distribution of unknown tags over years and that the proportional allocation of unknowns over areas within months may be in error. Errors might also arise due to the method by which the month of return for tags is imputed.

B.3.3 Description of Fisheries Catching Salmon Originating in Another Party's Rivers or Artificial Production Facilities

B.3.3.1 Salmon and Non-Salmon Fisheries in Fisheries Statistical Districts 18-32 and 35-40 in Nova Scotia

Fisheries Statistical Districts (FSD) of Nova Scotia are shown in Figure 5. The great majority of U.S.A. tags returned from Nova Scotia and New Brunswick came from fish caught in FSD 18-32 and 35-40 in Nova Scotia. Numbers of salmon trap nets and gill nets within FSD's 18-32 and 35-40 have declined from 41 and 60, respectively, in 1981 to 35 and 51 in 1983 (Table 8). Fishing effort (net days) is available for the period since 1980.

Non-salmon gear for the same years in the same FSD's consists of commercial fish traps and weirs (the principal by-catch gear) (Table 9) and numerous (1 000's) groundfish and surface gill nets. Between 1974 and 1978 non-salmon gear accounted for 38.4 percent of salmon landings in mainland Nova Scotia. Such catches represent 42.4 percent (1.6 t) in FSD's 26-28, 30-34, 36 and 37 and 100 percent of salmon landings (2.6 t) in FSD's 35 and 38-41.

Open seasons for licensed salmon gear have been reduced from 3.5 or 4 months (depending on FSD's) in 1980 to 3 weeks in 1984. Although there are no regulated seasons for non-salmon gear, the retention of salmon by-catch has been illegal since 1981.

Total annual landings of Atlantic salmon by all gear types in these FSD's have ranged from 49.7 t in 1967 to 7.4 t in 1983 (Table 11). Total estimated numbers of salmon for each of these Districts appear in Table 12. Estimated numbers of 1-SW, 2-SW and 3-SW salmon landed in each District 1970-83 are shown in Tables 13, 14 and 15. Since 1981, 1-SW fish have comprised from 35 to 60 percent of the total numbers.

A few tags of U.S.A. origin have been returned from additional FSD's on the Bay of Fundy shore of New Brunswick, and the eastern shore and Atlantic coast of Cape Breton Island, Nova Scotia.

B.3.3.2 Newfoundland and Labrador

The commercial salmon fishery in Newfoundland and Labrador is a limited entry fishery. The fishery is controlled by season, amount of fishing gear per licensed fisherman, mesh size, and placement of gear.

The entire salmon fishery in Newfoundland and Labrador is a fixed gill net or trap net fishery. Salmon traps are a small but unknown proportion of the total gear licensed. The webbing of both nets and traps is multifilament nylon material, since it is illegal to use webbing that contains monofilament in single or multiple strands. The regulated minimum mesh size is 127 mm for all areas (Figures 6, 7) except in Bay St. Georges (Area K) and a section of the south coast from Cape Pine to Point Crewe (Areas G and H) where the minmum mesh size is 114 mm. It is illegal to use drift nets or seines for Atlantic salmon in Newfoundland and Labrador.

In bays less than six nautical miles in width, salmon gear (nets and trap leaders) must be tied up on Sundays so as to permit the free passage of fish.

The total number of fishermen and fishing gear licensed to fish for Atlantic salmon in each Statistical Area A to O, 1975-1983 are shown in Tables 20 and 21. In 1975 a new salmon licensing policy was implemented whereby there was a freeze on new entrants, a program of licence reduction through attrition, and additional restrictions on licence transfers. The number of licensed commercial fishermen and licensed fishing effort in the Province of Newfoundland and Labrador has decreased by 26% and 21% respectively, (Tables 20, 21). Statistical Areas C, E, F, G, J and L have experienced more than a 30% decrease in licensed gear since 1975. Areas B, I and N had a reduction of 10% in licensed effort and Areas M and O (Labrador) received a slight increase in licensed effort. No data are available on the effective fishing effort, as all licensed gear is not necessarily fished throughout the fishing season. Therefore, the impact of changes in the fishing effort on fishing mortality rates cannot be evaluated.

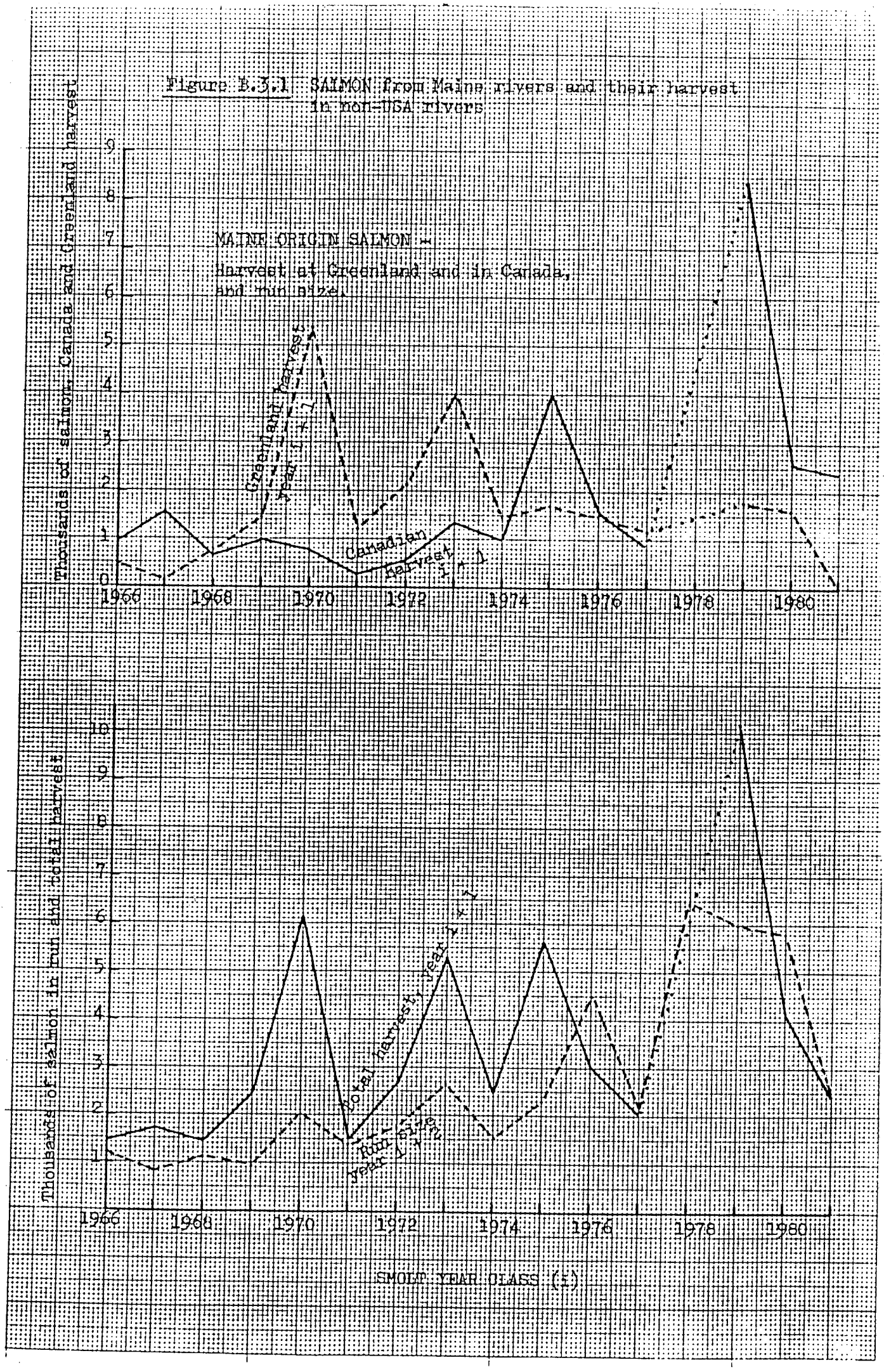
Measures to reduce fishing mortality and interception of non-Newfoundland-Labrador origin salmon in 1975-84 are given in Table 22.

Average monthly catches of large (>2.7 kg) and small salmon (<2.7 kg) for Newfoundland Statistical Areas A to O from 1974-83 are presented in Tables 23 and 24. The mean yearly number of fish landed by month and Statistical Areas A-O, 1975-83 are given in Tables 25 and 26. The landings include salmon caught in licensed salmon gear and other gear. No estimates are available on the proportion of salmon caught in other gear. The landings also include an estimate of fish consumed by fishermen or sold locally and not recorded on purchase slips. Estimated catches for October-December are primarily obtained from estimated local sales.

B.3.4 Data Deficiencies and Research Programs

The Working Group Report (Section 4) identifies data deficiencies related to sex ratios of catches, gear types, catch statistics, tag returns, measurement of effective fishing effort, statistical reporting and stock identification technique. Remedial measures proposed are endorsed by the ACFM.

Figure B.3.1 SALMON from Maine rivers and their harvest in non-USA rivers



ANNEX 9

APPENDIX 1

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

ANNEX 9, APPENDIX 1

REPORT OF MEETING OF THE WORKING GROUP ON NORTH ATLANTIC SALMON 18-20 SEPTEMBER, 1984, ST. ANDREWS, NEW BRUNSWICK, CANADA

International Council for the
Exploration of the Sea

C.M.1985/Assess:5

ERRATA TO "Report of Meeting of the Working Group on North Atlantic Salmon"

In TABLE OF CONTENTS: Figures 1-7 to read ..... Figures 1-9.

Page 7 - 1st line to read ..... "Estimation of the combined harvest for 1981 and 1982 required...."

Page 9 - 4th para., last sentence to read: "Therefore, the impact of changes in the licensed effort on ...."

Page 11 - Under 6. Statistical Reporting, in 1st sentence replace Table 23 by Table 27.

Under: USA - Replace Table 24 by Table 28.
and Under 'By Statistical Area etc.' add in brackets (Figure 9).

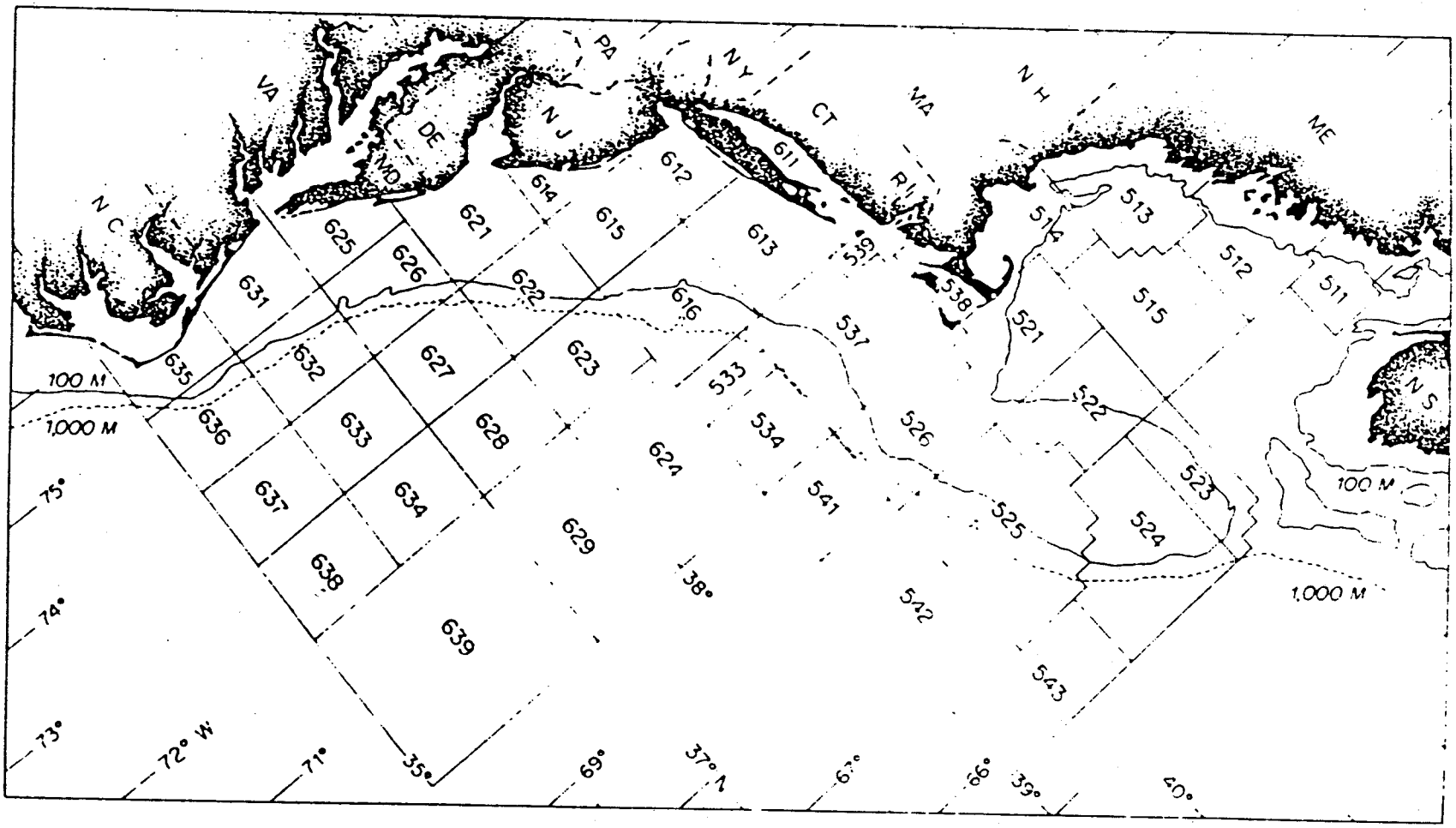
Under: Nova Scotia, etc. replace Table 25 by Table 29.

Page 16 - Table 1 - Note that footnote 2 pertains to 'Tagged smolts' in MAINE

Page 19 - Table 3 - Under TOTALS for NEWFOUNDLAND, for the month of October, replace 48 by 38.

-o-o-o-

FIGURE 9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This report not to be quoted without prior reference to the Council*

International Council for the
Exploration of the Sea

C.M. 1985/Assess: 5

REPORT OF MEETING OF THE WORKING GROUP ON NORTH ATLANTIC SALMON

St. Andrews, New Brunswick

Canada

September 18-20, 1984

*General Secretary
ICES
Palaegade 2-4
DK-1261 Copenhagen K
Denmark

TABLE OF CONTENTS

0 INTRODUCTION

The Working Group on North Atlantic salmon met at the Biological Station, St. Andrews, New Brunswick, Canada, from 18 to 20 September, 1984. The following members participated:

E. M. P. Chadwick	Canada
W. G. Doubleday	Canada (Chairman)
T. L. Marshall	Canada
D. J. Meerburg	Canada
T. R. Porter	Canada
D. G. Reddin	Canada
J. Møller Jensen	Denmark
V. Anthony	USA
E. T. Baum	USA
J. Boreman	USA
P. Goodyear	USA
A. M. Lange	USA
A. L. Meister	USA
P. J. Rago	USA

1 MAIN TASKS

At its May 1984 meeting, the Council of the North Atlantic Salmon Conservation Organization (NASCO) requested advice from ICES. The request included questions posed by the three Commissions of NASCO. Advice on the questions posed by the West Greenland and Northeast Atlantic Commissions is required prior to the 1985 annual meeting of NASCO, but advice in response to the questions posed by the North American Commission is required prior to its next meeting in early 1985. Since ICES advice is provided by the Advisory Committee on Fishery Manangement which is scheduled to meet in late October and early November 1984 and not to meet again until May 1985, it was necessary to convene a second meeting of the Working Group in 1984. The ICES Bureau accepted an invitation by Canada to host the meeting in St. Andrews.

The questions posed by NASCO in relation to the North American Commission are reproduced under agenda item 5 (Appendix I). Ten documents were presented to the Working Group (Appendix II). The Working Group addressed all questions posed by NASCO but were unable to answer the questions completely due to the non-existence and, in some cases, non-availability of relevant data at the time of the meeting. The Working Group anticipates that improvements to the computerized information system used by USA scientists to analyze tag recovery data will permit more detailed analyses on these questions to be carried out in future years.

Sections 2-4 of this report respond to the three requests originated by the North American Commission.

2 ESTIMATES OF CATCHES OF SALMON ORIGINATING IN THE RIVERS OR ARTIFICIAL PRODUCTION FACILITIES OF ONE PARTY OF THE NORTH AMERICAN COMMISSION OF NASCO AND TAKEN IN THE FISHERIES OF ANOTHER PARTY

2.1 WILD SMOLT PRODUCTION IN USA RIVERS

Estimates of wild smolt production in Maine rivers were provided to the Working Group. Seven rivers in Maine are currently self-sustaining and supporting salmon fisheries, and another five have minor populations. The total smolt rearing area for these rivers is an estimated 19,700 units (1 unit = 100 m^2). Estimates of the number of smolts in fresh water produced per unit range from 2 to 9. The Working Group questioned the accuracy of the production estimates, but considered 2.4 and 5.5 smolts/unit as reasonable bounds consistent with estimates for other North American rivers with wild salmon populations. Additional production of smolts is expected from escapement of spawners in several other Maine rivers during 1981-84. The only river outside of Maine with known wild smolt production in the Pawcatuck River in Rhode Island; current production in this river is considered minor. Insufficient evidence was available to the Working Group for examination of historical trends.

2.2 HISTORY, DESCRIPTION, AND ANALYSIS OF THE USA HATCHERY AND TAGGING PROGRAM

Three papers were presented to the Working Group that described the history of the USA salmon tagging program, the tagging technique and tags used, and analyzed the geographic and seasonal pattern of tag recaptures by age group. Since 1966, about 1,250,000 tagged Atlantic salmon smolts have been released in the USA. An additional 590,000 were tagged with coded wire nose tags and released in southern New England. In addition, more than 10,000 adult Atlantic salmon were tagged during the period 1962-1982 while entering four Maine rivers on their spawning migration. During the period 1962-1984, more than 8.5 million hatchery-reared smolts were released in USA rivers, with an additional 6.3 million juvenile Atlantic salmon (fry and parr) released in headwater areas of numerous New England rivers. A summary of annual releases of tagged and untagged hatchery-reared salmon is provided in Table 1. USA hatchery production has increased dramatically in recent years. Fry stocking increased from 50,000 fry in 1968 to over 1.2 million fry in 1984. Parr stocking increased from an average of approximately 55,000 parr per year in the 1960's to an average of over 300,000 parr per year in 1981-1984. Smolt stocking increased from an average of close to 160,000 smolts per year in the 1960's to an average of approximately 850,000 smolts per year in the 1980's.

USA-tagged salmon released in Maine during 1966-1982 have been recaptured in East Greenland, West Greenland, Labrador, Newfoundland, Nova Scotia, Bay of Fundy, and homewaters (e.g. Table 2-4 for 1 SW and older). The highest proportion of tag returns in non-USA fisheries has been from 1SW fish (91.6%), while the highest proportion of homewater returns have been from 2SW fish (94.5%). The geographic distributions of tag recoveries by age in Canada and Greenland including post-smolts are provided in Figures 1-4. The bulk of recaptures of 1SW and MSW other than at homewaters have been from NAFO Subarea 1 (West Greenland, 56%) and Newfoundland (40%). Within Newfoundland, 26% have been from Labrador and 63% have been from Statistical

Areas A-D. USA origin salmon caught in Nova Scotia comprise only 3% and New Brunswick only 1% of the total. The bulk of recaptures of post kelts (77%) have been from Newfoundland, 14% from West Greenland, 9% from Nova Scotia, and 19% from New Brunswick. Table 2 does not provide an indication of annual variation in tag returns among Statistical Areas, nor does it reflect changes in the fisheries that might have altered the distribution of catch of USA salmon during the tag recovery period 1967-1983.

Marine recoveries of 1SW and MSW salmon tagged in Maine, 1966-1983, are detailed by month of recovery in Tables 3 and 4. Most of the USA tag recoveries from Labrador occurred in July-September; whereas, a substantial number (30%) of the recoveries from insular Newfoundland were in the fall months. These recoveries indicate that most Maine salmon migrate north along the outer coast of Newfoundland in the spring to summer feeding areas in the Davis Strait-Labrador Sea area. A few fish may utilize a migration route that passes up the west coast of Newfoundland through the Strait of Belle Isle. They return during the fall to overwinter off Newfoundland and some return to northern feeding grounds next spring while others return to homewaters. As with Table 2, Tables 3 and 4 do not reflect interannual variation in tag recoveries among Statistical Areas. Since these migration routes reflect only tag returns from fisheries and, since salmon fisheries occur close to shore, little is known of the offshore movements of salmon. Recovery of one salmon possessing a USA tag in research fishing on the Grand Banks suggests that some salmon may be far enough offshore to avoid being caught in coastal salmon fisheries during at least part of their migration.

2.3 MULTIVARIATE ANALYSIS OF ORIGIN OF SALMON CAUGHT NEAR TWILLINGATE

A paper originally published in 1978 was presented to the Working Group, containing an analysis of the stock composition of the Newfoundland fishery in Statistical Areas B and C from Oct.-Dec. during 1974, 1975, and 1976. A multivariate analysis of four-scale measurements on scale samples from 30 fish was used and resulted in an estimated 2% Labrador origin, 21% Newfoundland origin, 67% Maritime origin, and 10% USA origin in the samples. Problems detected in the analysis since publication included use of scales in the reference set that were from different smolt classes than those appearing in the Twillingate fishery samples. It was later found that variations between years in the scale characters are greater than variations between stocks for a given year. The analysis presented is now considered inconclusive with regard to determination of stock origin of the Twillingate catch for those years.

2.4 ESTIMATION OF HARVEST OF USA ORIGIN FISH IN CANADIAN AND GREENLAND WATERS

A paper was presented to the Working Group (Working Group Paper #5) proposing a method for estimating the harvest (in numbers) of USA salmon in non-USA fisheries. The method expands returns of tags from fish tagged as smolts in the USA to total numbers of USA origin fish killed in a fishery using the following equation:

$$H = T/(R \times L \times (1-NC) \times RATIO)$$

where H equals the total harvest of USA origin salmon of a given smolt class in a non-USA fishery, T equals the number of tags returned from fish in that smolt class caught in the fishery, R equals the proportion of tags captured in the fishery that were returned, L equals the proportion of tagged smolts

retaining their tags until capture in the fishery, NC equals the non-catch fishing mortality associated with the fishery, and RATIO equals the ratio of tagged to total smolts in the smolt class.

The Working Group decided to calculate harvest of Maine origin salmon only since 1) most of the tag recoveries were from the Maine stocks, 2) no tag recoveries represented the Merrimack or Pawcatuck River stocks, and 3) tag releases from the Connecticut River stock had a much lower return rate per unit number released. In most years, adult returns to states in the USA, other than Maine, were negligible; however, in 1981, 8% of the total run was of non-Maine fish (Connecticut River). The Working Group also decided to use an alternative method to calculate the RATIO parameter values, which involves less assumptions, particularly with respect to wild smolt production and survival rates of young fish. The alternative method extrapolates the tag recoveries to total Maine fish (tagged and untagged) at sea in year i by using the ratio of tags recovered to total estimated run size in Maine rivers in year i+1. The L-value in the harvest formula now represents the proportion of tags lost by the salmon between the period of exposure to the non-USA fisheries and the time they return to their homewaters. The loss of tags during this period was considered to be negligible; therefore, the Working Group used L = 1 in the formula.

A value of 0.70 was assumed by the Working Group for the tag reporting rate (R), based on Pippy (1982). Non-catch fishing mortality was assumed to be equal to 0.20 for the Greenland fishery, representing the mid-point of a range of 0.1-0.3 adopted by the 1980 Working Group (Anon. 1980), and a value of 0.10 for the Canadian fisheries, representing the mid-point of a range of 0.07-0.13 reported by Ritter et al. (1980). The Working Group noted that a component of the non-catch fishing mortality (local consumption) would not enter into non-catch fishing mortality as used in the harvest formula because local consumers would also return tags.

Resultant estimates of harvest of the 1966-1981 smolt classes of Maine origin salmon at Greenland, Newfoundland, and other Canadian provinces, are given in Table 5. The estimated harvest in Greenland ranged from 80 to 5,370 fish annually, peaking in 1970. The Newfoundland harvest ranged from an estimated 243 to 7,837 fish annually, peaking in 1980. The estimated harvest for other Canadian provinces ranged from 28 to 926 fish, peaking in 1968, and the combined harvest in non-USA fisheries ranged from 1,442 to 10,169 fish, peaking in 1980.

More detailed analyses were performed on the 1980 and the pooled 1981-82 tag return data from Newfoundland and Labrador. Approximately 90% of tags of maiden fish reported from Newfoundland and Labrador were from Statistical Areas A-D and O (Table 2). Harvest estimates were based on the assumption that the ratio of total run size in USA waters to the number of tagged fish recovered in the Penobscot River was equal to the ratio of total USA origin fish (intercepted in Canadian waters) to the number of reported tags for areas A, B, C, D and O. It was further assumed that 30% of the tags were not reported and that the non-catch fishing mortality rate was 0.10. To identify key areas and times, the estimated harvests were broken down by area and month. The computation of harvest by area and month for 1980 was straightforward but the necessary tag information had been distilled from the USA database.

Estimation of the combined harvest for 1980 and 1981 required additional assumptions because the tag recovery data had been compiled for the period 1966 to 1983 combined in Meister (WP #3) and it was necessary to subtract tags reported by Bastien (MS 1984) for the period 1966-1981.

The tags whose area of capture within Newfoundland was not known within a given month were allocated to Statistical Areas in proportion to the tags reported for those areas for that month. However, since these tag returns represented 17 years of reported data, it was further assumed that tags of unknown area were returned uniformly during the 17-year period.

One additional assumption was required to allocate the reported multi-sea-winter salmon tags (Table 8 of Meister) to Statistical Area. Tag counts in Table 8 of Meister were pooled into Areas A and B, and C through F. It was assumed that the distribution of tags within these Areas were the same as observed for 1^+ sea-winter fish reported in Table 5 of Meister. The adjusted tag returns of 1^+ sea-winter fish, multi-sea-winter and post-kelt salmon were summed for each month (May to December) and area subdivision. From this cell total, the tag returns reported in Tables 11 and 12 of Bastien (1984) were subtracted. This resultant tag estimate for each cell was then multiplied by a composite ratio defined as the sum of 1981 and 1982 total USA runs divided by the sum of the Penobscot River tag returns from 1981 and 1982. Each cell was then further adjusted for non-reporting rate and non-catch fishing mortality as described previously. All Penobscot River tags were assumed to be reported from home waters. Some tags may not be reported due to embedding of tags within fish but no information is available on this. The intensive nature of the USA management efforts plus cooperation of USA anglers and the absence of a USA commercial fishery suggest that the non-reporting rate for tags is low.

The pattern of estimated harvest of US origin salmon in these areas is compared to the pattern of Canadian commercial catch statistics for the same area in Tables 6 and 7.

In light of the data deficiencies that exist for the reporting of tags and in Canadian commercial catch statistics, the comparisons were made on a relative basis. Thus, data for each cell were divided by the appropriate grand total. The relation between USA origin fish and Canadian commercial catches was consistent between the two tables. In both tables, there was an increasing proportion of USA fish relative to Canadian catches later in the year. Most USA origin salmon in both tables were caught during June and July. The harvest of USA origin salmon declined consistently from July to September in both tables. In Newfoundland (Areas A-D), the catch of USA origin salmon increased markedly during October-December. Both tables also show that a small proportion (<1%) of the total Newfoundland and Labrador commercial catch occurs during the period September-December, yet a large proportion (16-40%) of the harvest of USA origin salmon occurred during this period. These results are also consistent with the tag returns as reported in Table 3. The return of Canadian grilse to their natal streams prior to these months may increase the relative fraction of USA origin fish in Canadian waters. Another explanation might be that catches are underestimated during the fall.

Comparisons of Tables 6 and 7 indicate that there are annual variations in the proportion of total tag returns and catches prior to and after September in each of Statistical Areas A, B, C, D, and O; as well as annual variations in proportion of tag returns and catches between individual areas.

Negative values in the estimated USA catches reflect the allocation procedures used for tags without Area of capture. In particular, they suggest that the assumption of a uniform distribution of unknown tags over years and that the proportional allocation of unknowns over areas within months may be in error. Errors might also arise due to the method by which the month of return for tags is imputed. All of these issues, as well as others identified in Chapter 4 should be further investigated.

3 DESCRIPTION OF FISHERIES CATCHING SALMON ORIGINATING IN ANOTHER PARTY'S RIVERS OR ARTIFICIAL PRODUCTION FACILITIES

3.1 SALMON AND NON-SALMON FISHERIES IN FISHERIES STATISTICAL DISTRICTS 18-32 AND 35-40 IN NOVA SCOTIA

Fisheries Statistical Districts (FDS) of Nova Scotia are shown in Fig. 5. Numbers of salmon trap nets and gill nets within FSD's 18-32 and 35 to 40 have declined from 41 and 60, respectively, in 1981 to 35 and 51 in 1983 (Table 8). Fishing effort (net days) is available since 1980.

Non-salmon gear for the same years in the same FSD's consists of commercial fish traps and weirs (the principal by-catch gear) (Table 9) and numerous (1,000's) groundfish and surface gill nets. Between 1974 and 1978 non-salmon gear accounted for 38.4 percent of salmon landings in mainland Nova Scotia. Such catches represent 42.2 percent (1.6 t) in FSD's 26-28, 30-34, 36 and 37 and 100 percent of salmon landings (2.6 t) in FSD's 35 and 38-41 (Gray et al. 1980).

Open seasons for licensed salmon gear have been reduced from 3.5 or 4 months (depending on FSD's) in 1980 to 3 weeks in 1984 (Table 10). Although there are no regulated seasons for non-salmon gear, the retention of salmon by-catch has been illegal since 1981.

Total annual landings of Atlantic salmon by all gear types in these FSD's have ranged from 49.7 t in 1967 to 7.4 t in 1983 (Table 11). Total estimated numbers of salmon for each of these Districts appear in Table 12. Estimated numbers of 1-SW, 2-SW and 3-SW salmon landed in each District 1970-83 are shown in Tables 13, 14, 15. Since 1981, 1-SW fish have comprised from 35 to 60 percent of the total numbers. Landings of mackerel and herring (t) from potential salmon by-catch gear, i.e. commerical fish traps, weirs and gill nets are provided by each FSD in Tables 16, 17, 18 and 19, respectively.

The Working Group noted that a few tags of USA origin had been returned from additional FSD's on the Bay of Fundy, shore of New Brunswick, and the eastern shore and Atlantic coast of Cape Breton Island, Nova Scotia.

3.2 NEWFOUNDLAND AND LABRADOR

The commercial salmon fishery in Newfoundland and Labrador is a limited entry fishery. The fishery is controlled by season, amount of fishing gear per licensed fisherman, mesh size, and placement of gear. The entire salmon fishery in Newfoundland and Labrador is a fixed gill net or trap net fishery. Salmon traps are a small but unknown proportion of the total gear licenced. The webbing of both nets and traps is multifilament nylon material, since it is illegal to use webbing that contains monofilament in single or multiple strands. The regulated minimum mesh size is 127 mm for all Areas (Figs. 6, 7) except in Bay St. Georges (Area K) and a section of the south coast from Cape Pine to Point Crewe (Area G and H) where the minimum mesh size is 114 mm.

Both salmon gill nets and trap nets are typically set perpendicular to shore with one end attached to shore and the other end anchored. The salmon nets may be set straight or contain a "hook" or "hawk" on the offshore end. Some nets are set offshore with one or both ends anchored. It is illegal to use drift nets or seines for Atlantic salmon in Newfoundland and Labrador. The minimum and maximum lengths of salmon net permitted in each berth is 45 m and 183 m, respectively. In many areas, berths are licensed and issued to fishermen through a draw system. In other areas berths are not licensed and fishermen obtain the berth on a first come or historical rights basis. Nets or traps cannot be set less than 90 m from another net.

In bays less than six nautical miles in width, salmon gear (nets and trap leaders) must be tied up on Sundays so as to permit the free passage of fish.

The total number of fishermen and fishing gear licensed to fish for Atlantic salmon in each Statistical Area A to O, 1975-1983 are shown in Tables 20 and 21. In 1975 a new salmon licensing policy was implemented whereby there was a freeze on new entrants, a program of licence reduction through attrition, and additional restrictions on licence transfers. The number of licensed commercial fishermen and licensed fishing effort in the Province of Newfoundland and Labrador has decreased from 6981 fishermen and 1.3×10^6 fathoms of gear in 1975 to 5104 fishermen and 1.0×10^6 fathoms in 1983, a decrease of 26% and 21%, respectively, (Tables 20, 21). Statistical Areas C, E, F, G, J and L have experienced more than a 30% decrease in licensed gear since 1975. Areas D, I and N had a reduction of 10% in licensed effort and Areas M and O (Labrador) received a slight increase in licensed effort. No data are available on the effective fishing effort, as all licensed gear is not necessarily fished throughout the fishing season. Therefore, the impact of changes in the increased effort on fishing mortality rates cannot be evaluated.

Measures to reduce fishing mortality and interception of non-Newfoundland-Labrador origin salmon in 1975-84 are given in Table 22.

The total landings of Atlantic salmon in Newfoundland-Labrador by Statistical Areas A to O, 1975-83 are given in Tables 23 and 24. The mean yearly number of fish landed by month and Statistical Areas A-O, 1974-83 are given in Tables 25 and 26. The landings include salmon caught in licensed salmon gear and other gear. No estimates are available on the proportion of

salmon caught in other gear. The landings also include an estimate of fish consummed by fishermen or sold locally (local sales) and not recorded on purchase slips (Moores et al. 1984). Estimated catches for Oct.-Dec. are primarily obtained from estimated local sales.

Average monthly catches of large (>2.7 kg) and small salmon (<2.7 kg) for Newfoundland Statistical Areas from 1984-83 are presented in Tables 23 and 24. Tables 25 and 26 present annual catches for the same Areas.

4 DATA DEFICIENCIES AND RESEARCH PROGRAMS

4.1 DOCUMENTATION OF WORKING GROUP DATA

It was agreed that some valuable information used to develop Working Group reports is not presently available to the scientific community, in part, because of a lack of a suitable vehicle to publish the material. Possible alternatives discussed included the development of a special ICES report series, utilization of national report series, or the development of a report series by NASCO. It was recommended that this topic be discussed by the ANACAT Committee at the next Statutory Meeting of ICES.

4.2 ASSESSMENT OF DATA DEFICIENCIES AND RESEARCH PRIORITIES TO CHARACTERIZE INTERCEPTION FISHERIES

1. Sex Ratios - No data are available to characterize the sex composition of the intercepted catch. It is likely that it may not be possible to segregate sexes in these catches using tag returns. The need for such data is uncertain.

2. Gear Type - About 1/3 of the tags returned are accompanied by information concerning gear and the information supplied is often ambiguous. Reported landings are not broken out by gear type and incidental catches may not be reported in future landings data, because regulations forbid possession of salmon by-catches. The importance of such illegal by-catches should be assessed.

3. Catch Statistics - There is some evidence that catch statistics for salmon reported in local sales in the fall are underestimated, but it is unclear whether local sales are also underestimated in periods earlier in the year when reported landings are high. These data are important for interpreting interceptions in the Newfoundland fall fishery and may be important in assessing fishing mortality on some other stocks.

4. Tag Returns - There is a need to evaluate the accuracy of information accompanying tag returns, perhaps through community surveys. In addition, there is a need for accurate information on the date and location of capture, and the proportion of captures that are not reported, particularly in light of the possibility that non-reporting may be increasing in Canadian and Greenland fisheries as a result of increased regulation.

5. Description of Fisheries - A measure of effective fishing effort which reflects the type and amount of gear and duration of deployment needs to be developed.

6. Statistical Reporting - It was agreed that basic statistical data be compiled according to the temporal resolution of Table 23 and with geographic resolution as follows:

USA - By rivers as listed in Table 24

- By Statistical Area for Marine Catches

Newfoundland and Labrador - by Statistical Section as presented in Figures 6 and 7

Nova Scotia, New Brunswick and Prince Edward Island - by Management Zone as presented in Table 25 and Figure 5

Quebec - by Quebec Marine Fisheries Districts (figure 8)

7. Stock Identification Technique - Carlin tagging programs should be continued. The possibility of increasing the return rate through alternative reward programs should be investigated. Any modification of the present reward program should be coordinated. Further research needs to be conducted on rates of non-reporting.

It was agreed that the use of coded wire tags to identify salmon of USA origin in interception fisheries has the advantage of low tagging mortality and rapid application. However, the codes on the wire tags cannot be read unless removed from the fish, an adipose mark is required, detection and tagging equipment are costly, the method is not practical for wild fish of varying sizes, and an extensive screening of the catches is required by trained observers. The Working Group agreed that the method, while suitable for certain uses, has little potential for solving problems posed by the North American Commission.

It was agreed that the possibility of defining stocks using a variety of scale characteristics (such as shape and texture) of both hatchery or wild produced smolts be pursued, perhaps including a marking program to integrate tetracycline into bony structures.

Genetic techniques have not as yet provided the necessary resolution to segregate North American salmon into Canadian and USA components. New genetic techniques, however, should be further investigated for use in, at least, separating North American and European salmon at West Greenland.

Other techniques should be explored to identify practical and cost effective methods to identify stock origin including biochemical and physical characteristics of the individuals.

5 OTHER BUSINESS

The chairman reported that he had received a letter from Dr. Studenetsky, Director VINRO, USSR, describing the Soviet salmon fishery. The description is paraphrased here since the report of the May meeting, for which the description was intended, has been printed and widely distributed.

5.1. DESCRIPTION OF THE FISHERY FOR NORTH ATLANTIC SALMON IN THE USSR

In USSR rivers flowing into the Barents Sea, North Atlantic salmon are fished exclusively by means of counting fences. In rivers flowing into the White Sea, counting fences take 75% of the catch and trap nets take the remaining 25%. The minimum mesh size of the gear is 40 mm.

Days of fishing alternate with days when fish are allowed to pass the gear. The alternation ensures that at least 50% of returning salmon are permitted to spawn.

The 1982 catch was 311 t and the 1983 catch was 436 t.

APPENDIX I

ICES WORKING GROUP ON NORTH ATLANTIC SALMON

SEPTEMBER 18-20, 1984

AGENDA

1. Call to order

2. Adoption of agenda

3. Distribution of meeting documents

4. Organization of meeting

5. Questions posed by NASCO related to the North American Commission

   - ICES is requested to describe historical fisheries (together with relevant regulatory measures) of the members of the Commission which have caught salmon originating in rivers or artificial production facilities of another party to the Convention. Specifically:

     1. Estimates should be provided of the number, weight, age and sex composition and river of origin of such salmon catches, categorized seasonally, geographically and by gear type. These estimates should take into consideration available information on the release and recovery of tagged salmon and on catches and exploitation rates for salmon in areas where such catches occur.

     2. The description of fisheries catching salmon originating in another party's river or artificial production facility should include catch, effort, gear type, season and the composition by species, age and sex of annual historical catches.

     3. Data deficiencies and research programs required to meet the needs of the North American Commission for scientific information on salmon stocks and fisheries should be identified.

6. Other business

7. Adoption of report

PENDIX II

DOCUMENTS SUBMITTED TO THE WORKING GROUP:

Anthony, V. C. and A. W. Neill. Methods of stock identification for Atlantic salmon: a review.

Baum, E. T. History and description of the USA Atlantic salmon tagging and stocking program.

Baum, E. T. and A. L. Meister. Analysis of USA Atlantic salmon tagging data.

Deland, K. F. Wild Atlantic salmon smolt production in Maine rivers.

Foreman, J., A. M. T. Lange, and V. C. Anthony. Estimates of harvest of USA Atlantic salmon in non-USA fisheries.

Marshall, T. L. Catch, effort and licensing in fisheries statistical districts 18-32, 35-40 of Nova Scotia.

Meister, A. L. The marine migrations of tagged Atlantic salmon (Salmo salar L) of USA origin.

Porter, T. R. Description of commercial fisheries for Atlantic salmon in Newfoundland and Labrador, 1975-83.

Porter, T. R. and E. G. M. Ash. Summary of Atlantic salmon commercial catch statistics for statistical areas A to O, Newfoundland and Labrador, 1975-83.

Reddin, D. G. and R. K. Misra. 1978. Multivariate analyses of Atlantic salmon (Salmo salar) caught in the Twillingate fall commercial fishery. Int. Counc. Explor. Sea C.M. 1978/M:11.

APPENDIX III

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Anon. 1980. Report of the Working Group on North Atlantic salmon. ICES Anadromous and Catadromous Fish Committee. C.M. 1980/M:10.

Bastien, Y. 1984. A study of the interception of mainland origin Atlantic salmon in the Newfoundland commercial fishery. Atlantic Salmon Federation, St. Andrews, New Brunswick, Canada.

Cutting, R. E. MS 1984. Summary table of recreational and commercial Atlantic salmon harvests of the Scotia-Fundy Region, 1967-1983. CAFSAC Res. Doc. 84/ .

Gray, R. W., D. L. Morantz, and J. D. Cameron. 1980. Size, distribution and significance of the commercial by-catch of Atlantic salmon (Salmo salar) in mainland Nova Scotia. Can. MS Rep. Fish. Aquat. Sci. No. 1583: ix + 39 p.

Moores, R. B., A. W. Veitch, and E. G. M. Ash. 1984. Atlantic salmon commercial catch statistics, Newfoundland and Labrador, 1980 and 1981. Can. Data Rep. Fish. Aquat. Sci. 466: iv + 219 p.

Pippy, J. (Chairman). 1982. Report of the Working Group on the interception of mainland salmon in Newfoundland. Can. MS. Rep. Fish. Aquat. Sci. No. 1654.

Ritter, J.A., T. L. Marshall, D. G. Reddin, and W. G. Doubleday. 1980. Assessment of the impact of the West Greenland Atlantic salmon (Salmo salar) fishery on stocks and catches in North America. ICES Anadromous and Catadromous Fish Committee. C.M. 1980/M:38.

Table 1. Summary of USA Atlantic salmon stocking program.

Year of release	MAINE					MERRIMACK RIVER			
	Fry	Parr	Untagged smolts	Tagged smolts	Tagged adults[1]	Fry	Parr	Untagged smolts	CWT smolts[3]
1962		151,490	69,520		151				
1963		11,280	101,180		123				
1964		49,010	20,250		160				
1965		46,970	220,185		146				
1966		117,790	243,985	82,250	834				
1967		12,640	143,035	60,880	444				
1968		25,000	181,120	66,170	372				
1969		25,000	6,015	79,190	316				
1970		25,000	1,915	48,190	390				
1971		15,800	59,085	29,830	240				
1972	129,000		69,015	48,480	460				
1973			105,345	38,030	220				
1974		44,180	95,320	41,750	442				
1975		24,780	140,335	28,980	591	36,000			
1976		185,960	277,695	24,980	658	139,000	16,600	2,100	
1977			325,695	48,800	311	72,000	675	31,040	
1978		116,400	302,600		1,347	106,100		47,175	
1979	28,150	71,780	311,580	59,750	751	76,900	15,000	24,700	
1980			632,105	49,760	1,496	125,500		32,400	
1981	201,800	121,230	207,540	49,900	565	57,000		100,000	
1982	349,150	375,400	345,815	49,950	602	107,600	24,000	95,450	72,000
1983	20,000	77,100	488,215	99,950		8,370	25,000	67,000	42,000
1984	97,000	22,485	694,285	99,900		525,520	23,290	24,415	43,285
TOTAL	825,100	1,519,295	5,041,835	1,006,740	10,619	1,253,990	104,565	424,280	157,285

[1]With adipose tags, 1962-1965; with Carlin tags 1966-1982.
[2]With Carlin tags.
[3]With coded wire nose tags.

Table 1. (Continued)

Year of release	CONNECTICUT RIVER Fry	Parr	Untagged smolts	Tagged smolts[2]	CWT smolts[3]	TOTALS Fry	Parr	Untagged smolts	Tagged smolts	CWT smolts
1962							151,490	69,520		
1963							11,280	101,180		
1964							49,010	20,250		
1965							46,970	220,185		
1966							117,790	243,985	82,250	
1967			5,000				12,640	148,035	60,880	
1968	50,000		4,900			50,000	25,000	185,920	66,170	
1969			17,300				25,000	23,315	79,190	
1970	50,000		46,400	3,500		50,000	25,000	48,315	51,690	
1971	75,000		27,900			75,000	15,800	86,985	29,830	
1972			22,700			129,000		91,715	48,480	
1973	15,000		30,400	24,900		15,000		135,745	62,930	
1974	8,600		29,500	49,900		8,600	44,180	124,820	91,650	
1975	12,500	12,000	36,300	42,400		48,500	36,780	176,635	71,380	
1976	30,000		62,300	1,600		169,000	202,560	342,095	26,580	
1977	50,000		67,200	47,100		122,000	675	423,935	95,900	
1978	50,000		105,800	25,000		156,100	116,400	455,575	25,000	
1979	53,500		182,900			158,550	86,780	519,180	59,750	
1980	281,000		63,500			406,500		728,050	49,760	
1981	172,700	182,000	84,700			431,500	303,230	392,240	49,900	
1982	303,800	19,400	98,600		136,200	760,550	418,800	539,865	49,950	208,200
1983	230,600	252,100	41,670		172,530	258,970	354,200	596,885	99,950	214,530
1984	619,700	141,000	292,815	50,000	121,185	1,242,220	186,775	1,008,515	149,900	164,470
TOTAL	2,002,400	606,500	1,169,885	244,400	429,915	4,081,490	2,230,360	6,633,000	1,251,140	587,200

Table 2. Distribution of Tag Returns from Smolts (N = 756,059) and Post-Kelts (N = 10,619) released in the State of Maine 1966-1982 and recovered during the period 1967-1984.

Area of Recovery		Number of tag returns by age			
		1 sea-winter	Multi sea-winter	Post-kelt	Total
W. Greenland	1A	87	5	2	94
"	1B	238	13	11	262
"	1C	316	5	6	327
"	1D	200	9	2	211
"	1E	140	2	2	144
"	1F	108	3	4	115
"	Unknown	350	0	7	357
Total W. Greenland		1,439	37	34	1,510
Total E. Greenland XIV (ICES)		7	0	0	7
Labrador	0	225	18	12	255
Newfoundland	A	234	5	6	245
"	B	208	8	25	241
"	C	86	8	4	98
"	D	39	5	2	46
"	E	16	6	3	25
"	F	14	4	16	34
"	G	13	0	7	20
"	H	13	3	28	44
"	I	12	1	28	41
"	J	18	2	51	71
"	N	6	0	0	6
"	Unknown	109	6	7	122
Total Nfld.-Labrador		993	66	189	1,248
Nova Scotia	4X[1].	18	30	6	54
"	4X[2].	13	4	11	28
"	4W	2	0	3	5
"	4V	1	0	1	2
Total Nova Scotia		34	34	21	89
Total New Brunswick 4X-4T		14	12	2	28
Total (%) Distant Fisheries	(1A-4X)	2,487 (91.6)	149 (5.4)	246 (53.2)	2,882 (48.8)
Total (%) Homewater Returns	5Y	228 (8.4)	2,585 (94.5)	216 (46.8)	3,029 (51.2)
GRAND TOTAL		2,715 (100.0)	2,734 (100.0)	462 (100.0)	5,911 (100.0)

1. Inside Bay of Fundy
2. Outside Bay of Fundy

Table 3. Marine Recoveries of 1+ sea-winter salmon (1967-1983). Data presented by NAFO area and division, and by month of recovery.

NAFO	Area	Total recoveries	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Un
	(NEW BRUNSWICK ((Fundy)	14	-	-	-	1	5	6	2	-	-	
4X	(NOVA SCOTIA ((Fundy)	18	-	1	-	13	4	-	-	-	-	
	((South Shore)	13	1	1	5	2	-	-	-	3	1	
	(UNKNOWN NOVA SCOTIA	3	-	-	-	-	-	-	-	-	-	
4W	(Eastern Shore)	2	-	-	1	1	-	-	-	-	-	
4Vn	(Cape Breton)	1	-	-	-	1	-	-	-	-	-	
TOTALS		51	1	2	6	18	9	6	2	3	1	
	NEWFOUNDLAND											
3Pn+s	J	18	-	-	3	14	1	-	-	-	-	
3Ps	I	12	-	-	1	10	-	-	-	-	1	
3Ps	H	13	-	-	1	10	2	-	-	-	-	
	(G	13	-	-	2	8	1	-	-	-	-	1
	(F	14	-	2	5	5	2	-	-	-	-	-
3L	(E	16	-	1	6	3	-	-	-	2	3	1
	(D	39	-	1	15	15	4	-	1	1	-	2
	(C	86	-	2	11	21	4	-	5	22	19	2
3K	(B	208	-	-	21	72	4	2	23	57	27	2
	(A	234	1	1	41	152	9	-	5	18	5	2
	UNKNOWN	109	-	-	22	46	13	3	4	6	4	11
TOTALS		762	1	7	128	356	40	5	48	106	59	22
	LABRADOR											
2J		70	-	1	4	47	15	2	-	-	-	1
2H		121	1	-	-	21	60	33	1	1	1	3
2G		10	-	-	-	2	6	1	-	-	-	1
	Unknown "0"	6	-	1	1	2	1	-	-	-	-	1
4R+S	West Coast & North Shore	18	-	-	-	12	5	1	-	-	-	-
TOTALS		225	1	2	5	84	87	37	1	1	1	6
	GREENLAND											
E.G.		7	-	-	-	-	-	3	4	-	-	-
1F		108	-	-	-	4	58	38	8	-	-	-
1E		140	-	-	1	21	73	35	4	-	-	6
1D		199	-	-	-	12	116	45	16	5	-	5
1C		316	-	-	-	30	130	78	31	7	-	40
1B		238	-	-	-	3	31	85	45	7	-	67
1A		87	-	-	-	-	18	50	14	3	-	2
1*	Unknown	350	-	-	-	8	44	66	43	9	-	180
TOTALS		1,445	-	-	1	78	470	400	165	31	-	309

Table 4. Marine Recoveries of Multi sea-winter Fish (1966-1983). Data presented by NAFO area and division, and by month of recovery.

NAFO	Area	Total recoveries	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Unk.
	NEW BRUNSWICK (Totals)	12	-	2	3	3	2	1	-	-	1
	(Fundy)		-	2	3	3	2	1	-	-	1
	NOVA SCOTIA (Totals)	35	4	16	11	1	-	1	-	-	2
	Fundy	30	3	14	10	1	-	1	-	-	1
	South Shore	4	1	2	-	-	-	-	-	-	1
	East Shore	-	-	-	-	-	-	-	-	-	-
	Cape Breton	-	-	-	-	-	-	-	-	-	-
	Antigonish	1	-	1	-	-	-	-	-	-	-
	NEWFOUNDLAND (Totals)	48	8	16	13	1	0	2	4	2	2
(G-J)	South Shore	6	-	2	3	-	-	-	-	-	1
(C-F)	East Coast	23	8	9	3	-	-	-	2	1	-
(A-B)	North Coast	13	-	4	5	-	-	1	1	1	1
	Unknown	6	-	1	2	1	-	1	1	-	-
	LABRADOR (Totals)	18	1	3	9	3	1	1	-	-	-
	4R, 4S + 3Kn	3	-	2	1	-	-	-	-	-	-
	2J	7	-	1	4	1	-	1	-	-	-
	2H	3	-	-	1	1	1	-	-	-	-
	2G	2	-	-	1	1	-	-	-	-	-
	Unknown	3	1	-	2	-	-	-	-		-
	GREENLAND (Totals)	37	-	-	5	12	9	3	1	-	7
	E. Greenland	0			-	-	-	-	-	-	-
	1F	3			-	2	1	-	-	-	-
	1E	2			2	-	-	-	-	-	-
	1D	9			1	3	1	-	-	-	4
	1C	5			1	3	-	-	1	-	-
	1B	13			1	3	5	1	-	-	3
	1A	5			-	1	2	2	-	-	-
	Unknown	-									
TOTALS		150	13	37	41	20	12	8	5	2	12

Table 5. Estimated harvest (numbers)[1] of Maine origin Atlantic salmon in non-USA fisheries.

Year i	Maine (year i+2)			Greenland		Newfoundland (year i+1)		Other Canada		Total	
	Tags returned	Run size[2]	ratio[3]	No. tags	Harvest	No. tags	Harvest	No. tags	Harvest	No. tags	Harvest
1966	176	1,223	.144	40	496	45	496	39	430	124	1,422
1967	10	848	.012	1	148	5	661	7	926	13	1,735
1968	16	1,140	.014	6	765	3	340	3	340	12	1,445
1969	65	968	.067	54	1,439	39	924	3	71	96	2,434
1970	272	2,029	.134	403	5,370	54	640	11	130	468	6,140
1971	195	1,419	.137	93	1,212	21	243	4	46	118	1,501
1972	180	1,782	.101	120	2,122	31	487	5	79	156	2,688
1973	393	2,644	.149	334	4,003	115	1,255	8	85	457	5,313
1974	270	1,575	.171	141	1,472	103	956	3	28	247	2,456
1975	93	2,283	.041	39	1,699	81	3,136	21	813	141	5,648
1976	83	4,509	.018	15	1,488	15	1,323	3	265	33	3,076
1977	33	2,185	.015	10	1,190	7	741	1	106	18	2,037
1978	0	-	-	-	-	-	-	-	-	-	-
1979	381	5,999	.064	64	1,786	316	7,837	22	546	402	10,169
1980	253	5,810	.044	40	1,623	67	2,417	4	144	111	4,184
1981	163	2,442	.067	3	80	91	2,156	9	213	103	2,449

[1]Harvest = tags/(0.70*(1 - non-catch fishing mortality)*ratio).

0.70 = tag return rate

Non-catch fishing mortality = 0.20 (Greenland) and 0.10(Canada)

[2]Estimated run size in Maine rivers.

[3]Tags returned/run size.

- Tag recoveries from Atlantic Sea Run Salmon Commission, 1966-1979 compiled by Eastien (1984).

Table 6 Comparison of percent composition of Canadian commercial catch statistics and USA origin fish (in parentheses) by Statistical Area and month for 1980.

1980	A	B	C	D	O	Sum
May	0.18 (0)	0.29 (0)	0.38 (0.11)	0.34 (0.06)	0.04 (0)	1.23 (0.17)
June	7.03 (8.12)	4.53 (4.07)	1.36 (0.90)	0.88 (1.23)	58.84 (1.67)	72.64 (15.99)
July	3.89 (24.65)	3.33 (11.60)	1.06 (1.92)	0.85 (1.36)	13.83 (14.41)	22.96 (53.94)
Aug	0.11 (2.06)	0.36 (0.92)	0.01 (0.80)	0.03 (0.80)	2.40 (9.55)	2.91 (14.13)
Sept	* (0)	0.07 (0.33)	0 (0)	0 (0.80)	0.15 (1.67)	0.22 (2.80)
Oct	* (0.66)	0.02 (3.00)	* (0.27)	0 (0.06)	* (0)	0.02 (3.99)
Nov	0.01 (1.12)	0.01 (3.54)	* (0.88)	0 (0.03)	0 (0)	0.02 (5.57)
Dec	0 (0.32)	0 (1.68)	* (1.14)	0 (0.18)	0 (0)	0 (3.32)
SUM	11.22 (36.93)	8.61 (25.14)	2.81 (4.88)	2.10 (4.52)	75.26 (27.30)	

* < 0.005%

Table 7 Comparison of percent composition of Canadian commercial catch statistics and USA origin fish (in parentheses) by Statistical Area and month for 1981 plus 1982.

1981 + 1982	A	B	C	D	O	Sum
May	0.52 (0.07)	1.15 (0)	1.20 (-0.04)	1.19 (-0.89)	0.01 (1.09)	4.07 (1.12)
June	15.61 (12.35)	7.81 (2.66)	3.09 (2.69)	2.19 (2.75)	12.82 (1.09)	41.52 (21.54)
July	8.49 (4.98)	6.53 (5.94)	1.98 (2.09)	1.49 (0.17)	29.43 (18.53)	47.92 (31.71)
Aug	0.24 (-1.91)	0.79 (-2.06)	0.12 (-0.93)	0.28 (2.34)	4.11 (9.27)	5.54 (6.71)
Sept	* (0)	0.11 (0.73)	0 (0)	* (0)	0.54 (4.91)	0.65 (5.64)
Oct	0.01 (2.33)	0.04 (8.84)	0.01 (1.12)	* (0)	0.02 (0.55)	0.08 (12.84)
Nov	0.07 (2.38)	0.10 (-1.53)	0.02 (5.99)	0.01 (0.06)	0.01 (0.55)	0.21 (7.45)
Dec	0 (3.92)	0.01 (5.52)	* (2.75)	0 (1.09)	0 (0.55)	0.01 (13.83)
SUM	24.94 (24.12)	16.54 (20.10)	6.42 (13.67)	5.16 (6.41)	46.94 (36.54)	

Table 8. Numbers of licensed salmon trap and gill nets in Fishery Statistical Districts 18 to 32 and 35 to 40, 1981 to 1983.

FSD	1981		1982		1983	
	trap	gill	trap	gill	trap	gill
18						
19	12	1	7	1	7	1
20	4		4		4	
21						
22	17	6	16	5	16	5
23	6	1	6	1	6	1
25		10		9		9
26		1		1		1
27	2	24	2	21	2	19
28		13		12		12
30		4		4		3
31						
32						
35						
36						
37						
38						
39						
40						
Total	41	60	35	54	35	51

Table 9. Numbers of licensed non-salmon commercial fish traps and herring weirs in Fishery Statistical Districts 18 to 32 and 35 to 40, 1981 to 1983.

FSD	1981		1982		1983	
	trap	weir	trap	weir	trap	weir
18	3					
19	7		7		7	
20	11		29		13	
21	36		4		15	
22	75		71		59	
23	68		73		61	
25	2					
26	5		4		5	
27	10		9		10	
28	4		6		5	
30	6		10		5	
31	2				2	
32		1		1		
35						
36		1		1		1
37		32		28		32
38		2				
39						
40						
Total	229	36	213	30	182	33

Table 10. Open seasons for commercial salmon fishing, 1967-1983. (There is no licensed salmon gear in Districts 18, 21, 31, 32, 35, 36, 37, 38, 39 and 40).

Years	FSD's	Season
1967 and previous to 1980	18, 19, 20, 21, 22 23, 25, 26, 27, 28, 30, 31	Apr 15-Aug 15
	35, 36, 37, 38, 39 40	May 1-Aug 15
1981	19	Jun 1-Jul 31
	18, 20, 21, 22, 23 25, 26, 27	May 15-Jul 31
	28, 30, 31, 32, 36 37, 38	Jun 8-Jul 31
	35, 39, 40	Jun 1-Aug 10
1982-83[1]	18, 19, 20, 21	Jun 1-Jul 31
	22, 23, 25, 26, 27 28, 30, 31, 32, 36 37, 38	May 4-Jul 31
	35, 39, 40	Jun 1-Aug 10

[1]In 1984, seasons were further restricted to Jun 18-Jul 6 in all but FSD's 35, 39, 40 which were Jul 23-Aug 10.

Table 11. . Commercial salmon catches (kg) by selected Fisheries Statistical Districts, of Nova Scotia, 1967-1983. Figures include catches from salmonid gear as well as by-catch estimates (Cutting, MS 1984).

Fish. Stat. Dist.	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	0	0	0	0	0	0	0	11	0	0	0	363	867	1185	34	113	272
19	1234	1024	1248	621	1155	789	1086	1309	2711	1478	1108	1958	318	1743	1475	422	568
20	5570	3076	1046	688	1117	1130	1058	2595	3032	1854	2315	1805	236	3147	2467	413	1446
21	1356	404	545	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	6384	4566	4593	1300	1276	2321	2224	3034	8886	2314	7815	8287	5141	18623	2511	3523	2056
23	7949	1516	1558	685	1157	891	1001	1599	2496	800	2707	1265	301	2926	3271	3166	672
25	2331	473	375	285	383	496	769	2098	2033	1277	4978	2271	878	1312	415	594	919
26	1966	694	1170	598	634	601	485	839	446	678	1341	309	130	246	63	200	91
27	2402	752	743	400	137	366	541	423	1156	1946	1335	2021	1618	4622	1324	734	847
28	861	256	252	450	238	216	245	203	408	355	976	419	212	806	245	994	452
30	0	492	104	54	68	94	295	594	608	82	533	643	42	91	205	103	0
31	13	0	0	0	0	3	0	0	0	75	41	703	340	482	544	272	0
32	4	0	5	0	0	0	0	794	998	0	0	0	0	136	135	454	0
35	1363	492	434	315	294	0	66	248	166	512	522	197	94	206	0	0	0
36	0	0	0	0	0	0	0	0	0	16	14	54	9	19	0	0	0
37	0	0	0	0	0	340	104	136	321	183	356	210	115	134	0	62	33
38	199	132	12	0	0	11	11	0	14	4	11	14	0	0	0	0	0
39	710	38	4	0	5	0	12	0	0	0	0	0	0	0	0	0	0
40	17267	9297	4528	3057	2422	3984	968	2027	3413	2438	2724	985	477	1736	91	50	0
Total	49709	23212	16617	8533	6969	11292	8165	16602	26686	14012	26916	21504	11778	37411	12781	11100	7356

Table 12. Number of salmon in the commercial salmon catches, in selected FSD's of Nova Scotia, 1967-1983. Figures include 1-SW and M-SW fish from salmon and non-salmonid gear (Cutting, MS 1984).

Fish. Stat. Dist.	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	0	112	0	0	0	0	0	3	0	0	0	151	352	447	10	25	0
19	272	432	316	161	399	198	310	342	738	414	375	634	211	663	498	144	75
20	893	124	260	190	485	335	269	749	1147	545	623	590	55	728	753	79	41
21	291	0	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	1607	873	1055	349	383	522	539	943	3001	409	2699	2648	2190	7116	737	1021	449
23	1980	386	382	209	757	218	369	547	881	66	982	371	112	824	1012	869	358
25	554	143	123	105	149	134	241	859	711	513	1147	691	354	537	103	195	290
26	898	185	339	143	201	399	105	133	99	191	377	84	43	97	30	80	41
27	545	160	188	95	35	106	122	111	288	511	336	505	427	1077	352	171	193
28	179	49	58	124	67	58	62	68	88	76	224	101	53	196	100	241	127
30	0	0	24	12	15	21	65	120	131	18	107	128	8	29	57	14	0
31	3	0	0	0	0	1	0	0	0	15	12	180	75	117	181	100	0
32	1	0	4	0	0	0	0	212	220	0	0	0	0	27	58	126	0
35	362	13	114	118	75	0	17	71	40	184	169	42	20	28	0	0	0
36	0	0	0	0	0	0	0	0	0	7	39	12	2	4	0	0	0
37	0	0	0	0	0	72	14	30	62	31	69	33	24	28	0	17	6
38	63	42	3	0	0	1	2	0	3	1	3	3	0	0	0	0	0
39	224	9	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0
40	5518	2971	1451	936	849	1203	385	630	809	729	760	823	420	413	39	20	0

Table 13. Number of 1-SW Atlantic salmon reported or calculated from the commercial fisheries catches of selected FSD's of Nova Scotia, 1970-1983 (Cutting, MS 1984).

Fish. Stat. Dist.	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	0	0	0	0	1	0	0	0	117	268	310	4	0	68
19	38	237	54	132	79	175	142	215	392	166	410	241	79	113
20	62	394	135	61	287	102	238	185	313	26	63	342	2	318
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	100	166	198	91	448	746	37	1606	1369	1753	5841	254	376	235
23	96	626	34	244	320	559	6	648	154	72	303	478	284	340
25	68	106	40	116	285	431	380	78	312	264	347	19	105	150
26	18	99	139	5	21	1	68	133	25	24	68	26	59	35
27	11	7	42	0	29	52	120	70	94	111	137	69	31	21
28	39	24	17	14	38	0	3	13	23	17	24	68	37	47
30	0	0	0	0	104	27	0	0	12	0	7	7	4	0
31	0	0	1	0	0	0	0	5	39	0	17	100	47	0
32	0	0	0	0	59	0	0	0	0	0	0	31	42	0
35	50	16	0	4	29	8	117	89	0	0	4	0	0	0
36	0	0	0	0	0	0	0	36	554	0	0	0	0	0
37	0	0	0	0	0	0	7	46	0	0	0	0	8	8
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	428	517	530	280	299	84	395	258	67	253	46	32	15	0
Totals	810	2192	1190	947	1969	2185	1513	3382	3481	3954	7577	1681	1081	1336

Table 14. Number of 2-SW Atlantic salmon reported or calculated from the commercial fisheries catches of selected FSD's of Nova Scotia, 1970-1983 (Cutting, MS 1984).

Fish. Stat. Dist.	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	0	0	0	0	2	0	0	0	34	82	134	6	25	25
19	123	162	144	178	263	462	272	160	242	45	252	247	65	73
20	128	91	198	205	462	1044	307	434	277	28	661	411	73	164
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	249	217	320	435	495	1229	361	1092	1261	431	1256	458	641	205
23	113	131	184	125	227	312	60	323	215	40	513	533	585	18
25	37	37	94	125	574	280	133	1063	378	90	190	83	88	135
26	125	102	90	93	112	98	123	244	59	19	29	4	21	6
27	84	28	64	120	82	236	391	263	405	316	932	282	132	171
28	85	43	41	48	30	85	68	211	74	32	165	32	204	70
30	12	15	20	64	14	79	18	93	97	6	22	49	10	0
31	0	0	0	0	0	0	15	7	141	75	100	81	53	0
32	0	0	0	0	153	218	0	0	0	0	23	27	84	0
35	68	59	0	13	42	31	67	80	40	19	23	0	0	0
36	0	0	0	0	0	0	0	3	12	2	2	0	0	0
37	0	0	68	10	30	51	19	23	16	22	26	0	11	0
38	0	0	0	0	0	3	1	3	3	0	0	0	0	0
39	0	0	0	1	0	0	0	0	0	0	0	0	0	0
40	508	332	673	105	331	725	334	502	192	227	367	7	5	0
Totals	1532	1209	1604	1522	2817	4853	2169	4501	3446	1434	4615	2230	1997	512

Table 15. Number of 3-SW Atlantic salmon reported or calculated from the commercial fisheries catches of selected FSU's of Nova Scotia 1970-1983 (Cutting, MS 1984).

Fish. Stat. Dist.	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	0	0	0	0	0	0	0	0	0	2	3	0	0	0
19	0	0	0	0	0	101	0	0	0	0	1	1	0	0
20	0	0	2	3	0	1	0	4	0	1	4	0	4	0
21	0	0	0	0	0	0	0	0	0	0	19	0	0	0
22	0	0	4	13	0	26	11	1	18	6	8	5	4	8
23	0	0	0	0	0	10	0	11	2	0	0	1	0	0
25	0	0	0	0	0	0	0	6	1	0	0	1	2	5
26	0	0	0	7	0	0	0	0	0	0	0	0	0	0
27	0	0	0	2	0	0	0	3	6	0	8	1	8	3
28	0	0	0	0	0	3	5	0	4	4	7	0	0	1
30	0	0	1	1	2	25	0	14	19	2	0	1	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	2	0	0	0	0	4	0	0	0
35	0	0	0	0	0	1	0	0	2	1	1	0	0	0
36	0	0	0	0	0	0	0	0	0	0	2	0	0	0
37	0	0	4	4	0	11	12	0	17	2	2	0	0	0
38	0	0	1	2	0	0	0	0	0	0	0	0	0	0
39	0	0	0	1	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	12	33	2	180	28	39	69	18	59	10	18	17

Table 16. Landings of herring and mackerel (t) reported in commercial traps selected FSD's of Nova Scotia, 1970-1983.

FSD	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	-	-	-	-	-	-	-	51	-	32	19	1	0	<1
19	66	84	6	20	11	58	72	106	16	5	<1	13	-	-
20	12	176	25	80	-	52	143	367	8	279	16	98	27	37
21	139	540	204	47	121	28	103	70	53	3	3	<1	<1	9
22	514	347	274	470	193	87	267	41	190	77	31	92	53	10
23	116	336	124	232	161	143	525	430	288	277	52	45	1014	346
25	681	1206	633	1321	1561	2796	3394	2942	2187	1810	991	1464	2162	1910
26	177	136	188	780	30	26	84	28	11	-	-	-	-	-
27	-	-	2	-	20	22	-	26	24	<1	-	-	1	-
28	<1	<1	-	-	-	<1	-	-	22	2049	1918	63	93	232
30	35	6	-	-	-	15	4	140	<1	12	5	-	<1	4
31	-	-	36	-	3	2	125	362	140	245	16	1076	948	695
32	<1	22	12	46	155	31	841	137	80	65	-	67	21	23
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-	<1
37	-	-	<1	-	-	-	-	-	-	-	-	-	-	-
38	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-
39	-	-	1	-	-	-	-	-	-	-	-	-	-	-
40	31	-	-	-	-	-	-	-	-	-	-	-	6	4

Table 17. Landings of herring and mackerel (t) reported in weirs of selected FSD's of Nova Scotia, 1970-1983.

FSD	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	<1	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	14	28	7	-	1	-	-	-	-	-	-	-	-
26	-	31	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	2	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	10	12	-	-	<1	-	5	1	-	-	-	-	-	-
36	2777	1136	3315	3553	1077	638	5871	632	287	-	-	-	-	-
37	4187	5054	4033	7787	1388	1163	2438	88	1425	596	59	1755	735	735
38	4150	3261	1449	99	28	3	1332	114	1036	1121	29	276	416	377
39	71	169	122	73	18	25	-	-	6	459	-	2	0	10
40	479	213	148	71	15	30	59	44	13	11	8	-	91	1

Table 18. Landings of herring (t) reported in both drift and set gill nets, of selected FSD's of Nova Scotia, 1970-1983.

FSD	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	3	11	22	20	<1	4	349	664	1097	983	728	852	1177	399
19	198	219	172	206	62	82	36	29	67	73	41	93	29	6
20	731	562	85	298	116	98	79	71	425	301	169	496	261	145
21	200	413	557	139	21	298	8	36	2	1	3	7	1	<1
22	105	163	101	98	44	71	79	24	54	57	40	16	3	4
23	97	71	29	44	19	39	45	35	57	2	5	1	0	<1
25	130	19	20	176	121	60	30	2	85	31	80	6	29	26
26	1184	1252	716	95	281	751	683	520	512	112	246	740	425	215
27	439	995	559	91	423	320	521	629	702	77	254	32	764	140
28	1424	1033	1060	655	627	551	335	903	834	147	419	134	270	86
30	1487	595	259	27	74	68	356	901	406	284	970	61	101	78
31	8494	4103	3176	2300	2068	732	3219	3916	1103	718	882	1810	1030	723
32	21	39	7	653	4	5	1229	868	90	25	839	34	120	3
35	218	253	147	104	62	90	179	60	125	59	12	47	18	-
36	1360	2235	1224	142	288	60	274	871	199	415	884	330	36	1359
37	445	1048	170	608	326	370	1043	945	913	302	708	260	281	174
38	2	18	54	-	180	72	-	17	49	122	474	1	-	-
39	417	405	1012	545	148	141	1155	388	678	379	38	23	31	<1
40	37	32	45	48	27	20	73	24	9	15	16	28	8	25

Table 19. Landings of mackerel (t) reported in both drift and set gill nets, of selected FSD's of Nova Scotia, 1970-1983.

FSD	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
18	16	18	33	29	<1	-	56	70	239	184	209	212	281	132
19	345	585	186	253	76	74	264	120	207	179	205	200	46	102
20	247	434	258	402	121	74	409	314	421	231	173	288	115	115
21	137	36	164	197	39	17	24	28	36	7	7	2	13	36
22	421	387	361	301	228	137	255	164	229	403	401	330	206	146
23	210	297	176	320	201	91	328	339	138	165	55	125	119	97
25	823	747	427	279	194	146	248	7	227	307	505	252	224	377
26	164	126	208	238	164	36	81	120	114	96	102	117	25	37
27	134	128	143	262	252	114	174	280	123	96	101	118	69	79
28	200	128	182	496	103	59	134	147	67	30	36	60	11	6
30	74	127	68	66	79	57	77	260	169	213	110	268	247	161
31	491	359	287	447	232	187	255	346	92	65	74	207	65	89
32	181	89	33	45	39	18	53	124	33	17	80	76	21	14
35	1	-	-	-	-	-	-	-	-	-	-	-	-	-
36	<1	5	-	-	-	-	-	<1	-	3	-	-	-	-
37	<1	2	3	-	-	-	3	2	<1	1	4	7	<1	2
38	<1	-	<1	-	-	-	-	-	-	-	-	-	-	-
39	5	2	-	-	-	-	-	-	-	<1	-	-	-	-
40	-	-	-	-	-	-	-	-	2	<1	1	1	<1	<1

Table 20. Number of licensed commercial salmon fishermen by Statistical Area, 1975-83. Percent change, 1975-83, in number licensed is shown.

Area	Number of licensed salmon fishermen									% change
	1975	1976	1977	1978	1979	1980	1981	1982	1983	
A	769	696	655	664	663	651	636	651	618	-20
B	1,399	1,234	1,154	1,148	1,148	1,163	1,126	1,154	1,039	-26
C	765	685	622	621	617	591	550	562	482	-37
D	596	525	469	473	457	446	412	428	386	-35
E	635	518	446	459	445	449	429	416	360	-43
F	314	308	264	261	266	246	246	273	240	-24
G	103	103	86	87	85	81	75	79	72	-30
H	388	335	303	284	296	279	269	278	254	-35
I	226	194	188	186	186	182	179	176	152	-33
J	393	353	324	316	308	294	288	297	273	-31
K	181	157	142	139	140	130	124	128	114	-37
L	185	111	97	100	93	95	94	95	83	-55
M	185	157	144	141	138	137	134	138	124	-33
N	158	130	112	118	116	109	109	109	107	-32
O	729	781	750	818	810	739	731	753	800	+10
Total Nfld.	6,252	5,506	5,006	4,997	4,958	4,853	4,671	4,784	4,304	-30
Prov.	6,981	6,287	5,756	5,815	5,768	5,592	5,402	5,537	5,104	-26

Table 21. Number of licensed gear units (50 fathoms) by Statistical Area, 1975-83. Percent change, 1975-83, in number licensed is also shown.

Area	Licensed salmon fishing gear (in 50 fathom units)									% change
	1975	1976	1977	1978	1979	1980	1981	1982	1983	
A	2,818	2,639	2,473	2,516	2,515	2,480	2,411	2,362	2,478	-12
B	3,962	3,547	3,327	3,371	3,349	3,485	3,390	3,233	3,753	-5
C	2,565	2,354	2,163	2,172	2,169	2,320	1,944	1,706	1,669	-35
D	2,074	2,074	1,876	1,901	1,853	1,834	1,709	1,630	1,511	-27
E	2,567	2,276	1,973	2,066	1,971	2,024	1,954	1,678	1,420	-45
F	1,875	1,823	1,582	1,588	1,617	1,536	1,524	1,555	1,093	-42
G	432	347	292	287	283	268	252	242	245	-43
H	1,330	1,207	1,063	1,069	1,051	1,003	979	903	948	-29
I	594	577	554	576	588	593	598	505	580	-2
J	1,974	1,823	1,691	1,661	1,619	1,556	1,528	1,426	1,155	-41
K	574	501	467	456	455	426	403	364	418	-27
L	412	301	270	264	247	254	253	214	259	-37
M	411	350	322	288	312	314	309	304	461	+12
N	439	372	314	344	345	324	328	316	425	-3
O	3,154	3,558	3,408	3,725	3,795	3,501	3,450	3,531	3,436	+9
Total Nfld	22,027	20,191	18,367	18,559	18,374	18,417	17,581	16,438	16,415	-25
Prov	25,181	23,749	21,775	22,284	22,169	21,918	21,031	19,969	19,851	-21

Table 22. Major changes to management of commercial fisheries for Atlantic salmon in Newfoundland and Labrador, 1975-84.

1975

- New Salmon Licensing Policy implemented.

  Marine features are:

  (1) Freeze on new entrants
  (2) Policy of attrition introduced
  (3) Strict transfer policy introduced.

1976

- Licensing policy modified to eliminate from the fishery persons employed full-time in jobs other than the fishery.

1978

- Reduced fishing season in area Cape St. Gregory south to Cape Ray from May 15 - December 31 to June 1 - July 10; and in area Cape Kay to Pass Island, season reduced from May 15 - December 31 to May 20 - July 10.

- Changes in herring and mackerel fishing season to reduce salmon by-catch - closed period: herring - June 15 to July 31; mackerel - July 1 to July 31.

1979

- To reduce salmon by-catch:

  (1) mesh size in cod trap leaders increased to 177 mm;
  (2) monofilament prohibited in cod traps.

1981

- Commercial salmon season changed from May 15 - December 31 to May 18 - December 31 for all areas except Area J which remained May 20 - July 10 and Area KL which remained June 1 - July 10.

- Closure of Bay of Islands to cod traps.

- Closure of area outside two nautical miles off Port aux Basques.

1982

- Fourteen separate management zones to be implemented (includes Gulf area of Newfoundland). this will result in more specific localized management plans on a zone-by-zone basis if necessary.

1983

- Implement a program to standardize amount of fishing gear per licensed fisherman such that full-time fishermen are limited to 200 fathoms and part-time fishermen limited to 50-100 fathoms. The program was brought in over two years. In 1983 all part-time fishermen who were previously licensed for more than 100 fathoms were reduced to 100 fathoms and; full-time fishermen who were licensed for more than 300 fathoms were reduced to 200 fathoms in 1983 except for those fishermen who had been licensed for more than 300 fathoms; these were reduced to 300 fathoms in 1983 and to 200 fathoms in 1984. Fishermen who had been licensed for less than 200 fathoms had their licensed gear increased to 200 fathoms in 1983.

1984

- Area J_2 - closed to salmon fishing.
- Transfer of licenses restricted to among the immediate family members.
- It became illegal to retain salmon captured incidentally in non-salmon commercial gear.
- Voluntary buy-back of fishing licences.
- No transfer of part-time licences.

OPEN SEASONS

1975-1977	All Areas A to O	May 15 - December 31
1978-1980	Areas A to I; M to O	May 15 - December 31
	Area J	May 20 - July 10
	Areas K, L	June 1 - July 10
1981-1983	Areas A to I; M to O	May 18 - December 31
	Area J	May 20 - July 10
	Areas K, L	June 1 - July 10
1984	Areas A to I; M to O	June 5 - December 31
	Area J_1, K, L	June 5 - July 10
	Area J_2	Closed

TABLE 23. AVERAGE MONTHLY CATCH, 1974-83, OF SMALL SALMON FOR NEWFOUNDLAND STATISTICAL AREA A-O

MONTH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL
5	43.5	768.6	177.7	468.3	2545.6	534.5	141.1	225.6	218.3	816.1	175.8	27.0	116.1	18.8	14.5	6291.5
6	26256.5	15041.6	7086.1	6347.0	3381.7	4347.0	1919.2	5858.5	2898.7	12451.2	6790.2	2459.2	2662.6	939.0	6799.9	105238.4
7	38898.4	22743.0	6908.5	7547.6	2413.9	3882.2	2825.5	6081.7	3021.3	6870.1	2553.2	1212.4	4841.4	4389.8	54174.0	168363.0
8	1075.8	2170.4	764.0	859.6	48.6	154.4	314.1	374.2	441.0	304.5	120.6	15.9	303.6	71.3	12524.7	19542.7
9	3.8	140.6	6.8	1.4	0.0	2.3	0.0	1.6	0.0	0.0	0.0	2.3	3.6	0.0	717.4	879.8
10	1.6	14.3	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	22.4
11	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	66279.8	40878.5	14943.1	15223.9	8392.3	8920.4	5199.9	12541.6	6579.3	20441.9	9639.8	3716.8	7927.3	5418.9	74234.5	300338.0

TABLE 24. AVERAGE MONTHLY CATCH, 1974-83; OF LARGE SALMON FOR NEWFOUNDLAND STATISTICAL AREA A-O

MONTH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL
5	646.5	1590.1	3721.4	3193.8	4649.7	4560.1	35.8	803.7	437.3	13015.4	535.2	89.6	109.8	1.9	99.2	33489.5
6	16864.9	8562.0	6143.7	4471.5	3098.9	3973.0	371.8	2442.1	1787.0	17460.2	1764.0	694.5	780.9	263.0	23832.7	92510.2
7	9870.1	4559.1	1280.9	923.6	798.6	874.3	170.7	888.5	170.6	684.2	413.7	229.4	389.8	486.5	63544.9	85284.9
8	544.6	1746.3	439.7	388.5	66.6	22.1	29.1	11.0	105.3	139.0	38.3	11.1	87.4	29.7	11999.3	15658.0
9	3.9	157.6	11.5	8.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	1480.9	1668.4
10	28.7	169.0	29.8	4.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.3	296.9
11	91.4	241.1	54.7	2.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	396.8
12	0.0	26.7	6.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.2
TOTAL	28050.1	17051.9	11687.8	8993.8	8615.5	9431.9	607.4	4145.3	2500.2	31298.8	2751.2	1024.6	1371.6	781.1	101026.6	229337.8

Table 25. Estimated number of 1-sea-winter Atlantic salmon harvested in Newfoundland and Labrador commercial fisheries by statistical area and year.

Area	1975	1976	1977	1978	1979	1980	1981	1982	1983
A	60303	89300	61651	25731	103080	80078	93998	59428	53542
B	71225	30249	44691	17821	21524	64024	44106	50764	36695
C	28024	6284	18031	11578	5342	18246	14252	18607	13688
D	21994	10204	15236	10193	9661	14568	12843	12006	6432
E	9819	7983	11318	4771	2347	10012	9363	3091	3741
F	14513	9128	7915	1487	2719	10362	6940	3457	4838
G	3395	2833	2454	3702	11445	6153	7024	6706	3891
H	9604	11266	11366	7416	3129	19347	4698	16820	5084
I	9008	10265	3226	4210	4095	5602	3820	10191	3581
J	35959	52492	8601	2352	7976	19399	6849	10521	9965
K	5606	13307	11976	7401	10550	11441	11097	6466	7201
L	2816	2046	2657	2735	3111	8113	4230	4875	4693
M	5937	11986	4437	6046	11038	6668	8300	6528	13082
N	4289	4993	4404	1484	7449	6926	7370	11002	2432
O	111791	78209	69602	33656	45714	103479	114680	79449	48392
Total	394283	340545	277565	140583	249180	384418	349570	299911	217257

Table 26. Estimated number of multi-sea winter salmon caught in Newfoundland-Labrador commercial fisheries by Statistical Area and year.

Area	1975	1976	1977	1978	1979	1980	1981	1982	1983
A	27034	40698	51394	17675	15708	34853	36479	17340	20401
B	22950	14303	20371	14564	7403	24029	26632	16022	11901
C	24380	10811	19150	12785	3849	10609	14366	6089	7265
D	14171	6648	11849	10689	1757	6919	10356	4278	4086
E	12153	7042	11875	8572	1418	10747	11168	2425	3478
F	17669	10628	11754	5901	1881	13953	8644	2238	3438
G	628	310	266	1013	1239	522	834	395	447
H	3304	4269	3677	4782	3106	5916	2226	3526	2767
I	1246	3575	1550	1512	1029	2960	2031	3868	1288
J	44207	70272	35897	18851	18327	22691	19931	20669	15100
K	2431	3748	4958	2572	1462	3416	1573	1432	2218
L	858	825	1524	991	476	1818	687	993	833
M	1444	1620	2166	1225	926	1651	1227	887	1523
N	843	283	1431	594	477	1164	1179	969	446
O	114521	131540	116980	91473	52238	124955	112334	83243	59719
Total	287839	306572	294842	193199	111296	266203	249667	164374	134910

Table 27 Standardized weeks used for processing Atlantic salmon commercial catch statistics.

WEEK	MONTH	DAYS	
1	January	01-07	
2	January	08-14	
3	January	15-21	January
4	January	22-28	
5	February	29-04	
6	February	05-11	
7	February	12-18	February
8	February	19-25	
9	March	26-04	
10	March	05-11	
11	March	12-18	March
12	March	19-25	
13	March	26-01	
14	April	02-08	
15	April	09-15	
16	April	16-22	April
17	April	23-29	
18	May	30-06	
19	May	07-13	
20	May	14-20	May
21	May	21-27	
22	May	28-03	
23	June	04-10	
24	June	11-17	
25	June	18-24	June
26	June	25-01	
27	July	02-08	
28	July	09-15	
29	July	16-22	July
30	July	23-29	
31	August	30-05	
32	August	06-12	
33	August	13-19	August
34	August	20-26	
35	August	27-02	

Table 27 (Cont'd)

WEEK	MONTH	DAYS	
36	September	03-09	
37	September	10-16	
38	September	17-23	September
39	September	24-30	
40	October	01-07	
41	October	08-14	
42	October	15-21	October
43	October	22-28	
44	November	29-04	
45	November	05-11	
46	November	12-18	November
47	November	19-25	
48	November	26-02	
49	December	03-09	
50	December	10-16	
51	December	17-23	December
52	December	24-31	

Table 2f USA list of salmon rivers utilized for catch and run statistics.

Connecticut River	-	Connecticut USA
Pawcutuck River	-	Rhode Island
Merrimack River	-	Massachussets
Androscoggin River	-	Maine
Ducktrap River	-	"
Kennebec River	-	"
Sheepscot	-	"
Penobscot	-	"
Union	-	"
Narraguagus	-	"
Pleasant	-	"
Machias	-	"
E. Machias	-	"
Dennys	-	"
St. Croix	-	Maine & New Brunswick
Other	-	

US Tributaries to Saint John River, Canada

Table 29. DESCRIPTION OF MANAGEMENT ZONES, NEW BRUNSWICK AND PRINCE EDWARD ISLAND

Management zone	Statistical districts	Description
1 Restigouche	63, 64, 65, 68.	All coastal waters of Restigouche and Gloucester counties that border on the Gulf of St. Lawrence and Chaleur Bay, and all waters of the rivers and any tributaries that flow into that portion of Chaleur Bay and the Gulf of St. Lawrence bounded by Restigouche and Gloucester counties.
2 Miramichi[1]	70, 71, 72, 73, 75, 76, 77, 78.	All coastal waters of Northumberland, Kent and Westmorland counties that border on the Northumberland Strait and Gulf of St. Lawrence, and all waters of the rivers and any tributaries that flow into that portion of Northumberland Strait and the Gulf of St. Lawrence bounded by Northumberland, Kent and Westmorland counties.
3 Saint John	48, 49, 52, 53, 55, 56, 57, 58, 59, 60, 61, 79, 81.	All coastal waters of Charlotte, Saint John, Albert and Westmorland counties that border on the Bay of Fundy, and all waters of the rivers and any tributaries that flow through Madawaska, Victoria, Carleton, York, Sunbury, Queens, Kings, Charlotte, Saint John, Albert and Westmorland counties and empty into that portion of the Bay of Fundy bounded by Charlotte, Saint John, Albert and Westmorland counties.
4 Prince Edward Island	82, 83, 85, 86, 87, 88, 92, 93, 95, 96.	All coastal and inland waters of Prince, Queens and Kings counties.

[1]District 68 belongs in Zone 1 by description but most fishermen fish under Zone 2 regulations and quotas. District 68 catch is included in Zone 2 in this report.

Table 29. (cont'd) DESCRIPTION OF MANAGEMENT ZONES, NOVA SCOTIA

Management zone	Statistical districts	Description
5 Cape Breton East	1, 4, 6, 7, 8, 9.	All coastal and inland waters of Victoria, Cape Breton and Richmond counties excepting that portion of Victoria County which lies northwest of a line from Cape North to the county border.
6 Gulf Shore, N.S.	2, 3, 10, 11, 12, 13, 45, 46.	All coastal waters of Inverness, Antigonish, Pictou, Colchester and Cumberland counties which border on the Northumberland Strait and Gulf, and all waters of the rivers and any tributaries which flow into that portion of the Northumberland Strait bounded by Inverness, Antigonish, Pictou, Colchester and Cumberland counties.
7 Eastern Shore	14, 15, 16, 17, 18, 19, 20, 21.	All coastal waters of Guysborough County and that portion of Halifax County east of the city of Halifax, and all waters of the rivers and any tributaries which flow into that portion of the Atlantic Ocean bounded by Guysborough County and Halifax County east of the city of Halifax.
8 Upper Bay of Fundy	24, 35, 39, 40, 41, 42, 43, 44.	All coastal waters of Annapolis, Kings, Hants, Colchester and Cumberland counties, which border on the Bay of Fundy, and all waters of the rivers and any tributaries which flow into that portion of the Bay of Fundy bounded by Annapolis, Kings, Hants, Colchester and Cumberland counties.

Table 29. (cont'd) DESCRIPTION OF MANAGEMENT ZONES, NOVA SCOTIA

Management zone	Statistical districts	Description
9 South Shore	22, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, 37, 38.	All coastal waters of Lunenburg, Queens, Shelburne, Yarmouth and Digby counties and that portion of Halifax County west of the city of Halifax, and all waters of the rivers and any tributaries which flow into that portion of the Atlantic Ocean bounded by Lunenburg, Queens, Shelburne, Yarmouth and Digby counties and Halifax County west of the city of Halifax.

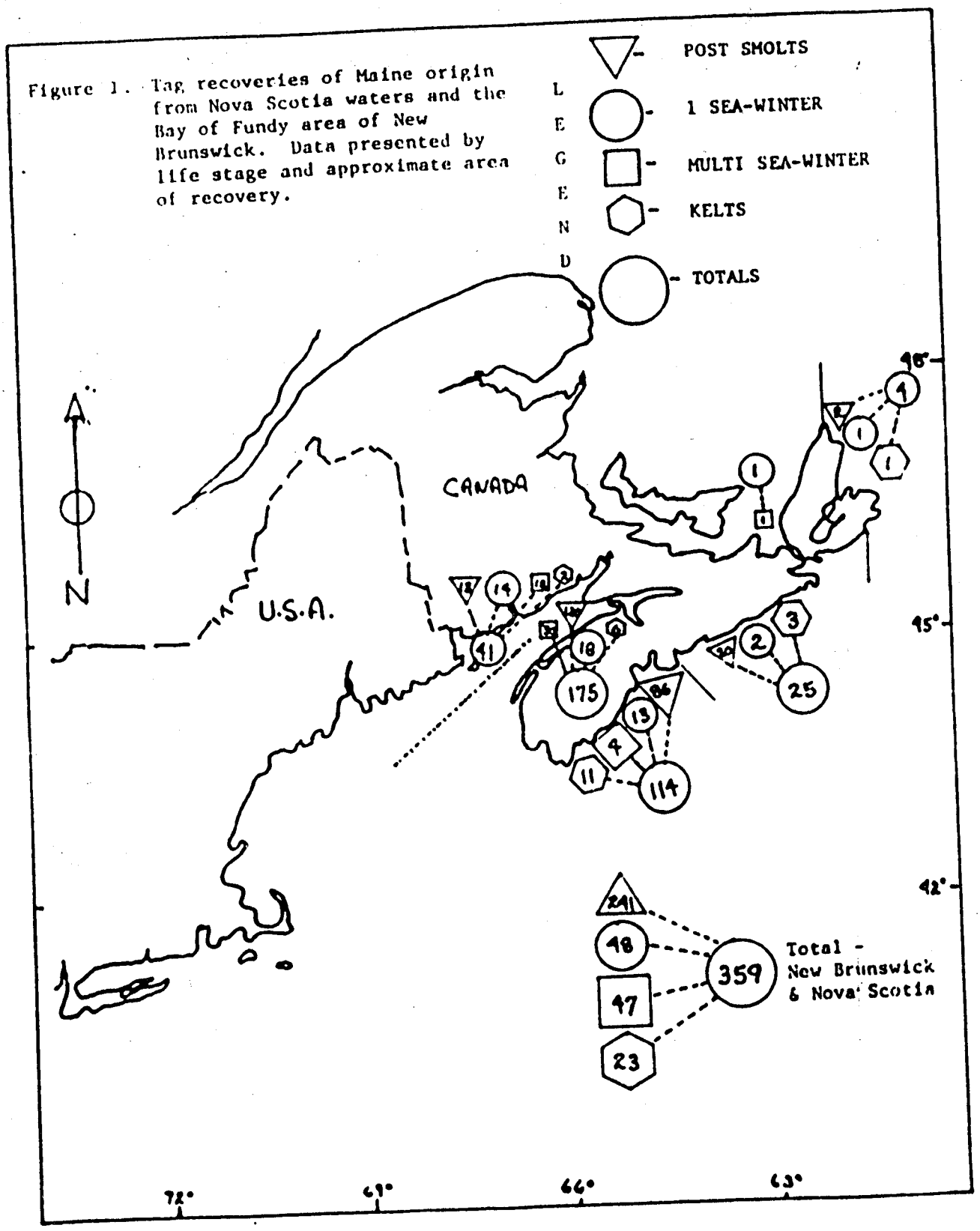


Figure 1. Tag recoveries of Maine origin from Nova Scotia waters and the Bay of Fundy area of New Brunswick. Data presented by life stage and approximate area of recovery.

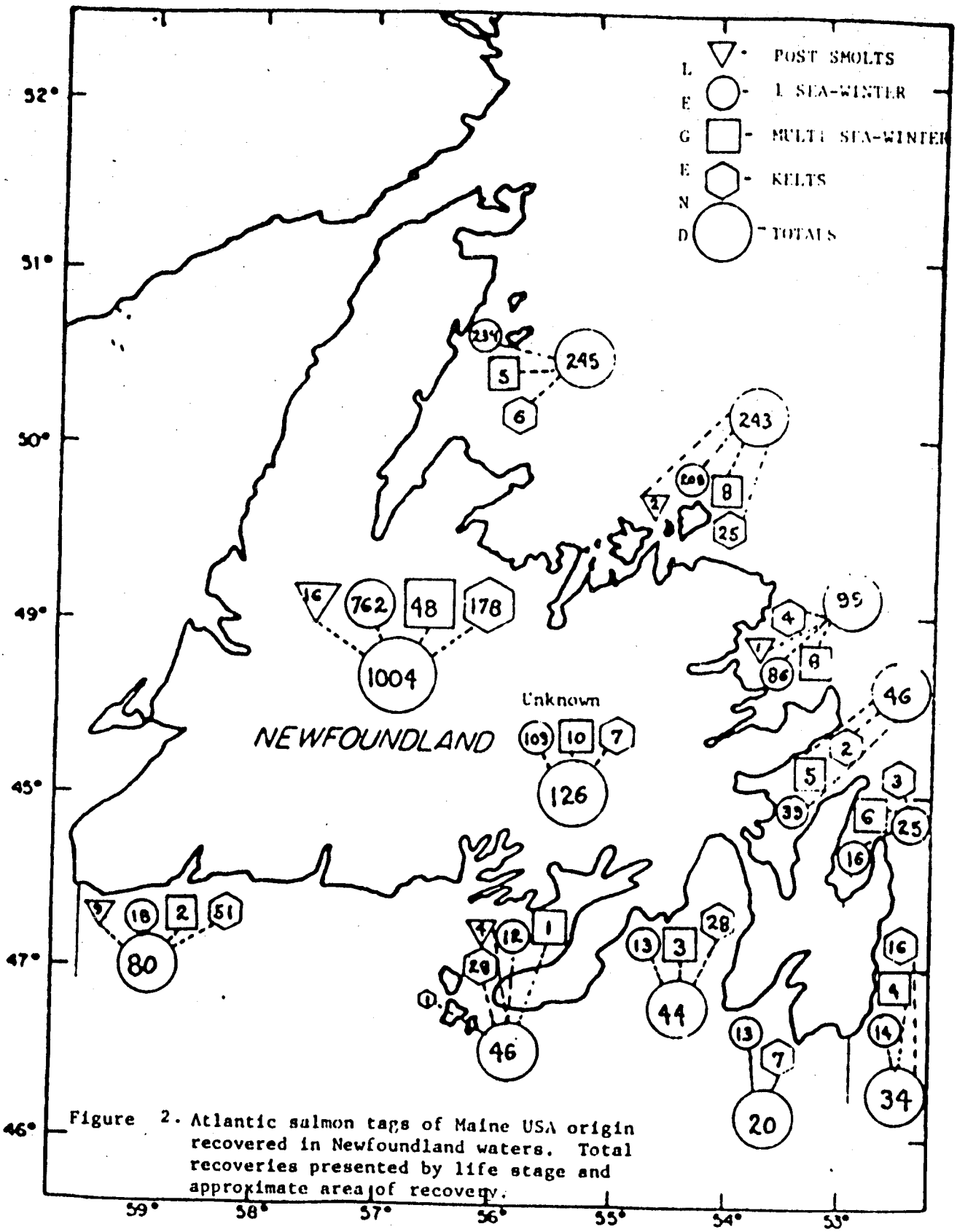


Figure 2. Atlantic salmon tags of Maine USA origin recovered in Newfoundland waters. Total recoveries presented by life stage and approximate area of recovery.

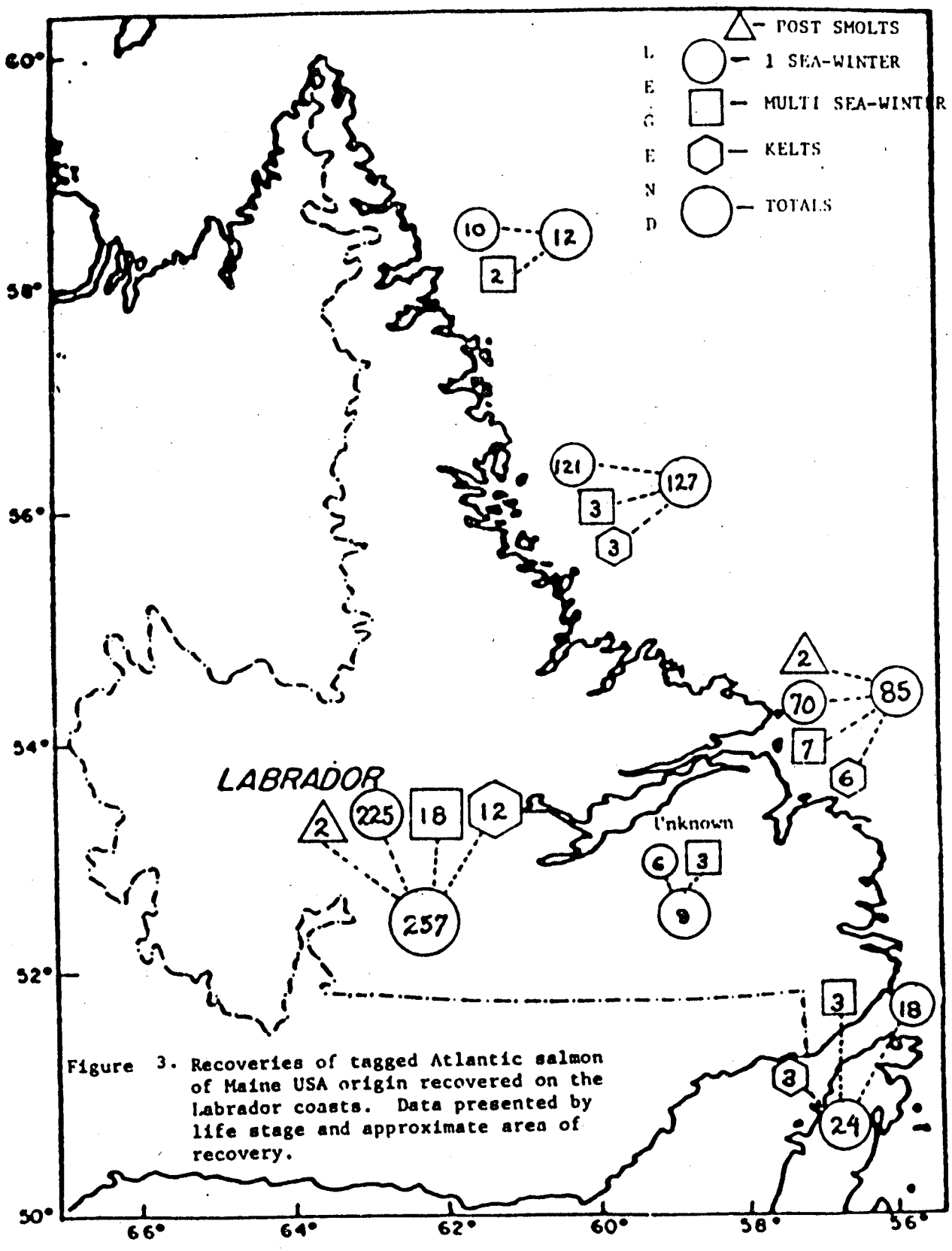


Figure 3. Recoveries of tagged Atlantic salmon of Maine USA origin recovered on the Labrador coasts. Data presented by life stage and approximate area of recovery.

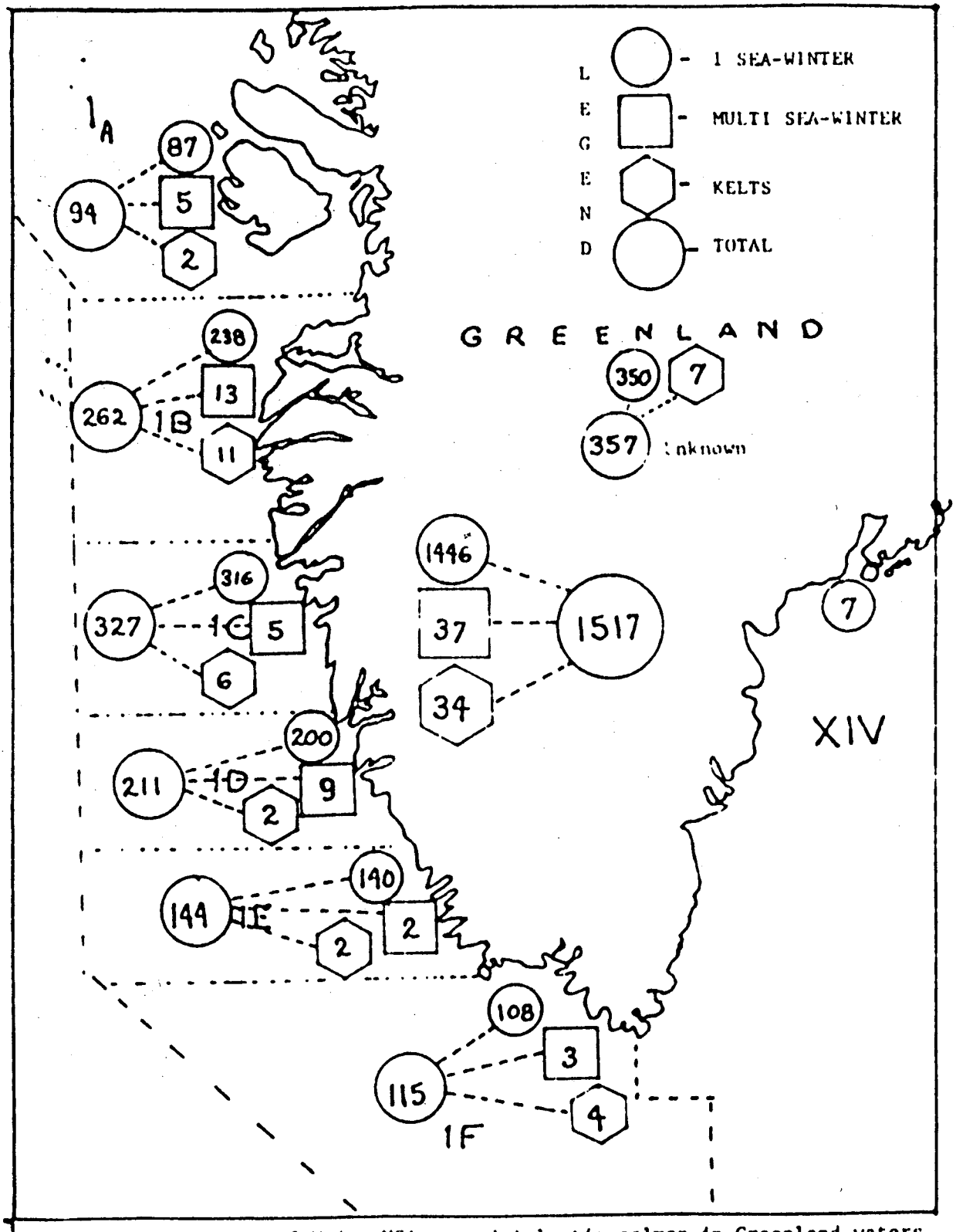


Figure 4. Recoveries of Maine USA tagged Atlantic salmon in Greenland waters. Total recoveries presented by life stage and NAFO divisions.

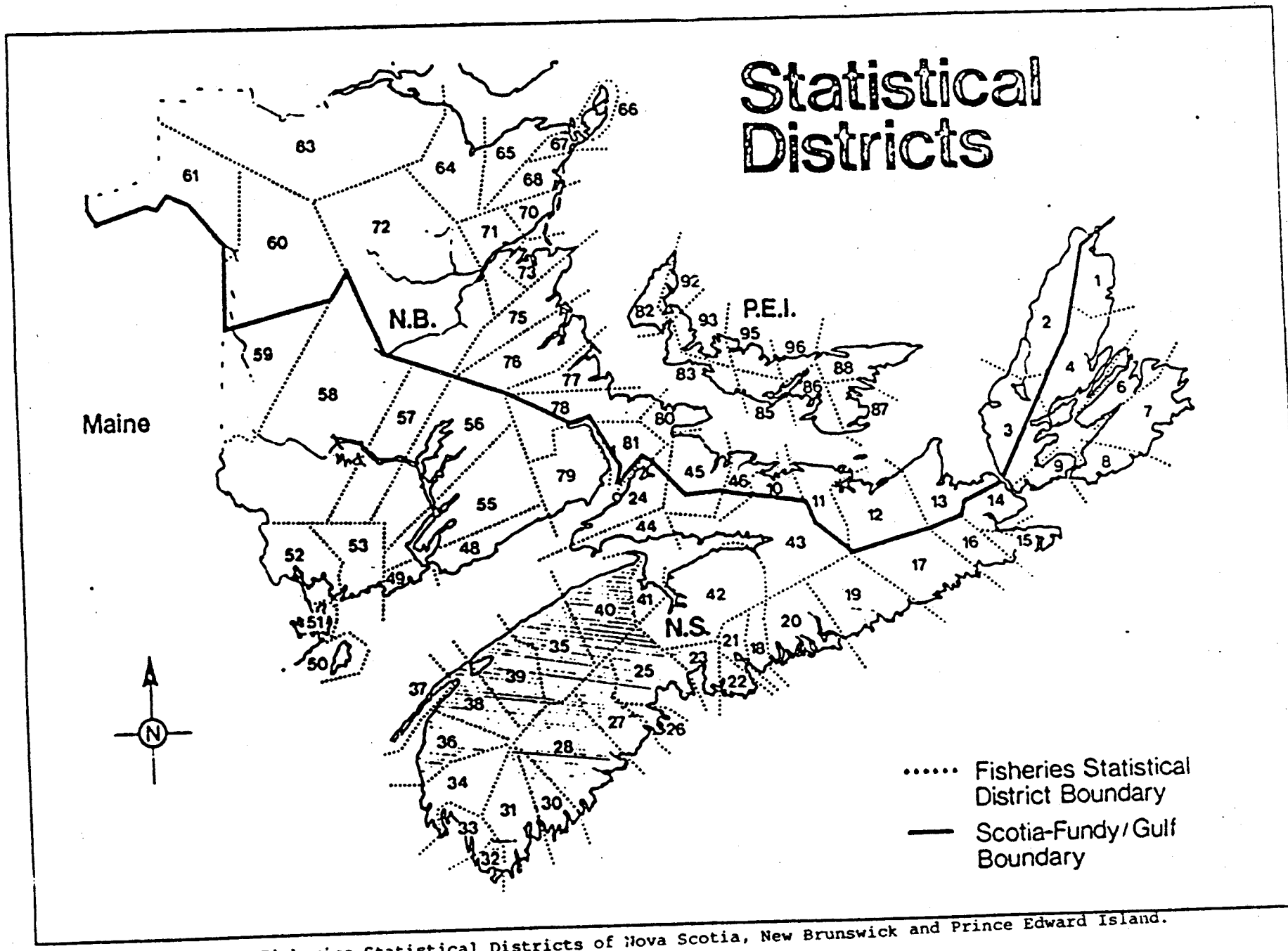


Figure 5. Fisheries Statistical Districts of Nova Scotia, New Brunswick and Prince Edward Island.

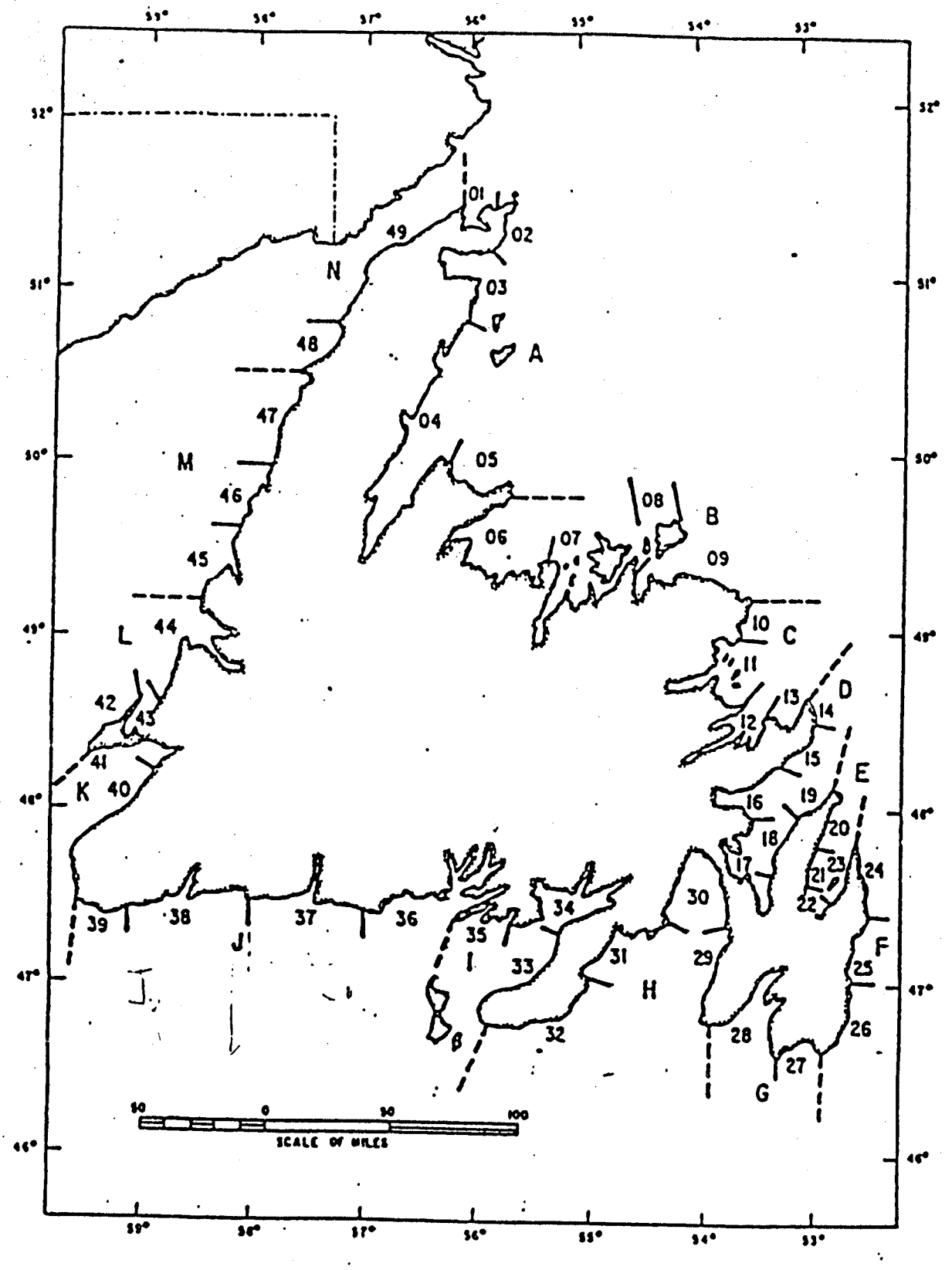


Fig. 6. Boundaries of Statistical Section (numerically indicated) and Statistical Areas (alphabetical) in insular Newfoundland.

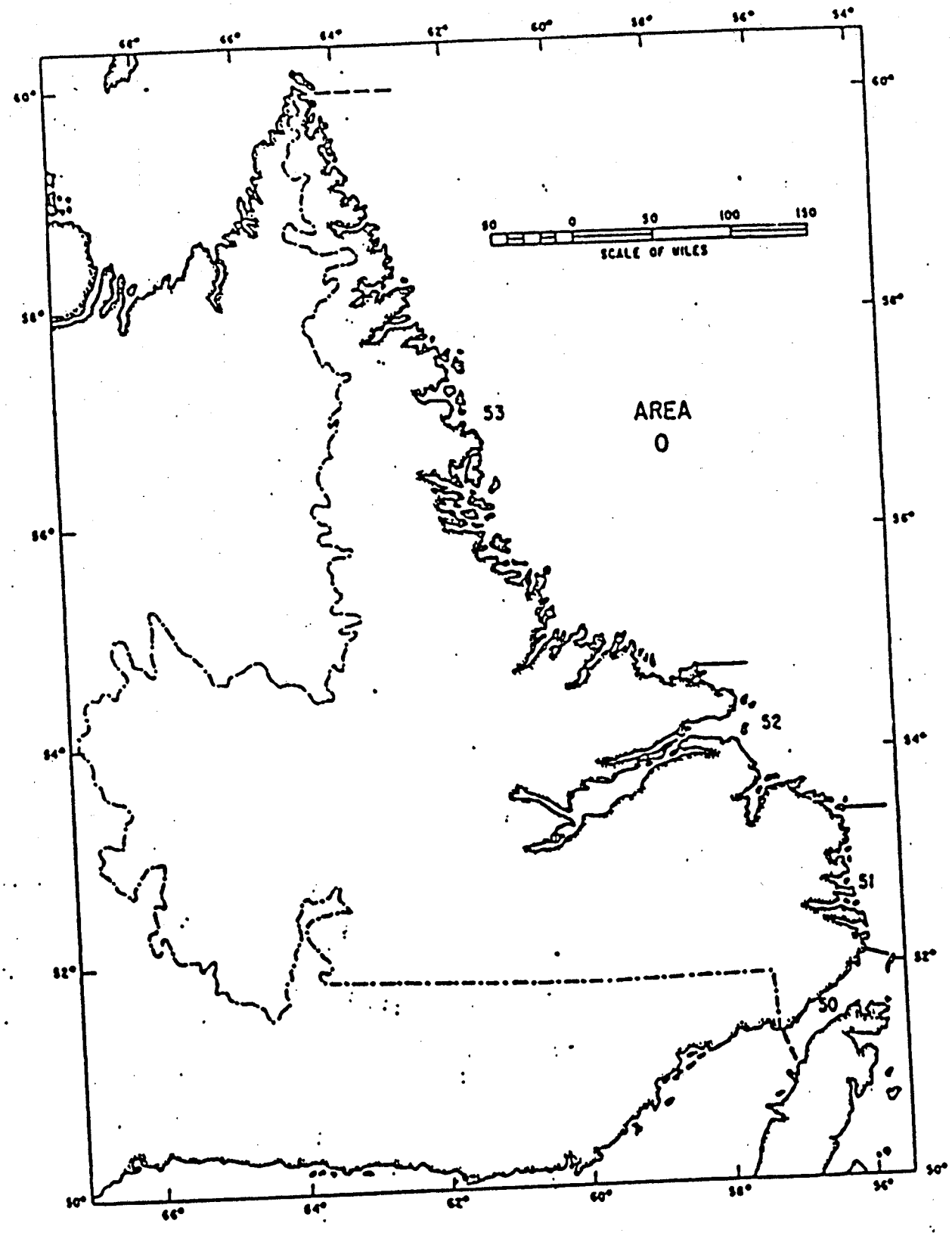
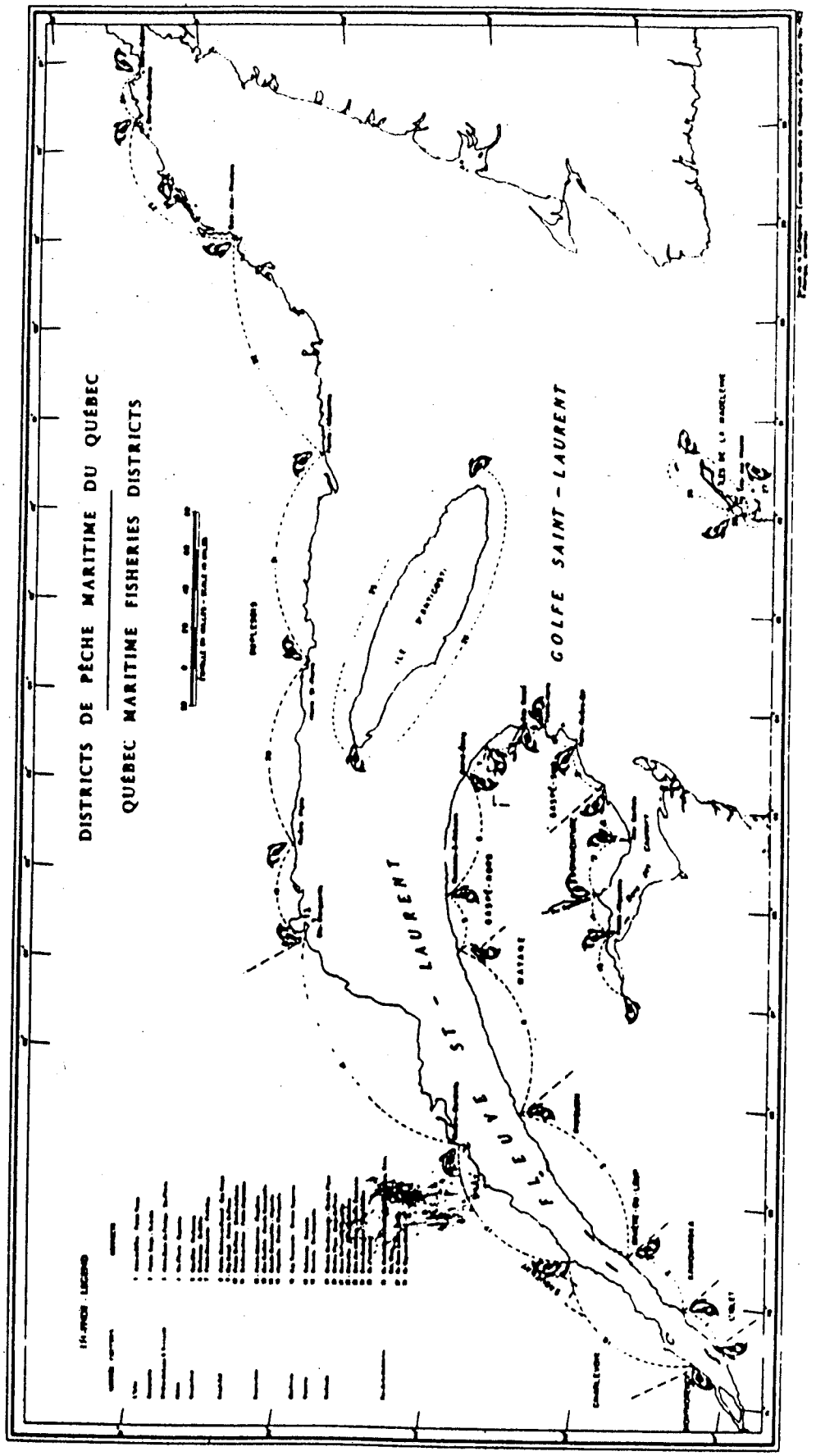


Fig. 7. Boundaries of Statistical Section (numerically indicated) and Statistical Areas (alphabetical) in Labrador.

FIGURE 8


DISTRICTS DE PÊCHE MARITIME DU QUÉBEC
QUÉBEC MARITIME FISHERIES DISTRICTS
GOLFE SAINT - LAURENT
FLEUVE ST - LAURENT

ANNEX 10

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)17

REPORT OF MEETING OF THE WORKING GROUP ON NORTH ATLANTIC SALMON 6-8 MAY 1985, BANGOR, MAINE, USA

This report not to be quoted without reference to the Council*

International Council for the
Exploration of the Sea

C.M. 1985/Assess: 19

REPORT OF MEETING OF THE WORKING GROUP ON NORTH ATLANTIC SALMON

Bangor, Maine USA May 6-8, 1985

* General Secretary
ICES
Palaegade 2-4
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Denmark

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Report of Meeting of
Working Group on North Atlantic Salmon

0 INTRODUCTION

The Working Group on North Atlantic Salmon met at the Atlantic Sea-Run Salmon Commission, Bangor, Maine, U.S.A. from May 6-8, 1985. The following members participated:

V. C. Anthony	USA
E. T. Baum	USA
E. M. P. Chadwick	Canada
W. G. Doubleday	Canada (Chairman)
C. P. Goodyear	USA
A. M. Lange	USA
T. L. Marshall	Canada
A. L. Meister	USA
D. J. Meerburg	Canada
T. R. Porter	Canada
P. J. Rago	USA
D. G. Reddin	Canada

1 MAIN TASKS

ICES convened a special meeting of the Working Group to provide a timely response to a request from the North Atlantic Salmon Conservation Organization (NASCO) to advise on the areal and seasonal distribution of Canadian salmon catches and catches of U.S. origin salmon in Canadian fisheries. The analysis was to include all years back at least as far as 1970. In view of the brief interval between receipt of the request and the May, 1985 meeting of ACFM, the Working Group did not extend its substantive discussions beyond this one major topic. Other matters of interest to the North American Commission of NASCO are to be considered by the Working Group in the autumn of 1985.

2. AREAL AND SEASONAL DISTRIBUTION OF CANADIAN SALMON CATCHES AND CATCHES OF U.S. ORIGIN SALMON IN CANADIAN FISHERIES

The Working Group reviewed newly compiled information regarding distribution of salmon catches and returns of tags of U.S. origin from Canadian fisheries, concentrating on the Newfoundland and Labrador fisheries since they account for the majority (80%) of Canadian returns of U.S. salmon tags. Total catches (1974-83) and tag returns (1970-83) by year, month, and Statistical Area (A-O) were examined.

2.1 USA Tagging Of Hatchery-Reared Smolts

Recaptures of tagged hatchery-reared smolts released to Maine rivers provided the only data available to assess the area and season distribution of catches of U.S. origin salmon in Canadian fisheries. Recaptures of Carlin tagged hatchery-reared smolts released into the Connecticut River were not used in this report (Anon. 1985).

Since 1970, 618,350 smolts have been tagged with Carlin tags and released in the State of Maine (Table 1). These Atlantic salmon were reared in 2 federal and 1 state hatcheries in Maine and stocked in the Machias, Narraguagus, Union, and Penobscot rivers. A modified Carlin plastic tag with polyethelene attachment was utilized in most years, although stainless steel wire was also used for attachment purposes in Maine in 1972 and 1973.

Most Canadian commercial fishermen typically return tags directly to the Maine Atlantic Sea-Run Salmon Commission for a reward (currently $8.00), or to a Canadian federal official for eventual forwarding to the State of Maine or Connecticut. Tags from salmon taken in the Greenland area are returned by the Ministry for Greenland, although some are recovered from salmon landed in Denmark and Norway. Government agencies in those countries usually provide whatever information is available at that time. In some instances very detailed recapture information is available; however, in many other instances only the year and general area of recapture is provided.

Homewater tag returns were obtained primarily by capturing adult salmon returning to spawn in their rivers of origin. Fishway traps at hydroelectric dams allow tagged salmon that escape sport fisheries to be counted. There is no directed commercial fishery for Atlantic salmon in the USA, and a small incidental catch in fisheries for other species. In Maine, a voluntary angler registration system assures that nearly all tagged salmon are reported to fishery agencies.

Figures 1 and 2 illustrate the statistical areas and sections used for reporting catches and tags in the Province of Newfoundland and Labrador.

2.2 Overview of Tagging Data

Tag data were summarized from the basic data cards stored at the Atlantic Sea-Run Salmon Commission for 1970-83. To provide insight into the amount of detailed information available for each tag return, and the extent of returns with unknown date of capture, two randomly selected years of raw tag data were examined by the Working Group. A major concern regarding the summarization of the data was imputing the exact date of capture when it was not reported by the fisherman. The exact date was considered to be important especially for fish taken late in the year when there appeared to be a large proportion of USA origin salmon in the catch. The Working Group examined original coding sheets and tag return envelopes for smolts released in 1974 and 1981. It was found that 7% of tag returns from the 1974 release and 10% of tag returns for the 1981 release did not have the month when the tag was recaptured. Of 16 tag returns with unknown date of capture only one tag was inferred to be from the fall fishery of Newfoundland. The Working Group concluded that the non-recording of tag recovery date was not an important error, especially for salmon captured in the fall season.

Distributions of sea ages of recaptured USA hatchery-reared salmon smolts are given in Table 2. Most recaptures in Greenland (95%), Newfoundland (91%) and Labrador (91%) were of 1-SW salmon; most recaptures in other Canadian fisheries (71%) were of post-smolts and most of those occurred in 1972. Most homewater recaptures (89%) were of 2-SW salmon.

Distributions of tag recaptures among standardized months (Anon. 1985) and Statistical Areas of Newfoundland and Labrador for 1979-83 indicated that most (82%) of the recaptures were in Statistical Areas A-D and O (Table 3). Most of the south coast recoveries (Areas H-J) were of salmon tagged as adults.

2.3 Overview of Newfoundland and Labrador Catch Data

Catch data were obtained from two sources; sales slips and local sales estimates. Sales slips or purchase slips were supplied to fish buyers by Fisheries Statistics and Systems Branch, Department of Fisheries and Oceans and designed to include such information as daily catch (lbs.) by species and size, price per unit weight, fisherman's name, buyer's name, community where fish were landed and type of fishing gear used. In addition, buyers were asked when purchasing salmon to record the number and size of the salmon and state of processing in which they were purchased.

Local sales represent those salmon landings not recorded on purchase slips. These include salmon eaten by the fishermen, given away, or sold directly to consumers. For each community this quantity was estimated monthly by the local fisheries officers and submitted to Fisheries Statistics and Systems Branch on supplementary purchase slip B.

There are two size categories: small salmon (1SW - one sea-winter) are those less than 2.7 kg, large salmon (MSW - multi-sea-winter) are equal or are greater than 2.7 kg. Small salmon are assumed to be one-sea-winter while large salmon are assumed to be multi-sea-winter in reports to ICES.

Catches were available by Statistical Area and month from 1974 to 1983. A summary of average catch by area and month over years is presented in Table 4. Seventy-three percent of the catch was taken in Statistical Areas A-D and O. Although the catch during September to December represents only 1% of the total catch, 23% of USA tag recoveries with known month were from those months (Table 3).

2.4 Comparisons of Catch and Tag Recoveries by Season and Area

Percentage of tags recaptured in Newfoundland Statistical Areas A, B, C, D, and O to total tags recaptured in Newfoundland and Labrador for each smolt class were examined by month for the years 1971-83 (Table 5). These years correspond to the year following release of hatchery smolts. It was assumed that the small percentage of MSW salmon and previous spawners included in the totals would not bias interpretation of these data.

Percentage distributions of Newfoundland and Labrador catches by month and Statistical Area are presented in Table 6 for the 1974 to 1983 fisheries.

Interannual changes in geographical patterns of tag recaptures and catches are presented in Tables 7 and 8. There was considerable interannual variation in the proportion of tag returns from each Statistical Area. Statistical Areas A, B, and O usually had higher percentages of recoveries than did other areas. There was less variation between years in the percentage of catch taken in each Statistical Area (Table 8). The greater variation in Table 7 is partly due to the low number of tags returned in some years. Fifty-nine percent of tag recoveries were of the 1973, 1974 and 1979 releases. Total returns per 1000 marks are highly variable from year to year (Table 9). Because homewater returns include observations at fish traps it is assumed that there is a nearly complete census of the return of marks to homewater areas. As a consequence, the large variations in total returns per 1000 marks is largely a result of changes in survival from stocking to recovery. There is a significant positive correlation between returns/1000 marks from the homewater and distant fisheries for smolts released in 1970-1982 ($r = .79$, $n = 12$). This result suggests that annual variations in survival from the time of smolt release until they enter the foreign fishery is primarily responsible for the year to year variation in returns/1000 marks released. Other factors that would influence the distributions and proportions of marked fish that are reported include changes in catchability, changes in the reporting rate of tags recovered, and changes in catch levels.

The Working Group looked in more detail at data from the Northeast section of Newfoundland to see if tags were recovered more at headlands than in the bays. There was no evidence that most of the catch of USA fish were taken in Statistical Sections which were predominantly headlands (i.e. Sections 02, 09, 10, 14) (Table 10). It appeared that most of the tags were recovered in Sections 04, 06, 07 and 53, which contain bays. Statistical Sections, however, do not provide sufficient detail to make conclusions regarding the importance of recaptures of USA origin salmon at headlands versus in bays.

The Working Group hypothesized that tag returns of Maine origin Atlantic salmon should be proportional to commercial landings by Canadian fishermen (Table 11). To test this hypothesis, total tag returns for the period 1974 to 1983 were compared to average commercial catches (in kg) by 23 statistical sections for Newfoundland in areas A, B, C, D and O. Linear regression analyses (Table 12) suggested that about one-fifth of the variance ($r = .2049$) in total tag returns was explained by variations in commercial catches when all 23 statistical sections were considered. The low overall coefficient of determination was apparently due to the independence of tag returns and catches in Labrador (Area O). When these data were excluded, the coefficient of determination rose to 0.8190 for the 19 sections of insular Newfoundland. Further regression analyses for each area within insular Newfoundland suggested strong linear relations for areas A, C, and D and a somewhat weaker relation for area B. It was noted that higher correlation occurred for areas A and D where local production of salmon was low relative to catches and lower correlation occur in areas B and O when local production was relatively high. The lack of a relationship between tag returns and catch in area O may be related to migration patterns of salmon returning from Greenland. Most tags are returned from section 53 whereas the bulk of the catch comes from section 51. The regression slope for areas A - D (pooled) suggests that 1 tag is returned for every 1000 kg of commercial catch. If an average weight of 2.8 kg is assumed, then the tag return rate of about 1 per 3500 fish.

No statistically significant relationship was found between annual catch in a Statistical Area and tag recoveries in that Area for the corresponding smolt class. This is partly due to wide variation in survival of tagged smolts and to the small contribution of Maine origin salmon to total catches.

The monthly distributions of total catch by Canadian commercial fishermen and total tag recoveries of Maine origin salmon caught in Newfoundland are summarized in Figures 3 to 5. Average percent values of total catch in insular Newfoundland (Fig. 3) peak in June and decline steadily thereafter. Tag recoveries, however, have two peaks, one in July and one in November. Both catches and tag recoveries are low in September. This probably reflects the absence of fish from the area as well as lack of fishing effort.

In contrast to Insular Newfoundland, the percent of catch and tag returns in Labrador were unimodal (Fig. 4). Commercial catches tend to peak in July whereas tag recoveries peak one month later. Neither catches nor tag recoveries were observed in October through December.

Further analysis of the insular Newfoundland catches and tag recoveries indicated that Areas A to D (Fig. 5) had similar distributions to those observed in Fig. 3. It was noted that 85% tags returned for insular Newfoundland in Areas A to D and 56% of the total catch occurred in these areas. Peak tag returns lag peak catches by one month in June and July, respectively. About one-third of the tag recoveries occurred in October to December, whereas less than one-half of one percent of the average landings occur in the same period.

On the average less than one percent of total Newfoundland-Labrador commercial catch was caught in the fall (September 1 to December 31) for the period 1974 to 1983 (Fig. 6). This fraction of the total catch has fluctuated over an eightfold range. For the past 4 years the total catch has been declining whereas the total catch for the autumn fishery has remained constant. Hence an apparent trend of increasing percentage catch in the fall fishery has occurred. The percent of tag recoveries although variable (7 to 48%) has had no apparent trend over time. An average of about 28% of the tagged Maine-origin fish have been recaptured from September to December in the Newfoundland and Labrador fishery.

Figure 7 shows the percent of average total landings of Atlantic salmon and percent tag recoveries from Maine-origin salmon in statistical areas of Newfoundland and Labrador. Areas A, B and O account for 75% of tag recoveries and 64% of the total catch. The ratio of tag returns to commercial landings is lower in areas E-N combined and area O than in other areas of Newfoundland, particularly A and B. It was noted that there were wide fluctuations in percentage of annual tag returns and commercial catches in each area.

3 OTHER BUSINESS

3.1 Research Needs

The Working Group discussed various issues relevant to its remit which were not yet examined which should be discussed at the next Working Group meeting. A number of assumptions used by Anon. 1985 to calculate the number of USA origin salmon harvested in the Canadian fisheries have been questioned. The Working Group recommends that they be further examined at the September 1985 meeting with the view that they refine these estimates. These issues were:

1) description of sport fisheries for Atlantic salmon in Maine, USA;

2) catch and effort statistics for these sport fisheries by river system, by sea age;

3) Maine homewater returns (tagged and untagged) from fisheries and traps should be enumerated by river, year of release, and by sea age;

4) Newfoundland catch data by month from 1970 to 1973;

5) a sensitivity analysis of the ratio model used in the September 1984 Work Group report;

6) weight and length of 2SW fish returned to Maine homewaters (both tagged and untagged);

7) estimates of catches of Maine origin salmon in some areas and years (Anon 1985) exceeded reported catches in the fall fishery. The reasons for this should be examined;

8) the effectiveness of the tag recovery network;

9) a reevaluation of the reporting rate of tags;

10) non-catch fishing mortalities used for Newfoundland fisheries should be reevaluated;

11) the estimation of tag loss rates should be examined;

12) the ratio of tag returns in homewaters to the total returns of salmon to all Maine rivers should be reexamined. The tag returns from anglers should be evaluated for reporting rates, tag loss, or for exploitation rates on rivers without fish counting traps;

13) the exploitation rates for Maine sport fisheries for salmon should be reevaluated;

14) the extent of bycatches of Atlantic salmon in the fisheries of other species and poaching should be evaluated;

15) further examination of pre-1970 tagging data and catches was not considered by the Working Group to merit high priority.

3.2 Tag Recoveries at Greenland

In 1984, ten tags were recovered at West Greenland from salmon tagged in the USA the previous year. Of these ten, seven were recovered by a Canadian scientist sampling in Holsteinsborg. This led the Working Group to question the efficiency of the tag reporting network at West Greenland.

3.3 Research Coordination

The USA plans to increase its tagging program both with Carlin and coded wire tags, beginning in 1986. The procedures for recovering these tags should be discussed fully at the next Working Group meeting.

3.4 Next Meeting

The Working Group was pleased to accept the invitation of the National Marine Fisheries Service to host the next meeting of the Working Group at Woods Hole, Mass. September 16-20, 1985.

APPENDIX I

ICES Working Group on North Atlantic Salmon
(May 6-8, 1985)

Agenda

1. Call to order
2. Adoption of agenda
3. Distribution of meeting documents
4. Organization of meeting and appointment of rapporteurs
5. Question posed by NASCO related to the North American Commission:
   - ICES is requested to advise on the area and season distribution of Canadian salmon catches and catches of U.S. origin salmon in Canadian fisheries, the analysis to include all years back at least as far as 1970.
6. Other business
7. Adoption of report

Appendix II

DOCUMENTS SUBMITTED TO THE WORKING GROUP:

1. Marshall, T. L. and J. H. Ingram. Tag returns and estimated contribution of Saint John River salmon to distant fisheries, 1974-1983.

2. Meister, A. L. Tabulation of homewater and distant tag recovery data for Atlantic salmon of Maine, USA, origin, 1966-1984.

3. Meister, A. L. Graphs and tables of tag recovery data for Atlantic salmon of Maine, USA, origin in Statistical Areas A-D Newfoundland, May to December, 1970-1983.

4. Porter, T. R., D. G. Reddin and G. Somerton. Summary of Atlantic salmon commercial catch statistics for Statistical Areas A to O, Newfoundland and Labrador, 1974-83.

5. Rideout, S. G., P. J. Rago and C. P. Goodyear. Summary of Carlin tagging studies on Atlantic salmon in the Connecticut River, 1970 to 1978.

Appendix III

References

Anonymous. 1985. Report of meeting of the Working Group on North Atlantic salmon., ICES. C.M.1985/Assess:5,55p.

Table 1. Recoveries of tagged hatchery-reared Atlantic salmon smolts released in the rivers of Maine, USA. Data presented by geographic area of recovery and year of release for the years 1970-1983.

	YEAR OF RELEASE																
Recoveries*	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983+	Average 70-75	Average 76-82	TOTALS
Tagged smolts released	48190	29830	48480	38030	41750	28980	24980	48800	0	59750	49760	49900	49950	99950	39210	47190	618350
E. & W. Greenland	403	86	112	352	126	38	11	9	-	68	38	3	2	10	186	22	1258
Labrador	14	9	9	8	21	26	3	5	-	89	16	24	9	14	15	24	247
Newfoundland	47	18	21	113	83	62	12	1	-	240	33	66	19	22	57	62	737
Quebec	0	1	0	0	0	0	0	0	-	4	0	0	0	0	<1	1	5
N.S. & N.B.	14	3	127	5	14	16	1	3	-	14	6	9	2	2	30	6	216
N.E. & Atl. States	0	0	2	1	0	0	0	0	-	0	2	0	0	0	<1	<1	5
TOTAL DISTANT	478	117	271	479	244	142	27	18	-	415	95	102	32	48	289	115	2468
HOMEWATER	281	168	187	381	166	79	95	36	-	465	255	158	55	8	210	177	2334

+ Tag recoveries not complete

* Tag recoveries include returns from all fisheries directed for salmon, and also include by catch and catches from research vessels. Homewater recoveries also include observations from fish counting traps.

Table 2. Recoveries of hatchery-reared Atlantic salmon tagged as smolts in Maine, USA. from the fisheries of Greenland, Canada and homewaters, USA. Data presented by year of smolt release and sea-age at recovery, 1979-1984.

Release Year	Greenland		Labrador			Newfoundland			Other Canada					Homewaters				TOTAL
	1SW	MSW	OSW	1SW	MSW	OSW	1SW	MSW	OSW	1SW	MSW	Unk.	PS	1SW	2SW	3SW	PS	
1970	387	16	1	12	1	4	36	6	3	3	8	1	0	5	270	6	0	759
1971	79	7	0	7	2	2	5	11	2	0	2	-	0	-	152	16	0	285
1972	103	9	0	7	2	2	18	1	124	1	4	-	0	3	176	8	0	458
1973	338	14	0	7	1	3	97	13	0	4	2	-	0	9	371	1	0	860
1974	122	4	0	20	1	0	82	1	12	2	0	-	0	5	161	0	0	410
1975	36	2	0	24	2	1	56	5	0	13	3	-	0	8	69	2	0	221
1976	10	1	0	3	0	0	11	1	0	1	0	-	0	13	82	0	0	122
1977	9	0	0	4	1	0	1	0	2	1	0	-	0	3	31	0	2	54
1978	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1979	67	1	1	82	6	1	234	9	6	8	0	-	0	82	378	4	1	880
1980	37	1	0	14	1	0	27	7	4	1	3	-	0	25	229	1	0	350
1981	1	2	0	22	2	3	63	0	3	5	1	-	0	51	107	0	0	260
1982	1	1	0	9	0	2	16	0	2	1	0	-	1	6	48	NA	NA	87
1983	10	NA	0	14	NA	0	22	NA	1	1	NA	-	0	8	NA			56
1984	NA		0	NA		0	NA		1	NA		-	0	NA				1
TOTAL	1200	58	2	225	19	18	668	54	160	41	23	1	1	218	2074	38	3	4803

NA = Incomplete

OSW - post smolt

MSW - includes a few previous spawners tagged as hatchery smolts

PS - previous spawner

Table 3. Recoveries by standardized month in Statistical Areas of Newfoundland and Labrador from the 1970-1983 releases of tagged Atlantic salmon of Maine, USA, origin. Recoveries include all sea-ages.

Statistical Area	Months										% of Total
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Unk.	Total	
A	0	45	138	7	0	6	20	1	30	247	22.91
B	0	28	63	5	1	12	85	22	32	248	23.01
C	4	11	23	3	1	4	21	14	13	94	8.72
D	4	20	14	4	0	1	1	0	5	49	4.55
E	2	9	3	1	0	1	0	0	1	17	1.58
F	2	10	6	0	0	0	0	0	3	21	1.95
G	0	4	8	0	0	0	0	0	4	16	1.48
H	1	17	12	1	0	0	0	0	4	35	3.25
I	0	24	22	2	0	0	0	0	3	51	4.73
J	2	27	15	0	0	0	0	0	3	47	4.36
K	0	0	2	0	0	0	0	0	0	2	0.19
L	0	0	0	0	0	0	0	0	0	0	0.00
M	0	0	2	0	0	0	0	0	0	2	0.19
N	0	0	1	0	0	0	0	0	1	2	0.19
O	0	9	86	105	34	1	0	0	12	247	22.91
Total	15	204	395	128	36	25	127	37	111	1078	
% Total	1.4	18.9	36.6	11.9	3.3	2.3	11.8	3.4	10.3		100.00

Table 4. Average catch (tonnes) 1974-83 of Atlantic salmon of all sea ages in the Newfoundland-Labrador commercial fisheries by Statistical Area and month.

Statistical Area	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Area Total	% of Total
A	3.1	129.1	120.7	4.6	0.0	0.1	0.4	0.0	258.1	16
B	8.9	68.8	65.9	12.1	1.0	0.8	1.1	0.1	158.8	10
C	17.1	41.3	19.4	3.5	0.1	0.1	0.2	<0.1	81.7	5
D	16.4	34.0	19.2	3.5	<0.1	<0.1	<0.1	<0.1	73.2	4
E	27.0	21.4	8.6	0.4	0.0	<0.1	<0.1	0.0	57.4	3
F	22.2	26.8	11.4	0.4	<0.1	0.0	0.0	0.0	60.8	4
G	0.4	5.3	6.0	0.1	0.0	0.0	0.0	0.0	12.4	1
H	4.2	21.5	14.6	0.7	<0.1	0.0	0.0	0.0	41.0	2
I	2.4	13.5	6.1	1.3	0.0	0.0	0.0	0.0	23.4	1
J	61.9	105.0	15.0	1.3	0.0	0.0	0.0	0.0	183.1	11
K	2.7	19.1	6.0	0.4	0.0	0.0	0.0	0.0	28.1	2
L	0.5	8.0	3.4	0.1	<0.1	0.0	0.0	0.0	12.0	1
M	0.8	8.5	10.7	1.0	<0.1	0.0	0.0	0.0	20.9	1
N	<0.1	2.9	9.9	0.3	0.0	0.0	0.0	0.0	13.2	1
Insular Nfld.	167.6	505.2	317.0	30.0	1.2	1.1	1.8	0.2	1024.1	62
O (Lab)	0.5	128.4	410.2	81.3	8.5	0.3	<0.1	0.0	629.2	38
TOTAL PROV.	168.1	633.6	727.2	111.3	9.7	1.4	1.8	0.2	1653.3	100

Table 5. Percentage of total Newfoundland and Labrador tag recoveries by Statistical Area and month for 1971-84

Year 1971								
Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	0.00	1.67	1.67	5.00	0.00	6.67	15.00	
July	6.67	8.33	1.67	0.00	8.33	3.33	28.33	
Aug	0.00	1.67	0.00	0.00	5.00	1.67	8.33	
Sept	0.00	0.00	0.00	0.00	10.00	0.00	10.00	
Oct	0.00	1.67	0.00	0.00	0.00	1.67	3.33	
Nov	1.67	16.67	10.00	0.00	0.00	0.00	28.33	
Dec	0.00	3.33	3.33	0.00	0.00	0.00	6.67	
Sum	8.33	33.33	16.67	5.00	23.33	13.33	100.00	(60)

Year 1972								
Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	0.00	0.00	8.70	8.70	
June	0.00	0.00	0.00	4.35	0.00	13.04	17.39	
July	0.00	0.00	0.00	0.00	0.00	13.04	13.04	
Aug	0.00	0.00	4.35	0.00	4.35	13.04	21.74	
Sept	0.00	0.00	0.00	0.00	26.09	0.00	26.09	
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nov	0.00	0.00	13.04	0.00	0.00	0.00	13.04	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	0.00	0.00	17.39	4.35	30.43	47.83	100.00	(23)

1. Years are (year + 1) where year is the release year and most returns are assumed to be of 1-SW salmon.

Numbers in parentheses are the total number of tag recoveries in Newfoundland and Labrador for the smolt class excluding those with unknown month or area.

Table 5. Continued.

Year 1973 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	3.57	7.14	3.57	3.57	3.57	21.43	42.86	
July	10.71	0.00	0.00	0.00	3.57	10.71	25.00	
Aug	0.00	0.00	0.00	0.00	14.29	0.00	14.29	
Sept	0.00	0.00	0.00	0.00	7.14	0.00	7.14	
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nov	3.57	7.14	0.00	0.00	0.00	0.00	10.71	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	17.86	14.29	3.57	3.57	28.57	32.14	100.00	(28)

Year 1974 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	1.80	0.90	0.00	0.90	3.60	
June	0.00	0.00	0.90	5.41	0.00	10.81	17.12	
July	11.71	4.50	3.60	4.50	3.60	8.11	36.04	
Aug	0.00	0.90	0.90	0.00	0.90	0.00	2.70	
Sept	0.00	0.00	0.90	0.00	0.90	0.00	1.80	
Oct	0.90	0.90	1.80	0.00	0.00	0.00	3.60	
Nov	3.60	17.12	1.80	0.00	0.00	0.00	22.52	
Dec	0.00	8.11	4.50	0.00	0.00	0.00	12.61	
Sum	16.22	31.53	16.22	10.81	5.41	19.82	100.00	(111)

Table 5. Continued.

Year 1975 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	1.01	0.00	0.00	0.00	1.01	
June	0.00	4.04	3.03	2.02	0.00	3.03	12.12	
July	12.12	10.10	2.02	2.02	5.05	6.06	37.37	
Aug	1.01	1.01	0.00	2.02	8.08	0.00	12.12	
Sept	0.00	0.00	0.00	0.00	5.05	0.00	5.05	
Oct	0.00	5.05	1.01	0.00	0.00	0.00	6.06	
Nov	4.04	16.16	4.04	0.00	0.00	0.00	24.24	
Dec	0.00	0.00	2.02	0.00	0.00	0.00	2.02	
Sum	17.17	36.36	13.13	6.06	18.18	9.09	100.00	(99)

Year 1976 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	1.16	0.00	0.00	0.00	1.16	
June	5.81	4.65	2.33	0.00	0.00	4.65	17.44	
July	24.42	3.49	4.65	2.33	10.47	3.49	48.84	
Aug	2.33	4.65	0.00	2.33	13.95	1.16	24.42	
Sept	0.00	0.00	0.00	0.00	2.33	0.00	2.33	
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nov	1.16	4.65	0.00	0.00	0.00	0.00	5.81	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	33.72	17.44	8.14	4.65	26.74	9.30	100.00	(86)

Table 5. Continued.

Year	1977					Other		
Month	A	B	C	D	O	(E-N)	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	13.33	6.67	0.00	0.00	0.00	13.33	33.33	
July	33.33	13.33	0.00	0.00	6.67	0.00	53.33	
Aug	0.00	0.00	0.00	0.00	6.67	0.00	6.67	
Sept	0.00	0.00	0.00	0.00	6.67	0.00	6.67	
Oct	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nov	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	46.67	20.00	0.00	0.00	20.00	13.33	100.00	(15)

Year	1978					Other		
Month	A	B	C	D	O	(E-N)	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
July	16.67	0.00	0.00	0.00	16.67	0.00	33.33	
Aug	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sept	0.00	0.00	0.00	0.00	33.33	0.00	33.33	
Oct	0.00	0.00	0.00	0.00	33.33	0.00	33.33	
Nov	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	16.67	0.00	0.00	0.00	83.33	0.00	100.00	(6)

Table 5. Continued.

Year 1980 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	0.31	0.00	0.00	0.31	
June	10.06	4.40	0.63	0.63	0.94	2.52	19.18	
July	22.33	9.12	2.20	0.63	12.26	5.03	51.57	
Aug	0.94	0.63	1.57	0.00	11.64	0.00	14.78	
Sept	0.00	0.31	0.00	0.00	1.57	0.00	1.89	
Oct	1.26	0.63	0.00	0.31	0.00	0.00	2.20	
Nov	0.63	5.03	0.94	0.00	0.00	0.00	6.60	
Dec	0.00	2.20	1.26	0.00	0.00	0.00	3.46	
Sum	35.22	22.33	6.60	1.89	26.42	7.55	100.00	(318)

Year 1981 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	2.08	0.00	2.08	4.17	
June	4.17	2.08	2.08	2.08	0.00	6.25	16.67	
July	0.00	6.25	0.00	4.17	4.17	4.17	18.75	
Aug	0.00	0.00	0.00	0.00	25.00	0.00	25.00	
Sept	0.00	0.00	0.00	0.00	2.08	0.00	2.08	
Oct	0.00	2.08	2.08	0.00	2.08	0.00	6.25	
Nov	0.00	12.50	10.42	2.08	0.00	0.00	25.00	
Dec	2.08	0.00	0.00	0.00	0.00	0.00	2.08	
Sum	6.25	22.92	14.58	10.42	33.33	12.50	100.00	(48)

Table 5. Continued.

Year 1982 Month	A	B	C	D	O	Other (E-N)	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	6.98	2.33	2.33	4.65	0.00	3.49	19.77	
July	10.47	12.79	3.49	2.33	5.81	10.47	45.35	
Aug	1.16	0.00	1.16	0.00	18.60	0.00	20.93	
Sept	0.00	0.00	0.00	0.00	1.16	0.00	1.16	
Oct	2.33	3.49	0.00	0.00	0.00	0.00	5.81	
Nov	2.33	3.49	1.16	0.00	0.00	0.00	6.98	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	23.26	22.09	8.14	6.98	25.58	13.95	100.00	(86)

Year 1983 Month	A	B	C	D	O	Other (E-N)	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	7.41	7.41	0.00	0.00	0.00	3.70	18.52	
July	18.52	3.70	0.00	0.00	3.70	0.00	25.93	
Aug	0.00	0.00	0.00	0.00	22.22	0.00	22.22	
Sept	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Oct	7.41	0.00	0.00	0.00	3.70	0.00	11.11	
Nov	7.41	14.81	0.00	0.00	0.00	0.00	22.22	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	40.74	25.93	0.00	0.00	29.63	3.70	100.00	(27)

Table 5. Continued.

Year 1984 Month	A	B	C	D	O	Other	Sum	
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
June	0.00	0.00	0.00	2.78	0.00	2.78	5.56	
July	2.78	2.78	5.56	2.78	5.56	5.56	25.00	
Aug	5.56	0.00	2.78	0.00	27.78	0.00	36.11	
Sept	0.00	0.00	0.00	0.00	5.56	0.00	5.56	
Oct	2.78	2.78	0.00	0.00	0.00	0.00	5.56	
Nov	5.56	11.11	2.78	0.00	0.00	0.00	19.44	
Dec	0.00	2.78	0.00	0.00	0.00	0.00	2.78	
Sum	16.67	19.44	11.11	5.56	38.89	8.33	100.00	(36)

Table 6. Percentage (by weight) of Atlantic salmon of all sea ages caught in Newfoundland-Labrador commercial fisheries for 1974-83.

Year	1974							
Month	A	B	C	D	O	E-N	Sum	
May	0.00	0.00	0.11	0.41	0.00	7.79	8.31	
June	0.02	0.09	1.38	4.28	0.35	20.59	26.72	
July	7.03	3.78	1.33	3.00	30.50	11.17	56.80	
Aug	0.44	1.07	0.40	0.66	3.82	0.53	6.93	
Sept	0.01	0.05	0.00	0.00	0.87	0.00	0.92	
Oct	0.00	0.10	0.02	0.01	0.00	0.00	0.12	
Nov	0.00	0.16	0.02	0.00	0.00	0.00	0.19	
Dec	0.00	0.01	0.00	0.00	0.00	0.00	0.01	
Sum	7.49	5.24	3.26	8.37	35.54	40.10	100.00	(2010)

Year	1975							
Month	A	B	C	D	O	E-N	Sum	
May	0.01	0.19	1.73	1.59	0.00	9.40	12.92	
June	3.28	4.37	4.32	2.70	5.43	15.70	35.80	
July	8.18	6.28	1.42	0.84	23.27	3.22	43.21	
Aug	0.37	0.98	0.29	0.07	5.50	0.28	7.49	
Sept	0.00	0.03	0.02	0.00	0.30	0.00	0.35	
Oct	0.02	0.07	0.02	0.00	0.00	0.00	0.11	
Nov	0.00	0.08	0.02	0.00	0.00	0.00	0.10	
Dec	0.00	0.02	0.00	0.00	0.00	0.00	0.02	
Sum	11.86	12.02	7.82	5.20	34.50	28.60	100.00	(2043)

Numbers in parentheses are the total annual catch of salmon in kg in Newfoundland and Labrador.

Table 6. Continued.

Year	1976						
Month	A	B	C	D	O	E-N	Sum
May	0.08	0.23	0.79	0.68	0.08	12.23	14.08
June	7.53	2.39	1.34	1.06	6.27	13.71	32.31
July	8.91	2.57	0.45	0.65	24.21	6.93	43.72
Aug	0.61	0.62	0.24	0.29	6.76	1.08	9.59
Sept	0.00	0.01	0.00	0.00	0.26	0.00	0.27
Oct	0.00	0.01	0.00	0.00	0.01	0.00	0.02
Nov	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	17.13	5.84	2.83	2.68	37.58	33.95	100.00 (2012)

Year	1977						
Month	A	B	C	D	O	E-N	Sum
May	0.01	0.67	1.66	1.53	0.01	8.35	12.24
June	11.25	5.04	3.23	2.19	7.76	11.76	41.22
July	7.49	3.20	1.32	0.87	24.43	3.60	40.91
Aug	0.05	0.35	0.37	0.07	3.98	0.14	4.97
Sept	0.00	0.00	0.00	0.00	0.57	0.00	0.57
Oct	0.01	0.03	0.00	0.00	0.00	0.00	0.03
Nov	0.00	0.03	0.01	0.00	0.00	0.00	0.05
Dec	0.00	0.01	0.00	0.00	0.00	0.00	0.01
Sum	18.82	9.32	6.59	4.66	36.75	23.85	100.00 (1938)

Table 6. Continued.

Year	1978							
Month	A	B	C	D	O	E-N	Sum	
May	0.01	0.82	1.53	2.39	0.04	9.09	13.89	
June	6.19	4.97	3.81	2.51	9.16	12.39	39.02	
July	5.14	2.28	1.23	1.49	26.09	2.96	39.20	
Aug	0.06	0.57	0.26	0.05	6.13	0.21	7.27	
Sept	0.00	0.06	0.01	0.00	0.43	0.00	0.51	
Oct	0.00	0.10	0.00	0.00	0.00	0.00	0.10	
Nov	0.00	0.01	0.00	0.00	0.00	0.00	0.02	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	11.40	8.82	6.84	6.44	41.85	24.65	100.00	(1180)

Year	1979							
Month	A	B	C	D	O	E-N	Sum	
May	0.05	0.20	0.16	0.13	0.01	4.47	5.01	
June	10.36	2.91	1.48	1.80	3.56	14.86	34.96	
July	16.70	4.06	1.12	0.98	24.02	6.14	53.01	
Aug	0.47	0.68	0.10	0.02	4.75	0.23	6.25	
Sept	0.00	0.00	0.00	0.00	0.70	0.00	0.70	
Oct	0.00	0.00	0.00	0.00	0.01	0.00	0.01	
Nov	0.00	0.02	0.01	0.00	0.00	0.00	0.03	
Dec	0.00	0.01	0.01	0.00	0.00	0.00	0.01	
Sum	27.58	7.88	2.88	2.93	33.03	25.70	100.00	(987)

Table 6. Continued.

Year	1980							
Month	A	B	C	D	O	E-N	Sum	
May	0.40	0.57	0.82	0.80	0.10	4.58	7.27	
June	10.44	6.23	1.99	1.21	12.65	15.58	48.10	
July	4.82	4.13	1.29	0.97	23.38	4.42	39.01	
Aug.	0.16	0.57	0.01	0.04	4.12	0.19	5.10	
Sept	0.01	0.11	0.00	0.00	0.29	0.01	0.41	
Oct	0.01	0.04	0.01	0.00	0.00	0.00	0.06	
Nov	0.03	0.02	0.01	0.00	0.00	0.00	0.05	
Dec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sum	15.87	11.67	4.12	3.01	40.55	24.77	100.00	(2103)

Year	1981							
Month	A	B	C	D	O	E-N	Sum	
May	1.04	2.01	2.06	1.38	0.01	6.85	13.34	
June	13.37	5.86	2.02	1.67	17.95	9.43	50.29	
July	3.64	2.76	0.71	0.60	20.86	2.63	31.20	
Aug.	0.19	0.34	0.04	0.16	3.51	0.11	4.35	
Sept	0.00	0.05	0.00	0.00	0.34	0.00	0.38	
Oct	0.02	0.06	0.01	0.00	0.00	0.00	0.10	
Nov	0.14	0.16	0.03	0.00	0.00	0.00	0.33	
Dec	0.00	0.00	0.01	0.00	0.00	0.00	0.01	
Sum	18.40	11.25	4.87	3.81	42.66	19.02	100.00	(1909)

Table 6. Continued.

Year	1982							
Month	A	B	C	D	O	E-N	Sum	
May	0.02	0.25	0.31	0.23	0.01	2.93	3.75	
June	7.90	5.64	2.34	1.45	6.34	11.55	35.22	
July	6.40	5.57	1.73	1.29	28.52	8.70	52.21	
Aug	0.15	0.88	0.13	0.24	5.62	0.53	7.56	
Sept	0.00	0.15	0.00	0.00	0.90	0.01	1.06	
Oct	0.00	0.02	0.01	0.00	0.05	0.00	0.09	
Nov	0.02	0.05	0.02	0.00	0.00	0.00	0.10	
Dec	0.00	0.02	0.00	0.00	0.00	0.00	0.02	
Sum	14.49	12.58	4.54	3.22	41.45	23.72	100.00	(1321)

Year	1983							
Month	A	B	C	D	O	E-N	Sum	
May	0.04	0.23	0.53	0.41	0.02	4.56	5.79	
June	9.66	4.52	3.54	1.07	5.24	12.53	36.56	
July	9.04	5.91	1.41	0.88	23.47	5.28	46.98	
Aug	0.17	1.65	0.16	0.52	6.13	0.46	9.09	
Sept	0.00	0.22	0.00	0.04	0.83	0.01	1.10	
Oct	0.03	0.05	0.01	0.00	0.20	0.00	0.28	
Nov	0.07	0.09	0.02	0.00	0.02	0.00	0.19	
Dec	0.00	0.01	0.00	0.00	0.00	0.00	0.01	
Sum	19.00	12.68	5.66	2.91	35.91	23.84	100.00	(1029)

Table 7. Percentage of total Newfoundland and Labrador tag recoveries by Statistical Area and month for 1971-84.

Release Year + 1	STATISTICAL AREA						TOTAL RETURNS
	A	B	C	D	O	E to N	
1971	8.33	33.33	16.67	5.00	23.33	13.33	60
1972	0	0	17.39	4.35	30.43	47.83	23
1973	17.86	14.29	3.57	3.57	28.57	32.14	28
1974	16.22	31.53	16.22	10.81	5.41	19.82	111
1975	17.17	36.36	13.13	6.06	18.18	9.09	99
1976	33.72	17.44	8.14	4.65	26.74	9.30	86
1977	46.67	20.00	0	0	20.00	13.33	15
1978	16.67	0	0	0	83.33	0	6
1980	35.22	22.33	6.60	1.89	26.42	7.55	318
1981	6.25	22.92	14.58	10.42	33.33	12.50	48
1982	23.26	22.09	8.14	6.98	25.58	13.95	86
1983	40.74	25.93	0	0	29.63	3.70	27
1984	16.67	19.44	11.11	5.56	38.89	8.33	36

Table 8. Percentage (by weight) of Atlantic salmon of all sea ages caught in Newfoundland-Labrador commercial fisheries for 1974-83.

Year	STATISTICAL AREA						TOTAL CATCH (t)
	A	B	C	D	O	E to N	
1974	7.49	5.24	3.26	8.37	35.54	40.10	2010
1975	11.86	12.02	7.82	5.20	34.50	28.60	2043
1976	17.13	5.84	2.83	2.68	37.58	33.95	2012
1977	18.82	9.32	6.59	4.66	36.75	23.85	1938
1978	11.40	8.82	6.84	6.44	41.85	24.65	1180
1979	27.58	7.88	2.88	2.93	33.03	25.70	987
1980	15.87	11.67	4.12	3.01	40.55	24.77	2103
1981	18.40	11.25	4.87	3.81	42.66	19.02	1909
1982	14.49	12.58	4.54	3.22	41.45	23.72	1321
1983	19.00	12.68	5.66	2.91	35.91	23.84	1029

Table 9. Tag recapture rate of Maine origin Atlantic salmon caught in homewaters and commercial fisheries of Newfoundland-Labrador and Greenland.

Year	1000's of tags applied	Tag returns per 1000 tags applied: Home-waters	A	B	C	D	E-N	Insular Nfld.	O	Green-land
1970	48.2	5.83	0.10	0.41	0.21	0.06	0.19	0.56	0.29	8.36
1971	29.8	5.64	0.03	0.03	0.17	0.03	0.34	0.60	0.30	2.89
1972	48.5	3.86	0.12	0.08	0.02	0.02	0.19	0.43	0.19	2.31
1973	38.0	10.03	0.55	1.03	0.47	0.34	0.58	2.97	0.21	9.26
1974	41.8	3.83	0.43	0.89	0.31	0.14	0.22	1.99	0.50	3.01
1975	29.0	2.72	0.97	0.52	0.24	0.13	0.24	2.13	0.87	1.31
1976	25.0	3.80	0.28	0.12	0	0	0.08	0.48	0.12	0.44
1977	48.8	0.74	0.02	0	0	0	0	0.02	0.10	0.18
1978	0	0	-	-	-	-	-	-	-	-
1979	59.8	7.78	1.99	1.24	0.35	0.10	0.38	4.01	1.49	1.14
1980	49.8	5.12	0.06	0.22	0.14	0.10	0.14	0.66	0.32	0.76
1981	49.9	3.17	0.40	0.42	0.14	0.12	0.24	1.32	0.48	0.06
1982	50.0	1.10	0.22	0.14	0	0	0.02	0.38	0.18	0.04
1983*	100.0	-	0.06	0.07	0.04	0.02	0.03	0.22	0.14	0.10
1984	100.0									

* Recoveries incomplete.

Table 10. Recoveries of tagged hatchery-reared salmon of Maine, USA, origin from selected Statistical Sections of Newfoundland and Labrador. Data presented by year of release for 1979-83.

STATISTICAL AREA	SECTION	YEAR OF RELEASE 1970	1971	1972	1973	1974	1975	1976	1977	1979	1980	1981	1982	1983	TOTALS
A	01	-	-	-	1	-	1	-	-	-	-	-	-	-	2
	02	2	-	1	1	4	9	-	-	27	-	3	-	-	47
	03	1	-	-	2	1	4	3	-	13	1	1	1	-	27
	04	1	-	4	12	13	11	4	1	56	1	13	6	2	124
	05	1	1	1	5	-	4	-	-	18	1	3	4	4	42
Total		5	1	6	21	18	29	7	1	114	3	20	11	6	242
B	06	4	-	2	12	9	5	1	-	34	4	8	4	3	86
	07	8	1	1	18	17	5	-	-	25	7	8	2	4	96
	08	7	-	1	7	6	5	1	-	15	-	4	1	-	47
	09	1	-	-	2	5	-	1	-	1	-	1	-	-	11
Total		20	1	4	39	37	15	3	-	75	11	21	7	7	240
C	10	-	-	-	-	1	1	-	-	4	-	2	-	-	8
	11	1	-	-	1	3	3	-	-	5	1	3	-	3	20
	12	3	1	1	11	2	-	-	-	3	1	1	-	-	23
	13	6	4	-	6	7	1	-	-	10	5	1	-	1	41
Total		10	5	1	18	13	5	-	-	22	7	7	-	4	92
D	14	-	1	-	-	-	1	-	-	-	1	-	-	-	3
	15	1	-	-	1	1	2	-	-	1	1	1	-	-	8
	16	1	-	-	4	2	2	-	-	-	-	1	-	-	10
	17	-	-	-	4	2	1	-	-	3	2	3	-	1	16
	18	-	-	-	2	1	-	-	-	1	1	-	-	1	6
	19	1	-	1	2	-	-	-	-	1	-	1	-	-	6
Total		3	1	1	13	6	6	-	-	6	5	6	-	2	49
TOTAL ABCD		38	8	12	91	74	55	10	1	217	26	54	18	19	623
O	50	1	-	-	2	-	-	-	-	3	1	1	-	-	8
	51	3	1	1	5	4	5	-	-	21	-	2	1	3	46
	52	-	-	-	-	1	3	1	1	12	-	5	-	2	25
	53	10	8	8	-	13	17	2	4	51	15	16	8	9	161
	Unk.	-	-	-	1	3	1	-	-	2	-	-	-	-	7
Total O		14	9	9	8	21	26	3	5	89	16	24	9	14	247
GRAND TOTAL		52	17	21	99	95	81	13	6	306	42	78	27	33	870

Table 11. Annual catches in kg of Atlantic salmon of all ages for certain Statistical Sections of Newfoundland and Labrador, 1974-84.

STATISTICAL AREA	SECT.	YEARS 1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[1]	MEAN 74-83
A	01	1086	2429	1647	1924	3688	3070	1637	2286	1239	1779	1940	2079
	02	58417	74405	69596	104413	25980	50084	53260	76786	43638	27337	10982	58392
	03	25986	33807	51004	48459	15965	36219	54743	49953	33770	26151	14200	37606
	04	50891	118838	192095	165756	74709	157812	143476	167139	69730	112314	72190	125276
	05	14163	12802	30341	44250	14175	24917	80539	55112	43071	27976	24418	34735
B	06	38947	78828	58447	72662	34393	30385	92055	86003	49453	40841	48899	58201
	07	17598	54208	21644	33969	30259	17014	54832	47494	44415	36241	25682	35767
	08	9377	48356	18824	22882	11720	12990	72038	42271	31101	17114	9552	28667
	09	39394	64223	18532	51197	27694	17337	26541	38999	41264	36256	41540	36144
C	10	15703	25390	9352	11156	5644	5508	12213	17505	10026	4374	10155	11687
	11	24057	49673	12527	27771	33355	7892	29595	18935	17443	14741	16516	23599
	12	16606	28204	12143	30587	18916	6867	12693	23725	13516	13381	15668	17664
	13	9089	56466	22862	58310	22829	8137	32222	32836	18999	25726	18107	28748
D	14	10760	6009	2301	2439	5171	204	2433	2575	1840	768	893	3450
	15	39531	20610	8206	14119	10009	4102	6947	5175	5531	3869	5721	11810
	16	44830	24999	13410	17534	12335	7649	16982	15327	13779	8437	8102	17528
	17	54653	36723	16670	21933	24116	10494	19802	32895	16585	11775	14254	24565
	18	6489	5927	3219	15230	12639	4460	7065	8165	2172	2492	3868	6786
	19	11996	11958	10154	19108	11683	2008	10145	8643	2601	2647	2572	9094
0	50	96397	100084	96051	113954	62723	32127	65047	52165	41732	39843	40125	70012
	51	451423	302729	296756	279026	189444	91649	337198	291574	241282	129663	99701	261074
	52	119084	184370	194816	196573	90480	114222	297779	327602	180542	119327	78443	182480
	53	47281	117720	168646	122897	151308	87940	152582	143230	84096	80686	50567	115639
	TOTAL	1203758	1458758	1329243	1476149	889235	733087	1581824	1546395	1007825	783738	614095	1201001

1. FIGURES ARE PRELIMINARY

Table 12. Relation between mean Canadian commercial catches (X) (in kg) and total tag returns (Y) of Maine-origin Atlantic salmon by Statistical Section for Newfoundland. Data are pooled for the years 1974 to 1983.

Statistical Area	Intercept	Slope	N	r
A	-2.48683	.00086	5	.9915
B	-5.20282	.00124	4	.5401
C	-7.51054	.00108	4	.9264
D	-.05915	.00043	6	.8893
O	63.09879	-.00008	4	-.11727
A - D (pooled)	-2.75518	.00092	19	.9050
A - D & O (pooled)	16.29508	.00025	23	.4526

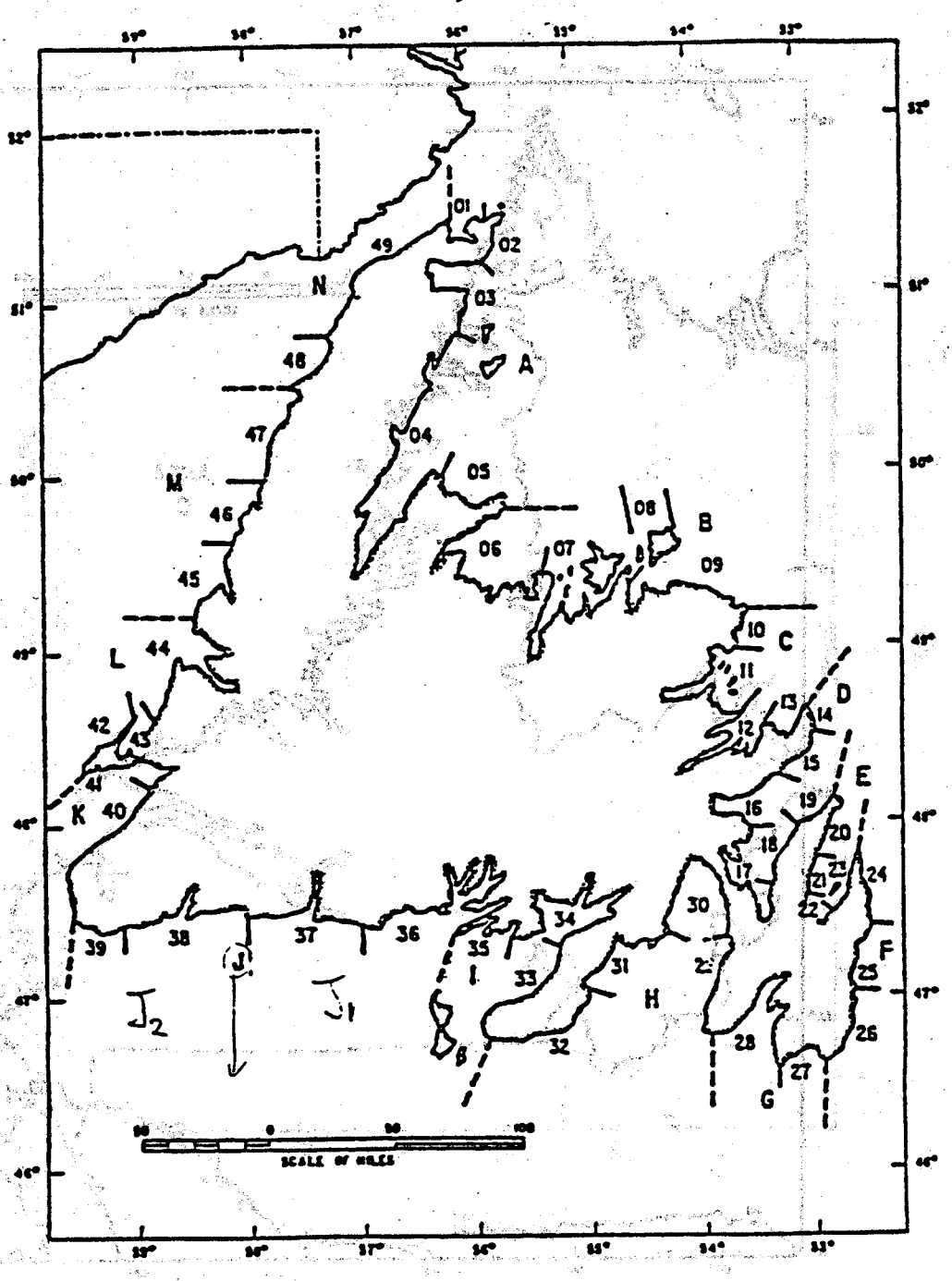


Fig. 1. Boundaries of Statistical Section (numerically indicated) and Statistical Areas (alphabetical) in insular Newfoundland.

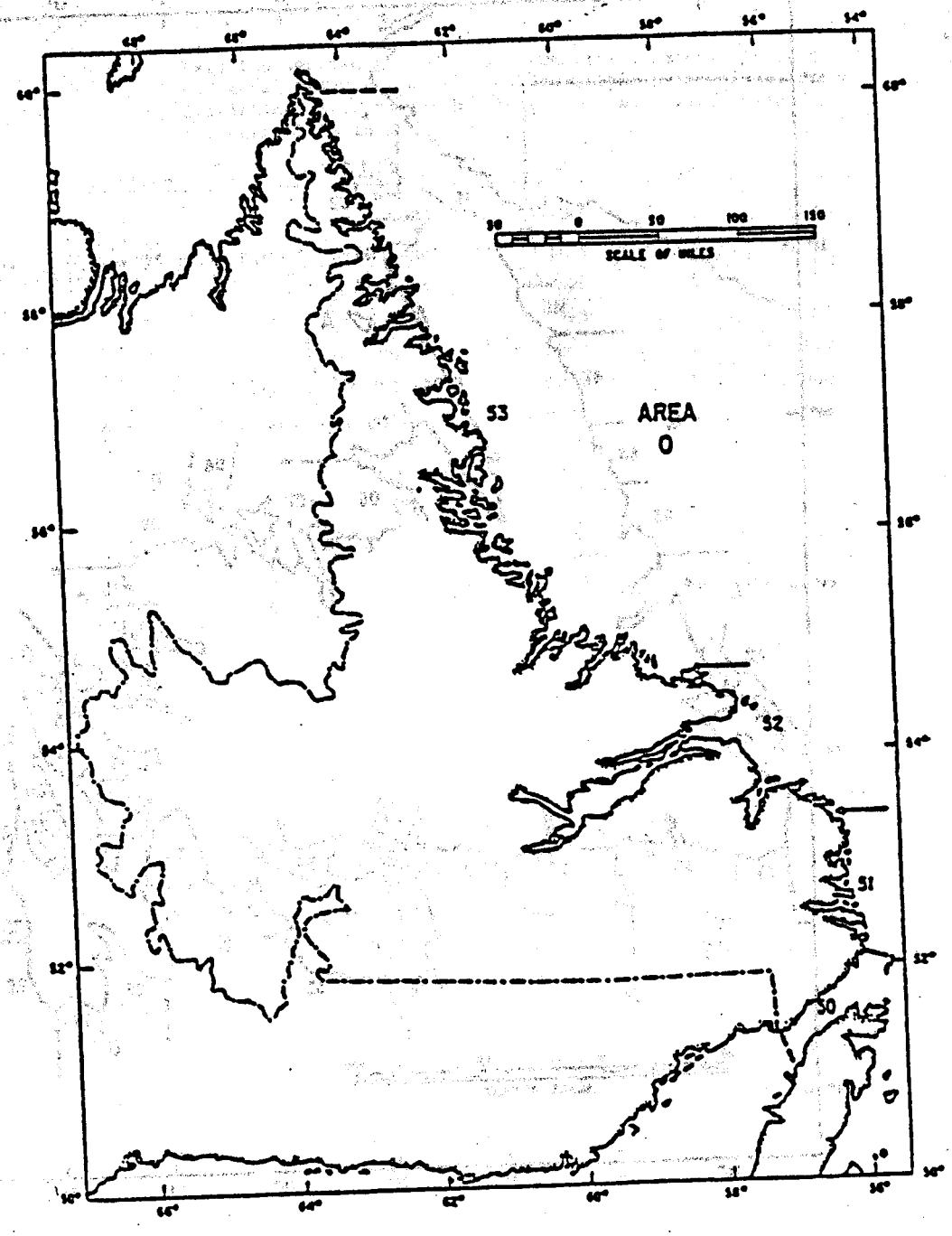


Fig. 2. Boundaries of Statistical Section (numerically indicated) and Statistical Areas (alphabetical) in Labrador.

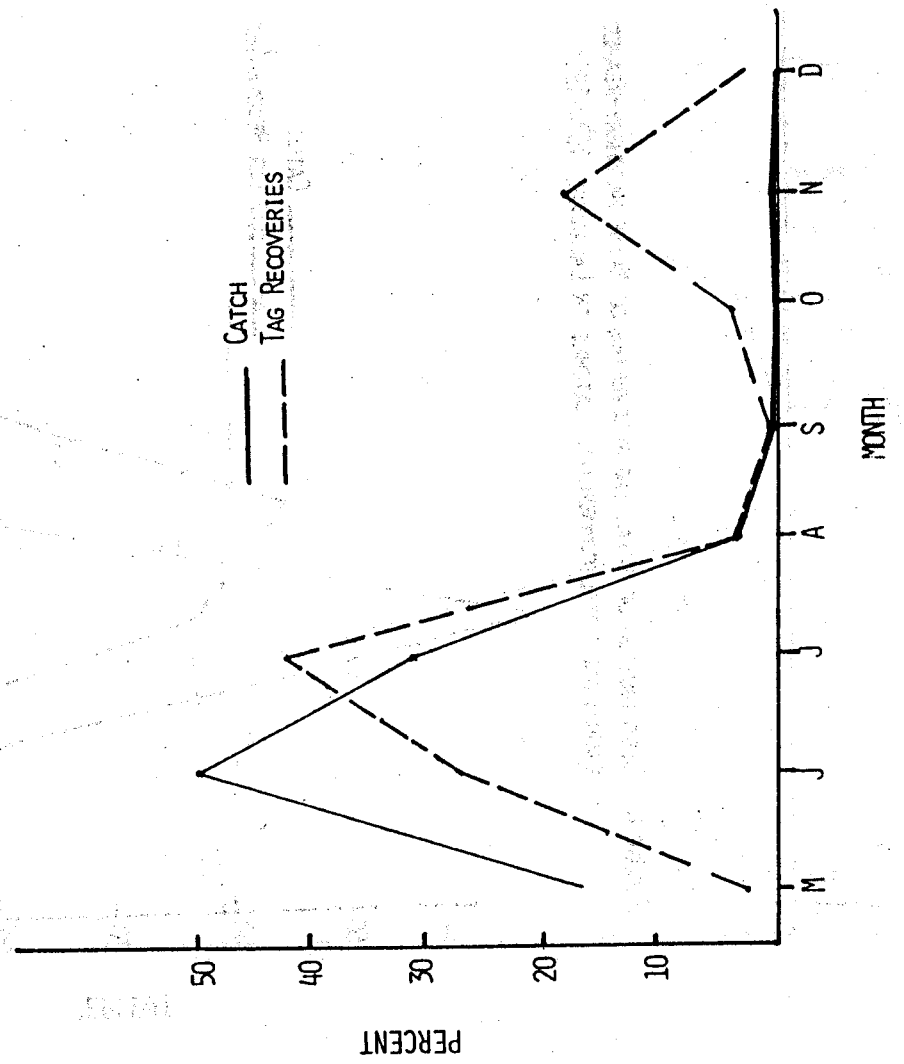


FIGURE 3. DISTRIBUTION OF TOTAL TAG RECOVERIES OF MAINE HATCHERY-REARED SALMON AND TOTAL COMMERCIAL CATCHES IN INSULAR NEWFOUNDLAND, 1970-1983.

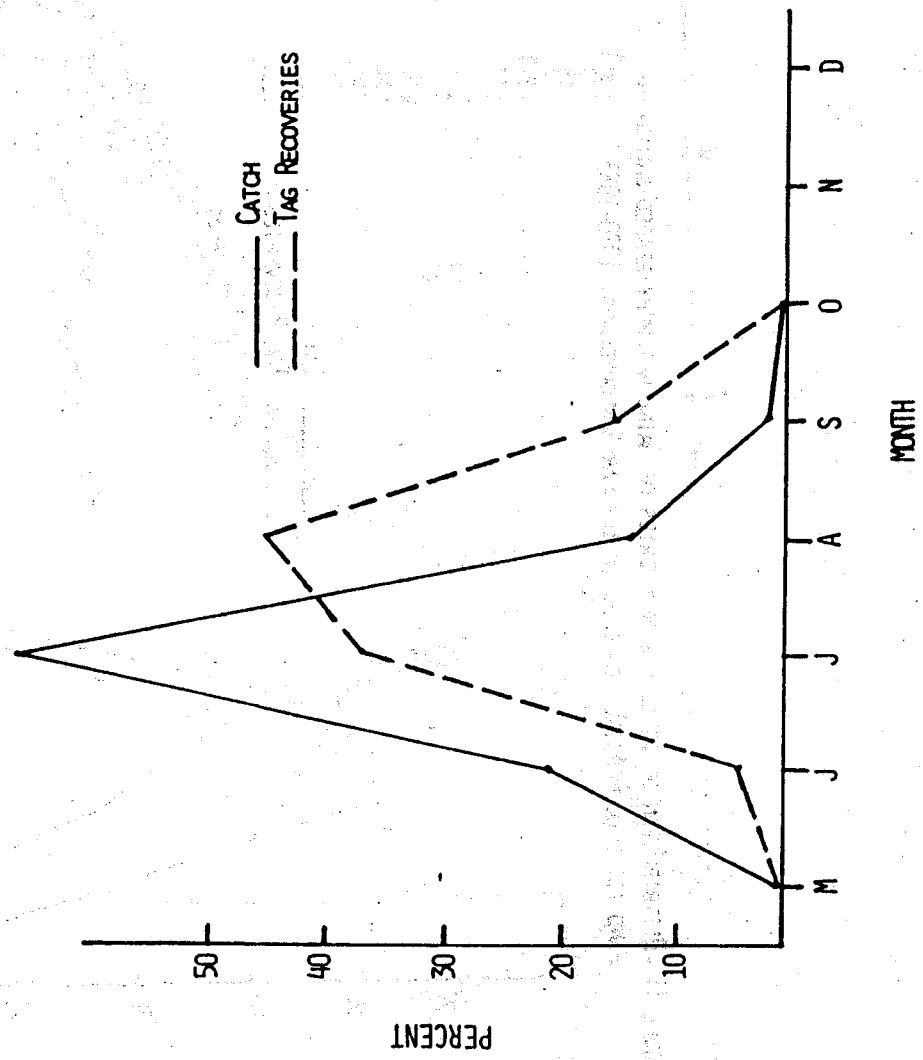


FIGURE 4. DISTRIBUTION OF TOTAL TAG RECOVERIES OF MAINE HATCHERY-REARED SALMON AND TOTAL COMMERCIAL CATCHES IN LABRADOR, 1970-1983.

FIGURE 5. DISTRIBUTION OF TOTAL TAG RECOVERIES OF MAINE HATCHERY-REARED SALMON, AND TOTAL COMMERCIAL CATCHES IN NEWFOUNDLAND AREAS A-D, 1970-1983.

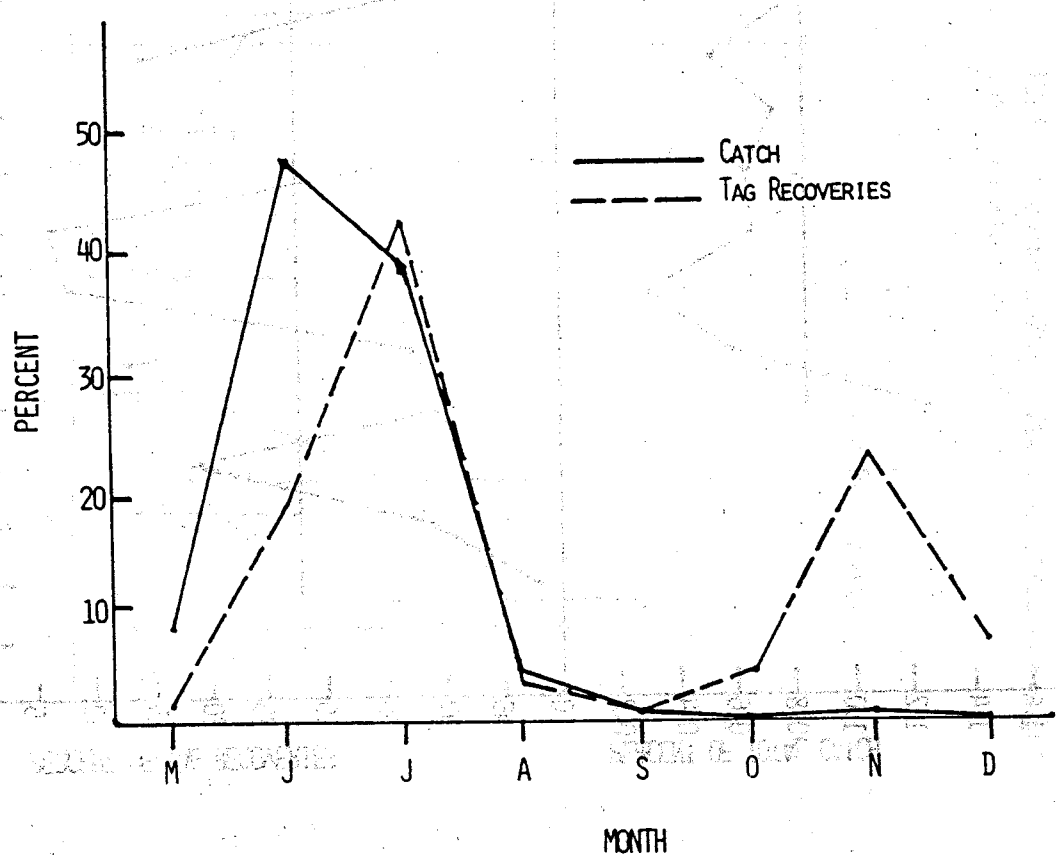


FIGURE 6. PERCENT OF TOTAL CATCH (KG.) IN NEWFOUNDLAND-LABRADOR DURING THE PERIOD SEPTEMBER 1-DECEMBER 31, (1974-1983) AND PERCENT OF ANNUAL TAG RECOVERIES OF MAINE HATCHERY-REARED SALMON DURING THE PERIOD SEPTEMBER 1-DECEMBER 31, (1974-1983, EXCLUDING 1979).

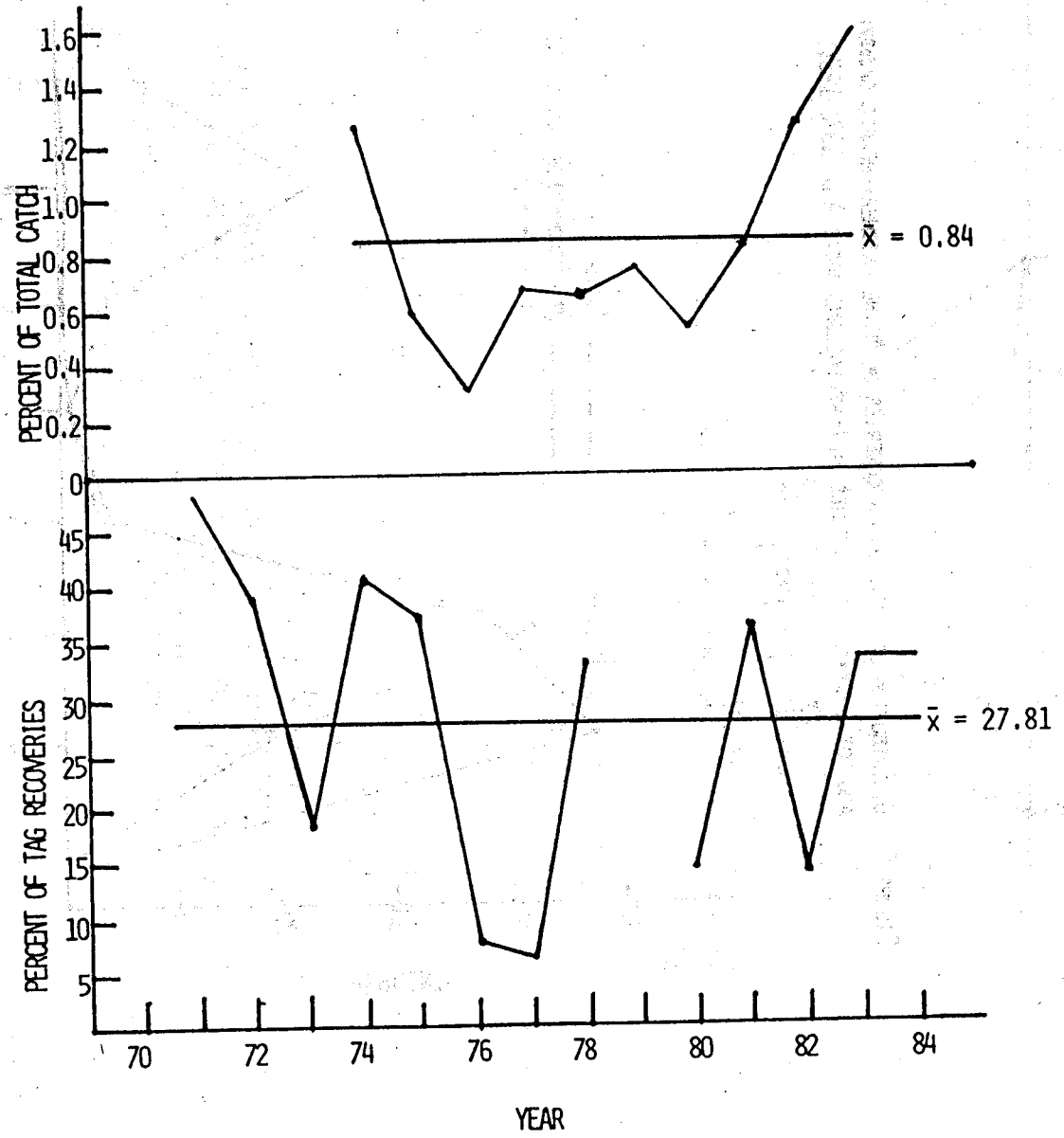
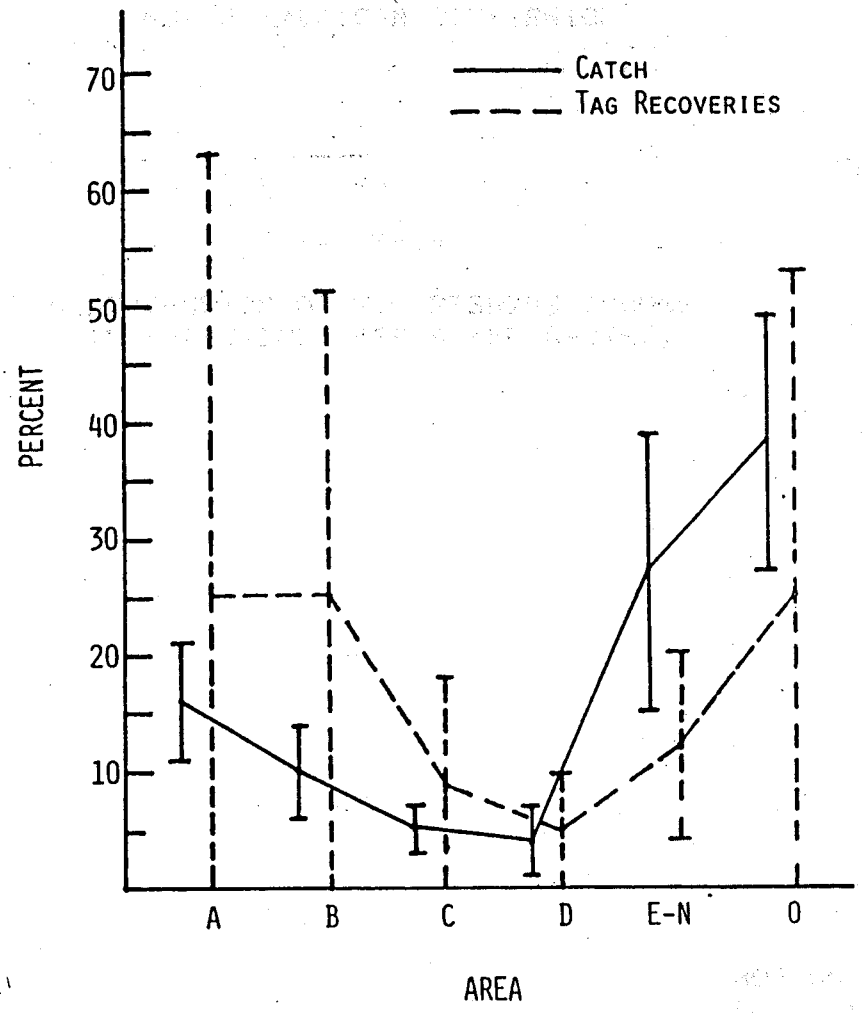


FIGURE 7. PERCENT OF AVERAGE TOTAL CATCH OF ATLANTIC SALMON IN STATISTICAL AREAS OF NEWFOUNDLAND-LABRADOR (1974-1983) AND PERCENT OF TOTAL TAG RECOVERIES OF MAINE HATCHERY-REARED SALMON (1970-1983 EXCLUDING 1978). VERTICAL LINES REPRESENT THE STANDARD DEVIATION.



ANNEX 11

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

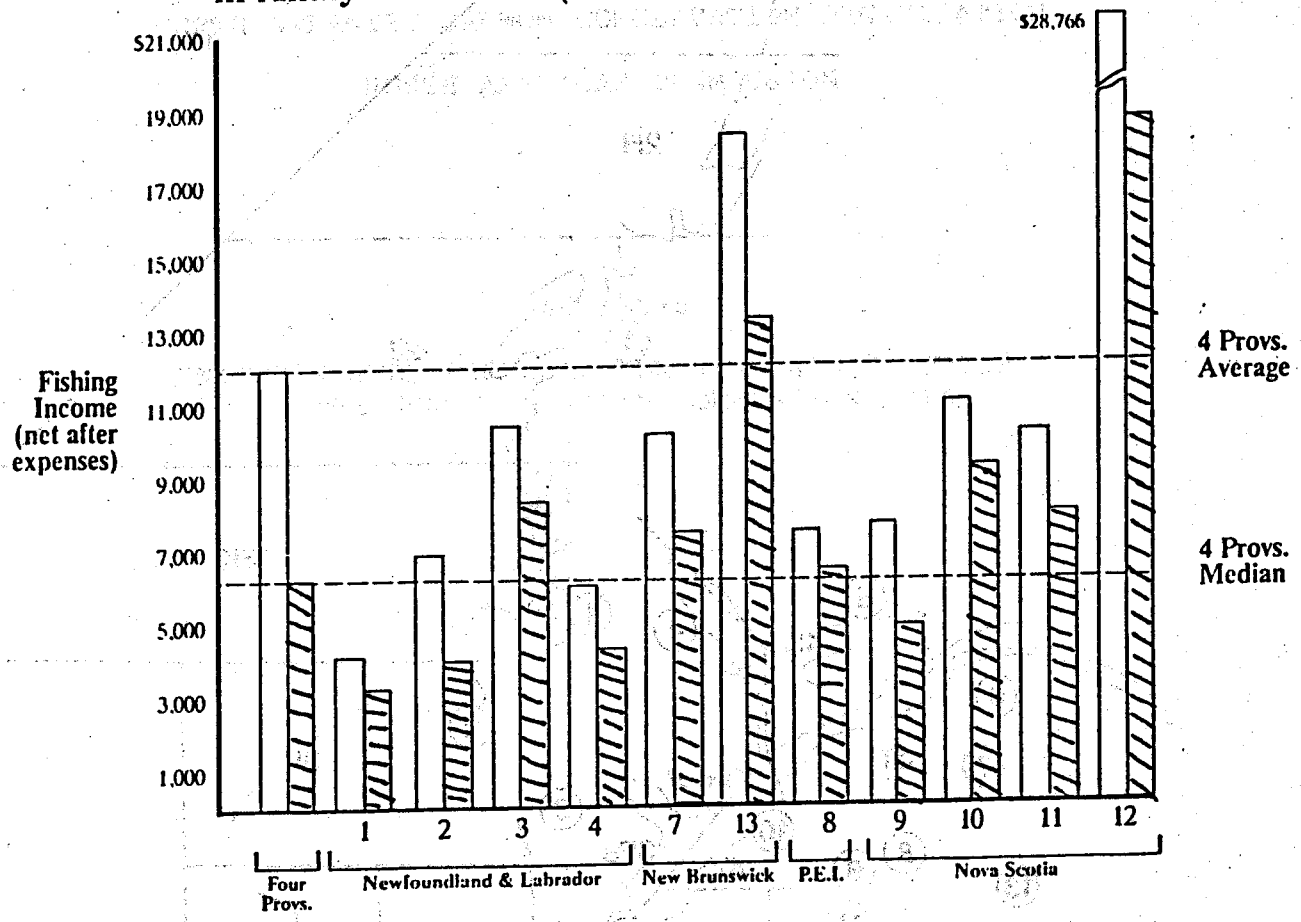
NORTH AMERICAN COMMISSION

NAC (85)7

DISTRIBUTION OF NET FISHING INCOME IN ANALYTICAL AREAS (FULL-TIME)

BOSTON
February 1985

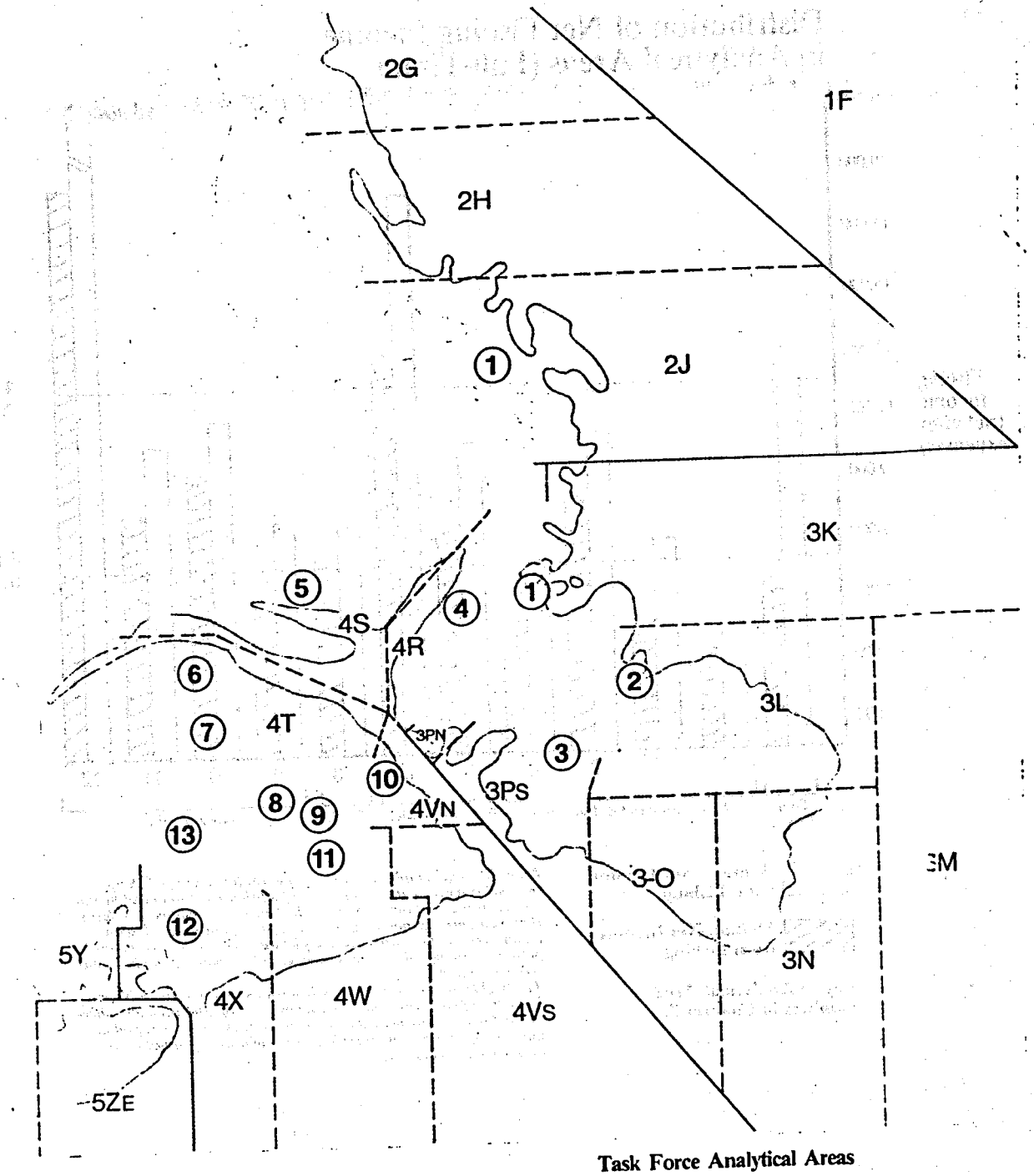
Figure 4.3
Distribution of Net Fishing Income in Analytical Areas (Full-Time)



Note: In all geographical areas, the figures for 'average' fishing income exaggerate the real picture of a fisherman's financial health. The reason is that the incomes of 'highliners' are relatively so large that their earnings pull up group averages significantly. Median incomes present a more accurate picture. The 'median' is the mid-point of earnings: 50% of fishermen earn less than the median, and 50% earn more.

The 'highliners' in southern New Brunswick and southwest Nova Scotia significantly exceed the earnings levels of fishermen elsewhere in the Atlantic provinces. The earnings in these two areas pull up the 'average' for the entire region, creating a wide gap between average and median incomes.

The Atlantic Fishery



BOUNDARY OF NAFO SUB-AREAS. . . . . .

BOUNDARY OF NAFO DIVISIONS. . . . . .

183 METRE (100 FATHOM) CONTOUR. . . . . .

200-MILE FISHING ZONE . . . . . .

Task Force Analytical Areas

1. North East Newfoundland and Labrador
2. South East Newfoundland
3. South Coast Newfoundland
4. West Coast Newfoundland
5. North Shore Quebec
6. Gaspé Quebec
7. Gulf New Brunswick
8. Prince Edward Island
9. Gulf Nova Scotia
10. North East Nova Scotia
11. Eastern Nova Scotia
12. South Western Nova Scotia
13. Fundy New Brunswick

ANNEX 12

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)8

UNITED STATES PROPOSAL FOR REGULATORY ACTION IN THE NORTH AMERICAN COMMISSION AREA

BOSTON
February 1985

UNITED STATES PROPOSAL FOR REGULATORY ACTION IN THE NORTH AMERICAN COMMISSION AREA

BOSTON, MASSACHUSETTS

FEBRUARY, 22, 1985

The report of the Advisory Committee on Fisheries Management (ACFM) [NAC Paper (85)2] shows that the harvest of U.S. origin salmon in interception fisheries is 6.3 times greater than home river harvests, and even 1.2 times greater than the total returns of salmon to home rivers in the United States (based on the average of the 1975-81 smolt classes). This level of interception of U.S. salmon is significant and has a serious and deleterious effect on our efforts to maintain our wild stocks. Perhaps more importantly, this level of interception calls into question our ability to continue and expand domestic efforts to restore and enhance Atlantic salmon production in our rivers.

The United States believes that there is no compelling reason that its stocks of salmon should be subjected to higher levels of interception than those of other stocks originating in the North American Commission Area. In this connection, the United States draws the attention of the North American Commission to Article 7, paragraph 1(b), of the Convention which provides for regulatory action by the Commission in order to minimize interceptions. We note that with this Article, the Convention imposes a duty not merely to regulate but to minimize interceptions.

Last year the United States put forward a proposal designed to deal with the interception problem in the North American Commission Area. This proposal was not accepted because of concern with specific application of the

proposal. While we continue to believe that the proposal has merit, we recognize the concern expressed and are prepared to examine other alternatives.

The United States appreciates the management efforts taken by Canada in 1984 to conserve stocks of salmon. While directed primarily at the conservation of Canadian stocks, these measures have produced some benefit for stocks of U.S. origin. We are aware that these measures could not have been adopted without cooperation and sacrifice on the part of the fishermen of eastern Newfoundland.

Recognizing the Commissions responsibility under Article 7, and further recognizing the factors to be considered in meeting that responsibility under Article 9, and on the basis of the scientific advice provided by the ACFM, the United States proposes at this time to set aside its 1984 proposal and instead proposes that the fishery for salmon in all of Newfoundland be closed from September 1 through December 31, as well as retaining those conservation measures imposed by the 1984 Canadian Atlantic Salmon Management Plan.

We believe that such a closure would represent an important step toward achieving parity in the level of interception of North American stocks. At the same time, we believe that it would work a substantial benefit for stocks of U.S. origin without significant disruption in fishing patterns for Canadian stocks. For these reasons, we believe that the proposal takes into account the objections and concerns of both members of the Commission.

Although this proposal is clearly not sufficient to meet our long-term goal of minimizing the level of interception of U.S. origin salmon to such extent that this level is no greater than that for other stocks of salmon originating in the North American Commission Area, we believe that it is important that we begin working towards this goal, relying as we must on the

best scientific information available. We believe that the proposal's benefits will be substantial, while its impacts on the fishermen affected will be minimal.

Finally, we believe that the timely adoption of this proposal by the North American Commission will reinforce and strengthen the resolve of all Parties to the Convention to act in the best interest of the salmon. We ask that the Canadian delegation give it serious consideration.

ANNEX 13

NAC (85) 9
NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

SPECIFIC REPORT TO ICES

The United States will provide further details on interceptions off Newfoundland of fish of US origin by time period and statistical area. Available 1984 tag recovery data will also be provided. ICES is requested to ask the Working Group on Atlantic Salmon to consider this data and advise whether their observations regarding the proportion of fish of US origin are confirmed or otherwise by this examination of data from earlier years.

BOSTON
FEBRUARY 1985

ANNEX 14

NAC (85)22

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

QUESTIONS FROM NASCO TO ICES, JUNE 1985

With respect to Atlantic salmon in the North American Commission area, ICES is requested to:

a) provide estimates of the number, weight, age composition, and river of origin of historical catches from 1967-1984 of salmon originating in rivers or artificial production facilities of another country. These estimates should be broken down by season, locality, and gear type. The estimates should also take into consideration available information on the release and recovery of tagged salmon and catches and exploitation rates for salmon in areas where such catches occur;

b) provide a description of fisheries catching salmon originating in another country's river or artificial production facility. The description should include catch, effort, exploitation rate, gear type, season, and age composition of historical catches of salmon by year;

c) assess the extent of by-catches of Atlantic salmon in fisheries for other species and poaching of Atlantic salmon;

d) evaluate the tag recovery procedure, including an assessment of the accuracy and completeness of information accompanying tag returns;

e) assess the proportion of salmon tags captured but not reported;

f) specify data deficiencies and necessary research programs to address those deficiencies;

g) estimate the expected impact of management measures taken by Canada in 1984 and 1985 in reducing the harvest in Canadian fisheries of salmon originating in the USA.

EDINBURGH
June 1985

ANNEX 15

NAC (85) 18

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

CANADIAN STATEMENT FOR
NORTH AMERICAN COMMISSION

By its actions in 1984 and 1985 Canada has responded positively to the need for salmon conservation. These actions bear repeating because they represent significant leadership on the part of Canada in re-building depleted stocks of salmon of North American origin, and at the same time they will reduce interceptions of fish of US origin within the area of Canada's jurisdiction.

In 1984 measures were introduced for a mandatory buy-back of commercial salmon licences in south western Newfoundland, and for voluntary buy-back in the rest of the province. This resulted in the permanent removal of 802 licensed fishermen from the salmon fishery.

In New Brunswick the commercial fishery was closed in the Miramichi and St John area, and in Quebec, the Government of that province closed its commercial fishery in the Gaspe Peninsula and a portion of the North shore of the St Lawrence.

The opening of the commercial fishing season was delayed in Newfoundland, allowing more large spawning salmon to return to their rivers of origin in Mainland Canada and in New England. In the remainder of New Brunswick, Nova Scotia and Price Edward Island the commercial fishing season was shortened drastically to reduce the interception of salmon returning to spawn.

In New Brunswick, Newfoundland and Nova Scotia all anglers were required to release all large salmon (100%), in order to increase the numbers of fish surviving to spawn, while Quebec province reduced the daily limit for anglers by one salmon, in addition to delaying the season opening dates.

In 1985, Canada's salmon conservation plan goes much further by maintaining most of the measures introduced in 1985, while in addition closing the commercial fishery completely in Nova Scotia, New Brunswick and Prince Edward Island, and cancelling all part-time commercial licenses in Newfoundland. These measures will affect 1140 commercial salmon fishermen, and again result in increasing the number of salmon which return to their rivers of origin to spawn, both in Canada and the Northeastern States.

Clearly these stringent measures taken by Canada are a clear commitment to conservation, to the reduction of interception fisheries and to the rebuilding of depleted salmon stocks.

The direct impact of the 1984 Canadian Fishery restrictions provide a dramatic example of improved survival to spawning. For example, on the Miramichi River, 83% of the home water returns potentially survived to spawn versus 10% in 1983, and on the St John river it was 78% compared to 38% in 1983.

In addressing its responsibility under the terms of the NASCO Convention, and specifically the requirement for co-operation on matters relating to minimizing interception under Article 7, Canada has, in the short term since the Convention has been adopted, taken strong and positive action to restrict its own salmon fishery, and also to reduce the level of interception of salmon produced in the rivers of the United States.

At this meeting we have tabled information to indicate the extent to which the measures taken by Canada in 1984 and 1985 will reduce the interception of salmon of US origin. That information indicates to us that the restrictions we have imposed would be expected to reduce those interceptions by approximately 25%.

At the request of the United States we have agreed to refer to ICES for their assessment of the impact of measures taken by Canada in 1984 and 1985 on reducing the interception of salmon produced in United States waters.

In the meeting of the West Greenland Commission Canada has stressed the agreement (at the Annual Meeting in June 1984) by Canada, the United States and the EEC to the effect that the burdens and benefits of salmon conservation should be fairly shared.

Canada has certainly shared the burdens, and in the course of time we hope to also share in the benefits of our conservation actions.

Canada came to this meeting prepared to take additional measures, on top of those I have already enumerated, in response to the proposal by the United States to make changes in the fall salmon fishing at Newfoundland provided that the burden of additional measures for conservation be shared by West Greenland. The burdens of conservation cannot be carried by Canada alone if NASCO is to succeed in "promoting the conservation, restoration, enhancement and rational management of salmon stocks in the North Atlantic Ocean <u>through international co-operation</u>", as stated in the Convention.

We are profoundly disappointed that NASCO has been unable to act positively at this meeting to meet Canada's requests for a realistic reduction in the quota at West Greenland comparable with the management measures already taken by Canada. Article 9

of the Convention indicates that a number of factors are to be taken into account by this Commission in exercising its functions. Specifically, Article 9 (b) refers to "measures taken and other factors both inside and outside the Commission area that affect the salmon stocks concerned." Clearly the measures taken or not taken at West Greenland affect the salmon stocks of concern to this Commission.

In view of the stringent measures we have already imposed on our fishery, and the estimates of the impact those will have on reducing the interception of US origin salmon, we deeply regret the failure of NASCO to agree on the adoption of comparable measures at West Greenland to reduce the interception of salmon of Canadian origin. Regrettably we cannot, at this time accede to the request contained in the US proposal.

It must be evident that we in Canada are strongly committed to salmon conservation, and we remain ready to take additional measures when it becomes evident that other parties to NASCO are also prepared to support conservation measures comparable to those which have been introduced by Canada.

EDINBURGH
JUNE 1985

ANNEX 16

NAC (85) 19
NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

STATEMENT OF
THE HONORABLE ALLEN E PETERSON,
HEAD OF THE DELEGATION OF THE UNITED STATES OF AMERICA

Thank you, Mr Chairman. I thank the Canadian delegation for its response to our proposal. There are a few observations I would like to make.

First, I would like to make it absolutely clear that the United States appreciates the actions taken by Canada to conserve salmon. Our appreciation has been expressed a number of times and at various levels, including by Members of Congress at a recent Inter-Parliamentary Meeting. We recognize the contributions Canada has made to the conservation of Atlantic salmon, and we recognize that certain benefits will accrue to the United States from these contributions. We do have some questions regarding the level of benefits that have accrued or will accrue to the salmon originating in our rivers and anticipate that the ICES Working Group will provide a factual assessment of the effects of the Canadian measures on returns of salmon to our rivers.

We, too, are concerned at the failure of the West Greenland Commission to adopt a 1985 quota at this meeting since we may also lose a significant quantity of our fish. We, too, tried very hard to reach an acceptable solution over the past week. On reflection, we may all perhaps think of things we might have done differently, however we have had a full airing of views, all of which I believe are legitimate, and it is obvious that the differences in views were too great to achieve any agreement at this meeting.

We deeply regret, however, that Canada so closely links our work in the North American Commission to the work of other Commissions. There are but two members of the North American Commission - at times perhaps three. In our view, this linkage immediately and inevitably increases the number of Parties that can influence what we do in the North American Commission Area. We rejected such linkage last year between actions in the North East Atlantic Commission and those in the West Greenland Commission. We believe the record shows that Canada also rejected this linkage. It troubles us that Canada would now choose to construct a similar linkage. The drafters of the Convention, in their wisdom, chose to consider salmon in three Regional Commissions. The alternative would be to deal with all

questions related to salmon conservation, restoration, enhancement and rational management in the Council. While some linkage is unavoidable given the inter-relationships among salmon stocks throughout the North Atlantic, we firmly believe that linkage between the work of one Commission and another must be avoided at all costs and at all times. Otherwise, the Organization itself risks paralysis.

Canada has said it has taken strong measures. We acknowledge that Canada's action has resulted in increased escapements to certain rivers, a truer measure of conservation efforts, we believe, than reduced effort or harvest. But all too often, I suspect, Canada forgets that we in the United States have also promoted salmon conservation, whether in public relations, in increasing our production of salmon or in using our influence to persuade other Parties to act with restraint. While our production of salmon may be small in relation to that of others, it is effective and real. I would defy anyone to match us dollar for dollar in our investments on behalf of salmon restoration.

Despite increases in our production of salmon, we ourselves are further restricting salmon harvests in our rivers. In other words, we find ourselves producing more but having to catch less just to stay even. We too have paid a heavy price, and our fishermen have sacrificed in the interest of salmon conservation.

In the North American Commission, both partners have thus been practicing conservation and moving forward. We believe that this cooperation certainly warrants action by Canada to reduce its interceptions of our fish. I would note that the United States now loses more fish to interceptions than any other Party to NASCO. This, again, is not fair. We estimate, on the basis of the information contained in the most recent ICES Working Group Report, that even with Canada's 1984 and 1985 management plans, Canada continues to catch three to five times the number of salmon of U.S. origin that we catch. My purpose in noting this is not to initiate an extended discussion of the numbers, although I am willing to put them all on the table. My purpose is to demonstrate that the United States continues to lose a majority of its salmon to intercepting fisheries.

We recognize the difficulties involved in Canada's developing management measures throughout its Provinces that are fair to all salmon fishermen, both recreational and commercial. Despite these difficulties, we do not believe that they are reason for not taking strong action to protect our fish.

We are disturbed at Canada's rejection of our proposal, especially because the current proposal represents a significant modification of an earlier proposal. Recognizing the political concerns of Canada, we modified our earlier proposal specifically to try to achieve greater protection of our fish while minimizing the impact on Canadian fisheries. Our modified proposal would have helped to save a very significant percentage of our fish at a cost of less than one percent of Canada's total salmon catch.

The impact of our modified proposal on Canada's commercial fishery would have been minimal - approximately 13 metric tons of fish. We believed it possible to modify the proposal further so as to reduce its impact on Canada's fishery to three or four tons of fish while still producing significant benefits to our salmon. In this sense, the proposal made by Denmark in respect of Greenland in the West Greenland Commission of a 1985 quota of 833 metric tons represented a greater percentage reduction than that we asked of Canada. We firmly believe that our proposal would have produced benefits for the United States at almost no cost to Canada.

Mr Chairman, we recognize that it is not our business to tell Canada how to manage its fisheries, but we believe we have some basis under the Convention to propose how Canada should manage its interception of our salmon. By slight adjustments - one day at the beginning of the salmon season in June in one area in Newfoundland - Canada could maintain its commercial catch, close the fall fishery, and not lose any additional fish. One day's catch in June in Newfoundland far exceeds the proposed restriction in the fall months. Our proposal would thus have affected the proportion of benefits of the Canadian management plan only slightly, if at all.

Again, it is not for us to recommend the management measures Canada chooses to employ. But we hope that the Government of Canada, while having rejected our proposal at this meeting, will re-examine its ability under its own internal management regime to minimize interceptions of U.S. salmon. Such re-examination would, we believe, further demonstrate Canada's commitment to the purposes and objectives of the Convention and would serve as an example to other members of the Organization. In doing so, together Canada and the United States could stand very proud of their management record, demonstrate their willingness to make NASCO work and set a standard for other NASCO Commissions. In closing, let me urge that we not allow narrow views or statements made in the heat of the moment to prevail.

EDINBURGH
JUNE 1985

ANNEX 17

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)10

REPORT OF THE NASCO SCIENTIFIC WORKING GROUP ON INTRODUCTIONS OF NEW SALMONIDS ON THE ATLANTIC SEABOARD

BOSTON
February 1985

REPORT OF NASCO SCIENTIFIC WORKING GROUP

INTRODUCTIONS OF NEW SALMONIDS ON THE ATLANTIC SEABOARD

INTRODUCTION

At the May, 1984 meeting of the North American Commission of the North Atlantic Salmon Conservation Organization (NASCO) in Ottawa, Dr. D. Goldthwaite (USA) and Dr. G. I. Pritchard (Canada) were appointed to pursue the establishment of a bilateral scientific working group to examine and develop recommendations for the consideration of the Commission at its next 1985 meeting on the following matters:

1. The potential for adverse impacts on Atlantic salmon stocks resulting from the introduction of Pacific salmonids in the Great Lakes and along the Atlantic coast of North America and ways of minimizing such impact, if noted.

2. Options for protecting the genetic integrity of Atlantic salmon populations including the possible development of protocols for movement or transplants of stocks.

3. The feasibility of and possible ways for achieving more closely aligned fish health programs.

This document constitutes the first report of this Working Group. Although it was recognized that such introductions might impact upon other species such as capelin, herring, and other salmonids, and that impacts could differ species to species, this report confines itself to relationships with Atlantic salmon.

BACKGROUND

In recent years, Pacific salmon, i.e. coho, chinook and steelhead rainbow trout have become an important aspect of the Great Lakes fisheries management programs to provide increased opportunities for sports fishing. Pink salmon were inadvertently introduced into Lake Superior, they were also released in earlier years in both Maine and Newfoundland in attempts to establish natural reproduction, but returns dwindled to, at best, a few fish. Moreover, coho, pink or chum salmon introductions have been made to several of the New England states (e.g. New Hampshire, Connecticut, Rhode Island, Maine, and Massachusetts) for research and with a view toward generating a coastal marine sport fishery and/or utilizing saltwater cage-rearing or sea-ranching techniques. The only recorded introductions of chinook to Atlantic coastal waters

were early introductions to New Brunswick which did not result in the development of a run. Sockeye salmon do not appear to have been introduced to Atlantic waters, although kokanee, the landlocked sockeye, were introduced on at least one occasion to the Great Lakes. Rainbow and brown trout, of course, are used widely through the area and eggs and juveniles imported routinely.

Public concerns on introductions of Pacific salmon at the moment appear focussed upon the increasing distribution of pink salmon in the Great Lakes basin and possible expansion to the Atlantic seaboard, as well as the potential interaction between Atlantic salmon and coho salmon escaping and/or straying from cage or sea ranch operations. The following points are pertinent:

- As a result of a small release of pink salmon into Lake Superior, the species appears to colonize readily.
- the abundance of pinks in Lake Ontario is limited and none have been observed in tributaries in the eastern or southern portion of the lake as yet.
- pinks are abundant in Lake Erie, and fish seen in Lake Ontario are likely strays from the Lake Erie stock.
- angling pressure in Lake Ontario is unlikely to retard growth in abundance of pinks, given their limitations as an angling fish; alternatively, contingency plans could be established to reduce populations by netting during spawning migrations.
- coho salmon will probably interact with Atlantic salmon when spawning (both spatially and temporaly) in rivers where access to spawning habitat is restricted, as similar habitat is used, and the coho may superimpose redds on those of Atlantic salmon.

Apprehensions relative to conservation of existing genetic diversity, communicable diseases, and ecological disturbances are not confined to introductions of Pacific salmon. Commercial interests plan to import Atlantic salmon smolts from Scotland to Maine in 1985. The Commission is alerted also to the growing interests in, and capabilities for engineering the genetic performance of salmon using the modern techniques of biotechnology including gene implantation and induced ploidy, and the possible need to regulate their use.

POTENTIAL FOR ADVERSE IMPACTS

Members of the Working Group reviewed their respective departmental files for case histories of documented adverse

effects on resources to the Atlantic seaboard from the introduction of Pacific salmon, but none were readily apparent. This does not suggest that damages might not occur. The necessity for a case by case examination of either each new introduction or change in established transfer patterns should not be lessened. There appears on the surface to be little in way of concensus within the scientific community as to how real such risks might be. Such a discrepancy in views might be related in part to the specific regions being addressed, given that it may already be too late to preserve the wild salmon genetic resource throughout much of the more southern range of the species, and the varying degree to which Atlantic salmon already has been taken into culture with inherent high probabilities of loss of genetic diversity. In the absence of definite studies on the potential impact of Pacific salmon on East Coast fauna, debate on the issue and perceptions of inherent dangers will probably continue. Studies which have been proposed to address the issue of potential adverse affects are wide ranging, including those that are both marine and freshwater based (e.g. ocean limitation on salmon production, migration routes, predation and potential marine competitors, effects of mixed-fisheries on Atlantic salmon, spawning interactions including super-imposition of redds, fry competition, dissemination of pathogens, etc.) However, the likelihood of such comprehensive studies being conducted is remote, so other options should be sought.

It follows that blanket bans on the introduction of Pacific salmon to the Atlantic seaboard are unlikely necessary, nor would they be easily workable except in the short term. However, orderly and regulated introductions need to be facilitated, preferably following a case by case review pending the development of adequate histories on the source of stocks, and on the distribution and performance patterns established. Mechanisms to examine proposed introductions are in place within most jurisdictions, reference tending to be made to the existing "Codes of Practice" such as ones prepared by the International Council for the Exploration of the Sea (ICES), European Inland Fisheies Advisory Council (EIFAC) and the American Fisheries Society (AFS). However, none of these protocols were designed with Atlantic salmon in mind, and their adequacy may be in doubt. Underlying the establishment of appropriate protocols is the necessity to have minimal size standards for each breeding population and model programs of genetic resource preservation and protection, also effective policies and model programs for the control and/or eradication of the communicable diseases.

OPTIONS FOR PROTECTING GENETIC INTEGRITY

It is important to distinguish between the two processes by which genetic resources are lost. The first is extinction which, once it occurs, is qualitative, final and irreversible.

The second process, termed here as genetic impoverishment, is a matter of degree, and to some extent is reversible. Options to protect genetic integrity of Atlantic salmon should give priority attention to the issues concerned with genetic impoverishment.

The Food and Agriculture Organization of the United Nations (FAO), through a cooperative project with the United Nations Environment Program (UNEP) prepared in 1980 a paper[1] which reviewed the problems of conserving genetic resources of fish. The report pointed out that the basic constraint is lack of knowledge and recommended, among other things, the need for a mechanism for monitoring changes in the genetic diversity of fish populations, for promotion of research directed at creation of knowledge on the genetics of fish which would assist in a more applicable definition of genetic impoverishment in fish species, and for promotion of research on appropriate methodologies for conservation. Equally significant and most relevant to Atlantic salmon, the report emphasized the importance of maintaining breeding populations of an effective size of at least 50 for short-term fitness and of at least 500 for long-term survival; and of avoiding "genetic bottlenecks" created by reduction of breeding populations to small size for one or more generations.

Since that report was prepared, few actions have materialized. Moreover, the economic importance of genetic resources to fish production and aquaculture have yet to be as dramatically documented as those in the agricultural sector, and few model programs have emerged. One report[2] which was prepared by the California Gene Resources Program in 1982 and reportedly the first such comprehensive assessment and plan developed for managing the genetic resources of anadromous fish resources provides useful direction. That report emphasized the importance of genetic considerations in fisheries management, and suggested a number of technical and policy options aimed at maintaining and fully using salmonid genetic resources. These are over and above the commitments already made to have California programs include mid-run closures, area registration, and escapement goals, together with those for restoring native and hatchery stocks. The report proposed, in part, the following types of initiatives:

- an inventory of rivers and streams to determine the genetic changes in their salmonid stocks;

- design and implementation of a marking study of both hatchery and natural stock within a major watershed system;

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1) FAO 1981. Conservation of the Genetic Resources of Fish: Problems and Recommendations. FAO. Fisheries Technical Paper 217. 43 p.

2) Calif. Gene Resources Program. 1982. Anadromous Salmonid Genetic Resources. An Assessment and Plan for California, National Council on Gene Resources, Berkeley. 168 p.

- monitoring the relationship between season closure and harvest regulation programs, and resulting escapement and hatchery return levels within a mixed stock watershed;
- initiating on-site case studies to obtain fundamental data on the specific impacts of genetic diversity and salmonid productivity that result from management practices;
- case studies to obtain precise knowledge regarding the technical measures required forin-situ and ex-situ conservation;
- holding a working conference on the biological basis and applicability of the stock concept to salmonid management;
- developing a research plan that coordinates public and private interests in salmonid gene resource research;
- basing fisheries planning explicitly on a comprehensive consideration of salmonid genetic resources;
- developing a carefully planned and coordinated information system to assemble, analyze, and distribute data related to salmonid genetic resources.

The FAO report went even farther than the California document in advocating that governments should consider urgently the establishment of freshwater and marine reserves, the biological criteria for the design and management of such aquatic reserves to be defined from genetic, ecological and demographic principles. Such a recommendation does not appear to have had anadromous fish in mind.

It follows that, although potential options are numerous, few simple answers emerge, and concerns for genetic impoverishment of Atlantic salmon resources may warrant a higher profile in public policies, and an acceptance in principle of a minimum stock size. A stock may be defined as a genetically distinct population of fish which mate randomly and tend to be temporally or spatially isolated from other populations. A safe minimum standard would need to be adopted, e.g. 50 fish in short-term, 500 in long term. However, stock definition has not been systematically undertaken for many populations of Atlantic salmon in North America, and there is a lack of concensus as to how this might best be done. Therefore, a priority requirement should be the establishment and standardization of such methodology.

The stock concept has wide acceptance among fisheries managers and scientists and has been utilized to varying degrees as a basis for planning and management. Nevertheless, the scientific and technological basis for identifying and monitoring discrete stocks is limited; and the research necessary to identify population units that are important for

species productivity and stability may take considerable time and effort. A conference would enable researchers and managers to share state-of-the-art information about the stock concept relative to Atlantic salmon, establish methodology, and/or plan future research if needed.

DISEASE CONTROL

Progressive fish health programs have emerged in the past decade, and technical procedures established to support those related to salmonids have gained wide acceptance. Therefore, it is both feasible and timely to seek ways for achieving more closely aligned fish health programs as they apply to Atlantic salmon in North America.

The activities of the Great Lakes Fisheries Commission and its Fish Disease Control Committee provides an example of USA-Canada collaboration which works well. It effectively has two elements, a policy statement adopted by the Commission, and a Model Fish Disease Control Program which serves as a guide for member agencies in their program development. A policy statement might similarly be used by the North American Commission of NASCO to reflect their position on this subject.

As to model programs, the present situation is as follows. Within the USA, a New England Atlantic salmon disease control program developed by the Atlantic Salmon Disease Advisory Committee (ASDAC) of the New England Atlantic Salmon Committee has been endorsed by natural resources agencies responsible for managing the fisheries resources. This program sets forth essential requirements for the prevention and control of serious fish diseases, and includes a system for inspecting and certifying fish hatcheries and the technical procedures to be used. It is, however, confined to Atlantic salmon. The ASDAC utilized the following as sources of information in the preparation of its control program: the "Great Lakes Fish Disease Control Program", the "Colorado River Fish Disease Control Program", the "Fish Health Protection Policy" of the U.S. Fish and Wildlife Service, the "Procedures for the Detection and Identification of Certain Fish Pathogens" developed by the Fish Health Section of the American Fisheries Society, the "Fish Health Protection Manual of Compliance" of the Depatment of Fisheries and Oceans of Canada, the "Canadian Maritimes Policy Guidelines for the Movement of Salmonid Stocks", and United States Title 50 CFR 16.13.

In contrast, Canada has had in place since 1977 the Fish Health Protection Regulations which fall under the Fisheries Act, the Manual of Compliance of which was updated in 1984. These regulations control a wide number of salmonids, yet are directed only toward importations and inter-provincial movement of fish, including eggs of such fish. Although standards established under the regulations are deployed more widely, it is now generally agreed that mechanisms for controlling fish

diseases intra-provincially are inadequate. As a result, a task force in Atlantic Canada is now deployed to develop both regulations and a model program for that area, but has yet to report.

It would therefore appear opportune to encourage a close liaison between such planning activities, and to establish a mechanism to supplement the informal communications which now occur with regularity. Such a mechanism could also provide regular reviews of the "state-of-health" in regions represented, and alerts relative to emerging disease problems.

RECOMMENDATIONS

It is recommended that the North American Commission of NASCO acknowledge that the perception of potential adverse impacts on Atlantic salmon resulting from introductions of Pacific salmonids in the Great Lakes and along the Atlantic coast of North America has not been substantiated, yet the concerns may be warranted, at least in part. Blanket bans do not appear justified, but case by case examinations will continue to be needed to facilitate orderly and controlled introductions. Underlying such approaches is the need for establishing policy positions relative to the protocols upon which such examinations are structured, and minimum safe standards of stock size to prevent impoverishment of genetic resources; also for the Commission to state its intentions on disease control needs that should be supported through model programs.

It is recommended that priority attention be directed toward the following:

- The conduct of a workshop to identify and standardize methodology for identifying and monitoring discrete stocks of Atlantic salmon, and to recommend a safe minimum size of each population of breeding stock required to ensure both short-term fitness and long-term survival.

- The establishment of a group of experts to liaise on the development of model disease control programs, and to assess needs to ensure that fish health programs are more closely aligned.

- The establishment of a group of experts to review existing protocols and control mechanisms now in use for assessing impacts of introducing non-indigenous salmonids, and for use of salmonids with manipulated genetic performance potentials.

It is further recommended that the Commission declare itself on the principles and practices that it wishes to encourage within each member agency through the release of a policy statement on "Fish Health Management", and that the statement contain the following elements.

"To work towards the attainment of fish disease control in the Atlantic salmon along the Atlantic coast of North America, it shall be the policy of the North American Commission of NASCO to encourage each member agency to:

- develop legislative authority and regulations to allow control and possible eradication of fish diseases;
- prevent the release of seriously diseased fish;
- discourage the rearing of diseased fish;
- prevent the importation, into the areas populated by Atlantic salmon, of fish infected with certifiable diseases;
- prevent the transfer, within the areas populated by Atlantic salmon, of fish infected with restricted diseases, and
- eradicate fish diseases wherever practicable.

The Commission will strive to coordinate the fish disease control activities of the member agencies by seeking to establish compatability between the various model programs of member agencies that impinge upon Atlantic salmon".

It is further recommended that this report be forwarded to member agencies for endorsement, or proposed amendments as appropriate.

February 6, 1985

ANNEX 18

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

NAC (85)11

TERMS OF REFERENCE OF ICES WORKING GROUP

BOSTON
February 1985

International Council for the Exploration of the Sea

C.Res.1984/2:33

C.Res.1984/2:33 The Working Group on Introductions and Transfers of Marine Organisms (Chairman: Dr C J Sindermann) will meet in Goteborg (Sweden) on 28-31 May 1985, including two days of joint session with the FAO/EIFAC Working Party on Introductions, to:

(i) complete the preparation of the "Manual of Procedures to Reduce the Risks of Adverse Effects Arising from the Introductions and Transfers of Marine Species",

(ii) consider revisions and modifications of the revised Code of Practice developed over the past five years,

(iii) consider and make plans for a possible mini-symposium or special meeting on the effects of introductions and transfers in the form of presentations of critical case histories,

(iv) continue to explore methods for the increased dissemination, understanding and implementation of the revised Code of Practice,

(v) continue the synthesis and compilation of relevant national laws and regulations,

(vi) prepare a document on the dangers that non-indigenous species may be introduced by drilling vessels on continental shelves,

(vii) continue to monitor the introduction of the alga Undaria into Atlantic waters,

(viii) continue the review of the status of salmonid fish, algal, shellfish and other introductions in and between ICES member countries,

(ix) discuss at the joint session (a) commonalities and differences in codes of practice, (b) guidelines for handling the codes, (c) protocols, and (d) practice, joint activities, including a special meeting in 1987 on introductions.

ANNEX 19

NAC (85) 23
NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

PROPOSAL TO ESTABLISH A JOINT WORKING GROUP TO REVIEW THE EFFECTS OF ACID RAIN ON ATLANTIC SALMON

A bilateral working group of Canadian and USA scientists should be formed to consider the extent and implications of acidification of freshwater salmon habitat in the North American Commission Area and to advise NASCO regarding:

1) Identification of freshwater habitats which support or have supported Atlantic salmon populations and classification of these habitats in relation to their vulnerability to loss of productivity of Atlantic salmon due to acidification.

2) Trends in acidification of habitat identified in question 1, and in the fish populations supported by those habitats.

3) The influence of acidification of freshwater habitat on growth and survival of Atlantic salmon fry and parr and the implications for smolt and adult production.

4) The causes of increasing acidity of habitats where such increases have occurred, including the sources of acids precipitated from the atmosphere.

5) The effectiveness of mitigation measures such as liming and the extent to which these measures are in current use.

BOSTON
FEBRUARY 1985

ANNEX 20

NAC (85) 24

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

NORTH AMERICAN COMMISSION

DECISION OF THE NORTH AMERICAN COMMISSION ON AN AMENDMENT TO RULE 15 OF THE RULES OF PROCEDURE

The Commission,

Having regard to Article 11, paragraph 1, of the Convention, adopts the following amendment to Rule 15 of its Rules of Procedure:

Rule 15 shall read as follows:

In the event of the office of Chairman falling vacant due to resignation or permanent inability to act, the Vice-Chairman shall act as Chairman until the next meeting of the Commission, on which occasion a new Chairman shall be elected to serve for the remainder of his predecesssor's term of office.

EDINBURGH
June 1985

ANNEX 21

NAC (85)20
NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
NORTH AMERICAN COMMISSION

ELECTION OF OFFICERS

Following a discussion of Article 10, paragraph 6, of the Convention and Rules 11 and 12 of the Rules of Procedure, the Commission confirmed that the terms of office of the Chairman and Vice-Chairman should expire at the end of the Third Annual Meeting.

EDINBURGH
June 1985

ANNEX 22

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
SECOND ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION
21-22 FEBRUARY 1985, COPLEY PLAZA HOTEL, BOSTON, MASS, USA
AND 3-7 JUNE 1985, DRAGONARA HOTEL, EDINBURGH, UK

LIST OF NORTH AMERICAN COMMISSION PAPERS

NAC (85)1	Provisional Agenda
NAC (85)2	ACFM Report from ICES on Salmon Stocks (Nov 1984)
NAC (85)3	Draft Agenda
NAC (85)4	Impact of 1984 Management Plan on Newfoundland Commercial Salmon Fisheries
NAC (85)5	Known Bright Atlantic Salmon Catches from Maine Rivers 1948-84
NAC (85)6	Estimated Total Run Size in US Rivers
NAC (85)7	Distribution of Net Fishing Income in Analytical Areas (Full-time)
NAC (85)8	United States Proposal for Regulatory Action in North American Commission Area
NAC (85)9	Specific Report to ICES
NAC (85)10	Report of NASCO Scientific Working Group on Introductions of New Salmonids on the Atlantic Seaboard
NAC (85)11	Terms of Reference of ICES Working Group
NAC (85)12	Draft Proposal to Establish Joint Working Group to Review Effects of Acid Rain on Atlantic Salmon
NAC (85)13	Draft Report of Second Annual Meeting of the North American Commission
NAC (85)14	Estimated Reductions in Interception of US Salmon in Newfoundland
NAC (85)15	Draft Decision of the North American Commission on Amendment to Rule 15 of the Rules of Procedure
NAC (85)16	Draft Questions from NASCO to ICES, June 1985
NAC (85)17	Report of the Meeting of the Working Group on North Atlantic Salmon, Bangor, Maine, USA, 6-8 May 1985

NAC (85)18	Canadian Statement to North American Commission
NAC (85)19	Statement made by the Head of US Delegation
NAC (85)20	Election of Officers
NAC (85)21	Agenda
NAC (85)22	Questions from NASCO to ICES
NAC (85)23	Proposal to Establish Joint Working Group to Review Effects of Acid Rain on Atlantic Salmon
NAC (85)24	Decision of the North American Commission on Amendment to Rule 15 of Rules of Procedure
NAC (85)25	Report of the Second Annual Meeting of the North American Commission

NOTE: This list contains all papers submitted to the Commission prior to and at the meetings. Some, but not all, of these papers are included in this Report as annexes.