REPORT OF THE EIGHTH ANNUAL MEETINGS OF THE

NORTH AMERICAN COMMISSION

11-14 JUNE 1991
EDINBURGH, UK

NORTH-EAST ATLANTIC COMMISSION

11-14 JUNE 1991
EDINBURGH, UK

WEST GREENLAND COMMISSION

11-14 JUNE 1991
EDINBURGH, UK

TABLE OF CONTENTS

REPORT OF THE

EIGHTH ANNUAL MEETING

OF THE

NORTH AMERICAN COMMISSION

11-14 JUNE 1991

EDINBURGH, UK

CHAIRMAN:	DR GABY WARD (CANADA)
VICE-CHAIRMAN:	MR STETSON TINKHAM (USA)
RAPPORTEUR:	MR STETSON TINKHAM (USA)
SECRETARY:	DR MALCOLM WINDSOR

NAC(91)18

CONTENTS

NAC(91)18

REPORT OF THE EIGHTH ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION OF THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 11-14 JUNE 1991, SHERATON HOTEL, EDINBURGH, UK

1. OPENING OF THE MEETING

1.1 The Eighth Annual Meeting of the North American Commission was opened by the Chairman, Dr Gaby Ward (Canada), who welcomed the delegates to Edinburgh.

1.2 A list of participants is given in Annex 1.

2. ADOPTION OF THE AGENDA

2.1 The Commission adopted its agenda, NAC(91)17, (Annex 2).

3. NOMINATION OF A RAPPORTEUR

3.1 The Commission nominated Mr Stetson Tinkham (USA) as rapporteur for the meeting.

4. ACFM REPORT FROM ICES ON SALMON STOCKS "SALMON IN THE NORTH AMERICAN COMMISSION AREA"

4.1 The Chairman of the ACFM, Dr Fredric Serchuk, presented the scientific advice from ICES relevant to the North American Commission, CNL(91)11, (Annex 3) prepared in response to a request from the Commission at its Seventh Annual Meeting. He reported that Canada introduced two new management measures in 1990: quotas by salmon fishing area were introduced in the Newfoundland commercial salmon fishery, and in Quebec measures resulting in a delay in the opening of the commercial salmon fishing season, reductions in the commercial fishing quotas and restrictions on commercial fishing within 500m of river mouths were introduced. Salmon landings in Canada totalled 870t in 1990, the lowest recorded level during the past 30 years. 74% of the catch was taken by commercial fishermen, and the catch comprised fish of Canadian and USA origin. Dr Serchuk reported that egg deposition levels approximated or exceeded targets in 6 Canadian rivers, but egg depositions and salmon returns were reduced, in general. The ACFM used two calculations, the "fixed closure date prediction" and the "fixed quota prediction", to estimate that the effect of introducing quotas may have been to reduce interceptions of USA origin salmon by from 0 - 185 fish and 130 - 364 fish respectively. The report noted that recreational fishermen in the USA retained 627 fish in 1990, 30% more than in 1989, and that the number of fish which were caught and released exceeded the number caught and killed. Catches in Maine rivers, and USA returns in general, were greater than those in 1989, with returns totalling 4,442 fish in 1990. The ACFM report noted that the islands of St Pierre et Miquelon recorded a commercial catch of 1t of Atlantic salmon in 1990. Finally, the ACFM pointed out that the number of escapees from fish farms, and their effects on wild stocks could not be quantified.

5. REPORT OF THE NAC SCIENTIFIC WORKING GROUP ON SALMONID INTRODUCTIONS AND TRANSFERS

5.1 The Co-Chairman of the NAC Scientific Working Group on Salmonid Introductions and Transfers presented a report on the activities of the group in 1990/91, NAC(91)5, (Annex 4). During this period an inventory of Salmonid introductions and transfers undertaken in 1990 and some proposed for 1991 had been prepared, NAC(91)6, (Annex 5). The Working Group had also discussed the importance of a gene bank for salmon in the North American Commission area. The Working Group reported that while the establishment of a gene bank using cryopreservation is not a mechanism for preserving a gene pool, gene banks would be desirable if a stock was threatened. Gene banks could also be beneficial for some enhancement and aquaculture programmes. Further investigations are required to determine the extent to which cryopreservation may cause genetic damage to the genes. The Working Group had also provided an outline of the occurrence of parasites and diseases harmful to Atlantic salmon in the North American Commission area. The Commission requested the Working Group to continue to describe the distribution of parasites and diseases in the Commission area.

5.2 At its Sixth Annual Meeting the Commission considered a discussion document entitled 'Introductions and Transfers of Salmonids: Their Impacts on North American Atlantic Salmon and Recommendations to Reduce Such Impacts', NAC(89)13. The Commission had been requested to endorse the principle of the protocols contained in the document but it was agreed that time was required for a thorough review. At the Commission's Eighth Annual Meeting, the representatives of Canada and the USA reported on the results of the consultations within their respective countries and endorsed the principles of the protocols including the concept of zoning of rivers. The Commission agreed that specific comments on the protocols should be provided to the Working Group by 31 July 1991 and that the Working Group should revise the protocols, taking into consideration the comments provided, by 31 December 1991.

6. IMPACT OF ACID RAIN ON ATLANTIC SALMON

(a) ACFM Report from ICES

6.1 ICES provided no new scientific advice with respect to the impact of acid rain on Atlantic salmon.

(b) Review of Mitigative Measures

6.2 Following a discussion of bilateral legislative and treaty initiatives which had been undertaken by Canada and by the United States, the representative of Canada tabled a list of questions, NAC(91)11, (Annex 6) to be referred to the "Clean Air Committee" established under the Canada - United States Air Quality Agreement.

7. REVIEW OF THE 1990 FISHERY

7.1 The representative of Canada tabled documents NAC(91)7, (Annex 7) and NAC(91)8, (Annex 8), describing the 1990 Canadian Atlantic salmon catches and the status of Atlantic salmon stocks in Canada, respectively. The US representative tabled

document NAC(91)10, (Annex 9) describing the status of USA Atlantic salmon stocks. In general, while Canada reported some success in achieving egg deposition targets, and while returns increased in several rivers in both countries, runs are well below historical averages. In the USA rivers, restoration targets have not yet been achieved.

8. REVIEW AND DISCUSSION OF THE PROPOSED 1991 CANADIAN AND US SALMON MANAGEMENT MEASURES AS THEY RELATE TO THE MANDATE OF THE COMMISSION AND TO THE FINDINGS OF THE ACFM REPORT FROM ICES

8.1 The representative of Canada tabled document NAC(91)9, (Annex 10) describing the 1991 Atlantic Salmon Management Plan. The plan establishes a 600t commercial quota for Newfoundland, reduces daily bag limits for recreational fishermen, and provides for subsistence fisheries by aboriginal communities. The US representative questioned what further commitments Canada would make, under Article 7 paragraph 1(b) of the Convention, and tabled paper NAC(91)15, (Annex 11) as a proposed North American Commission regulatory measure.

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

9.1 The Commission reviewed and accepted the relevant sections of paper CNL(91)44, (Annex 12), and agreed to recommend it to the Council as part of the annual request for scientific advice to ICES.

10. REPORT ON THE NASCO TAG RETURN INCENTIVE SCHEME AND ANNOUNCEMENT OF AWARDS

10.1 The Chairman announced that the draw for the prizes in the Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 4 June 1991. The winner of the first prize was Miss Tina Dunnett, Newcastle, New Brunswick. A list of all prize winners was presented to the Commission, NAC(91)3, (Annex 13). The Commission offered its congratulations to all of the prize winners.

11. DATE AND PLACE OF THE NEXT MEETING

11.1 The Commission agreed to hold its next meeting during the Ninth Annual Meeting of the Council, 8-12 June 1992, in Washington DC, USA.

12. OTHER BUSINESS

12.1 The Secretary presented information obtained from the Government of France on catches of Atlantic salmon for the islands of St Pierre et Miquelon, NAC(91)4, (Annex 14).

13. CONSIDERATION OF THE DRAFT REPORT OF THE MEETING

13.1 The Commission considered a draft Report of the meeting.

ANNEX 1

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
EIGHTH ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION
11-14 JUNE 1991, EDINBURGH, UK

LIST OF PARTICIPANTS

* Denotes Head of Delegation

MEMBERS OF THE COMMISSION

CANADA

*MR JEAN E HACHE	Representative Department of Fisheries and Oceans, Ottawa, Ontario
DR WILF CARTER	Representative Atlantic Salmon Federation, St Andrews, New Brunswick
DR GABY WARD	Representative Champlain College, Quebec
MR MIKE CALCUTT	Department of Fisheries and Oceans, Ottawa, Ontario
MR DAVID MEERBURG	Department of Fisheries and Oceans, Ottawa, Ontario
MR MATT MURPHY	Food, Fisheries & Allied Workers/Canada Auto Workers Staff Representative, Newfoundland
MR REX PORTER	Department of Fisheries and Oceans, St John's, Newfoundland
MR DAVID RIDEOUT	Department of Fisheries and Oceans, Ottawa, Ontario
MR DAVID VARDY	Department of Fisheries, Government of Newfoundland and Labrador, St John's, Newfoundland

USA

DR FRANK CARLTON	Representative National Coalition for Marine Conservation, Savannah, Georgia

MR CLINTON TOWNSEND	Representative Maine Council of the Atlantic Salmon Federation, Canaan, Maine
DR JENNIFER BAILEY	National Marine Fisheries Service, Maryland
MR EDWARD T BAUM	Atlantic Sea Run Commission, Maine
MR DAVID EGAN	Connecticut River Atlantic Salmon Commission, Guilford
MR ROBERT JONES	Connecticut Bureau of Fisheries, Hartford, Connecticut
MR HENRY LYMAN	Atlantic Salmon Federation, Boston, Massachusetts
MR JAMES MCCALLUM	US House of Representatives, Washington DC
MR ARTHUR NEILL	National Marine Fisheries Service, Woods Hole, Massachusetts
MR GILBERT RADONSKI	Sport Fishing Institute, Washington DC
MR RICHARD ROE	National Marine Fisheries Service, Gloucester, Massachusetts
MR STETSON TINKHAM	Dept of State, Office of Fisheries Affairs, Washington DC
DR JAMES WEAVER	US Fish and Wildlife Service, Newton Corner, Massachusetts

OBSERVERS - PARTIES

NORWAY

MR BJORNULF KRISTIANSEN	Norwegian Farmers Association, Oslo

SECRETARIAT

Secretary	DR MALCOLM WINDSOR
Assistant Secretary	DR PETER HUTCHINSON

ANNEX 2

NAC(91)17
EIGHTH ANNUAL MEETING OF THE NORTH AMERICAN COMMISSION
11-14 JUNE 1991
SHERATON HOTEL, EDINBURGH, UK

AGENDA

1. Opening of the Meeting

2. Adoption of the Agenda

3. Nomination of a Rapporteur

4. ACFM Report from ICES on Salmon Stocks "Salmon in the North American Commission Area"

5. Report of the NAC Scientific Working Group on Salmonid Introductions and Transfers

6. Impact of Acid Rain on Atlantic Salmon
   (a) ACFM Report from ICES
   (b) Review of Mitigative Measures

7. Review of the 1990 Fishery

8. Review and Discussion of the Proposed 1991 Canadian and US Salmon Management Measures as they relate to the Mandate of the Commission and to the Findings of the ACFM report from ICES

9. Recommendations to the Council concerning Request to ICES for Scientific Research and Scientific Advice

10. Report on the NASCO Tag Return Incentive Scheme and Announcement of Awards

11. Date and Place of the Next Meeting

12. Other Business

13. Consideration of the Draft Report of the Meeting

ANNEX 3

COUNCIL

PAPER CNL(91)11

REPORT OF THE ICES ADVISORY COMMITTEE ON FISHERY MANAGEMENT (SECTION 4)

4. INFORMATION OF INTEREST TO THE NORTH AMERICAN COMMISSION

Source of Information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

4.1 Description of the Fishery in Canada, 1990

Two new management measures were introduced in the Newfoundland and Labrador commercial fisheries in 1990:

- Quotas by Salmon Fishing Area (SFA) were introduced in the Newfoundland commercial salmon fishery. Salmon Fishing Area 1 had an allowance of 80 t. An allowance is an estimate of expected catch and not a limitation on allowable harvest. Monitoring of the quotas was conducted by fisheries officers who were in contact with buyers and fishermen on a weekly or daily basis.

SFA	1990 Catch (t)	Quota (t)
1	30	80 [1]
2	151	200
3	135	155
4	92	100
5	25	25
6	19	20
7-11	72	80
13-14	87	95
Q7-9	64	NA [2]
Q11	1	15

[1] Allowance
[2] Not Applicable

- Along the Quebec North Shore, the opening of the commercial fishing season, previously 1 June, was delayed by 10 days in Q7 and Q8 and by 1 month in Q9. The total quota in numbers was reduced by 12% to 29,605 salmon. Commercial fishing was prohibited within a 500 m zone from the mouth of the rivers.

The total salmon landings for Canada in 1990 were 870 t (Table 1); this is the lowest recorded level in the period 1960-90. The recreational fisheries harvested 22%

(191 t), commercial fisheries 74% (644 t), and native fisheries 4% (35 t) of the total landings by weight.

Catches in the Newfoundland commercial fishery are given in text table below:

Newfoundland Commercial Fishery

Year	1985	1986	1987	1988	1989	1990
Catch (t)	881	1230	1485	972	867	586 [1]

[1] Preliminary

4.2 Composition and Origin of Catch

Only salmon of Canadian and USA origin were caught in Canada during 1990. Re-captures of tagged 1SW salmon of USA and Canadian Origin occurred in the Newfoundland and Labrador fisheries.

4.3 Exploitation Rates in Canadian Fisheries

Exploitation rates on 1SW salmon for the Restigouche River have averaged 48% for early and late runs combined. The combined rate for 1SW salmon in the Miramichi River is 25%. The Margaree River late run 1SW exploitation rate is 17%.

4.4 Status of Canadian Stocks

Estimates of egg depositions in 1990 approximated or exceeded target egg requirements in six rivers. However, egg deposition was 32% below target in the Saint John River. With the exception of the Conne River, most rivers obtained a major component of eggs from MSW salmon.

Additional assessments (based on counts obtained at fishways, counting fences and by divers) made in 1990 suggest that target egg depositions approximated or were below requirements on 4 rivers. Four rivers of the inner Bay of Fundy (SFA 23), had returns that were down relative to historical returns. Reasons for shortfalls in target egg deposition vary by river system and include the effects of low water levels on juvenile survival in 1987, natural cycles, low pH and increased marine mortality.

Counts of 1SW fish at 10 of 12 fishways on systems in insular Newfoundland were down from the 1984-1989 mean. In 8 of 12 cases, the few large salmon counted in Newfoundland were below 1984-1989 mean. In the Maritime provinces, counts of 1SW salmon were similar to or above the mean at all 3 fishways (in SFA 20, 21, 23); counts of MSW salmon declined at all fishways. Counts of 1SW fish in Quebec increased over the 1984-1989 mean at all fishways; counts of MSW salmon were similar to or increased above mean at 2 out of 4 fishways.

4.5 Harvest Estimates of USA-Origin Salmon in Canada

The Working Group updated the time series of Carlin tag returns and harvest estimates of Maine-origin 1SW salmon in Newfoundland and Labrador. The total harvest of 1,717 Maine-origin salmon in the 1989 fishery was distributed primarily in SFAs 1-5.

Carlin Harvest, Maine-Origin Salmon

Year	1984	1985	1986	1987	1988	1989
Harvest	1329	2288	552	580	393	1717

Comparative harvest estimates based on CWT and Carlin tag recoveries were calculated for the communities and Statistical Sections sampled.

The proportional harvest model was used to estimate the harvests of 1SW Maine-origin salmon in two communities in Labrador and one in Newfoundland. ACFM concludes that the proportional harvest method cannot be used to estimate the total harvest of Maine-origin salmon in the Newfoundland and Labrador commercial fisheries without a greatly expanded scale sampling program for river age data.

4.6 Evaluation of the Effects of the 1990 Quota on the Commercial Salmon Fishery of Newfoundland and Labrador

In 1990, Canada introduced quota management for the Newfoundland and Labrador commercial salmon fisheries (see Section 4.1). Quotas were attained in 8 of the 12 SFAs (4, 5, 6, 8, 10, 11, 13 and 14) resulting in closing dates in these fisheries ranging from June 21 to July 25.

To evaluate the effects of the closures, the Working Group used two approaches, both of which relied on the weekly distribution of landings by SFA for 1984 to 1989. In the first approach, the closure date that occurred in each SFA in 1990 was applied to each SFA and year (1984-1989) to compute the percent reduction in harvest for that year. The minimum, maximum and mean percentages were then applied to the 1990 catches to predict the range of catches forgone in 1990. This approach was called the "Fixed Closure Date Prediction".

It is estimated that the catch of 1SW salmon forgone in SFAs 4, 5, 6, 8, 10, 11, 13 and 14 due to early closure was between 20,000 and 120,000 fish. The catch of large salmon forgone in these SFAs was between 4,000 and 22,000 fish.

The estimates of harvest of USA salmon are highly variable, thus the effects could range between 0% and 71% reduction in the harvest, equivalent to 0 to 185 fish.

In the second approach, the 1990 quota was applied to the temporal distribution of catches in each SFA for the years 1984 to 1989. The date on which the quota used in 1990 would have been fulfilled, the landings that would have been caught, and the

estimated reduction in the interceptions of Maine-origin salmon were computed. This approach was called the "Fixed Quota Prediction".

The predicted reduction in total catch, 1984-89, ranged from 98 t (13%) to 746 t (53%) with a mean predicted reduction of 321 t (30%). The total predicted reduction in harvests of 1SW salmon of Maine-origin ranged from 130 to 364 fish with a mean reduction of 228 fish.

Some salmon released from one SFA due to closure of fisheries may be caught in fisheries that are still open. This may lower the predicted reduction in harvests.

4.7 Description of the Fishery in the USA, 1990

Recreational catches of Atlantic salmon (fish kept) of 627 were about 30% higher in 1990 than in 1989. The increased catch was attributed to increased effort as evidenced by higher sales of licenses, excellent angling conditions and, in some instances, larger runs of salmon. The number of salmon caught and released in Maine rivers exceeded the number caught and killed.

The angling exploitation rate on combined age classes in the Penobscot River for 1990 (13.0%) was the same as for 1989 (12.6%) based upon the fish passage efficiency (.85) and reporting rate (.80) adopted by the Working Group in previous years.

4.8 Status of the USA Stocks

Catches in 1990 in Maine rivers with salmon runs that are primarily of wild origin increased but were 44% below the long-term average.

Spawning escapement of MSW female salmon to the Penobscot, Merrimack and Connecticut rivers is well below established targets based on the full habitat utilization of 2.4 eggs/m^2.

Documented (counted or reported) Atlantic salmon returns to rivers in the United States totalled 4,442 in 1990. This figure is 23% greater than that recorded for 1989.

ACFM notes that the number of wild-origin 1SW and 2SW salmon in the Penobscot River has increased in recent years. The percentage of wild 2SW salmon in Penobscot River trap counts has increased from less than 1% in 1981 to over 8% in 1990; increases for wild 1SW salmon have been even greater, up 17% in 1990.

4.9 Description of the Fishery in the Islands of St. Pierre and Miquelon (France)

A catch of 1 t of salmon for the Islands of St. Pierre and Miquelon was given in the Working Group report. These catches were made by professional fishermen and do not include catches by pleasure boat fishermen. In 1989, there were 13 professional fishermen and 37 licensed pleasure boat fishermen. Tag returns from previous years indicate that salmon of Canadian and US origin have been captured in the commercial fisheries of St. Pierre and Miquelon.

4.10 Quantitative Estimates of the Effects of Fish Farm Escapees

USA

The total number of salmon that escape from net pens in the USA is unknown, since most rivers in the vicinity of net pens do not have fish trapping facilities. About 20% of the 1990 angling catch in the East Machias River was of salmon of aquaculture origin. Small numbers of fish were also documented in two other Maine rivers. The effects of fish farm escapees on USA salmon stocks is unknown, but is thought to be small.

Canada

Most of the aquaculture production in Canada occurs in southern New Brunswick and is based primarily upon stock originally from the Saint John River. The number of salmon that escape from net pens annually is unknown, although it is known that there are occasional losses of fish due to predators or storm damage. A recent example occurring in 1990 was the loss of about 19,000 large salmon from one cage site in southern New Brunswick. ACFM notes that the aquaculture facility in Quebec is land-based, therefore the probability of escape from this facility is very low.

Documentation of aquaculture escapees in Canadian rivers during 1990 was restricted to the Saint John River at the Mactaquac trap facility. A provisional estimate is that 6% (221) of the total MSW returns were of farmed origin. The effects of the escapees on the wild stocks could not be quantified.

Table 1 Nominal catch of Salmon by Country (in tonnes round fresh weight), 1960-1990

Year	Canada[5]	Denmark	Faroes	Finland	France	East Green-Land	West Green-Land	Iceland	Ireland[2]	Norway[4]
1960	1,636	-	-	-	75	-	60	100	743	1,659
1961	1,583	-	-	-	75	-	127	127	707	1,533
1962	1,719	-	-	-	75	-	244	125	1,459	1,935
1963	1,861	-	-	-	75	-	466	145	1,458	1,786
1964	2,069	-	-	-	75	-	1,539	135	1,617	2,147
1965	2,116	-	-	-	75	-	861	133	1,457	2,000
1966	2,369	-	-	-	75	-	1,370	106	1,238	1,791
1967	2,863	-	-	-	75	-	1,601	146	1,463	1,980
1968	2,111	-	5	-	75	-	1,127	162	1,413	1,514
1969	2,202	-	7	-	75	-	2,210	133	1,730	1,383
1970	2,323	-	12	-	75	-	2,146	195	1,787	1,171
1971	1,992	-	-	-	75	-	2,689	204	1,639	1,207
1972	1,759	-	9	32	34	-	2,113	250	1,804	1,568
1973	2,434	-	28	50	12	-	2,341	256	1,930	1,726
1974	2,539	-	20	76	13	-	1,917	225	2,128	1,633
1975	2,485	-	28	76	25	-	2,030	266	2,216	1,537
1976	2,506	-	40	66	9	<1	1,175	225	1,561	1,530
1977	2,545	-	40	59	19	6	1,420	230	1,372	1,488
1978	1,545	-	37	37	20	8	984	291	1,230	1,050
1979	1,287	-	119	26	10	<1	1,395	225	1,097	1,831
1980	2,680	-	536	34	30	<1	1,194	249	947	1,830
1981	2,437	-	1,025	44	20	<1	1,264	163	685	1,656
1982	1,798	-	865	54	20	<1	1,077	147	993	1,348
1983	1,424	-	678	57	16	<1	310	198	1,656	1,550
1984	1,112	-	628	44	25	<1	297	159	829	1,623
1985	1,133	-	566	49	22	7	864	217	1,595	1,561
1986	1,559	-	530	38	28	19	960	310	1,730	1,598
1987	1,784	-	576	49	27	<1	966	222	1,239	1,385
1988	1,311	-	243	34	32	4	893	396	1,874	1,076
1989	1,139	-	364	52	14	<1	337	278	1,079	905
1990[1]	870	13	312	59	15	<1	227	421	442	908

1 Provisonal figures.
2 Catch on River Foyle allocated 50% Ireland and 50% Northern Ireland.
3 Not including angling catch (mainly grilse).
4 Before 1966, sea trout and sea charr included (5% total).
5 Includes estimates of some local sales and by-catch.
6 Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.

cont'd.

Table 1 cont'd.

Year	St-Pierre and Miquelon	Sweden (West Coast)	UK England + Wales	UK Scotland	UK Northern Ireland[23]	USA	USSR	Others[6]	TOTAL
1960	-	40	283	1,443	139	1	1,100	-	7,279
1961	-	27	232	1,185	132	1	790	-	6,519
1962	-	45	318	1,738	356	1	710	-	8,725
1963	-	23	325	1,725	306	1	480	-	8,651
1964	-	36	307	1,907	377	1	590	-	10,800
1965	-	40	320	1,593	281	1	590	-	9,467
1966	-	36	387	1,595	287	1	570	-	9,825
1967	-	25	420	2,117	449	1	883	-	12,023
1968	-	20	282	1,578	312	1	827	403	9,830
1969	-	22	377	1,955	267	1	360	893	11,615
1970	-	20	527	1,392	297	1	448	922	11,316
1971	-	18	426	1,421	234	1	417	471	10,794
1972	-	18	442	1,727	210	1	462	486	10,925
1973	-	23	450	2,006	182	2.7	772	533	12,746
1974	-	32	383	1,708	184	0.9	709	373	11,941
1975	-	26	447	1,621	164	1.7	811	475	12,209
1976	2.5	20	208	1,019	113	0.8	772	289	9,537
1977	-	10	345	1,160	110	2.4	497	192	9,495
1978	-	10	349	1,323	148	4.1	476	138	7,650
1979	-	12	261	1,076	99	2.5	455	193	8,090
1980	-	17	360	1,134	122	5.5	664	277	10,081
1981	-	26	493	1,233	101	6.0	463	313	9,930
1982	-	25	286	1,092	132	6.4	364	437	8,645
1983	3	28	429	1,221	187	1.3	507	466	8,732
1984	3	40	345	1,013	78	2.2	593	101	6,893
1985	3	45	361	913	98	2.1	659	-	8,095
1986	2.5	54	430	1,271	109	1.9	608	-	9,249
1987	2	47	302	922	56	1.2	564	-	8,142
1988	2	40	395	882	114	0.9	419	-	7,716
1989	2	29	296	895	142	1.7	359	-	5,894
1990[1]	1	33	297	543	94	2.4	316	-	4,554

ANNEX 4

NORTH AMERICAN COMMISSION

PAPER NAC(91)5

REPORT OF THE ACTIVITIES IN 1990/91 OF THE NAC SCIENTIFIC WORKING GROUP ON SALMONID INTRODUCTIONS AND TRANSFERS

REPORT OF ACTIVITIES IN 1990/91 OF THE NAC SCIENTIFIC WORKING GROUP ON SALMONID INTRODUCTIONS AND TRANSFERS

T.R. Porter
Canadian Co-chairman

David Goldthwaite
USA Co-chairman

There were four main issues addressed by the Scientific Working Group in 1990-91. Consultation and collaboration were conducted by correspondence.

1. INVENTORY OF INTRODUCTIONS AND TRANSFERS OF SALMONIDS IN THE NAC AREA

State and provincial reports on salmonid introductions and transfers for 1990, and some proposed for 1991, have been reported and tabulated for NAC. Some reporters took the time to review, critically, the content of the 1986-89 inventory and were able to make corrections, fill data gaps, or clarify the records. The quality of the inventory has improved as a result of that extra review effort.

Most salmonid introductions and transfers, as in the past, are in connection with aquaculture (fish husbandry) or for research. Movements for fish management purposes involving recreational fisheries is the least frequent reason for moving fishes.

The Scientific Working Group recommended in its 1987 report, that no salmonids be introduced into the NAC area from sites west of the Continental Divide nor from Europe or Iceland. The current inventory update indicates these types of fish movements are still taking place (Table 1). The movements of rainbow trout and Atlantic salmon eggs to Prince Edward Island from Washington, Scotland and Norway are part of a vaccine development research operation, and the fish are destroyed after use. The three movements to New Brunswick of brook trout from Washington came from Beiteys Resort (having a long disease-free history) for use in aquaculture activities.

Salmonid introductions and transfers proposed for 1991 were provided by Connecticut and Ontario (Table 2). As is usually the case, most agencies are not yet clear on details for proposed introductions and transfers in the coming year.

2. COMMENTS ON NASCO COUNCIL PAPER CNL(90)31, "DRAFT GUIDELINES FOR DEVELOPING ADVISORY CODES OF PRACTICE TO MINIMIZE THREATS TO WILD SALMON STOCKS"

The Working Group reviewed Council Paper CNL(90)31 and provided comments to the NASCO Secretariat. A copy of the comments is attached in Appendix I. The revised paper CNL(91)25 incorporated our comments.

3. GENE BANK FOR NAC AREA

In the 1990 Annual Meeting the North American Commission asked the Scientific Working Group to discuss the importance of a gene bank for the NAC, and to consider the recommendation of a gene bank within the NAC area.

The Working Group forwarded this question to the Genetics Subgroup for consideration. The geneticists were not in total agreement on the desirability of a gene bank using cryopreservation. There was concern that the establishment of a gene bank would provide the false sense of security that "genetic characteristics of a salmonid population can be preserved in a gene bank". Geneticists agreed that there is no substitute for protecting and maintaining wild populations in their native habitat. Proper fisheries management and protection of spawning and nursery areas is the only safe way to maintain the genetic integrity of a salmon stock. Establishment of a sanctuary for selected populations is more desirable than cryopreservation in gene banks.

Presently, the technology exists for the cryopreserving of sperm, but not eggs. Thus, the genetic contribution of female salmon to a stock cannot be preserved. Concern was also raised that the cryopreservation may cause genetic damage. This concern requires further investigation.

In some circumstances, it is not possible to preserve gene pools in their native habitat. An example of this would be habitat loss due to acidification. Under such circumstances, gene banking via cryopreservation may be the only option, even though the entire gene pool cannot be preserved. Without gene banking, the entire gene pool of the population would be lost.

The establishment of a gene bank could be of assistance to stock enhancement programs that derive their hatchery production from wild broodstock when population sizes are small. The cryopreserved milt could be used to cross year-classes and enhance the effective numbers of parents. A gene bank could also provide similar benefits to aquaculturists. It could also reduce the frequency of requiring spawners from wild populations for aquaculture.

In summary, establishment of a gene bank using cryopreservation is not a mechanism for preserving a gene pool of a salmon population. Protection of gene pools can only be ensured by preservation of spawning and nursery areas, and effective fisheries management. Gene banks using cryopreservation would be desirable if a stock is threatened to extinction by such things as habitat deterioration, disease or parasites. However, only part of the gene pool could be preserved. A gene bank could also be beneficial for some enhancement and aquaculture programs. Investigations are required to determine the extent that cryopreservation may cause genetic damage to the genes.

In the event that cryopreservation is used to preserve at least part of a gene pool, it is important that milt be obtained from several year-classes and from all size components within populations.

4. DISTRIBUTION OF PARASITES AND DISEASES

The NAC requested the Scientific Working Group to "describe the distribution of parasites and diseases that are harmful to Atlantic salmon and assess their effects on wild stocks". This request was forwarded to the Fish Health Subgroup for response. Initial activities of the Subgroup have centered on describing the geographic distribution of the various parasites and diseases (Table 3). Copies of their responses (United States and Canada) are attached (Appendix II).

The data provided outline the occurrence of parasites and diseases within the various jurisdictions in New England and Atlantic Canada, with the exception of the Province of Quebec. The specificity of the information varies substantially between the two nations due to the large amount of data that are currently available concerning the occurrence of diseases (and parasites) in the wild environment in Canada. This type of information is very limited in the United States. However, the Scientific Working Group feels that the general issue of geographic occurrence has been covered. The occurrence of a disease in a state or province does not mean that the disease is found throughout the area or in a clinical state. It simply signifies that the disease was found in at least one site on one or more testings.

The Scientific Working Group and the Fish Health Subgroup were unsure of what NAC meant by "assess their (parasites and diseases) effects on wild salmon stocks". The Working Group requests clarification on this request. Also, if further detail is required on the distribution of parasites and diseases harmful to salmon, then this could be undertaken next year. The Scientific Working Group feels that it is desirable to maintain an up-to-date inventory on the distribution of diseases. The Working Group will continue to work with the Fish Health Subgroup to further develop and/or refine the geographic occurrence information.

The Scientific Working Group encourages NAC to request that the ICES Working Group on the Pathology and Diseases of Marine Organisms continue, and update, where appropriate, their series of identification leaflets for diseases and parasites of fish and shellfish (series called "Fiche").

DECISIONS REQUIRED BY NAC

1. Clarification of previous requests to "assess the effects of important parasites and diseases on wild salmon stocks".

2. Is further detail required on distribution of parasites and diseases?

Table 1. Summary of salmonid introductions and transfers in 1990 from west of the Continental Divide and from Europe.

Species	Receiving State/Prov.	Source	Life Stage	Quantity	Comments
Rainbow trout	MA (USA)	Utah	eggs	600,000	2 shipments/publ. fishing
	PEI	Washington	eggs	20,000	vaccine development
A. salmon	PEI	Scotland	eggs	10,000	for research purposes
	PEI	Norway	eggs	10,000	to be destroyed
	ME (USA)	Scotland	eggs	1,216,804	aquaculture
Bk. trout	ME (USA)	Utah	eggs	145,327	public stocking
	ME (USA)	Colorado	eggs	20,000	west of Cont. Divide?
	NB	Washington	eggs	160,000	aquaculture
Arct. char	QUE	British Columbia	eggs	27,000	some research

Table 2. Summary of reported proposed salmonid introductions and transfers in 1991 as provided by participating agencies.

Species	Receiving State/Prov.	Source	Life Stage	Quantity	Comments
Rainbow trout	CT	Montana	eggs	15,000	public fishing
	ONT	Washington	eggs	70,000	aquaculture
A. salmon	ONT	N. Scotia	eggs	50,000	Lake Ontario restoration
Arct. char	ONT	Manitoba	eggs	?	aquaculture broodstock
Brown trout	CT	New York	eggs	35,000	public fishing

Table 3. A list of important fish diseases which may affect Atlantic salmon in Atlantic Canada (excluding Quebec) and in the New England states.

Disease agent[1]	Geographic State[2]	Distribution Province
1) Viral Hemorrhagic Septicemia (VHS) Virus	None	None
2) Infectious Hematopoietic Necrosis (IHN) Virus	None	None
3) Whirling Disease, Myxobolus cerebralis	CT	None
4) Ceratomyxosis, Ceratomyxa shasta	None	None
5) Proliferative Kidney Disease Agent (PKD)	None	NF
6) Infectious Pancreatic Necrosis (IPN) Virus	ME NH VT	NF NS NB PEI
7) Bacterial Kidney Disease (BKD) Renibacterium salmoninarum	ME NH	NF NS NB PEI
8) Furunculosis, Aeromonas salmonicida	CT NH MA ME VT	NB NF NS
9) Enteric Redmouth, Yersinia ruckeri	CT NH MA ME	NF NS NB
10) Saddleback Disease, Flexibacter columnaris	?	NF NS NB
11) Vibriosis, Vibria anguillarium, v ordalli	?	NF NS NB PEI
12) Aeromonas hydrophila	?	NF NS NB PEI

[1] The pathogens have been detected in the past five years.
[2] Rhode Island was included, however, it has not conducted fish health inspections in the past.

Comments on NASCO Paper CNL(90)31: "Draft Guidelines for Developing Advisory Codes of Practice to Minimise Threats to Wild Salmon Stocks"

General

1. Most points presented in NASCO Paper CNL(90)31 are good and can be supported; however, the guidelines are incomplete and the annex contains several errors and omissions.

2. There was no reference anywhere in the paper to the work of the NAC/Scientific Working Group on Salmonid Introductions and Transfers. The NAC/Working Group has tabled several papers on the potential threats to wild stocks and recommended protocols to minimize the impacts of introductions and transfers (see NAC(89)13, 14, 15 and 16). The protocols recommended by the NAC/Working Group were agreed to in principle by NAC and therefore, where appropriate, should be incorporated into the Secretary's draft guidelines.

Specific

3. Section 2.3: Reference should be made to the activities of NAC in developing protocols and the Commission's endorsement of the recommendations in Annex 13 of NAC(87)20 and agreement in principle to protocols in NAC(89)13.

4. Section 3: Reference should be made to NAC(89)13, 14, 15 and 16.

5. Section 4.1: The protocols recommended in NAC(89)15, Section 2.2.1 and Section 2.2.4 should be considered for inclusion. Note tha the Genetics Subgroup recommended that the effective number of parents used for broodstock should not be less than 100. Section 4.1 should provide guidelines on development of broodstock for aquaculture. The Note at the end of Section 4.1 implies that it is either not practical or too late to place controls on broodstock development in the industry. This may be true for many, but not necessarily all, areas within the NAC area; however, it is not too late to place controls on broodstock development in the NAC area. NAC(89)13 provides recommendations for development of broodstock in each of three proposed Zones in the NAC area. These recommendations could be considered.

6. Section 4.1.3: More specifics could be given for the possible management measures which could be introduced. One consideration would be the Zoning concept which was recommended by the NAC/Scientific Working Group in NAC(89)13. Guidelines could be given to define what is meant by "particularly valuable stocks". Small stocks are most vulnerable to genetic impacts.

7. Section 4.2: It would be appropriate for each country to establish a licensing system to control introductions and transfers. Also, each country should establish a scientific committee to review applications for introductions and transfers and evalueate the risk for adverse genetic, ecological and/or fish health effects on wild stocks.

8. Section 4.3: The Fish Health Subgroup of the NAC/Scientific Working Group made a number of specific recommendations which could be considered for inclusion in this section (see NAC(89)14).

9. Annex 1: Section 2.4 should not be under Canada; it should have a separate section. Section 7.4 should also be a separate section. The recommended protocols in NAC(89)13 should be included in Annex 1.

State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
Natural Resources Conservation Council

AGENCY OF NATURAL RESOURCES
103 South Main Street, 10 South
Waterbury, Vermont 05676
802-244-7331
DEPARTMENT OF FISH AND WILDLIFE

TO: Rex Porter and Dave Goldthwaite, Co-chairmen NASCO Bilateral Scientific Working Group

FROM: Angelo Incerpi, Co-chairmen , Bilateral Scientific Working Group Subcommittee on Salmonid Fish Health

DATE: May 20, 1991

RE: Distribution of Fish Pathogens

A quick survey was made of state and federal fish health officials in New England. The attached identifies the emergency and restricted listed diseases identified in the various states during the past 5 years. It's important to remember that currently commercial aquaculture facilities are neither required to conduct fish health inspections, or to report the results of fish health inspections conducted. In addition, there is very little information available on the distribution of pathogens in natural populations. The survey still provides some valuable insights to the distribution of the listed pathogens even with these inadequacies.

cc. Tom Wiggins

The North American Commission (NAC) of the North Atlantic Salmon Conservation Organization (NASCO) developed a fish health protocol intended to protect wild stocks of Atlantic salmon in eastern Canada and the eastern United States from fish diseases that may be transmitted through the movement of introduced or transfer of salmonid stocks. A list of emergency or restricted fish diseases was developed that have not, or only on a limited basis, been detected in the waters of New England. The following identifies the listed diseases and the known geograpical distribution by state.

Disease Agent*	Geographic Distribution by State**
1.) Viral Hemorrhagic Septicemia (VHS) Virus	None
2.) Infectious Hematopoietic Necrosis (IHN) Virus	None
3.) Whirling Disease, Myxobolus cerebralis	CT
4.) Ceratomyxosis, Ceratomyxa shasta	None
5.) Proliferative Kidney Disease Agent (PKD)	None
6.) Infectious Pancreatic Necrosis (IPN) Virus	ME, NH, VT
7.) Bacterial Kidney Disease (BKD), Renibacterium salmoninarum	ME, NH
8.) Furunculosis, Aeromonas salmonicida	CT, NH, MA, ME, VT
9.) Enteric Redmouth, Yersinia ruckeri	CT, NH, MA, ME
10.) Other:	None

*The pathogens have been detected in the past 5 years
**Rhode Island was included; however, has not conducted fish health inspections in the past.

Government of Canada / Gouvernement du Canada

'01972

MEMORANDUM NOTE DE SERVICE

TO / A: T.R. Porter
Canadian Co-Chairman
NAC Scientific Working Group on
Salmonid Introductions and Transfers

FROM / DE: M.I. Campbell
Canadian Co-Chairman
Fish Health Subgroup
NAC Scientific Working Group

GOVERNMENT OF CANADA
1110-N8
MAY 23 1991
FISHERIES AND OCEANS

SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE – N / RÉFÉRENCE	1154-7'C'
YOUR FILE – V / RÉFÉRENCE	
DATE	May 17, 1991

SUBJECT / OBJET

RE: DISTRIBUTION OF PARASITES AND DISEASES THAT ARE HARMFUL TO ATLANTIC SALMON

I have just received a copy of the ICES 'Report of the Working Group on Pathology and Diseases of Marine Organisms (WGPDMO)' (Ostend, 19-22 February 1991) and think that I understand why you may not have seen the WGPDMO's assessment of the NASCO request on the distribution of parasites and diseases. I've attached a copy of the one page of the report which deals with the request.

I believe that when an international group of about twenty-five disease experts - the ICES WGPDMO - avoids dealing with the issue we should realise the enormity of the task involved in attempting to deal with the question. However ICES WGPDMO has offered to address the issue providing NASCO is more specific about the information required; we should pick up this offer if the NAC Scientific Working Group still feels it is a valid exercise.

As pointed out in the ICES report the available literature on parasites and diseases of Atlantic salmon is voluminous, even the literature specific to Atlantic Canada is substantial. Interested parties should be encouraged to do their own 'specific' literature searches. In terms of an 'assessment' of possible harmful effects on wild salmon I think that the ICES WGPDMO report's conclusions are correct: **"... the impact cannot be easily evaluated."** and **"... there is a general lack of sound information on the types and impact of diseases in natural populations of Atlantic salmon and that research is needed in this area."**

With all of the above in mind I have prepared the appended table **"DISTRIBUTION OF DISEASES/PATHOGENS IN ATLANTIC CANADA: 1976 - 1990"** from information provided by Dr. Derek Shaw in St. John's and Mr. John Cornick of the Fish Health Service Unit (FHSU) in Halifax (I have included 'all species' data as provided by Derek and John). I have no Quebec data and hope that Dave Goldthwaite was able to get the U.S.A. information.

In Atlantic Canada we take fish diseases, their diagnoses, treatment and - most importantly - their avoidance very seriously. In addition to the very strong and well respected Canadian Fish Health Protection Regulations (FHPR), which control movements of fish into the country and between

provinces and which are currently undergoing a major revision to make them even better, we also have 'Regional Fish Health Guidelines' to control **intra**-provincial movements of fish. There are also various 'introductions and transfers' committees and 'fish health advisory' committees to consider fish movements and to advise on fish health matters. All of these apply equally to aquaculture and to enhancement projects.

Following are some general comments for some of the specific parasites/diseases of importance to the Maritime Provinces of Canada. These may of use to you in interpreting the information in the table:

FURUNCULOSIS:

-Furunculosis is one of the diseases included in the 'Regional Fish Health Guidelines'. In essence the 'guidelines' say that fish intended for movement to another watershed **within** a province must be examined using FHPR protocols. Fish found to be negative may be moved to any watershed whereas fish found to be positive for the bacterium may only go to systems that are already known to also be positive for the organism. Fish showing overt signs of disease or from a source undergoing an active disease outbreak may not be stocked at all.

-To augment the 'Regional Fish Health Guidelines' a carrier testing programme is also used on Atlantic salmon smolts destined for stocking or for distribution to sea cages in New Brunswick.

-From 1979 to 1990 some 142 Atlantic Canada fish health cases (all species of fish) were diagnosed as having a 'typical' or 'atypical' strain of *Aeromonas salmonicida.*

-In 1989 an unusual situation arose when a non-sterile batch of commercial furunculosis vaccine resulted in salmon at several private aquaculture facilities in southwest New Brunswick contracting the disease. Aggressive efforts were made to control and limit the spread of the disease through the destruction of fish.

-In general whenever furunculosis has taken hold in a culture situation chemotherapy/antibiotic therapy have met with marginal success and resistant bacteria have developed. Destruction and disinfection have been the only reasonably reliable control measures.

-Only two river systems in the Maritimes are considered to be 'endemically' infected with furunculosis; the Saint John River and the Restigouche River, both in New Brunswick. In the Restigouche River the disease was first diagnosed in the summer of 1975. Since then 500 to 2000 Atlantic salmon are estimated to have died yearly. Various research projects have suggested that the large repeat spawners are the hardest hit and that mortality peaks in late June - July. There is some correlation with low and warm waters and the mortalities. Less research has been done on the Saint John.

BACTERIAL KIDNEY DISEASE:

-Bacterial Kidney Disease is another disease covered by 'Regional Fish Health Guidelines'. In essence fish with 'clinical' BKD as expressed lesions can not be stocked although fish with only Indirect Fluorescent Antibody Technique (IFAT) or Direct Fluorescent Antibody Technique (DFAT) detectable infections can be moved.

-The data provided by Dr. Shaw and Mr. Cornick show that between 1976 and 1990 there have only been 71 diagnosed BKD cases (all species of fish) in Atlantic Canada (includes some IFAT/DFAT, non-clinical identifications).

-To better protect the industry a BKD monitoring programme has been used to screen salmon broodstocks. Eggs from positive parents (using lesions and IFAT/DFAT methodologies) are discarded.

-Although clinical BKD situations do occur in various private and public culture facilities aggressive application of the 'guidelines' and the monitoring programme has resulted in many thousands of fish being destroyed and a limited BKD 'problem'.

-Although the BKD organism, *Renibacterium salmoninarum*, is fairly ubiquitous in Maritime watersheds, and occasionally causes the odd clinical case in the wild, it seems to consistently express itself as clinical disease in only one natural setting - the Ingram Brook/Margaree River - in Cape Breton Nova Scotia **and** under 'stress' conditions in fish culture facilities.

INFECTIOUS PANCREATIC NECROSIS:

-The information provided by both Dr. Shaw and Mr. Cornick show that IPN is widespread throughout Atlantic Canada with some 275 positive cases (all species of fish) between 1976 and 1990.

-This is a disease that is very difficult to assess in natural settings; it generally kills only very young fish, shortly after they first start to feed, and their loss is extremely difficult to detect in the wild.

-In the Maritimes, at least, there is some evidence that 'domestic' fish have become somewhat 'refractory' to the disease. Losses due to IPN in federal facilities have become almost non-existent in recent years. In 1979 we imported some brook trout eggs from a FHPR certified source in the U.S.A. and distributed them to 7 federal hatcheries. At all but one site the fry from these eggs suffered extreme losses due to IPN **and** because, I believe, of the increased pathogen load at the hatcheries, adjacent troughs of 'domestic' fry also suffered higher than usual losses.

PARASITES:

* Although I have not included parasites in the table prepared from Dr. Shaw's and Mr. Cornick's data I have chosen a few examples of parasite problems for illustrative purposes. Further detail on Atlantic Canadian parasite situations can be obtained from the literature.

GILL COPEPODS: - At the Cardigan Salmonid Enhancement Centre in PEI we have, in the past, experienced problems with both *Salmincola salmoneus*, in reconditioning Atlantic salmon kelts, and *S. edwardsii* in brook trout being held for broodstock. Because these gill maggots do not require any intermediate hosts their numbers can build up to pathologically significant levels. Problems develop with loss of gill surface for effective respiration and with secondary fungal and/or bacterial infections. To preserve valuable salmon kelts a method has been developed whereby the copepods are manually removed from the fish and subsequent salt treatments are used to avoid secondary infections. In the case of the brook trout we generally cannot keep broodstock longer than about two years before the parasite loads become too great for the fish to handle. Brook trout manual removal of the parasite is not possible as the trout gills are too fragile and too much damage is sustained during the procedure. The two species of parasite are host specific.

HEXAMITA SP.: - Several Maritime hatcheries, private and public, have suffered significant fry loss due to this parasite. Atlantic salmon, brook trout, rainbow trout and lake trout have been among the species affected. Reasonable control, and sometimes complete cures, have been obtained through the use of 'Epsom salt'($MgSO_4$) and salt (NaCl) baths and/or food additives.

SEA LICE: - Species of sea lice (generally *Caligus* but also *Lepheophtheirus*) continue to plague some sea cage sites. In the past some control measures have included the use of Neguvon which is no longer permitted to be used because of the ongoing environmental debate over this product.

***STEPHANOSTOMUM TENUE*:** - This acanthocolpid digenean provides a good example (albeit a rainbow trout rather than Atlantic salmon example) of how aquacultural practices sometimes result in 'abnormal' disease situations. This parasite uses the mud dog whelk (*Nassarius obsoletus*) as a normal first intermediate host and the mummichog (*Fundulus heteroclitus*) as a second intermediate with the American eel (*Anguilla rostrata*) as the definitive host. In 1985 rainbow trout aqaculturists at estuarine/sea cage sites around Prince Edward Island suffered severe losses due to heavy infestations of encysted parasites in and around the heart pericardium. Subsequent research revealed that the parasite *S. tenue* was utilizing the trout as an unusual secondary host by entering the trout through the buccal cavity, migrating to the heart area and encysting there. Virtually 100% of the fish in shallow, warm water, cage sites with suitable mud dog whelk habitat became infected with as many as 75 cysts per heart. Death was caused because the

parasite cysts inhibited normal heart activity, particularly at times of increased activity such as feeding. Thanks to the research the problem has been completely avoided in recent years by ensuring that cages are placed in water that gives at least 10 metres clearance off the bottom.

I hope, Rex, that this is of some use and encourage the Scientific Working Group to rethink the request, perhaps redefine it somewhat and to consider the advice given by the ICES WGPDMO. I think too that NASCO should encourage the ICES WGPDMO to continue, and perhaps update, their series of fish disease 'fiches'- example attached to this memo - as they will go a long way towards answering the questions we've posed.

M.F. Campbell

DISTRIBUTION OF DISEASES/PATHOGENS IN ATLANTIC CANADA: 1976 - 1990

Disease/Pathogen	Distribution	Species	Remarks
Furunculosis (*Aeromonas salmonicida*) 133 cases	southern N.B. freshwater culture sites and marine cage sites; culture sites in the Minto-Grand Lake N.B. area; culture facilities on the Saint John River, N.B.; wild fish in St. John River and Restigouche River, N.B.; N.B. Provincial Govt. aquarium, Shippagan, N.B. (American plaice); culture sites (marine and freshwater) in Bay d'Espoir, Nfld.; Long Pond reservoir, Nfld.	Atlantic salmon, ouananiche, rainbow trout, brook trout, Arctic charr, American plaice	SEE MEMO TEXT 'typical' and 'atypical' strains as well as strains showing various antibiotic resistances (in situations where antibiotic therapies have been used and sometimes abused)
Bacterial Kidney Disease (*Renibacterium salmoninarum*) 71 cases	IFAT/DFAT surveys show the organism to be very widespread (if not ubiquitous) in natural systems in Atlantic Canada; clinical (lesions) cases have occurred:- in the Fraser River, Labrador; Cinq Cerf River, Nfld.; in the Ingram Brook/Margaree River, N.S.; in freshwater hatcheries and marine cage sites in southern N.B.; at culture facilities in Cape Breton, N.S.; at a culture facility on the upper St. John River; at culture facilities in the Minto-Grand Lake, N.B. area; at 'pond' culture sites in eastern N.B.	Atlantic salmon, rainbow trout, brook trout, Arctic charr,	SEE MEMO TEXT

Disease/Pathogen	Distribution	Species	Remarks
Infectious Pancreatic Necrosis Virus 275 cases	widespread (if not ubiquitous) in Atlantic Canada	Atlantic salmon, ouananiche, rainbow trout, brook trout, brown trout, lake trout, squid, Atlantic cod, softshell clams	SEE MEMO TEXT
Enteric Redmouth (*Yersinia ruckerii*) 49 cases	Crossing Place River, Nfld.; Fraser River, Labrador; Bay d'Espoir watershed, Nfld.; Bras d'Or Lakes, N.S.; Miramichi River N.B.; widespread, though sporadic, in natural systems and culture facilities	Atlantic salmon, ouananiche, Arctic charr, brook trout, rainbow trout, lake trout, rainbow smelt, white sucker	although the ERM bacterium has been detected numerous times - including situations of 'clinical' disease - this disease is not, at present, a serious problem in Atlantic Canada
Saddleback Disease (*Flexibacter columnaris*) 32 cases	culture facilities throughout Atlantic Canada	Atlantic salmon, rainbow trout, brook trout	this disease is characterised by a 'saddle' lesion starting on the dorsal surface, at or near the dorsal fin and sometimes encircling the fish; in acute cases death usually occurs within 48 hours; good control can be achieved with antibiotics such as oxytetracycline
Vibriosis (*Vibrio anguillarum, V. ordalli*)	widespread in estuarine/marine cage sites	Atlantic salmon, rainbow trout	acceptable control is achieved using polyvalent vaccines
Aeromonas hydrophila 115 cases	widespread if not ubiquitous	all species; cases include shellfish (oysters, mussels, quahaugs) as well as freshwater and saltwater fishes and even tropical fish have been submitted to the lab which have been positive	although often considered as an opportunistic pathogen, this bacterium has caused severe losses in culture facilities which have required drug therapy to control

4.4. DISTRIBUTION OF PARASITES AND DISEASES HARMFUL TO ATLANTIC SALMON IN NASCO'S N.E. ATLANTIC COMMISSION AND W. GREENLAND AREAS.

WGPDMO had been asked by ICES to perform this task and report the information to the Working Group on North Atlantic Salmon for its meeting in March 1991. The WG discussed this requirment and felt it was difficult to deal with in view of the lack of clarity concerning the purpose of the request.

The literature on parasites and diseases of Atlantic salmon is substantial and in view of the important number of organisms already described it would be a major task to concisely evaluate and comment on their distribution or their harmful effects as requested. The WGPDMO could, however, provide information or analyze data on specific diseases which are thought to be the most important, if so required.

The WGPDMO recognizes that there are several pathogens that could be harmful to wild or cultured Atlantic salmon under particular circumstances, but this can be a complex process due to the interrelationship of numerous environmental and biological factors.

Conclusions

(a) The WGPDMO recognizes that there are some examples where the introduction or presence of a disease (e.g. furunculosis, Gyrodactylus, BKD) in a wild population has in the past proved to the detrimental to stocks, but a quantification of the impact cannot be easily evaluated. With this in mind an attempt could be made to review available data existing in the literature and evaluate this for WGNAS. This, however, can not be done for all disease organisms and some specifications are required. The presence of a known pathogenic organisms does not imply a severe effect on a wild population as the pathogenicity may vary from area to area and in time within one area, e.g. furunculosis in the U.K. (see Furunculosis Committee Report 1935).

(b) WGPDMO recognizes that there is a general lack of sound information on the types and impact of diseases in natural populations of Atlantic salmon and that research is required in this area.

Recommendation

This matter should be referred back to NASCO with a request to be more specific as to the information required and to provide some indication of the purpose of it.

4.5. HEALTH STATUS OF SEA TROUT STOCKS ESPECIALLY WITH REGARD TO IRELAND AND SCOTLAND.

The WG received reports prepared intersessionally by WGPDMO members in the three main countries affected by declining sea trout stocks.

1. **Ireland** (J. McArdle)

The catches of sea trout appear to have declined since at least 1987 and, perhaps, even earlier in many fisheries in the west of the country based on detailed figures from 23 fisheries presented to the group.

FICHES D'IDENTIFICATION DES MALADIES ET PARASITES DES POISSONS, CRUSTACÉS ET MOLLUSQUES
Préparées sous les auspices du Groupe de Travail CIEM sur la Pathologie et les Maladies des Organismes marins

IDENTIFICATION LEAFLETS FOR DISEASES AND PARASITES OF FISH AND SHELLFISH
Prepared under the auspices of the ICES Working Group on the Pathology and Diseases of Marine Organisms

FICHE N° 21

CORYNÉBACTÉRIOSE

LEAFLET NO. 21

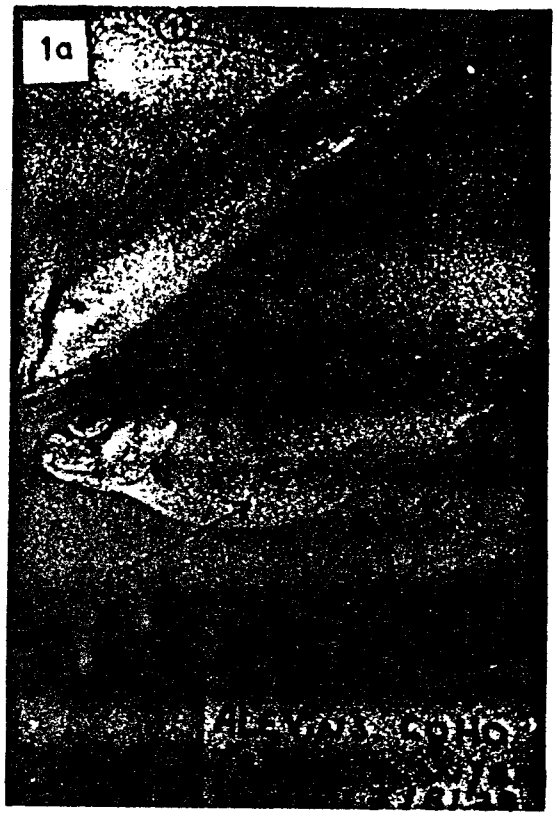
BACTERIAL KIDNEY DISEASE

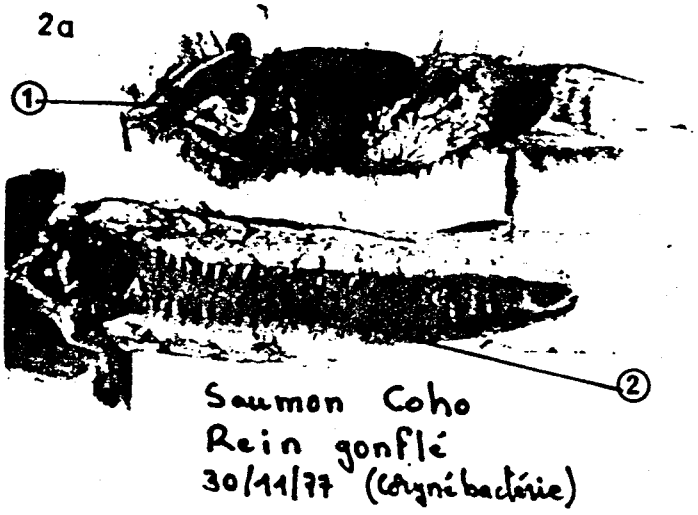
par / by
M. VIGNEULLE
Laboratoire National de Pathologie
des Animaux Aquatiques – Services Vétérinaires
BP 337, 29273 Brest CEDEX, France

Éditées par / Edited by
CARL J. SINDERMANN

CONSEIL INTERNATIONAL POUR L'EXPLORATION DE LA MER
INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA
Palægade 2–4, DK-1261 Copenhague K, Danemark / DK-1261 Copenhagen K, Denmark

Décembre / December 1985
ISSN 0109-2510





Figures 1a and 1b. External lesions. 1) Sub-cutaneous swelling; 2) abdominal swelling; 3) exophthalmia; 4) purpura area.

Figures 2a and 2b. Internal lesions. 1) Pericarditis; 2) swelling of kidney (anterior and posterior parts); 3) liver abscess.

Figures 1a et 1b. Lésions externes. 1) Papule sous-cutanée, 2) abdomen gonflé, 3) exophtalmie, 4) zone de purpura.

Figures 2a et 2b. Lésions internes. 1) Péricardite, 2) rein gonflé antérieurement et postérieurement, 3) abcès du foie.

2

BACTERIAL KIDNEY DISEASE

Host species

All species of the sub-family Salmoninae. Specially susceptible: *Oncorhynchus tshawytscha*, chinook salmon; *Oncorhynchus kisutch*, coho salmon; *Salmo salar*, Atlantic salmon; *Salmo gairdneri*, rainbow trout; *Salmo trutta fario*, brown trout; *Salvelinus fontinalis*, brook trout.

Disease name

Bacterial kidney disease (BKD), Dee disease, corynebacteriosis

Etiology

Coccobacillus, Gram positive, non motile, member of the Corynebacteriaceae group. The name of the species, *Renibacterium salmoninarum*, belonging to the new genus *Renibacterium*, was proposed recently.

The bacterium can be cultured on Ordal and Earp's substrate, which has been modified by Evelyn and must contain L-cysteine and serum. The growth is slow, taking from 15 to 21 days at 15°C.

The taxonomic study of strains of different geographical origin shows some diversity, but most of them can be grouped in two distinct phenons. The bacterium is determined by: bacterioscopy of Gram-coloured smears from infected organs; culture of the bacterium from diseased animals; immunofluorescence; and immunodiffusion

Associated environmental conditions

Conditions for the disease to appear: low temperature, optimum 10°C to 12°C; and soft fresh water. The non-specific resistance is lowered by stress (transport, handling, etc.).

Transmission: via the eggs; from diseased to sound animals; and through the food

Reservoir: diseased fish and carriers

Geographical distribution

North America, Europe, and Japan

Significance

The disease in its chronic form is present in many salmonid farms both in fresh and sea water (in certain cases in France mortality amounts to 20 %). Some cases have been found in free-living fish.

Control

Prophylaxis. Hardening of eggs after fertilization in a solution of erythromycin phosphate (1–2 mg/l) for 30 to 60 min. Inoculation of spawners: sub-cutaneous injection of erythromycin phosphate in doses of 11 mg/kg live weight.

CORYNÉBACTÉRIOSE

Espèces hôtes

Toutes les espèces de la sous-famille des Salmoninés. Plus particulièrement; *Oncorhynchus tshawytscha*, saumon chinook; *Oncorhynchus kisutch*, saumon coho; *Salmo salar*, saumon salar; *Salmo gairdneri*, truite arc-en-ciel; *Salmo trutta fario*, truite fario; *Salvelinus fontinalis*, omble de fontaine.

Nom de la maladie

Corynébactériose, maladie de la Dee, maladie bactérienne du rein

Étiologie

Bactérie coccobacillaire, Gram positive, immobile, membre du groupe des corynébactéries. La dénomination de *Renibacterium salmoninarum*, appartenant au nouveau genre *Renibacterium* a été récemment proposée.

La culture est obtenue sur milieu d'Ordal et Earp, modifié par Evelyn, qui contient obligatoirement de la L-cystéine et du sérum. Elle est lente, de 15 jours à 3 semaines à 15°C.

L'étude taxonomique de souches bactériennes d'origine géographique différente a démontré leur diversité. La plupart d'entre elles se regroupent toutefois en deux phénons distincts. La mise en évidence de la bactérie s'effectue par: bactérioscopie de calques ou frottis d'organes colorés au Gram; mise en culture du germe à partir d'animaux malades; immunofluorescence; immunodiffusion.

Conditions de milieu

Conditions d'apparition: température basse, optimum de 10°C à 12°C; faible dureté de l'eau douce. Diminution de la résistance non spécifique par divers stress (transport, manipulations, etc.).

Transmission: par les oeufs; d'animaux malades à animaux sains; par l'aliment

Réservoir: poissons malades et porteurs

Distribution géographique

Amérique du Nord, Europe, Japon

Importance

Maladie chronique présente dans de nombreux élevages de salmonidés aussi bien en eau douce qu'en eau de mer (en France elle a occasionné des mortalités allant jusqu'à 20 %). Quelques cas sur des animaux sauvages ont été signalés.

Prophylaxie et traitement

Prophylaxie. Durcissement des oeufs après fertilisation dans une solution de phosphate d'érythromycine à la dose de 1 à 2 mg/l pendant 30 minutes à une heure. Ino-

A second injection can be given not later than 30 days before spawning. A combination of both methods is strongly recommended.

Treatment. No curative treatment is known. The use of either erythromycin in doses of 9 to 10 g/100 kg fish/day for 21 days, or sulphamides (e.g., sulphamerazine) in doses of 20 g/100 kg/day, can in certain cases put a temporary stop to mortality.

Gross clinical signs

Modification of certain metabolic parameters: lowering of liver glycogen; lowering of haematocrit; early hypoglycaemia and hypocholesterolaemia; plasma hypoproteinaemia appears progressively, first of all in the albumin fraction.

External macroscopic lesions: non-specific; exophthalmia, melanism, haemorrhagic swellings in scapular and pelvic zones; more specific but less constant; erythemic, cutaneous papillae, purpura zones, sub-cutaneous swellings, abdominal swelling due to ascites.

Internal macroscopic lesions: swelling of kidney (especially the posterior kidney) which seems greyish or is covered by whitish, miliary or larger nodules. These nodules can also be found in other organs (liver, spleen, heart); peritonitis with ascites and false membranes; pericarditis; viscera seem haemorrhagic and swollen; and hepatomegaly.

Histopathology

Corresponds to a chronic inflammatory process in different forms according to localization. Predominant exudative forms: oedema, cutaneous papillae, early swelling of kidney, exophthalmia, and hepatomegaly; sero-fibrinous pericarditis and peritonitis.

A haemorrhagic form can sometimes be important cutaneously (purpura). It is also seen in the liver and pyloric caeca, in the swimbladder, and in the gonads.

Cellular, histiocytic, and macrophagic cell division; false membranes, and granulomatous lesions, specially in the kidney, but also in other organs (liver, spleen, heart, brain, etc.).

Lymphocytic infiltration; sometimes multinucleated cells are present; central caseinoform necrosis; older lesions specially in the muscles.

culation des géniteurs: injection sous-cutanée d'une solution de phosphate d'érythromycine à la dose de 11 mg/kg de poids vif. Une deuxième injection peut être faite 30 jours plus tard, mais pas moins de 30 jours avant la ponte. L'association des deux méthodes est fortement recommandée.

Traitement. Pas de traitement curatif connu. L'utilisation d'érythromycine à la dose de 9 à 10 g/100 kg poissons/jour pendant 21 jours ou des sulfamides, par exemple sulfamérazine, à la dose de 20 g/100 kg/jour jusqu'à ce que la mortalité cesse, peut entraîner dans certains cas une diminution passagère des mortalités.

Signes cliniques macroscopiques

Modifications de certains paramètres métaboliques: diminution du glycogène hépatique; baisse de l'hématocrite; hypoglycémie et hypocholestérolémie précoces; hypoprotéinémie plasmatique apparaissant progressivement, touchant d'abord la fraction «albumine».

Lésions macroscopiques externes: non spécifiques; exophtalmie, mélanisme, tuméfactions congestivo-hémorragiques au niveau des ceintures scapulaires et pelviennes; plus spécifiques mais inconstantes; papules cutanées érythémateuses, zones de purpura, tuméfactions sous-cutanées, gonflement de l'abdomen par l'ascite.

Lésions macroscopiques internes: gonflement du rein, d'abord postérieur, qui peut prendre ensuite un aspect grisâtre, ou être parsemé de nodules blânchatres miliaires, ou plus importants, retrouvés éventuellement dans d'autres organes (foie, rate, coeur); péritonite avec ascite et fausses membranes; péricardite; aspect congestivo-hémorragique des viscères; hépatomégalie.

Histopathologie

Elle correspond à un processus inflammatoire chronique, apparaissant sous plusieurs formes, selon les localisations. Forme exsudative prédominante: oedème, support essentiel des papules cutanées, du gonflement précoce du rein, de l'exophtalmie, de l'hépatomégalie; épanchement séro-fibrineux, péritonite, péricardite.

Forme hémorragique, importante parfois au niveau cutané (purpura). Se rencontre également au niveau du foie, des caeca pyloriques, de la vessie natatoire, des gonades.

Prolifération cellulaire, histiocytaire et macrophagique; fausses membranes et lésions granulomateuses du rein essentiellement mais aussi d'autres organes (foie, rate, coeur, cerveau, etc.).

Infiltration lymphocytaire, parfois présence de cellules multinucléées, nécrose caséiforme centrale; lésions anciennes et surtout musculaires.

4

Key references
Références bibliographiques

ALDRIN, J. F., MEVEL, M., ROBERT, J. Y., VIGNEULLE, M., and BAUDIN LAURENCIN, F. 1978. Incidences métaboliques de la corynébactériose expérimentale chez le saumon coho, *Oncorhynchus kisutch*. Bull. Soc. Sci. Vét. et Méd. Comp. Lyon, 80(2): 79–90.

AUSTIN, B., and RODGERS, C. J. 1980. Diversity among strains causing bacterial kidney disease in salmonid fish. Curr-Microbiol., 3: 231–235.

BULLOCK, G. L., and STUCKEY, H. M. 1975. Bacterial kidney disease of salmonid fishes. U.S. Dept. Int., Fish Wildl. Serv., Leaflet FDL 41, 7 pp.

EVELYN, T. P. T. 1977. An improved growth medium for the kidney disease bacterium and some notes on using the medium. Bull. Off. Int. Epiz., 87(5–6): 511–513.

EVELYN, T. P. T. 1978. Sensitivities of bacterial kidney disease detection methods with special remarks on the culture method. Proc. Joint 3rd Biennial Fish Health Section and 9th Annual Midwest Fish Disease Workshops, Kansas City, Aug. 15–18, 1978, pp. 15–16.

KLONTZ, G. W. 1978. Prevention of bacterial kidney disease in adults and juvenile salmonids. Proc. Joint 3rd Biennial Fish Health Section and 9th Annual Midwest Fish Disease Workshops, Kansas City, Aug. 15–18, 1978, pp. 11–14.

SANDERS, J. E., and FRYER, J. L. 1980. *Renibacterium salmoninarum* gen. nov., sp. nov., the causative agent of bacterial kidney disease in salmonid fishes. Int. J. System. Bacteriol., 30(2): 496–502.

SANDERS, J. E., PILCHER, K. S., and FRYER, J. L. 1978. Relation of water temperature to bacterial kidney disease in coho salmon (*Oncorhynchus kisutch*), sockeye, salmon (*Oncorhynchus nerka*), and steelhead trout (*Salmo gairdneri*). J. Fish. Res. Bd Can., 35: 8–11.

SMITH, I. W. 1964. The occurrence and pathology of Dee disease. Scot. Dept. Agr. Fish. Freshwater Salmon Fish. Res. Rep., 34(3): 1–12.

WARREN, J. W. 1963. Kidney disease of salmonid fishes and the analysis of hatchery waters. Prog. Fish-Cult., 25(3): 121–131.

WOLF, K., and DUNBAR, C. E. 1959. Test of 34 therapeutic agents for control of kidney disease in trout. Trans. Am. Fish. Soc., 88: 117–124.

Key laboratory
Laboratoire de référence

Laboratoire National de Pathologie des Animaux Aquatiques – Services Vétérinaires
BP 337, 29273 Brest CEDEX, France

ANNEX 5

NORTH AMERICAN COMMISSION

PAPER NAC(91)6

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS IN EASTERN NORTH AMERICA

1986-1990

Prepared for the:
North American Commission (NASCO) Scientific Working Group on Salmonid Introductions and Transfers

ABBREVIATIONS USED IN TABLES

Countries/Provinces/States

AK	ALASKA
BC	BRITISH COLUMBIA
CAN	CANADA
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
FIN	FINLAND
ICE	ICELAND
ID	IDAHO
IN	INDIANA
LAB	LABRADOR
ME	MAINE
MAN	MANITOBA
MA	MASSACHUSETTS
MI	MICHIGAN
MT	MONTANA
NB	NEW BRUNSWICK
NFLD	NEWFOUNDLAND
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NOR	NORWAY
NY	NEW YORK
NS	NOVA SCOTIA
ONT	ONTARIO
OR	OREGON
PA	PENNSYLVANIA
PEI	PRINCE EDWARD ISLAND
QUE	QUEBEC
RI	RHODE ISLAND
SCO	SCOTLAND
TN	TENNESSEE
US	UNITED STATES OF AMERICA
UT	UTAH
VT	VERMONT
WA	WASHINGTON
WV	WEST VIRGINIA
WY	WYOMING

Other Terms

ANAD	ANADROMOUS
ATL	ATLANTIC
AQC	AQUACULTURE
BOF	BAY OF FUNDY
BK	BROOK
CK	CREEK
CM	CENTIMETRE(S)
CNTR	CENTRE
DOM	DOMESTIC
E EGGS	EYED EGGS
ENV	ENVIRONMENT
EXP	EXPERIMENTAL/ RESEARCH
FCS	FISH CULTURE STATION
FF	FISH FARM
FING	FINGERLING(S)
G	GRAM
G EGGS	GREEN EGGS
H	HATCHERY
HARB	HARBOUR
IS	ISLAND
JUV	JUVENILE
LAB	LABORATORY
LK	LAKE
LL	LANDLOCKED
MO	MONTH
NW	NORTHWEST
P	PROPOSED
PS	PUBLIC STOCKING
P SMOLT	POST SMOLT
P/S	PARR/SMOLT TRANSITION
PYP	POST-YEARLING PARR
QUAR	QUARANTINE (FACILITY)
REV	REVISION
R	RIVER
RET	RETURN(ING)
SJR	SAINT JOHN RIVER
SKAM	SKAMANIA
SS	STEELHEAD STRAIN
SP	SPRING(S)
STR	STRAIN
TF	TROUT FARM
TR	TRIPLOID
U	UNIVERSITY
UNID	UNIDENTIFIED
UNK	UNKNOWN
UY PARR	UNDERYEARLING PARR
W	WILD
WS	WATERSHED
YEAR	YEARLING
*	REVISION

ABBREVIATIONS USED IN TABLES

Organizations

ASF	ATLANTIC SALMON FEDERATION
ASI	ATLANTIC SALMON (MAINE) INC
ASL	ATLANTIC SMOLTS LIMITED
ASRSC	ATLANTIC SEA-RUN SALMON COMMISSION
AVC	ATLANTIC VETERINARY COLLEGE
CDEP	CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEC	DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DFO	DEPARTMENT OF FISHERIES AND OCEANS (CANADA)
EPS	ENVIRONMENTAL PROTECTION SERVICE (CANADA)
FMS	FUNDY MARINE SURVEYORS
IAS	INTEGRATED AQUATIC SYSTEMS LIMITED
HML	HUNTSMAN MARINE LABORATORY
MDFW	MASSACHUSETTS DIVISION OF MARINE FISHERIES
MAPA	QUEBEC MINISTERE AGRICULTURE, PECHERIE, ALIMENTATION
MINL	MARINE INSTITUTE OF NEWFOUNDLAND AND LABRADOR
MMOP	MERI MER OCEAN PRODUCTS
MPL	MARICULTURE PRODUCTS LIMITED
MSRL	MARINE SCIENCES RESEARCH LABORATORY
NBDNRE	NEW BRUNSWICK DEPARTMENT OF NATURAL RESOURCES AND ENERGY
NBFWB	NEW BRUNSWICK FISH AND WILDLIFE BRANCH
NEFFI	NEW ENGLAND FISHING ENTERPRISES INC
NHFG	NEW HAMPSHIRE FISH AND GAME DEPARTMENT
NMFS	NATIONAL MARINE FISHERY SERVICE
NSDF	NOVA SCOTIA DEPARTMENT OF FISHERIES
NWAFC	NORTHWEST ATLANTIC FISHERIES CENTRE
NYDEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
OMNR	ONTARIO MINISTRY OF NATURAL RESOURCES
OPI	OCEAN PRODUCTS INCORPORATED
OSL	OCEAN SCIENCES LABORATORY, MEMORIAL UNIVERSITY
SMBDA	ST. MARY'S BAY DEVELOPMENT ASSOCIATION
USFWS	UNITED STATES FISH AND WILDLIFE SERVICE

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

CONNECTICUT

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
7001	MT, INNES HATCHERY (ERWIN)	1987	15000	EGGS	CT, CDEP/BURLINGTON HATCHERY				HOUSATONIC RIVER
8001	TN, ERWIN HATCHERY (ERWIN)	1988	15000	EGGS	CT, CDEP/BURLINGTON HATCHERY				HOUSATONIC RIVER
9001	MT, INNES HATCHERY (ERWIN)	1989	15000	EGGS	CT, CDEP/BURLINGTON HATCHERY				HOUSATONIC RIVER
0001	MT, INNES HATCHERY (ERWIN)	1990	15000	EGGS	CT, CDEP/BURLINGTON HATCHERY	*			NOT YET RELEASED: 17/01/91
0002	MT, INNES HATCHERY (ERWIN)	P1991	15000	EGGS	CT, CDEP/BURLINGTON HATCHERY				
SALMO TRUTTA (BROWN TROUT)									
0003	NY, CATSKILL HATCHERY (SEEFORELLEN)	1990	20000	EGGS	CT, CDEP/BURLINGTON HATCHERY	*			NOT YET RELEASED: 17/01/91
0004	NY, CATSKILL HATCHERY (SEEFORELLEN)	P1991	35000	EGGS	CT, CDEP/BURLINGTON HATCHERY				

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

MAINE

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS KETA (CHUM SALMON)									
6001	WA, MINTER CREEK H (MINTER CR/WILD)	1986	500000	EGGS	ME, SEA RUN INC/DEAD RIVER H				CASCO BAY (SEA RANCHING)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
9003	FIN, OY BALTIC (BALTIC/DONALDSON DOM)	1989	10000	EGGS	ME, PINE TREE TROUT				(STOCK ACCIDENTALLY KILLED)
9004	FIN, OY BALTIC (BALTIC/DONALDSON DOM)	1989	110000	EGGS	ME, MPL/BINGHAM HATCHERY	1990			
0012	ONT, RAINBOW SP H (DOMESTIC/STEVENSON)	1990	5000	EGGS	ME, PINE TREE TROUT/SANFORD				
0013	ONT, RAINBOW SP H (DOMESTIC/STEVENSON)	1990	15000	EGGS	ME, PIERCE ASSOCIATES/WEST BUXTON				
SALMO SALAR (ATLANTIC SALMON)									
6005	NB, SEA FARMS H (SAINT JOHN RIVER)	1986	25000	SMOLTS	ME, OCEAN PRODUCTS INCORPORATED				EASTPORT CAGES (AQC)
6004	SCO, ALLT MOR H (ARAY IVER/WILD)	1986	50000	EGGS	ME, SEA RUN INC/DEAD RIVER H	P			
6003	NB, MACTAQUAC FCS (SAINT JOHN RIVER)	1986	106000	EGGS	ME, ASRSC/GREEN LAKE HATCHER	P			AROOSTOOK R (RESTORATION)
6002	NB, MACTAQUAC FCS ? (SAINT JOHN RIVER)	1986	200	ADULTS	ME, ASRSC				AROOSTOOK R (RESTORATION)
7002	NB, FLORENCEVILLE H (SJR/MINTO)	1987	40000	UY PARR	ME, SALEN INCORPORATED				UPPER SJR (ENHANCEMENT)
7004	NB, MACTAQUAC FCS (SAINT JOHN RIVER)	1987	55	GRILSE	ME, ASRSC				AROOSTOOK R (RESTORATION)
7007	SCO, WESTER ROSS H (DOMESTIC)	1987	500000	EGGS	ME, ASI/OQUOSSOC H (REARING)	1989	25000	SMOLTS	CROSS IS (AQUACULTURE)
7006	NB, SEA FARMS (AQC BROODSTOCK)	1987	25000	SMOLTS	ME, OCEAN PRODUCTS INCORPORATED				EASTPORT CAGES (AQC)
7001	FIN, OY BALTIC (DOMESTIC SEA CAGES)	1987	500000	EGGS	ME, OPI/DEBLOIS HATCHERY	1988	27000	SMOLTS	SEE NEXT LINE
7001					ME, OPI/GARDNER LAKE H	1989	22000	SMOLTS	BROAD COVE (AQUACULTURE)
7005	NB, SEA FARMS (AQC BROODSTOCK)	1987	18000	SMOLTS	ME, FRANK RIER				LUBEC CAGES (AQC)
7008	NB, JAIL IS SALMON (FUNDY/ST JOHN)	1987	1000000	EGGS	NB, SEA FARMS, OROMOCTO H	1989	30000	SMOLTS	JOHNSON BAY (AQUACULTURE)
7003	NB, FLORENCEVILLE H (SJR)	1987	150000	FRY	ME, ASRSC				UPPER SJR (ENHANCEMENT)
8001	ICE, ELDI FISH FARMS (AQC BROODSTOCK)	1988	156000	EGGS	ME, MPL/BINGHAM HATCHERY	P1989			(AQUACULTURE)
8012	ICE, ELDI FISH FARMS	1988	500000	EGGS	ME, MPL/BINGHAM HATCHERY	1989	3000	SMOLTS	ALLEN IS (AQUACULTURE)
8012						1989	100000	SMOLTS	SWANS IS (AQUACULTURE)
8012						1989	80000	SMOLTS	LUBEC (AQUACULTURE)
8012						1989	20000	SMOLTS	TREAT IS (AQUACULTURE)
8013	ICE, ISNO SEA CAGES (AQC BROODSTOCK)	1988	280000	EGGS	ME, MPL/BINGHAM HATCHERY	1989	15000	SMOLTS	MATHEWS IS (AQUACULTURE)
8013						1989	60000	SMOLTS	SWANS IS (AQUACULTURE)
8013						1989	80000	SMOLTS	LUBEC (AQUACULTURE)
8013						1989	20000	SMOLTS	TREAT IS (AQUACULTURE)
8014	FIN, OY BALTIC (MOORUM)	1988	1000000	EGGS	ME, MPL, BINGHAM HATCHERY	1989	100000	SMOLTS	SWANS IS (AQUACULTURE)
8014						1989	80000	SMOLTS	COOPER IS (AQUACULTURE)
8014						1989	30000	SMOLTS	TREAT IS (AQUACULTURE)
8004	SCO, LANDCATCH (AQC/2 NORWAY STRAINS)	1988	1000000	EGGS	ME, ASI/OQUOSSOC HATCHERY	P1989			(AQUACULTURE)
8004	SCO, LANDCATCH (AQC/2 NORWAY STRAINS)	1988	1000000	EGGS	ME, ASI/OQUOSSOC HATCHERY	P1989			(AQUACULTURE)
8004	SCO, LANDCATCH (DOMESTIC)	1988	1500000	EGGS	ME, ASI/OQUOSSOC HATCHERY	1989	20000	SMOLTS	GR WASS IS (AQUACULTURE)
8004						1989	80000	SMOLTS	TREAT IS (AQUACULTURE)
8004						1989	80000	SMOLTS	ROGERS IS (AQUACULTURE)
8004						1989	5000	SMOLTS	MATHEWS IS (AQUACULTURE)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALMO SALAR (ATLANTIC SALMON) - CONTINUED									
8004						1989	35000	SMOLTS	TREAT IS (AQUACULTURE)
8004						1989	225000	SMOLTS	CROSS IS (AQUACULTURE)
8004									
8017	NB, JAIL IS SALMON (FUNDY/ST JOHN)	1988	1600000	EGGS	NB, SEA FARMS/DIG & SPRING H	1988	200000	FRY	(SEE NEXT LINE)
8017					NH, BRISTOL HATCHERY	1989	90000	SMOLTS	CUTLER HARB (AQUACULTURE)
8017						1989	60000	SMOLTS	GR WASS IS (AQUACULTURE)
8015		1988	1500000	EGGS	NB, SEA FARMS/DIG & SPRING H	1988	200000	FRY	(SEE NEXT LINE)
8015					NH, BRISTOL HATCHERY	1989	10000	SMOLTS	GROVE PT (AQUACULTURE)
8016		1988	1000000	EGGS	NB, SEA FARMS/DIGDEQUASH H	1989	100000	SMOLTS	LUBEC (AQUACULTURE)
8016						1989	20000	SMOLTS	ROGERS IS (AQUACULTURE)
8016						1989	20000	SMOLTS	GROVE PT (AQUACULTURE)
8005	NB, DIGDEQUASH H (AQC/ST JOHN)	1988	30000	SMOLTS	NB, J STEVENS/LK UTOPIA H				LUBEC SEA CAGES (AQC)
8006	NB, DIGDEQUASH H (AQC/ST JOHN)	1988	99300	SMOLTS	ME, SEA FARMS				LUBEC SEA CAGES (AQC)
8007	NB, DIGDEQUASH H (AQC/ST JOHN)	1988	350000	UY PARR	ME, SALEN INC				UPPER SJR (ENHANCEMENT)
8008	NB, FLORENCEVILLE H (SJR/MINTO & ASF)	1988	20000	UY PARR	ME, SALEN INC				UPPER SJR (ENHANCEMENT)
8009	NB, FLORENCEVILLE H (SJR & MINTO)	1988	27000	FRY	ME, SALEN INC				UPPER SJR (ENHANCEMENT)
8010	NB, MACTAQUAC FCS (ST JOHN RIVER)	1988	100	ADULTS	ME, ASRSC				AROOSTOOK R (RESTORATION)
8011	NB, MACTAQUAC FCS (ST JOHN RIVER)	1988	100000	EGGS	ME, ASRSC/GREEN LK H (HATCHING)	1988		FRY	AROOSTOOK R (RESTORATION)
9001	NB, FLORENCEVILLE H (DOMESTIC/SJR)	1989	30000	PARR	ME, SALEN INC				SJR (ENHANCEMENT)
9002	NB, FLORENCEVILLE H (DOMESTIC/SJR)	1989	80000	FRY	ME, SALEN INC				SJR (ENHANCEMENT)
9005	NB, ST JOHN FCS (ST JOHN)	1989	10000	SMOLTS	ME, DFO				AROOSTOOK R (SURVIVAL TEST)
9007	NB, SEA FARMS CANADA (ATLANTIC/SJR)	1989	627000	EGGS	ME, OPI/GARDNER LAKE				(NOT SPECIFIED)
9008	NB, GRANGER COVE SALMON (ATLANTIC/SJR)	1989	225000	EGGS	ME, OPI/GARDNER LAKE				(NOT SPECIFIED)
9009	NB, GRANGER COVE SALMON (ATLANTIC/SJR)	1989	250000	EGGS	ME, ASI/QUOSSOC HATCHERY				(NOT SPECIFIED)
9010	NB, KELLY COVE SALMON (ATLANTIC/SJR)	1989	550000	EGGS	ME, MPL/BINGHAM HATCHERY				(NOT SPECIFIED)
9011	NB, AQUA VENTURES (ATLANTIC/SJR)	1989	550000	EGGS	ME, MPL/BINGHAM HATCHERY				(NOT SPECIFIED)
9012	NB, KELLY COVE SALMON (ATLANTIC/SJ)	1989	187500	EGGS	ME, NEFFE, KENNEBEC AQUACULTURE				(NOT SPECIFIED)
9013	NB, AQUA VENTURES (ATLANTIC/SJR)	1989	187500	EGGS	ME, NEFFE, KENNEBEC AQUACULTURE				(NOT SPECIFIED)
9014	NB, AQUA VENTURES (ATLANTIC/SJR)	1989	250000	EGGS	ME, NEFFE, KENNEBEC AQUACULTURE				(NOT SPECIFIED)
9015	NB, KELLY COVE SALMON (ATLANTIC/SJR)	1989	250000	EGGS	ME, NEFFE, KENNEBEC AQUACULTURE				(NOT SPECIFIED)
9016	NB, AQUA VENTURES (ATLANTIC/SJR)	1989	125000	EGGS	ME, ASI/OQUOSSOC HATCHERY				(NOT SPECIFIED)
9017	NB, KELLY COVE SALMON (ATLANTIC/SJ)	1989	125000	EGGS	ME, ASI/OQUOSSOC HATCHERY				(NOT SPECIFIED)
9018	NB, CONNORS BROS (ATLANTIC/SJ)	1989	200000	EGGS	ME, PICARD FARMS/FRENCHVILLE				(NOT SPECIFIED)
0001	NB, SAINT JOHN FCS (SJR WILD)	1990	40000	FRY	ME, ASRSC (PUBLIC STOCKING)				WASHBURN, AROOSTOOK RIVER
0002	NB, SAINT JOHN FCS (SJR WILD)	1990	7569	SMOLTS	NB, DFO (PUBLIC STOCKING/RESEARCH)				PRESQUE ISLE, AROOSTOOK R
0003	NB, SAINT JOHN FCS (SJR WILD)	1990	6164	SMOLTS	NB, DFO (PUBLIC STOCKING/RESEARCH)				VAN BRUEN, SAINT JOHN RIVER
0004	SCO, LANDCATCH (AQUACULTURE/DOMESTIC)	1990	1216804	EGGS	ME, ASI/OQUOSSOC HATCHERY				
0005	NB, AQUA VENTURES (ATLANTIC/SJR)	1990	299830	EGGS	ME, KENNEBEC AQUACULTURE/EMBDEN				
0006	NB, KELLY COVE SALMON (ATLANTIC/SJR)	1990	140500	EGGS	ME, PENOBSCOT SALMON COMPANY INC				
0007	NB, GRANGER COVE SALMON (ATL/SJR)	1990	178640	EGGS	ME, ASI/OQUOSSOC HATCHERY				
0008	NB, AQUA VENTURES (ATLANTIC/SJR)	1990	230782	EGGS	ME, ASI/OQUOSSOC HATCHERY				
0009	NB, KELLY COVE SALMON (ATLANTIC/SJR)	1990	274890	EGGS	ME, MPL/BINGHAM HATCHERY				

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS						FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
SALVELINUS ALPINUS (ARCTIC CHAR)									
9006	NB, HML (HML/FRASER R, LABRADOR)	1989	20000	EGGS	ME, MPL/BINGHAM HATCHERY	P1990			(NOT SPECIFIED)
SALVELINUS FONTINALIS (BROOK TROUT)									
0010	CO, 4 SEASONS TF (WILDCAT RESERVOIR)	1990	20000	EGGS	ME, PIERCE ASSOCIATES/WEST BUXTON				
0011	UT, EGAN HATCHERY (EGAN/H/OWHI)	1990	145327	EGGS	ME, MDIFW/COBB STATE HATCHERY	1990	112019	FING	VARIOUS (PUBLIC STOCKING)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

MASSACHUSETTS

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS KISUTCH (COHO SALMON)									
6003	OR, ORE AQUA INC (UNKNOWN)	1986	25000	EGGS	MA, SP INC/SALEM LABORATORY				SALEM LAB TANKS (AQC)
6001	MA, SULLIVAN & SANDWICH H (NORTH R/WA)					1986	24942	SMOLT	NORTH RIVER (RESEARCH)
7001	OR, ORE AQUA INC (UNKNOWN)	1987	35000	EGGS	MA, R T CAPELESS				HINSDALE TANKS (AQC)
8002	MI, PLATTE RIVER HATCHERY				MA, SULLIVAN HATCHERY	1988	30000	JUV	NORTH RIVER (RESEARCH)
8001	MA, (NORTH RIVER)				MA, SULLIVAN HATCHERY	1988	21000	JUV	NORTH RIVER (RESEARCH)
9001	MI, PLATTE RIVER HATCHERY	*			MA, SULLIVAN HATCHERY	1989	50000		NORTH RIVER (RESEARCH)
9002	NY, SALMON RIVER HATCHERY	*			MA, SULLIVAN HATCHERY	1989	50000		NORTH RIVER (RESEARCH)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
6004	WA, TROUT LODGE (UNKNOWN)	1986	50000	EGGS	MA, MOHAWK TROUT HATCHERY				SUTHERLAND PONDS (AQC)
9005	WA, TROUT LODGE (DOMESTIC)	1989	550000	EGGS	MA, MCLAUGHLIN HATCHERY	1990	100000	FRY	SEE NEXT LINE
9005					SANDWICH HATCHERY	*1991		1+	(PUBLIC FISHING)
9005					MA, MCLAUGHLIN HATCHERY	1990	75000	FRY	SEE NEXT LINE
9005					SUNDERLAND HATCHERY	*1991		1+	(PUBLIC FISHING)
9005					MA, MCLAUGHLIN HATCHERY	1990	75000	FRY	SEE NEXT LINE
9005					MONTAGUE HATCHERY	*1991		1+	(PUBLIC FISHING)
9006	ID, BLACK CANYON TF (DOMESTIC)	1989	30000	EGGS	MA, MCLAUGHLIN HATCHERY	*1991		1+	(PUBLIC FISHING)
0001	ONT, AQUAFARMS CANADA (DOMESTIC)	1990	20000	EGGS	MA, D J ADAMS HATCHERY				(PRIVATE AQUACULTURE)
0002	UT, TROPHY FISH RANCH INC (DOMESTIC)	1990	500000	EGGS	MA, MDFW/MCLAUGHLIN HATCHERY	1991	80000	FRY	SEE NEXT 2 LINES
0002					SUNDERLAND HATCHERY	*1991			VARIOUS (PUBLIC FISHING)
0002					SUNDERLAND HATCHERY	*1992			VARIOUS (PUBLIC FISHING)
0002					MA, MDFW/MCLAUGHLIN HATCHERY	1991	80000	FRY	SEE NEXT 2 LINES
0002					MONTAGUE HATCHERY	*1991			VARIOUS (PUBLIC FISHING)
0002					MONTAGUE HATCHERY	*1992			VARIOUS (PUBLIC FISHING)
0003	UT, TROPHY FISH RANCH INC (DOMESTIC)	1990	100000	G EGGS	MA, MDFW/SANDWICH HATCHERY	*1991			VARIOUS (PUBLIC FISHING)
0003					MA, MDFW/SANDWICH HATCHERY	*1992			VARIOUS (PUBLIC FISHING)
0004	ONT, AQUAFARMS CANADA (DOMESTIC)	1990	7000	FING	MA, MDFW/PLYMOUTH ROCK TROUT CO.				UNKNOWN
0005	ONT, RAINBOW SPRINGS H (DOMESTIC)	1990	60000	E EGGS	MA, MDFW/PLYMOUTH ROCK TROUT CO.				UNKNOWN
0006	ONT, WILDCAT TROUT FARM (DOMESTIC)	1990	100000	E EGGS	MA, MDFW/PLYMOUTH ROCK TROUT CO.				UNKNOWN
ONCORHYNCHUS MYKISS KAMLOOPS (KAMLOOPS TROUT)									
6002	WA, TROUT LODGE (UNKNOWN)	1986	10000	EGGS	MA, CANDEES TROUT HATCHERY				EGERMONT PONDS (AQC)
SALMO SALAR (ATLANTIC SALMON)									
8003	ME, (UNION RIVER)				MA, MDFW, REED HATCHERY	1988	6033	FRY	WESTFIELD RIVER
8003						1988	27467	FRY	MANHAN RIVER
8003						1988	14969	FRY	BEAR RIVER
8003						1988	23430	FRY	COLD RIVER
8003						1988	12000	FRY	SOUTH RIVER

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALMO SALAR (ATLANTIC SALMON) - CONTINUED									
8004	ME, (UNION RIVER)				MA, MDFW/REEDHATCHERY	1988	22600	SMOLTS	DEERFIELD RIVER
8004						1988	22800	SMOLTS	MILLERS RIVER
8005	ME, (UNION RIVER)				MA, NDFW/REEDHATCHERY	1988	2700	PARR	MILLERS RIVER
8005						1988	2300	PARR	DEERFIELD RIVER
9003	CT, (CONNECTICUT RIVER)				MA, MDFW/REEDHATCHERY	1989	120000	FRY	DEERFIELD RIVER
9004	CT, (CONNECTICUT RIVER)				MA, MDFW/REEDHATCHERY	1989	20000	SMOLTS	DEERFIELD RIVER
9004						1989	20000	SMOLTS	MILLERS RIVER

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NEW BRUNSWICK

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
7007	ONT, RAINBOW SPRINGS HATCHERY	1987	2000	EGGS	NB, ST ANDREWS BIOLOGICAL STATION				
7015	QUE, PISCICULTURE ALLEGHANYS	1987	3000	FING	NB, D WOLVERTON				CENTREVILLE (AQUACULTURE)
7016	ONT, RAINBOW SPRINGS HATCHERY	1987	4000	FING	NB, A PHILLIPS				MONCTON (AQUACULTURE)
7010	PEI, INTEGRATED AQUATICS	1987	4000	FING	NB, DON CHAPMAN				CAMPOBELLO (AQUACULTURE)
7008	WA, BEITEYS RESORT	1987	75000	EGGS	NB, PURTILL HATCHERY				SUSSEX (AQUACULTURE)
7002	ONT, AQUAFARMS CANADA LTD	1987	15000	FING	NB, FUNDY MARINE SURVEYORS				ST JOHN (AQUACULTURE)
7014	QUE, PISCICULTURE ALLEGHANYS	1987	1300	FING	NB, G CORMIER				GRAND FALLS (AQUACULTURE)
7013	PEI, INTEGRATED AQUATICS	1987	3600	FING	NB, MERI-MER OCEAN PRODUCTS				WELSHPOOL (AQUACULTURE)
7012	QUE, PISCICULTURE ALLEGHANYS	1987	6000	FING	NB, ATLANTIS SEA FARMS				CLIFTON ROYAL (AQUACULTURE)
7011	QUE, PISCICULTURE ALLEGHANYS	1987	200000	EGGS	NB, ATLANTIS SEA FARMS				CLIFTON ROYAL (AQUACULTURE)
7003	ONT, RAINBOW SPRINGS HATCHERY	1987	50000	EGGS	NB, PURTILL HATCHERY				SUSSEX (AQUACULTURE)
7017	ONT, AQUAFARMS CANADA LTD	1987	100000	EGGS	NB, ALVIN CRAFT/HATFIELD POINT				HATFIELD PT (AQUACULTURE)
7005	ONT, RAINBOW SPRINGS HATCHERY	1987	40000	EGGS	NB, OAK BAY HATCHERY				ST STEPHEN (AQUACULTURE)
7009	PEI, INTEGRATED AQUATICS	1987	3000	FING	NB, LLOYD COOK				ST GEORGE (AQUACULTURE)
7001	ONT, RAINBOW SPRINGS HATCHERY	1987	177000	EGGS	NB, ATLANTIC SEA FARM				CLIFTON ROYAL (AQC)
7018	ONT, AQUAFARMS CANADA LTD	1987	20000	EGGS	NB, MEADOW LAKE FARMS				ST JOHN (AQUACULTURE)
7004	ONT, RAINBOW SPRINGS HATCHERY	1987	50000	EGGS	NB, ATLANTIC SMOLTS LTD				MINTO (AQUACULTURE)
7006	ONT, RAINBOW SPRINGS HATCHERY	1987	20000	EGGS	NB, SISCOR CORPORATION				MONCTON (AQUACULTURE)
8024	ONT, RAINBOW SPRINGS HATCHERY	1988	10000	FING	NB, WILLIAM KNOW (REARING)				ST JOHN (AQUACULTURE)
8023	QUE, PISCICULTURE ALLEGHANYS	1988	800	FING	NB, GILLES CORMIER (REARING)				GRAND FALLS (AQUACULTURE)
8022	PEI, INTEGRATED AQUATICS	1988	4300	FING	NB, L COOK, ST GEORGE (REARING)				BOF CAGES (AQUACULTURE)
8021	QUE, PISCICULTURE ALLEGHANYS	1988	100000	EGGS	NB, GREEN ACRES TF (REARING)				MONCTON (AQUACULTURE)
8020	WA, BEITEYS RESORT	1988	125000	EGGS	NB, EDWARD EUSTACE (REARING)				SUSSEX (AQUACULTURE)
9004	PEI, BROOKVALLEY MARINE	1989	4350	EGGS	NB, MASCARINE MARICULTURE				MASCARINE (AQC)?
9005	ONT, RAINBOW SPRINGS HATCHERY	1989	100000	EGGS	NB, MEDARD CORMIER, MONCTON				
9006	PEI, GLYNDE RIVER AQUACULTURE	1989	20000	EGGS	NB, B GATES/BELLEISLE CREEK				
9013	ONT, AQUAFARMS CANADA LTD	1989	75000	EGGS	NB, ALVIN CRAFT/HATFIELD POINT				
0001	PEI, INTEGRATED AQUATICS	1990	5000	EGGS	NB, NB COMMUNITY COLLEGE/ST. ANDREWS				
0002	PEI, BROOKVALLEY MARINE	1990	1900	FING	NB, M. LEGERE/FORTUNE				
0003	ONT, RAINBOW SPRINGS HATCHERY	1990	50000	EGGS	NB, MEDARD CORMIER/MONCTON				
0004	QUE, PISCICULTURE ALLEGHANYS	1990	600	FING	NB, MICHEL BIRON/FREDERICTON				
0005	ONT, RAINBOW SPRINGS HATCHERY	1990	2000	FING	NB, POLLUTECH ENVIRONMENT/BATHURST				
SALMO SALAR (LANDLOCKED ATLANTIC SALMON)									
8019	ME, GRAND LK STREAM H (WEST GRAND LK)	1988	35000	EGGS	NB, DFO/ST JOHN FCS (REARING)	P			(ENHANCEMENT)
9001	ME, GRAND LK STREAM HATCHERY	1989	35000	EGGS	NB, DFO/ST JOHN FCS				
SALMO TRUTTA (BROWN TROUT)									
7022	NB, FLOWERS COVE H (LOCH LOMOND)	1987	10000	JUV	NB, NBDNRE				EAST MUSQUASH R
8005	NB, FLOWERS COVE H (LOCH LOMOND)	P1988	10000	JUV	NB, NBDNRE				EAST MUSQUASH R

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALVELINUS ALPINUS (ARCTIC CHAR)									
8006	MAN, ROCKWOOD H (FRASER R, LABRADOR)	1988	3000	EGGS	NB, BUCTOUCHE INDIAN BAND				BUCTOUCHE (AQUACULTURE)
	NB, FLOWERS COVE H (WALTON LAKE)	*1989	1000	JUV					2ND KEDRON LK
9002	MAN, ROCKWOOD HATCHERY	1989	5000	EGGS	NB, GREEN ACRES TROUT FARM/MONCTON				BUCTOUCHE (AQC) ?
9003	MAN, ROCKWOOD HATCHERY	1989	5000	EGGS	NB, BUCTOUCHE INDIAN BAND				
9012	MAN, ROCKWOOD HATCHERY	1989	3000	EGGS	NB, SEA FARMS CANADA/SUSSEX				
0006	PEI, BROOKVALLEY MARINE	1990	40000	EGGS	NB, GREEN ACRES TROUT FARM/MONCTON				
SALVELINUS FONTINALIS (BROOK TROUT)									
7020	QUE, PISCICULTURE ALLEGHANYS	1987	100000	EGGS	NB, ATLANTIS SEA FARMS				CLIFTON ROYAL (AQUACULTURE)
7019	QUE, PISCICULTURE ALLEGHANYS	1987	180000	EGGS	NB, DOUGLAS DAIGLE, RICHIBUCTO				RICHIBUCTO (AQUACULTURE)
7021	QUE, PISCICULTURE ALLEGHANYS	1987	130000	FING	NB, PIERRE MORIN				GRAND FALLS (AQUACULTURE)
8018	QUE, PISCICULTURE ALLEGHANYS	1988	30000	FING	NB, PIERRE MORIN (REARING)				GRAND FALLS (AQUACULTURE)
8016	QUE, PISCICULTURE ALLEGHANYS	1988	4000	FING	NB, GILLES CORMIER (REARING)				GRAND FALLS (AQUACULTURE)
8015	ME, PHILLIPS HATCHERY	1988	150000	EGGS	NB, FLOWERS COVE H (REARING)				
8014	QUE, PISCICULTURE ALLEGHANYS	1988	100000	EGGS	NB, RONALD NOWLAN (REARING)				POKEMOUCHE (AQUACULTURE)
8013	QUE, PISCICULTURE ALLEGHANYS	1988	20000	EGGS	NB, JAMES McCRAE (REARING)				SAINT JOHN (AQUACULTURE)
8012	QUE, PISCICULTURE ALLEGHANYS	1988	75000	EGGS	NB, ALVIN CRAFT (REARING)				HATFIELD PT (AQUACULTURE)
8011	QUE, PISCICULTURE ALLEGHANYS	1988	300000	EGGS	NB, DOUGLAS DAIGLE (REARING)				RICHIBUCTO (AQUACULTURE)
8010	QUE, PISCICULTURE ALLEGHANYS	1988	75000	EGGS	NB, NOEL BOSSE (REARING)				EDMUNDSTON (AQUACULTURE)
8009	QUE, PISCICULTURE ALLEGHANYS	1988	200000	EGGS	NB, REGINALD BOSS (REARING)				EDMUNDSTON (AQUACULTURE)
8008	QUE, PISCICULTURE ALLEGHANYS	1988	200000	EGGS	NB, GREEN ACRES TF (REARING)				MONCTON (AQUACULTURE)
8007	QUE, PISCICULTURE ALLEGHANYS	1988	50000	EGGS	NB, WILLIAM KNOW (REARING)				ST JOHN (AQUACULTURE)
9007	ONT, WILDCAT TROUT FARM	1989	120000	EGGS	NB, D DAIGLE (REARING)				RICHIBUCTO
9008	PEI, BROOKVALLEY MARINE	1989	120	FISH	NB, ROBERT METHE (REARING)				SALISBURY
9009	PEI, BROOKVALLEY MARINE	1989	25000	EGGS	NB, BILL KNOR/GAGETOWN				
9010	PEI, BROOKVALLEY MARINE	1989	5500	FISH	NB, BILL KNOR/GAGETOWN				
9011	PEI, BROOKVALLEY MARINE	1989	21000	EGGS	NB, L McCRAE/HATFIELD POINT				
0007	PEI, BROOKVALLEY MARINE	1990	20000	FING	NB, NBDNRE/MINTO				
0008	WA, BEITEYS RESORT	1990	60000	EGGS	NB, GREEN ACRES TF (REARING)				MONCTON (AQUACULTURE)
0009	WA, BEITEYS RESORT	1990	50000	EGGS	NB, ALVIN CRAFT (REARING)				HATFIELD PT (AQUACULTURE)
0010	WA, BEITEYS RESORT	1990	50000	EGGS	NB, GREEN ACRES TF (REARING)				MONCTON (AQUACULTURE)
0011	PEI, BROOKVALLEY MARINE	1990	6000	FING	NB, BILL KNORR/SAINT JOHN				
0012	QUE, PISCICULTURE ALLEGHANYS	1990	200000	EGGS	NB, GREEN ACRES TF (REARING)				MONCTON (AQUACULTURE)
0013	QUE, PISCICULTURE ALLEGHANYS	1990	300000	EGGS	NB, DOUGLAS DAIGLE (REARING)				RICHIBUCTO (AQUACULTURE)
0014	QUE, PISCICULTURE ALLEGHANYS	1990	275000	EGGS	NB, REGINALD BOSSE (REARING)				EDMONSTON (AQUACULTURE)
0015	QUE, PISCICULTURE ALLEGHANYS	1990	50000	EGGS	NB, ALVIN CRAFT (REARING)				HATFIELD PT (AQUACULTURE)
0016	PEI, BROOKVALLEY MARINE	1990	60000	EGGS	NB, LEGERE FISH FARM/CAPE PELE				
0017	QUE, PISCICULTURE ALLEGHANYS	1990	25000	EGGS	NB, MCCREA FARM LTD/HATFIELD POINT				
0018	QUE, PISCICULTURE ALLEGHANYS	1990	50000	FING	NB, MEDARD CORMIER/MONCTON				
0019	ME, PHILLIPS HATCHERY	1990	20000	EGGS	NB, NBDNRE/FLOWERS COVE (QUAR)				

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALVELINUS FONTINALIS X SALVELINUS ALPINUS (CHARBROOK)									
8004	NB, FLOWERS COVE H (WALTON X PHILLIPS)	P1988	10000	JUV	NB, NBDNRE				MINE PONDS
SALVELINUS NAMAYCUSH X SALVELINUS FONTINALIS (SPLAKE)									
6001	NB, FLOWERS COVE H (CLEAR X PHILLIPS)	1986	100	YEAR	NB, NBDNRE				NORTH LAKE (EXP STOCKING)
6001		1986	550	YEAR					PEABODY LK (EXP STOCKING)
6001		1986	100	YEAR					BLIND LK (EXP STOCKING)
7023	NB, FLOWERS COVE H (CLEAR X PHILLIPS)	1987	2000	JUV	NB, NBDNRE				MULLIN STREAM L
7023		1987	500	JUV					BIG MEADOW POND
7023		1987	2000	JUV					NL RIVER LAKE
7023		1987	150	JUV					GRAND MANAN
7023		1987	175	JUV					HARRIS LAKE
7023		1987	700	JUV					GLENN SEVERN
8001	NB, FLOWERS COVE H (CLEAR X PHILLIPS)	P1988	5000	JUV	NB, NBDNRE				GRAND LAKE
8001		P1988	2000	JUV					MULLIN STREAM
8001		P1988	2000	JUV					NL RIVER LAKE
	NB, FLOWERS COVE H (CLEAR X PHILLIPS)	P1989	5000	JUV					LAKE UTOPIA
	NB, FLOWERS COVE H (CLEAR X PHILLIPS)	P1989	150	JUV					GOLDSMITHS LAKE
OSMERUS MORDAX (RAINBOW SMELT)									
6002	NB, (SUCKER BROOK, SKIFF LAKE)	1986	50000	E EGGS	NB, NBDNRE				UNIQUE L (LL SALMON FORAGE)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NEWFOUNDLAND

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
6001	ONT, RAINBOW SPRINGS HATCHERY	1986	5000	5CM					HOPEALL CAGES (AQC)
	ONT, RINGWOOD HATCHERY ?	1986	6700	JUV					HOPEALL CAGES ? (AQC)
7002	ONT, RAINBOW SPRINGS H (UNKNOWN)	1987	4000	JUV	NFLD, EPS/NWAFC TANKS (BIOASSAY)	P			TO BE DESTROYED
7003	ONT, RAINBOW SPRINGS H (UNKNOWN)	1987	900	JUV	NFLD, MSRL TANKS (RESEARCH)	P			TO BE DESTROYED
7001	ONT, AQUAFARMS CANADA (UNKNOWN)	1987	300	JUV	NFLD, MSRL TANKS (RESEARCH)	P			TO BE INCINERATED
7004	ONT, RAINBOW SPRINGS H (UNKNOWN)	1987	10000	TR EGGS	NFLD, BAY D'ESPOIR HATCHERY	P			BAY D'ESPOIR (AQUACULTURE)
7007	ONT, RAINBOW SPRINGS H (UNKNOWN)	1987	300	JUV	NFLD, DFO/NWAFC TANKS (RESEARCH)				FISH DESTROYED
8013	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	150	15CM	NFLD, MSRL/MEMORIAL U (RESEARCH)				ST JOHNS, STOCK DESTROYED
8012	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	500	15CM	NFLD, NWAFC (RESEARCH)				ST JOHNS, STOCK DESTROYED
8010	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	500	10CM	NFLD, DFO/NWAFC (RESEARCH)				ST JOHNS, STOCK DESTROYED
8009	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	500	7CM	NFLD, DFO/NWAFC (RESEARCH)				ST JOHNS, STOCK DESTROYED
8015	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	2000	FRY	NFLD, EPS/NWAFC (BIOMONITORING)				
8016	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	2000	FRY	NFLD, EPS/NWAFC (BIOMONITORING)				ST JOHNS, STOCK DESTROYED
8008	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	2000	FRY	NFLD, EPS/NWAFC (BIOMONITORING)				ST JOHNS, STOCK DESTROYED
8017	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	30000	TR EGGS	NFLD, BAY D'ESPOIR HATCHERY				ST ALBANS, STOCK DESTROYED
8014	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	125000	TR EGGS	NFLD, BAY D'ESPOIR HATCHERY	P1989			ROTI BAY CAGES (AQC)
8011	ONT, RAINBOW SPRINGS H (HATCHERY)	1988	10000	EGGS	NFLD, MARINE INSTITUTE				ST JOHNS, STOCK DESTROYED
8007	ONT,	1988	600	FING	NFLD, BAY D'ESPOIR HATCHERY				
8006	ONT,	1988	100000	EGGS	NFLD, BAY D'ESPOIR HATCHERY				
9011	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1989	50	30-50G	NFLD, MINL/MINL TANKS	P			TO BE DESTROYED
9009	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1989	2000	0.5G	NFLD, DOE, NWAFC (BIOMONITORING)	P			TO BE DESTROYED
9008	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1989	2000	0.5G	NFLD, DOE/NWAFC (BIOMONITORING)	P			TO BE DESTROYED
9007	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1989	75000	TR EGGS	NFLD, BAY D'ESPOIR HATCHERY	P1990			ROTI BAY CAGES (AQC)
9006	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1989	600	13CM	NFLD, OSL/BAY D'ESPOIR H (RESEARCH)	P			TO BE DESTROYED
9010	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*1990	5000	E EGGS	NFLD, MINL/MINL TANKS (TEACHING)	P			ST JOHNS, TO BE DESTROYED
0001	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	200	FISH	NFLD, DOE/NWAFC (EXPERIMENTAL)				STOCK DESTROYED
0002	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	60000	E EGGS	NFLD, BAY D'ESPOIR HATCHERY	P			SEA CAGES
0003	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	0.5-1 G	NFLD, LEDREW FUDGE (BIOASSAY)				STOCK DESTROYED
0005	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	2000	0.5 G	NFLD, ENV PROTECTION (BIOASSAY)				STOCK DESTROYED
0006	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	0.5-1 G	NFLD, LEM LAB INC (BIOASSAY)				STOCK DESTROYED
0007	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	10-15 CM	NFLD, NWAFC (INFECTION EXPERIMENTS)				STOCK DESTROYED
0008	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	20000	E EGGS	NFLD, BAY D'ESPOIR HATCHERY	P			SEA CAGES
0009	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	1500	0.5 G	NFLD, ENV PROTECTION (BIOASSAY)				STOCK DESTROYED
0011	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	1500	40 MM	NFLD, SMBDA/HOLYROOD POND				(AQUACULTURE)
0012	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	0.5-1 G	NFLD, LEM LAB INC (BIOASSAY)				STOCK DESTROYED
0013	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	10-15 CM	NFLD, NWAFC (IMMUNOLOGY)				STOCK DESTROYED
0015	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	500	1-2 G	NFLD, LEM LAB INC (BIOASSAY)				STOCK DESTROYED
0016	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	1000	0.5-1 G	NFLD, LEM LAB INC (BIOASSAY)				STOCK DESTROYED
0017	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	200	FISH	NFLD, MARINE INSTITUTE (EXP)				STOCK DESTROYED
0018	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	130000	E EGGS	NFLD, BAY D'ESPOIR HATCHERY	P			SEA CAGES
0019	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	1500	O.5 G	NFLD, ENV PROTECTION (BIOASSAY)				STOCK DESTROYED
0021	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	*	?		PEI, BROOKVALLEY MARINE	1990	1000	1-1.5 G	SEE NEXT LINE
0021		*			NFLD, LEM LAB INC (BIOASSAY)				STOCK DESTROYED
0022	ONT, RAINBOW SPRINGS H (EX H/DOMESTIC)	1990	150	FISH	NFLD, MARINE INSTITUTE (EXP)				STOCK DESTROYED

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALMO SALAR (ATLANTIC SALMON)									
8001	NB, KELLY COVE SEA CAGES (FUNDY/SJR)	*1988	130000	EGGS	NB, BRIDEN/CHAMCOOK H (QUAR)	1989	130000	EGGS	SEE NEXT LINE
8001					NFLD, BAY D'ESPOIR H (QUARANTINE)				
9012	NB, KELLY COVE SEA CAGES (FUNDY/SJR)	1989	100000	EGGS	NB, CHAMCOOK HATCHERY (QUAR)	1989	100000	EGGS	SEE NEXT LINE
9012					NFLD, BAY D'ESPOIR H (QUARANTINE)				
SALVELINUS ALPINUS (ARCTIC CHAR)									
	LAB, (FRASER RIVER)	1986	54500	EGGS	NFLD, MSRL				
7005	LAB, (FRASER RIVER)	1987	10000	EGGS	NFLD, MSRL (INCUBATION)				EGGS DESTROYED
7006	LAB, (FRASER RIVER)	1987	60000	EGGS	NFLD, BAY D'ESPOIR H (QUARANTINE)				EGGS DESTROYED
8005	MAN, DFO, WINNIPEG	1988	30000	EGGS	NFLD, AQUA BLUE FARMS/PORT REXTON				
8004	NB, HUNTSMAN MARINE LABORATORY	1988	30000	EGGS	NFLD, BAY D'ESPOIR HATCHERY				
8003	MAN, DFO, WINNIPEG	1988	10000	EGGS	NFLD, BAY D'ESPOIR HATCHERY				
8002	LAB, (IKINET BROOK)	1988	5000	EGGS	NFLD, BAY D'ESPOIR HATCHERY				
9001	PEI, INTEGRATED AQUATICS (FRASER R/DOM)	*1989	150	7-10 CM	NFLD, DFO/NWAFC (RESEARCH)	P			STOCK TO BE DESTROYED
9002	MAN, ROCKWOOD HATCHERY (FRASER R/DOM)	*1989	5000	EGGS	NFLD, BAY D'ESPOIR HATCHERY	P1990			ROTI BAY CAGES (AQC)
9003	NB, HUNTSMAN MARINE LAB (FRASER R/DOM)	*1989	30000	E EGGS	NFLD, BAY D'ESPOIR H (QUARANTINE)	P1990			ROTI BAY CAGES (AQC)
9004	MAN, ROCKWOOD HATCHERY (FRASER R/DOM)	*1989	3000	EGGS	NFLD, MARINE INSTITUTE (TEACHING)	P			STOCK TO BE DESTROYED
9005	MAN, ROCKWOOD HATCHERY (FRASER R/DOM)	*1989	5000	EGGS	NFLD, NORDCO AQUARIUM (EXP)	1989			ST JOHNS, STOCK DIED
0014	PEI, IAS (EX ST JOHN EX FRASER R/DOM)	1990	200	FING	NFLD, NWAFC (RESEARCH)	P			STOCK TO BE DESTROYED

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NEW HAMPSHIRE

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS KISUTCH (COHO SALMON)									
	NH,	1986	30000	FRY					GREAT BAY TRIBUTARIES
6003	NH, MILFORD HATCHERY (LAMPREY RIVER)	1986	61745	PARR					LAMPREY R (SPORT FISHERY)
6002	NH, MILFORD HATCHERY (LAMPREY RIVER)	1986	130000	SMOLTS					LAMPREY R (SPORT FISHERY)
	NH,	1986	129665	SMOLTS					GREAT BAY ESTUARY
7003	NH, MILFORD HATCHERY (LAMPREY RIVER)				NH, TWIN MOUNTAIN HATCHERY ?	1987	151000	SMOLTS	LAMPREY RIVER (RESEARCH)
8004	NY, SALMON RIVER H (SALMON RIVER)				NH, TWIN MOUNTAIN HATCHERY	1988	99411	SMOLTS	LAMPREY R (RECREATION)
9005	MI, PLATTE RIVER HATCHERY (PLATTE)	1987	300000	E EGGS	NH, NHFG, TWIN MOUNTAIN HATCHERY	1989	200295	SMOLTS	LAMPREY R (RECREATION)
0001	MI, PLATTE RIVER HATCHERY (OREGON)	P1990	400000	SMOLTS					LAMPREY R (RECREATION)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
	NY, (LAKE ONTARIO)	1986	47215	SMOLTS					GREAT BAY ESTUARY
6004	NY, SALMON RIVER H (SALMON RIVER)	1986	47000						LAMPREY R (RECREATION)
7004	NY, SALMON RIVER H (SALMON RIVER)	1987	37000						LAMPREY R (RECREATION)
ONCORHYNCHUS TSHAWYTSCHA (CHINOOK SALMON)									
8005	NY, SALMON RIVER H (SALMON RIVER)				NH, TWIN MOUNTAIN HATCHERY	1988	110918	AGE 1	LAMPREY R (RECREATION)
8003	NY, SALMON RIVER H (SALMON RIVER)				NH, TWIN MOUNTAIN HATCHERY	1988	431460	FRY	LAMPREY R (RECREATION)
9004	NY, SALMON RIVER H (SALMON RIVER)	1988	1100000	EGGS	NH, NHFG/MILFORD HATCHERY	1989	631000	SMOLTS	LAMPREY R (RECREATION)
0001	NY, SALMON RIVER H (SALMON RIVER)	1989	700000	EGGS	NH, NHFG/MILFORD HATCHERY	1990	427000	SMOLTS	LAMPREY & EXETER RIVERS
0002	NY, SALMON RIVER H (SALMON RIVER)	1990	779000	EGGS	NH, NHFG/MILFORD HATCHERY	P1991		SMOLTS	(RECREATIONAL FISHERY)
SALMO TRUTTA (BROWN TROUT)									
6001	NH, MILFORD HATCHERY (DOMESTIC)	1986	9850	SMOLTS	NH, NHFG				8 RIVERS (RESEARCH)
7001	NH, MILFORD HATCHERY (DOMESTIC)	P1987	9850	SMOLTS	NH, NHFG				8 RIVERS (RESEARCH)

NEW JERSEY

ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
7001	NY, ALTMAR HATCHERY (SALMON R)	1987	53000	E EGGS	NJ, HAYFORD HATCHERY	1988?			LARGE LOSS, PREDATION
7001						1988	1128	SMOLTS	RARITAN RIVER (RESEARCH)
ONCORHYNCHUS TSHAWYTSCHA (CHINOOK SALMON)									
6001	NY, ALTMAR HATCHERY (SALMON R)	1986	70000	EGGS	NJ, NJDEP/HAYFORD H (EXP REARING)	1987	59705		RARITAN RIVER
7002	NY, ALTMAR HATCHERY (SALMON R)	1987	95000	E EGGS	NJ. NJDEP/HAYFORD H (EXP REARING)	1988	91170	SMOLTS	RARITAN RIVER

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NEW YORK

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS KISUTCH (COHO SALMON)									
6004	NY, SALMON R H (LK ONTARIO/SALMON R)	1986	547000	JUV	NY, NYDEC				LK ONTARIO (ENHANCEMENT)
6008	NY, SALMON R H (LK ONTARIO/SALMON R)	1986	102000	YEAR	NY, NYDEC				LK ERIE (SPORT FISHING)
6011	NY, SALMON R H (LK ONTARIO/SALMON R)	1986	194000	YEAR	NY, NYDEC				LK ONTARIO (SPORT FISHING)
6011		1986	268000	FING					LK ONTARIO (SPORT FISHING)
7011	NY, SALMON R H (LK ONTARIO/SALMON R)	P1987	350000	YEAR	NY, NYDEC				LK ONTARIO (SPORT FISHING)
7009	NY, SALMON R H (LK ONTARIO/SALMON R)	P1987	100000	1+	NY, NYDEC				LK ONTARIO (SPORT FISHING)
7034	NY, 2 HATCHERIES (SALMON R)	1987	80000	YEAR	NY, NYDEC				LK ONTARIO (SPORT FISHING)
8015	NY, 2 HATCHERIES (SALMON R)	1988	299850	YEAR	NY, NYDEC				LK ONTARIO (SPORT FISHING)
8016	NY, 2 HATCHERIES (SALMON R)	1988	256500	FING	NY, NYDEC				LK ONTARIO (SPORT FISHING)
8028	NY, SALMON R H (LK ONTARIO/SALMON R)	1988	31600	16MO					CHAUTAUQUA CR, LK ERIE
8028		1988	32600	16MO					18 MILE CREEK, LK ERIE
8028		1988	14500	16MO					CANADAWAY CREEK, LK ERIE
8028		1988	90250	16MO					CATTARAUGUS CR, LK ERIE
8028		1988	40000	6MO					CATTARAUGUS CR, LK ERIE
8027	NY, CALEDONIA HATCHERY (SALMON R)	1988	40000	6MO					18 MILE CREEK, LK ERIE
9003	NY, SALMON R H (LK ONTARIO/SALMON R)	1988	37500	11MO	NY, NYDEC				CATTARAUGUS CR, LK ERIE
9004	NY, SALMON R H (LK ONTARIO/SALMON R)	1989	180000	F FING	NY, NYDEC				3 LK ERIE TRIBS (STOCKING)
9013	NY, SALMON R H (LK ONTARIO/SALMON R)	1988	175000	F FING	NY, NYDEC/CALEDONIA H	1989	147865	YEAR	3 LK ERIE TRIBS (STOCKING)
9013		1989	143040	YEAR					LAKE ONTARIO (STOCKING)
9014	NY, CALEDONIA H (LK ONTARIO/SALMON R)	1989	53400	F FING					LAKE ONTARIO (STOCKING)
9014		1989	54065	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
0008	NY, SALMON R H (LK ONTARIO/LK ONTARIO)	1989	160000	F FING					LAKE ONTARIO (STOCKING)
0009	NY, SALMON R H (LK ONTARIO/SALMON R)	1990	162500	F FING	NY, NYDEC, LAKE ERIE UNIT				LAKE ERIE (STOCKING)
0010	NY, SALMON R H (LK ONTARIO/SALMON R)	1990	144400	FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
0011	NY, SALMON R H (LK ONTARIO/SALMON R)	1990	187200	F FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
0012	NY, SALMON R H (LK ONTARIO/SALMON R)	1990	110000	YEAR	NY, NYDEC (PRODUCE SPAWNING RUN)				LAKE ONTARIO (STOCKING)
0013	NY, SALMON R H (LK ONTARIO/SALMON R)	P1991	90000	YEAR	NY, NYDEC (PRODUCE SPAWNING RUN)				LAKE ONTARIO (STOCKING)
		P1991	155000	FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
6015	NY, CALEDONIA H (DOMESTIC)	1986	103000	JUV	NY, NYDEC				LK ONTARIO (SPORT FISHING)
6006	NY, SALMON RIVER H (SALMON R/WA SS)	1986	100000	YEAR					LK ERIE (SPORT FISHING)
6003	NY, SALMON RIVER H (SALMON R/WA SS)	1986	335000	1+					LK ONTARIO (SPORT FISHING)
6007	MI, IN (LK MICHIGAN/SKAMANIA SS)				NY, NYDEC/SALMON RIVER HATCHERY	1986	17950	YEAR	LK ERIE (SPORT FISHING)
7016	NY, SALMON RIVER H (STEELHEAD STRAIN)	P1987	412000	YEAR					
7003	NY, SALMON RIVER H (LK ONTARIO/WA SS)	1987	130000	JUV					4 LAKE ERIE TRIBUTARIES
7002	IN, (LK MICHIGAN/SKAMANIA SS)				NY, NYDEC, SALMON RIVER HATCHERY	1987	20000	YEAR	CHAUTAUQUA CREEK
7027	NY, SALMON RIVER H (DOMESTIC/WFC)	1987	23000	FING					NOT IDENTIFIED
7028	NY, SALMON R H (DOMESTIC/WYTHEVILLE)	1987	172000	FING					NOT IDENTIFIED
7029	NY, SALMON RIVER HATCHERY (DOMESTIC)	1987	90600	YEAR					NOT IDENTIFIED
7024	NY, SALMON R H (WA OR SKAMANIA SS)	1987	60000	FING					LK ONTARIO TRIBUTARIES
7025	NY, 3 HATCHERIES (FINGER LAKES SS)	1987	69350	FING					LK ONTARIO TRIBUTARIES

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS MYKISS (RAINBOW TROUT) - CONTINUED									
7026	NY, 3 HATCHERIES (WA OR SKAMANIA SS)	1987	443340	YEAR					LK ONTARIO TRIBUTARIES
	NY, RANDOLPH H (DOMESTIC/NASHUA)				NY, CALEDONIA HATCHERY	1988	5000	10MO	BUFFALO CREEK, LK ERIE
8027	NY, CALEDONIA H (DOMESTIC/NASHUA)	1988	7500	10MO					18 MILE CREEK
8027		1988	5000	10MO					CANADAWAY CREEK
8027		1988	5000	10MO					CATTARAUGUS CREEK
8027		1988	17800	14MO					EAGLE BAY, LK ERIE
8027		1988	11600	15MO					STURGEON POINT, LK ERIE
8026	NY, RANDOLPH H (DOMESTIC/NASHUA)	1988	5000	14MO					BUFFALO HARBOUR
8007	NY, CALEDONIA H (CALEDONIA/DOMESTIC)	1988	150500	FING					LK ONTARIO (ENHANCEMENT)
8008	NY, CALEDONIA H (CALEDONIA/DOMESTIC)	1988	77370	YEAR					LK ONTARIO (ENHANCEMENT)
8024	NY, SALMON RIVER H (SALMON R/WA SS)	1988	50000	6MO					SPOONER BROOK, LK ERIE
8024		1988	50000	6MO					CLEAR CREEK
8024		1988	18000	16MO					CHAUTAUQUA CREEK
8024		1988	37000	16M0					CATTARAUGUS CREEK
8024		1988	23700	16MO					18 MILE CREEK
8025	IN, (SKAMANIA STEELHEAD STRAIN)				NY, CALEDONIA HATCHERY	1988	10100	16MO	CATTARAUGUS CREEK
8025		1988	18000	16MO					CHAUTAUQUA CREEK
8005	NY, VARIOUS (FINGER KK X DOMESTIC SS)	1988	6780	YEAR					LK ONTARIO TRIBUTARIES
8004	NY, VARIOUS HATCHERIES (SKAMANIA SS)	1988	107000	YEAR					LK ONTARIO TRIBUTARIES
8003	NY, VARIOUS HATCHERIES (WA SS)	1988	293700	YEAR					LK ONTARIO TRIBUTARIES
8006	NY, VARIOUS HATCHERIES	1988	308050	FING					LK ONTARIO TRIBUTARIES
9005	NY, SALMON R H (SALMON R/SS)	1989	13100	F FING	NY, NYDEC				CATTARAUGUS CR (STOCKING)
9005		1989	102900	YEAR					4 LK ERIE TRIBS (STOCKING)
9017	NY, CALEDONIA H (SALMON R/WA SS)	1989	212440	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
9018	NY, SALMON R H (SALMON R/WA SS)	1989	171970	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
9018		1989	75000	F FING					LAKE ONTARIO (STOCKING)
9019	NY, CALEDONIA HATCHERY (DOM/NASHUA)	1989	93790	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
9019		1989	25000	F FING					LAKE ONTARIO (STOCKING)
0001	NY, SALMON RIVER H (LK ONTARIO/WILD)				NY, NYDEC, LAKE ERIE UNIT	1990	120700	YEAR	LAKE ERIE (STOCKING)
0002	NY, SALMON RIVER H (LK ONTARIO/WILD)	1990	48400	FING	NY, NYDEC, LAKE ERIE UNIT				LAKE ERIE (STOCKING)
0003	NY, CALEDONIA H (SALMON RIVER/WA SS)	1990	287200	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
0004	NY, SALMON RIVER H (SALMON R/WA SS)	1990	125000	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
0005	NY, SALMON RIVER H (SALMON R/WA SS)	1990	180000	FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
0006	NY, SALMON RIVER H (SALMON R/WA SS)	P1991	375000	YEAR	NY, NYDEC				LAKE ONTARIO (STOCKING)
0007	NY, SALMON R H (LK ONTARIO/SKAM SS)	P1991	82000	YEAR	NY, NYDEC (PRODUCE SPRING RUN)				LAKE ONTARIO (STOCKING)
ONCORHYNCHUS NERKA KOKANEE (KOKANEE SALMON)									
6002	CT, EAST TWIN LAKE				NY, NYDEC/ROME HATCHERY	P1986	165090	0+	6-10 LAKES (ENHANCEMENT)
7001	CT, EAST TWIN LAKE	1987	197000	EGGS	NY, NYDEC/CATSKILL HATCHERY	P1987			6-10 LAKES (ENHANCEMENT)
7010	CT, EAST TWIN LAKE				NY, NYDEC/ROME H (REARING)	P1987	90300	FRY	8 INLAND LK (ENHANCEMENT)
9001	CT, EAST TWIN LK H (EAST TWIN LK)	1988	93000	EGGS	NY, NYDEC/CATSKILL HATCHERY	1988	93000	EGGS	SEE NEXT LINE
9001					NY, ROME HATCHERY	1989	55000	FING	INLAND LKS (STOCKING)
0014	CT, EAST TWIN LAKE	1989	186000	EGGS	NY, NYDEC/CATSKILL HATCHERY	1989	135000	EGGS	SEE NEXT LINE
0014					NY, ROME HATCHERY	1990	115000	FING	UNIDENTIFIED (ENHANCEMENT)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
ONCORHYNCHUS TSHAWYTSCHA (CHINOOK SALMON)									
6009	MI, (LAKE MICHIGAN)				NY, NYDEC/SALMON RIVER H	1986	529400	SP FING	LK ERIE (SPORT FISHING)
6012	NY, 2 HATCHERIES (SALMON RIVER)	1986	2849000	SP FING					LK ONTARIO (SPORT FISHING)
7033	NY, 2 HATCHERIES (SALMON RIVER)	1987	3111330		NY, NYDEC				LK ONTARIO (SPORT FISHING)
8014	NY, 2 HATCHERIES (SALMON RIVER)	1988	2848000	SP FING	NY, NYDEC				LK ONTARIO (SPORT FISHING)
8029	NY, SALMON R H (LK ONTARIO/SALMON R)	1988	500000	6MO					CATTARAUGUS CR, LAKE ERIE
8029		1988	20000	6MO					18 MILE CREEK, LAKE ERIE
9015	NY, SALMON R H (LK ONTARIO/SALMON R)	1989	620000	SP FING	NY, NYDEC				3 LAKE ERIE TRIBUTARIES
9015		1989	2212200	SP FING					LAKE ONTARIO (STOCKING)
9016	NY, CALEDONIA H (LK ONTARIO/SALMON R)	1989	540000	SP FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
0015	NY, SALMON R H (LK ONTARIO/LK ONTARIO)	1990	574200	SP FING	NY, NYDEC, LAKE ERIE UNIT				LAKE ERIE (STOCKING)
0016	NY, CALEDONIA H (LK ONTARIO/SALMON R)	1990	540000	SP FING	NY, NYDEC				LAKE ONTARIO (STOCKING)
0017	NY, SALMON R H (LK ONTARIO/SALMON R)	1990	2180000	SP FING	NY, NYDEC (PRODUCE SPAWNING RUN)				LAKE ONTARIO (STOCKING)
0018	NY, SALMON R H (LK ONTARIO/SALMON R)	P1991	2700000	SP FING	NY, NYDEC (PRODUCE SPAWING RUN)				LAKE ONTARIO (STOCKING)
SALMO SALAR (ATLANTIC SALMON)									
6017	NY, 2 H (PENOBSCOT & LITTLE CLEAR)	1986	55000	YEAR					LK ONTARIO (RESTORATION)
7023	NY, CORTLAND HATCHERY (PENOBSCOT)	1987	9130	YEAR					LK ONTARIO (RESTORATION)
7017	NY, ADIRONDACK H (LITTLE CLEAR)	1987	49000	YEAR					LK ONTARIO (RESTORATION)
8001	NY, CORTLAND HATCHERY (PENOBSCOT)	1988	5530	FING					LK ONTARIO TRIBUTARIES
8002	NY, ADIRONDACK H (LITTLE CLEAR)				NY, VARIOUS HATCHERIES	1988	31900	YEAR	LK ONTARIO TRIBUTARIES
9010	VT, PITTSFORD H (GRAND LK STREAM)	1989	44020	YEAR	NY, NYDEC				LK ONTARIO (STOCKING)
9011	NY, TUNISON H (PENOBSCOT)	1989	290	21MO	NY, NYDEC				LK ONTARIO (STOCKING)
9011		1989	4710	YEAR					LK ONTARIO (STOCKING)
9011		1989	14670	F FING					LK ONTARIO (STOCKING)
SALMO TRUTTA (BROWN TROUT)									
6014	NY, 3 HATCHERIES (DOMESTIC)	1986	442000	YEAR					LK ONTARIO (SPORT FISHING)
6010	WEST GERMANY (SEA RUN)	1986	20000	EGGS	NY, COLD SPRINGS HATCHERY	P			LONG ISLAND
6001	WEST GERMANY (SEEFORELLEN)				NY, NYDEC/CATSKILL HATCHERY	P1986	12000	1+	SEVERAL LAKES (ENHANCEMENT)
7022	NY, SEVERAL HATCHERIES (DOMESTIC)	1987	25000	YEAR	NY, NYDEC				DUNKIRK HARBOUR, LAKE ERIE
7022		1987	25000	YEAR					CATTARAUGUS CR, LAKE ERIE
7030	NY, 2 HATCHERIES (DOMESTIC)	1987	417760	YEAR					LAKE ONTARIO (ENHANCEMENT)
8023	NY, CATSKILL H (SEEFORELLEN, W GERMAN)				NY, CALEDONIA HATCHERY (REARING)	1988	20020	3MO	CANADAWAY CR, LAKE ERIE
8022	NY, RANDOLPH H (DOMESTIC/RANDOLPH)	1988	5000	10MO					BUFFALO CR, LAKE ERIE
8019	NY, RANDOLPH H (DOMESTIC/RANDOLPH)	1988	7400	10MO					18 MILE CREEK, LAKE ERIE
8019		1988	5000	10MO					CANADAWAY CR, LAKE ERIE
8019		1988	5000	10MO					CATTARAUGUS CR, LAKE ERIE
8018	NY, CATSKILL HATCHERY (ROME)				NY, CALEDONIA HATCHERY (REARING)	1988	19000	17MO	SILVER CREEK, LAKE ERIE
8016	NY, RANDOLPH HATCHERY (ROME LAB)	1988	5000	17MO					DUNKIRK HARBOUR, LAKE ERIE
8017	NY, BATH HATCHERY				NY, CALEDONIA HATCHERY (REARING)	1988	14000	17MO	DUNKIRK HARBOUR, LAKE ERIE

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS						FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE
SALMO TRUTTA (BROWN TROUT) - CONTINUED								
8009	NY, VARIOUS H (SEEFORELLEN)	1988	20000	FING				LAKE ONTARIO (ENHANCEMENT)
8010	NY, VARIOUS H (DOMESTIC OR SKAMANIA)	1988	26370	FING				LAKE ONTARIO (ENHANCEMENT)
8011	NY, VARIOUS H (DOMESTIC OR SKAMANIA)	1988	404310	YEAR				LAKE ONTARIO (ENHANCEMENT)
9002	NY, CATSKILL H (CATSKILL/SEEFORELLEN)	1989	45000	YEAR	NY, NYDEC			SEVERAL LAKES (STOCKING)
9002		1989	15130	YEAR				DUNKIRK HARBOUR (STOCKING)
9002		1989	40000	YEAR				LAKE ONTARIO (STOCKING)
9012	NY, CALEDONIA H (CALEDONIA/ROME LAB)	1989	282630	YEAR	NY, NYDEC			LAKE ONTARIO (STOCKING)
9012		1989	37950	F FING				LAKE ONTARIO (STOCKING)
9020	NY, SALMON RIVER HATCHERY (/ROME LAB)	1989	84680	YEAR	NY, NYDEC			LAKE ONTARIO (STOCKING)
0019	NY, RANDOLPH H (DOMESTIC/RANDOLPH)	1990	22000	UNID	NY, DEC LK ERIE UNIT (RV FIN CLIP)			LAKE ERIE (STOCKING)
0020	NY, CATSKILL H (CATSKILL/SEEFORELLEN)	1990	25000	YEAR	NY, DEC LK ERIE UNIT (LP FIN CLIP)			LAKE ERIE (STOCKING)
0021	NY, CALEDONIA H (CALEDONIA/SEEFORELLEN)	1990	37300	F FING	NY, NYDEC LAKE ERIE UNIT			LAKE ERIE (STOCKING)
0022	NY, CATSKILL H (CATSKILL/SEEFORELLEN)	1990	48450	YEAR	NY, NYDEC			LAKE ONTARIO (STOCKING)
0024	NY, CATSKILL H (CATSKILL/SEEFORELLEN)	1990	45000	YEAR	NY, NYDEC (FISHERY ENHANCEMENT)			LAKE ONTARIO (STOCKING)
0023	NY, CATSKILL H (CATSKILL/SEEFORELLEN)	P1991	40000	YEAR	NY, NYDEC			10 INLAND LAKES (STOCKING)
SALVELINUS NAMAYCUSH (LAKE TROUT)								
6013	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1986	1382000	YEAR				LK ONTARIO (REHABILITATION)
7031	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1987	366300	FING				LK ONTARIO (REHABILITATION)
7032	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1987	818100	YEAR				LK ONTARIO (REHABILITATION)
8012	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1988	247100	FING				LK ONTARIO (RESTORATION)
8013	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1988	767500	YEAR				LK ONTARIO (RESTORATION)
9006	PA, ALLEGHENY HATCHERY (SENECA LAKE)	1989	352300	YEAR	NY, NYDEC			LK ONTARIO (REHABILITATION)
9007	PA, ALLEGHENY HATCHERY (SUPERIOR)	1989	240000	YEAR	NY, NYDEC			LK ONTARIO (REHABILITATION)
9007		1989	19500	F FING				LK ONTARIO (REHABILITATION)
9008	PA, ALLEGHENY HATCHERY (LK ONTARIO)	1989	158000	YEAR	NY, NYDEC			LK ONTARIO (REHABILITATION)
9008		1989	212500	F FING				LK ONTARIO (REHABILITATION)
9009	NY, CALEDONIA HATCHERY (SENECA LK/SENECA)	1989	28000	YEAR	NY, NYDEC			LK ONTARIO (REHABILITATION)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NOVA SCOTIA

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
6001	WV, WHITE SULPHUR SPRINGS HATCHERY	1986	100000	EGGS	NS, DFO/MERLIN FISH FARMS				WESTCHESTER (FISH FARM)
6001		1986	50000	EGGS	NS, DFO/COLDBROOK FCS				
6001		1986	100000	EGGS	NS, DFO/NSDF/ST PETERS HATCHERY				
7003	WA, BEITEYS RESORT	1987	550000	EGGS	NS, NSDF/ST PETERS HATCHERY	P			
7005	ONT, SPRING VALLEY HATCHERY	1987	150000	EGGS	NS, NSDF/ST PETERS HATCHERY	P			
7004	ONT, AQUAFARMS CANADA	1987	50000	EGGS	NS, MERLIN FISH FARMS				WESTCHESTER (FISH FARM)
7001	WV, WHITE SULPHUR SP H (WYTHEVILLE)	1987	250224	EGGS	NS, DFO, NSDF/FRASERS MILLS H	P			(LOCAL STOCKING)
7002	WA, BEITEYS RESORT	1987	100000	EGGS	NS, MERLIN FISH FARMS				WESTCHESTER (FISH FARM)
7006	PEI, INTEGRATED AQUATICS	1987	45000	FING	NS, OSTREA SEA FARMS				SHAD BAY (AQUACULTURE)
8013	ONT, RAINBOW SPRINGS HATCHERY	1988	2000	FING	NS, EPS/DARTMOUTH (RESEARCH)				
8012	ONT, RAINBOW SPRINGS HATCHERY	1988	35000	FRY	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
8011	WA, BEITEYS RESORT	1988	200000	FRY	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
8010	ONT, SPRING VALLEY HATCHERY	1988	250000	EGGS	NS, NSDF/FRASERS MILLS H	P			(LOCAL STOCKING)
8009	ONT, AQUAFARMS CANADA	1988	30000	EGGS	NS, NSDF/FRASERS MILLS H (REARING)	P			(LOCAL STOCKING)
8008	ONT, AQUAFARMS CANADA	1988	100000	EGGS	NS, NSDF/ST PETERS HATCHERY	P			(ENHANCEMENT)
8007	WV, WHITE SULPHUR SPRINGS HATCHERY	1988	250000	EGGS	NS, NSDF/FRASERS MILLS H (REARING) P				(ENHANCEMENT)
8006	ONT, RAINBOW SPRINGS HATCHERY	1988	200000	TR EGGS	NS, NOVA AQUA SMOLT (REARING)				GLACE BAY (AQUACULTURE)
9004	ONT, VAN AQUA INC, BRANTFORD	1989	6000	FING	NS, NOVA AQUA SEA LTD				GLACE BAY
9005	WA, BEITEYS RESORT	1989	150000	EGGS	NS, MERLIN FISH FARMS				WENTWORTH (FISH FARMS)
9007	ONT, RAINBOW SPRINGS HATCHERY	1989	100000	EGGS	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
9008	PEI, INTEGRATED AQUATICS	1989	125000	FING	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
9009	PEI, BROOKVALLEY MARINE	1989	25000	FING	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
9010	ONT, SPRING VALLEY H, PETERSBURG	1989	100000	EGGS	NS, LITTLE HARB TROUT FARM				TRENTON (TROUT FARM)
9011	WV, WHITE SULPHUR SPRINGS HATCHERY	1989	250000	EGGS	NS, NSDF, FRASERS MILLS H				
0020	ONT, RAINBOW SPRINGS HATCHERY	1990	40000	FING	NS, NOVA AQUA SMOLT/GLACE BAY				
0021	PEI, INTEGRATED AQUATICS	1990	20000	FING	NS, NOVA AQUA SEA LTD/GLACE BAY				
0022	PEI, BROOKVALLEY MARINE	1990	2000	FING	NS, NOVA AQUA SMOLT/GLACE BAY				
0023	ONT, SPRING VALLEY H, PETERSBURG	1990	150000	EGGS	NS, LITTLE HARB TROUT FARM/PICTOU				
0024	ONT, RAINBOW SPRINGS HATCHERY	1990	3000	FING	NS, ENVIRONMENT CANADA/DARTMOUTH				
0025	PEI, BROOKVALLEY MARINE	1990	46000	FING	NS, LOCH BRAS D'OR SALMON				
0026	ONT, RAINBOW SPRINGS HATCHERY	1990	50000	TR EGGS	NS, SUGAR LOAF FISH FARM/OXFORD				
0027	ONT, SPRING VALLEY H, PETERSBURG	1990	100000	EGGS	NS, FRASERS MILLS H/ ST ANDREWS				
SALMO SALAR (ATLANTIC SALMON)									
8004	NB, HUNTSMAN MARINE LAB (SJR C)	1988	50000	FRY	NS, NOVA AQUA SMOLT				(AQUACULTURE)
8003	NB, MACTAQUAC FCS (ST JOHN R)	1988	50000	EGGS	NS, DFO/COLDBROOK FCS (REARING)	P			(AQUACULTURE) BROODSTOCK
9012	NB, MACTAQUAC FCS	1989	50000	EGGS	NS, DFO/COLDBROOK FCS (REARING)	P			(AQUACULTURE) BROODSTOCK
9013	, AQUAVENTURES	1989	100000	EGGS	NS, NOVA AQUA SMOLT (EXPERIMENTAL)				GLACE BAY
9006	NB, CHAMCOOK	1989	50000	FING	NS, NOVA AQUA SMOLT				GLACE BAY (AQUACULTURE)
0028	NB, BRIDEN ASSOCIATION & SEA FARMS	1990	72000	FING	NS, NOVA AQUA SMOLT (EXPERIMENTAL)				GLACE BAY
0029	NB, SEA FARMS CANADA, SPRINGDALE	1990	130000	SAC FRY	NS, NOVA AQUA SMOLT (QUARANTINE)				GLACE BAY (EXPERIMENTAL)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

NOVA SCOTIA (Continued)

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)				TRANSFERS				FINAL DISPOSITION LOCATION (PURPOSE)
		YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	
SALMO SALAR (LANDLOCKED ATLANTIC SALMON)									
8005	ME, GRAND LAKE STREAM HATCHERY	1988	25000	EGGS	NS, M MULLEN/WEYMOUTH (REARING)				BEAR RIVER (AQUACULTURE)
9002	ME, GRAND LAKE STREAM HATCHERY	1989	50000	EGGS	NS, FRASERS MILLS HATCHERY				
SALVELINUS ALPINUS (ARCTIC CHAR)									
8001	MAN, ROCKWOOD HATCHERY	1988	1600	EGGS	NS, NOVA AQUA SMOLT	P			GLACE BAY (AQUACULTURE)
9001	MAN, ROCKWOOD HATCHERY	1989	3000	EGGS	NS, SALMONID PROPAGATION ASSOC				ST PETERS
9003	MAN, ROCKWOOD HATCHERY	1989	5000	EGGS	NS, MICMAC SMOLTS				WEYMOUTH
9014	NB, PURTILL, SUSSEX	1989	10000	EGGS	NS, BRAS D'OR SALMON (TEST)				LITTLE NARROWS
9015	NB, PURTILL, SUSSEX	1989	10000	EGGS	NS, SPA CO-OP (EXPERIMENTAL)				ST PETERS
0030	NB, PURTILL, SUSSEX	1990	8000	FRY	NS, SALMONID PROPAGATION ASSOC LTD				ST PETERS (EXPERIMENTAL)
0031	NB, PURTILL, SUSSEX	1990	5000	FRY	NS, LOCH BRAS D'OR SALMON				BADDECK (EXPERIMENTAL)
SALVELINUS FONTINALIS (BROOK TROUT)									
8002	ME, PHILLIPS HATCHERY	1988	100000	EGGS	NS, NSDF/FRASERS MILLS H (REARING)	P			VARIOUS WATERS (STOCKING)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

ONTARIO

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
8004	IN, MIXSABAH HATCHER (/SKAMANIA)	1988	56000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1988	30000	FING	SEE NEXT LINE
8004					ONT, NORMANDALE HATCHERY	1989	25000	YEAR	GEORGIAN BAY (RESTORATION)
8006	MAN, ROCKWOOD HATCHERY (DOM/TAGWERKER)	1988	25000	E EGGS	ONT, PINE VALLEY HATCHERY (QUAR)	1989	?	YEAR	PRIVATE POND (AQUACULTURE)
9005	IN, TWIN BRANCH H (LK MICHIGAN/SKAM)	1989	80000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1989	35000	FING	SEE NEXT LINE
9005					ONT, NORMANDALE HATCHERY	1990	31000	YEAR	GEORGIAN BAY (RESTORATION)
0002	IN, TWIN BRANCH H (LK MICHIGAN/SKAM)	1990	115000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1990	45000	FING	SEE NEXT LINE
0002					ONT, NORMANDALE HATCHERY	P1991		YEAR	GEORGIAN BAY (RESTORATION)
1002	WA, BEITEYS RESORT (DOMESTIC SP RUN)	1991	70000	E EGGS	ONT, OMNR/ALMA HATCHERY (QUAR)	P1991	50000	FING	(PRIVATE AQUACULTURE)
SALMO SALAR (ATLANTIC SALMON)									
7010	NS, COLDBROOK FCS (LAHAVE RIVER)	*1987	50000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1988	35000	FING	SEE NEXT LINE
7010					NORMANDALE HATCHERY	1989	27000	YEAR	LK ONTARIO (RESTORATION)
7003	ME, GREEN LK H (PENOBSCOT RIVER)	*1987	58000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1987	35000	FING	SEE NEXT LINE
7003					NORMANDALE HATCHERY	1988	27000	YEAR	LK ONTARIO (RESTORATION)
7002	SCO, ALLT MOR HATCHERY (LOCAL RIVER)	*1987	35000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1987			SEE NEXT LINE
7002					NORMANDALE HATCHERY	1987	25000	FING	(PRIVATE ACQUACULTURE)
7011	NB, MACTAQUAC FCS (SAINT JOHN RIVER)	*1987	35000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1987			SEE NEXT LINE
7011					NORMANDALE HATCHERY	1988	32000	YEAR	(PRIVATE AQUACULTURE)
1003	NS, MERSEY HATCHERY	*1987	800	FING	ONT, ONTARIO HYDRO (RESEARCH)	1988			STOCK DESTROYED
8011	NS, COLDBROOK FCS (LAHAVE RIVER)	*1988	61000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1989		FING	SEE NEXT LINE
8011					NORMANDALE HATCHERY	1990	32000	YEAR	LK ONTARIO (RESTORATION)
9001	NS, COLDBROOK FCS (LAHAVE RIVER)	*1989	60000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1990	35000	FING	SEE NEXT LINE
9001					NORMANDALE HATCHERY	1991		YEAR	LK ONTARIO (RESTORATION)
0003	NS, COLDBROOK FCS (LAHAVE RIVER)	*1990	80000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1991		FING	SEE NEXT LINE
0003					NORMANDALE HATCHERY	P1992	50000	YEAR	LK ONTARIO (RESTORATION)
1004	NS, COLDBROOK FCS (LAHAVE RIVER)	P1991		E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	P1992		FING	SEE NEXT LINE
1004					NORMANDALE HATCHERY	P1993		YEAR	LK ONTARIO (RESTORATION)
SALMO SALAR (LANDLOCKED ATLANTIC SALMON)									
6002	NY, ADIRONDACK H (LITTLE CLEAR POND)	*1986	3400	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1987			SEE NEXT LINE
6002					NORMANDALE HATCHERY	1987	1000	SMOLTS	LK ONTARIO (RESTORATION)
8005	ME, GRAND LK STREAM H (WEST GRAND LK)	*1988	75000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1988		FING	SEE NEXT LINE
8005					NORMANDALE HATCHERY	1989	58000	YEAR	LK ONTARIO (RESTORATION)
9002	ME, GRAND LK STREAM H (WEST GRAND LK)	1989	63000	E EGGS	ONT, OMNR/NORMANDALE H (QUAR)	1989		FING	SEE NEXT LINE
9002					NORMANDALE HATCHERY	1989	52000	YEAR	LK ONTARIO (RESTORATION)
0006	ME, GRAND LK STREAM H (WEST GRAND LK)	*1990	110000	E EGGS	ONT, OMNR/NORMANDALE & Alma (Quar)	1990	81000	FING	SEE NEXT 2 LINES
0006					NORMANDALE & ALMA HATCHERIES	P1991		YEAR	(REHABILITATION STOCKING)
0006					NORMANDALE & ALMA HATCHERIES	P1991		YEAR	(PRIVATE AQUACULTURE)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	YEAR	NUMBER	STAGE	TRANSFERS SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALVELINUS ALPINUS (ARCTIC CHAR)									
7007	NB, HUNTSMAN MARINE LABORATORY	1987	30	FING	ONT, SIR WILFRED U (RESEARCH)				STOCK DESTROYED
7009	ICE, UNIVERSITY OF ICELAND	1987	3000	EGGS	ONT, U OF GUELPH (RESEARCH)				STOCK DESTROYED
7006	NB, HUNTSMAN MARINE LABORATORY	1987	200	FING	ONT, U OF GUELPH (RESEARCH)				STOCK DESTROYED
8009	ICE, U OF ICELAND (THINGVALLAVATN LK)	1988	2000	EGGS	ONT, U OF GUELPH (RESEARCH)				STOCK DESTROYED
8007	MAN, ROCKWOOD H (FRASER R, LAB)	*1988	5000	E EGGS	ONT, PINE VALLEY HATCHERY (QUAR)	1989	3500		COLD WATER H (PRIVATE AQC)
9006	MAN, ROCKWOOD H (FRASER R, LAB)	*1989	5000	E EGGS	ONT, ONTARIO VET COLLEGE (AQC DEV)				ALL FISH DIED
9003	MAN, ROCKWOOD H (FRASER R, LAB)	*1989	30000	E EGGS	ONT, COLDWATER & ALMA H (QUAR)	P1990	20000	FING	(PRIVATE AQC BROODSTOCK)
0001	MAN, ROCKWOOD HATCHERY (VARIOUS)	*1990	67000	E EGGS	ONT, OMNR/COLDWATER & Alma H (Quar)	P1991		FING	(PRIVATE AQUACULTURE)
1001	MAN, ROCKWOOD HATCHERY (VARIOUS)	P1991		E EGGS	ONT, COLDWATER & ALMA H (QUAR)	P1991	20000		SEE NEXT 2 LINES
1001					COLDWATER & ALMA HATCHERIES	P1991		FING	(AQC BROODSTOCK)
1001					COLDWATER & ALMA HATCHERIES	P1992		FING	(AQC BROODSTOCK)
SALVELINUS FONTINALIS X SALVELINUS ALPINUS (CHARBROOK)									
8008	QUE, SILVER SPRINGS HATCHERY	1988	500	FISH	ONT, U OF OTTAWA (RESEARCH)				INCINERATED
SALVELINUS NAMAYCUSH (LAKE TROUT)									
1005	NY, SENECA LAKE (SENECA LAKE/WILD)	1990	70000	G EGGS	ONT, OMNR/NORMANDALE & Alma (Quar)	1991	60000	FING	SEE NEXT LINE
1005					WHITE LAKE HATCHERY	P1992	50000	YEAR	LK ONTARIO (REHABILITATION)
1006	NY, SENECA LAKE (SENECA LAKE/WILD)	P1991	70000	G EGGS	ONT, OMNR/NORMANDALE H (QUAR)	P1992	60000	FING	SEE NEXT LINE
1006					WHITE LAKE HATCHERY	P1993	50000	YEAR	LK ONTARIO (REHABILITATION)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

PRINCE EDWARD ISLAND

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS KISUTCH (COHO SALMON)									
9017	BC, PRIVATE AQUACULTURE FACILITY	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0009	BC, CHILLIWACK RIVER HATCHERY	1990	40000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
	ONT, RAINBOW SPRINGS HATCHERY	1986	50000	EGGS	PEI, GLYNDE RIVER AQUACULTURE				BREADALBANE (AQUACULTURE)
7004	ONT, RAINBOW SPRINGS HATCHERY	1987	50000	FING	PEI, SILVER SEA AQUACULTURE				LITTLE YORK (AQUACULTURE)
7007	ONT, AQUAFARMS CANADA	1987	25000	FING	PEI, BROOKVALLEY MARINE FARMS				SOURIS (AQUACULTURE)
7003	ONT, RAINBOW SPRINGS HATCHERY	1987	100000	EGGS	PEI, GLYNDE RIVER AQUACULTURE				BREADALBANE (AQUACULTURE)
7002	ONT, RAINBOW SPRINGS HATCHERY	1987	100000	EGGS	PEI, INTEGRATED AQUATICS SYSTEMS				BROOKVALE (AQUACULTURE)
7011	ONT, RAINBOW SPRINGS HATCHERY	1987	75000	EGGS	PEI, GLYNDE RIVER AQUACULTURE				BREADALBANE (AQUACULTURE)
7010	ONT, VAN AQUA INC	1987	250000	EGGS	PEI, BROOKVALLEY MARINE FARMS				SOURIS (AQUACULTURE)
7009	QUE, PISCICULTURE ALLEGHANYS	1987	15000	FING	PEI, EDWARD MURPHY				KENSINGTON (AQUACULTURE)
7008	WA, BEITEYS RESORT	1987	200000	FING	PEI, INTEGRATED AQUATICS SYSTEMS				BROOKVALE (AQUACULTURE)
7001	ONT, RAINBOW SPRINGS HATCHERY	1987	50000	EGGS	PEI, GLYNDE RIVER AQUACULTURE				BREADALBANE (AQUACULTURE)
7005	ONT, RAINBOW SPRINGS HATCHERY	1987	50000	FING	PEI, BROOKVALLEY MARINE FARMS				SOURIS (AQUACULTURE)
7012	ONT, AQUAFARMS CANADA	1988	30000	EGGS	PEI, BROOKVALLEY MARINE FARMS	P			SOURIS (AQUACULTURE)
8001	QUE, PISCICULTURE ALLEGHANYS	1988	50000	FING	PEI, EDWARD MURPHY (REARING)				HUNTER R (AQUACULTURE)
8002	WA, BEITEYS RESORT	1988	200000	EGGS	PEI, BROOKVALLEY MARINE FARMS				FORTUNE (AQUACULTURE)
8003	WA, BEITEYS RESORT	1988	250000	EGGS	PEI, INTEGRATED AQUATICS (REARING)				BROOKVALE (AQUACULTURE)
8004	ONT, RAINBOW SPRINGS HATCHERY	1988	125000	EGGS	PEI, GLYNDE RIVER AQUACULTURE				GLYNDE R (AQUACULTURE)
8005	ONT, RAINBOW SPRINGS HATCHERY	1988	25000	TR EGGS	PEI, GLYNDE RIVER AQUACULTURE				GLYNDE R (AQUACULTURE)
9001	ONT, RAINBOW SPRINGS HATCHERY	1989	25000	FING	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
9002	ONT, RAINBOW SPRINGS HATCHERY	1989	43500	E EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
9003	ONT, RAINBOW SPRINGS HATCHERY	1989	68500	E EGGS	PEI, BROOKVALLEY MARINE FARMS				SOURIS (AQUACULTURE)
9004	ONT, RAINBOW SPRINGS HATCHERY	1989	20000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
9005	WA, BEITEYS RESORT	1989	24384	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
9009	ONT, RAINBOW SPRINGS HATCHERY	1989	75000	E EGGS	PEI, BROOKVALLEY MARINE				SOURIS (AQUACULTURE)
9010	ONT, RAINBOW SPRINGS HATCHERY	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0007	ONT, RAINBOW SPRINGS HATCHERY	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0012	ONT, RAINBOW SPRINGS HATCHERY	1990	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0001	ONT, RAINBOW SPRINGS HATCHERY	1990	50000	TR EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
0002	ONT, RAINBOW SPRINGS HATCHERY	1990	165100	E EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
0003	ONT, RAINBOW SPRINGS HATCHERY	1990	50000	TR EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
0004	ONT, RAINBOW SPRINGS HATCHERY	1990	200000	E EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
0005	ONT, RAINBOW SPRINGS HATCHERY	1990	100000	E EGGS	PEI, DOVER FISH HATCHERY				DOVER (AQUACULTURE)
0006	WA, BEITEYS RESORT	1990	20000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)				CHARLOTTETOWN (DESTROYED)
0007	ONT, RAINBOW SPRINGS HATCHERY	1990							
SALVELINUS ALPINUS (ARCTIC CHAR)									
7013	MAN, ROCKWOOD HATCHERY	1987	5000	EGGS	PEI, ATL VETERINARY COLLEGE				
8006	NB, HUNTSMAN MARINE LAB	1988	500	FING	PEI, INTEGRATED AQUATICS (REARING)				BROOKVALE (AQUACULTURE)

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
SALVELINUS ALPINUS (ARCTIC CHAR) - CONTINUED									
9006	NB, HML (FRASER R, LABRADOR)	1989	50000	E EGGS	PEI, IAS/BROOKVALE (QUARANTINE)	1989	45600	FING	BROOKVALE (AQUACULTURE)
9008	MAN, ROCKWOOD H (FRASER R, LABRADOR)	*1989	3000	E EGGS	PEI, DOVER FISH HATCHERY				DOVER (BROODSTOCK DEV)
0018	NB, PURTILL B FISH	1989	12000	E EGGS	PEI, IAS (EXP QUARANTINE PROGRAM)				
0019	NB, PURTILL B FISH	1990	88000	E EGGS	PEI, IAS (EXP QUARANTINE PROGRAM)				
0020	NB, PURTILL B FISH	1990	15000	SAC FRY	PEI, IAS (EXP QUARANTINE PROGRAM)				
0021	NB, PURTILL B FISH	1990	62000	SAC FRY	PEI, IAS (EXP QUARANTINE PROGRAM)				
SALVELINUS FONTINALIS (BROOK TROUT)									
7006	ONT, WILDCAT TROUT FARM	1987	20000	JUV	PEI, GLYNDE RIVER AQUACULTURE				BREADALBANE (AQUACULTURE)
SALMO SALAR (ATLANTIC SALMON)									
8007	NB, HML (ST JOHN CULTURED)	1988	45000	FRY	PEI, ATL VET COLLEGE (REARING)				(AQUACULTURE)
9007	NB, BOF CAGE SITE (ST JOHN R)	1989	50000	E EGGS	PEI, IAS/BROOKVALE (QUARANTINE)	1989	18300	FING	BROOKVALE (AQUACULTURE)
9011	NB, SEA FARMS CANADA	1989	2000	FRY	PEI, ATL VET COLLEGE (RESEARCH)	P			TO BE DESTROYED
9012	NB, HUNTSMAN MARINE LAB	1989	1500	PYP	PEI, ATL VET COLLEGE (RESEARCH)	P			TO BE DESTROYED
9013	NB, SEA FARMS CANADA	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
9014	NS, MERSEY FCS	1989	7500	FING	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
9015	SCO, PRIVATE FACILITY	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
9016	NOR, PRIVATE AQUACULTURE FACILITY	1989	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0008	NS, COLDBROOK FCS	1989	20000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0022	NB, MIRAMICHI FCS (MIRAMICHI)	1989	70000	G EGGS	PEI, DFO/CARDIGAN FCS (QUAR)	P			PEI (ENHANCEMENT PROGRAMS)
0010	NB, SEA FARMS CANADA	1990	15000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0011	NB, SEA FARMS CANADA	1990	400	FING	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0013	SCO, MARINE HARVEST LIMITED	1990	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0014	NOR, JAKTA FISKEOPPDRETT AS	1990	10000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0015	ME, KENNEBEC AQUACULTURE	1990	200	PARR	PEI, AQUA HEALTH (RESEARCH)	P			TO BE DESTROYED
0016	NB, SEA FARMS CANADA	1990	2050	FING	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0017	NB, SEA FARMS CANADA	1990	393	P SMOLT	PEI, AQUA HEALTH (RESEARCH)	P			TO BE DESTROYED
0023	NB, MIRAMICHI FCS (MIRAMICHI/NW)	1990	55000	G EGGS	PEI, DFO/CARDIGAN FCS (QUAR)	P			PEI (ENHANCEMENT PROGRAMS)
0024	NS, COLDBROOK FCS	1990	20000	E EGGS	PEI, AQUA HEALTH (VACCINE DEV)	P			TO BE DESTROYED
0025	NB, SALMON DEMONSTRATION FARM	1990	250	1 Kg	PEI, ATL VET COLLEGE (RESEARCH)	P			TO BE DESTROYED

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

QUEBEC

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
COREGONUS CLUPEAFORMIS (LAKE WHITEFISH)									
8004	ONT, WHITELAKE HATCHERY	1988	700	FING	LAVAL UNIVERSITY (RESEARCH)	P			TO BE DESTROYED
COREGONUS LAVARETUS (LAKE WHITEFISH)									
7003	FIN, (VAASA)	1987	150	G EGGS	LAVAL UNIVERSITY (RESEARCH)	P			TO BE DESTROYED
ONCORHYNCHUS KISUTCH (COHO SALMON)									
7001	BC, ROSEWALD CREEK HATCHERY	1987	150	JUV	LAVAL UNIVERSITY (RESEARCH)	P			TO BE DESTROYED
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
7002	ONT, AQUAFARMS CANADA	1987	50000	EGGS	QUE, BILL NOWELL				(AQUACULTURE)
8001	PEI, GLYNDE RIVER AQUACULTURE	1988	80000	FING	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
8002	ONT, REDBOW FARMS	1988	80000	FING	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
8003	ONT, ABERFOYLE FISHERIES	1988	80000	FING	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
8005	ONT, SPRING VALLEY HATCHERY	1988	600000	EGGS	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
9007	ONT, AQUAFARMS CANADA (DOMESTIC)	1988	100000	EGGS	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
9003	ONT, SPRING VALLEY H (DOMESTIC)	1989	100000	FRY	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
9008	ONT, SPRING VALLEY H (DOMESTIC)	1989	1000000	EGGS	QUE, FERME ST MATHIEU				(AQUACULTURE-MARKET)
0001	ONT, WILDCAT TROUT FARM	1990	40000	FRY	QUE, SALMONID INC/HATCHERY				(AQUACULTURE)
SALMO SALAR (ATLANTIC SALMON)									
0005	NB, SEA FARMS, DIGDEGUASH	1990	?	SMOLTS	QUE, BAIE DES CHALEURS AQC				(AQUACULTURE)
SALVELINUS ALPINUS (ARCTIC CHAR)									
9002	MAN, ROCKWOOD HATCHERY (WILD)	1989	20000	FRY	QUE, INRS/RIMOUSKI (RESEARCH)				
9005	MAN, ROCKWOOD HATCHERY (WILD)	1989	5000	EGGS	QUE, J P THONNEY HATCHERY				(AQUACULTURE)
9006	MAN, ROCKWOOD HATCHERY (WILD)	1989	5000	EGGS	QUE, RESERCE LA PETITE NATION				(AQUACULTURE)
0002	BC, SUN VALLEY TROUT FARM	1990	15000	EGGS	QUE, PISCICULTURE ALLEGHANYS				
0003	BC, SUN VALLEY TROUT FARM	1990	12000	EGGS	QUE, INRS/RIMOUSKI (RESEARCH)				
0004	MAN, ROCKWOOD HATCHERY	1990	15000	EGGS	QUE, MAPA (RESEARCH)				
SALVELINUS FONTINALIS (BROOK TROUT)									
9001	ONT, THISTLE SPRINGS FARM (DOMESTIC)	1989	2000	YEAR	QUE, CENTRE DE PECHE BLAINVILLE				(POND FISHING)
9004	ME, PHILLIPS HATCHERY (DOMESTIC)	1989	10000	FRY	QUE, (HOLDING PRIOR TO STOCKING ?)	1989	10000	FRY	SJR, MAINE (STOCKING)

SUMMARY OF SALMONID INTRODUCTIONS AND TRANSFERS, 1986-1990

RHODE ISLAND

FILE	ORIGINAL SOURCE LOCATION (STOCK/STRAIN)	TRANSFERS YEAR	NUMBER	STAGE	SPONSOR/FACILITY (PURPOSE)	YEAR	NUMBER	STAGE	FINAL DISPOSITION LOCATION (PURPOSE)
ONCORHYNCHUS MYKISS (RAINBOW TROUT)									
6001	WA, TROUT LODGE (UNKNOWN)	1986	150000	EGGS	RI,	P1988?		2+	STATEWIDE (STOCKING)
7001	WA, TROUT LODGE (UNKNOWN)	1987	150000	EGGS	RI,	P1989?		2+	STATEWIDE (STOCKING)

ANNEX 6

NORTH AMERICAN COMMISSION

PAPER NAC(91)11

PROPOSED QUESTIONS BY NORTH AMERICAN COMMISSION (NASCO) TO THE AIR QUALITY COMMITTEE, ESTABLISHED UNDER THE CANADA/US AIR QUALITY AGREEMENT

1. How effective (and within what time frame) are the SO_2 emission control programs of Canada and the United States expected to be in promoting a return to naturally occurring pH levels in affected Atlantic salmon watersheds of eastern Canada and the United States?

2. What are the principal sources of SO_2 emissions affecting the Southern Upland area of Nova Scotia, where many Atlantic salmon stocks have been eliminated as a result of pH reductions?

NORTH AMERICAN COMMISSION

PAPER NAC(91)7

CANADIAN ATLANTIC SALMON CATCHES

TABLE A: February 19, 1991

Canadian Atlantic Salmon Catches in Tonnes since 1960 and Numbers since 1982

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

Year	Grilse		Salmon		Total	
	Tonnes	Numbers	Tonnes	Numbers	Tonnes	Numbers
1960	-		-		1,636	
1961	-		-		1,583	
1962	-		-		1,719	
1963	-		-		1,861	
1964	-		-		2,069	
1965	-		-		2,116	
1966	-		-		2,369	
1967	-		-		2,863	
1968	-		-		2,111	
1969	-		-		2,202	
1970	761		1,562		2,323	
1971	510		1,482		1,992	
1972	558		1,201		1,759	
1973	783		1,651		2,434	
1974	950		1,589		2,539	
1975	912		1,573		2,485	
1976	785		1,721		2,506	
1977	662		1,883		2,545	
1978	320		1,225		1,545	
1979	582		705		1,287	
1980	917		1,763		2,680	
1981	818		1,619		2,437	
1982*	716	358,000	1,082	240,000	1,798	598,000
1983*	513	265,000	911	201,000	1,424	466,000
1984*	467	234,000	645	143,000	1,112	377,000
1985	593	333,084	540	122,621	1,133	455,705
1986	780	417,269	779	162,305	1,559	579,574
1987	833	435,799	951	203,731	1,784	639,530
1988	677	372,178	633	137,637	1,311	509,815
1989	549	304,620	590	135,484	1,139	440,104
1990	405	222,944	465	101,910	870	324,854

The 1990 total catch of salmon (870 tonnes) is:

- 37.3% below the previous 5 year mean (1,385.2)
- 47.0% below the previous 10 year mean (1,637.7)
- 51.3% below the previous 15 year mean (1,783.0)
- 54.1% below the previous 20 year mean (1,889.6)

The 1990 total catch of MSW salmon only (465 tonnes) is:

- 33.6% below the previous 5 year mean (698.6)
- 51.2% below the previous 10 year mean (951.3)
- 58.1% below the previous 15 year mean (1,108.0)
- 61.5% below the previous 20 year mean (1,205.3)

The 1990 total catch of grilse only (405 tonnes) is:

- 41.1% below the previous 5 year mean (686.4)
- 41.1% below the previous 10 year mean (686.3)
- 40.1% below the previous 15 year mean (674.9)
- 41.0% below the previous 20 year mean (684.3)

NOTE: ALL CATCH FIGURES FOR 1990 ARE PRELIMINARY

* Numbers for 1982-84 are estimated (assuming 2.0kg for average 1SW salmon; 4.5kg for MSW salmon)

Table B: Nominal Catches (Provisional) of Atlantic Salmon in Canada for 1990 (in kg round fresh weight)

	GRILSE	% OF TOTAL	SALMON	% TOTAL	TOTAL	% OF TOTAL
QUEBEC						
R	12,474	3.1	57,044	12.3	69,518	8.0
C	4,708	1.2	59,957	12.9	64,665	7.5
TOTAL	17,182	4.3	117,001	25.2	134,183	15.5
NFLD						
R	54,397	13.5	1,502	0.3	55,899	6.4
C	264,707	65.2	321,210	69.2	585,917	67.3
TOTAL	319,104	78.7	322,712	69.5	641,816	73.7
MARITIMES						
R	61,683	15.3	0	0	61,683	7.1
C	0	0.0	0	0	0	0.0
TOTAL	61,683	15.3	0	0	61,683	7.1
NATIVE FOOD FISHERY (ALL AREAS)	7,034	1.7	24,844	5.3	31,878	3.7
TOTAL	405,003	100.0	464,557	100.0	869,560	100.0

R = Recreational (Total = 187,100 kg or 21.5%)
C = Commercial (Total = 650,582 kg or 74.8)

NOTE: All catch figures for 1990 are preliminary

TABLE C: A COMPARISON OF THE OVERALL 1984 THROUGH 1990 ATLANTIC SALMON FISHERIES* (IN TONNES)

AREA	GRILSE						MSW SALMON						TOTAL					
	1985	1986	1987	1988	1989	1990	1985	1986	1987	1988	1989	1990	1985	1986	1987	1988	1989	1990
QUEBEC																		
R	7.1	9.3	13.1	14.4	9.9	12.5	47.7	61.5	47.2	57.3	48.9	57.0	54.8	70.8	60.4	76.8	58.8	69.5
C	4.2	7.4	6.0	8.4	4.6	4.7	65.5	68.5	96.9	89.5	75.3	60.0	69.8	75.9	103.0	92.0	79.9	64.7
TOTAL	11.3	16.7	19.1	22.8	14.5	17.2	113.2	130.0	144.1	146.8	124.2	117.0	124.6	146.7	163.4	168.8	138.7	134.2
NFLD.																		
R	61.7	62.9	48.8	74.1	37.9	54.4	1.2	1.9	2.6	2.9	2.0	1.5	62.9	64.8	51.5	77.0	39.9	55.9
C	464.0	608.3	702.1	505.6	432.9	264.7	398.8	621.8	770.5	457.7	463.7	321.2	862.9	1230.1	1472.7	963.3	896.7	585.9
TOTAL	525.7	671.2	750.9	579.7	470.8	319.1	400.1	623.7	773.1	460.6	465.7	322.7	925.8	1294.9	1524.2	1040.3	936.6	641.8
MARITIMES																		
R	52.9	86.4	56.8	68.6	60.6	61.7	0	0	0	0	0	0	52.9	86.4	56.8	68.6	60.6	61.7
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	52.9	86.4	56.8	68.6	60.6	61.7	0	0	0	0	0	0	52.9	86.4	56.8	68.6	60.6	69.7
NATIVE	2.5	5.7	6.2	6.1	4.6	7.0	26.3	25.3	33.7	26.0	25.8	24.8	28.9	31.0	39.9	32.2	30.4	31.8
TOTAL	592.6	780.0	833.2	677.4	550.5	405.0	539.7	779.0	951.1	633.4	615.8	464.6	1132.3	1559.0	1784.3	1310.8	1166.3	869.5

* Numbers may not add directly due to rounding process

R = Recreational
C = Commercial

NOTE: ALL CATCH FIGURES FOR 1990 ARE PRELIMINARY

Table D: Harvest (tonnes) by Zone in the Newfoundland Commercial Salmon Fisheries, 1978-82, Average and Yearly since 1983

Zone	1978-82 Average Catch	1983 Catch (Tonnes)	1984 Catch (Tonnes)	1985 Catch (Tonnes)	1986 Catch (Tonnes)	1987 Catch (Tonnes)	1988 Catch (Tonnes)	1989 Catch (Tonnes)	1990 Catch (Tonnes)	1990 Compared to 1978-82
1	124	81	51	72	89	75	65	76	30	-76
2	485	286	211	139	309	407	292	213	151	-69
3	257	191	134	123	192	369	184	151	135	-47
4	166	125	128	111	200	180	103	133	92	-45
5	70	58	60	72	61	60	39	37	15	-79
6	57	30	35	65	54	48	25	27	12	-79
7	45	23	20	25	19	26	16	14	6	-87
8	40	24	32	31	24	23	19	12	3	-93
9	17	9	12	11	8	7	8	8	3	-82
10	36	22	28	51	49	28	18	40	23	-36
11	54	44	34	101	67	53	21	35	29	-46
12	79	53	0	0	0	0	0	0	0	-100
13	40	33	43	32	79	66	78	46	43	+8
14	36	37	33	30	79	132	96	76	44	+22
Total	1,504	1,016	821	862	1,230	1,472	963	868	586	-61
Insular Nfld. only	895	649	559	651	832	991	607	579	405	-55

* All figures for 1990 are preliminary

ANNEX 8

NORTH AMERICAN COMMISSION

PAPER NAC(91)8

CAFSAC REPORT
STATUS OF ATLANTIC SALMON STOCKS

STATUS OF ATLANTIC SALMON STOCKS

1.0 Introduction

CAFSAC uses several sources of information to assess the status of Atlantic salmon stocks; the most important are derived from the fisheries, from counting fences and from mark-recapture experiments. The year to year comparison of the information from the fisheries is difficult because fishing success is influenced by environmental conditions such as water levels and temperatures in rivers or at sea. Counts of returning salmon at fishways, counting fences and estimates derived from mark-recapture studies are more reliable but they are not available for all rivers.

1.1 Atlantic Overview

Catch quotas were introduced for the first time in 1990 to the commercial Atlantic salmon fisheries in Salmon Fishing Areas (SFA) 2-11 and 13-14 (Fig. 1) while in SFA 1, a catch allowance was in effect. A general overview of the status of salmon stocks for the Atlantic is provided in Table 1 and compares the information available for 1990 with that for: (a) 1989, (b) 1984/85-1989 and (c) 1980-89. Recreational catches in 1990 were generally higher than during 1989. However CAFSAC notes that recreational catches in 1989 were among the lowest on record. When 1990 recreational catches were compared to the average of the previous 5-6 years, it is only in Quebec that recreational catches were consistently higher in 1990.

The implementation of quotas decreased commercial catches in almost all Newfoundland SFAs, the total for SFAs 1-11 being 40% lower than the average for the previous 5 years. The lower catches are not entirely related to the management because the quotas were not reached in five of the SFAs. There are indications for two Newfoundland rivers that the decreased catches in 1990 could be related to lower marine survival. The commercial catches for Gulf Newfoundland (SFAs 13-14) were also lower by about 40% when compared to the previous five years.

Counting facilities and river spawner counts in all Scotia-Fundy SFAs showed lower returns of wild one sea winter (1SW) and multi-sea winter (MSW) salmon compared with 1989 or with the 1984-89 mean except in the Liscomb River (SFA 20) where returns in 1990 were 80% higher than in 1989 and 24% higher than the 1984-89 average.

CAFSAC notes that the landings in the first two weeks of the commercial salmon fishery at West Greenland in 1990 were low, suggesting that returns of 2SW salmon to Canada in 1991 may also be low.

2.0 Newfoundland Region Summary

A major change was introduced in the management of the commercial fishery in 1990. Quotas were introduced for the first time in SFAs 2-11 while in SFA 1 a catch allowance was in effect. In some SFAs, caution notices were moved farther out from the mouths of rivers.

Otherwise, management measures were the same as in 1989 for both commercial and recreational fisheries. The number of commercial fishermen and gear units in 1990 decreased from 1989 in both insular Newfoundland and Labrador.

In Labrador the quota/catch allowances for 1990 were not taken prior to the closure of the commercial fishery on October 15. Catches of small (60t) the large (122t) salmon in Labrador were close to or the lowest on record and were well below the 1984-89 mean in both SFAs 1 and 2. The recreational catch of 2,243 grilse was below 1989 (-29%) and the 1974-83 (-42%) and 1984-89 (-28%) means. The catch of large salmon in 1990 (259) also declined compared with 1989 (-37%) and with the 1973-84 (-44%) and 1984-89 (-26%) means. Low catches of small and large salmon in both the commercial and recreational fisheries suggest a low abundance of both components in Labrador in 1990.

In insular Newfoundland, commercial catches of small (151t) and large (167t) salmon were the lowest on record which could be attributed in part to the implementation of quotas. The fishery closed during June-July in SFAs 4, 5, 6, 8, 10 and 11. In SFAs 3, 7 and 9, the fishery lasted the entire season without quotas being taken. Catches of small and large salmon in 1990 were less than the average catch to the same date for the 1984-89 period for all SFAs except for 10 and 11.

Recreational catches of grilse and large salmon in Labrador in 1990 were below 1989 and also lower than the long-term and short-term means. In insular Newfoundland , the catch of grilse increased over 1989 but was below the 1974-83 and 1984-89 means. In 1989, grilse catch was approximately one-half of recent average catch. The recreational catch of 17,409 grilse for insular Newfoundland in 1990 was 51% above 1989 but 16% below the 1974-83 and 22% below the 1984-89 means.

In spite of the implementation of quotas in the commercial fishery, recreational catches in most SFAs were either comparable to or below the 1984-89 mean. Counts of grilse at fishways and counting fences were also low in nearly all cases compared to 1984-89 mean. This suggests that had 1990 management measures not been in place, escapements might have been even lower.

Commercial catches coupled with recreational catches and counts at fishways and counting fences suggest that overall there was a decrease in abundance of small salmon in 1990. Commercial catches and counts suggest the same for large salmon.

A lower marine survival could have contributed to the suggested low abundance in 1990. Survival of smolts (back to river) in 1990 for Northeast Brook, Trespassey in SFA 9 and Conne River in SFA 11 was low for the second consecutive year. Another possibility would be that adverse environmental conditions (low water levels and high water temperatures) in rivers in 1987 could have contributed to low returns in 1990 and could also impact negatively in 1991.

2.1 Newfoundland Region Rivers

2.1.1 Gander River, Newfoundland, SFA 4

Life Stage: 1SW and MSW salmon
Target: 45 million eggs

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch	3358	2361	1444	2686	1173	1155	1155	4578	2534
Other removals/mortalities					407	401			
Counts					8136	8021			
Total escapement					8136	8241			
Spawning escapement (1SW+MSW)					6556	6685			
% of target met					33	34			

[1]For 1974-1990

Recreational catches: Catches have ranged from 1,155 to 4,578 during the past ten years. Catches have declines in recent years while rod days of effort have remained more or less steady.

Data and assessment: Complete counts of fish are obtained from a counting fence first used in 1989 and counts have historically been conducted at a fishway located on the Salmon Brook tributary.

State of the stock: The percentage of target egg deposition achieved in 1989 and 1990 was 33% and 34% respectively.

Forecast: Not presently possible.

2.1.2 Conne River, Newfoundland, SFA 11

Life stage: 1SW salmon
Target: 7.8 million eggs (~ 4,000 1SW fish)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch	2729	2060	1598	1544	1036	767	767	3302	1925
Other removals/mortalities[2]		1190	1218	872	546	1067	546	1218	979
Counts		7515	9687	7118	4469	4321	4321	9687	6626
Total returns		8302	10155	7627	4968	5383	4968	10155	7287
Spawning escapement		5052	7339	5211	3386	3549	3386	7339	4907
% of target met		118	176	128	84	91	84	176	119

[1]Recreational catch for the period 1974-1990, others from 1986-1990.
[2]Includes food fishery, brood stock removals, in-river mortalities.

Recreational catches: Catches have ranged from 767 to 3,302 during the past ten years. Both catch and number of rod-days of effort have decreased in recent years.

Data and assessment: Complete counts of fish are obtained from a fish counting fence first used in 1986. Smolts are monitored by mark-recapture estimates.

State of the stock: Target requirements were met in 1986-1988 by contribution of 1SW salmon only. In 1989 and 1990, 84% and 91% of the target was obtained by 1SW fish, with the buffer from large salmon ensuring that the egg requirement target was met.

Forecast: With estimated output of between 56,000 and 66,000 smolts, and using a mean smolt to adult survival of 8.1%, (based on only three years of data) adult returns for 1991 are forecast to be between 4,500 and 5,300 grilse.

Recommendations: In season monitoring should continue with closures of recreational and food fisheries implemented if necessary, as in 1990, to ensure adequate spawning escapement.

3.0 Scotia-Fundy Region Summary

Catches of 1SW fish relative to the 1984-1989 mean increased 6% in SFA 19, 38% in SFA 20 and 15% in SFA 21, but decreased 69% in SFA 22, and 28% in SFA 23. Hooked and released catches of MSW fish relative to the 1984-1989 mean increased 10% in SFA 19, but decreased 37% in SFA 20, 9% in SFA 21, and 85% in SFA 22.

Counting facility and river spawner counts in all SFAs of Scotia-Fundy Region for 1990 indicate returns of wild 1SW and wild MSW salmon lower than either those of 1989 or the 1984-1989 mean except for the wild 1SW returns to Liscomb Falls (Liscomb River) which were up 80% from 1989 and up 28% from the 1984-1989 mean. Counts of MSW salmon at the same facilities were below those of 1989 and 1984-1989 mean counts. Wild MSW returns were all below forecast numbers.

Counts by divers and at fishways indicate that minimum target escapements were met above the fishways on the Grand (SFA 19) and LaHave (SFA 21) rivers. Four rivers, the Liscomb (SFA 20), Point Wolfe, Alma and Saint John above Mactaquac (SFA 23) did not attain the target numbers of spawners. In addition, escapement to the Big Salmon River (SFA 23) was substantially below that of 1968-1973, and escapement to the Petitcodiac River (SFA 23) was extremely low.

The survival of hatchery-reared smolts released in 1989 expected to return as 1SW at counting facilities, was down from 1989 on the Saint John (lowest of record) and LaHave (lowest in 5 years) but up on both the Liscomb (double that of 1989) and Tusket rivers. MSW return rates at all fishways were down from 1989. Despite low return rates, hatchery fish contributed about 20% of potential spawning escapement above Mactaquac on the Saint John, 30% above Liscomb Falls on the Liscomb River, 30% above Morgan Falls on the La Have River and 50% above the Grand River Falls on Grand River.

MSW salmon returning to counting facilities in 1991 are forecast to be 23% higher on the Liscomb (SFA 20), 9% higher on the LaHave (SFA 21), and 13% or 27% higher on the Saint John River (SFA 23) compared with 1990.

Escapement and catches of 1SW fish in inner Bay of Fundy rivers of SFA 22 and SFA 23 decreased in 1990 relative to 1989. Juvenile densities since 1984 have been stable but 1SW catches in 3 of the last 4 years suggest a decline in marine survival of these stocks known to utilize the Bay of Fundy-Gulf of Maine area.

3.1 Scotia-Fundy Region Rivers

3.1.1 Grand River, Nova Scotia, SFA 19

Life stage: 1SW, repeat 1SW, and limited 2SW
Target: 1.1 million eggs

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch[1]									
Grilse	542	360	342	338	307	416	307	542	380
Salmon	133	194	107	105	74	98	34	194	108
Other removals				33	25	21			
Count at fishway (adjusted)				669	625	559			
Below fishway est.				143					
Required spawning escapement				539	545	545			
Escapement[2]				716	481	486			
% of target met				134	89	92			

[1]Min, max and mean for 1984 to 1989. Catches also include released fish.
[2]For 1989 and 1990 this pertains to above the fishway only.

Recreational catches: Recreational catches have ranged from 422 fish in 1984 to 381 fish in 1989 over the period that the Nova Scotia license-stub return system has been in place. This river is the highest or second highest producer of fish less than 63cm on Cape Breton Island.

Data and assessment: Counts of fish and scale samples are taken at the fishway located 10.2km above the head of the tide on the main river. By-pass of fish ascending the falls was estimated at 9% for fish less than 63cm and 43% for fish 63cm or greater. Numbers below the fishway were estimated from redd counts in 1988 only.

State of the stock: Target requirements were met in 1988 and likely met in 1989.

Forecast: Not presently possible.

3.1.2 Saint John River, N.B (above Mactaquac) SFA 23

Life stage: 1SW, MSW salmon (wild and hatchery origin)
Target: 29.4 million eggs (4,400 MSW and 3,200 1SW fish)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch (1SW)	3060	1692	1650	1755	2304	2110	1151	3580	2289
Other removals/mortalities[2]									
1SW	962	1187	567	973	1377	936			
MSW	5008	3406	2074	2005	1394	1250			
Counts 1SW	7078	7046	7972	9191	9587	7907	4140	17314	8959
MSW	6960	4143	3430	2600	4291	3919	2010	10451	5283
Returns 1SW	8544	8766	9237	10180	10861	8804	4946	19275	10408
MSW	11311	6925	4832	3537	4541	4125	3537	13916	7644
Spa Escp. 1SW	4522	5887	7020	7452	7191	5758			
MSW	6303	3519	2758	1532	3147	2875			
% target 1SW	141	184	219	233	225	180			
MSW	143	80	63	35	72	65			

[1]For the period 1975-1990.
[2]Incl. food fishery, broodstock and in-river mortality.

Recreational catches: MSW salmon have not been retained since 1984; up to 1990, 1SW landings have ranged from 311 in 1972 to 3,580 in 1976.

Data and assessment: Counts of fish obtained from the collection facility at Mactaquac Dam were augmented by estimates of down river removals. Smolts and juveniles of hatchery origin were counted at time of release.

State of the stock: Target egg requirement have been met only three times in the last 13 years (1980, 1984, 1985); 1SW escapement makes no significant contribution to egg deposition because most of these fish are males.

Forecast: A relationship between egg depositions and wild 1SW returns indicates a return of between 6,500 and 7,600 wild 1SW fish, depending on the forecast model. Another relationship between wild 1SW returns, their fork length and MSW returns suggests that the 7,300 1SW returns in 1990 will provide 3,400 or 4,000 wild MSW returns, depending on forecast model. The product of the numbers of hatchery releases and recent return rates suggest hatchery returns in 1991 of 3,400 1SW and 1,300 MSW salmon. Total 1SW returns could be between 9,900 and 12,000 1SW fish; total MSW returns could be between 4,700 and 5,200 MSW salmon.

4.0 Gulf Region Summary

SFAs 12-14, Newfoundland-Labrador

Commercial fishery access to Atlantic salmon stocks in 1990 was regulated by season, quota, license and gear restrictions. SFA 12 remained closed, SFA 13 opened June 5 and closed July 3 when the quota of 35t was caught. SFA 14 opened June 5 and closed July 14 when a 50t quota was caught. The southern Labrador portion of SFA 14 reopened July 20-30 with

a supplementary quota of 10t shared equally among fishermen. No new licenses were issued in 1990 and licenses were distributed as follows: 107 in SFA 13 and 249 in SFA 14 of which 76 were in southern Labrador. Fishermen were restricted to a maximum of 200 fathoms of fixed gillnet, per license.

The recreational fishery regulations were similar to 1989, subject to in-season closures due to low water levels, quotas taken and local season variations. Anglers were required to release salmon greater than or equal to 63cm in insular Newfoundland, but these salmon could be retained in southern Labrador. The seasonal bag limit of 15 fish, daily limit of two retained and daily limit of four hooked and released, introduced in 1986, remained in effect in 1990. The largest recreational catch of 1SW salmon occurred on the Humber River followed by River of Ponds. The total 1SW catch for the region was within 6% of the previous 5-year mean. Recreational harvest of 1SW salmon in SFA 12 was 12% less than the previous 5-year mean.

The Gulf Region commercial landings in 1990, were 86.7t of the 95t quota. This represented a 29% reduction from 1989 and a 42% reduction from the previous 5-year mean. Small salmon catches decreased by 39% and large salmon catches by 47% compared with the previous 5-year mean. The commercial harvest in SFA 13 was 43t, 29% below the previous 5-year mean while the recreational harvests of 1SW salmon were 11% higher. The commercial harvest in SFA 14 of 43.7t was 51% less than the 5-year mean. Recreational harvest of 1SW salmon was similar to the previous 5-year mean. MSW recreational catches in southern Labrador (Section 50) were 40% less than the previous 5-year mean.

The number of 1SW salmon returns to the Torrent River fishway in 1990 were 12% more than the 5-year mean. The number of 1SW salmon returning to the counting fence at Western Arm Brook was reduced by 53% from the 5-year mean.

The commercial and sport catches of small (1SW) salmon in Statistical sections 45-49 (Areas M+N) were forecast using Western Arm Brook smolts. However, the 1984-1985 data point must be excluded for this regression to be significant. This method predicted a harvest of between 13,800 and 19,700 for 1991.

SFA 17, PEI

The recreational catch of 1SW salmon in PEI was the highest since 1974 but 1SW returns to the Morell River were 67% of the 5-year mean. MSW returns to the Morell River were about 30% above the 5-year mean.

4.1 Gulf Region Rivers

4.1.1 Humber River-Bay of Islands, Newfoundland, SFA 13

Life stage: 1SW and MSW
Target: 27.7 million eggs (18,452 fish)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch 1SW Humber River	2430	3456	3074	4042	1217	3054	1217	5102	3234
Commercial catch (numbers Bay of Islands									
Small (< 63cm)			8060	9989	4211	4983			
Large (> 63cm)			728	824	815	579			

[1]For 1976-1990

Recreational catches: The recreational catch from Humber River has ranged between 876 to 6,147 small salmon (less than 63cm) since 1953 and large salmon catch prior to 1984 ranged between 27 to 526. Humber River has accounted for almost 100% of Bay of Islands recreational catch.

Data and assessment: The status of stocks was determined using recreational catch obtained from DFO statistics applied to a preliminary estimate of a range in exploitation rate. Exploitation rates were estimated from recaptures of fish tagged in the estuary.

State of the stock: Based on an estimate of angling catch of 1SW salmon in 1990, 1SW egg deposition requirements were not met. On average over the period 1985-90, egg depositions were between 39% and 77% of the requirements for the Humber River. Under the extreme scenario that recreational fisheries in Humber River and Humber Arm commercial fisheries had not taken place, egg deposition would have been between 76 and 162% of the requirements for Humber River.

Forecast: Not presently possible.

4.1.2 Restigouche River, SFA 15

Life Stage: 0+, 1+, 2+, juveniles, 1SW, MSW salmon
Target: 71.4 million eggs (12,200 MSW; 2,600 1SW salmon)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
River harvest[2]									
MSW	1074	1693	1073	1207	1336	1186	688	6707	3100
1SW	3517	5413	5005	6776	3301	4367	896	6776	2800
Estuary harvest[3]									
MSW	1217	1576	1902	1430	1649	1606	23	18180	3100
1SW	35	30	100	73	163	136	0	7339	1300
Spawning escapement[4]									
MSW (X 1000)	8-13	11-19	7-13	10-17	8-13	6-11	1-2	11-19	5-11
1SW (X 1000)	4-8	5-13	5-12	7-16	3-8	4-10	1-2	7-16	3-7
Total Returns[4]									
MSW (X 1000)	11-18	16-26	12-18	15-24	12-19	11-17	6-9	23-26	13-20
1SW (X 1000)	8-13	13-21	12-19	16-26	8-13	10-17	3-4	16-26	8-12
% egg target met[4]	63-112	89-159	59-105	83-146	63-113	53-96	9-20	89-158	43-89

[1]Min and max for the period 1970 to the present unless otherwise indicated.
[2]River harvest includes mortalities associated with catch and release, and broodstock.
[3]Estuary harvest is food fishery.
[4]Range given reflects uncertainty of angling exploitation rate (assumed to lie between 0.3 and 0.5), from which spawning escapement (and therefore eggs), and total returns are derived.

Recreational catches: The recreational catches have ranged from 2,068 to 6,181 MSW and 896 to 6,776 1SW salmon during the past 10 years (MSW catch includes catch and release in NB). Effort in rod-days and catch have remained fairly stable over recent years.

Data and assessment: Spawning escapement was estimated from angling catch divided by exploitation rate minus losses to: (1) poaching and disease, (2) mortality associated with catch and release in the sports fishery, and (3) removals for hatchery broodstock. The exploitation rate has not been measured on the Restigouche River since 1973, but is assumed to lie between 30% and 50%. Spawning escapement has also been estimated from canoe surveys since 1982, but this was prevented in 1990 by high water. Salmon have been counted at headwater protection barriers on the Upsalquitch River since 1980 and Causapscal River (Matepedia) since 1988. Juvenile salmon densities have been estimated since 1972 from electrofishing at 15 standard sites.

State of the stock: Because angling exploitation rates have not been measured in recent years, true spawning escapements are unknown. Potential indices of spawning escapement (canoe counts, barrier counts, and juvenile densities (Fig. 2)) suggest that the stock is larger now than it was in the early 1980s.

Forecast: There is no evidence to suggest that returns will be significantly different than average.

4.1.3 Miramichi River, New Brunswick, SFA 16

Life stage: 1SW and MSW salmon
Target: 132 million eggs (23,600 MSW and 22,600 1SW fish)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch 1SW - Bright	18439	26163	20765	30620	24426	21372	8390	30620	21309
1SW salmon									
Total returns	60800	117549	84816	121919	75231	90848	25184	121919	75141
Spawning escapement	37815	85398	58777	86278	44385	62924	10849	86278	48928
% spawner target met	167	378	260	382	196	278			
MSW salmon									
Total returns	20738	31285	19421	21745	17211	29774	15137	31285	22898
Spawning escapement	19122	29216	17056	19980	14540	26588	3608	29216	16351
% spawner target met	81	124	72	85	62	113			
% egg target	98	172	133	150	90	148			

[1]For 1981-1990

Recreational Catches: Have ranged from 8,390 to 30,600 fish during the past 10 years. Both catch and effort have increased in recent years, although there is much year to year variation.

Data and Assessment: An index trap has been operated in the estuary since 1954. The trap efficiency, estimated in 1972-73, changed in the early 1980s when the river channel was altered and the trap was recalibrated in 1985-87. Estimated returns from the trap efficiency and mark-recapture are very similar, differing by less than 2% in 1990.

State of the stock: Target egg deposition rates have been almost met or exceeded in each of the last six years. The previous spawner component of MSW salmon returns has increased from under 10% to almost 40% over the last 6 years. Juvenile densities (Fig 3) also suggest improvement in the stock.

Forecast: A new forecasting technique predicts 26,000 MSW salmon in 1991 with wide confidence limits (17,000-52,000). The average returns over the last five years were 23,600 MSW salmon.

4.1.4 Margaree River, Nova Scotia, SFA 18

Life stage: 1SW and MSW salmon
Target: 6.714 million eggs (1,036 MSW + 582 1SW salmon)

Year	1985	1986	1987	1988	1989	1990	Min[1]	Max[1]	Mean[1]
Recreational catch									
1SW	223	295	403	589	208	252	21	899	162
MSW	313	754	803	368	463	1693	56	704	211
Returns									
1SW min	588	778	1063	2356	754	504			
max	1083	1432	1956	4953	1605	1483			
MSW									
min	826	1989	2119	1772	2622	4200			
max	1519	3660	3898	3465	5181	14561			
% of egg deposition target met									
min	79	192	206	175	251	382			
max	148	354	380	353	501	1399			

[1]1985-1989, and min and max (1947-90) values based on DFO statistics; 1987 to 1990 are creel estimated values. MSW min, max and mean values are pre-1985 retained MSW values.

Recreational catch: Catch of 1SW salmon has averaged 328 since 1985. MSW releases have averaged 784. MSW releases were a maximum in 1990 relative to historical catches.

Data and assessment: Complete counts are not available. Assessments are based on recreational catch estimates and combined with an assumed exploitation rate up to 1987 and an estimated exploitation rate since 1988 to calculate returns. Recreational catches are estimated from creel surveys which in 1990 were based on the "bus route" design at 10 index pools.

State of the stock: Target egg depositions have been met or exceeded since 1985. Returns of MSW in 1990 were highest ever estimated.

Forecast: Not presently possible.

Table 1. Overview of the status of Atlantic salmon in Atlantic Canada during 1990. Indices include recreational catches with estimates of catch and release, where available, for MSW salmon, commercial catches and estimated returns. Estimated returns consist of counts of salmon from fishways or counting fences and index facilities (ex. Millbank trap, SFA 16). The data for 1990 are compared with 1989, and previous 5/6 year (1984/85-89) and 10-year (1980-89) means. A "-" symbol implies a decrease by more than 10%, "+" indicates an increase by more than 10% while "0" refers to a change in either direction of less than 10%. No statistical significance is assigned to these changes. Blank means no information.

	Recreational catch						Estimated returns						Commercial catch					
	1SW			MSW			1SW			MSW			1SW			MSW		
Zones	1989	84/85-89	1980-89	1989	84/85-89	1980-89	1989	84/85-89	1980-89	1989	84/85-89	1980-89	1989	84/85-89	1980-89	1989	84/85-89	1980-89
Newfoundland																		
SFA																		
1	-	-	-	-	-	-							-	-	-	-	-	-
2	-	0	-	-	0	0							-	-	-	-	-	-
3	+	+	+										-	-	-	+	0	-
4	+	-	-				-	-		+	-		-	-	-	-	-	-
5	+	-	-				+	-	-	0	0	+	-	-	-	-	-	-
6	+	0	0										-	-	-	-	-	-
7	-	-	-										-	-	-	-	-	-
8	-	-	0										-	-	-	-	-	-
9	+	0	0				+			-			-	-	-	-	-	-
10	0	-	-				-	0		+	+		-	-	-	-	-	-
11	+	-	-				0			+			-	-	-	+	-	-
Gulf																		
12	+	-	-															
13	+	+	0										0	-	-	-	-	-
14	+	0	0				+	0	0	+	+	-	-	-	-	-	-	-
15	+	-	+				0	-		-	-							
16	0	-	0				+	0	-	+	+	0						
17	+	+	+				+	-		+	-							
18	-	-	-	-	-													
Scotia Fundy																		
19	+	0	0	0	-		-			0								
20	+	+	+	-	-		+	+	+	-	-	-						
21	-	+	0	-	-		0	0	0	-	-	0						
22	-	-	-	-														
23	-	-	-				-	0	0	-	-	-						
Quebec																		
0																		
1	+	+		0	+													
2	+	+		-	-													
3	+	+		+	+													
4																		
5	+	+		+	+													
6	+	+		+	+													
7	+	+		+	0								+	+		-	-	
8	+	+		+	+								-	-		-	0	
9	+	-		0	-								+	0		0	0	
10	+	0		-	-								+	0		-	-	
11																		

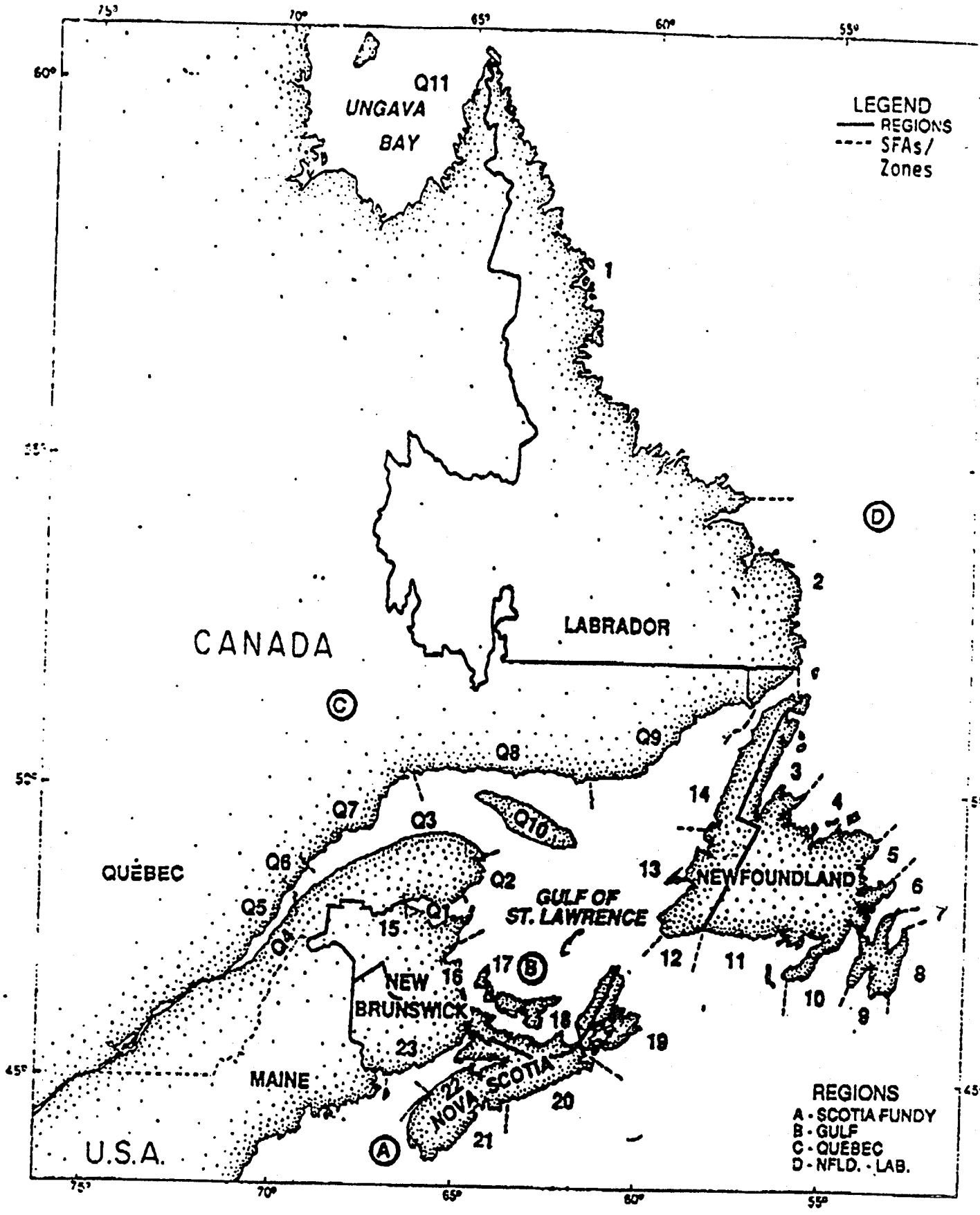


Figure 1. Map of Atlantic Provinces showing Salmon Fishing Areas 1-23, Salmon Management Zones of Quebec (Qs) 1-11, provincial and DFO regional boundaries.

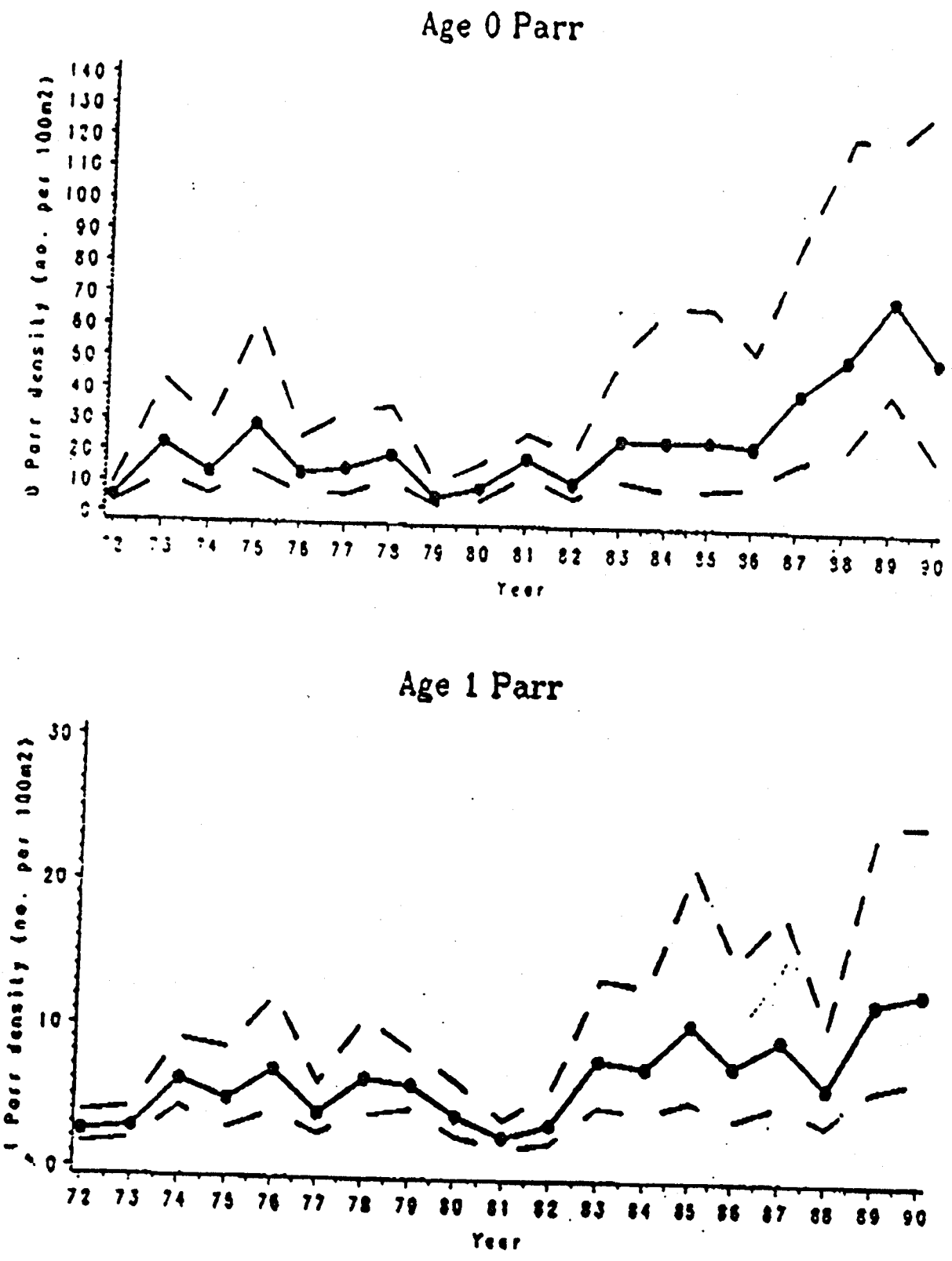


Fig. 2. Mean densities of 0+ and 1+ salmon parr at 15 sites in the Restigouche River, 1972-1990. Dashed lines are 95% confidence limits.

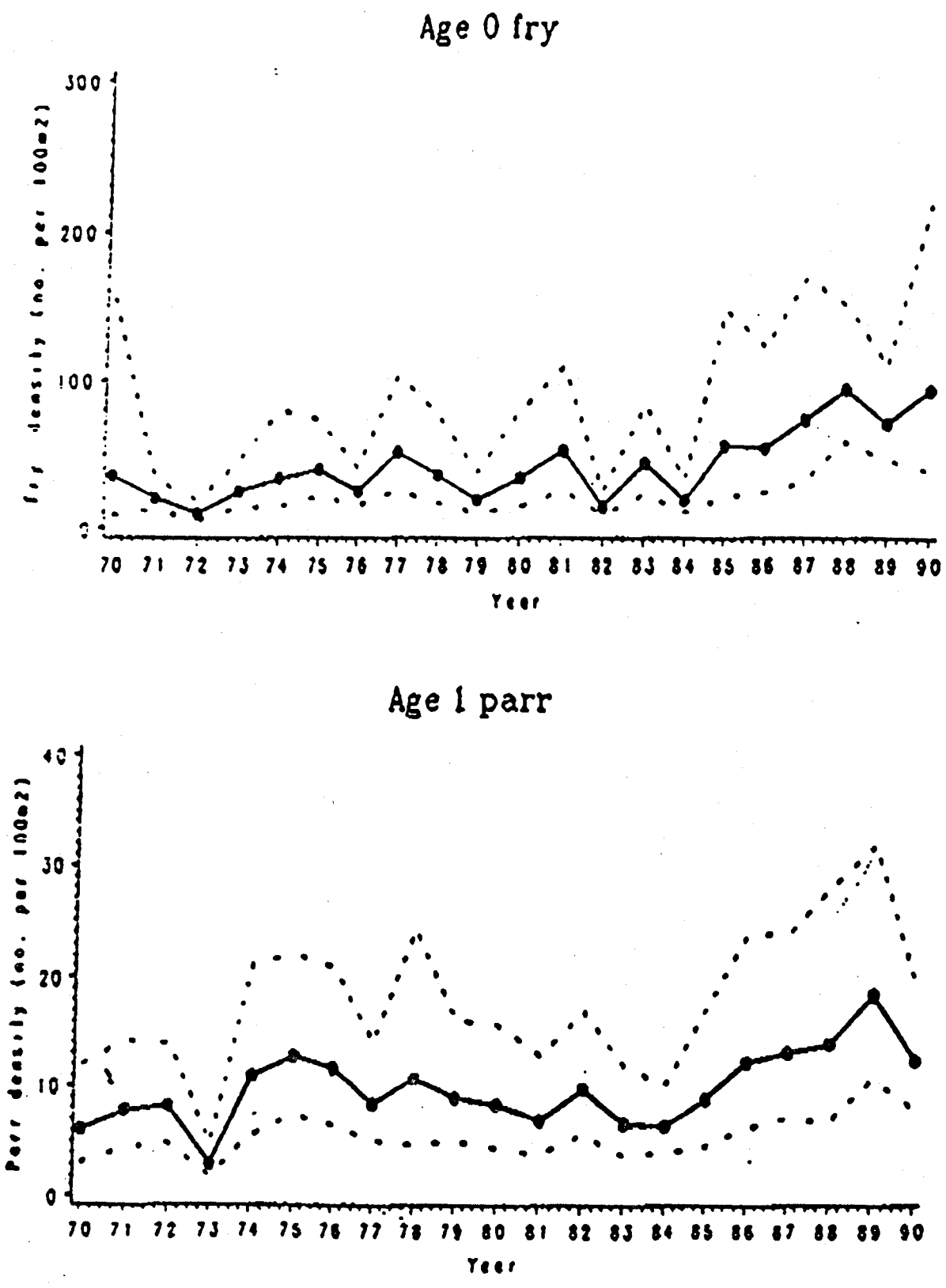


Figure 3: Mean densities of age 0+ (upper) and 1+ (lower) parr at 15 electrofishing sites in the Miramichi River, 1970 to 1990. The upper and lower 95% confidence limits are shown as dashed lines.

ANNEX 9

NORTH AMERICAN COMMISSION

PAPER NAC(91)10

STATUS OF ATLANTIC SALMON STOCKS IN THE UNITED STATES OF AMERICA IN 1990

STATUS OF ATLANTIC SALMON STOCKS IN THE UNITED STATES OF AMERICA IN 1990

1. INTRODUCTION

No commercial fishery exists for Atlantic salmon in the United States of America. Catches of Atlantic salmon by the recreational fishery are tabulated by individual states. USA salmon stocks are assessed by analysis of sport fishery catches, adult counts on monitored rivers and scientific collections of juvenile fish. The material presented here is abstracted from the 1991 report of the US Atlantic Salmon Assessment Committee.

The United States of America is dedicated to the restoration of Atlantic salmon to its native habitat. The rivers of the northeastern states once produced large salmon runs estimated in many cases to have numbered in the tens of thousands each year. Prime examples are the river systems under restoration, the Connecticut, Merrimack and Penobscot rivers, which may have produced runs in excess of 100,000, 30,000 and 80,000 salmon, respectively. The industrialization of the 1800s made spawning habitat inaccessible and water quality less than tolerable for salmon in these rivers. Yet in recent years, under great expense, tremendous strides have been made to reverse these conditions and return salmon to their historical habitat.

Restoration has involved a tremendous investment in fish passage at dams, in improvement of the water quality of salmon rivers and the building of an extensive system of hatcheries to reintroduce the fish where previously extirpated. The installation of state-of-the-art fish passage and fish guidance systems is a continuing process of making salmon spawning habitat available to adult fish. Improvements in water quality, by an array of legislation, has made habitat hospitable to all life stages of salmon including the delicate fry and parr. The hatchery system for Atlantic salmon involves numerous facilities that keep salmon broodstock and raise juvenile salmon for stocking.

2. THE SPORT FISHERY

The documented sport fishery catch of Atlantic salmon in the state of Maine during 1990 was considerably higher than recorded for 1989 (Table 1). The increase in catch has been attributed to larger runs of salmon and excellent angling conditions throughout the fishing season. As in previous years, the number of salmon caught and released was substantially higher than the number retained. In 1990, over 800 salmon were released out of a total angling catch of 1432.

The exploitation rate in Maine rivers varied from 0% to about 25% with an overall statewide exploitation rate of 13%. This rate is similar to what has been observed for recent years. The exploitation rate in the Penobscot River, which supports the largest Atlantic salmon sport fishery in the USA, has gone through changes related to abundance of salmon and changes in the management of the resource (Figure 1). With the increase in stocking and large runs of the late 1970s, the exploitation rate in the Penobscot increased from levels of approximately 6% to higher exploitation of approximately 21%. With regulations designed to reduce catch in the 1980s,

exploitation has decreased to approximately 10% in recent years. Since 1985, only one salmon has been allowed to be killed per year per person on the Penobscot River.

Historical trends in total sport catch for the Penobscot and other Maine rivers are represented in Figure 2. Sport catch is dominated by the catch of 2SW salmon. Total catch is still dominated by contributions from the Penobscot River fishery.

Rivers with self-sustaining native stocks continue to show a decline in their sport fishery catches. Catches of 2SW wild origin salmon (identified by scale reading) improved only slightly in these rivers during 1990 and are still well below the long term trend (Figure 3).

3. STOCKING OF JUVENILE SALMON

Over 5 million juvenile salmon were released into USA rivers in 1990 (Table 2 and Figure 4). This represents the fourth consecutive year that total hatchery output for run restoration in the USA has exceeded 5 million fish. Maine (primarily the Penobscot), the Merrimack and the Connecticut rivers continue to be the largest restoration efforts accounting for over 97% of the stocked fish. Fry stocking has been increase on the Penobscot, Merrimack and Connecticut rivers reflecting the increased emphasis being put on this introduction strategy in the major restoration programs.

Juvenile salmon continue to be tagged with Carlin and coded wire tags (Figure 5). Carlin tags were applied to 50,000 smolts released into the Penobscot River in 1990. Coded wire tags were applied to smolts released into the Penobscot (203,000), the Merrimack (152,000) and the Connecticut (502,000) rivers. A total of 857,000 coded wire tags were released in 1990.

Carlin tags have been used on salmon stocks from the Connecticut River and various rivers in the state of Maine. Large tagging experiments with Maine origin smolts began in 1966. After early research on tagging methods and adult releases, most tagging studies have been conducted with smolts in the Penobscot River. Tagging levels have been between approximately 25,000 and 100,000 tags annually throughout the time series with exception of 1978 when Carlin tagging was suspended for one year. Carlin tags have also been applied to Connecticut River smolts, first during the early 1970s, and later during the period 1984-1988.

Coded wire tags were first used on USA stocks (Connecticut River) to evaluate broodstock performance and were not intended for distant water recovery. After 1984, tags were applied to Connecticut and Merrimack river salmon with target recoveries in Greenland and Canadian commercial salmon fisheries. Penobscot origin salmon were first tagged with coded wire tags in 1986.

4. RUN SIZE AND ESCAPEMENT

Run size to Maine rivers is estimates by the ICES Working Group Model which integrates run estimates for rivers with and without trapping facilities (Figures 6-8). The estimated run of 1SW salmon has increased since the early 1970s which probably reflects increased stocking activities in the state of Maine. Two distinct peaks of abundance have occurred in 1SW returns, one in 1980-81 and other since 1986. This

trend is not reflected in the estimated run of 2SW salmon which has shown a declining trend since the early 1980s (Figure 7). The run of 2SW salmon continues to dominate total returns to Maine rivers. The estimated run of 3SW salmon shows a steady pattern of decline and appears to be unaffected by increased stocking levels (Figure 8).

Run estimates for the Merrimack and Connecticut rivers are based on trap counts since no fishing is allowed in these rivers (Figure 9). Total run sizes in 1990 were 248 and 263 in the Merrimack and Connecticut rivers, respectively, which represents an increase of 195% and 141% over 1989 levels. These restoration rivers have typically produced runs of less than 500 salmon each year. Increases in 1990 are attributed in part to increased returns from fry stocked origin salmon.

The target run size for restoration of Atlantic salmon in the northeastern United States is in excess of 50,000 salmon each year. This target is based primarily on expected stock size for the major restoration river systems. Expectations are that the Connecticut River will produce in the range of 12,000 to 21,000 salmon each year, the Merrimack 5,000 to 7,000 salmon and the Penobscot River 10,000 to 15,000 salmon. These estimates are for both sexes and before exploitation by in-river recreational fisheries. Many smaller rivers make up the remainder.

5. ATLANTIC SALMON RESEARCH PROGRAM HIGHLIGHTS, 1990

The research program for Atlantic salmon in the USA is extensive in the areas of husbandry, ecology and management of the species. Research is conducted by the National Marine Fisheries Service, US Fish and Wildlife Service, Forestry Service, National Parks Service, all New England States, Indian tribes, private groups and many Universities. The cooperative efforts of state, federal, private and academic researchers is broadly organized by the three major restoration programs on the Connecticut, Merrimack and Penobscot rivers. Research is conducted on topics unique to individual rivers and of general interest to the international salmon research community.

Connecticut River

The Connecticut River program is conducting studies on different smolt release strategies to improve marine survival. To optimize smolt performance, extensive work has been done on biochemical indicators of physiological level of smoltification which is taken to indicate migrational readiness.

The effect of the lower Connecticut estuary on migrating smolts is being evaluated with a series of pen releases made in Long Island Sound. Smolts ferried to the sound are imprinted as other smolts released in the river, but they are not subjected to the same predation effects that the river releases experience.

A cooperative effort composed of federal and state research groups is attempting to develop a drainage specific database on fry stocking. Rearing habitat is evaluated to determine its carrying capacity for juvenile salmon. From these data, optimal stocking densities are determined for fed and unfed fry.

Merrimack River

Research is being conducted on the migration timing, preferences and routes utilized by smolts fitted with internal radio transmitters. The studies have yielded important information on the performance of fish passage facilities at various dams on the Merrimack River. These data are important to determine the pattern of spillage and fish guidance systems used at each facility.

Methods testing for the recovery of coded wire tags from live fish is underway at the Nashua Fish Hatchery. Initial trials have utilized the adipose eye tissue, transparent tissue located behind the eye, for a placement site of coded wire tags. Coded wire tags can be individually coded and application is automated, thus making this tagging system extremely useful for studies of wild and fry stocked juveniles. If the tags can be recovered without undue stress on the fish, this technique will prove useful in future tagging studies.

Maine Rivers

A study of wild salmon rivers in the state of Maine has been initiated. The Narraguagus River will become a new "indicator river" which should represent conditions in eastern Maine concerning the native populations of salmon. This study is designed to evaluate whether changes in abundance are due to changes in conditions in freshwater. There are three phases to this research: (1) Adult returns will be counted, measured and tagged at a fishway on the Narraguagus River to evaluate stock and recruitment relationships and exploitation rate on that river; (2) Juvenile salmon populations will be measured and tagged using electro-fishing surveys of rearing habitat. The statistical properties of electro-fishing survey data will be investigated. Applicability of these data to drainage wide estimates of year class abundance and survivorship will be tested; (3) Atlantic salmon rearing habitat will be evaluated in respect to water quality and prey community structure. Water chemistry analyses including pH trends on small time scales and analysis of contaminant loading in the watershed will be conducted. In addition, rearing habitat in the Narraguagus River will be re-inventoried and quantified.

Table 1. Sport fishery landings of Atlantic salmon in Maine rivers, 1990. Landings by age are for fish kept in the fishery and includes 1, 2 and 3 sea-winter salmon, additionally previous spawners (PS) are enumerated. Total caught includes released fish.

	Landings (fish kept)					Total Caught	
River	1SW	2SW	3SW	PS	Total	1990	1989
St. Croix*	2				2	6	15
Dennys	1	31	0	1	33	36	13
E. Machias	1	46	0	1	48	83	32
Machias	0	2	0	0	2	2	18
Pleasant*	0				0	0	0
Narraguagus	1	49	0	1	51	61	44
Union	0	0	0	0	0	0	4
Penobscot	45	348	12	11	416	1106	868
Ducktrap	0	3	0	0	3	3	0
Sheepscot	1	8	0	0	9	9	5
Kennebec	1	45	0	0	46	106	2
Saco	0	16	0	0	16	19	5
Other-marine	0	1	0	0	1	1	0
Total	52	549	12	14	627	1432	1006

* Grilse fishery only.

Table 2. Summary of Atlantic salmon stocked (000's) in USA rivers.

	Maine			Merrimack			Connecticut			Total		
Year	Fry	Parr	Smolt	Fry	Parr	Smolt	Fry	Parr	Smolt	Fry	Parr	Smolt
1962	0	151	70	0	0	0	0	0	0	0	151	70
1963	0	11	101	0	0	0	0	0	0	0	11	101
1964	0	49	20	0	0	0	0	0	0	0	49	20
1965	0	47	220	0	0	0	0	0	0	0	47	220
1966	0	118	326	0	0	0	0	0	0	0	118	326
1967	0	13	204	0	0	0	0	0	5	0	13	209
1968	0	25	247	0	0	0	50	0	5	50	25	252
1969	0	25	85	0	0	0	0	0	17	0	25	103
1970	0	25	50	0	0	0	50	0	50	50	25	100
1971	0	16	89	0	0	0	75	0	28	75	16	117
1972	129	0	117	0	0	0	0	0	23	129	0	140
1973	0	0	143	0	0	0	15	0	55	15	0	199
1974	0	44	137	0	0	0	9	0	79	9	44	216
1975	0	25	169	36	0	0	13	12	79	49	37	248
1976	0	186	303	63	93	2	30	0	64	93	278	369
1977	0	0	374	72	1	31	50	0	114	122	1	520
1978	0	116	303	106	0	47	50	0	131	156	116	481
1979	28	72	371	78	0	40	54	0	183	159	72	594
1980	0	0	682	126	0	32	29	12	52	155	12	766
1981	252	71	257	57	0	100	168	188	79	477	258	436
1982	349	375	395	50	182	67	292	44	209	691	601	671
1983	20	78	538	8	25	109	226	399	98	254	501	745
1984	134	57	795	519	29	68	625	391	312	1278	478	1175
1985	472	168	772	148	6	174	422	226	282	1042	400	1228
1986	576	124	780	524	32	104	162	471	302	1262	627	1187
1987	969	309	720	1078	112	141	1101	729	206	3148	1149	1067
1988	858	967	938	1718	129	91	1310	147	395	3886	1243	1424
1989	580	713	605	1033	149	58	1242	389	221	2855	1251	884
1990	761	458	660	952	35	117	1265	307	475	2978	800	1252

Figure 1. Sport fishery exploitation on the Penobscot River.

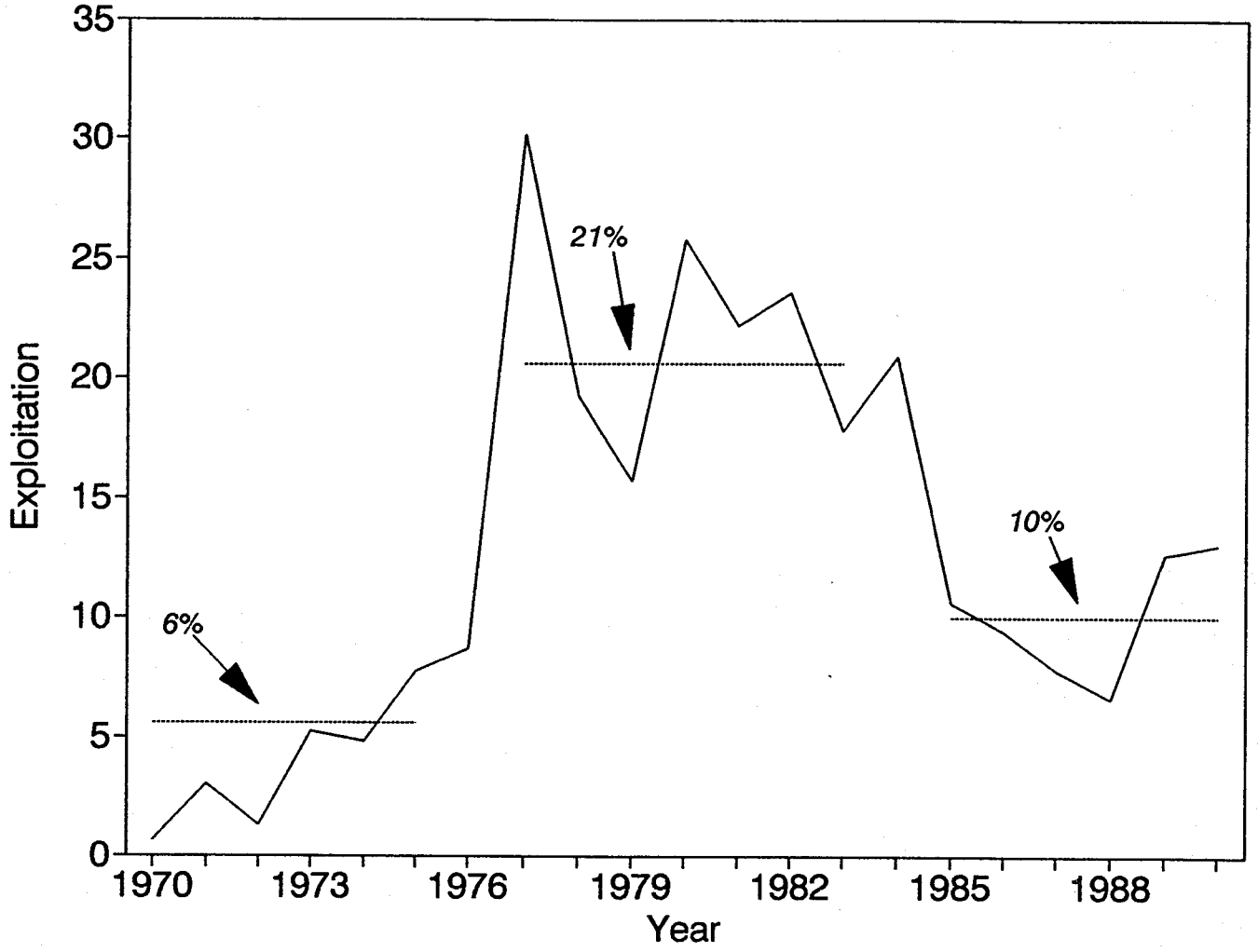


Figure 2. Sport catch of salmon of all ages to the Penobscot and Maine rivers. (includes released fish).

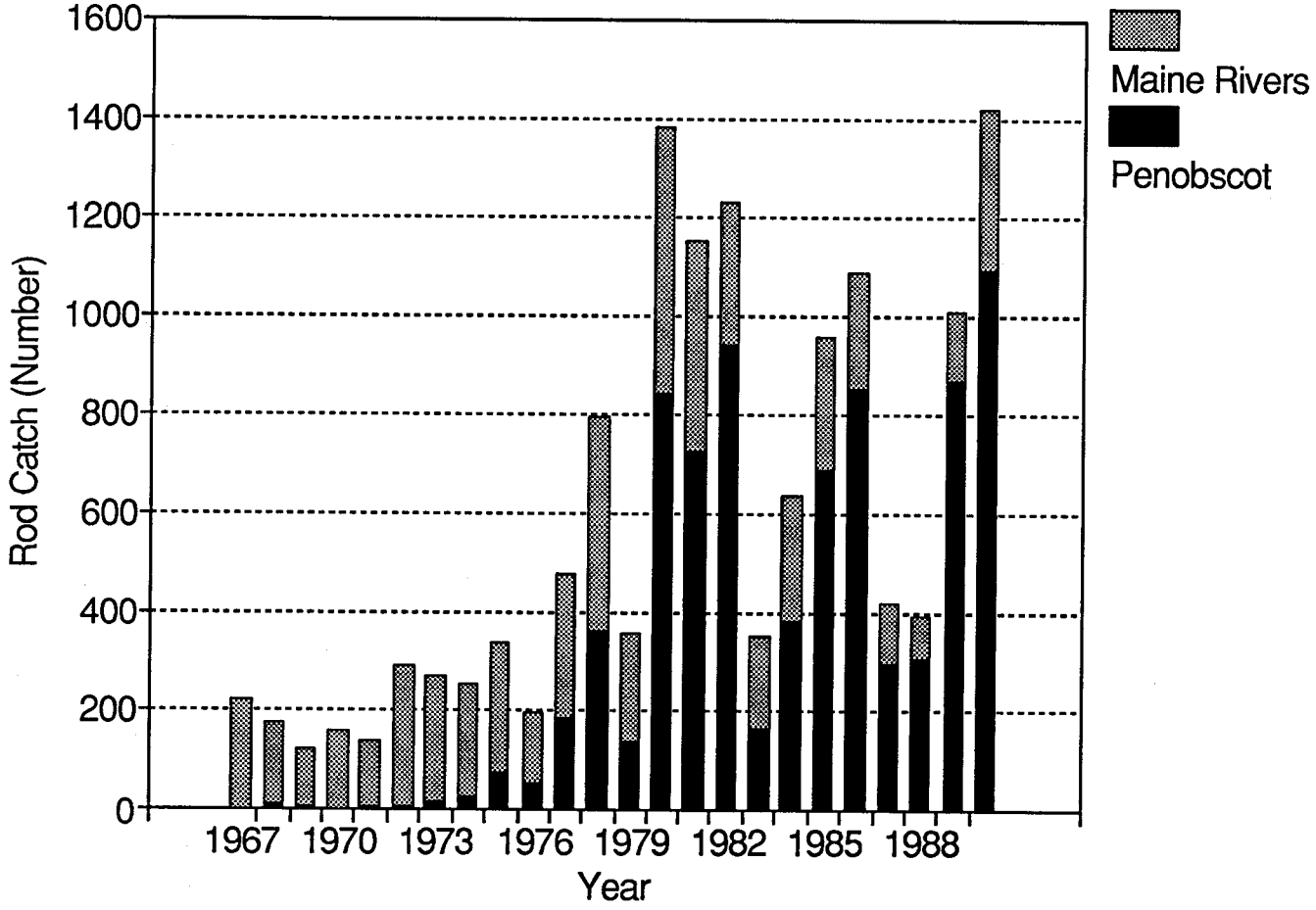


Figure 3. Sport catch (fish kept) of wild origin 2SW salmon in Maine rivers still supporting self-sustaining runs. Line indicates moving average.

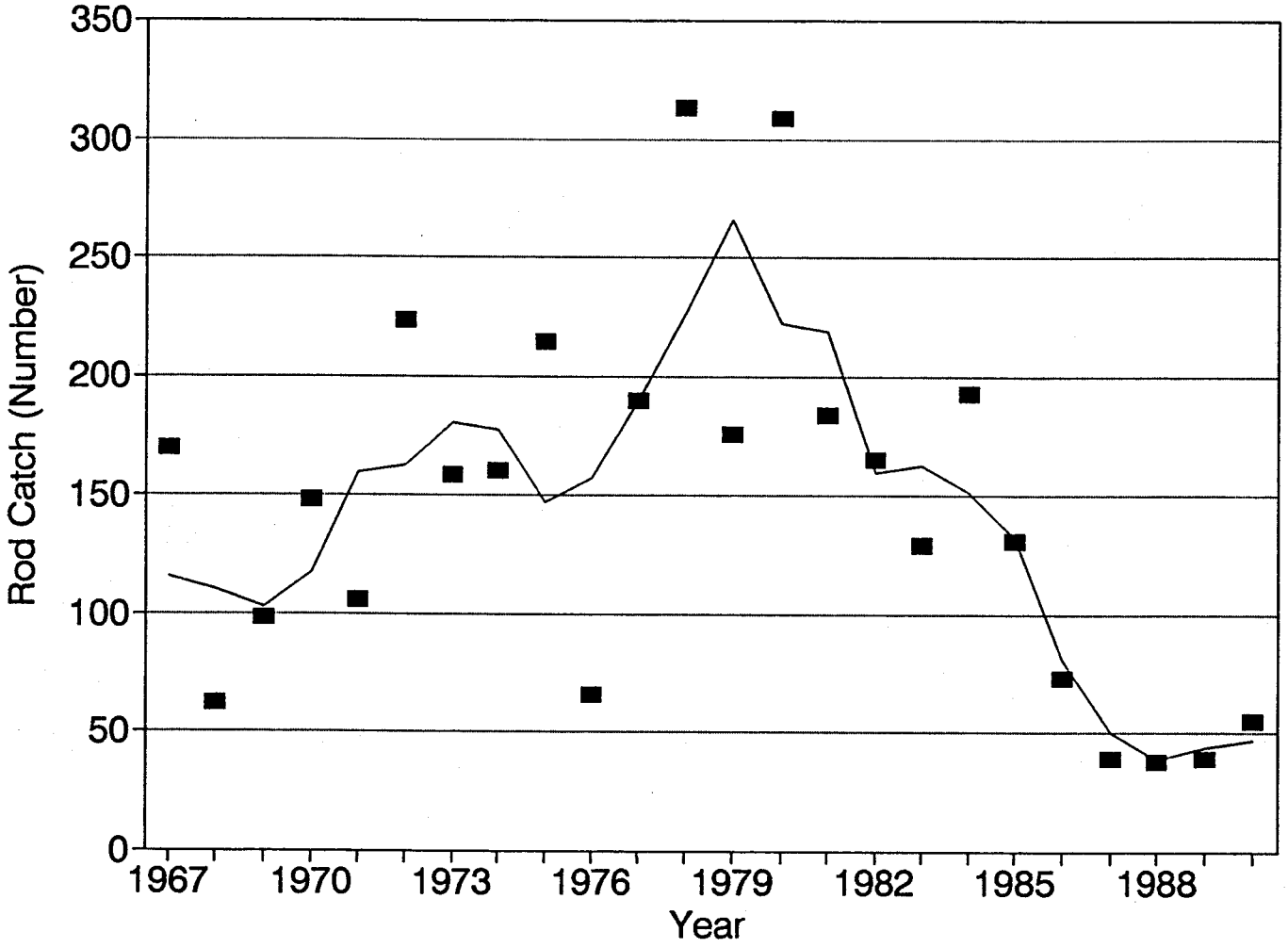


Figure 4. Atlantic salmon stocked in USA rivers.

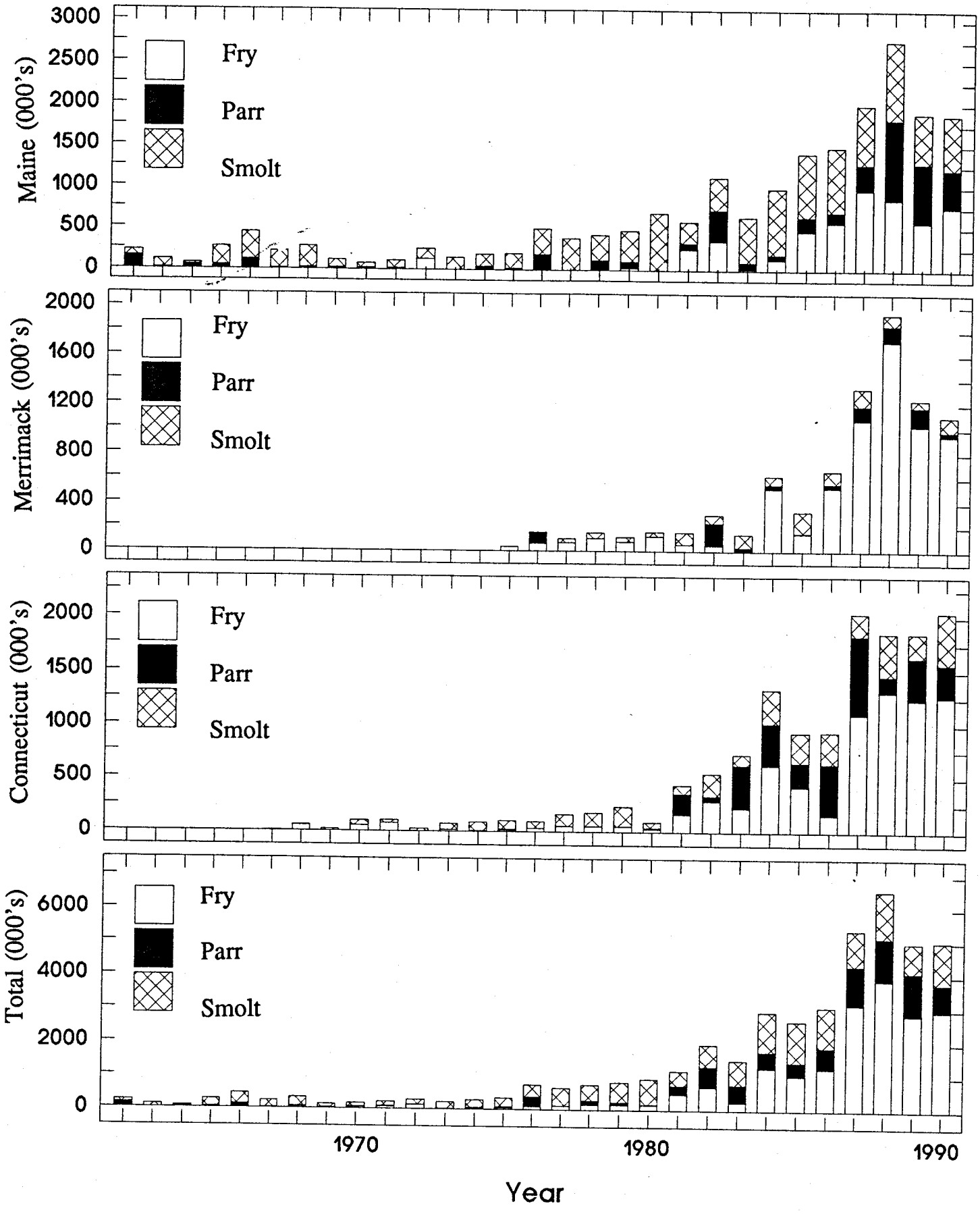


Figure 5. Tag releases in USA rivers.

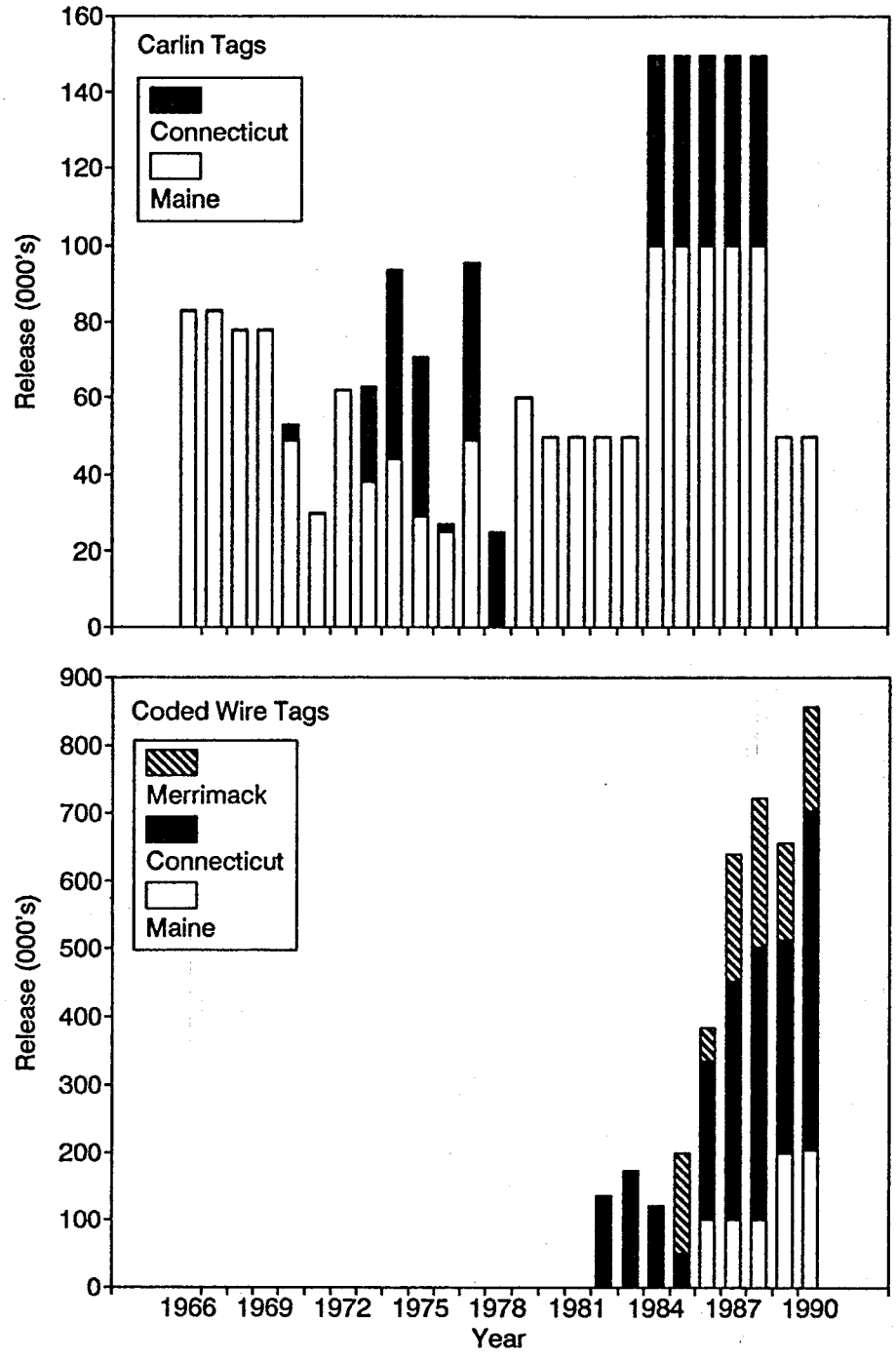


Figure 6. Estimated run size (ICES Working Group model) of 1SW salmon to Maine rivers. Line indicates moving average.

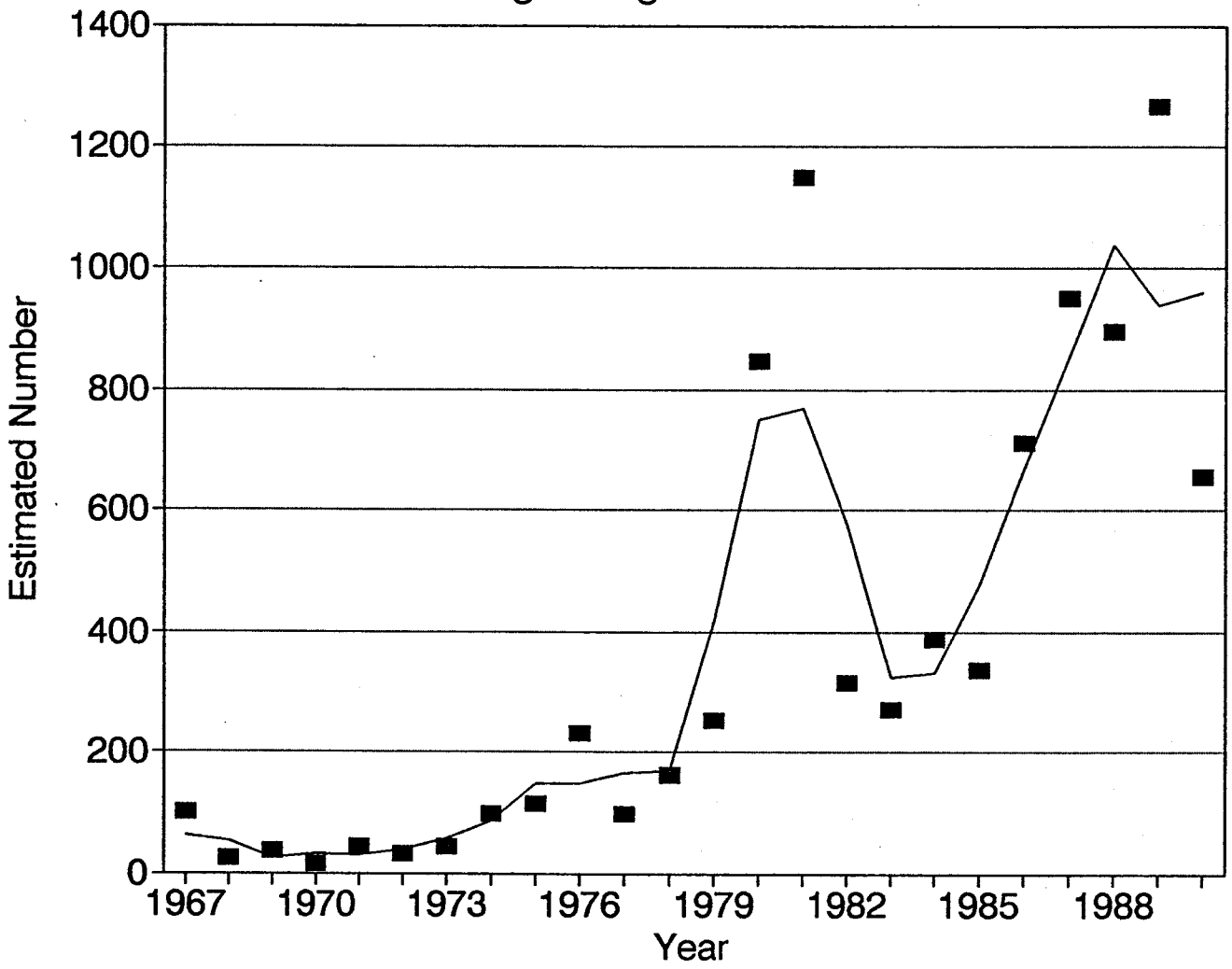


Figure 7. Estimated run size (ICES Working Group model) of 2SW salmon to Maine rivers. Line indicates moving average.

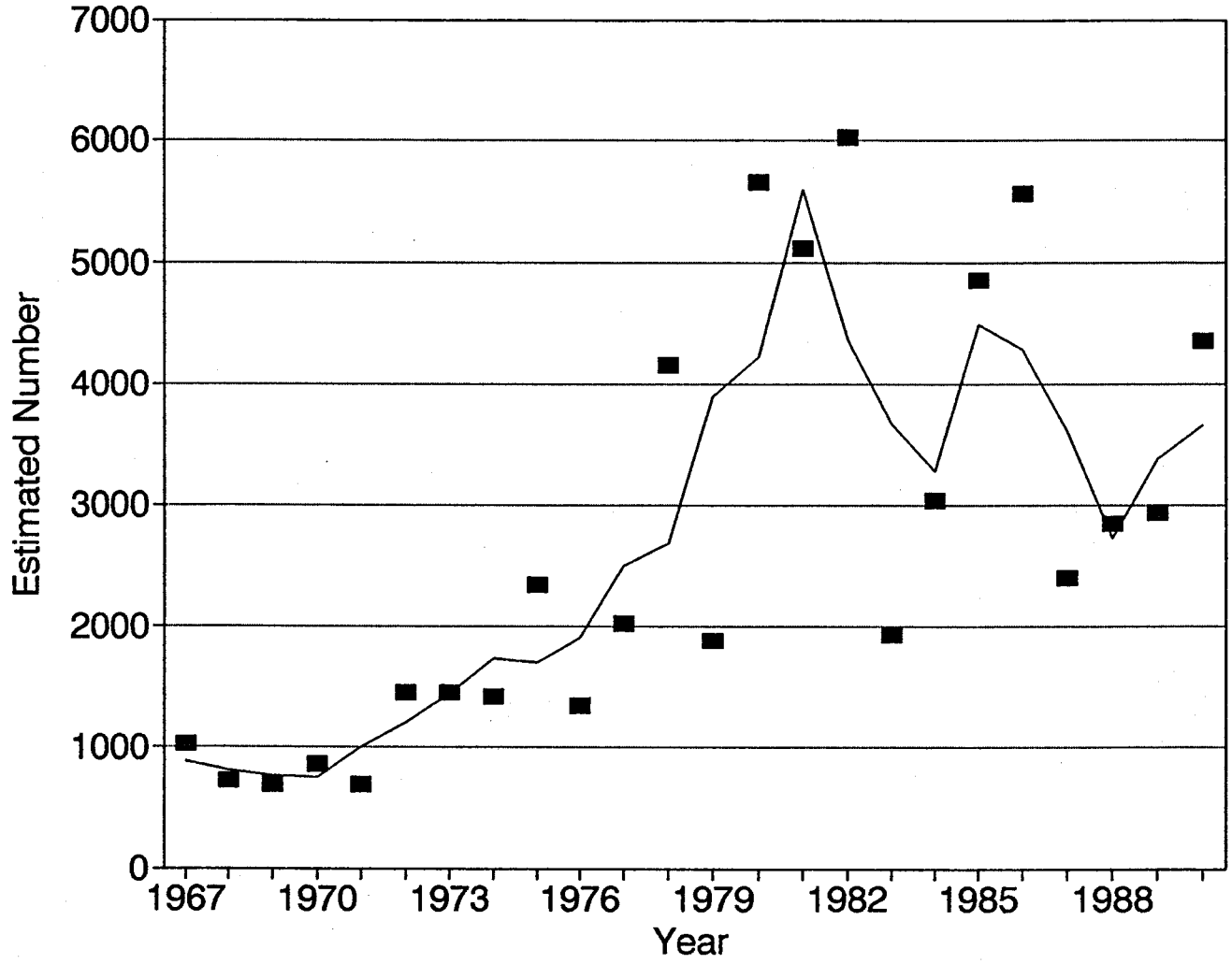


Figure 8. Estimated run size (ICES Working Group model) of 3SW salmon to Maine rivers. Line indicates moving average.

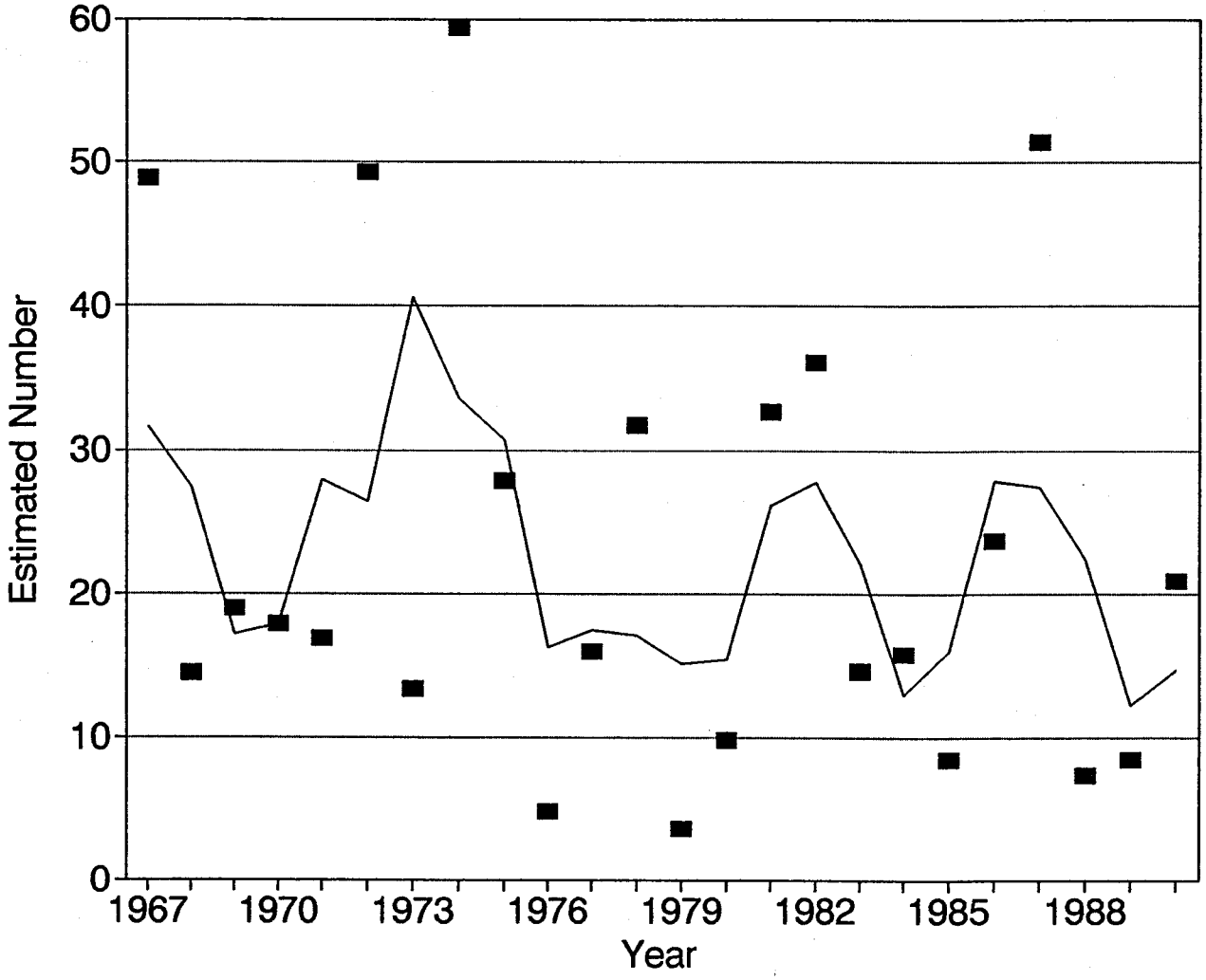
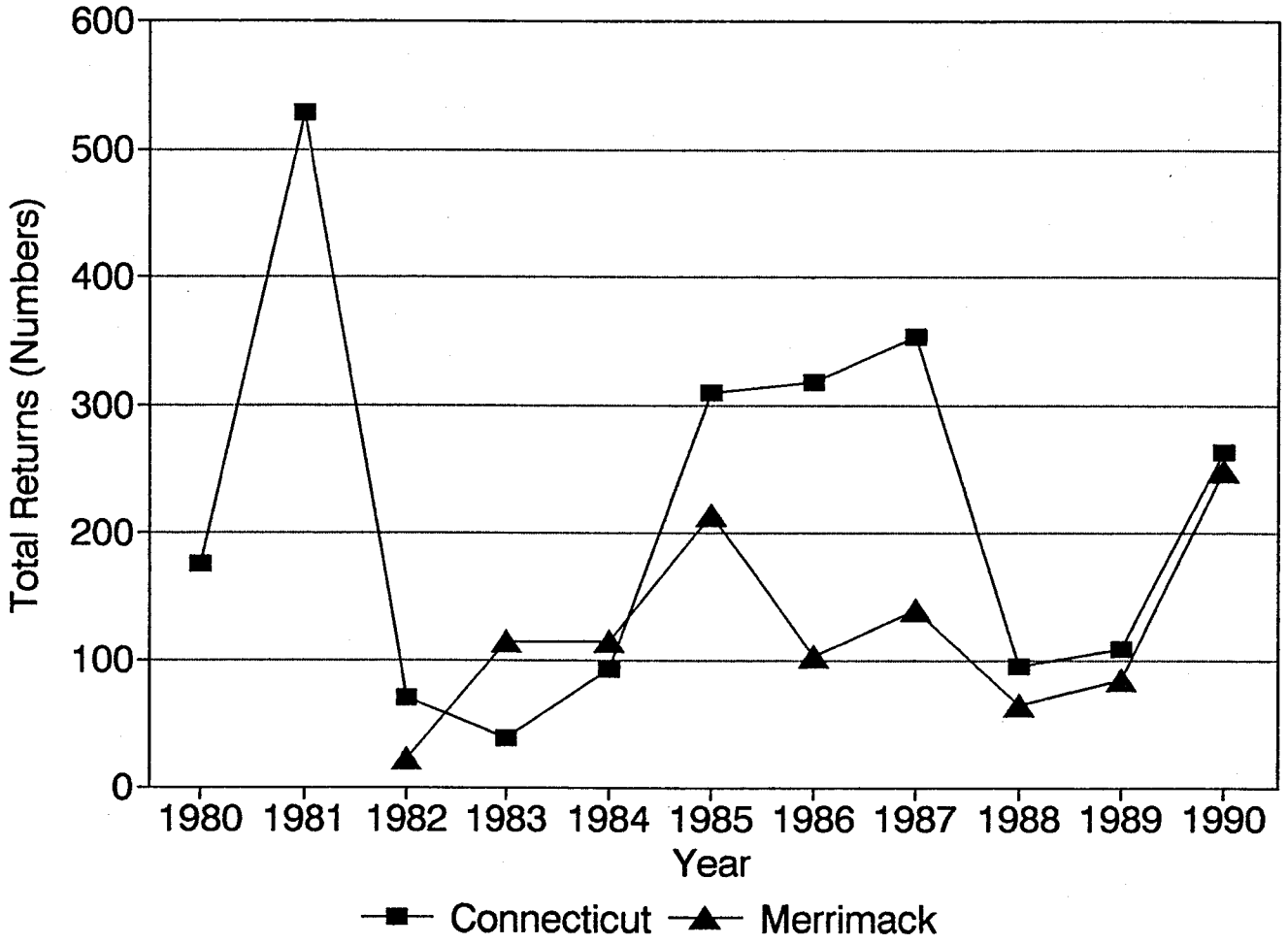


Figure 9. Total returns of salmon of all ages to the Connecticut and Merrimack rivers.



ANNEX 10

NORTH AMERICAN COMMISSION

PAPER NAC(91)9

1991 ATLANTIC SALMON MANAGEMENT PLAN

NEWS RELEASE
COMMUNIQUE

For immediate release, May 24, 1991

MINISTER CROSBIE ANNOUNCES 1991 ATLANTIC SALMON MANAGEMENT PLAN

OTTAWA ... John C Crosbie, Minister of Fisheries and Oceans and Minister responsible for the Atlantic Canada Opportunities Agency, today released details of the 1991 Atlantic salmon management plan. The plan was developed following consultations with the Atlantic Salmon Advisory Board, provincial governments and user groups.

Commercial

- The Newfoundland commercial fishery will open June 5, 1991 with a 600-tonne quota. This represents a 67 tonne reduction in Salmon Fishing Areas (SFAs) 3, 4 and 13.
- To allow for a more equitable allocation of quota, SFAs 2 and 14 have been sub-divided as requested by industry.
- SFA 1 has been extended south to Fish Cove Point. The allowance concept will be maintained as this area includes Labrador communities which are highly dependent on the resource.
- As in previous years, there will be no commercial salmon fishery in the Maritime provinces in order to meet Atlantic salmon conservation goals.
- Options are being considered for the retirement of commercial salmon fishing licences.
- The existing moratorium on licence transfers remains in effect.

"The need to conserve and protect valuable Atlantic salmon stocks is crucial," said Mr Crosbie. "For this reason, we will review the commercial salmon fishery in Newfoundland and Labrador at mid-season and implement closures if necessary. In addition, other options may be considered such as further closures or quota reductions for future management plans". The Minister further added that, "in view of the fact that the retirement of commercial salmon licences in 1992 is being considered, the existing moratorium on licence transfers will remain in effect".

Aboriginal Food Fisheries

- Throughout the Atlantic provinces, consultations are ongoing to form agreements to ensure food fishery rights for aboriginal communities. In many instances, Atlantic salmon is the primary species involved in these consultations.
- In Newfoundland, the Conne River Micmac Band will be issued a licence for an Atlantic salmon food fishery permitting the harvest of up to 1200 salmon.

"Under the 1991 plan, the importance of fishing to aboriginal communities which have traditionally harvested the resource for their own consumption has been recognized," said Mr Crosbie. "Aboriginal food fisheries are the allocation priority after conservation. I have instructed my officials to continue discussions with aboriginal leaders. I encourage these consultations which ultimately are aimed at introducing cooperative management measures".

Recreational

- In Newfoundland and Labrador, seasonal bag limits have been reduced from 15 to 10. This reduction reflects the existing limits in other Maritime provinces. Daily bag limits remain unchanged.
- In the Maritime provinces, recreational fisheries have been given greater recognition, after aboriginal food fisheries, based on their significant economic potential.
- Under the 1991 management plan, an allocation of 100 salmon has been set for a recreational fishery on the Conne River. If returns are higher or lower than estimates, allocations will be adjusted accordingly during a mid-season review which will take place in late June.

Previously established recreational salmon fishing seasons in the Maritime provinces have been retained as well as in Newfoundland and Labrador, allowing for minor adjustments where stock conditions permit.

Conservation and Protection

- A toll-free telephone number once again will allow Atlantic Canadians to report suspected salmon poaching.
- Salmon enhancement programs will continue to help rebuild Atlantic salmon stocks. In particular, projects to rebuild salmon stocks in rivers such as the Humber are presently being reviewed.

"Individuals will pay a heavy price for ignoring salmon fishing regulations, specifically those who take salmon with unlicensed gear. Those who choose to harm the resource through illegal fishing activity will be charged and prosecuted to the full extent of the law," stressed the Minister.

The zonal/river management system will be maintained in order to ensure that specific management issues are addressed on an individual basis.

Canada will continue its active role within the North Atlantic Salmon Conservation Organization (NASCO) to ensure that Canadian efforts to restore the salmon stocks are not undermined by overfishing outside Canadian waters.

"I am committed to rebuilding Atlantic salmon stocks," said Mr Crosbie. "Conservation will remain the overriding priority in managing this fishery for all those in Atlantic Canada who benefit from the resource".

For information:

Berkley Slade
Fisheries and Oceans
Newfoundland Region
(709)772-2643

Greg Stevens
Fisheries and Oceans
Scotia-Fundy Region
(902)426-5433

Rhéal Vienneau
Fisheries and Oceans
Gulf Region
(506)851-7790

Mike Calcutt
Fisheries and Oceans
Ottawa, Ontario
(613)990-0107

Backgrounder
Fiche d'Information

1991 ATLANTIC SALMON MANAGEMENT PLAN HIGHLIGHTS

Commercial Quotas

Quotas for the 1991 Newfoundland and Labrador commercial salmon fishery have been set as follows:

Salmon Fishing Area (SFA)	Quota (t)	Allowance (t)
1	--	80
2a and 2b	200	--
3	120	
4	78	
5	25	
6	20	
7	15	
8	10	
9	7	
10	25	
11	25	
12	closed	
13	25	
14a and 14b	50	
Total	**600t**	**80t**

Recreational Bag Limits

Bag limits for the 1991 Atlantic salmon recreational fishery have been set as follows:

	NB	NS	PEI	Nfld and Labrador
Season	10	10	5	10
Possession	6	6	1	2 day limit
Daily	2	2	1	2

May 24, 1991

Scientific Excellence - Resource Protection & Conservation
Benefits for Canadians

1991 ATLANTIC SALMON MANAGEMENT PLAN

Guiding Principles and Major Elements

The 1991 Atlantic Salmon Management Plan is guided by the principles adopted by the Department of Fisheries and Oceans through consultations with the Atlantic Salmon Advisory Board and the provincial governments. It incorporates the three Regional Atlantic Salmon Management Plans which are developed in consultation with Regional zone representations from interested associations and organizations.

In the province of Quebec, the provincial government administers management plans for the salmon stocks in that province.

OBJECTIVES

The main objectives of the 1989-1993 management strategy are to ensure that target spawning requirements are met in the Maritime provinces, and that spawning levels increase in insular Newfoundland rivers.

PRINCIPLES

1. Conservation of Atlantic salmon stocks remains the overriding priority in the management of this fishery. This priority includes measures aimed specifically at the large salmon component in order to increase spawning escapement.

2. The importance of fishing to aboriginal communities is recognized and is given first priority after conservation. It is DFO policy to respect and honour the aboriginal right to fish for food, social and ceremonial purposes.

3. The Atlantic salmon fishery will be managed so as to distribute the benefits most effectively among the largest number of Canadians.

4. In the Maritime provinces, the importance of the recreational fishery is given greater recognition based on the relatively larger potential benefits to be generated. In Newfoundland and Labrador, the commercial fishery has traditionally been of greater importance. However, the recreational fishery offers considerable potential for economic benefits.

5. Allocation of Atlantic salmon stocks will be made by Management Zones and/or river system and according to interests and/or dependence of user groups and that of industries and communities deriving benefit from the harvestable resource.

6. Interception of migrating salmon in mixed-stock fisheries will be minimized where practical and feasible, by adjusting seasons, gear and fishing area and the introduction of quotas.

7. Incidental catches of Atlantic salmon by commercial fishermen will be minimized by adjusting seasons, gear and area of fishing, and the retention of salmon caught under these circumstances will be illegal.

8. Access to Atlantic salmon stocks for commercial and recreational fisheries will be regulated by all or a combination of the following: seasons, quotas, gear and licensing restrictions. The Aboriginal Food Fishery will be governed by DFO's National Policies on management and enforcement for the Aboriginal People's Food Fishery.

9. Atlantic salmon enhancement plans will be developed in concert with Atlantic Salmon Management Plans.

10. Atlantic salmon habitat will be protected and improved to allow for maximum stock production.

11. The practice of tagging salmon catches will be maintained.

MAJOR ELEMENTS

1. In 1991, the Department of Fisheries and Oceans will continue zonal/river management in selected areas. This approach will be expanded to other areas of the Atlantic Provinces if evaluations of this management scheme reveal positive results.

2. In 1991, quotas for the commercial fishery in Newfoundland and Labrador will be as follows:

Salmon Fishing Areas	**Quotas (mt)**	**Allowance (mt)**
1	--	80
2A, 2B	200*	
3	120	
4	78	
5	25	
6	20	
7	15	
8	10	
9	7	
10	25	
11	25	
12	Closed	
13	25	
14A, 14B	50*	
TOTAL	**600**	**80**

* Quotas in SFA 2 and 14 will be further allocated to their respective sub-areas A and B, on the basis of average landings which have taken place in these areas during the past five years.

3. The 1991 commercial fishing season for the province of Newfoundland and Labrador will commence on June 5, 1991. As was the case in 1990, restrictions will be put in place in 1991 to prohibit commercial salmon fishing in some inner bays and estuaries of Newfoundland. These measures will allow for additional escapement to occur.

4. Only full-time fishermen will be eligible to hold salmon licences. In the future, fishermen who may be down-graded to the part-time categorization will have to regain their full-time categorization within two years in order to retain their eligibility to their salmon licence. During this two-year period, fishermen down-graded to part-time will be eligible to hold their salmon licence.

5. The commercial salmon fisheries in the Maritime Provinces will remain closed.

6. There will be no new commercial salmon fishing licences issued on an Atlantic-wide basis.

7. Transfers of commercial fishing licences will not be permitted in the Maritime Provinces and in Newfoundland and Labrador in 1991.

8. Only the retention of grilse will be permitted in the recreational fisheries for the provinces of New Brunswick, PEI, Nova Scotia and Newfoundland (excluding Labrador). All multi-sea winter salmon (63cm and greater in length) hooked by anglers will be required to be released immediately with the least possible harm to the fish. The Province of Quebec will maintain this restriction for the bordering rivers within the Restigouche system as has been done since 1984.

9. Recreational fishing seasons in all Atlantic Provinces may be adjusted where stock conditions permit.

10. The seasonal bag limits along with the possession and daily limits in Nova Scotia and New Brunswick will be maintained at 10, 6 and 2 respectively which will be required to be grilse. In PEI, the bag limits will remain at 5, 1, 1. In Newfoundland and Labrador, the bag limits will be set at 10 for the season and 2 per day; the possession limit will remain at twice the daily catch limit.

11. The daily and seasonal salmon bag limits do not include any salmon that are hooked and subsequently released. However, on a daily basis, fishermen must stop fishing for salmon once they have retained the daily limit or have released a maximum number of fish equal to twice the daily bag limit.

12. During 1991, the tagging systems will be maintained in the Atlantic Provinces for all fisheries.

13. It will be illegal to retain, or be in possession of, salmon captured incidentally in non-salmon commercial gear. The Department of Fisheries and Oceans will review its priorities for inland and coastal enforcement to restrain any increase in poaching activity and to monitor other commercial fisheries which may be susceptible to incidental catches of Atlantic salmon. Innovative low cost and efficient enforcement activities are encouraged. Interest groups will be asked to assist enforcement personnel in this regard.

14. Ongoing consultations with aboriginal communities will continue throughout Atlantic Canada with the objective of arriving at mutually acceptable plans for the exercise and management of the aboriginal people's food fishery.

    Consultations will also be aimed towards determining the overall role and participation to be given to aboriginal communities in the management and enforcement of the Atlantic Salmon fishery.

15. During 1991, salmon enhancement activities will continue to be discussed with Provinces and user groups in the context of available funding.

16. The Department of Fisheries and Oceans maintains its commitment to cooperate within the North Atlantic Salmon Conservation Organization (NASCO). Specifically, Canada will push for further reductions in the West Greenland interceptions of Canadian origin salmon, seek implementation of measures at NASCO which will require the reporting of all Atlantic salmon harvests and work within NASCO for the elimination of high seas interceptions of Atlantic salmon.

ANNEX 11

NORTH AMERICAN COMMISSION

PAPER NAC(91)15

QUOTA PROPOSAL FOR 1991

The USA proposes that catch quotas be set for the 1991 fishery in Labrador - Newfoundland to address interceptions of USA origin salmon. An allowance of 80 tonnes is proposed for Northern Labrador (SFA1), and quotas of 200 tonnes for Southern Labrador (SFA2a and 2b), 120 tonnes for SFA3, 78 tonnes for SFA4, 25 tonnes for SFA5, and 20 tonnes for SFA6.

ANNEX 12

COUNCIL

PAPER CNL(91)44

DRAFT DECISION OF THE COUNCIL TO REQUEST SCIENTIFIC ADVICE FROM ICES

1. With respect to Atlantic salmon in each Commission area, where relevant:

   (a) Describe the events of the 1991 fisheries with respect to catches, gear, effort, composition and origin of the catch (including escapees and sea ranched fish), and rates of exploitation;
   (b) Describe the status of the stocks occurring in the Commission area;
   (c) Begin a time series of aggregate estimates of all unreported catches, including those taken in international waters (the latter should be provided separately);
   (d) Specify data deficiencies and research needs.

2. With respect to the West Greenland Commission, propose and evaluate methods to estimate:

   (a) abundance of salmon in the area of the fishery at the time it operates;
   (b) total abundance of stocks exploited by the fishery wherever they are;
   (c) possible catch levels based upon maintaining adequate spawning biomass;
   (d) some index based on the rivers which make a major contribution to the West Greenland fishery.

3. Evaluate the following management measures on the stocks and fisheries occurring in the respective Commission areas:

   (a) regulations introduced into the Norwegian salmon fisheries in 1989;
   (b) quota management measures taken in 1990 and 1991 in the Newfoundland and Labrador commercial salmon fisheries.

4. With respect to Atlantic salmon in the North-East Atlantic Commission and West Greenland Commission areas, provide an inventory of parasites and diseases of wild and reared salmon by country.

5. With respect to Atlantic salmon in the West Greenland Commission area, evaluate the effects which management of the West Greenland fishery has had on stocks in homewaters.

6. With respect to Atlantic salmon in NASCO area, provide a compilation of microtag, finclip, and external tag releases by ICES Member Countries in 1991.

NORTH AMERICAN COMMISSION

PAPER NAC(91)3

NASCO TAG RETURN INCENTIVE SCHEME

1991 PRIZES

The draw for the 10 winners in the North American Commission was made by the Auditor at NASCO Headquarters on 4 June 1991. At the Eighth Annual Meeting of the Commission in Edinburgh, the Chairman of the Commission, Dr Gaby Ward announced the winners:

First prize - $1500 - Miss Tina Dunnett, Box 657, Newcastle, New Brunswick

Second prize - $1000 - Wilbert Munn, P O Box 156, Boiestown, New Brunswick

Third prize - $500 - J Gilbert, 16 Crescent Street, Brewer, Maine

Fourth prizes - $100

- Wallace Campbell, Charlottetown, Labrador
- Chesley Price, 97 Brookfield Avenue, Corner Brook, Newfoundland
- Micheline Fradette, 351 Boulay, Matane, Quebec
- Ronald LeBlond, c/o Edmunston R E Ltd, 36 Court Street, Edmunston, New Brunswick
- Elihu Bloodsworth, RR#3, Nackawic, Meductic, New Brunswick
- Mike Crosby, 23 Glen Drive, Halifax, Nova Scotia
- Keith Woolaver, 85 Murray Avenue 11, Fredericton, New Brunswick

The Commission offers its congratulations to the winners.

ANNEX 14

NORTH AMERICAN COMMISSION

PAPER NAC(91)4

SALMON FISHERIES ON ST PIERRE ET MIQUELON

NAC9(91)4

SALMON FISHERIES ON ST PIERRE ET MIQUELON

1. At its Seventh Annual Meeting the Commission considered a paper presenting details of the Laws and Regulations governing salmon fisheries in St Pierre et Miquelon together with details of catches and details of the possibility of developing aquaculture on the islands. The Commission requested that the Secretary pursue efforts to obtain detailed information regarding these fisheries.

2. In accordance with this request I contact the Ministere de la Mer in Paris requesting detailed information on the fisheries according to the format agreed by the Working Group (CM 1988/Asses:16 and CM 1988/M:4). I have so far received details of the official catch for 1990 which is as follows:

Number	Weight (tonnes)
884	1.889

A total of 53 licences were issued, 13 to professional fishermen and 40 to recreational fishermen.

3. The official time series of catches obtained to date is therefore as follows:

	Number	Weight (tonnes)
1987	442	0.984
1988	813	2.084
1989	971	2.590
1990	884	1.889

Secretary
Edinburgh
7 June 1991

ANNEX 15

LIST OF NORTH AMERICAN COMMISSION PAPERS

PAPER NO.	TITLE
NAC(91)1	Provisional Agenda
NAC(91)2	Draft Agenda
NAC(91)3	NASCO Tag Return Incentive Scheme, 1991 Prizes
NAC(91)4	Salmon Fisheries on St Pierre et Miquelon
NAC(91)5	Report of the Activities in 1990/91 of the NAC Working Group on Salmonid Introductions and Transfers
NAC(91)6	Summary of Salmonid Introductions and Transfers in Eastern North America 1986-1990
NAC(91)7	Canadian Atlantic Salmon Catches
NAC(91)8	CAFSAC Report - Status of Atlantic Salmon Stocks
NAC(91)9	1991 Atlantic Salmon Management Plan
NAC(91)10	Status of Atlantic Salmon Stocks in the United States of America in 1990
NAC(91)11	Proposed Questions by North American Commission (NASCO) to the Air Quality Committee, Established under the Canada/US Air Quality Agreement
NAC(91)12	Not Issued
NAC(91)13	Figures used by the Chairman of ACFM in the Presentation to the Commission
NAC(91)14	Clearing the Air
NAC(91)15	Quota Proposal for 1991
NAC(91)16	Draft Report of the Eighth Annual Meeting
NAC(91)17	Agenda
NAC(91)18	Report of the Eighth Annual Meeting
CNL(91)11	Report of the ICES Advisory Committee on Fisheries Management (Section 4)
CNL(91)44	Draft Decision of the Council to Request Scientific Advice from ICES

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

REPORT OF THE

EIGHTH ANNUAL MEETING

OF THE

NORTH-EAST ATLANTIC COMMISSION

11-14 JUNE 1991

EDINBURGH, UK

CHAIRMAN:	MR HENRIK SCHMIEGELOW (EEC)
VICE-CHAIRMAN:	MR PEKKA NISKANEN (FINLAND)
RAPPORTEURS:	MR GEORG RIEBER-MOHN (NORWAY) MR RUNE BILDENG (NORWAY)
SECRETARY:	DR MALCOLM WINDSOR

NEA(91)8

CONTENTS

NEA(91)8

REPORT OF THE EIGHTH ANNUAL MEETING OF THE NORTH-EAST ATLANTIC COMMISSION OF THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 11-14 JUNE 1991, SHERATON HOTEL, EDINBURGH, UK

1. OPENING OF THE MEETING

1.1 The Eighth Annual Meeting of the North-East Atlantic Commission was opened by the Chairman, Mr Henrik Schmiegelow (EEC), who welcomed the delegates to Edinburgh and referred to the excellent work of the previous Chairman, Mr Stefan de Maré (Sweden).

1.2 A list of participants is given in Annex 1.

2. ADOPTION OF THE AGENDA

2.1 The Commission adopted its agenda, NEA(91)7, (Annex 2).

3. NOMINATION OF A RAPPORTEUR

3.1 The Commission nominated Mr Georg Rieber-Mohn (Norway) and Mr Rune Bildeng (Norway) as rapporteurs for the meeting.

4. REVIEW OF THE 1990 FISHERY

4.1 The Commission reviewed the 1990 fishery in the Faroe Islands which had been described in detail in the ACFM report from ICES. The catch in 1990 amounted to 312 tonnes which was well within the quota agreed by the Commission in 1989.

5. ACFM REPORT FROM ICES ON SALMON STOCKS

5.1 The Chairman of the ACFM, Dr Fredric Serchuk, presented the scientific advice from ICES relevant to the North-East Atlantic Commission, CNL(91)11, (Annex 3) prepared in response to a request from the Commission at the Seventh Annual Meeting.

5.2 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to the importance of information on stock size in formulating regulatory measures and asked if any trends in the status of the stocks in the North-East Atlantic Commission area were evident. The Chairman of the ACFM advised that a major shortcoming was the lack of target stock levels which made it difficult to evaluate changes. The representative of Iceland asked for clarification of the reasons for the change in river age of fish occurring in the Faroese fishery. The representative of the ACFM advised that changes in river age could be due to changes in the composition of the stocks or the occurrence of farm fish in the fishery.

6. EFFECT OF ESCAPEES OF FARMED SALMON ON SALMON STOCKS

6.1 The Chairman of the ACFM advised the Commission that a preliminary examination of samples collected at the Faroe Islands indicated that the contribution of farmed fish to the fishery may be substantial. Information from homewaters indicated that the greatest proportions of farm fish were found in the catches in Norway, Scotland and Iceland. In view of the trends in fish farm production he advised that further monitoring is necessary.

6.2 The representative of Denmark (in respect of the Faroe Islands and Greenland) expressed concern that large numbers of farmed fish in the wild must have caused a problem for the wild stocks. The representative of Norway explained that the escape of farmed fish was a problem both for river managers and for the salmon farmers and outlined measures being taken in Norway to address the problem. These include strict provisions concerning the anchoring and structure of net pens, improved training for fish farm personnel, improved maintenance procedures, inspection programmes for sea-cages in exposed sites and efforts to catch fish which have escaped. The representative of Norway also referred to the scientific assessments being undertaken in Norway to assess the contribution of farmed salmon to the catches and spawning stocks and the possible impacts on wild stocks.

6.3 The representative of Finland expressed concern about Norwegian farming operations in the vicinity of the Tana and Neiden rivers. The Norwegian representative explained that the local authorities intended to withdraw permission for these farms to operate but the legal process had not been concluded to date.

7. IMPACTS OF ACID RAIN ON ATLANTIC SALMON

7.1 The Chairman of the ACFM advised the Commission that no new information had been developed on this issue since the report to the Commission in 1989, as no further questions had been posed by NASCO.

7.2 The representative of Finland expressed concern that the acidity of some northern rivers was increasing as a result of industrial emissions from the Kola Peninsula. Cooperative efforts between the USSR and Finland to reduce these emissions by renewing industry has begun but the undertaking will be of a long term nature.

7.3 The representative of Sweden noted that there had been some improvements in conditions as a result of reductions in levels of acidic substances and at a later date it would be useful for ICES to undertake a further assessment of losses due to acidification. He considered that this issue would require long-term monitoring by the Commission and should therefore be a permanent agenda item.

7.4 The representative of Norway advised the Commission that acidification was a serious problem both in general and for the Atlantic salmon in Norway. There is evidence that the problem is expanding on the West Coast and Norway has invested considerably in research and liming.

7.5 The representative of Denmark (in respect of the Faroe Islands and Greenland) suggested that a broader agenda item in line with Article 9(c) of the Convention might be more appropriate than specific agenda items.

7.6 The Commission agreed to examine this question at its next annual meeting.

8. REGULATORY MEASURES

8.1 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to the provisions of Article 9 of the Convention and stated that nothing in the report from ICES indicated any need for a change in the present regulatory measures.

8.2 The representative of Norway referred to the severe measures introduced in the salmon fishery in Norway in 1989 and commented that these measures should be reflected in a reduction in the Faroese quota for the coming years. The representative of the EEC noted that although the ACFM report did not include specific recommendations there is a pattern of low catches in Community waters and in the Faroes. The 1989 smolt class experienced high mortality and he stressed the need for caution and therefore for a reduction in the quota or other measures to reduce the catch.

8.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) pointed out that the regulatory measure adopted in 1989 took account of the restrictions in the fisheries of an important state of origin. He commented that the Norwegian catch had only declined by about 100 tonnes from the level in the year before the measures were introduced despite the closure of the drift net fishery, and questioned the severity of the measures. The representative of Norway responded by referring to the contribution of farmed fish in the catch which had increased in recent years and may now account for up to 35% of the catch. He cautioned against comparing recent catches with only one year's data from before the measures were introduced.

8.4 The Commission considered a proposal, NEA(91)6, (Annex 4) from the Chairman for a regulatory measure for fishing of salmon in the Faroe Islands for the calendar year 1992. All parties found the proposal acceptable and it was therefore adopted by the Commission.

9. FISHING FOR SALMON IN INTERNATIONAL WATERS BY NON-CONTRACTING PARTIES

9.1 The Chairman referred to the deliberations on this issue in the Council. The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to the fact that this fishery had probably been substantial and requested that ICES take this fishery into account in assessing unreported catches. The representative of Norway noted that there were some indications of the size of the catch from this fishery in earlier years and supported the need to try to assess the scale of the catches in future years.

10. RECOMMENDATIONS TO THE COUNCIL ON SCIENTIFIC RESEARCH

10.1 The Commission reviewed and accepted the relevant sections of paper CNL(91)44, (Annex 5) and agreed to recommend it to the Council as part of the annual request for scientific advice to ICES.

11. REPORT ON NASCO TAG RETURN INCENTIVE SCHEME AND ANNOUNCEMENT OF AWARDS

11.1 The Chairman announced that the draw for the prizes in the Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 4 June 1991. The winner of the first prize was Mr K Massie, Montrose, Scotland. A list of all prize winners was presented to the Commission, NEA(91)3, (Annex 6). The Commission offered its congratulations to all of the winners.

12. OTHER BUSINESS

13. DATE AND PLACE OF NEXT MEETING

13.1 The Commission agreed to hold its next meeting during the Ninth Annual Meeting of the Council, 8-12 June 1992 in Washington, USA.

14. CONSIDERATION OF THE DRAFT REPORT OF THE MEETING

14.1 The Commission agreed the draft report of the meeting.

ANNEX 1

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
EIGHTH ANNUAL MEETING OF THE WEST GREENLAND COMMISSION
11-14 JUNE 1991, EDINBURGH, UK

LIST OF PARTICIPANTS

* Denotes Head of Delegation

MEMBERS OF THE COMMISSION

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*MR KJARTAN HOYDAL	Representative Faroese Home Government, Torshavn, Faroe Islands
MR EINAR LEMCHE	Representative Greenland Home Rule, Copenhagen
MR HJALTI I JAKUPSSTOVU	Fisheries Research Institute, Torshavn, Faroe Islands
MR JENS MOELLER JENSEN	Greenland Fisheries Research Institute, Copenhagen
MR JOHN PETERSEN	Minister of Fisheries, Torshavn, Faroe Islands
MR SOFUS POULSEN	Faroese Commercial Attaché, Aberdeen

EEC

*MR HENRIK SCHMIEGELOW	Representative Directorate-General of Fisheries, EC Commission, Brussels
MR HARRY KOSTER	Representative Directorate-General of Fisheries, EC Commission, Brussels
MR ANDREW THOMSON	Representative Directorate-General for External Relations, EC Commission, Brussels
MR LUIS T DA COSTA	Secretariat of the Council of the European Communities, Brussels

MR JOHN CARBERY	Secretariat of the Council of the European Communities, Brussels
MS NICOLE P F BOLLEN	Ministry of Agriculture & Fisheries, Netherlands
DR TONY BURNE	Ministry of Agriculture, Fisheries and Food, London
MR J CALVERA	Agriculture, Fisheries & Food Attaché, Spanish Embassy, London
MR RONAN CORVIN	Representation of Ireland to EC, Brussels
MR DAVID DUNKLEY	Scottish Office Agriculture & Fisheries Department, Montrose
MRS PAM JARVIS	Ministry of Agriculture & Fisheries, London
MR JESPER KAAE	Danish Embassy, London
MR TOM KELLY	Scottish Office Agriculture & Fisheries Department, Edinburgh
MR JOHN KEOHANE	Department of the Marine, Dublin
MR CHRISTIAN LE GROS	Ministère de la Mer, Paris
MR CHARLES MCCALL	Ministry of Agriculture, Fisheries and Food, London
DR KEVIN O'GRADY	National Rivers Authority, London
MR TED POTTER	Ministry of Agriculture, Fisheries and Food, Lowestoft
MR WOLFGANG THOMAS	Bundesministerium fur Ernährung, Landwirtschaft und Foresten, Bonn
MR BOB WILLIAMSON	Scottish Office Agriculture & Fisheries Department, Edinburgh

FINLAND

*MR PEKKA NISKANEN	Representative Ministry of Agriculture and Forestry, Helsinki
MR EERO NIEMELA	Representative Finnish Game and Fisheries Institute, Helsinki

ICELAND

*MR ARNI ISAKSSON	Representative Institute of Freshwater Fisheries, Reykjavik
MR ORRI VIGFUSSON	Association of Icelandic Fishing Clubs

NORWAY

*MR SVEIN MEHLI	Representative Directorate for Nature Management, Trondheim
MR OYVIND VASSHAUG	Representative Country Administration of Hordaland, Bergen
MR STEINAR HERMANSEN	Representative Ministry of the Environment, Oslo
MR RUNE BILDENG	Ministry of Fisheries, Oslo
DR LARS PETTER HANSEN	Norwegian Institute for Nature Research, Trondheim
MR KJELL HARVOLD	Ministry of the Environment, Oslo
MR MARIUS HAUGE	Fisheries Councillor, Norwegian Embassy, London
MR BJORNULF KRISTIANSEN	Norwegian Farmers Association, Oslo
MS ASTRID LANGVATN	Directorate for Nature Management, Trondheim
MR BORRE PETTERSEN	Norwegian Hunters and Anglers Organization
MR GEORG RIEBER MOHN	Regional Board of Salmon Fishery, Oslo
MR NIKOLAI SKEIE	Consul General of Norway, Edinburgh
MR TROND WOLD	Norske fiskeoppdretteres forening, Trondheim

SWEDEN

*MR GUNNAR HOERSTADIUS	Representative Ministry of Agriculture, Stockholm
DR INGEMAR OLSSON	Representative National Board of Fisheries, Goteborg

USSR

*DR GEORGY LUKA	Representative PINRO, Murmansk
MR G BOROVKOV	Representative Ministry of Fisheries, Moscow
MR KONSTANTIN BUDANOV	Representative Murmanrybvod, Murmansk

OBSERVERS - PARTIES

CANADA

DR GABY WARD	Representative Champlain College, Quebec
MR DAVID MEERBURG	Department of Fisheries and Oceans, Ottawa, Ontario

USA

DR VAUGHN ANTHONY	National Marine Fisheries Service, Woods Hole, Massachusetts
DR JENNIFER BAILEY	National Marine Fisheries Service, Maryland
DR KEVIN FRIEDLAND	National Marine Fisheries Service, Woods Hole, Massachusetts
MR GILBERT RADONSKI	Sport Fishing Institute, Washington DC
MR RICHARD ROE	National Marine Fisheries Service, Gloucester, Massachusetts
MR STETSON TINKHAM	Dept of State, Office of Fisheries Affairs, Washington DC

OBSERVERS - NON-PARTIES

ICES

DR EMORY ANDERSON	International Council for the Exploration of the Sea, Copenhagen

DR RICHARD GRAINGER	International Council for the Exploration of the Sea, Copenhagen
DR FREDRIC SERCHUK	National Marine Fisheries Service, Woods Hole, Massachusetts

SECRETARIAT

Secretary	DR MALCOLM WINDSOR
Assistant Secretary	DR PETER HUTCHINSON

ANNEX 2

NEA(91)7
EIGHTH ANNUAL MEETING OF THE NORTH-EAST ATLANTIC COMMISSION
11-14 JUNE 1991
SHERATON HOTEL, EDINBURGH, UK

AGENDA

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the 1990 Fishery
5. ACFM Report from ICES on Salmon Stocks
6. Effect of Escapees of Farmed Salmon on Salmon Stocks
7. Impacts of Acid Rain on Atlantic Salmon
8. Regulatory Measures
9. Fishing for Salmon in International Waters by Non-Contracting Parties
10. Recommendations to the Council on Scientific Research
11. Report on NASCO Tag Return Incentive Scheme and Announcement of Awards
12. Other Business
13. Date and Place of Next Meeting
14. Consideration of the Draft Report of the Meeting.

ANNEX 3

COUNCIL

PAPER CNL(91)11

REPORT OF THE ICES ADVISORY COMMITTEE ON FISHERY MANAGEMENT (SECTION 3)

3. INFORMATION OF INTEREST TO THE NORTH-EAST ATLANTIC COMMISSION

Source of Information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

3.1 Description of the Fishery in the North-East Atlantic

The gear used in the Faroes fishery is long lines. The numbers of licenses issued for the 1989/90 and 1990/91 seasons were 14 and 13, respectively; of these, 11 and 8, respectively, were used. This shows a continuing reduction in the number of vessels participating in the fishery from 1988/89, when 19 licenses were issued, 12 of which were used.

In the 1989/90 season, the licensed vessels were allowed to fish from 1 November to 20 December and 3 January to 12 April. No fishing took place outside the Faroes EEZ.

3.2 Catch at Faroes in the 1989/90 and 1990/91 Seasons

The total nominal catch in the 1989/90 season was 361 t. The catch for the calendar year 1990 was 312 t and the preliminary catch figure for the first half of the 1990/91 season (1 November - 20 December 1990) was 120 t.

Catch (t)

Year	Catch	Season	Catch
1985	566	84/85	598
1986	530	85/86	545
1987	576	86/87	539
1988	243	87/88	208
1989	364	88/89	309
1990	312	89/90	361

The discard rate was 9.4% during the 1989/90 season, which is within the range observed in the seasons 1982/83 to 1988/89.

3.3 Catch per Unit Effort in the Faroes Fishery

The catch in numbers per 1,000 hooks (CPUE) by statistical rectangle is shown for the whole 1989/90 season in Figure 5. The CPUE was high at the beginning of the season, decreased in January and February, but improved again for the remainder of

the season. In December, the highest CPUE was recorded close to the Islands, but as the season progressed, the best catch rates were recorded further to the north.

3.4 Biological Characteristics of the Catch at Faroes

As in previous years, the catch was predominantly 2SW salmon (92.8%), with small numbers of 1SW and 3SW and older fish.

The proportions of river age 1 and 2 fish have increased in the catch as the proportions of river age 3 and 4 fish have decreased. This may reflect changes in the stocks contributing to the fishery, including an increase in fish farm escapees.

3.5 Origin of Salmon in the Faroes Fishery

Microtagged salmon from the Faroe Islands have been recaptured predominantly as 2SW fish in the Faroes fishery. Recaptures from Ireland and UK (N. Ireland) have been mainly 1SW, many being in the discards. Recovery rates for tagging in the remainder of UK have been fairly evenly split between 1SW and MSW fish.

Of the 221 external tags recovered in 1990, 205 (93%) were of Norwegian origin. Tags were also recovered from Sweden (11) and Scotland (4); there was one tag of unknown origin.

3.6 Exploitation Rates in the Faroes Fishery

Extant exploitation rates on 2SW salmon from the Imsa (Norway) have generally been high (up to 50%), although there has been a fairly steady decrease from the 1982/83 season to 1989/90. The decrease in recent seasons probably reflects the lower total catches in the Faroes fishery and possibly the cessation of fishing outside the Faroes EEZ. However, there appears to have been a corresponding increase in the exploitation of 2SW salmon from the River Drammen.

Exploitation

Season	85/86	86/87	87/88	88/89	89/90
Drammen	30	3	6	36	45
Imsa (w)	38	13	5	3	5
Imsa (h)	30	28	21	10	15

New data have been provided on the River Lagan stock (Swedish west coast) showing that extant exploitation rates on 2SW salmon in the Faroes fishery have averaged about 10% in the last three seasons. Data from Ireland and all parts of the UK confirm that those countries are relatively minor contributors to the Faroes fishery with extant exploitation rates on both 1SW and 2SW fish being less than 1%, although rates on River North Esk salmon have been higher at some times in the past.

3.7 Effects of Fish Farm Escapees on Catches at Faroes

Experiments to investigate the migratory behaviour of farmed fish provide direct evidence that farmed fish contribute to the Faroes fishery. From a preliminary examination of samples collected from the fishery it appears the contribution of farm fish may be substantial.

3.8 Effects of Management Measures at Faroes

The Working Group assessed the operation of the management measures at Faroes. The nominal catch of 312 t in the Faroes fishery in 1990 was only 49% of the permitted maximum of 632.5 t.

No area closures were ordered because of the presence of undersized fish. ACFM again noted that area closures are unlikely to be an effective measure without extensive monitoring or the cooperation of fishermen.

In 1990, salmon fishing was permitted for 150 days for vessels over 50 GRT. Effort data are not available for the calendar year of 1990. A total of 532 sets was estimated to have been fished in the 1989/90 season. This is 33% of the total of 1600 permitted in both 1989 and 1990.

ACFM, therefore, concluded that, as effort had been well below that permitted, the catch had not been limited by the effort or quota measures agreed by NASCO.

3.9 Homewaters Fisheries

3.9.1 Catches

Total nominal catches by country are given in Table 1. In many countries there was a reduction in the proportion of 1SW salmon in the catch.

3.9.2 Exploitation rates

Exploitation rates in Ireland, Norway, Sweden and UK (Northern Ireland) were considerably lower than the averages for recent years, while estimates for one stock in Iceland and two in UK (England) were within the ranges previously observed. Exploitation on the River Burrishoole (Ireland) and River Bush (UK [Northern Ireland]) stocks in coastal fisheries decreased in 1990. This is partly attributed to reduced effort. The regulatory measures introduced in Norway in 1989 have resulted in a considerable decrease in the exploitation rate on Norwegian stocks. In the USSR, exploitation rates on most rivers were about 50% except for the Kola river, where all fisheries were removed, and the Keret and Varzuga rivers, where it was 25-30%.

Location (River)	Preliminary 1990 Exploitation (Average) 1SW	2SW	All Ages
Iceland (Ellidaar)	44(40)		
Ireland (Burrishoole)			54(76)
Norway (Drammen)	5(53)	40(50)	
Norway (Imsa, wild)	22(58)	42(78)	
Norway (Imsa, hatchery)	68(72)	68(85)	
Sweden (Lagan)	45(72)	22(49)	
UK, E & W (Itchen, net)			19(14)
UK, E & W (Itchen, rod)			49(47)
UK, E & W (Test, rod)			37(33)
UK, N. Ire. (Bush)	61(71)	38(45)	
UK, Scot. (N. Esk)	37(32)	37(34)	

3.9.3 Status of stocks

As no targets for stock production were available, ACFM considered that it could only assess the status of particular stocks on the basis of changes in production or survival at different life stages. Counts and estimates of wild smolt runs for five stocks showed wide variation and no clear trends between years. There was no evidence of common patterns between regions.

Adult salmon counts for seven rivers in the North-East Atlantic have been very variable with no apparent trends during this period and no clear common patterns between systems.

3.10 Effects of Fish Farm Escapees on Stocks and Catches in Homewaters

The greatest proportions of farm escapees were found in catches in Norway, Scotland and Iceland. (In Iceland there were also substantial numbers of ranched fish). The estimated proportion of farmed fish in samples from Icelandic rivers varied between 9.6% and 25.2%, whereas the proportion of ranched fish was estimated at between 16.1% and 36.1%. The proportion of both ranched and farmed salmon in the catches tended to increase towards the end of the fishing season.

The estimates of farmed fish in Norwegian marine fisheries were highly variable among sites. Catches in outer coastal fisheries (16-64%) contained a higher proportion of farmed fish during the fishing season than did catches at fisheries in fjord areas (6-36%). The incidence of farmed fish was much lower in samples taken in freshwater during the angling season than in samples taken during the autumn after the angling season had finished. The reason for this is that farmed fish enter the fjords and the rivers later in the season than wild fish.

3.11 Effects of Regulations Introduced in Norwegian Salmon Fisheries in 1989

The impact of the measures on catches in Norwegian homewaters in 1989 and 1990 is shown below.

Catch (t)

	1986	1987	1988	1989	1990
Drift	795	552	527	0	0
Other	497	461	314	488	504
Freshwater	306	372	235	417	404
Proportion in freshwater	.19	.27	.22	.46	.44

It is likely that the ban on drift netting in 1989 has resulted in a larger number of salmon being available to the other marine homewater fisheries. The additional regulation of these fisheries has probably resulted in a substantial increase in freshwater escapement as suggested by increased catches in freshwater. In 1989 and 1990, freshwater catch increased by 35% over the average catch for 1982-88 and accounted for 45% of the total nominal catch compared to 21% in the period 1982-88. Increased freshwater escapement is also suggested by the reduction in marine exploitation rates on most components of the River Imsa salmon stock. This was not the case for salmon of the River Drammen stock, however, because drift net exploitation on this stock has always been low.

The salmon fishery on the west coast of Norway intercepts stocks from the USSR, Finland and the Swedish west coast on their return to their home rivers. Exploitation on 1SW fish tagged as smolts on the River Lagan (Sweden) was lower in 1989 and 1990 (average 2%) than in 1985-88 (average 7%). This suggests that the management measures introduced in Norway in 1989 also affected Swedish west coast stocks.

The frequency of net-marked salmon entering a river may also give information about changes in netting effort on the migration route. The proportion of net-marked salmon recorded in samples of river fisheries in 1990 was much lower than the unweighted means during the period 1978-88. The reduced proportion of net-marked fish may be accounted for by the management measures introduced in the Norwegian homewater fishery in 1989.

Table 1 Nominal catch of Salmon by Country (in tonnes round fresh weight), 1960-1990

Year	Canada[5]	Denmark	Faroes	Finland	France	East Green-Land	West Green-Land	Iceland	Ireland[2]	Norway[4]
1960	1,636	-	-	-	75	-	60	100	743	1,659
1961	1,583	-	-	-	75	-	127	127	707	1,533
1962	1,719	-	-	-	75	-	244	125	1,459	1,935
1963	1,861	-	-	-	75	-	466	145	1,458	1,786
1964	2,069	-	-	-	75	-	1,539	135	1,617	2,147
1965	2,116	-	-	-	75	-	861	133	1,457	2,000
1966	2,369	-	-	-	75	-	1,370	106	1,238	1,791
1967	2,863	-	-	-	75	-	1,601	146	1,463	1,980
1968	2,111	-	5	-	75	-	1,127	162	1,413	1,514
1969	2,202	-	7	-	75	-	2,210	133	1,730	1,383
1970	2,323	-	12	-	75	-	2,146	195	1,787	1,171
1971	1,992	-	-	-	75	-	2,689	204	1,639	1,207
1972	1,759	-	9	32	34	-	2,113	250	1,804	1,568
1973	2,434	-	28	50	12	-	2,341	256	1,930	1,726
1974	2,539	-	20	76	13	-	1,917	225	2,128	1,633
1975	2,485	-	28	76	25	-	2,030	266	2,216	1,537
1976	2,506	-	40	66	9	<1	1,175	225	1,561	1,530
1977	2,545	-	40	59	19	6	1,420	230	1,372	1,488
1978	1,545	-	37	37	20	8	984	291	1,230	1,050
1979	1,287	-	119	26	10	<1	1,395	225	1,097	1,831
1980	2,680	-	536	34	30	<1	1,194	249	947	1,830
1981	2,437	-	1,025	44	20	<1	1,264	163	685	1,656
1982	1,798	-	865	54	20	<1	1,077	147	993	1,348
1983	1,424	-	678	57	16	<1	310	198	1,656	1,550
1984	1,112	-	628	44	25	<1	297	159	829	1,623
1985	1,133	-	566	49	22	7	864	217	1,595	1,561
1986	1,559	-	530	38	28	19	960	310	1,730	1,598
1987	1,784	-	576	49	27	<1	966	222	1,239	1,385
1988	1,311	-	243	34	32	4	893	396	1,874	1,076
1989	1,139	-	364	52	14	<1	337	278	1,079	905
1990[1]	870	13	312	59	15	<1	227	421	442	908

1 Provisonal figures.
2 Catch on River Foyle allocated 50% Ireland and 50% Northern Ireland.
3 Not including angling catch (mainly grilse).
4 Before 1966, sea trout and sea charr included (5% total).
5 Includes estimates of some local sales and by-catch.
6 Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.

cont'd.

Table 1 cont'd.

Year	St-Pierre and Miquelon	Sweden (West Coast)	UK England + Wales	UK Scotland	UK Northern Ireland[23]	USA	USSR	Others[6]	TOTAL
1960	-	40	283	1,443	139	1	1,100	-	7,279
1961	-	27	232	1,185	132	1	790	-	6,519
1962	-	45	318	1,738	356	1	710	-	8,725
1963	-	23	325	1,725	306	1	480	-	8,651
1964	-	36	307	1,907	377	1	590	-	10,800
1965	-	40	320	1,593	281	1	590	-	9,467
1966	-	36	387	1,595	287	1	570	-	9,825
1967	-	25	420	2,117	449	1	883	-	12,023
1968	-	20	282	1,578	312	1	827	403	9,830
1969	-	22	377	1,955	267	1	360	893	11,615
1970	-	20	527	1,392	297	1	448	922	11,316
1971	-	18	426	1,421	234	1	417	471	10,794
1972	-	18	442	1,727	210	1	462	486	10,925
1973	-	23	450	2,006	182	2.7	772	533	12,746
1974	-	32	383	1,708	184	0.9	709	373	11,941
1975	-	26	447	1,621	164	1.7	811	475	12,209
1976	2.5	20	208	1,019	113	0.8	772	289	9,537
1977	-	10	345	1,160	110	2.4	497	192	9,495
1978	-	10	349	1,323	148	4.1	476	138	7,650
1979	-	12	261	1,076	99	2.5	455	193	8,090
1980	-	17	360	1,134	122	5.5	664	277	10,081
1981	-	26	493	1,233	101	6.0	463	313	9,930
1982	-	25	286	1,092	132	6.4	364	437	8,645
1983	3	28	429	1,221	187	1.3	507	466	8,732
1984	3	40	345	1,013	78	2.2	593	101	6,893
1985	3	45	361	913	98	2.1	659	-	8,095
1986	2.5	54	430	1,271	109	1.9	608	-	9,249
1987	2	47	302	922	56	1.2	564	-	8,142
1988	2	40	395	882	114	0.9	419	-	7,716
1989	2	29	296	895	142	1.7	359	-	5,894
1990[1]	1	33	297	543	94	2.4	316	-	4,554

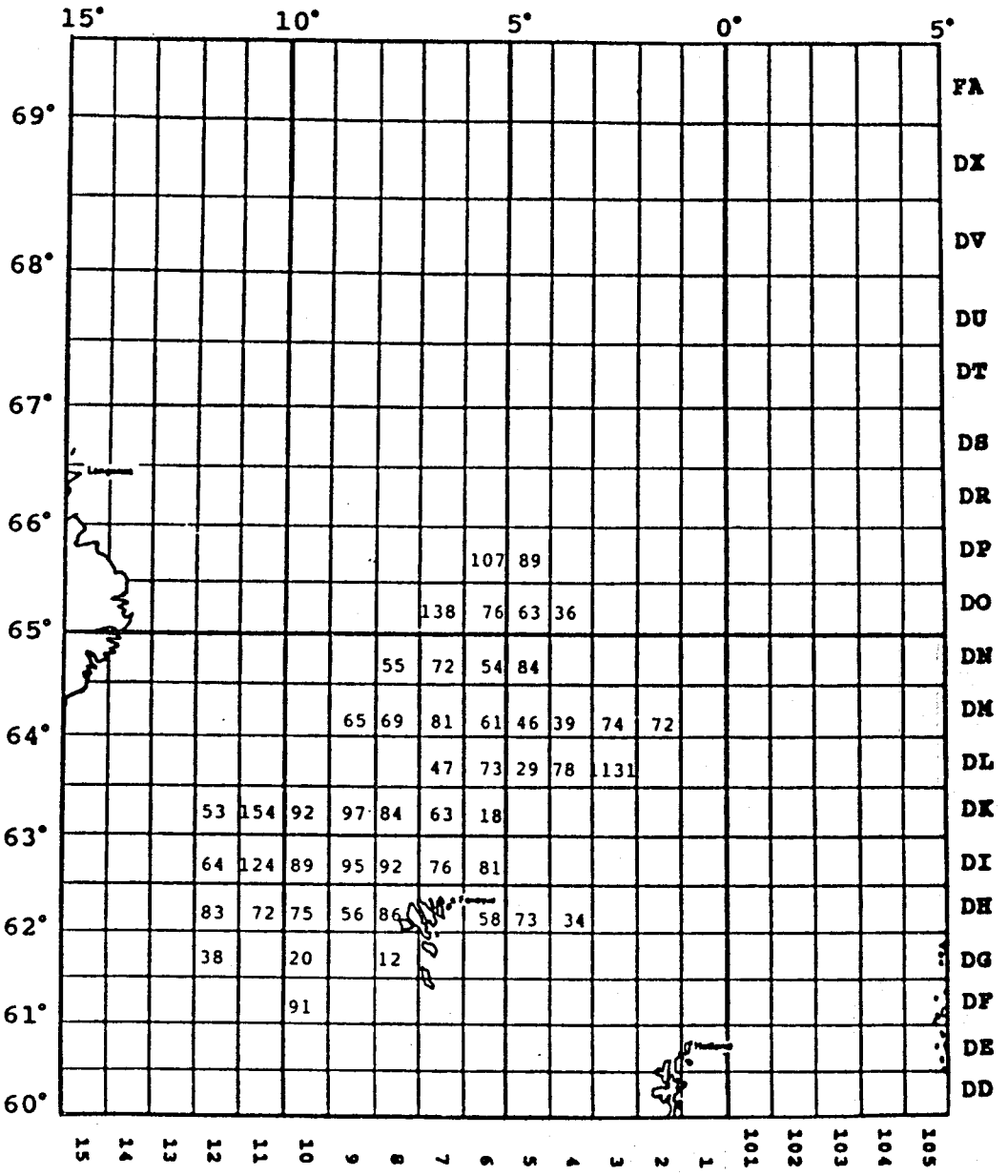


Figure 5 Catch per unit effort (1000 hooks) by statistical rectangle from logbooks, 1989/1990 season.

ANNEX 4

NORTH-EAST-ATLANTIC COMMISSION

NEA(91)6

PROPOSAL BY THE CHAIR FOR A REGULATORY MEASURE FOR FISHING OF SALMON IN THE FAROE ISLANDS FOR THE CALENDAR YEAR 1992

The North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization

having regard to Article 8, subparagraph (b), recognising the need for regulatory measures in the Faroese fishery for the year 1992 decides that:

The Faroese catch shall be controlled in accordance with an effort limitation programme, set out in Appendix 1, for a period of one year.

The total nominal catch for the duration of the period shall not exceed 550 tonnes.

Appendix 1

The following regulatory measures for the fishing of salmon in the fisheries zone of the Faroe Islands for the year 1992 shall apply:

(1) Areas with salmon below the length of 60cm will be closed for salmon fishery at short notice, following the general rules for closing areas with undersized fish already in force in the Faroese fisheries zone;
(2) The number of boats licensed for salmon shall not exceed 15;
(3) The salmon fishing season will be limited to 150 days between 1 January and 15 April and 1 November and 31 December. The Faroese Authorities shall inform NASCO before 15 December 1991 of the fishing season for 1992;
(4) Subject to the maximum annual catch the total allowable number of fishing days for the salmon fishery in the Faroe Islands zone shall be set at 1200.

ANNEX 5

COUNCIL

PAPER CNL(91)44

DRAFT DECISION OF THE COUNCIL TO REQUEST SCIENTIFIC ADVICE FROM ICES

1. With respect to Atlantic salmon in each Commission area, where relevant:

   (a) Describe the events of the 1991 fisheries with respect to catches, gear, effort, composition and origin of the catch (including escapees and sea ranched fish), and rates of exploitation;
   (b) Describe the status of the stocks occurring in the Commission area;
   (c) Begin a time series of aggregate estimates of all unreported catches, including those taken in international waters (the latter should be provided separately);
   (d) Specify data deficiencies and research needs.

2. With respect to the West Greenland Commission, propose and evaluate methods to estimate:

   (a) abundance of salmon in the area of the fishery at the time it operates;
   (b) total abundance of stocks exploited by the fishery wherever they are;
   (c) possible catch levels based upon maintaining adequate spawning biomass;
   (d) some index based on the rivers which make a major contribution to the West Greenland fishery.

3. Evaluate the following management measures on the stocks and fisheries occurring in the respective Commission areas:

   (a) regulations introduced into the Norwegian salmon fisheries in 1989;
   (b) quota management measures taken in 1990 and 1991 in the Newfoundland and Labrador commercial salmon fisheries.

4. With respect to Atlantic salmon in the North-East Atlantic Commission and West Greenland Commission areas, provide an inventory of parasites and diseases of wild and reared salmon by country.

5. With respect to Atlantic salmon in the West Greenland Commission area, evaluate the effects which management of the West Greenland fishery has had on stocks in homewaters.

6. With respect to Atlantic salmon in NASCO area, provide a compilation of microtag, finclip, and external tag releases by ICES Member Countries in 1991.

ANNEX 6

NORTH-EAST ATLANTIC COMMISSION

PAPER NEA(91)3

NASCO TAG RETURN INCENTIVE SCHEME

1991 PRIZES

The draw for the 10 winners in the North-East Atlantic Commission was made by the Auditor at NASCO Headquarters on 4 June 1991. At the Eighth Annual Meeting of the Commission in Edinburgh, the Chairman of the Commission, Mr Henrik Schmiegelow announced the winners:

First prize - $1500 - K Massie, Timber Cottage, Rossie Braes, Ferryden, Montrose, UK

Second prize - $1000 - Remi Sorensen, FR-740 Hvannasund, Faroe Islands

Third prize - $500 - Jan Milen, Kaptensgatan 9, 30245 Halmstad, Sweden

Fourth prizes - $100

- J Ritchie, Woodston Villa, St Cyrus, by Montrose, UK

- Jasper Klakkstein, Kirkjubrekka, FR-700 Klaksvik, Faroe Islands

- K Jensen, 29 Viewfield Road, Aberdeen, UK

- Gustav Bjorkman, Rekekroken, 26300 Hoganas, Sweden

- W H Littlecott, 8 Meggeson Avenue, Townhill Park, Southampton, UK

- Heri Mellemgaard, Augustenborgs Landevej 77/A3, Ulkeböl, 6400 Sönderborg, Denmark

- Stig Lundin, Sydkrafts Fisherikontor, Box 92 312 22, Laholm, Sweden

The Commission offers its congratulations to the winners.

ANNEX 7

LIST OF NORTH-EAST ATLANTIC COMMISSION PAPERS

PAPER NO.	TITLE
NEA(91)1	Provisional Agenda
NEA(91)2	Draft Agenda
NEA(91)3	NASCO Tag Return Incentive Scheme, 1991 Prizes
NEA(91)4	Additional Figures used by the Chairman of ACFM in the Presentation to the Commission
NEA(91)5	Draft Report of the Eighth Annual Meeting of the North-East Atlantic Commission
NEA(91)6	Proposal by the Chair for a Regulatory Measure for Fishing of Salmon in the Faroe Islands for the Calendar Year 1992
NEA(91)7	Agenda
NEA(91)8	Report of the Eighth Annual Meeting of the North-East Atlantic Commission
CNL(91)11	Report of the ICES Advisory Committee on Fishery Management
CNL(91)44	Draft Decision of the Council to Request Scientific Advice from ICES

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

REPORT OF THE

EIGHTH ANNUAL MEETING

OF THE

WEST GREENLAND COMMISSION

11-14 JUNE 1991

EDINBURGH, UK

CHAIRMAN:	DR WILFRED CARTER (CANADA)
VICE-CHAIRMAN:	MR GILBERT RADONSKI (USA)
RAPPORTEUR:	DR JENNIFER BAILEY (USA)
SECRETARY:	DR MALCOLM WINDSOR

WGC(91)13

CONTENTS

WGC(91)13

REPORT OF THE EIGHTH ANNUAL MEETING OF THE WEST GREENLAND COMMISSION OF THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 11-14 JUNE 1991, SHERATON HOTEL, EDINBURGH, UK

1. OPENING OF THE MEETING

1.1 The Eighth Annual Meeting of the West Greenland Commission was opened by the Chairman, Dr Wilfred Carter (Canada), who welcomed delegates to Edinburgh.

1.2 A list of participants is given in Annex 1.

2. ADOPTION OF THE AGENDA

2.1 The Commission adopted its agenda, WGC(91)9, (Annex 2).

3. NOMINATION OF A RAPPORTEUR

3.1 The Commission nominated Dr Jennifer Bailey (USA) as rapporteur for the meeting.

4. REVIEW OF THE 1990 FISHERY AND ACFM REPORT FROM ICES ON SALMON STOCKS

4.1 The Chairman of the ACFM, Dr Fredric Serchuk, presented the scientific advice from ICES relevant to the West Greenland Commission, CNL(91)11, (Annex 3) prepared in response to a request from the Commission at its Seventh Annual Meeting.

4.2 The fishery in 1990 opened on 1 August and ended in November, although the official closing date was 31 December. The total catch was 227 tonnes which is 110 tonnes less than in 1989. This catch was the lowest since 1961. The quota in 1990 was divided into a "free" quota of 457 tonnes and a "small boat" quota of 467 tonnes. The total landings did not exceed the "free" quota. The low catches appear to have been caused by lower water temperature in the fishery area in the summer of 1990 and a low abundance of salmon.

4.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to a lack of balance between the attention paid in the ACFM report to the fishery at West Greenland and to those in homewaters and suggested that this imbalance should be addressed. He questioned the reliability of the estimate of the proportion of North American origin fish in the fishery and referred to previous statements made by the ACFM concerning the importance of feeding areas other than those at West Greenland.

4.4 The representative of the United States observed that the error rate was considerably lower than the misclassification rate. He requested further information on fishing effort and on the shift in distribution of the fishery. The representative of Canada noted the striking decline of catches in the West Greenland fishery and requested if

there was any indication of a decline in fishing effort. The Chairman of the ACFM advised that the reduction in catches appeared to be related to a number of factors including low water temperature in the coastal area and stressed the need for additional information. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted the marked increase in the harp seal population in recent years but stated that he had no evidence of reduced fishing effort. He would, however, try to provide such information if similar information was provided for homewater fisheries.

4.5 The Chairman noted that the questions posed to ICES indicated that a discussion of the homewater fisheries should be included in the ACFM report to the Commission. He also referred to the report of the Seventh Annual Meeting in which it is concluded that the ACFM report will be the West Greenland Commission's reference document with the Working Group report as a necessary appendix.

5. REGULATORY MEASURES

5.1 The representative of Canada referred to the information presented and the statements made indicating serious concern with the status of the stocks and the need to take measures to ensure that the stocks have the opportunity to recover. In that context, Canada would recommend a substantial reduction in the quota at West Greenland although the duration of any measure would be open for discussion.

5.2 The representative of the EEC referred to the reduction in the proportion of European origin salmon in the catch at West Greenland in 1990, which indicated a problem with these stocks. The EEC would, therefore, be seeking a reduction in the quota at West Greenland.

5.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to the Opening Statement made at the 1990 meeting of the Council which identified three areas of concern in which no progress had been made including the lack of recommendations from ICES on TAC's. Denmark (in respect of the Faroe Islands and Greenland) would only act on the basis of scientific advice and in this context he referred to data from the river Miramichi which indicated that target egg depositions had been exceeded in 1990. He cautioned against the use of catch data as an indicator of stock status since in some countries restrictions had been imposed on the fisheries. The representative of Denmark (in respect of the Faroe Islands and Greenland) tabled a paper, WGC(91)4, (Annex 4) which concluded that factors other than the Greenlandic fishery, maybe other fisheries, have been the main reason for the observed decline in catches. He questioned the relationship between the reduction in quotas for the West Greenland fishery and returns to the states of origin, and requested that ICES undertake such analyses as appropriate to advise on the effects of the management of salmon in the North Atlantic.

5.4 The representative of the United States referred to the commitments made in accordance with Article 15(5)(b) which had resulted in reductions in exploitation rates in US waters to about 10%, compared to levels about 5 to 6 times as high at Greenland. He noted that in a majority of rivers in the United States and Canada target egg depositions were not being achieved. He observed that the appearance that some rivers achieved target egg depositions may be misleading because the targets

may have been achieved as a result of the presence of grilse rather than MSW fish as was desired.

5.5 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to the positive discussion and the spirit in which the questions before the Commission had been addressed. He tabled a proposal, WGC(91)11, (Annex 5) outlining a method for developing a rational approach to the management of salmon at West Greenland. This posed a longer term approach to quota allocation and indicated that quotas should vary so as to reflect the state of stocks. Upon a vote Canada and Denmark (in respect of the Faroe Islands and Greenland) voted in favour, the United States voted against the proposal and the EEC abstained. Under the Rules of Procedure of the Commission the proposal was rejected. The representative of the EEC explained that the Community had abstained because of the lack of clarity on the relation between this proposal and document CNL(91)44.

5.6 The representative of Denmark (in respect of Faroe Islands and Greenland) tabled a proposal, WGC(91)10, (Annex 6) for an emergency regulatory measure essentially extending the status quo for the West Greenland salmon fishery. The proposal was intended to bridge the gap until a new mechanism for assessing the status of stocks relevant to West Greenland fisheries is established. The representative of Canada referred to the concern made in the Opening Statements to Council regarding the state of salmon stocks and the appropriate measures required to rebuild these stocks. He referred to the severe measures taken by Canada to rebuild salmon stocks and expressed his disappointment that the proposal contained in WGC(91)10 did not reflect these concerns about the stocks and Canada could not therefore support the proposal. Upon a vote, Denmark (in respect of the Faroe Islands and Greenland) voted in favour of the proposal, Canada and the United States voted against the proposal and the EEC abstained. Under the Rules of Procedure of the Commission the proposal was rejected.

5.7 The representative of Canada tabled a proposal for an emergency regulatory measure for West Greenland, WGC(91)12, (Annex 7). He indicated that the proposal of 760 tonnes was higher than Canada would have liked but in order to help reach agreement Canada was prepared to accept a quota at this high level for one year. Upon a vote, Canada voted in favour, Denmark (in respect of the Faroe Islands and Greenland) and the United States voted against the proposal and the EEC abstained. In accordance with the Rules of Procedure of the Commission the proposal was rejected. The representative of Denmark (in respect of the Faroes Islands and Greenland) explained that they had voted against the proposal because of the lack of scientific advice to support the proposal. The representative of the EEC explained that the Community could have accepted the proposals contained in WGC(91)10 and WGC(91)12 but had abstained because none of the proposals could form the basis of a positive decision by the Commission.

5.8 The representative of the EEC appealed to the representative of Denmark (in respect of the Faroe Islands and Greenland) not to aggravate the problems caused by the lack of agreement in the Commission when fixing a unilateral quota.

6. RECOMMENDATIONS TO THE COUNCIL ON SCIENTIFIC RESEARCH

6.1 The Commission reviewed and accepted the relevant section of paper CNL(91)44, (Annex 8) and agreed to recommend it to the Council as part of the annual request for scientific advice to ICES.

7. REPORT ON NASCO TAG RETURN INCENTIVE SCHEME AND ANNOUNCEMENT OF AWARDS

7.1 The Chairman announced that the draw for the prizes in the Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 4 June 1991. The winner of the first prize was Henrik Heilmann from Manitsoq, Greenland. A list of all prize winners was presented to the Commission, WGC(91)3, (Annex 9). The Commission offered its congratulations to all prize winners.

8. OTHER BUSINESS

9. DATE AND PLACE OF NEXT MEETING

9.1 The Commission agreed to hold its next meeting during the Ninth Annual Meeting of the Council, 8-12 June 1992, in Washington DC, USA.

10. CONSIDERATION OF THE DRAFT REPORT OF THE MEETING

10.1 The Commission agreed the draft report of the meeting.

ANNEX 1

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
EIGHTH ANNUAL MEETING OF THE WEST GREENLAND COMMISSION
11-14 JUNE 1991, EDINBURGH, UK

LIST OF PARTICIPANTS

* Denotes Head of Delegation

MEMBERS OF THE COMMISSION

CANADA

*MR J E HACHE	Representative Department of Fisheries and Oceans, Ottawa, Ontario
DR WILF CARTER	Representative Atlantic Salmon Federation, St Andrews, New Brunswick
DR GABY WARD	Representative Champlain College, Quebec
MR MIKE CALCUTT	Department of Fisheries and Oceans, Ottawa, Ontario
MR DAVID CLARK	Atlantic Salmon Federation, New Brunswick, Canada
MR DAVID MEERBURG	Department of Fisheries and Oceans, Ottawa, Ontario
MR MATT MURPHY	Food, Fisheries & Allied Workers/Canada Auto Workers Staff Representative, Newfoundland
MR REX PORTER	Department of Fisheries and Oceans, St John's, Newfoundland
MR DAVID RIDEOUT	Department of Fisheries and Oceans, Ottawa, Ontario
MR DAVID VARDY	Department of Fisheries, Government of Newfoundland and Labrador, St John's, Newfoundland

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*MR KJARTAN HOYDAL	Representative Faroese Home Government, Torshavn, Faroe Islands

MR EINAR LEMCHE	Representative Greenland Home Rule, Copenhagen Office
MR PETER DAVIDSEN	Greenlandic Fishermen & Hunters Association
MR HJALTI I JAKUPSSTOVU	Fisheries Research Institute, Torshavn, Faroe Islands
MR JENS MOELLER JENSEN	Greenland Fisheries Research Institute, Copenhagen
MRS AMALIE JESSEN	Department of Fisheries & Industry, Greenland Home Rule, Nuuk
MR ORLA SANDBORG	Greenlandic Fishermen & Hunters Association
MR JOHN PETERSEN	Minister of Fisheries, Torshavn, Faroe Islands
MR SOFUS POULSEN	Faroese Commercial Attaché, Aberdeen

EEC

*MR HENRIK SCHMIEGELOW	Representative Directorate-General of Fisheries, EC Commission, Brussels
MR HARRY KOSTER	Representative Directorate-General of Fisheries, EC Commission, Brussels
MR ANDREW THOMSON	Representative Directorate-General for External Relations, EC Commission, Brussels
MR LUIS T DA COSTA	Secretariat of the Council of the European Communities, Brussels
MR JOHN CARBERY	Secretariat of the Council of the European Communities, Brussels
MS NICOLE P F BOLLEN	Ministry of Agriculture & Fisheries, Netherlands
DR TONY BURNE	Ministry of Agriculture, Fisheries and Food, London
MR J CALVERA	Agriculture, Fisheries & Food Attaché, Spanish Embassy, London
MR RONAN CORVIN	Representation of Ireland to EC, Brussels
MR DAVID DUNKLEY	Scottish Office Agriculture & Fisheries Department, Montrose

MRS PAM JARVIS	Ministry of Agriculture & Fisheries, London
MR JESPER KAAE	Danish Embassy, London
MR TOM KELLY	Scottish Office Agriculture & Fisheries Department, Edinburgh
MR JOHN KEOHANE	Department of the Marine, Dublin
MR CHARLES MCCALL	Ministry of Agriculture, Fisheries and Food, London
DR KEVIN O'GRADY	National Rivers Authority, London
MR TED POTTER	Ministry of Agriculture, Fisheries and Food, Lowestoft
MR WOLFGANG THOMAS	Bundesministerium fur Ernährung, Landwirtschaft und Foresten, Bonn
MR BOB WILLIAMSON	Scottish Office Agriculture & Fisheries Department, Edinburgh

USA

DR FRANK CARLTON	Representative National Coalition for Marine Conservation, Savannah, Georgia
MR CLINTON TOWNSEND	Representative Canaan, Maine
DR VAUGHN ANTHONY	National Marine Fisheries Service, Woods Hole, Massachusetts
DR JENNIFER BAILEY	National Marine Fisheries Service, Maryland
MR EDWARD T BAUM	Atlantic Sea Run Commission, Maine
MR DAVID EGAN	Connecticut River Atlantic Salmon Commission, Guilford, Connecticut
DR KEVIN FRIEDLAND	National Marine Fisheries Service, Woods Hole, Massachusetts
MR ROBERT JONES	Connecticut Bureau of Fisheries, Hartford, Connecticut
MR HENRY LYMAN	Atlantic Salmon Federation, Boston, Massachusetts
MR JAMES MCCALLUM	US House of Representatives, Washington DC

MR ARTHUR NEILL	National Marine Fisheries Service, Woods Hole, Massachusetts
MR GILBERT RADONSKI	Sport Fishing Institute, Washington, DC
MR RICHARD ROE	National Marine Fisheries Service, Gloucester, Massachusetts
MR STETSON TINKHAM	Dept of State, Office of Fisheries Affairs, Washington DC
DR JAMES WEAVER	US Fish and Wildlife Service, Newton Corner, Massachusetts

OBSERVERS - PARTIES

ICELAND

*MR ARNI ISAKSSON	Representative Institute of Freshwater Fisheries, Reykjavik

NORWAY

MR OYVIND VASSHAUG	Representative Country Administration of Hordaland, Bergen

SWEDEN

DR INGEMAR OLSSON	Representative National Board of Fisheries, Goteborg

OBSERVERS - NON-PARTIES

ICES

DR EMORY ANDERSON	International Council for the Exploration of the Sea, Copenhagen
DR RICHARD GRAINGER	International Council for the Exploration of the Sea, Copenhagen
DR FREDRIC SERCHUK	National Marine Fisheries Service, Woods Hole, Massachusetts

SECRETARIAT

Secretary	DR MALCOLM WINDSOR
Assistant Secretary	DR PETER HUTCHINSON

ANNEX 2

WGC(91)9
EIGHTH ANNUAL MEETING OF THE WEST GREENLAND COMMISSION
11-14 JUNE 1991
SHERATON HOTEL, EDINBURGH, UK

AGENDA

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the 1990 Fishery and ACFM Report from ICES on Salmon Stocks
5. Regulatory Measures
6. Recommendations to the Council on Scientific Research
7. Report on NASCO Tag Return Incentive Scheme and Announcement of Awards
8. Other Business
9. Date and Place of Next Meeting
10. Consideration of the Draft Report of the Meeting.

ANNEX 3

COUNCIL

PAPER CNL(91)11

REPORT OF THE ICES ADVISORY COMMITTEE ON FISHERY MANAGEMENT (SECTION 2)

2. INFORMATION OF INTEREST TO THE WEST GREENLAND COMMISSION

Source of information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

2.1 Catches

In 1990, the fishery at West Greenland was opened on 1 August and ended in November, although the official closing date was 31 December. The total nominal catch was 227 t.

Quota and Catch (t)

Year	1985	1986	1987	1988	1989	1990
Quota	852	909	935	-	900	924
Catch	864	960	966	893	337	227 [1]

[1] Preliminary

The salmon fishery at Greenland in recent years has been predominantly an in-shore, coastal small boat (<30ft) fishery. No information on effort is available for 1990, but the landings during the first week, and the two first weeks, are the lowest in the time series. The low catches appear to have been caused by lower water temperatures in the fishery area and a low abundance of salmon.

2.2 Composition and Origin of the Catch

The results of classifying salmon in samples from commercial catches in 1990 indicated that the North American proportion was 75% (95% CL = 79,70), and the European proportion was 25% (95% CL = 30,21).

An alternative estimate of the overall proportion of North American- and European-origin salmon for the years 1982-1990 was derived by weighting NAFO Division samples by catch in numbers. The table below gives the results:-

Year	Weighted by catch in numbers				Percentage of all samples combined	
	NA		EU		NA	EU
	%	Wt(t)	%	Wt(t)		
1982	57	-	43	-	62	38
1983	40	-	60	-	40	60
1984	54	-	46	-	50	50
1985	47	-	53	-	50	50
1986	59	537	41	423	57	43
1987	59	556	41	411	59	41
1988	42	349	58	544	43	57
1989	55	179	45	158	56	44
1990	74	168	26	59	75	25

ACFM is concerned about the lack of a suitable test sample of scales of known origin salmon for the discriminant analysis.

In 1990, the estimated number of fish caught was 62,353 from North America and 21,721 from Europe for a total of 84,074.

An estimate of the number of Maine salmon harvested at West Greenland in 1990 using the proportional harvest method was 3,968 fish.

2.3 Biological Characteristics of the Harvest

As previously observed, North American 1SW salmon were significantly shorter and lighter than their European counterparts, both overall and on an individual NAFO Division basis.

The sea age composition in 1990 of 95.9% 1SW, 3.2% 2SW, and 0.9% previous spawners indicated that there were proportionally more 1SW salmon and fewer 2SW and previously spawned salmon than in 1989.

The increasing number of farmed fish escaping at various life stages which turn up in the catches at sea in unknown quantities may reduce the precision of the discriminant analysis. For instance the proportion of North American-origin river age 1 salmon has increased from 2% in the 1986 samples to 8.8% in the 1990 samples. This could be the result of an increasing production of North American hatchery-origin salmon or because of increasing numbers of fish farm escapees of unknown origin in the fishery. The decrease in numbers of North American salmon of river age 4 years and older from the mean value of 22.5% from 1968-89 to 15.1%

in 1990 suggests that either production or migration of salmon from the northerly portion of the range in North America has decreased.

The CWT harvest estimate in 1989 for Maine-origin salmon was 3,533 fish.

CWT Harvest, Maine-Origin Salmon

Year	1987	1988	1989
Harvest	5538	4236	3533

2.4 Carlin Tag Reporting Rates

The three methods of harvest estimation available for US-origin salmon in the West Greenland fishery (Carlin tag recoveries, CWT recoveries, proportional harvest) provide independent and complementary results. Comparison of the available time series of harvest estimates (Figure 2) shows that the estimates from the proportional harvest model averaged several-fold greater than the Carlin estimates.

The ratio of Carlin-based estimates to the other methods provides an indirect estimate of reporting rate because neither the CWT estimate nor the proportional model rely on voluntary returns of tags to estimate harvest.

Figure 3 shows the estimates of reporting rate derived from comparisons between the CWT and proportional methods for the period 1976-1989. Results suggest a steady increase in the apparent reporting rate since the early 1980s when estimates were below 20% for the period. The higher level of overall reporting rate in the latter period may be related to the increase in tag rewards from 25 to 100 DKr in 1986, the initiation of the NASCO lottery in 1989, and increased scientific sampling in recent years.

None of the available comparisons support the previously-used baseline reporting rate of 80%. For the historical time series, the inter-annual pattern of variability in reporting rates could be sufficiently characterized by multiplying the Carlin estimate by 2.

The Carlin tag based harvest estimates of 1SW Maine-origin salmon for the 1989 fishery totalled 3,784 fish. This is the highest harvest estimate of Maine-origin 1SW salmon from Carlin tag data ever computed for the Greenland fishery.

Carlin Harvest, Maine-Origin Salmon

Year	1984	1985	1986	1987	1988	1989
Harvest	849	1469	2035	2075	2287	3784

2.5 Exploitation at West Greenland

The extant exploitation rates for 1SW Maine salmon in 1989 averaged 59%, which was higher than the previous year and the long-term average. The extant exploitation rates for 2SW salmon in 1989 were lower than in 1988 and approximately equal to the long-term average (1989 average = 82%).

Exploitation rates of 1SW salmon of Maine-origin for 1989 show an increase in Canada, above the previous three years, whereas at West Greenland exploitation appears to have remained at about the same level as in the previous three years. The effects of different reporting rates of Carlin tags and different P values on the possible range of fishery area exploitation for the years 1987 to 1989 are presented in Figure 4.

The capture of Maine-origin salmon outside the fishing areas at West Greenland and Canada suggests that the value FU = 0.1 (the proportion of the stock unavailable to either fishery) as previously assumed is too low. This in turn implies higher fishery area exploitation rates on these stocks at both West Greenland and Canada.

2.6 Effects of Management Measures in the Fishery at West Greenland

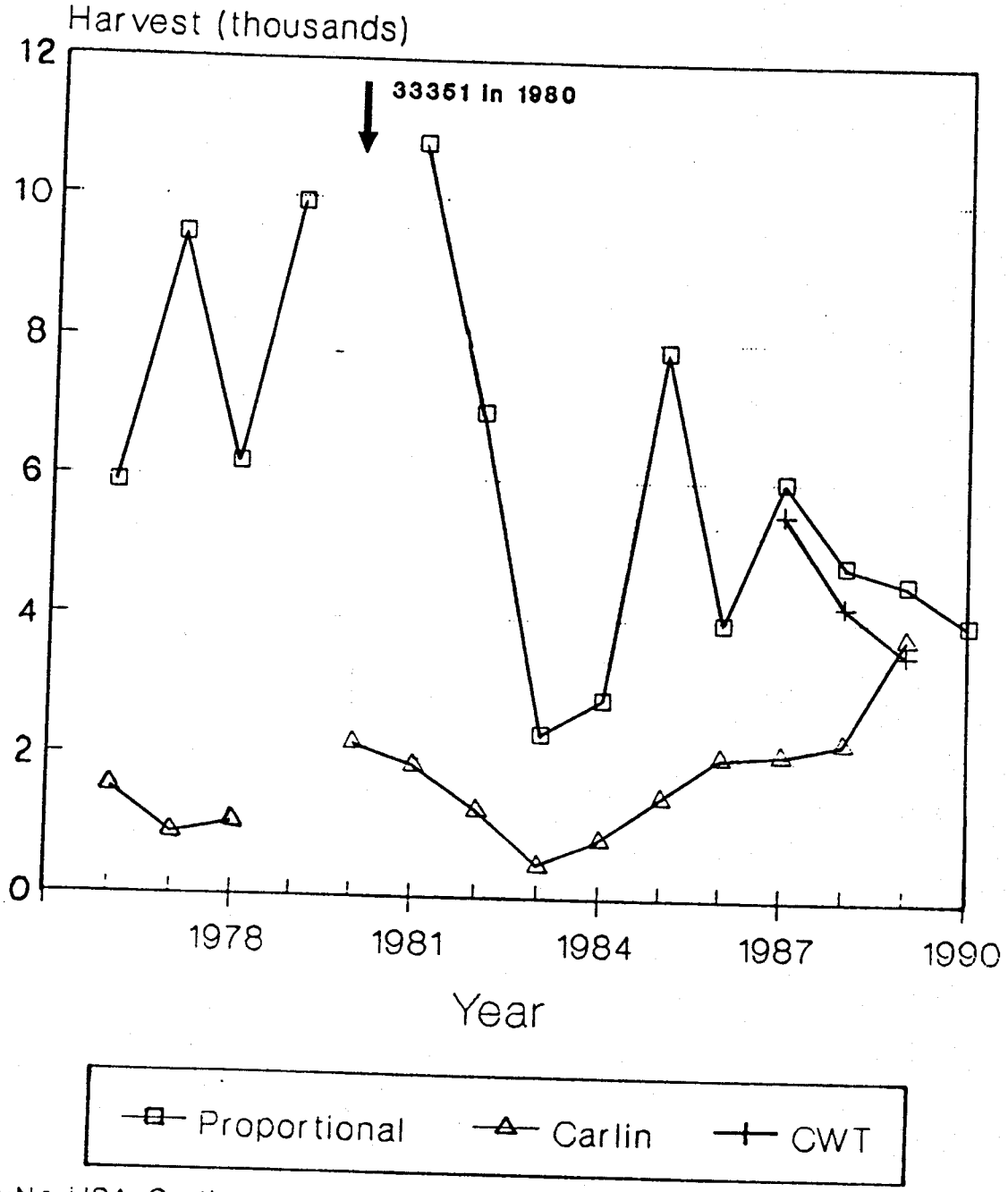
The total TAC agreed for the period 1988-1990 was 2,520 t, with an annual opening date of 1 August. In addition, the annual catch was not permitted to exceed the annual average (840 t) by more than 10%. The total harvest for the period corrected for an opening date of 1 August was 1,360 t and in no region was the annual limit exceeded. In 1988 the fishery was closed 4 December because the nominal catch was 893 t which corresponded to a catch of 820 t if the opening date had been 1 August. Hence, only in 1988 was the catch limited by the quota.

2.7 Quantitative Estimates of the Effects of Fish Farm Escapees

No quantitative estimates of fish farm escapees were available. Examination of the scale characters of samples from West Greenland in 1990 indicates that there may be some fish farm escapees in the catch.

Figure 2

Comparison of Harvest Estimates of Maine-origin Salmon at West Greenland



Note:No USA Carlin tags released in 1978

Figure 3 Estimated reporting rates for Carlin tags (1976-1989) based on comparison of Carlin-based harvest estimated and estimates based on CWT recoveries and the proportional harvest model (1987-1989).

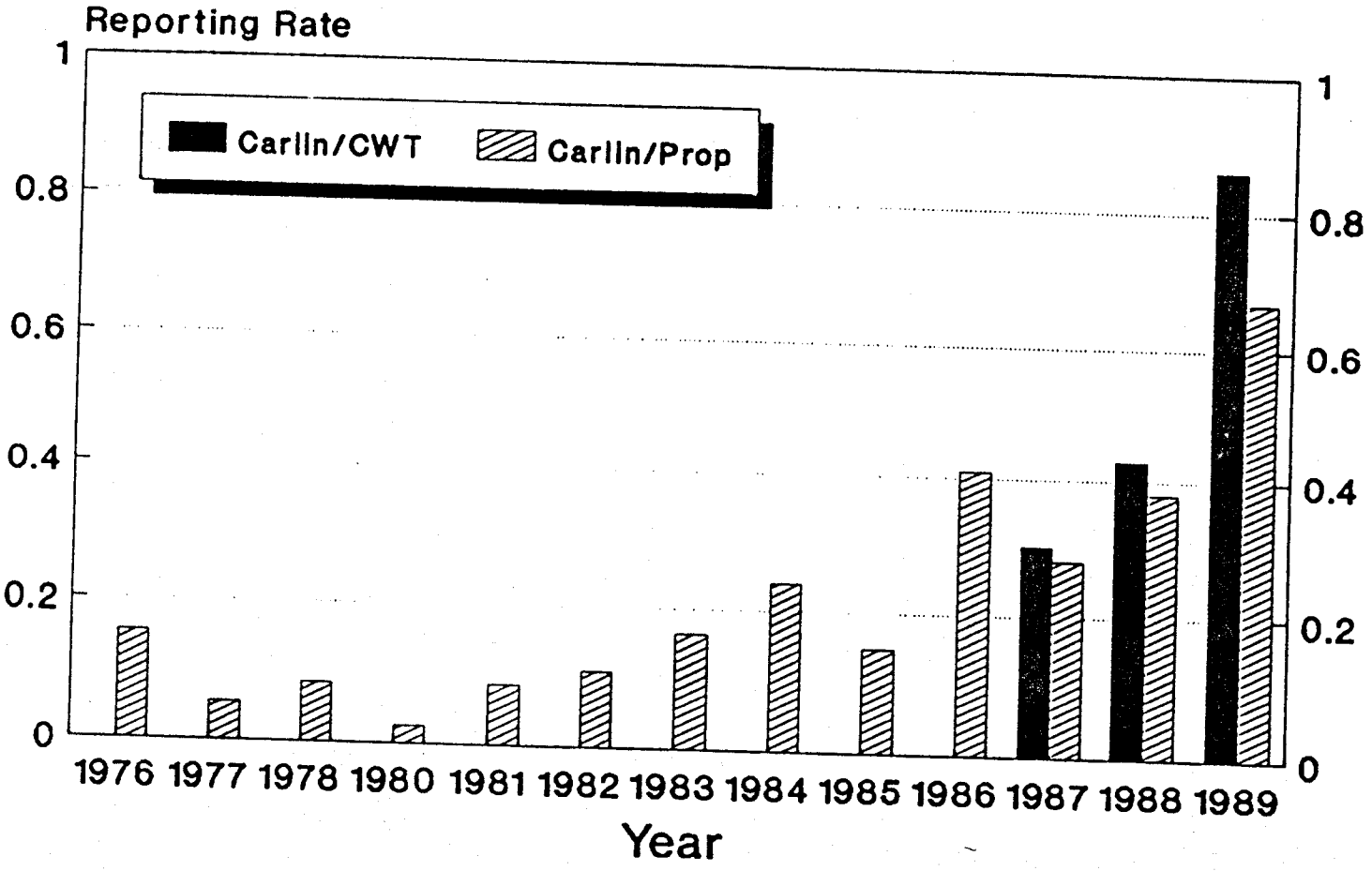
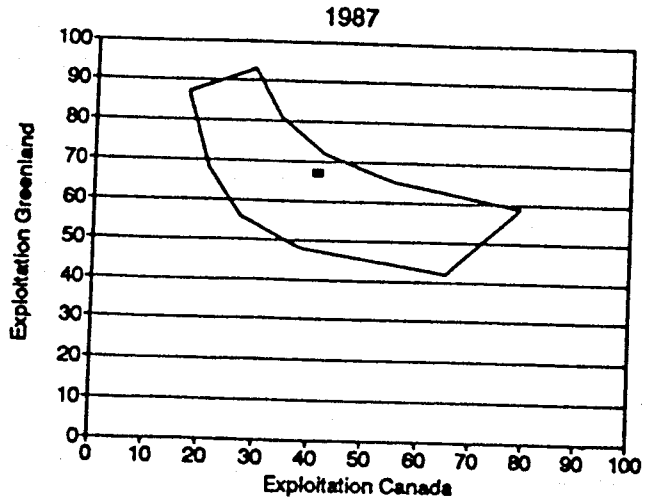
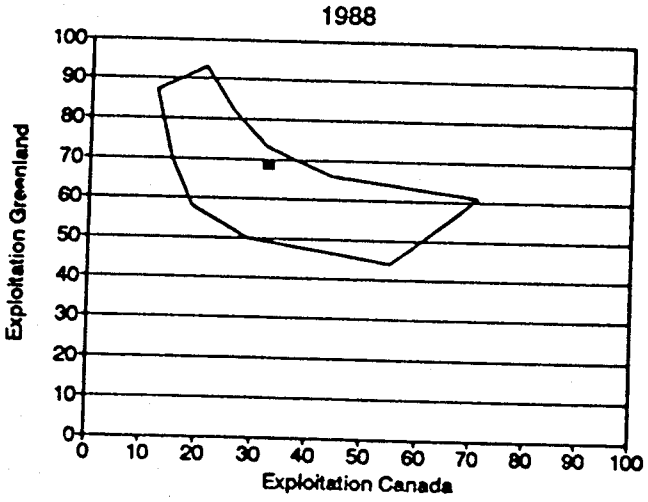
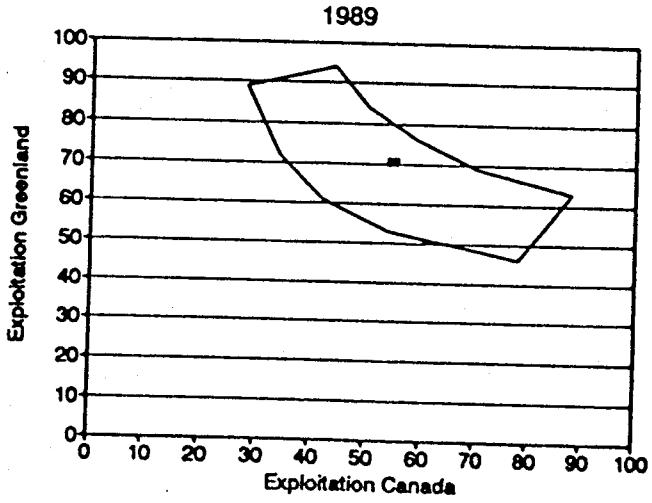


Figure 4 Effects of Carlin tag reporting rate and proportion of Maine salmon stocks available to the fisheries in Greenland and Canada.







The upper line of each figure represents the levels of fishery area exploitation when the Carlin-based harvest estimates are multiplied by 2.0

The lower line represents the level of fishery area exploitation for unadjusted Carlin tag estimates.

The midpoint represents the average of the values defining the perimeter of the two Carlin adjustment factors.

ANNEX 4

WEST GREENLAND COMMISSION

PAPER WGC(91)4

ARE HOMEWATERS AFFECTED BY MANAGEMENT IN GREENLAND?

Paper tabled by Denmark (in respect of Faroe Islands and Greenland)

WGC(91)4

ARE HOMEWATERS AFFECTED BY MANAGEMENT IN GREENLAND?

The nominal catch of salmon from NAFO sub-area 1 (West Greenland) has been cut back, due to management. During the period 1970 to 1975 other vessels than the Greenlandic participated in the fishery, and from 1976 only Greenlandic vessels participated. In 1984, the Greenland quota was reduced from 1191 tonnes to approx. 870 tonnes. The figure below gives the average figures from these three periods.

Nominal catch of salmon at West Greenland

N	Tonnes	Index
1970-75	2206	1.00
1976-83	1102	0.50
1984-89	720	0.33

These cut-backs have also benefitted the North American stock component; the figures given below show the decline in the catches of North American salmon at West Greenland.

Number of North American salmon caught at West Greenland

N	Number	Index
1970-75	255375	1.00
1976-83	162762	0.64
1984-89	123073	0.48

The estimated run in the rivers Miramichi, Restigouche and Saint John of MSW-fish one year later than the fishery at West Greenland did not show any increase in the number but rather a status quo; see the figures below.

Number of the MSW arriving to these three mentioned rivers.
Target spawners of MSW is 40200.

N+1	Number	Index
1971-76	47535	1.00
1977-84	48857	1.03
1985-90	44697	0.94

It is obvious that other factors than the Greenlandic fishery and maybe other fisheries has been the main reason for this observed decline in catches.

The Delegation of Denmark requests ICES through its ACFM to undertake such analyses as may be found appropriate to advise on the effects of the management of salmon in the North Atlantic.

ANNEX 5

WEST GREENLAND COMMISSION

PAPER WGC(91)11

DRAFT PROPOSAL BY DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND) FOR DEVELOPING A RATIONAL APPROACH TO THE MANAGEMENT OF SALMON AT WEST GREENLAND

1. Having regard to the desirability that the Commission address the question of developing a rational approach to the management of the salmon stocks with which it is concerned, the Commission agreed to ask scientific advice from ICES on the questions below:

   (a) if there is any method to provide, on a regular basis, some estimate of the size of the stocks relevant to the West Greenland fishery;

   (b) if there is any method to establish some index based on the rivers which make a major contribution to the West Greenland fishery.

2. On receiving the response to these questions the Commission would examine the options which might assist in determining the allocation of salmon stocks to Greenland, taking account of Article 9 of the Convention.

3. In proposing this longer term approach to quota allocation at West Greenland the Commission recognises that the quota at West Greenland should vary both upwards and downwards so as to reflect the state of the stocks.

ANNEX 6

WEST GREENLAND COMMISSION

PAPER WGC(91)10

DRAFT EMERGENCY REGULATORY MEASURE FOR THE WEST GREENLAND SALMON FISHERY PROPOSED BY DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

The catches of salmon at West Greenland shall, for the calendar years 1988, 1989, 1990 and 1991, not exceed a total of 2,520 tonnes.

However, in 1991 the annual catch shall not exceed 830 tonnes.

The fishing season in 1991 will open no later than 15 August.

Note (Not integral part of proposal)

This proposal is not meant to have any prejudice for any Party's position in coming years. It is meant as a measure to bridge the gap, until an agreed system of assessing status of salmon stocks, relevant to West Greenland fisheries, is established.

ANNEX 7

WEST GREENLAND COMMISSION

WGC(91)12

CANADIAN EMERGENCY REGULATORY PROPOSAL

Canada's concern for conservation has been made known to NASCO since its inception. Canadian conservation measures for its domestic fishery have been tabled during the meetings this week and are evidence of the continuation by Canada of very stringent conservation measures in 1991. Canada is looking for similar conservation measures to be taken by West Greenland.

In the past, due to concern for the salmon stocks, Canada sought significant reductions in the West Greenland quota. Scientists are suggesting that the stocks are continuing to decline, indeed harvests from many NASCO Members, including Greenland, are at all time lows. Canada believes that the quota for West Greenland must be established on a conservation basis and is willing to take a further year of an unjustifiably high West Greenland quota to see the mechanism put in place. Canada requests that the West Greenland quota be set at 760 tonnes for 1991.

ANNEX 8

COUNCIL

PAPER CNL(91)44

DRAFT DECISION OF THE COUNCIL TO REQUEST SCIENTIFIC ADVICE FROM ICES

1. With respect to Atlantic salmon in each Commission area, where relevant:

   (a) Describe the events of the 1991 fisheries with respect to catches, gear, effort, composition and origin of the catch (including escapees and sea ranched fish), and rates of exploitation;
   (b) Describe the status of the stocks occurring in the Commission area;
   (c) Begin a time series of aggregate estimates of all unreported catches, including those taken in international waters (the latter should be provided separately);
   (d) Specify data deficiencies and research needs.

2. With respect to the West Greenland Commission, propose and evaluate methods to estimate:

   (a) abundance of salmon in the area of the fishery at the time it operates;
   (b) total abundance of stocks exploited by the fishery wherever they are;
   (c) possible catch levels based upon maintaining adequate spawning biomass;
   (d) some index based on the rivers which make a major contribution to the West Greenland fishery.

3. Evaluate the following management measures on the stocks and fisheries occurring in the respective Commission areas:

   (a) regulations introduced into the Norwegian salmon fisheries in 1989;
   (b) quota management measures taken in 1990 and 1991 in the Newfoundland and Labrador commercial salmon fisheries.

4. With respect to Atlantic salmon in the North-East Atlantic Commission and West Greenland Commission areas, provide an inventory of parasites and diseases of wild and reared salmon by country.

5. With respect to Atlantic salmon in the West Greenland Commission area, evaluate the effects which management of the West Greenland fishery has had on stocks in homewaters.

6. With respect to Atlantic salmon in NASCO area, provide a compilation of microtag, finclip, and external tag releases by ICES Member Countries in 1991.

ANNEX 9

WEST GREENLAND COMMISSION

PAPER WGC(91)3

NASCO TAG RETURN INCENTIVE SCHEME

1991 PRIZES

The draw for the 10 winners in the West Greenland Commission was made by the Auditor at NASCO Headquarters on 4 June 1991. At the Eighth Annual Meeting of the Commission in Edinburgh, the Chairman of the Commission, Dr Wilfred Carter announced the winners:

First prize - $1500 - Henrik Heilmann, Niels Lyngesvej B500/60, Manitsoq, Greenland

Second prize - $1000 - Henrik Heilmann, Niels Lyngesvej B500/60, Manitsoq, Greenland

Third prize - $500 - Svend Olsen, Kangamiut, Greenland 3912

Fourth prizes - $100

- Apollo Egede, Godthaab, Greenland 3900
- Ejvind Suhervarra, Nuuk, Greenland 3900
- Jakob Moller, Fiskenaesset, Greenland 3900
- Jens Egede Sikemsen, Saarloq, Greenland 3920
- Peter Nikodimussen, Napassoq, Greenland 3912
- Siegesmund Tobiassen, Nuuk, Greenland 3900
- Peter Rosing, Kangamiut, Greenland 3912

The Commission offers its congratulations to the winners.

ANNEX 10

LIST OF WEST GREENLAND COMMISSION PAPERS

PAPER NO.	TITLE
WGC(91)1	Provisional Agenda
WGC(91)2	Draft Agenda
WGC(91)3	NASCO Tag Return Incentive Scheme, 1991 Prizes
WGC(91)4	Are Homewaters affected by Management in Greenland?
WGC(91)5	Run Maine Rivers
WGC(91)6	Figures used by the Chairman of AFCM in his Presentation to the Commission
WGC(91)7	Draft Report of the Eighth Annual Meeting of the West Greenland Commission
WGC(91)8	Draft Proposal by the Chair for a Regulatory Measure for Fishing of Salmon at West Greenland for the Calendar Year 1992
WGC(91)9	Agenda
WGC(91)10	Draft Emergency Regulatory Measure for the West Greenland Salmon Fishery proposed by Denmark (in respect of the Faroe Islands and Greenland)
WGC(91)11	Draft Proposal by Denmark (in respect of the Faroe Islands and Greenland) for Developing a Rational Approach to the Management of Salmon at West Greenland
WGC(91)12	Canadian Emergency Regulatory Proposal
WGC(91)13	Report of the Eighth Annual Meeting of the West Greenland Commission
CNL(91)11	Report of the ICES Advisory Committee on Fishery Management
CNL(91)44	Draft Decision of the Council to Request Scientific Advice from ICES

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