REPORT OF THE TWENTY-FIFTH ANNUAL MEETINGS OF THE COMMISSIONS

Gijón, Asturias, Spain

3 – 6 JUNE 2008

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REPORT OF THE

TWENTY-FIFTH ANNUAL MEETING

OF THE

NORTH AMERICAN COMMISSION

3 – 6 JUNE 2008
Gijón, Asturias, Spain

Chairman:	Mr George Lapointe (USA)
Vice Chairman:	Mr Guy Beaupré (Canada)
Rapporteur:	Ms Susan Roque (Canada)
Secretary:	Dr Malcolm Windsor

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NAC(08)10

Report of the Twenty-Fifth Annual Meeting of the North American Commission of the North Atlantic Salmon Conservation Organization Tryp Rey Pelayo Hotel Melia, Gijón, Spain 3-6 June, 2008

1. Opening of the Meeting

1.1 The Chairman, Mr. George Lapointe (USA), opened the meeting and welcomed participants to the Twenty-Fifth Annual Meeting of the Commission. He invited opening statements from participants and an opening statement was made on behalf of the NGOs (Annex 1).

1.2 A list of participants at the Twenty-Fifth Annual Meeting of the Council and Commissions is included on page 257 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda NAC(08)9 (Annex 2).

3. Nomination of a Rapporteur

3.1 Mrs. Sue Rocque (Canada) was appointed as Rapporteur.

4. Election of Officers

4.1 The current Chairman, Mr George Lapointe, has served two full terms and is not eligible for re-appointment. The USA nominated Mr Guy Beaupré (Canada) as Chairman and Canada nominated Mr Steve Gephard (USA) as Vice-Chairman. Both were elected by acclamation.

5. Review of the 2007 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

5.2 The representative of ICES, Mr Tim Sheehan, presented the report from ICES on the scientific advice on salmon stocks in the North American Commission area, CNL(08)7. His presentation is available as NASCO document CNL(08)25. The ACOM report, which contains the scientific advice relevant to all Commissions, is included on page 219 of this document.

6. Review and Discussion of the 2008 Canadian and US Salmon Management Measures as they relate to the Mandate of the Commission and to the Findings of the ACOM Report from ICES

6.1 Mr. Gerald Chaput (Canada) gave an overview of the fisheries and the stock status for Atlantic salmon in Eastern Canada for 2007, NAC(08)6 (Annex 3). In summary, low numbers of adult salmon in eastern Canada continued in 2007. The decline has been

more severe for large, including 2 SW salmon, compared to small salmon, although returns of small salmon declined sharply from 2006. The returns in 2007 of large salmon were unchanged from the last ten years and were the third lowest in the time series. Lower returns of small salmon in 2007 and the continued low abundance of salmon overall cannot be attributed to changes in freshwater production. Where monitored, smolt production has generally remained unchanged over the past ten years. In 2007, conservation limits were met or exceeded in 36% of 64 assessed rivers. Despite major changes in fisheries management, returns have continued to decline in the southern areas and many populations are threatened with extirpation.

6.2 Similarly, the USA provided a Report on US Atlantic Salmon Management and Research Activities in 2007, NAC(08)3 (Annex 4).

7. The St Pierre and Miquelon Salmon Fishery

7.1 Ms. Christiane Laurent-Monpetit representing France (in respect of St Pierre and Miquelon) presented document CNL(08)19. The report details an outline of the fishery, the regulatory framework and the management measures currently in place and planned. The representative of France (in respect of St Pierre and Miquelon) also reported on the scientific monitoring program recommended by NASCO and indicated that consultations are underway with respect to France and its current and future relationship with NASCO.

7.2 The USA indicated that it was interested in working with France (in respect of St Pierre and Miquelon) to expand the sampling program and Canada reported on its treaty with France that includes an annual meeting to discuss fisheries issues and other bilateral items. Canada took the opportunity at a recent meeting to encourage France to accede to the NASCO Convention.

8. Salmonid Introductions and Transfers

8.1 Two documents NAC(08)04 and NAC(08)05 had been previously tabled. NAC(08)05(rev) (Annex 5), A Description of the Management of the Commercial Atlantic Salmon Aquaculture Industry in the United States and Canada, was presented by the USA. The document contains a summary of management of commercial Atlantic salmon aquaculture on the East Coast of the United States and on the East Coast of Canada. It includes details for inventory tracking and control, disease testing and management, containment management systems, escape reporting and marking. As there are many similarities between aquaculture management in both the east coast of the US and Canada, and, given the proximity of aquaculture operations, both countries felt that it would be advantageous for them to continue to exchange information on the issues identified in the document. Agreement was reached to formalize reciprocal notification procedures in the event of escape of farmed fish.

8.2 In response to a question from the NGO representative, the USA indicated that the intent is to have the ability to identify farmed fish down to the site-specific level by the end of 2009.

8.3 With respect to NAC(08)04 (Annex 6), North American Commission Protocols on Introductions and Transfers of Salmonids, the USA summarized the jointly drafted

document and proposed that members of a Working Group be identified immediately following the NASCO meeting. The Working Group will compile information and meet by phone and in person, to prepare a report which addresses the issues and questions identified in the document. The document suggests that the report be provided to NAC Commissioners no later than two months before the 2009 NASCO Annual Meeting. Canada indicated that its delegation had not had an in-depth review of the document, but agreed to provide the name of a Working Group member to the USA.

9. Sampling in the Labrador Fishery

9.1 Canada reported that it will provide resources for sampling. A detailed program description was provided, NAC(08)7 (Annex 7), Labrador Aboriginal Food Fisheries and Sampling Program.

10. Announcement of the Tag Return Incentive Scheme Prize

10.1 The Chairman announced that the draw for the North American Commission prize in the NASCO Tag Return Incentive Scheme was made by the Auditor on 13 May. The winning tag was of Canadian origin. The tag was applied to a 54cm kelt in the Campbellton River, Newfoundland and Labrador, on 9 May 2007. It was recaptured in a bait herring net at Swan Island in the Bay of Exploits on 2 July 2007. The winner of the $1,500 prize is Ms Yvonne Troake of Summerford, Newfoundland and Labrador.

11. Recommendations to the Council on the Request to ICES for Scientific Advice

11.1 The Commission agreed to the request for scientific advice from ICES prepared by the Standing Scientific Committee in relation to the North American Commission area. The request to ICES, as agreed by the Council, is contained in document CNL(08)9 (Annex 8).

12. Other Business

12.1 Canada tabled document NAC(08)8 (Annex 9), Atlantic Salmon Endowment Fund, for information. The document provides a detailed description of the $30 million Fund that has the goal of helping to achieve healthy and sustainable wild Atlantic salmon populations and their habitat in the Atlantic Provinces and Quebec.

13. Date and Place of the Next Meeting

13.1 The Commission agreed to hold its next meeting at the same time and place as the Twenty-Sixth Annual Meeting of the Council in 2009.

14. Report of the Meeting

14.1 The Commission agreed a report of the meeting.

Note: The annexes mentioned above begin on page 13, following the French translation of the report of the meeting. A list of North American Commission papers is included in Annex 10.

NAC(08)10

Compte rendu de la Vingt-cinquième réunion annuelle de la Commission Nord-Américaine de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord, Hôtel Melia Tryp Rey Pelayo, Gijón, Espagne 3-6 juin, 2008

1. Séance d'ouverture

1.1 Le Président, M. George Lapointe (États-Unis) a ouvert la réunion et a souhaité la bienvenue aux délégués à la Vingt-cinquième réunion annuelle de la Commission. Il a invité les participants à présenter leur allocution d'ouverture. Une allocution d'ouverture a été prononcée au nom des ONG (annexe 1).

1.2 Une liste des participants à la Vingt-cinquième réunion annuelle du Conseil et des Commissions de l'OCSAN figure à la page 257 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté l'ordre du jour, NAC(08)9 (annexe 2).

3. Nomination d'un Rapporteur

3.1 La Commission a nommé, Rapporteur, Mme Sue Rocque (Canada).

4. Election des membres du Comité directeur

4.1 Le président actuel, M. George Lapointe, avait rempli deux mandats complets et ne pouvait donc pas être réélu. Les États-Unis ont nommé, Président, M. Guy Beaupré (Canada) et le Canada, M. Steve Gephard (États-Unis) en tant que Vice-président. L'élection a eu lieu par acclamation.

5. Examen de la pêcherie de 2007 et rapport de l'ACOM du CIEM sur les stocks de saumons dans la zone de la Commission

5.2 Le représentant du CIEM, M. Tim Sheehan, a présenté le rapport du CIEM contenant les recommandations scientifiques pertinentes aux stocks de saumons de la Commission d'Amérique du Nord, CNL(08)7. Sa présentation a été reproduite dans le document CNL(08)25 de l'OCSAN. Le rapport de l'ACOM qui énonce les recommandations scientifiques intéressant l'ensemble des Commissions, figure à la page 219 de ce document.

6. Examen et discussion des mesures de gestion du saumon, proposées pour l'année 2008 par le Canada et les États-Unis, dans le cadre du mandat de la Commission et des conclusions offertes par le rapport de l'ACOM du CIEM

6.1 M. Gerald Chaput (Canada) a donné un aperçu des pêcheries de saumons atlantiques et de l'état des stocks à l'est du Canada en 2007, NAC(08)6 (annexe 3). En bref, les

saumons adultes présents à l'est du Canada en 2007 ont continué à être en petits nombres. Le déclin a été plus prononcé chez les grands saumons, y compris les 2 HM, que chez les petits saumons, même si les remontées de petits saumons avaient considérablement baissé depuis 2006. En 2007, les remontées de grands saumons (qui n'ont pas évolué depuis ces dix dernières années) représentaient le troisième plus bas niveau du relevé historique. Et ce n'est pas à des changements de production en eau douce que l'on peut attribuer les remontées moins importantes de petits saumons en 2007 et la persistance générale d'une faible abondance de saumons. Là où elle est surveillée, la production de smolts n'a en général pas changé au cours des dix dernières années. En 2007, les limites de conservation avaient été atteintes voire dépassées dans 36% des 64 cours d'eau étudiés. Malgré les importantes modifications apportées à la gestion des pêcheries, les remontées ont continué à diminuer en nombre dans les zones méridionales et de nombreuses populations sont désormais menacées d'extinction locale.

6.2 Le représentant des États-Unis a également présenté un rapport sur la gestion du saumon atlantique ainsi que sur les activités de recherche menées par les États-Unis en 2007, NAC(08)3 (annexe 4).

7. Pêcherie de saumons à Saint Pierre et Miquelon

7.1 Mme Christiane Laurent-Monpetit, représentante de la France (pour Saint Pierre et Miquelon), a présenté le document CNL(08)19. Le rapport proposait un aperçu de la pêcherie, du cadre de réglementation et des mesures de gestion actuellement en place et prévues. La représentante de la France (pour Saint Pierre et Miquelon) a également rendu compte du programme de contrôle scientifique, recommandé par l'OCSAN. Elle a, par ailleurs, mentionné que des consultations étaient en cours à propos des relations actuelles et futures de la France avec l'OCSAN.

7.2 Le représentant des États-Unis a indiqué qu'ils aimeraient œuvrer avec la France (pour Saint Pierre et Miquelon) à l'extension du programme d'échantillonnage. Le représentant du Canada a rendu compte, de son côté, du traité que le Canada avait avec la France et qui comprenait une réunion annuelle sur le thème des pêcheries et autres questions d'intérêt mutuel. Le Canada avait profité d'une réunion récente pour encourager la France à adhérer à la Convention de l'OCSAN.

8. Introductions et transferts de salmonidés

8.1 Le représentant des États-Unis a présenté le document intitulé "Description de la gestion du secteur d'élevage commercial du saumon atlantique au Canada et aux États-Unis", NAC(08)05(rev) (annexe 5). Ce document venait s'ajouter à deux autres textes, le NAC(08)04 et le NAC(08)05, préalablement soumis. Le dernier document présenté par le représentant des États-Unis contenait une présentation synthétique de la gestion de l'aquaculture commerciale du saumon atlantique sur la côte Est des États-Unis et du Canada. Il fournissait des détails sur le contrôle et la localisation des données d'inventaire, sur le dépistage et la gestion des maladies, sur les systèmes de gestion de l'isolement des poissons, sur le marquage et sur le compte rendu des poissons échappés d'élevage. Il existe de nombreuses similarités entre la gestion aquacole de la côte Est des États-Unis et celle de la côte Est du Canada. Les établissements aquacoles des deux pays sont par ailleurs proches géographiquement. Par conséquent, les deux pays reconnaissaient qu'il y avait un avantage à continuer

d'échanger tout ce qui se rapporterait aux questions identifiées dans le document. Un accord a été conclu à propos des échappements de poissons d'élevage. Cet accord en formalise les procédures de notification réciproque.

8.2 En réponse à une question du représentant des ONG, le représentant des États-Unis a indiqué que l'intention était de pouvoir identifier les poissons d'élevage jusqu'au site d'où ils provenaient avant la fin de 2009.

8.3 Après avoir résumé le document co-rédigé intitulé « Protocoles de la Commission d'Amérique du Nord sur les Introductions et transferts de salmonidés », NAC(08)04 (annexe 6), le représentant des États-Unis a proposé d'identifier les membres d'un groupe de travail dès la fin de la réunion de l'OCSAN. Ceux-ci seraient chargés de compiler les informations nécessaires et de se réunir en personne ou par téléphone, afin de préparer un rapport qui répondrait aux questions identifiées dans le document. Ce document proposait que le rapport soit soumis aux membres de la Commission de l'Atlantique Nord deux mois au plus tard avant la Réunion annuelle de l'OCSAN. Le représentant du Canada a mentionné que sa délégation n'avait pas étudié le document en profondeur. Ils ont toutefois convenu de choisir un membre du groupe de travail et d'en fournir le nom aux États-Unis.

9. Echantillonnage dans la pêcherie du Labrador

9.1 Le représentant du Canada a informé la Commission que son pays contribuera des ressources au programme d'échantillonnage. La description détaillée du programme, intitulée « Programme d'échantillonnage et pêcheries aborigènes de subsistance du Labrador », NAC(08)7 (annexe 7), a été présentée.

10. Annonce du Prix du Programme d'encouragement au renvoi des marques

10.1 Le Président a annoncé que le tirage au sort du prix de la Commission Nord-Américaine du Programme d'encouragement au renvoi des marques de l'OCSAN a été effectué par le Commissaire aux comptes le 13 mai. La marque gagnante était d'origine canadienne. Elle avait été posée, le 9 mai 2007, sur un ravalé de 54 cm capturé dans la rivière Campbellton, en Terre-Neuve-et-Labrador. Ce poisson avait été recapturé dans un filet appât destiné aux harengs sur l'île de *Swan Island* dans la *Bay of Exploits* le 2 juillet 2007. Ms Yvonne Troake de Summerford, en Terre-Neuve-et-Labrador a remporté le prix de la Commission de 1 500 dollars.

11. Recommandations au Conseil en matière de recherches scientifiques dans le cadre de la demande adressée au CIEM

11.1 La Commission a convenu de recommander, dans le cadre de la demande annuelle de recommandations scientifiques adressée au CIEM, la section pertinente à la zone de la Commission d'Amérique du Nord telle qu'elle avait préparée par le Comité scientifique permanent. La demande de recommandations scientifiques adressée au CIEM et approuvée par le Conseil figure dans le document CNL(08)9 (annexe 8).

12. Divers

12.1 Le représentant du Canada a présenté, à titre d'information, le document intitulé « Fond de dotation pour le saumon atlantique » NAC(08)8 (annexe 9). Ce document

fournit une description détaillée du fond de 30 millions de dollars qui vise à faciliter le retour à un état sain et durable des populations de saumons atlantiques sauvages et de leur habitat dans les provinces atlantiques et au Québec.

13. Date et lieu de la prochaine réunion

13.1 La Commission a convenu de tenir sa prochaine réunion en même temps et au même endroit que la Vingt-sixième réunion annuelle du Conseil en 2009.

14. Compte rendu de la réunion

14.1 La Commission a accepté le compte rendu de la réunion.

Note: Une liste des documents de la Commission Nord-Américaine figure à l'annexe 10.

ANNEX 1

Joint NGO Statement to the North American Commission

I am pleased to present the joint opening statement on behalf of the NGO Group.

We wish to thank the United States and Canada for their commitment to accountability, transparency and consultation in the preparation of Implementation Plans and the Fisheries Management Focus Area report.

The NGOs acknowledge that, in 2007, the reported catch for the interceptory fishery at St. Pierre et Miquelon declined to 1.9t from 3.55 in 2006. However, this fishery continues to intercept vulnerable and endangered populations in the United States and Canada. Anecdotal information from Newfoundland fishermen and First Nations indicate that there is a sizeable unreported catch as well. It is imperative that France become a party to NASCO with respect to St. Pierre et Miquelon. We urge Canada and the U.S. to take an active role in reaching the objective of effective monitoring and restriction of this fishery.

We welcome the planned research for the Northwest Atlantic portion of SALSEA to begin this summer. We commend Canada for contributing $800,000 in ship time and personnel to carry out the research. There is strong NGO leadership in research on mortality at sea in North America and Europe. The research is an important cooperative campaign. A public awareness plan for this research would benefit from strategic input from both NGOs and Government and is an opportunity to reflect the advice of the NASCO Public Relations Group.

And finally, we look forward to hearing of discussions at the informal meeting of the North American Commission on Salmonid Introductions and Transfers and progress made in the establishment of cross border notification procedures when escapes occur.

ANNEX 2

NAC(08)9

Twenty-Fifth Annual Meeting of the North American Commission
Tryp Rey Pelayo Hotel Melia, Gijón, Spain

3-6 June, 2008

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Election of Officers
5. Review of the 2007 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area
6. Review and Discussion of the 2008 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
7. The St Pierre and Miquelon Salmon Fishery
8. Salmonid Introductions and Transfers
9. Sampling in the Labrador Fishery
10. Announcement of the Tag Return Incentive Scheme Prize
11. Recommendations to the Council on the Request to ICES for Scientific Advice
12. Other Business
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ANNEX 3

North American Commission

NAC(08)6

Overview Of Fisheries And Stock Status Of Atlantic Salmon In Eastern Canada For 2007

NAC(08)6

Overview Of Fisheries And Stock Status Of Atlantic Salmon In Eastern Canada For 2007

Summary of stock status

- Continued low numbers of adult salmon in eastern Canada
- Decline has been more severe for large (and 2SW) salmon compared to small salmon.
- Returns in 2007 of large salmon unchanged from recent ten years and third lowest of time series.
- Returns of small salmon declined sharply (-17%) from 2006.
- Lower returns of small salmon in 2007 and the continued low abundance of salmon overall cannot be attributed to changes in freshwater production. Where monitored, smolt production has generally remained unchanged over the past ten years.
- In 2007, conservation limits were met or exceeded in 36% of 64 assessed rivers.
- Return rates of salmon in monitored stocks remain low, which is considered to be the most important factor limiting adult salmon abundance.
- Despite major changes in fisheries management, returns have continued to decline in the southern areas and many populations are threatened with extirpation.

1) FISHERIES IN 2007

Catch in 2007 for Canada was 112 t, for St. Pierre & Miquelon was 2 t, and at West Greenland was 25 t. Catch in 2007 for Canada and for the total North Atlantic is the lowest of record.

Nominal catch of Atlantic salmon (t, round fresh weight) in the North Atlantic. Data for 2006 are finalized values, data for 2007 are provisional and are taken from the ICES Working Group on North Atlantic salmon report for April 2008.

	NAC					High seas fisheries				Total
			St.P.		NEAC					North
Year	Canada	USA	& M.	Total	Total	Faroes	East Gr	WestGr	Other	Atlantic
1980	2,680	6	-	2,686	5,434	536	<0.5	1,194	277	10,127
1981	2,437	6	-	2,443	4,909	1,025	<0.5	1,264	313	9,954
1982	1,798	6	-	1,804	4,471	606	<0.5	1,077	437	8,395
1983	1,424	1	3	1,428	5,873	678	<0.5	310	466	8,755
1984	1,112	2	3	1,117	4,769	628	<0.5	297	101	6,912
1985	1,133	2	3	1,138	5,533	566	7	864	-	8,108
1986	1,559	2	3	1,563	6,183	530	19	960	-	9,255
1987	1,784	1	2	1,787	4,830	576	<0.5	966	-	8,159
1988	1,310	1	2	1,313	5,284	243	4	893	-	7,737
1989	1,139	2	2	1,143	4,060	364	-	337	-	5,904
1990	911	2	2	915	3,420	315	-	274	-	4,924
1991	711	1	1	713	2,822	95	4	472	-	4,106
1992	522	1	2	525	3,329	23	5	237	-	4,119
1993	373	1	3	377	3,296	23	-	-	-	3,696
1994	355	0	3	358	3,581	6	-	-	-	3,945
1995	260	0	1	261	3,278	5	2	83	-	3,629
1996	292	0	2	294	2,750	-	0	92	-	3,135
1997	229	0	2	231	2,074	-	1	58	-	2,364
1998	157	0	2	159	2,219	6	0	11	-	2,396
1999	152	0	2	154	2,073	0	0	19	-	2,246
2000	153	0	2	155	2,728	8	0	21	-	2,913
2001	148	0	2	150	2,876	0	0	43	-	3,069
2002	148	0	2	150	2,495	0	0	9	-	2,654
2003	141	0	3	144	2,303	0	0	9	-	2,456
2004	161	0	3	164	1,977	0	0	15	-	2,156
2005	139	0	3	142	1,999	0	0	14	-	2,155
2006	137	0	3	140	1,878	0	0	22	-	2,040
2007	112	0	2	114	1,394	0	0	25	-	1,533

Harvest (fish which are retained) and catches (including harvests and fish caught–and–-released in recreational fisheries) are categorized in two size groups: small salmon and large salmon.

> Small salmon, generally 1SW, in the recreational fisheries refer to salmon less than 63 cm fork length, whereas in commercial fisheries, it refers to salmon less than 2.7 kg whole weight.
>
> Large salmon, generally MSW, in recreational fisheries are greater than or equal to 63 cm fork length and in commercial fisheries refer to salmon greater than or equal to 2.7 kg whole weight.

The harvest of 112 t in 2007 was comprised by number of 37,540 small salmon and 10,256 large salmon; the lowest value of record for small salmon and the third lowest value for large salmon, since 1985.

Harvest (weight, number) of Atlantic salmon by size group, 1985 to 2007.

	Small		Large		Total	
Year	(t)	(number)	(t)	(number)	(t)	(number)
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	1,310	509,815
1989	549	304,620	590	135,484	1,139	440,104
1990	425	233,690	486	106,379	911	340,069
1991	341	189,324	370	82,532	711	271,856
1992	199	108,901	323	66,357	522	175,258
1993	159	91,239	214	45,416	373	136,655
1994	139	76,973	216	42,946	355	119,919
1995	107	61,940	153	34,263	260	96,203
1996	138	82,490	154	31,590	292	114,080
1997	103	58,988	126	26,270	229	85,258
1998	87	51,251	70	13,274	157	64,525
1999	88	50,901	64	11,368	152	62,269
2000	95	55,263	58	10,571	153	65,834
2001	86	51,225	61	11,575	148	62,800
2002	99	53,464	49	8,439	148	61,903
2003	81	46,768	60	11,218	141	57,986
2004	94	54,253	68	12,933	161	67,186
2005	83	47,368	56	10,938	139	58,307
2006	82	46,747	55	11,248	137	57,995
2007	64	37,540	48	10,256	112	47,796
2007 as % of previous five year average	-27%	-25%	-16%	-6%	-23%	-21%
Previous five year average	88	49,720	57	10,955	145	60,675

No commercial fisheries occurred in Canada in 2007.

Fisheries are principally managed on a river-by-river basis and, in areas where retention of large salmon is allowed, it is closely controlled. Three user groups exploited salmon in Canada in 2007

- Aboriginal peoples,
- residents fishing for food in Labrador, and
- recreational fishers.

Most catches (95%) in Canada now take place in rivers or in estuaries. The remainder of the catches which occur in coastal waters are for the Labrador subsistence fisheries which are mainly located close to river mouths. There was an estimated 6 t of coastal catch in 2007 (5% of the total catch of 112 t).

Landings by user group and location of fishery in 2007.

Fishery / Pêcherie		Location of fishery / Lieu de pêche					
		River / eau douce		Estuary / estuaire		Coastal / côtier	
		kg	% of location / par endroit	kg	% of location / par endroit	kg	% of location / par endroit
Recreational / sportif		62,785	100%				
Aboriginal & Resident food / aborigène et alimentation	NB			4,531	100%		
	NS			45	100%		
	PEI			6	100%		
	Québec	7,488	41%	10,776	59%		
	Labrador	0	0%	20,451	77%	6,005	23%
Total		70,273	63%	35,808	32%	6,005	5%

Aboriginal Fisheries

The Supreme Court of Canada affirmed the constitutional right of the Aboriginal Peoples of Canada to fish for food, social and ceremonial purposes (FSC). The priority right to fish for FSC purposes over all other users can only be superceded by conservation of the resource.

In Québec and in DFO Gulf Region, Aboriginal peoples' food fisheries took place subject to agreements or through permits issued to the bands. The permits generally stipulate gear, season, and catch limits.

In Labrador (SFAs 1 and 2), food fishery arrangements in 2007 were developed with Nunatsiavut (fishing in northern Labrador coastal communities and Lake Melville),
Innu Nation (fishing in Natuashish and in Lake Melville from the community of Sheshatshiu), and Labrador Métis Nation (fishing in southern Labrador from Fish Cove Point to Cape St. Charles).

By agreement with First Nations there were no food fisheries for salmon in Newfoundland in 2007.

Harvest by Aboriginal peoples with recreational licenses are reported under the recreational harvest categories.

Harvests in 2007 are provisional. The increase in harvests in 2004 to 2006 are attributed to the reporting of harvests of the Labrador Metis Nation in the aboriginal fishery rather than as resident food fishery.

Reported aboriginal fishery harvests in eastern Canada.

Year / Année	Harvest / Récolte (t)	% large / % grands	
		By weight / par le poids	By number / par nombre
2003	44.3	72	49
2004	60.8	66	44
2005	56.7	57	34
2006	61.4	60	39
2007	47.6	61	40

Residents fishing for food in Labrador

The resident food fishery in Labrador was initiated in 2000. The Labrador residents fishing occurs in Lake Melville and the southern Labrador coastal communities from Cartwright to Cape St. Charles. The Labrador residents fishery includes non-aboriginal peoples and the fishery permitted a retention to a maximum of four salmon of any size while fishing for sea-run speckled trout and arctic charr. The estimated total catch of salmon for the fishery in 2007 was 1.7 t, about 733 fish.

Harvest in the Labrador resident food fishery.

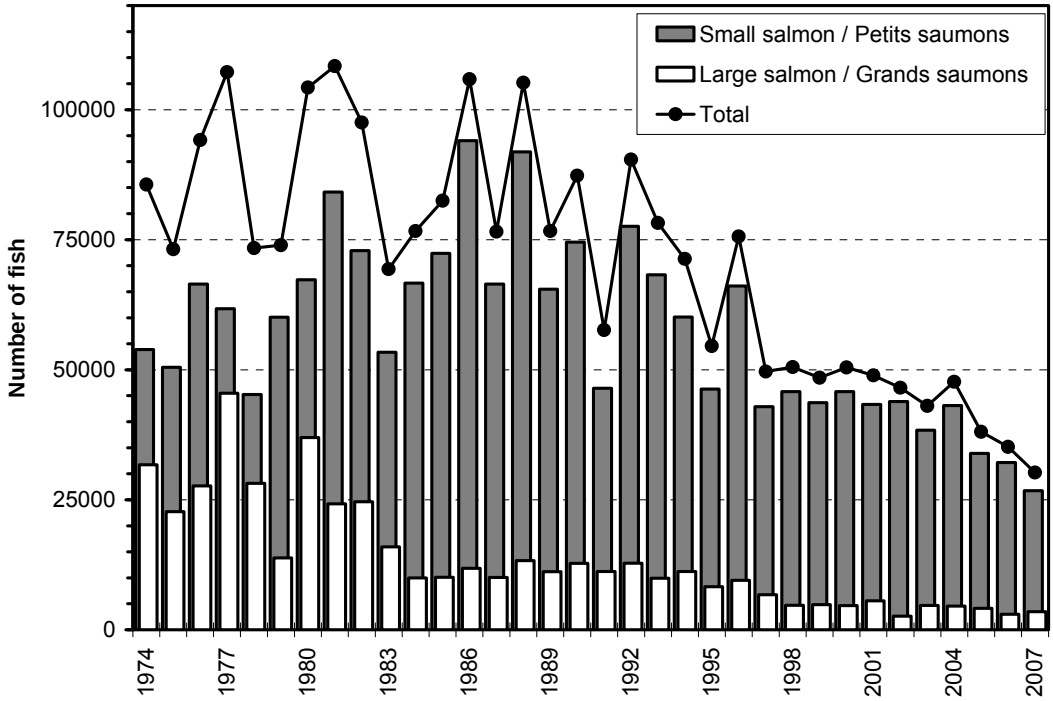
Year / Année	Harvest / Prélèvement (t)	Number of fish / Nombre de poissons	% large by number / % grand par nombre
2000	5.6	2,300	21%
2001	5.0	2,100	24%
2002	5.9	2,700	17%
2003	6.8	3,000	21%
2004	2.2	880	25%
2005	2.7	1,150	20%
2006	2.6	1,052	27%
2007	1.7	733	13%

Recreational Fisheries

Licenses are required for all persons fishing recreationally for Atlantic salmon. Gear is generally restricted to fly fishing and there are restrictive daily/seasonal bag limits. Recreational fisheries management in 2007 varied by area from complete closures of all fisheries to retention of both small and large salmon. Except in Québec and Labrador (SFA 1 and some rivers of SFA 2), only small salmon could be retained in the recreational fisheries. A large portion of the Maritime provinces and Anticosti Island were closed to salmon angling. This management plan was similar to that of 2004 to 2006, with a few river-specific differences.

Total recreational harvest of small and large salmon in 2007 of 30,247 fish was the lowest of record. A total of 26,750 small salmon and 3,497 large salmon were harvested.

Total harvest of salmon by size group in the recreational fisheries of eastern Canada, 1974 to 2007.



The percentage of the catches and harvests (by number of fish) in the bright salmon recreational fisheries in 2007 by province (and separately for Labrador and insular Newfoundland) are presented below. Almost 70% of the small salmon catches and 63% of the small salmon harvests were reported from Newfoundland and Labrador in 2007. Quebec has the largest percentage of the catch and harvests of large salmon. Of note, there are no complete recreational catch and harvest data for New Brunswick since 1997 and the values tabled are estimates of the proportion of the returns based on data from the early 1990s.

The percentage of the catch and the percentage of the harvest by size group within the provinces of eastern Canada in 2007.

	Small		Large	
	Catch	Harvest	Catch	Harvest
Newfoundland & Labrador	68%	63%	18%	7%
Québec	9%	14%	37%	93%
New Brunswick	20%	22%	38%	0%
Prince Edward Island	0%	0%	0%	0%
Nova Scotia	2%	1%	6%	0%
Total (number of fish)	49,884	26,750	23,183	3,497

The practice of catch and release in rod fisheries has become increasingly common on both sides of the Atlantic. In 2007, an estimated 179,000 salmon (size groups combined) were reported released in North Atlantic.

Within Canada, about 43,000 salmon (20,000 large and 23,000 small) were estimated to have been caught and released in 2007. This represents about 59% of the total number caught, including retained fish. Most of the fish released were in Newfoundland (49%), followed by New Brunswick (30%), Québec (15%), Nova Scotia (5%), and Prince Edward Island (0.2%). Expressed as a proportion of the fish caught, Nova Scotia anglers released the highest percentage (89%), followed by Prince Edward Island (88%), New Brunswick (69%), Newfoundland (55%), and Québec (48%).

Catch and release estimates by size group in the recreational fisheries of eastern Canada.

Year	Newfoundland			Nova Scotia			New Brunswick					Prince Edward Island			Quebec			CANADA*		
	Small	Large	Total	Small	Large	Total	Small Kelt	Small Bright	Large Kelt	Large Bright	Total	Small	Large	Total	Small	Large	Total	**SMALL**	**LARGE**	**TOTAL**
1984				939	1,655	2,594	661	851	1,020	14,479	17,011							**2,451**	**17,154**	**19,605**
1985		315	315	1,323	6,346	7,669	1,098	3,963	3,809	17,815	26,685			67				**6,384**	**28,285**	**34,669**
1986		798	798	1,463	10,750	12,213	5,217	9,333	6,941	25,316	46,807							**16,013**	**43,805**	**59,818**
1987		410	410	1,311	6,339	7,650	7,269	10,597	5,723	20,295	43,884							**19,177**	**32,767**	**51,944**
1988		600	600	1,146	6,795	7,941	6,703	10,503	7,182	19,442	43,830	767	256	1,023				**19,119**	**34,275**	**53,394**
1989		183	183	1,562	6,960	8,522	9,566	8,518	7,756	22,127	47,967							**19,646**	**37,026**	**56,672**
1990		503	503	1,782	5,504	7,286	4,435	7,346	6,067	16,231	34,079			1,066				**13,563**	**28,305**	**41,868**
1991		336	336	908	5,482	6,390	3,161	3,501	3,169	10,650	20,481	1,103	187	1,290				**8,673**	**19,824**	**28,497**
1992	5,893	1,423	7,316	737	5,093	5,830	2,966	8,349	5,681	16,308	33,304			1,250				**17,945**	**28,505**	**46,450**
1993	18,196	1,731	19,927	1,076	3,998	5,074	4,422	7,276	4,624	12,526	28,848							**30,970**	**22,879**	**53,849**
1994	24,442	5,032	29,474	796	2,894	3,690	4,153	7,443	4,790	11,556	27,942	577	147	724				**37,411**	**24,419**	**61,830**
1995	26,273	5,166	31,439	979	2,861	3,840	770	4,260	880	5,220	11,130	209	139	348		922	922	**32,491**	**15,188**	**47,679**
1996	34,342	6,209	40,551	3,526	5,661	9,187						472	238	710		1,718	1,718	**38,340**	**13,826**	**52,166**
1997	25,316	4,720	30,036	713	3,363	4,076	3,457	4,870	3,786	8,874	20,987	210	118	328	182	1,643	1,825	**34,748**	**22,504**	**57,252**
1998	31,368	4,375	35,743	688	2,476	3,164	3,154	5,760	3,452	8,298	20,664	233	114	347	297	2,680	2,977	**41,500**	**21,395**	**62,895**
1999	24,567	4,153	28,720	562	2,186	2,748	3,155	5,631	3,456	8,281	20,523	192	157	349	298	2,693	2,991	**34,405**	**20,926**	**55,331**
2000	29,705	6,479	36,184	407	1,303	1,710	3,154	6,689	3,455	8,690	21,988	101	46	147	445	4,008	4,453	**40,501**	**23,981**	**64,482**
2001	22,348	5,184	27,532	527	1,199	1,726	3,094	6,166	3,829	11,252	24,341	202	103	305	809	4,674	5,483	**33,146**	**26,241**	**59,387**
2002	23,071	3,992	27,063	829	1,100	1,929	1,034	7,351	2,190	5,349	15,924	207	31	238	852	4,918	5,770	**33,344**	**17,580**	**50,924**
2003	21,379	4,965	26,344	626	2,106	2,732	1,555	5,375	1,042	7,981	15,953	240	123	363	1,238	7,015	8,253	**30,413**	**23,232**	**53,645**
2004	23,430	5,168	28,598	828	2,339	3,167	1,050	7,517	4,935	8,100	21,602	135	68	203	1,291	7,455	8,746	**34,251**	**28,065**	**62,316**
2005	33,129	6,598	39,727	933	2,617	3,550	1,520	2,695	2,202	5,584	12,001	83	83	166	1,116	6,445	7,561	**39,476**	**23,529**	**63,005**
2006	30,491	5,694	36,185	1,014	2,408	3,422	1,071	4,186	2,638	5,538	13,433	128	42	170	1,091	6,185	7,276	**37,981**	**22,505**	**60,486**
2007	17,168	3,892	21,060	883	1,471	2,354	1,106	2,963	1,850	7,040	12,959	63	41	104	951	5,392	6,343	**23,134**	**19,686**	**42,820**

* totals for all years prior to 1997 are incomplete and are considered minimal estimates
blank cells indicate no information available

Other fisheries

St. Pierre & Miquelon

Based on a report from the Ministry of Agriculture and Fisheries, the following observations were made relative to the 2007 salmon fishery at St. Pierre et Miquelon:

- Fishermen indicated that the fishery in 2007 was poor.
- Fish arrived later than usual in 2007
- Catches were a mixture of small and large salmon from the start of the fishery, in contrast to other years when large salmon were captured first
- Effort was considered to have been similar to previous years but catches were substantially less than recent years.

This fishery catches salmon of both Canadian and USA origin. Based on samples collected in 2004, 100% were of North American origin of which 98% originated in Canada and 2% originated in the USA.

Reported harvest in 2007 was 1.9 t, decrease of 1.6 t (-44%) from 2006 and the lowest value since 1997.

Reported harvest (kg) by licence type in St. Pierre & Miquelon, 2000 to 2007.

Year / Année	Professional Licenses / Pêcheurs professionels(kg)	Recreational Licenses (kg) / Pêcheurs plaisanciers	Total (kg)
2000	1 134	1 133	2 267
2001	1 544	611	2 155
2002	1 223	729	1 952
2003	1 620	1 272	2 892
2004	1 499	1 285	2 784
2005	2 243	1 044	3 287
2006	1 730	1 825	3 555
2007	970	977	1 947

West Greenland fishery in 2007

Reported harvest in 2007 was 24.6 t representing about 6,300 fish

- 16.6 t were reported sold on the open markets and to hotels, restaurants or institutions
- 8.1 tons were reported kept for private consumption
- sampling from Qaquortoq indicated under-reporting at that location only (960 kg sampled, 801 kg reported)
- reported landing of 24.6 t, adjusted landing for assessment of 24.8 t

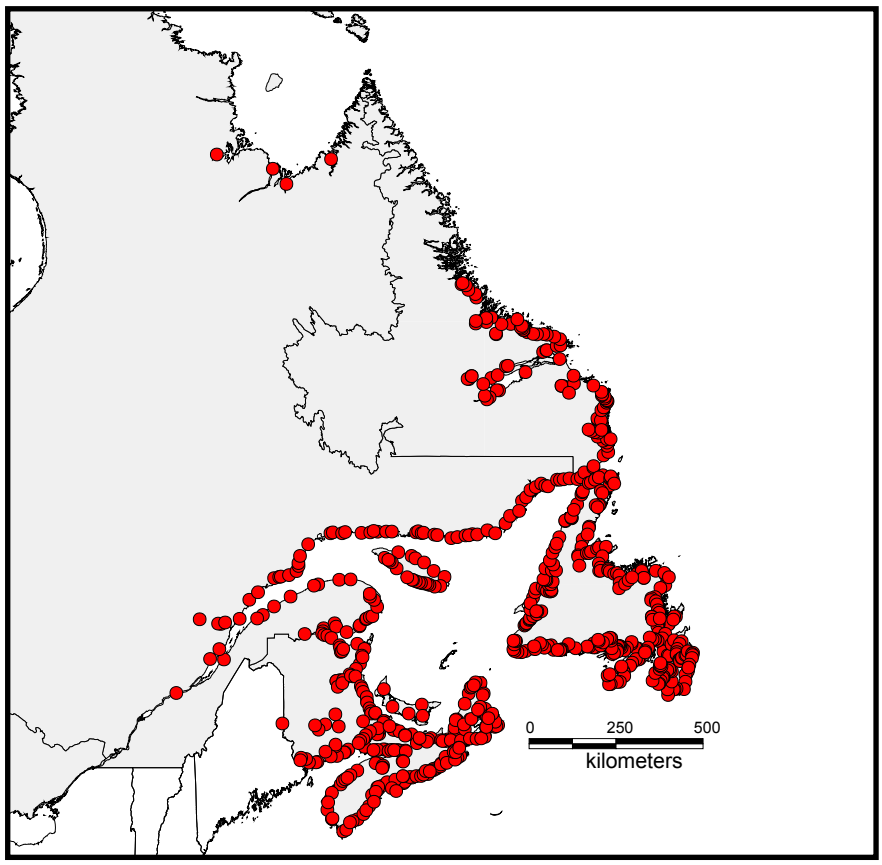
A total of 132 people reported fishing in 2007 but it was indicated that this is probably less than half of the people fishing.

Based on samples collected from the fishery, 82% of the samples were of North American origin. When weighted by catch, 6100 fish (76%) were estimated to have been of North American origin, 1900 fish (24%) were of European origin.

Tags from fish in eastern Canada were reported from the fishery in 2007: one salmon tagged as wild smolt from Miramichi River in 2006 and one salmon tagged as an adult spawner from Miramichi River in the fall of 2006.

2) STOCK STATUS FOR EASTERN CANADA

There are about 700 rivers in eastern Canada which are considered to have or have had anadromous Atlantic salmon populations. The rivers are distributed from 52.7º to 71.7ºW and 43.6º to 58.8ºN. This includes 223 rivers in the three Maritime provinces (New Brunswick, Nova Scotia, Prince Edward Island), 109 rivers in Quebec, 267 rivers in Insular Newfoundland, and 90 rivers in Labrador.



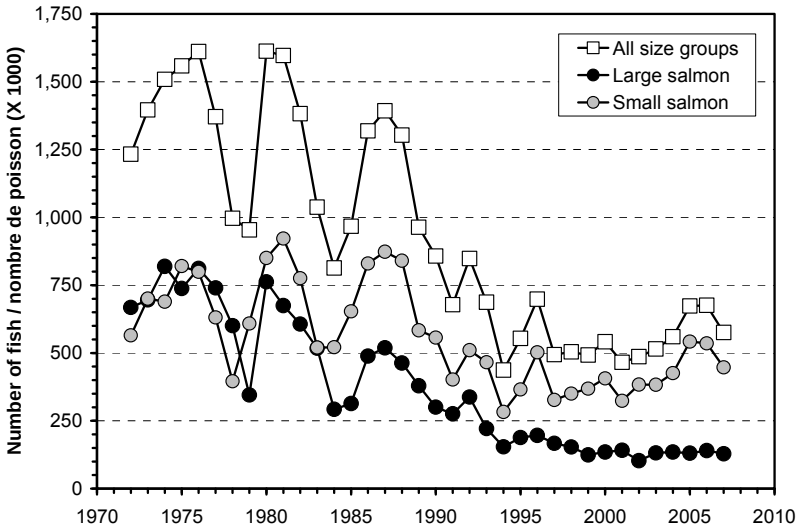
Stock status is inferred from a number of indicators including returns and spawners of adult salmon, smolt production, and juvenile indices. Returns and spawners are compared to the defined conservation limits for the rivers.

Total abundance of salmon

An approximation of the total abundance of salmon of all age groups was obtained by adding the returns from each region (Scotia-Fundy, Gulf, Quebec, Newfoundland, Labrador), the commercial fishery catches of Newfoundland and Labrador, and the commercial catch of salmon of North American origin at West Greenland. These numbers are different from those calculated at ICES for the following reasons:

- large salmon above include two-sea-winter, three-sea-winter and repeat spawners
- the numbers are not corrected for natural mortality between commercial fisheries and returns to rivers (if we were to correct for this, the estimates would be slightly higher).

This is shown in the graph below.



The low abundance of adult salmon continued into 2007.

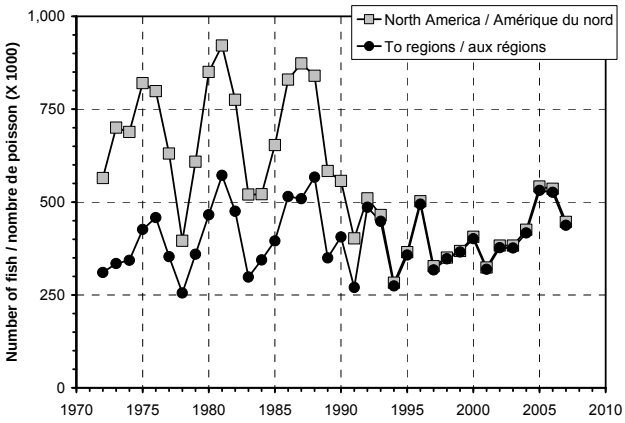
Important points about the estimated abundance:

- Abundances between 1972 and 1990 show large annual variations
- Maximum estimated abundance of salmon was about 1.6 million fish, all age groups
- Abundance of Atlantic salmon, all age groups combined was about 500 thousand fish from 1997 to 2003.
- In 2007, there were an estimated 575 thousand fish.

Large salmon abundance peaked at over 800 thousand fish but since 1999, there are fewer than 140 thousand animals of this size group, ages combined.

- Large salmon abundance has declined by 89% over the past 35 years.
- In 2007, there were an estimated 130,000 large salmon.
- Returns in 2007 of large salmon were unchanged from recent ten years and the third lowest of time series.
- Differences between returns to regions and total abundance represent removals in marine fisheries of Newfoundland and Labrador and West Greenland.
- In the Maritime provinces and Quebec, these large salmon are the egg-bearing females.

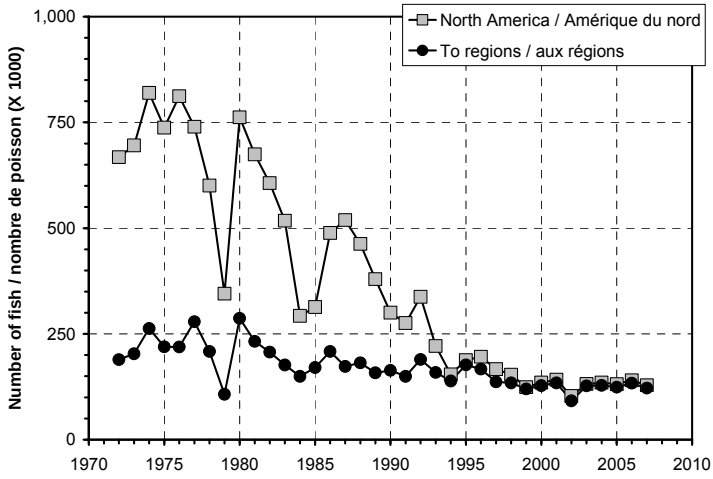
Large salmon



Small salmon (grilse) abundance declined from peaks of about 900 thousand fish to as low as 300 thousand fish in the 1990's.

- Small salmon abundance has declined by 50% over the past 35 years.
- There has been a slight upturn in small salmon abundance to about 500 thousand fish since 2005.
- In 2007, there were an estimated 450,000 small salmon.
- Returns of small salmon declined sharply (-17%) from 2006 due to reduced marine survival.

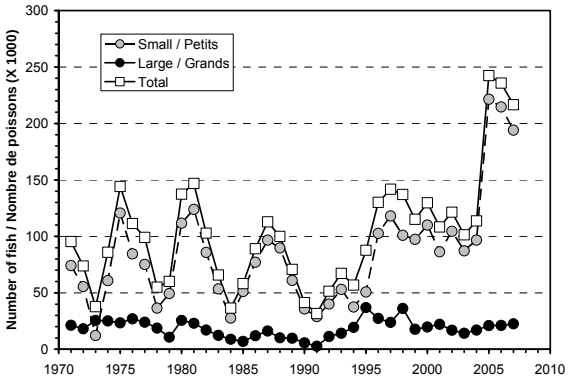
Small salmon



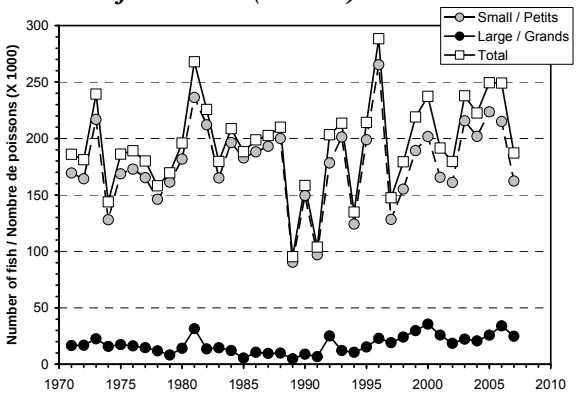
Declines in large salmon returns have been most severe in the Maritime provinces of eastern Canada. The upturn in small salmon abundance has occurred in Labrador and Newfoundland but not in the southern areas of eastern North America. The only upturn post commercial fishery closures has been noted in the small salmon returns to Labrador whereas returns to all other areas have remained the same or declined. Returns to the southern area (Scotia-Fundy) have remained at the lowest levels of the time series.

Estimated abundance of small salmon, large salmon and total after fisheries at sea to the five regions of eastern Canada, 1971 to 2007.

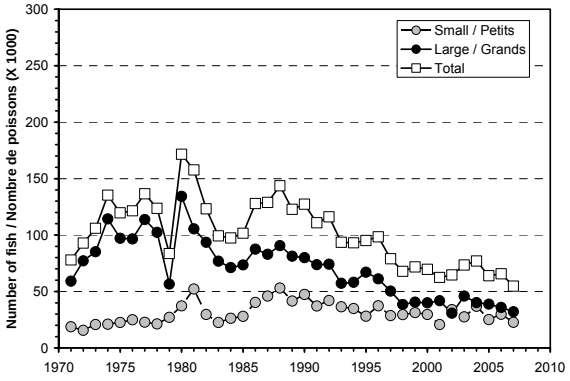
Labrador



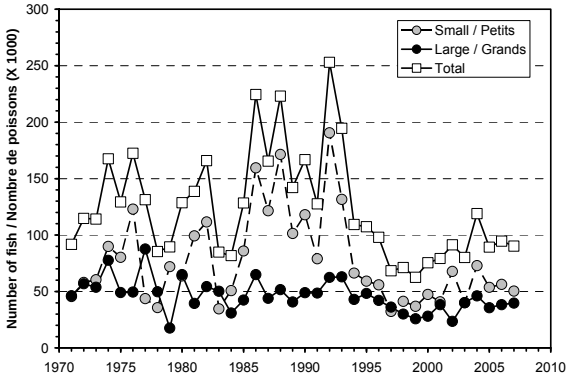
Newfoundland (insular)



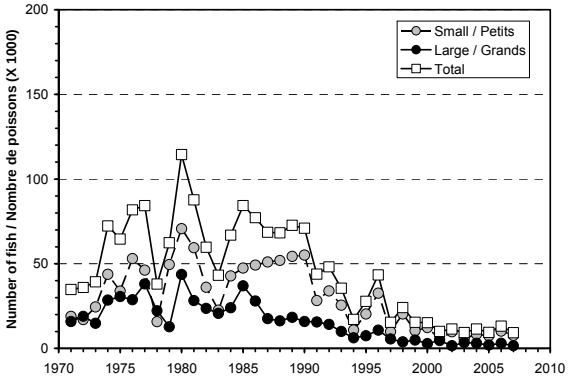
Quebec



Gulf



Scotia-Fundy



Spawners Relative To Conservation

Conservation objectives

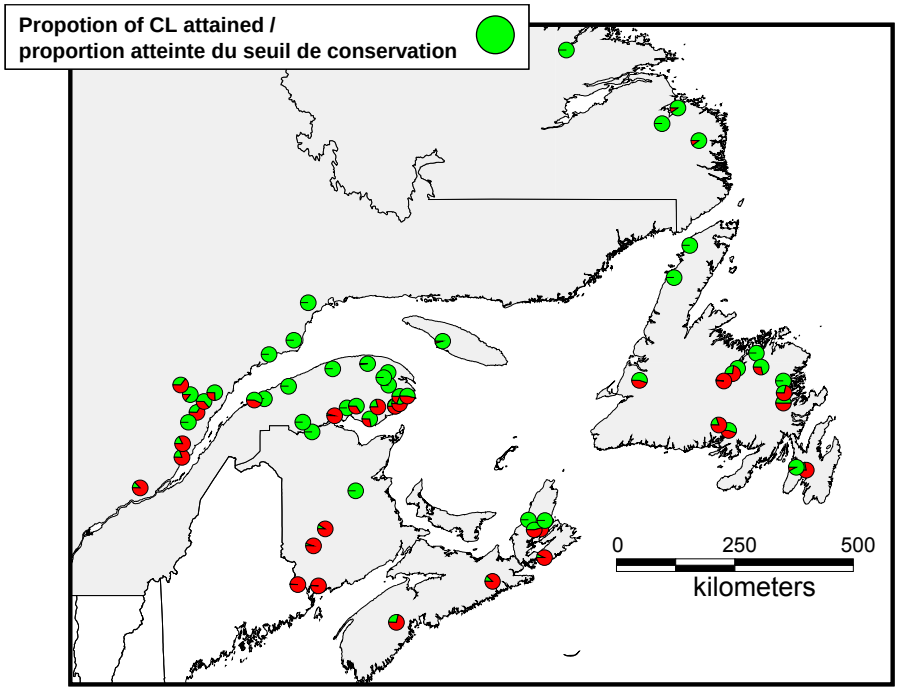
Conservation limits have been defined for all management regions of eastern Canada and correspond to an egg deposition per unit area of freshwater productive habitat. By geographic area, the conservation requirements are:

- Maritime provinces : 240 eggs per 100 m² of fluvial habitat, expected to maximize freshwater production
- Insular Newfoundland : 240 eggs per 100 m² of fluvial area plus 368 eggs per ha of pond area or 105 eggs per ha of pond area for northern peninsula. This level is expected to maximize freshwater production.
- Québec: 168 eggs per 100 m ² of units of productive habitat (habitat is weighted by productive capacity). This rate is expected to optimize harvest potential of adults.
- Labrador: 190 eggs per 100 m² of fluvial habitat. Fluvial habitat areas for many rivers remain to be measured.

Spawners relative to conservation

Estimated total spawners of 2SW salmon to each of the five regions in eastern Canada in 2007 were below the regional 2SW conservation requirements.

In 2007, river-specific spawning escapements relative to conservation were available from 63 rivers, compared to 70 rivers in 2006. High water conditions in the fall of 2007 prevented assessments in several rivers.



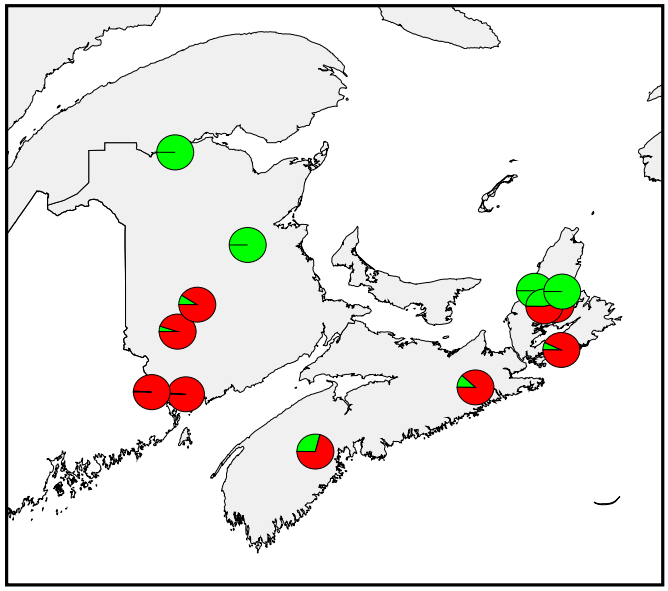
In 2007, 36% of the assessed rivers met or exceeded the conservation limits, compared to 50% of the 70 assessed rivers in 2006. Severe underescapement (<50% of conservation limit) was observed in 38% of the assessed rivers in 2007, in contrast to 29% of the assessed rivers in 2006. Most of the rivers with severe deficits in spawners were in the southern areas and in

rivers under colonization or development (upper Exploits, Terra Nova, Pabos, Jacques Cartier,…).

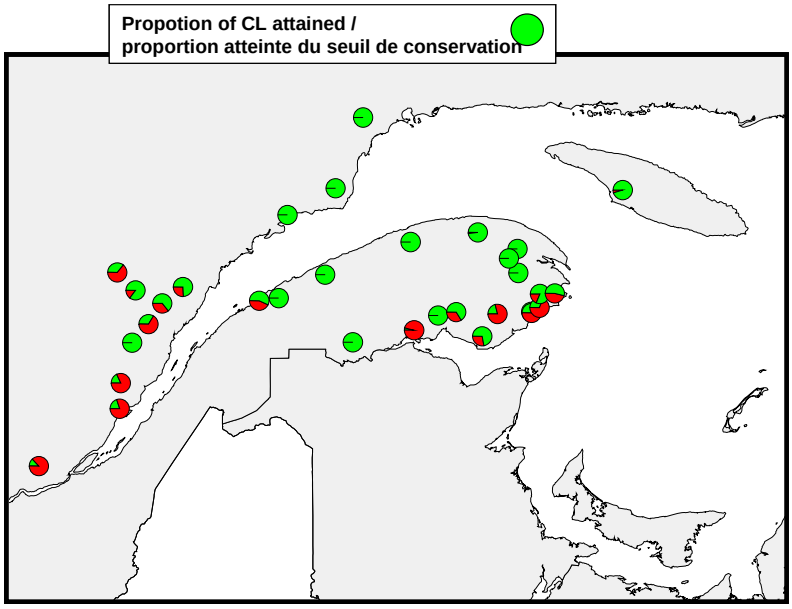
Overall, fewer rivers met or exceeded conservation in 2007 relative to 2006. Since 2000, generally less than 50% of the assessed rivers have met or exceeded the river-specific conservation limits in eastern Canada.

Percentage of assessed rivers exceeding CL	2000	2001	2002	2003	2004	2005	2006	2007
	43%	38%	29%	44%	54%	45%	50%	36%

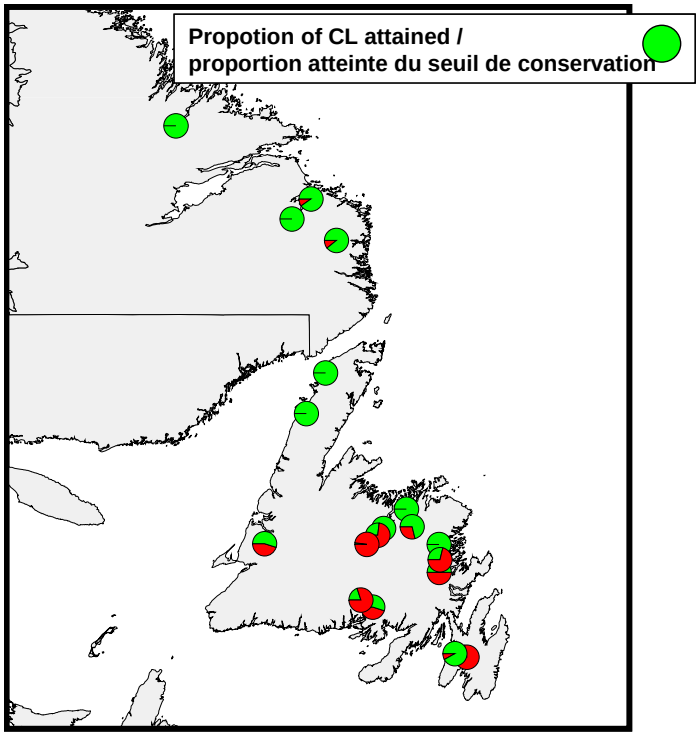
In the Maritime provinces, conservation limits were met or exceeded in only 4 of the 13 (31%) assessed rivers, same number as in 2006 (4 of 16 assessed rivers). Large deficits in spawning escapement were noted in the other nine rivers in 2007, compared with only seven of 16 rivers in 2006.



In Quebec, conservation limits were achieved in 38% of the 32 assessed rivers, in contrast to 54% of the 35 assessed rivers in 2006. Large deficits were observed in 31% of the assessed rivers in 2007 (compared with 17% in 2006) but these rivers were closed to retention of large salmon in the recreational fishery. In the 12 assessed rivers where retention of large salmon in the recreational fishery was allowed, conservation limits were exceeded in 9 of them (75%). In the other three rivers, the percent of conservation achieved ranged from 72% to 98%, in 2007.



In Newfoundland and Labrador, the conservation limits were exceeded in 37% of the 19 assessed rivers, compared with 63% of 19 rivers in 2006. The rivers which met or exceeded the conservation limits were all in the northern areas of this region. Large deficits (<50% of conservation) were noted in 26% of the assessed rivers in 2007, compared with only 4% of the rivers in 2006. For Labrador, conservation was exceeded in 2 of the 4 assessed rivers in 2007, compared to all four rivers exceeding conservation in 2006.



Freshwater production

Wild smolt production was estimated in 11 rivers in 2007. Relative to 2006, smolt production increased (>10% change) in five rivers, decreased in two rivers and remained unchanged in four rivers. The relative smolt production, scaled to the size of the river using the conservation egg requirements, was highest in the rivers of Québec and low in the southern rivers of the Scotia Fundy. In nine rivers monitored over at least the past ten years, there has generally been no change in smolt production with the exception of Campbellton River (Newfoundland) (decline) which showed a decline. Smolt production remains low in the southern areas which are consistent with the low spawning escapements to these rivers.

Juvenile salmon abundance monitored annually in a number of southern region and Gulf rivers show trends consistent with stock status. In the rivers of the southern Gulf, densities of juveniles have increased since 1985 in response to increased spawning escapements. Abundances of juveniles in the Atlantic coast rivers of Nova Scotia and Bay of Fundy rivers are low and have declined with decreasing spawning escapement. In the most recent survey (2002), young-of-the-year salmon were absent from 30 of 34 rivers sampled in the Inner Bay of Fundy, a stock which is presently listed as "Endangered" under Canada's Species at Risk Act.

Sea survival

Survival rates of the 2006 smolts returning as small salmon (or 1SW salmon) in 2007 were below the values of the 2005 smolts in all nine rivers assessed. Survival rates were 18% to 86% below those of 2005. 2SW salmon survival rates were also generally lower.

	% to 1SW / au stade madeleineau		
	Smolt year		
River / rivière	2006	2005	2004
Western Arm Brook (Newfoundland)	3.8	15.1	5.9
Campbellton (Newfoundland)	5.6	9.2	11.4
Conne (Newfoundland)	3.3	4.0	2.5
St-Jean (Quebec)	0.3	0.4	0.7
LaHave (Nova Scotia)	1.5	8.0	1.1
NAshwaak (New Brunswick)	1.8	12.7	5.1
Saint John Hatchery (New Brunswick)	0.2	0.6	0.4

Time series of return rates of smolts to 1SW and 2SW adults provide insights into temporal changes in marine survival of wild and hatchery 1SW and 2SW stocks. Specifically:

- Return rates in 2007 to many rivers were among the lowest of the time series and were low compared to historical levels,
- Return rates of fish to home waters did not increase as expected after closure of the commercial fisheries in 1984 and subsequently in 1992,
- 1SW return rates in MSW salmon stocks (Scotia-Fundy, Gulf, Quebec) are lower than those in predominantly 1SW salmon stocks of Newfoundland,
- 1SW return rates in MSW salmon stocks of the Scotia-Fundy and Gulf exceed those of 2SW salmon but 2SW returns rates are greater than 1SW return rates in Québec populations, and
- Return rates of wild stocks exceed those of hatchery stocks.

Summary of return rates of monitored stocks for the last five years					
Origin	Age group	Region	Return rate		Number of stocks
			Mean (%)	Range (%)	
Wild	1SW	Scotia-Fundy	4.22	1.13 to 12.73	2
		Gulf	3.29	1.90 to 6.40	2
		Québec	0.73	0.27 to 1.49	2
		Newfoundland	5.65	1.30 to 15.10	5
Wild	2SW	Scotia-Fundy	0.96	0.24 to 1.58	2
		Gulf	1.60	0.80 to 2.20	1
		Québec	0.70	0.19 to 1.39	2
Hatchery	1SW	Scotia-Fundy	0.37	0.24 to 0.56	1
	2SW	Scotia-Fundy	0.11	0.06 to 0.15	1

ANNEX 4

North American Commission

NAC(08)3

Report on US Atlantic Salmon Management and Research Activities in 2007

NAC(08)3

Report on US Atlantic Salmon Management and Research Activities in 2007

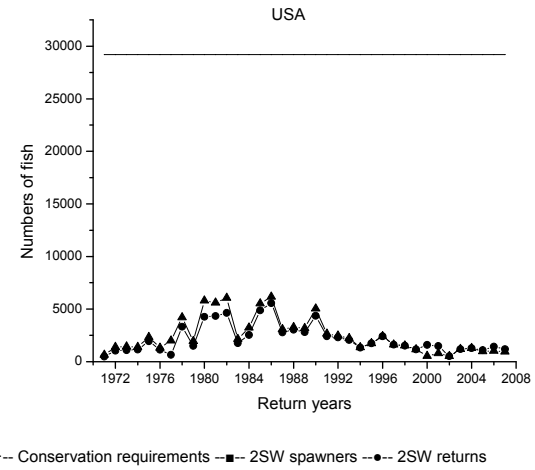
Adult Returns

In 2007, the total return to USA rivers was 1,255, a 15% decrease from 2006 returns and a 4% decrease from 2005 returns. In addition to catches at traps and weirs (1,218), returns were estimated for the eight core populations that comprise the federally endangered Gulf of Maine Distinct Population Segment (GOM DPS). Data on adult returns and redd counts collected from the Narraguagus, Pleasant, and Dennys rivers have been used to estimate returns to core populations within the GOM DPS using a linear regression. Fifty-three adult (90% CI = 39 - 72) fish were estimated to return to the GOM DPS.

Most returns occurred in Maine, with the Penobscot River accounting for 74% of the total return. Overall, 24% of the adult returns to the USA were 1SW salmon and 76% were MSW salmon. Most (74%) returns were of hatchery origin and the balance (26%) originated from either natural reproduction or hatchery fry. The adult return rate (1SW plus 2SW) of hatchery smolts released in the Penobscot River in 2005 was 0.17%, with the 2SW fish return rate 0.11%. Smolt survival on the Penobscot River correlates well with other large restoration programs in the Connecticut and Merrimack rivers. The estimated return rate for 2SW adults from the 2005 cohort of wild smolts on the Narraguagus was 0.73%, mirroring trends on the Penobscot.

As reported by the ICES Working Group on North Atlantic salmon, pre−spawning adults were stocked into USA rivers, however, even with these, all age classes of spawners (1SW, 2SW, 3SW, and repeat) in 2007 (1490 salmon) represented only 5.1% of the 2SW spawner requirements for all USA rivers combined (see Figure 1).

Figure 1: US 2SW returns, 2SW spawners, and 2SW conservation requirements



Stock Enhancement Programs

During 2007 over 12 million juvenile salmon (92% fry) were released into 15 River systems. The number of juveniles released was slightly more than that in 2006. Fry were stocked in

the Connecticut, Merrimack, Saco, Penobscot, and six rivers within the geographic range of the GOM DPS in Maine. The 363,500 parr released in 2007 were primarily the by-products of smolt production programs and included ages 0 and 1 fish. Smolts were stocked in the Penobscot (559,900), Merrimack (50,000), Connecticut (99,600), Dennys (56,500), and Pawcatuck (11,300) rivers. In addition to juveniles, 3,877 adult salmon were released into US rivers. Most were spent broodstock or broodstock excess to hatchery capacity. However, mature pre-spawn salmon released in the Sheepscot, East Machias, and Machias rivers and Hobart Stream produced redds. In the Merrimack River excess broodstock were released to support a recreational fishery and to enhance spawning in the watershed.

Mature adults stocked into Sheepscot, East Machias, and Machias rivers and Hobart Stream in the fall were added to USA 2SW returns to calculate spawners. Thus, spawners exceeded returns in 2007 with USA spawners totaling 1,490. Escapement to natural spawning areas was 687 (returns – broodstock + stocked pre-spawn adults).

Tagging and Marking Programs

Tagging and marking programs facilitated research and assessment programs including: identifying the life stage and location of stocking, evaluating juvenile growth and survival, instream adult and juvenile movement, and estuarine smolt movement. A total of 424,805 salmon released into USA waters in 2007 was marked or tagged. Tags and marks for parr, smolts and adults included: Floy, Carlin, HI-Z Turb'N, PIT, radio, acoustical, fin clips, and visual implant elastomer. In addition, approximately 37,000 fry had thermally marked otoliths. About 24% of the marked fish were released into the Connecticut River watershed and 68% into the Penobscot River.

Description of Fisheries

Commercial fisheries for sea-run Atlantic salmon are closed in US waters, including freshwater systems, coastal/ estuarine systems, and marine waters within the US Exclusive Economic Zone (EEZ). Except for a one-month recreational catch and release fishery on the Penobscot River, Maine and recreational fisheries for sea-run Atlantic salmon are closed in USA waters (including coastal waters). Estimated unreported catch is zero (metric tons). A total of 90 licenses were sold for the fall fishery, with about one third of the anglers complying with reporting requirements. A total of 83 angler trips were reported. Anglers had the opportunity to fish over at least 31 Atlantic salmon based on the catch of salmon at the Veazie trap. Three Atlantic salmon were captured and released. A fishery in the main stem of the Merrimack River and small reach of the Pemigewasset River was supported by the release of 1,081 broodstock in 2007. In Connecticut a recreational fishery for reconditioned broodstock is authorized on the Shetucket and Nagautuck Rivers. Detailed information on all of these fisheries is available in the US Fisheries Focus Area Report.

Commercial Aquaculture Production

During 2006, several US aquaculture companies merged into one large producer of salmon for Maine; Cooke Aquaculture. In 2006, 3 million smolts were stocked in hopes of increasing harvest totals for 2007/2008. Production of farmed salmon in Maine was reported to be 2,715 metric tonnes in 2007, about 60% of the 4,674 metric tonnes of production reported in 2006. Production in four the last six years has been less than half of the 13,202 t produced in 2001.

Habitat Conservation, Enhancement, and Restoration

- In 2007 USFWS and Project SHARE completed 392 stream-road crossing surveys using Vermont assessment protocol (n=19 prior to June) and the new 2007 Maine Road-Stream Crossing Survey protocol (n=373 after June 2007). Surveys included: 380 culverts, 3 open bottom arches, 3 bridges, and 6 abandoned road crossings. Twenty-four of fifty-five (44%) culverts surveyed in the West Branch of the Machias River were classified as barriers to fish. One of the "potential" barriers was retrofitted with an Open Arch Culvert in 2007. USFWS and Project SHARE staff has plans to conduct fisheries assessments in the remaining 54 West Branch Machias sites in 2008.
- In 2007, 13 stream habitat connectivity projects were completed in four Downeast Rivers using funds from USDA-WHIP, USFWS, MASC-SCEP, Project SHARE, Washington County Soil and Water Conservation District, and private landowners. One stream-road crossings (culvert) was completely removed in the Machias River watershed. The remaining 12 projects replaced undersized or failing structures with open bottom arches that spanned 1.2 times bankfull stream width. Although the majority of these restoration projects were located above mapped juvenile Atlantic salmon habitat, the Harmon Brook site, in the East Machias watershed, was within mapped habitat. This location is routinely stocked with fry, although stocking was not conducted in 2007 in anticipation of culvert replacement. Pre-construction electrofishing collected 40 salmon parr just above and below the road in Harmon Brook. One restoration site, located 50 meters above the West Branch Machias River, contained both YOY and parr Atlantic salmon during the pre-construction fish removal efforts.
- Maine streams have large wood loads far below predicted levels, and notably low compared to other parts of the United States. Although extensive research has been done on the relationship between Pacific salmonids and wood, relatively little is known about the role wood plays in influencing juvenile Atlantic salmon populations. Two hypotheses were tested in Old Stream, Maine, via snorkel survey in sites with naturally occurring high and low wood densities: 1) the density of juvenile Atlantic salmon was higher in sites that contained high as opposed to low loading of wood, and 2) where wood was available, juvenile salmon tended to be associated with it within a site. LWD was added to two sites, each with a paired control site, in Creamer Brook, East Machias Drainage in October, 2006. Results showed that age 1+ or older juveniles were at significantly higher densities in sites with high wood loading, but substrate coarseness was a more important factor. In addition, a significant proportion of both age 0+ and older juveniles associated with wood in sites where it was available. However, this association also interacted with substrate coarseness and weed cover. These findings suggest that wood is an important habitat feature for juvenile Atlantic salmon, but cannot be viewed in isolation of other habitat factors. In 2007, LWD was added to two sites, each with a paired control site.
- Fish Passage Improvements
    - Fisheries agencies in Maine continue to work to improve existing up- and down-stream fish passage, to have fish passage at dams where none exist, and to remove dams and other blocks of habitat connectivity. Thus, fish passage work in Maine focuses on dams licensed by the Federal Enegy Regulatory Commission (FERC) on the Penobscot, Kennebec, and Saco rivers and on opportunities to enhance passage throughout historic Atlantic salmon habitat. This includes participating in activities associated with: the Penobscot River

Restoration Project, passage facilities on the Kennebec at Lockwood (Florida Power and Light (FPL)), Hydro Kennebec (Brookfield Power), Shawmut (FPL), Weston (FPL), and Anson and Abenaki (Madison Paper Industries); on the Sebasticook River at Benton Falls (Benton Falls Hydro Associates), Burnham (Ridgewood Maine Hydro Partners), and Fort Halifax (FPL) projects, and replacing culverts on highways and logging roads. On the Presumpscot River, a Settlement Framework Agreement has been negotiated as a prelude to an agreement which would provide for passage at one FERC non-jurisdictional dam and at five additional hydro power dams. On the Narraguagus River, DMR-BSRFH and partners have been working with the Town of Cherryfield to repair the fishway at the ice control dam. The town has consulted with FWS for engineering plans and the most affordable plan, to line the wood fishway with aluminum, is being pursued. There has been progress resolving the conflicts associated with providing fish passage at the West Winterport Dam on the Marsh River, a tributary to the Penobscot River estuary.

- In 2007, the multi-agency New Hampshire River Restoration Task Force (NHRRTF) continued to work on identifying dams for removal in the state and pursuing strategic alterations and/or modifications of dams. There are two dams in the Merrimack River watershed scheduled for removal, the Merrimack Village Dam, Souhegan River, Merrimack, NH and the Black Brook Dam, Black Brook, Manchester, NH. A number of other passage improvements on dams in the Merrimack also continue to be achieved. In the Connecticut, the Raymond Dam was removed and a number of passage improvements were made as well.

The Endangered Gulf of Maine (GOM) Distinct Population Segment (DPS)

The federally endangered GOM DPS of Atlantic salmon, as listed in 2000, includes Cove Brook (a tributary to the lower Penobscot River) the Dennys, Machias, East Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers. Fifty-three adult (90% CI = 39 - 72) fish were estimated to return to the GOM DPS. Data on adult returns and redd counts collected from the Narraguagus, Pleasant, and Dennys rivers have been used to estimate returns to core populations within the GOM DPS using a linear regression.

The U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) collectively referred to as the Services, have joint responsibility for recovery of the endangered GOM DPS of Atlantic salmon. The Services work closely with the State of Maine on salmon management and conservation. Up until 2007, the Maine Atlantic Salmon Commission (MASC) was the state agency charged with the management and conservation of Atlantic salmon and coordinating with other state agencies to carry out these responsibilities. Over the past year, the MASC was merged with the stock enhancement division in the Maine Department of Marine Resources (MDMR) to form the Bureau of Sea Run Fisheries and Habitat.

In 2003 the Services assembled an Atlantic Salmon Biological Review Team (BRT) to review and evaluate all relevant scientific information necessary to evaluate whether the population in the Penobscot River and other rivers should be included in the GOM DPS. The populations in the Penobscot and a few other rivers were not included in the GOM DPS at the time it was listed under the ESA in November of 2000 because there was not enough

scientific information at that time to demonstrate that those populations were part of the same DPS or constituted a different DPS. Since the listing in 2000, new information has come to light which indicates that the GOM DPS should be re-evaluated to determine if any other populations should be included because they are closely related. The Draft Status Review was completed in January 2006 and underwent peer review. The Center for Independent Experts (CIE) completed the review and the BRT made revisions to the document based upon this critique. The Status Review was made available to the public during the fall of 2006. NMFS and the USFWS (collectively referred to as the Services) are currently considering the information presented in the 2006 Status Review, the comments from the peer reviewers, and the response of the BRT to the peer reviewers to determine if action under the ESA is warranted. The Services could determine that a change to the boundaries or conservation status of the existing GOM DPS is warranted, that a separate listing action is warranted, or that no action is warranted. If the Services determined that a modification to the existing listing or a new listing was warranted, then a proposed rule will be published along with the rationale for that proposal. A determination regarding the listing status of the expanded GOM DPS is expected in 2008.

The ESA also requires that the Services designate Critical Habitat for all species listed as endangered or threatened. The Services listed Atlantic salmon in the GOM DPS as endangered under the ESA in 2000, however, critical habitat has yet to be designated. Critical habitat is defined as habitat that includes physical and biological features essential to the conservation of the listed species. Critical habitat can be designated in all areas currently occupied by the species, and may be designated in those areas not occupied by the species if those areas are deemed essential to the conservation and recovery of the species. Federal agencies must consult with the Services on any action they permit, fund or carry out that may adversely affect critical habitat. Currently NMFS is working on developing the source documents that describe the habitat features essential to the conservation of the species as well as those activities that likely affect the identified habitat features. The information in the source document will be used to conduct an economic analysis designed to assess the economic impact that a critical habitat designation may have and weigh the cost of designating critical habitat with the benefits to recovery. Areas can be excluded from a critical habitat designation if the costs are deemed to be too great, as long as the decision not to designate does not jeopardize the continued existence of the species. A proposal on critical habitat designation is planned for 2008.

In 2006 the MDMR, USFWS, and NMFS contracted Sustainable Ecosystems Institute (http://www.sei.org/) to conduct an independent program review to determine if current hatchery operations, protocols, and practices are scientifically sound, have potential to further recovery, and are integrated with population assessment and evaluation programs. One of the main questions posed during this review was: Is there integrated adaptive management of Atlantic salmon in Maine? A team of six scientists was convened to review the Maine program. The visit included a tour of CBNFH and two days of presentations by and discussions with agency staff and interested scientists (i.e. researchers, managers from other programs, and retirees). The report was provided to the Services and MASC in May 2007. In response to this review, the three agencies are developing a new governance structure for the Maine Atlantic salmon program. The new governance structure addresses needs highlighted by SEI such as (1) the hatchery program should be more fully integrated with the recovery program; (2) the agencies should develop a conceptual framework for recovery; and (3) this framework should guide all recovery efforts. The new governance structure is replacing the Maine Atlantic Salmon Technical Advisory Committee and the Recovery Team. It is based on an agreed recovery framework with the intent that: 1) recovery and

restoration are done in accordance with the framework; 2) the framework and the program are based on best available science; 3) resources are made available to implement those actions or measures agreed to in any given cycle; 4) there is dispute resolution and continuity throughout the year; and 5) horizontal and vertical communication among and within agencies will improve. Action Teams related to estuarine, marine, and freshwater survival and production, conservation hatcheries, managing genetic diversity, population assessment, and outreach are the key component of the new Atlantic salmon program. Action Teams have just started the process of identifying the highest priority research and management actions to recover the Gulf of Maine Distinct Population Segment of Atlantic salmon. The finalization and implementation of a new Atlantic salmon recovery framework is not yet complete.

Other Additional Items of Interest

- Penobscot River Restoration and Multispecies Management Plan
    - One of the most significant ongoing restoration projects is the Penobscot River Restoration Project. The Penobscot River Restoration Trust was formed in 2004 as part of a multi-party settlement agreement with dam owner PPL (Pennsylvania Power and Light) and the FERC. The settlement, which was signed by the U.S. Department of Interior's Bureaus of Fish and Wildlife and Indian Affairs, the National Park Service, the State of Maine, the Penobscot Indian Nation and several non-governmental organizations, details conditions for dam removal, fish passage, and operational changes at eight hydroelectric projects on the lower Penobscot. The Penobscot Trust has a 3-5 year option period during which time the dams must be purchased. The Penobscot Trust and partners reached significant milestones in late 2007 by raising the $25 million needed to purchase the Veazie, Great Works and Howland Dams. Ten million dollars of the raised money was from the FY08 Omnibus Appropriations Bill passed in December 2007 will be directed to the Penobscot River Restoration Project through the NMFS. The funding was part of the Commerce, Justice, Science Bill included in the omnibus funding measure. The Penobscot Trust continues to work with partners to raise the subsequent funding to implement the removals, alterations, mitigation and economic development elements of the project. In addition to the initial purchase price of $25 million dollars, the preliminary estimate for project implementation, including dam removal and modifications, economic development and mitigation, is approximately $30 million.
    - In anticipation of the restoration potential of the Penobscot River Restoration Project, Maine Department of Marine Resource's (MDMR) Bureau of Sea-Run Fisheries and Habitat in conjunction with Maine Inland Fisheries and Wildlife (MIFW) have completed a draft strategic management plan for diadromous fish in the Penobscot. This plan includes four strategic goals: (1) coordinating management activities, (2)providing safe and effective upstream and downstream passage for diadromous fishes,(3) maintaining or improving abiotic (physical) and biotic habitat for diadromous fishes using ecosystem-based management, and (4) rebuilding diadromous fish populations. NMFS has provided comments on drafts of this plan and in November 2007 a public scoping meeting was held. In March 2008 the Penobscot Interagency Technical Committee (PNITC) was formed to develop operational management plans for diadromous fish within the basin. Members of the PNITC include managers and scientists from MDMR, MIFW, NMFS, the Penobscot Indian Nation (PIN) and FWS.

- The Penobscot River Restoration Project (PRRP) provides unique opportunities for restoration efforts. Many species will benefit from the PRRP directly, but many other passage impediments exist in the basin. Some diadromous fish species, such as Atlantic salmon, alewife, and shad, may require additional habitat improvements (barrier removal, fishways, etc.) or stocking. Thus, additional active restoration measures may be required to realize the full potential of the PRRP. Due to the high profile of the project and the high costs involved, there is a need to prioritize restoration efforts in the basin to increase the probability for project success. There are many ways to determine what a "successful" PRRP would look like. The PNITC has been tasked with developing one set of restoration goals and priorities for the basin. To help facilitate this goal, NMFS has begun developing an ecologically-based GIS tool to help set goals and to help identify and prioritize various restoration efforts. The outputs of this tool will help to ensure that achievable goals are established, and that funding and restoration efforts are applied in the most appropriate manner.

- Infectious Pancreatic Necrosis Virus (IPNV)
  - The viral pathogen IPVN was isolated from Connecticut River Atlantic salmon during routine brood stock health screening by the US Fish and Wildlife Service. No clinical signs of disease were noted in the fish. Two ovarian fluid samples were confirmed positive for IPNV using cell culture and polymerase chain reaction (PCR) assays. Each sample represented a pool of broodstock spawned at the Richard Cronin National Salmon Station. Thus, a minimum of two sea-run salmon females were infected. All the eggs and broodstock at the facility and eggs transferred to another facility were destroyed. This resulted in the loss of the entire year class of sea-run Connecticut River Atlantic salmon brood stock. Follow-up cell culture assays, PCR assays and histology were conducted on kidney, spleen, blood and pancreatic tissues from the killed brood stock. Infection and prevalence levels were low (3 of 121 positive) in the population and large scale horizontal transmission had not occurred while the fish were held in captivity at the station for eight months.
  - The US Geologic Survey Western Fisheries Research Center identified the isolate to be most similar in base pair structure to the Canada 3 genotype, which is significantly different from most other North American IPNV genotypes studied. Because this is not a typical North American isolate, pathologists speculate that the salmon were exposed during ocean migration.
  - IPNV represents a critical threat to Atlantic salmon recovery in the USA. The discovery of IPNV at any USA Atlantic salmon hatcheries will result in loss of genetic diversity for one or more stocks and from one to three spawning cohorts for a stock. Current procedures for screening and isolating fish at all the hatcheries are inadequate to protect against an IPNV outbreak. Enhancing bio-security protocols at each of the hatcheries seem to be the only way to reduce the risk of loses. A new bio-security plan for the sea run brood stock population at Richard Cronin includes isolating and increasing the number of holding tanks. Isolation will involve separate equipment, footbaths, barriers to prevent direct transfer of water from tank to tank, and using separate spawning and egg rinsing equipment for in each holding tank. Discrete egg incubation isolation units (fitted with enclosures for isolation) will be maintained for each brood stock pool and separate egg equipment (rinsing counting shocking picking) will be used for each incubation unit. If there is mating of individuals

in different pools, discrete paired pooled incubation isolation units will be utilized. Should IPN virus be isolated in a particular tank, broodstock and all resulting spawn from that tank will be destroyed. Eggs from broodstock tanks where spawners all tested negative will be carried through to hatch. Fry from these units will also be tested for all listed viruses prior to transfer/release.

- Fish Friends and Adopt a Salmon Family Programs
    - The use of salmon egg incubators in school as a tool to teach about salmon, watersheds and conservation continued to expand throughout the basin. The Connecticut River Salmon Association (CRSA) conducted their **Fish Friends Program** at schools in Connecticut. Trout Unlimited carried a similar message to schools in Massachusetts. Several cooperators including CRSA, USFS, USFWS, NHFG, VTFW and the Southern Vermont Natural History Museum cooperatively conducted the program in Vermont and New Hampshire. For the 2007-2008 school year 164 schools participated in this type of salmon education in the four states.
    - 2007 marked the fifteenth year in which the **Adopt-A-Salmon Family Program** has been providing outreach and education to school groups in Maine, New Hampshire, and Massachusetts in support of Atlantic salmon recovery and restoration efforts. The program is administered by the Central New England Fisheries Resources Office with support from the Nashua Nation Fish Hatchery, the Amoskeag Fishways, and a corps of very dedicated volunteers and SCA interns. Most participating schools implement the program throughout the school year with highlights including a visit to the hatchery (NNFH) for a ninety minute educational program in November, and incubating salmon eggs in the classroom beginning in January/February for release as fry into the watershed in the late Spring. In February 2007, 42 schools received 15,910 eggs to be reared in classroom incubators. Throughout the winter and spring, eggs were monitored by students until they hatched. In late Spring, fry were released into the Merrimack River watershed. In November 2007, 1,532 students and 150 teachers and parents from 24 schools throughout central New England participated in the educational program at NNFH. During the visit, participants learned about the effects of human impacts on migratory fish and other aquatic species and observed Atlantic salmon spawning demonstrations.

ANNEX 5

North American Commission

NAC(08)5 (rev)

A Description of the
Management of the Commercial Atlantic Salmon Aquaculture Industry
in the United States and Canada

NAC (08)5 (rev)

A Description of the Management of the Commercial Atlantic Salmon Aquaculture Industry in the United States and Canada

At the 2007 Annual Meeting of NASCO, the U.S. and Canada agreed to meet inter-sessionally to discuss, among other things, establishing a protocol regarding escapes of farmed salmon, share information on regulations related to aquaculture practices, and share information on statutory and policy guidelines used for aquaculture. Consistent with this agreement, on April 23 – 24, 2008, the United States and Canada met to exchange information on the management of the aquaculture industry on the east coast and measures taken to minimize the potential impacts to wild Atlantic salmon. In both the U.S. and Canada, the commercial Atlantic salmon aquaculture industry is located in close proximity to rivers with wild Atlantic salmon. Many of these stocks are in poor condition, further heightening the importance of actions taken to avoid or minimize adverse impacts. The need for careful management, and the potential severity of adverse impacts if they occur, was further emphasized by the ICES/NASCO Symposium held in Bergen in 2006.

At the April, 2008 meeting, the U.S. and Canada exchanged detailed information on various aspects of the management of the aquaculture industry, discussed challenges, identified benefits of collaboration, and agreed to the further refinement of notification procedures. A summary of management measures in the U.S. and Canada is provided below.

Sharing Information on the Management of Commercial Atlantic Salmon Aquaculture on the East Coast

United States

Within the U.S., changes in permits in the past few years have aligned state and federal conditions to ensure that measures to protect wild Atlantic salmon are legally binding on the lease holder. The approach to management of commercial Atlantic salmon aquaculture in Maine has a number of components, including:

(1) Requirement to use only North American strain Atlantic salmon. This permit condition is implemented by requiring genetic screening of broodstock, providing results to the federal fishery agencies and periodic blind testing at hatcheries and marine cages.

(2) Inventory tracking and control. The industry maintains a detailed inventory system that tracks fish within the hatchery and from the hatchery to the marine cages and ultimately to harvest. Detailed tracking is maintained on site and available for inspection upon request. Computer software designed for inventory tracking is used to detect any significant change in things such as feed volume that could indicate that an escape event has occurred. Reporting inventories at key points (stocking, harvest) and any anomalies such as feed reduction greater than 25% over 48 hrs is required as part of the Containment Management System (defined below) and is required by the regulatory agencies.

(3) Disease Testing and Management: Mandatory reporting of diseases of regulatory concern is part of Mane DMR's Chapter 24 regulations, and is the source of compliance action authority. All lots of fish to be stocked are sampled and tested for diseases of concern prior to receiving a transfer permit from the State of Maine. The US Department of Agriculture operates an Infectious Salmon Anemia

surveillance program, and conducts site and vessel biosecurity audits. USDA uses Maine's regulatory authority for enforcement and State of Maine permits are required to move vessels or equipment across the US – Canada border and between Cobscook Bay and areas to the west that have not had a history of ISA. Disinfection and testing protocols are detailed in the USDA program standards document. A bay management plan was agreed jointly with New Brunswick and is in place for Cobscook Bay as part of the ISA management plan for that area. The plan coordinates stocking and harvest to achieve a two month common fallow of all sites in the agreed area including Cobscook and Passamaquoddy bays. The two month fallow is part of an integrated strategy to control parasites and pathogens. Single year class stocking is required at all sites in Maine, regardless of location.

(4) Containment Management System: As part of their license application, a grower must submit a containment management system plan. The plan describes the site conditions, equipment to be deployed, identifies critical control points (stocking, grading, harvesting), and steps taken at each point to minimize the potential for conditions that could result in the loss of fish. Commercial hatcheries supporting the salmon farming industry are required to have a containment plan which describes appropriate barriers in place to prevent escapes. Third party audits of the containment management system are conducted annually to ensure compliance with the conditions of the system and to examine inventory and tracking records. In addition, a third party audit is required within 30 days of a reportable escape (defined below).

(5) Escape Reporting: Permit conditions require mandatory reporting of any known or suspected escape of 25% or more of a cage population and/or more than 50 fish with an average weight of two kg each or more within 24 hours of detection of the escape. Escapes that do not reach this threshold must be reported on monthly inventory reports.

(6) Marking**:** All Atlantic salmon placed in net pens must be identifiable through external means as commercially-reared and identifiable as to the hatchery sub-lot and/or individual facility into which they were placed. This level of specificity is required as of August 31, 2008. As of July 31, 2009 all fish stocked must be identifiable as to the marine cage site where they were placed. The industry is currently using genetic marking to meet these permit conditions.

Canada

The management of commercial Atlantic salmon aquaculture off the east coast of Canada is at various stages of development.

(1) Salmon Strains: Local strains of salmon are routine in Canada, with St. John River strain most common and some use of Gaspe strain. All salmon strain choices are subject to the risk assessment incorporated into Canada's Code for the Introduction and Transfer of Aquatic Organisms. Control is attained through the requirement for stringent containment measures and permits to transfer fish.

(2) Inventory tracking and control- This management element is in its infancy and is currently being developed on an individual company basis.

(3) Disease Testing and Management: In addition to disease testing, and requirements for fish health certificates, various management practices such as disinfection protocols, single year class stocking, and mandatory fallowing for a minimum of four months at each site (and two months for each Bay Management Area) are required to minimize disease In addition, designation of wharfs and vessel traffic

routes for aquaculture vessels has been imposed for ISA management. These requirements do not apply to non-aquaculture related vessels.

(4) Containment Management System: The industries in Newfoundland and New Brunswick both have Codes of Containment in place. Efforts are underway to develop a Code for Nova Scotia. The Codes are complimented by governance policies that further define and explain the regulatory requirements related to the codes of containment.

(5) Escape Reporting: In New Brunswick, a breach of containment resulting in the loss of 100 or more fish triggers a requirement to notify both Federal and Provincial authorities within 24 hours.

(6) Recapture**:** There is a focus on recapture, past attempts have not been successful but that is believed to be due in part to the delays in authorization, now authorization can be obtained in advance by applying by January 1st of each year and then it is activated by a phone call in the event of an escape. There is a requirement to submit a recapture management plan with the application. During recapture activities, reports detailing catches must be submitted on a daily basis so as to analyze any bycatch.

As is illustrated by the above brief summary, there are a great deal of similarities between Atlantic salmon commercial aquaculture management on the east coast of the U.S. and Canada. There was a general feeling that it would be advantageous to continue to exchange information on these issues in the future to learn from each other and strive for a consistent approach. The mechanism for such coordination will be discussed further by a Working Group being convened to examine the NAC Protocol Database and Scientific Working Group.

Benefits of Coordination

Collaboration and cooperation between the U.S. and Canada at the federal and Provincial/State level has resulted in tremendous success in the management of Infectious Salmon Anemia (ISA). The staff at the USDA program, Maine DMR, and New Brunswick DAA all work together to communicate regularly about the current status of the testing and evaluate any industry proposals that may have cross-jurisdictional effects, and we inform our other partner agencies as appropriate. The frequency of disease occurrence has dropped dramatically due to these coordination efforts and the management steps that have been implemented. This experience has reinforced the importance of collaborative efforts.

Notification

As has been noted, reporting of escapees or breaches of containment are required within the U.S. and in parts of Canada. Where reporting is required, within each country notification trees have been set up to ensure that those with responsibility for managing the industry and those with responsibility for conservation and recovery of wild Atlantic salmon are notified in a timely manner. The next step is then to formalize the communication across the border to ensure timely notification.

ANNEX 6

North American Commission

NAC(08)4

North American Commission
Protocols on Introductions and Transfers of Salmonids

NAC (08)4

North American Commission
Protocols on Introductions and Transfers of Salmonids

Background

The North American Commission (NAC) of the North Atlantic Salmon Conservation Organization (NASCO) recognized that the introduction and transfer of non-indigenous species, stocks and strains of salmonids have the potential for serious adverse fish health, genetic, and ecological effects on Atlantic salmon stocks. Thus, in 1987, the NAC established a Scientific Working Group to advise on the potential for adverse effects from salmonid introductions and transfers and, in 1992, adopted protocols for the introduction and transfer of salmonids for use in the NAC Area (NAC(92)24). Amendments were approved by the NAC in 1994 (NAC(94)14). Because of the manner in which the documents were published by NASCO, both the NAC (92)24 and NAC (94)14 documents must be read together in order to understand the protocols fully.

Further amendments were drafted in 1998, incorporating new information, addressing new issues, and recognizing progress made since 1992 by government agencies and private industry in protecting wild stocks from potential impacts of introductions and transfers of salmonids. Consideration was given to expert advice provided by the Fish Health and Genetic sub-groups of the NAC Scientific Working Group. Consideration was also given to the scientific information presented at the ICES/NASCO Symposium on Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon, held in Bath, England, in 1997. The Protocols were intended to present a minimal level of protection.

In 2004, NASCO adopted a Resolution to Minimize Impacts from Aquaculture, Introductions and Transfers, and Transgenics on Wild Salmon Stocks, The Williamsburg Resolution. The NAC Protocols are appended to the Williamsburg Resolution. Specific provisions of the Protocols of particular relevance are as follows:

> Section 4.2(5): *Each government agency is to annually submit to the NAC Scientific Working Group the results of the permit submission/review process, and a list of introductions and/or international transfers proposed for their jurisdiction…*

Responsibilities of the NAC Scientific Working Group on Salmonid Introductions and Transfers are identified in Section 4.3 of Appendix I of the Williamsburg Resolution. They are as follows:

> *(1) Maintain an inventory of all introductions of salmonids, transfers of salmonids from IHN-infected areas, and importation of salmonids across national boundaries into the Commission Area.*
>
> *(2) Review and evaluate all introductions and transfers in relation to the NAC protocols and report the results to the NAC.*

The Objectives of the Protocols

The fundamental objectives of the protocols, including the 1998 revisions, are to minimize the risks associated with:

> 1) introduction and spread of infectious disease agents (disease);
>
> 2) reduction in genetic diversity and prevention of the introduction of non-adaptive genes to wild Atlantic salmon populations (genetics); and

3) intra- and inter-specific ecological interactions of introductions and transfers of Atlantic salmon stocks (ecology).

The Scientific Working Group and Inventory Database

The Scientific Working Group (SWG) for the NAC, as described above, is responsible for maintaining an inventory of all introductions and transfers and to review these introductions and transfers for consistency with the NAC Protocols. The SWG created multiple databases which included an annual inventory of salmonid introductions and transfers and occurrences of diseases of concern. The group reviewed this inventory and reported on inconsistencies to the NAC annually until approximately 2004. Information was submitted from each country to be entered into the databases in subsequent years, but submissions have not been as comprehensive as in previous years and more recently the SWG has not met to review the inventory.

Information on the inventory of introductions and transfers into the Commission area began in 1986. Currently, there are three databases developed to track the following:

1) intentional introductions of live salmonids and gametes;
2) fish disease occurrences within the NAC area; and
3) known occurrences of Atlantic salmon aquaculture escapees in salmon rivers within the NAC area.

These three databases reside at the Department of Fisheries and Oceans office in Dartmouth, Nova Scotia.

The Current Situation

As stated above, the NAC databases have not been fully populated for the years 2004 to the present time and the SWG has not met to review inventories and transfers for consistency with the NAC Protocols. During the past few years, the U.S. and Canada have been undergoing significant domestic changes in the management of introduction and transfers. In light of these changes, it is timely and appropriate to revisit the status of the NAC Protocols, the SWG, and the inventory databases.

<u>Management of Introductions and Transfers within Canada</u>

Canada adopted a National Code on Introductions and Transfers of Aquatic Organisms in January 2002. The Code applies to all aquatic organisms in freshwater and marine habitats. The purpose of the Code is to establish an objective decision-making framework regarding intentional introductions and transfers that is designed to protect aquatic ecosystems while encouraging responsible use of the aquatic resources for the benefit of Canadians. The National Code was developed to minimize the negative impacts of introductions and transfers and, at the same time, permit environmentally sound fisheries resource enhancement and development of aquaculture. The Code ensures that a consistent single standard set of risk assessment and approval procedures is applied across the country. The risk analysis process results in an evaluation of the level of risk of adverse ecological, genetic and fish health effects from a proposed introduction and transfer. The Precautionary Approach has been adopted in the Code. The Code states that consultations should take place between neighboring jurisdictions if a proposed introduction, transfer or range extension might impact stocks within a watershed but outside the receiving province.

In 2005, the Canadian Food Inspection Agency (CFIA) was identified as the lead federal agency for implementing the National Aquatic Animal Health Program (NAAHP), and is currently working on amendments to regulations under the *Health of Animals Act* and

ministerial regulations to manage aquatic animal health in Canada. When CFIA begins implementing these amended regulations, they will be responsible for assessing all proposed introductions and transfers of aquatic animals for impacts of diseases of concern. The proposed amendments will align Canada's national aquatic animal health management more closely with international standards for animal health attestation.

Management of Introductions and Transfers within the United States

In 1989, the U.S. Fish and Wildlife (USFWS) established regulations to minimize the introductions of fish disease associated with salmonid fish transfers. Accordingly, transfers of live salmonids, gametes and fish products into and out of the United States are controlled by USFWS Title 50 authority. Movements within the United States are controlled by permits issued at the State level. Transfers of fish from freshwater hatcheries to marine cages in Maine are regulated through transfer permits issued by the Maine Department of Marine Resources (MDRM). Each permit identifies the genetic strain, fish health status, numbers and age. MDMR maintains an inventory of salmonid transfers.

MOU between Canada and the US (NAC (05)7)

In 2005, an MOU between Canada and the US on Introductions and Transfers was signed (NAC (05)7). This MOU recognizes that in Canada the National Code is the mechanism for approval of introductions and transfers. In this MOU, the Parties agree to report to the NAC annually on any decision that has an impact on the other jurisdiction, in particular any decisions made that are not consistent with the NAC Protocols are to be identified. The Parties also agree to consult with each other if a proposal is received for an introduction or transfer that may have an impact on the other, including any proposal that would be inconsistent with the NAC Protocols. The Parties agree to convene the NAC Scientific Working Group, from time to time, to review the provisions of the Williamsburg Resolution with respect to developments that may have an application on introductions and transfers in the NAC area and provide recommendations to the Parties for their consideration and action, if required.

ICES Working Group on Introductions and Transfers of Marine Organisms

Canada and the US are both members of the ICES Working Group on Introductions and Transfers of Marine Organisms. This group meets annually to review activities of member countries, with a focus on tracking aquatic invasive species. Each member is required to submit an annual report to ICES which describes:

1. Any new laws, policies or regulations in that country which relate to introductions and transfers
2. Deliberate releases or planned introductions
3. Live Imports
4. Unintentional releases
5. Meetings, conferences, symposia or workshop on Introductions and Transfers
6. Bibliography

Of particular relevance is section 3 which will capture all cross border movements of salmonids between Canada and the US.

Next Steps

In light of the significant changes that have occurred both within Canada and within the United States on management of aquaculture, introductions and transfers, it is appropriate to re-examine the Databases on Introductions and Transfers and Scientific Working Group. In

order to make an informed decision about the relevance of these documents, databases and working groups, it is proposed that the U.S. and Canada form a working group to explore, in before the 2009 NASCO meeting, the questions and issues identified below.

NAC Protocols

As stated above, the objective of the NAC Protocols on Introductions and Transfers are intended to minimize the risks associated with disease, genetics and ecology. The potential risks associated with introductions and transfers of salmonids remain as relevant today as they were when the Protocols were first adopted in 1992. There does not appear to be a need or reason to revisit the content of the Protocols.

Databases

As stated above, three databases have been created to track introductions and transfers of salmonids, fish diseases within the NAC area, and occurrences of aquaculture escapees in salmon rivers within the NAC area. The U.S.-Canada Working Group is asked to address the following:

(1) Is there a value to tracking introductions and transfers of salmonids?
    a. If yes, is this information currently recorded in other databases?
        i. If no, does the current NAC database contain the most important and relevant data?
        ii. If yes, what are these databases, who maintains them, how and when are they populated?
    b. If no, in the absence of such a database, how will compliance with the NAC Protocols be evaluated?
(2) Is there a value to tracking fish diseases within the NAC area?
    a. If yes, is this information currently recorded in other databases?
        i. If no, does the current NAC database contain the most important and relevant data?
        ii. If yes, what are these databases, who maintains them, how and when are they populated?
    b. If no, in the absence of such a database, how will compliance with the NAC Protocols be evaluated?
(3) Is there a value to tracking occurrences of aquaculture escapees in salmon rivers within the NAC area?
    a. If yes, is this information currently recorded in other databases?
        i. If no, does the current NAC database contain the most important and relevant data?
        ii. If yes, what are these databases, who maintains them, how and when are they populated?
    b. If no, in the absence of such a database, how will compliance with the NAC Protocols be evaluated?
(4) If the WG recommends maintenance of the NAC Database, they are requested to address the following:
    a. Review the fields currently in the database and recommend any changes;
    b. Develop operating procedures to identify what data is to be submitted (i.e. introductions into the country, between States/Provinces, within States/Provinces, etc.);
    c. Develop procedures for when data is to be submitted, how it is to be submitted, what the database output will be and how it will be used.
(5) If the WG recommends that the NAC Database is not needed as other databases contain the necessary information, they are requested to:

a. Identify the databases that contain the needed information;
b. For each database, describe the data it contains and the timeframe for populating those databases and procedures for gaining access or outputs;
c. Identify how the outputs from the various databases will be integrated to provide a complete view to allow consistency with NAC Protocols to be evaluated.

NAC Scientific Working Group on Salmonid Introductions and Transfers

As noted previously, the NAC Protocols and Williamsburg Resolution identify a number of roles for the NAC SWG including maintaining an inventory of introductions and transfers, inventory of diseases, and determining and reporting on compliance with the NAC Protocols.

In light of the conclusions reached above, the Working Group is asked to develop and describe the role of the NAC SWG including specifying:

(1) The database(s) that the NAC SWG is responsible for maintaining;
(2) The process and protocol for populating the database(s), including details of what information is to be provided, when and to whom;
(3) How the NAC SWG will review the output of the database(s) to determine compliance with the NAC Protocols, when and how it will conduct its work, and when and how it will report the results to the NAC.

Members of the Working Group are to be identified immediately following the 2008 Annual Meeting of NASCO and no later than June 15, 2008. The Working Group will compile information and meet by phone and in-person, as needed, in order to prepare a report which addresses the above questions and issues. This report is to be provided to the NAC Commissioners no later than two months before the 2009 NASCO annual meeting.

ANNEX 7

North American Commission

NAC(08)7

Labrador Aboriginal Food Fisheries
And Sampling Program

NAC(08)7

Labrador Aboriginal Food Fisheries And Sampling Program

General Principles:

- Government of Canada has a legal obligation under various treaties and Constitution of Canada to provide aboriginal people access to salmon for food, social and ceremonial (FSC) purposes
- Conservation comes first under the Fisheries Act and aboriginal land claims agreement
- Salmon harvests in Labrador traditionally provides edible and non-edible products and plays a big part in aboriginal life
- Labrador has several aboriginal groups that participate in FSC fisheries
    - 20 communities in Labrador benefit from FSC programs
- Access is provided through Aboriginal Communal Licenses which are negotiated and issued to each of the groups
    - Individuals are then designated by each group to fish
- There is a tradition of community sharing of the catch

Harvesting Regime:

- Individual must be designated to fish by an aboriginal group
- Harvest controlled through a limited number of tags
- Limitations of the fishery are through
    - Seasons
    - Gear type and length
    - Mesh sizes
    - Number of nets is restricted (one per fisher)
    - Location restrictions
    - Weekend take ups required in some area
- Fishing takes place near communities mainly in estuaries

Conservation Monitoring:

- Catch reporting is required through a log system
    - Reporting rates high in Labrador, 75-90%
    - In-season biological sampling program
    - Landings include estimates for non-returned logs
- All fish must be tagged
- Monitoring is done through enforcement officers of Aboriginal groups and Department of Fisheries & Oceans Canada
    - Past samples have shown there to be few or no US salmon caught in this fishery
- Counting fence returns from four rivers in Labrador used to provide advice related to conservation issues

Labrador Sampling Program:

NASCO endorses the sampling of individual salmon in all fisheries as part of good management practice. Consequently, Department of Fisheries & Oceans Canada will undertake to have samples collected by enforcement officers and staff of the Nunatsiavut Government and Labrador Metis Nation. Data to be collected will be location of capture, date of capture, fork length, whole or gutted weight, and scales. This sampling program will be carried out utilizing salmon that have been caught as part of the food fishery program and will not increase the number of salmon killed in those fisheries.

ANNEX 8

CNL(08)9

Request for Scientific Advice from ICES

1. With respect to Atlantic salmon in the North Atlantic area:

1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched Atlantic salmon in 2008[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 continue the work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance [3];

1.4 provide a compilation of tag releases by country in 2008 and advise on progress with analysing historical tag recovery data from oceanic areas;

1.5 evaluate the results of studies that estimate the level of pre-spawning mortality of salmon caught and released by anglers and the implications for stock assessments;

1.6 identify relevant data deficiencies, monitoring needs and research requirements[4].

2. With respect to Atlantic salmon in the North-East Atlantic Commission area:

2.1 describe the key events of the 2008 fisheries[5];

2.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

2.3 review and report on the development of age-specific stock conservation limits;

2.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2010-2012, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6];

2.5 further develop methods to forecast PFA for northern and southern stocks with measures of uncertainty;

2.6 further investigate opportunities to develop a framework of indicators that could be used to identify any significant change in previously provided multi-annual management advice.

3. With respect to Atlantic salmon in the North American Commission area:

3.1 describe the key events of the 2008 fisheries (including the fishery at St Pierre and Miquelon) [5];

3.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

3.3 update age-specific stock conservation limits based on new information as available;

3.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2009-2012 with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding [6];

4. With respect to Atlantic salmon in the West Greenland Commission area:

4.1 describe the key events of the 2008 fisheries[5];

4.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

4.3 describe the status of stocks and provide annual catch options or alternative management advice for 2009-2011 with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6,7];

4.4 update the framework of indicators used to identify any significant change in the previously provided multi-annual management advice.

Notes:

1. *With regard to question 1.1, ICES is asked to ensure that the terminology used in presenting the data on ranching is clearly defined. For the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal.*
2. *With regard to question 1.2, ICES is requested to include information on any new research into the migration and distribution of salmon at sea.*
3. *With regard to question 1.3, there is interest in determining if declines in marine survival coincide with changes in the biological characteristics of juveniles in fresh water or are modifying characteristics of adult fish (size at age, age at maturity, condition, sex ratio, growth rates, etc.) and with environmental changes.*
4. *NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea will be provided to ICES to assist it in this task.*
5. *In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the by-catch of other species in salmon gear, and on the by-catch of salmon in any existing and new fisheries for other species is also requested.*
6. *In response to questions 2.4, 3.4 and 4.3 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*
7. *In response to question 4.3, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.4 and 3.4.*

ANNEX 9

North American Commission

NAC(08)8

Atlantic Salmon Endowment Fund

NAC(08)8

Atlantic Salmon Endowment Fund

In February 2005 the Government of Canada announced creation of the $30 million CAD Atlantic Salmon Endowment Fund with the goal of helping to achieve healthy and sustainable wild Atlantic salmon populations and salmon habitat in New Brunswick, Newfoundland & Labrador, Nova Scotia, Prince Edward Island and Québec.

Following the announcement the Government negotiated an agreement with ***The Atlantic Salmon Conservation Foundation*** (*www.salmonconservation.ca*), a non-profit, charitable organization, to administer the fund. The objectives of the Foundation include fostering partnership among community groups, First Nations, Aboriginal groups, federal and provincial government agencies and others to improve conservation of wild Atlantic salmon and salmon habitat. Foundation intends to fund high-quality initiatives proposed by partnerships among groups working at the community level.

The Atlantic Salmon Conservation Foundation is an inclusive and volunteer based organization consisting of a Board of Directors assisted by six advisory committees. There is an advisory committee in each of the five provinces served by the Foundation, which are responsible for identifying province-specific conservation priorities and recommending to the Board projects which could be funded in the province. In addition, the Foundation has created a Central Advisory Committee to assist the Board in developing overall conservation priorities and processes, as well as to review funding proposals of broad conservation benefit or application.

Categories of eligible projects include: development of salmon and salmon habitat conservation plans; conservation, rebuilding and restoration of wild Atlantic salmon and salmon habitat; restoring access of wild Atlantic salmon to salmon habitat; and public education and awareness of the importance of conservation of wild Atlantic salmon and its habitat.

In March 2008 the Foundation launched its first round of funding applications with a total of $300,000 available for award in 2008. Proposals for funding were submitted through the ASCF website with over fifty applications for funding received from conservation groups and Aboriginal organizations in the five provincial constituencies. Eligible applications were reviewed by the advisory committees in May and the results of the 2008 round will be announced in mid-June.

The Foundation plans to initiate its second call for proposals in November 2008 with the goals of announcing successful proposals by March 2009 in order to allow adequate lead-time for summer and fall conservation activity. Subsequent calls will normally be held in the fall.

ANNEX 10

NAC(08)00

List of North American Commission Papers

Paper No.	Title
NAC(08)1	Provisional Agenda
NAC(08)2	Draft Agenda
NAC(08)3	Report on US Atlantic Salmon Management and Research Activities in 2007
NAC(08)4	Noth American Commission Protocols on Introductions and Transfers of Salmonids
NAC(08)5	Management of the Commercial Atlantic Salmon Aquaculture Industry in the United States and Canada
NAC(08)5(rev)	A description of the Management of the Commercial Atlantic Salmon Aquaculture Industry in the United States and Canada
NAC(08)6	Overview of Fisheries and Stock Status of Atlantic Salmon in Eastern Canada for 2007
NAC(08)7	Labrador Aboriginal Food Fisheries And Sampling Program
NAC(08)8	Atlantic Salmon Endowment Fund
NAC(08)9	Agenda
NAC(08)10	Report of the meeting.

REPORT OF THE

TWENTY-FIFTH ANNUAL MEETING OF

THE

NORTH-EAST ATLANTIC COMMISSION

3 – 6 JUNE 2008
Gijón, Asturias, Spain

Chairman:	Mr Richard Cowan (European Union)
Vice Chairman:	Mr Kaj Mortensen (Denmark (in respect of the Faroe Islands and Greenland))
Rapporteur:	Dr Paddy Gargan (European Union)
Secretary:	Dr Malcolm Windsor

NEA(08)8

CONTENTS

NEA(08)8

Report of the Twenty-Fifth Annual Meeting of the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization Tryp Rey Pelayo Hotel Melia, Gijón, Spain 3-6 June, 2008

1. Opening of the Meeting

1.1 The Chairman, Mr Richard Cowan (European Union) opened the meeting and welcomed the delegates to Gijon.

1.2 An opening statement was made on behalf of the Non-Government Organizations (NGOs) attending the Annual Meeting (Annex 1).

1.3 A list of participants at the Twenty-Fifth Annual Meeting of the Council and Commissions is included on page 257 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its agenda, NEA(08)7 (Annex 2).

3. Nomination of a Rapporteur

3.1 Dr Paddy Gargan (European Union) was appointed as Rapporteur for the meeting.

4. Election of Officers

4.1 The Commission unanimously re-elected Mr Richard Cowan (European Union) as its Chairman and unanimously elected Mr Andras Kristiansen (Denmark (in respect of the Faroe Islands and Greenland)) as its Vice-Chairman.

5. Review of the 2007 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

5.1 The Chairman noted that no regulatory measure was adopted last year in the North-East Atlantic Commission area and requested the representative of Denmark (in respect of the Faroe Islands and Greenland) to confirm that no fishery took place at Faroes in 2007. The representative of Denmark (in respect of the Faroe Islands and Greenland) reported that no fishery took place at Faroes in 2007.

5.2 The Chairman requested the representative of ICES, Mr Timothy Sheehan, to present the scientific advice on salmon stocks relevant to the North-East Atlantic Commission, CNL(08)7. The ACOM report from ICES, which contains the scientific advice relevant to all Commissions, is included on page 219 of this document. The

presentation by ICES is included in document CNL(08)25.

5.3 The Chairman thanked Mr Sheehan for his very clear and concise presentation and opened the meeting for comment on the scientific advice from ICES.

5.4 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted from the ICES report that there is a substantial mixed stock fishery in Norway. He also noted that there is a substantial unreported catch and asked the representative of ICES if he could provide information on the location of where these catches were taken, and whether they were mixed stock catches or in-river catches. The representative of ICES advised that the unreported catch was a difficult figure to estimate and report upon. He reported that individual delegates to the ICES Working Group provide assessments of unreported catch for their jurisdiction. He suggested that the members of the Commission might be in the best position to respond to this question. The Chairman noted that the issue of unreported catch had been discussed by the Council in 2006.

5.5 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to Question b, 4 on page 5 of the ACOM Report (CNL(08)7) posed by NASCO to ICES with respect to salmon in the NEAC Commission area, which to his knowledge, is the area east of 45 degrees West. He outlined that there were two parts to this question, the first being to describe the status of the stocks and secondly to provide annual catch options or alternative management advice for 2009-2011. Section 3.4 of the ACOM Report sets out the advice regarding catch options for Northern and Southern stocks. Both the Northern 1SW and MSW stocks were considered to be at full reproductive capacity while the Southern MSW stocks were considered to be suffering reduced reproductive capacity. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that in the ACOM Report, ICES states that therefore there should be no fishing on this complex at West Greenland or Faroes. This advice was given in underlined text in the report. He asked the representative of ICES if this implied that one could fish this stock complex in another area in the NEAC area. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that the West Greenland Commission area is the same as the regulatory area stated in the NASCO Treaty (Article 2.2) while the NEAC area is much larger than the Faroese regulatory area within the NASCO treaty. It is his view that ICES should give advice on the status of stocks and the consequences of any fishery on these stocks and NASCO and its Parties should decide on regulatory measures within that Commission area based on the scientific advice from ICES.

5.6 The representative from ICES responded by saying that, with regard to the possibility of the stock complex being fished elsewhere, it should not be fished elsewhere as the stock was below the spawning escapement reserve. Regarding the question of ICES advice, the ICES Working Group has been giving advice specifically in relation to distant water fisheries. He said that ICES can provide assistance at re-defining the question to avoid similar confusion in the future. The representative of Denmark (in respect of the Faroe Islands and Greenland) agreed that this would be helpful.

5.7 The representative of Iceland asked the representative of ICES if there had been any progress made on determining the level of by-catch of salmon in pelagic fisheries.

The representative of ICES said that the issue of by-catch had been reported previously and there were no new efforts to gather new data on by-catch.

5.8 The representative of the NGO's raised the issue of mixed stock fisheries relevant to the ICES Report. He noted that there was a lot of concern regarding the mixed stock fishery in Finnmark. This fishery takes large numbers of fish from Russia and Finland. He is aware that there is dialogue between Norway and Russia with regard to obtaining better scientific data on the nature of the stocks. He asked whether this was an issue which should be discussed. The Chairman commented that it was more appropriate to raise this issue on the Council agenda and he proposed to leave it for the Council to discuss.

6. Regulatory Measures

6.1 The Chairman noted that last year a Decision was adopted regarding the salmon fishery in Faroese waters in 2008. Under this Decision the Commission decided not to set a quota since the Faroe Islands would manage any fishery on the basis of the ICES advice and in a precautionary manner. He asked if Denmark (in respect of the Faroes Islands and Greenland) was in a position to continue with the present arrangement. Denmark (in respect of the Faroe Isalnds and Greenland) indicated that they could accept a continuation of the present agreement.

6.2 The Chairman circulated a Draft Decision regarding the salmon fishery in Faroese waters in 2009, (NEA(08)4). The Commission adopted this decision, NEA(08)6 (Annex 3).

7. Risk of Transmission of *Gyrodactylus salaris* in the Commission Area

7.1 In the absence of the Working Group's Chairman, Mr Stian Johnsen (Norway), the Secretary introduced the report of the meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission area, NEA(08)3 (Annex 4). The Secretary noted that the Group had recommended that the Commission should encourage each country without a contingency plan to develop one as a matter of urgency. The Secretary commented that the threat of *G.salaris* is serious and that the Group had recommended that information relating to the parasite be made available on the NASCO website.

7.2 The Chairman noted that one of the recommendations of the Working Group report was to establish a scientific Working Group to report back to the *G.salaris* Working Group. He believed that there may be some difficulties with this recommendation and sought advice from the Parties as to how to proceed. The representative of the European Union felt that there was no merit in the recommendation to set up another Working Group as much work had been done in this area in the recent past. Commenting on the recommendation from the Working Group to make representations to the European Commission in relation to Additional Guarantees he noted that the Fish Health Directive was not intended to be revised at present and re-opening this issue was unlikely to be productive. He therefore found the recommendations from the Working Group regarding representations to the European Commission and the establishment of a Scientific Working Group to be unacceptable.

7.3 The representative of Norway concurred with the view expressed by the representative of the European Union regarding the establishment of a Scientific Working Group.

7.4 The representative of the NGOs commented that the recommendations of the Working Group were made in good faith. While he was unhappy with the decision not to write to the European Commission, given the responses from the Parties on the issue, he did not intend to pursue the issue further at this meeting.

7.5 The Commission agreed to retain an agenda item on this issue for its next Annual Meeting to monitor developments.

8. Final Report of the Pilot Study to Improve Understanding of the Migration, Dispersal and Survival of Farmed Salmon

8.1 The Chairman outlined that at the Commission's meeting in 2003, it was agreed that a pilot tagging project be undertaken to investigate the behaviour of 'escaped' farmed salmon. He invited Dr Lars Petter Hansen, the project's co-coordinator, to present the findings of the project.

8.2 Dr Hansen set out the background to the pilot project. The objective was to investigate the fate of salmon 'escaped' from salmon farms and examine differences in the distribution of tag recoveries from fish released simultaneously from different countries. A number of countries were invited to participate but different problems delayed the start of the project. In 2006 Scotland and Norway released individually tagged large farmed salmon from farms along the coast.

8.3 597 large farmed salmon were released from the Floro area of Norway and 678 large farmed salmon were released from the Ardmair area of Scotland in spring 2006. Only five tag recoveries were made from the Scottish release (0.7%) compared to 42 (7.0%) from the Norwegian release. Dr Hansen speculated that the Norwegian fish may have been subjected to a higher fishing effort and that it is possible the Scottish fish move further out to sea and also suffer higher predation. Scottish tags were recovered north of the site of release on the Scottish mainland, in Shetland, in Sweden and Norway. The recovery locations of these tags could be explained by movement with the prevailing current. Most of the Norwegian recaptures were taken in fjords and rivers close to the site of release. Dr Hansen suggested that salmon that escape early may be driven by currents to arctic waters and have poor survival. Those fish released in Scotland showed a high capacity for dispersal and proved capable of reaching coastal waters and rivers in Norway and western Sweden. He concluded that there were likely to be difficulties in expanding this project but sought the views of the Parties.

8.4 The Chairman noted that the findings of the pilot programme were of interest but there may not be a desire to repeat the experiment. The representative of the NGO's recommended that all farmed salmon be tagged as is the case on the East Coast of the United States, (see NAC(08)5). He noted that while the industry is smaller in the USA, genetic marking techniques are being used for farmed salmon and

recommended that NASCO encourage the use of this technique in Europe. The Chairman noted that a workshop was held on marking of farmed salmon and it had proven difficult to make progress on this issue. The representative of the NGO's commented that there was a much smaller number of companies engaged in producing farmed salmon now and it may thus be easier to introduce a marking system.

9. Announcement of the Tag Return Incentive Scheme Prize

9.1 The draw for the North-East Atlantic Commission prize in the NASCO Tag Return Incentive Scheme was made by the Auditor on 13 May 2008. The winning tag was of Norwegian origin. The tagged fish was released from a bag net fishery at the outlet of the Trondheimfjord and was recaptured in the river Gaula. The winner of the Commission's prize was Mr Bjorn Ronningen, Favang, Norway. The Commission offered its congratulations to the winner.

10. Recommendations to the Council on the Request to ICES for Scientific Advice

10.1 The Commission agreed the request for scientific advice from ICES prepared by the Standing Scientific Committee in relation to the North-East Atlantic Commission area. The request to ICES, as agreed by the Council, is contained in document CNL(08)9 (Annex 5).

11. Other Business

11.1 The was no other business.

12. Date and Place of the Next Meeting

12.1 The Commission agreed to hold its next meeting at the Twenty-Sixth Annual Meeting of the Council.

13. Report of the Meeting

13.1 The Commission agreed a report of its meeting.

Note: The annexes mentioned above begin on page 81, following the French translation of the report of the meeting. A list of North-East Atlantic Commission papers in included in Annex 6.

NEA(08)8

Compte rendu de la Vingt-cinquième réunion annuelle de la Commission de l'Atlantique du Nord-Est de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord Hôtel Melia Tryp Rey Pelayo, Gijón, Espagne 3-6 juin, 2008

1. Ouverture de la réunion

1.1 Le Président, M. Richard Cowan (Union européenne) a ouvert la réunion et a souhaité aux délégués la bienvenue à Gijón.

1.2 Une déclaration d'ouverture a été prononcée au nom des Organisations non gouvernementales présentes à la Réunion annuelle (annexe 1).

1.3 Une liste des participants à la Vingt-cinquième réunion annuelle du Conseil et des Commissions de l'OCSAN figure à la page 257 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté l'ordre du jour, NEA (08) 7 (annexe 2).

3. Nomination d'un Rapporteur

3.1 La Commission a nommé le Dr Paddy Gargan (Union européenne), Rapporteur de la réunion.

4. Election des membres du comité directeur

4.1 À l'unanimité, la Commission a re-élu Président, M. Richard Cowan (Union européenne) et élu Vice-président, M. Andras Kristiansen (Danemark (pour les Iles Féroé et le Groenland).

5. Examen de la pêcherie de 2007 et du rapport de l'ACOM du CIEM sur les stocks de saumons dans la zone de la Commission

5.1 Le Président a rappelé que l'on n'avait adopté aucune mesure de réglementation l'année dernière concernant la zone de la Commission de l'Atlantique du Nord-Est. Il a, de ce fait, demandé au représentant du Danemark (pour les Iles Féroé et le Groenland) de confirmer qu'aucune pêche n'avait eu lieu aux Iles Féroé en 2007. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a confirmé qu'en effet aucune pêche n'avait eu lieu aux Iles Féroé en 2007.

5.2 Le Président a demandé au représentant du CIEM, M. Timothy Sheehan, de présenter les recommandations scientifiques intéressant la Commission de l'Atlantique du

Nord-Est, CNL(08)7. Le rapport de l'ACOM du CIEM, contenant les recommandations scientifiques pour l'ensemble des Commissions, figure à la page 219 de ce document. La présentation du CIEM est reproduite dans le document CNL(08)25.

5.3 Le Président a remercié M. Sheehan pour sa présentation à la fois très claire et concise. Il a ensuite ouvert la réunion et invité les participants à commenter les recommandations scientifiques du CIEM.

5.4 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a remarqué que, d'après le rapport du CIEM, il existait une importante pêcherie de stock mixte en Norvège. Il a également noté que le nombre de captures non déclarées était important et a demandé au représentant du CIEM s'il pouvait fournir des informations sur les endroits où ces captures avaient lieu. Il a également cherché à savoir si ces captures représentaient des prises effectuées dans les stocks mixtes ou en rivière. Le représentant du CIEM a indiqué qu'il était difficile d'estimer le volume des captures non déclarées. De ce fait, il n'était également pas facile de dresser un rapport sur ce sujet. Il a mentionné que les délégués participant au Groupe de travail du CIEM fournissaient chacun une évaluation des captures non déclarées pour leur juridiction. Il a de ce fait suggéré que les membres de la Commission étaient sans doute les meilleurs placés pour répondre à cette question. Le Président a fait remarquer que la question des captures non déclarées avait été débattue par le Conseil en 2006.

5.5 Le représentant du Danemark (pour les Iles Féroé et le Groenland) s'est reporté à la question b, 4 à la page 5 du rapport de l'ACOM (CNL(08)7). Cette question avait été posée par l'OCSAN au CIEM à propos du saumon de la zone de la Commission de l'Atlantique du Nord-Est, qui, selon l'avis du représentant du Danemark (pour les Iles Féroé et le Groenland) recouvrait la zone est du 45^{e} méridien ouest. Il a souligné qu'il y avait deux éléments à cette question : le premier était de décrire l'état des stocks et le second de fournir des options de captures annuelles ou autres recommandations de gestion pour la période. La Section 3.4 du rapport de l'ACOM définit les recommandations concernant les options de capture pour les stocks sud et nord. Les stocks du nord 1HM et PHM étaient considérés comme étant à leur pleine capacité reproductive tandis que les stocks sud PHM semblaient afficher une capacité de reproduction réduite. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a fait remarquer que le CIEM déclarait dans le rapport de l'ACOM que ce complexe ne devrait par conséquent être pêché ni au Groenland occidental, ni aux Iles Féroé. Cette recommandation apparaissait dans le rapport, en texte souligné. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a demandé au représentant du CIEM si ceci signifiait indirectement que ce complexe de stock pouvait être exploité à un autre endroit de la zone de la CANE. Il a ajouté que la zone de la Commission du Groenland Occidental correspondait à la zone de réglementation définie dans le traité de l'OCSAN (Article 2.2) tandis que la zone de la CANE dépassait la zone de réglementation féringienne telle qu'elle était décrite dans le traité de l'OCSAN. Le CIEM devait, à son avis, proposer des recommandations sur les conséquences de tous types de pêche pratiqués sur ces stocks en fonction de leur état. Il pensait également que l'OCSAN et ses Parties devraient trancher sur les mesures de réglementation concernant la zone de la Commission en fonction des recommandations scientifiques du CIEM.

5.6 Le représentant du CIEM a répondu que pour ce qui était de la possibilité que le groupe de stocks soit exploité ailleurs, ceci ne devrait pas avoir lieu car le stock se trouvait en deçà de la réserve d'échappements pour la reproduction. Quant à la question des recommandations du CIEM, le Groupe de travail avait proposé des recommandations spécifiques aux pêcheries en eaux distantes. Le représentant du CIEM a indiqué que le CIEM pouvait aider à re-définir la question afin d'éviter toute confusion semblable à l'avenir. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a convenu que ceci serait utile.

5.7 Le représentant de l'Islande a demandé au représentant du CIEM si des progrès avaient été réalisés en ce qui concernait l'évaluation du nombre de captures de saumons dans les pêcheries pélagiques. Le représentant du CIEM a répondu que l'on avait déjà rendu compte de la question des captures accidentelles de saumons. Aucun nouvel effort n'a donc été entrepris pour rassembler de nouvelles données sur ce sujet.

5.8 Le représentant des ONG a soulevé la question des pêcheries de stock mixte, dans le contexte du rapport du CIEM. Il a fait remarquer que la pêcherie de stock mixte du Finnmark suscitait de grandes inquiétudes. Cette pêcherie récolte de nombreux poissons provenant de la Russie et de la Finlande. Le représentant des ONG était conscient du dialogue qui avait lieu entre la Norvège et la Russie à propos de l'amélioration des données scientifiques concernant la nature des stocks. Il a demandé si cette question devait faire l'objet d'un débat. Le Président a noté qu'il était plus approprié de soulever cette question, en tant que point de l'ordre du jour, lors de la réunion du Conseil. Il a ainsi proposé de laisser le Conseil en débattre.

6. Mesures de réglementation

6.1 Le Président a rappelé qu'une décision avait été prise l'année dernière concernant la pêcherie de 2008 du saumon dans les eaux féringiennes. Conformément à cette décision la Commission a décidé de ne pas fixer de quota puisque les Iles Féroé étaient censées gérer toute pêcherie qui soit en accord avec les recommandations du CIEM et avec précaution. Il a demandé si le Danemark (pour les Iles Féroé et le Groenland) était en mesure de poursuivre l'arrangement actuel. Le représentant du Danemark (pour les Iles Féroé et le Groenland) a répondu qu'ils étaient en effet en mesure de continuer cet arrangement.

6.2 Le Président a fait circuler un avant projet de prise de décision concernant la pêcherie de saumons dans les eaux féringiennes en 2009 (NEA(08)4). La Commission a adopté cette décision, NEA(08)6 (annexe 3).

7. Risque de Transmission du *Gyrodactylus salaris* dans la zone de la Commission

7.1 En l'absence de M. Stian Johnsen (Norvège), Président du Groupe de travail, le Secrétaire a présenté le rapport de la réunion du Groupe de travail chargé de la question du *Gyrodactylus salaris* dans la zone de la Commission de l'Atlantique du Nord-Est, NEA(08)3 (annexe 4). Le Secrétaire a noté que le Groupe recommandait à la Commission d'inciter les pays sans plan de réserve à en élaborer un de toute urgence. Le Secrétaire a souligné que la menace posée par le *G.salaris* était sérieuse

et que le groupe avait recommandé de diffuser sur le site internet de l'OCSAN toute information se rapportant au parasite.

7.2 Le Président a communiqué que l'une des recommandations du rapport du Groupe de travail consistait à établir un groupe de travail scientifique qui rendrait compte de ses activités au groupe de travail chargé du *G.salaris*. Il estimait toutefois que la réalisation de cette recommandation pourrait présenter des difficultés. Il a par conséquent demandé aux Parties de se prononcer sur la façon dont il fallait aborder la question. Le représentant de l'Union européenne était d'avis qu'il n'y avait aucun mérite à fixer, comme il était recommandé, un autre Groupe de travail car l'on avait déjà, récemment, accompli beaucoup dans ce domaine. Se rapportant à la recommandation du Groupe de travail qui envisageait des représentations auprès de la Commission Européenne en vue d'obtenir des garanties supplémentaires, il a fait remarquer qu'aucune révision de la Directive sur la santé des poissons n'était prévue pour le moment et qu'un nouvel examen de la question ne serait probablement pas productif. À son avis, les recommandations du Groupe de travail concernant les représentations auprès de la Commission Européenne et la création d'un groupe de travail scientifique étaient inacceptables.

7.3 Le représentant de la Norvège a entériné l'opinion du représentant de l'Union européenne, émise à propos de la création d'un Groupe de travail scientifique.

7.4 Le représentant des ONG a fait remarquer que les recommandations du Groupe de travail avaient été proposées en toute bonne foi. La décision de ne pas écrire à la Commission Européenne l'avait déçu. Mais, étant donné les réponses des Parties à la question, il n'avait pas l'intention de poursuivre le sujet plus loin au cours de cette réunion.

7.5 La Commission a convenu de conserver cette question à l'ordre du jour de sa prochaine Réunion annuelle afin d'en surveiller l'évolution.

8. Dernier rapport de l'étude pilote visant à améliorer les connaissances sur la migration, dispersion et survie des saumons d'élevage

8.1 Le Président a rappelé brièvement qu'il avait été convenu, lors de la réunion de 2003 de la Commission, d'entreprendre une étude pilote de marquage afin d'étudier le comportement des saumons échappés d'élevage. Il a, ensuite, invité le Dr Lars Petter Hansen, coordinateur de ce projet, à en présenter les conclusions.

8.2 Le Dr Hansen a exposé le contexte de l'étude pilote. L'objectif était d'étudier le sort des saumons « échappés » d'élevages salmonicoles et d'examiner les différences qui existaient au niveau de la répartition géographique des marques récupérées sur des poissons qui avaient été relâchés simultanément depuis différents pays. Plusieurs pays avaient été invités à participer à cet exercice mais de nombreux problèmes avaient retardé le lancement du projet. En 2006, l'Ecosse et la Norvège avaient relâché des grands saumons, marqués individuellement, à partir d'élevages situés le long des côtes.

8.3 Parmi ces grands saumons, 597 et 678 avaient été relâchés, au printemps 2006, depuis

respectivement la région de Floro en Norvège et la région d'Ardmair en Ecosse. L'on n'avait récupéré que cinq marques provenant des poissons relâchés écossais (soit 0,7%) par rapport à 42 marques (soit 7.0%) provenant des poissons relâchés norvégiens. Peut-être, supposait le Dr Hansen, les poissons norvégiens avaient-ils été soumis à un plus grand effort de pêche. Peut-être également les poissons écossais s'étaient-ils dirigés plus loin en mer et avait subi une prédation plus importante. On avait retrouvé les marques écossaises au nord du site où ils avaient été relâchés (sur le continent écossais), aux Iles de Shetland, en Suède et en Norvège. Les lieux de récupération de ces marques pouvait s'expliquer par un mouvement suivant les courants dominants. La plupart des recaptures norvégiennes avaient lieu dans les fjords et rivières proches du site de relâchage. Le Dr Hansen a suggéré que les saumons qui s'échappent tôt peuvent être dirigés par les courants vers les eaux arctiques et ont un taux de survie bas. Les poissons relâchés en Ecosse démontraient une grande capacité de dispersion et s'avéraient capables d'atteindre les eaux côtières et les rivières de la Norvège et de l'Ouest de la Suède. Il a conclu en admettant qu'il serait probablement difficile d'étendre ce projet. Toutefois il demandait aux Parties leur avis.

8.4 Le Président a indiqué que les conclusions du programme pilote étaient intéressantes mais que l'on ne voudrait peut-être pas répéter cette expérience. Le représentant des ONG a recommandé un marquage automatique de tous les saumons d'élevage, comme il était pratiqué sur la côte Est des États-Unis, (voir NAC(08)5). Le secteur était certes moins important aux États-Unis. Cependant ils avaient recours, dans le cas du saumon d'élevage, à des techniques de marquage génétique – une technique que le représentant des ONG recommandait à l'OCSAN d'encourager en Europe. Le Président a fait remarquer qu'un atelier portant sur la question du marquage du saumon d'élevage avait été organisé. Il avait toutefois été difficile de progresser sur cette question. Le représentant des ONG a commenté que le nombre d'entreprises engagées à produire du saumon d'élevage était désormais moins important et qu'il serait de ce fait plus facile d'introduire un système de marquage.

9. Annonce du prix du programme d'encouragement au renvoi des marques

9.1 Le tirage au sort du prix de la Commission du Groenland Occidental du Programme d'encouragement au renvoi des marques de l'OCSAN a été effectué par le Commissaire aux comptes le 13 mai 2008. La marque gagnante était d'origine norvégienne. Le poisson, qui avait été marqué, avait été relâché lors d'une pêche au filet trappe à l'embouchure du Trondheim fjord. Il a ensuite été recapturé dans la rivière Gaula. M. Bjorn Ronningen, de Favang, en Norvège a remporté le prix de la Commission de 1 500 dollars. La Commission a félicité le gagnant.

10. Recommandations au Conseil s'inscrivant dans le cadre de la demande au CIEM de recommandations scientifiques

10.1 La Commission a approuvé la demande de recommandations scientifiques concernant la zone de la Commission de l'Atlantique Nord-Est, telle qu'elle avait été préparée par le Comité scientifique permanent et adressée au CIEM. La demande de recommandations scientifiques, approuvée par le Conseil, figure dans le document CNL(08)9 (annexe 5).

11. Divers

11.1 Aucune autre question n'a été traitée.

12. Date et lieu de la prochaine réunion

12.1 La Commission a convenu de tenir sa prochaine réunion lors de la Vingt-sixième réunion du Conseil.

13. Compte rendu de la réunion

13.1 La Commission a accepté le compte rendu de la réunion..

Note: Une liste des documents de la Commission de l'Atlantique du Nord-Est figure à l'annexe 6.

ANNEX 1

Joint NGO Opening Statement to the North-East Atlantic Commission

Mr. Chairman, ICES has concluded that three of the four NEAC stock complexes are suffering, or are at risk of suffering, reduced reproductive capacity after homewater fisheries have taken place, and no catch options for the fishery at the Faroes from 2009 -2011 would meet precautionary management objectives.

In commending our colleagues in the Faroes for not fishing for salmon in any form since 2000, this does tend to concentrate our minds on exploitation in homewater fisheries. In that regard, ICES has recommended that the precautionary approach is to fish only on rivers where stocks are at full reproductive capacity. Further, they highlight the particular threats posed by mixed stock fisheries.

Their report indicates that 38% of the NEAC catch comes from coastal fisheries in homewaters. While there has been considerable progress in reducing the catch from these fisheries, most recently in the UK and Ireland, and historically in Scotland, given the weakness of stock complexes, the figure of 38% is unacceptable.

Mixed stock coastal fisheries remain, in order of size (catch), in Norway, Scotland, with smaller fisheries in Russia, England & Wales, Northern Ireland and France. We remain concerned at the apparent lack of firm commitments by the Parties concerned to take firm action to close these fisheries. We note that the NASCO Decision Structure is being interpreted in different ways by different jurisdictions. We need to ensure consistency through scrutiny, a clear role for NGOs during the FAR process.

58% of catch in the NEAC area is from in-river fisheries, principally recreational rod fisheries. Bearing in mind the ICES advice, we emphasize the importance of river specific conservation limits (CLs) as a vital management tool, and, in a socio-economic context, the importance of catch and release.

We note the progress made by Scotland, Iceland and Norway towards setting river specific CLs. (we acknowledge that other jurisdictions have already developed these measures)

Whilst inevitably the focus of our attention this year has been on fisheries management, we must not forget other serious problems, such as the impact of aquaculture, the continuing damage caused by escapes and sea lice, and the threat posed by *G.salaris*

Aquaculture also impacts on sea trout, which provides recreational and commercial fisheries in the UK, Ireland and Norway. We ask Parties to consider whether the work of NASCO could be extended to cover this important species where appropriate. For example, England & Wales have a seatrout and salmon strategy.

The relationship between NASCO and the International salmon Farming Industry is another area of concern but we will be reserving our comments for the Council agenda.

ANNEX 2

NEA(08)7

Twenty-Fifth Annual Meeting of the North-East Atlantic Commission
Tryp Rey Pelayo Hotel Melia, Gijón, Spain

3-6 June, 2008

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Election of Officers
5. Review of the 2007 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area
6. Regulatory Measures
7. Risk of Transmission of *Gyrodactylus salaris* in the Commission Area
8. Final Report of the Pilot Study to Improve Understanding of the Migration, Dispersal and Survival of Farmed Salmon
9. Announcement of the Tag Return Incentive Scheme Prize
10. Recommendations to the Council on the Request to ICES for Scientific Advice
11. Other Business
12. Date and Place of the Next Meeting
13. Report of the Meeting

ANNEX 3

NEA(08)6

Decision regarding the salmon fishery in Faroese waters 2009

The North East Atlantic Commission:

RECOGNIZING the right of the Faroe Islands to fish for salmon in their area of fisheries jurisdiction;

ACKNOWLEDGING the restraint demonstrated by the Faroe Islands by not having commercial salmon fisheries for a number of years;

RECALLING that the Parties to the North-East Atlantic Commission have previously agreed decisions for the Faroese fishery based on the scientific advice from ICES;

ACKNOWLEDGING that in the past the Faroe Islands have managed the salmon fishery in the area of its fisheries jurisdiction in consideration of the advice from ICES concerning the biological situation and the status of the stocks contributing to the fishery;

AGREEING to continue to work together to establish an agreed mechanism to allocate any exploitable surplus between the Faroe Islands and homewater fisheries on a fair and equitable basis;

NOTING that the Faroe Islands will manage any salmon fishery on the basis of the advice from ICES regarding the stocks contributing to the Faroese salmon fishery in a precautionary manner and with a view to sustainability, taking into account relevant factors, such as socio-economic needs;

ACKNOWLEDGING that Faroese management decisions will be made with due consideration to the advice of ICES concerning the biological situation and the status of the stocks contributing to the fishery;

RECOGNIZING that ICES considers it highly unlikely that the catch options provided for the North-East Atlantic Commission will change during the next three years;

NOTING that Denmark (in respect of the Faroe Islands and Greenland) will, in case of any decision to open the fishery, inform the NASCO Secretariat and all members of the Commission of that decision and the attached conditions. In that event, other members of the Commission could call for a Commission meeting in accordance with Article 10 (7) of the Convention. In such a case, it is agreed to derogate from the provisions of Rule 16 of Procedure;

RECOGNISING that a Framework of Indicators has not been provided by ICES;

HEREBY DECIDES:

Not to set a quota for the salmon fishery in the Faroese Fisheries Zone for 2009.

ANNEX 4

NEA(08)3

Report of the Second Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission area

NEA(08)3

Report of the Second Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission area

1. The second meeting of the Working Group on *G.salaris* in the North-East Atlantic Commission area was held in Oslo, Norway, during 10-12 October 2007 under the Chairmanship of Mr Stian Johnsen (Norway). Representatives of the European Union (Finland and UK (England and Wales, Northern Ireland and Scotland)), Norway, NASCO's accredited NGO's, the World Organisation for Animal Health and the ICES Working Group on the Pathology and Diseases of Marine Organisms attended the meeting. The lack of participation by some NEAC Parties and EU Member States is a concern to the Working Group. The report of the meeting is attached.

2. The Working Group reviewed information on:

   - monitoring programmes for the parasite and information on its distribution;
   - the measures being taken to prevent the spread of the parasite and to eradicate it where it has been introduced;
   - initiatives being taken to increase awareness of the parasite;
   - the results of cost-benefit analyses in relation to the introduction and eradication of the parasite;
   - on-going and planned research and research requirements in relation to *G.salaris*;
   - other fish health issues of relevance to wild Atlantic salmon (because of time constraints there was only a brief exchange of information in relation to Proliferative Kidney Disease (PKD) and Anisakis infestations of salmon.

3. The Group noted that the host-parasite relationship between *G.salaris* and Atlantic salmon is complicated because of the existence of both pathogenic and non-pathogenic strains of the parasite, because the resistance of Atlantic salmon to the parasite varies, and because environmental conditions such as water quality can have a significant impact on the relationship. Nonetheless, given the potentially devastating impact of the parasite on wild stocks the Group concluded that Additional Guarantees under the EU Fish Health Directive should continue to be based only on the presence or absence of the parasite rather than trying to distinguish between pathogenic and non-pathogenic strains.

4. The Group endorsed the recommendations contained in the NEAC's 'Road Map', (document (NEA(04)13 as amended)) and believes that there should be urgency about their implementation by the NEAC Parties because the risks posed by the parasite have not been diminished in any way. These recommendations are in relation to:

   - the need for strengthened national and regional legislation and measures to prevent the further spread of the parasite;
   - revisions to international guidelines;
   - research, in particular with regard to differentiation of harmful and non-harmful forms of the parasite and the effects of environmental factors, and with regard to improved coordination of research

5. The Working Group recommends as follows:

- that the NEAC seeks reports on progress in developing contingency plans for *G.salaris* from those countries that did not attend the Working Group meeting and that those countries without plans be encouraged to develop them as a matter of urgency;

- that the NEAC Parties and the Secretariat make representations to the European Commission seeking the continued availability of all Additional Guarantees as originally adopted, in perpetuity after 2009;

- that information on *G.salaris* be made available on the NASCO website when it is revised, with appropriate links;

- that a scientific Working Group be established, that would report back to the *G.salaris* Working Group, to facilitate exchange of scientific information; to make recommendations on standardised methods; e.g. on monitoring; to identify and recommend areas where collaborative research across government laboratories requires funding; and to identify sources of funding.

- that the NEAC decides when the Group should next meet and encourage further participation in any future meetings.

6. The NEAC is asked to consider these recommendations and decide on appropriate action.

Secretary
Edinburgh
9 April 2008

GSWG(07)19

Report of the Second Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission Area

Clarion Collection Savoy Hotel, Universitetsgaten 11, Oslo, Norway
10-12 October 2007

1. Opening of the Meeting

1.1 The Chairman of the Working Group, Mr Stian Johnsen (Norway), opened the meeting and welcomed participants to Oslo. He particularly welcomed representatives of the World Organization for Animal Health (OIE), the ICES Working Group on the Pathology and Diseases of Marine Organisms (WGPDMO) and NASCO's accredited NGOs.

1.2 The Secretary of NASCO, Dr Malcolm Windsor, added his welcome and briefly described the structure and functions of NASCO. He indicated that the Group's report, including any recommendations, would be presented to NASCO's North-East Atlantic Commission (NEAC) for consideration at its Annual Meeting in June 2008. He noted that NASCO's role was to conserve and restore the Atlantic salmon and that this objective should guide the work of the Group in developing its recommendations.

1.3 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Working Group adopted its agenda, GSWG(07)18 (Annex 2), after amending Item 9 to 'Other fish health issues of relevance to wild Atlantic salmon'.

3. Consideration of the Terms of Reference

3.1 The Working Group considered its Terms of Reference (ToR), as contained in the 'Road Map', GSWG(07)3, agreed by NASCO's North-East Atlantic Commission in 2004 for taking forward the recommendations developed by a previous workshop in relation to *G. salaris.*

3.2 The Working Group considered that it did not have the socio-economic expertise available to it to undertake cost-benefit analyses as proposed in its ToR but nonetheless agreed that it would be useful, as at the Group's first meeting, to exchange information on such analyses where these had been undertaken by the Parties and their relevant jurisdictions.

3.3 The Working Group decided that, if time permitted, under Agenda item 9 it would briefly discuss progress in managing interactions between sea lice and wild Atlantic salmon but recognised that this topic was also being addressed by the NASCO/North Atlantic salmon farming industry Liaison Group and through the Parties'

implementation plans and reporting arrangements. It would also review information on Proliferative Kidney Disease (PKD) and Anisakis made available by the ICES WGPDMO.

4. Monitoring programmes for, and the distribution of, *G. salaris*

4.1 Reports on *G. salaris* sampling in UK (Scotland) in 2006, GSWG(07)5 (Annex 3) and 2007, GSWG(07)6 (Annex 4) and GSWG(07)7 (Annex 5), were presented. All salmon and trout farms are visited annually and 50% are sampled (30 fish per sample). Farms holding broodstock are visited twice each year. The 55 defined river catchments (covering the 380 salmon rivers) are sampled once every five years. In summary, this monitoring indicated that while gyrodactylids *(G. derjavini* and *G. truttae)* had been recorded during sampling programmes for farmed and wild fish, no *G. salaris* had been recorded. Information was also made available to the Working Group on the diagnostic methods used for *Gyrodactylus* species in Scotland, GSWG(07)8 (Annex 6).

4.2 The representatives of the UK (England and Wales) reported that in 2006/2007 monitoring for the parasite had occurred at 37 sites that had been sampled up to three times each. While gyrodactylids had been found at 14 sites, *G. salaris* was not recorded and England and Wales remain free of this parasite. *G. derjavini* was found at 7 sites on a mixture of Atlantic salmon, brown trout and rainbow trout. *G. truttae* was found on brown trout and *G. thymalli* was found on grayling.

4.3 The representative of the UK (Northern Ireland) reported that in 2006/2007 monitoring for the parasite had occurred at fish farms but *G. salaris* had not been found. In addition, sampling takes place in 12 rivers each year under a rolling programme in which all of the 27 rivers are sampled approximately once every three years. *G. salaris* had not been identified using microscopic inspection of skin scrapes and fin tissue.

4.4 The representative of Finland tabled a report on monitoring for *G. salaris*, GSWG(07)13 (Annex 7). In accordance with an agreement with Norway, 150 wild salmon parr are sampled annually from the rivers Teno and Näätämö**.** There is no aquaculture in these catchments. *G. salaris* has not been recorded. Sampling in two other watercourses draining into the Barents Sea, and at two fish farms in one of these watercourses, was also conducted but *Gyrodactylus* spp were not recorded. There was no sampling in a third river draining into the Barents Sea. There is no official monitoring for *G. salaris* in rivers draining into the Baltic and White Seas.

4.5 The representative of Norway reported that in 2006, more than 3,000 salmon from 94 rivers had been examined for *G. salaris*, together with approximately 1,800 fish, both rainbow trout and salmon, from fish farms, GSWG(07)14 (Annex 8). However, for 2007 the sampling programme had been restructured into a risk-based programme in which 108 rivers are monitored annually, with at least 30 fish being sampled from each river and with examination of the whole fish, not just their fins. In larger rivers, larger samples are examined. In fish farms only the fins are examined but sample sizes are at least 60 fish for rainbow trout and 30 fish in the case of salmon. Two other monitoring programmes are undertaken. In rivers where there has been an

eradication programme, samples are collected at 1 - 2 km intervals along the river and the monitoring continues for a period of at least five years to confirm the successful eradication of the parasite. In rivers where the parasite has appeared for the first time or where the parasite has reappeared after treatment, sampling of 60 fish is undertaken. The representative of Norway tabled a document on monitoring and research in relation to *G. salaris* in Fennoscandia, Denmark and Russia, GSWG(07)4 (Annex 9). This paper noted that nine different haplotypes of *G. salaris* have been identified and that the pathogenicity of the parasite appears to vary both within and among haplotypes. However, the host-parasite interaction is further complicated because there are also different types of Atlantic salmon with varying resistance to the parasite and environmental conditions such as water quality may have a significant impact on the relationship between the parasite and its host.

4.6 The Working Group recognised that there might be a situation where a non-pathogenic strain of *G. salaris* was introduced into a country or region that was previously free of the parasite. This could affect that country or region's disease status with regard to *G. salaris* which could increase the risk of pathogenic strains being introduced through movements of live fish, with consequences for wild Atlantic salmon. Nonetheless, the Group believes that in order to safeguard wild salmon stocks, Additional Guarantees should continue to be based on the presence or absence of *G. salaris* rather than trying to differentiate between pathogenic and non-pathogenic strains, since its pathogenicity may be influenced by the environment and the salmon population concerned. Further research into the pathogenicity of *G. salaris* is required.

4.7 At its first meeting the Working Group had agreed that it should seek an exchange of information on *G. salaris* monitoring and research from the ICES WGPDMO and the EC Fish Disease Reference Laboratory and, accordingly, the NASCO Secretariat had invited both organizations to be represented at the meeting to facilitate this exchange. ICES had agreed that a Norwegian representative to the WGPDMO, Dr Tor Atle Mo, would participate in the NASCO Working Group meeting, and that the Chairman of the NASCO Working Group would be invited to attend the next ICES WGPDMO meeting. Dr Mo indicated that the ICES WGPDMO had not had much focus on *G. salaris* as it is a freshwater parasite and is being dealt with in other fora. He indicated that he had contacted members of the ICES WGPDMO seeking information on: *G. salaris* monitoring and research; information on *G. salaris* from countries without wild Atlantic salmon; and topics for possible workshops and seminars. He summarised the information provided for those countries not represented. He indicated that there was no monitoring programme for *G. salaris* in the southern Baltic area of Russia but there may be sampling programmes in northern parts of the country. Information from Ireland indicated that under EC Decision 2004/453, Ireland has been granted an Additional Guarantee of freedom from the parasite and, in accordance with the conditions associated with this guarantee, monitoring of rivers is carried out annually and both microscopic and molecular methods of identification of gyrodactylids are used. *G. salaris* has not been found. Canada had reported that there is no evidence that *G. salaris* occurs in Canada but a research programme has commenced to develop diagnostic markers under the National Aquatic Animal Health Programme. It is anticipated that a database on the Canadian, and perhaps North

American, species of gyrodactylids will be developed. It is thought unlikely that there is a monitoring programme for *G. salaris* in the USA.

4.8 The Working Group discussed standards for monitoring programmes, which are vitally important in mapping the distribution of the parasite and in support of Additional Guarantees. The Group noted that the 'Road Map' contained some important guidance with regard to monitoring programmes, as follows:

- the geographic distribution of *G. salaris* should be established with a view to minimising its spread to uninfected catchments. To this end, existing monitoring programmes should be retained and expanded as necessary. Standardised targeted monitoring methods in watercourses, lakes and in rivers should be introduced;
- surveillance programmes should include all potential host species. On farms with both salmon and rainbow trout both populations should be tested. Higher sample sizes will be required for rainbow trout because the prevalence of the parasite is expected to be lower;
- diagnosis of *G. salaris* by morphology should be confirmed by the use of molecular techniques. Criteria for diagnosis should be based on the OIE Manual of Diagnostic Tests for Aquatic Animals;
- countries with shared catchments should cooperate in monitoring programmes.

4.9 The Working Group noted that principles concerning monitoring have been developed by OIE and are contained in the Aquatic Animal Health Code, 2007 and the Manual of Diagnostic Tests for Aquatic Animals, 2006 (the general principles are in section 1 of these documents and principles specific to *G. salaris* in section 2.1.14). With regard to standardised targeted monitoring methods the Working Group has recommended establishing a Scientific Working Group whose Terms of Reference include facilitating cooperation on issues including monitoring approaches (see paragraph 8.5 below).

5. Measures to prevent the spread of the parasite and to eradicate it where it has been introduced

(a) national and regional initiatives, including progress in developing contingency plans

5.1 At its first meeting the Working Group had considered that, consistent with the 'Road Map', it is essential that each Party and relevant jurisdiction should have a contingency plan to deal with an outbreak of *G. salaris*. While it was recognised that these plans would need to be tailored to the situation in each country, the Working Group had developed guidelines for establishing contingency plans for the treatment, containment and eradication of *G. salaris*.

5.2 A document, GSWG(07)9 (Annex 10), was tabled detailing the measures taken to prevent the spread of *G. salaris* in UK (Scotland). *G. salaris* is exotic to Scotland but it is considered that there is a risk of its introduction as a result of both the trade in fish eggs and via leisure pursuits. Importation of live salmonids from areas of lower health status with respect to *G. salaris*, is prohibited into Great Britain, although importation of disinfected eggs is permitted. A contingency plan has been developed

and contains sections on disease response assumptions; command and control; structures and responsibilities of government headquarters; field operations; communications; and resources. In February 2007, a table-top exercise was conducted in cooperation with officials from England and Wales and Norway to test the robustness of the plan. A number of revisions had been proposed in the light of this testing. Initiatives are underway to highlight the risks of importing the parasite through publicity at airports and ferry and sea ports.

5.3 The representative of Finland indicated that no contingency plan had been developed for the rivers draining into the Barents Sea and there were no plans to develop such a plan in the near future.

5.4 The representatives of the UK (England and Wales) indicated that a *G. salaris* group had been established involving scientists from Scotland, Northern Ireland and England and Wales in order to develop common approaches to diagnostic screening and for conducting surveillance in the event of the introduction of *G. salaris*. Furthermore, existing databases on fish movements are not well integrated and this aspect is also being addressed. They indicated that the contingency plan for England is being reviewed and there are separate, but parallel, plans for Wales and Northern Ireland. The DEFRA plan represents the strategic approach while the CEFAS and the Environment Agency elements of the contingency plan deal with strategies to be followed by the national control centre (CEFAS) and by the Environment Agency for combating an outbreak. Consideration of the legislative powers is underway. In addition, the information leaflets about *G. salaris* are being revised. The representative of the UK (Northern Ireland) indicated that the revised contingency plan is at the consultation stage and more details of the treatment method to be used are required.

5.5 A report on the eradication programme in Norway was presented (see GSWG(07)14, Annex 8). In 2007, a total of NOK49 million (approximately £4.5 million) had been allocated to the eradication programme, an increase from NOK30 million in 2006. A total of 46 rivers have been infected with the parasite but, of these, 15 have been treated and confirmed free of the parasite and 10 rivers have been treated but are still being monitored to confirm their freedom from the parasite. A further 10 rivers have been treated but the parasite has returned. Eleven rivers have not been treated. When rivers are treated, the salmon stock is maintained in a living gene bank and then parr are stocked back into the river following treatment. It was noted that in Norway, where barriers are erected to facilitate treatment, there is a need to take measures to conserve sea trout stocks but there are no species above barriers that would be a reservoir for the parasite. This may not be the case in other countries, making the eradication programme more complicated and expensive. It was further noted that in Norway the stretch of rivers accessible to anadromous salmonids was perhaps 10-15% of the catchment and that natural recolonisation of invertebrates could occur from areas above the treated zones. It was also stressed that a combination of both rotenone and acid aluminium was considered necessary since rotenone is needed in stagnant areas and very alkaline systems.

5.6 At its first meeting the Working Group had asked that the Russian delegation and the NASCO Secretariat cooperate in contacting the Government of Karelia to determine

if the report of movements of live rainbow trout to Karelia, from sources in Finland that had not been confirmed to be free of the parasite, was correct, and to see what action could be taken to prevent the spread of the parasite with imports of rainbow trout. The Secretary indicated that in accordance with this request he had contacted the Head of the Russian Federation's delegation to NASCO regarding this matter. He indicated that the response from the Federal Veterinary Authority had confirmed that while there had been imports of live rainbow trout to Russia from Finland, all imports were under permit and all the regulatory requirements had been met. It had subsequently been decided that the Russian import requirements would be modified to include specific provisions regarding the parasite *G. salaris*. The Working Group welcomed this information but requested that the Secretary seek further clarification from Russia on the existing regulatory requirements and the proposed new provisions concerning *G. salaris*.

5.7 At its first meeting the Working Group had recommended that NASCO's Parties and their relevant jurisdictions should: continue to develop methods for the use of chemical treatments which minimise any environmental impacts; establish whether the use of alternative or complementary methods to rotenone might be restricted or rejected under EU or other legislation; make available to the Working Group information on the effects of alternative or complementary methods; identify the means of ensuring continued experimental use of alternative or complementary methods to rotenone. The Working Group had been advised that an application for essential use derogation for rotenone under the so-called EU 'Biocides Directive' had been submitted by the Norwegian Government in March 2006. Furthermore, the private company VESO had submitted a dossier to the UK Health and Safety Executive, as the competent authority appointed by the Commission, for registration of rotenone in the positive list of the Directive. The representative of Norway advised the Working Group that a decision on the application for listing of rotenone was expected in 2008 or 2009 but that in the meantime continued use of rotenone is permitted within the EU and EEA. The Norwegian application for essential use derogation had been withdrawn. No new information was available on whether the use of acid aluminium might be restricted under EU or other legislation. In the event of a major demand for rotenone it was noted that there could be a delay of up to 18 months since the current supply can only meet the existing demand for the product.

5.8 The Working Group endorsed the recommendations in the 'Road Map' for strengthened national and regional legislation and measures to prevent the further spread of *G. salaris* and believes there should be urgency in their implementation by the Parties to the North-East Atlantic Commission of NASCO and their relevant jurisdictions because the risks posed by *G. salaris* have not diminished in any way. In particular, the Working Group noted that Iceland, Russia and a number of EU Member States (Ireland, France, Spain, Sweden, Germany) were not present at the meeting and that no reports had been submitted on progress in developing contingency plans in these countries. This is a concern to the Group, as is the fact that there is no plan for Finland. The Working Group recommends that this issue be considered further by the NEAC and that reports on progress in the development of these plans should be sought from the countries concerned and that those countries that do not have plans in place be encouraged to develop these as a matter of urgency.

(b) international initiatives

5.9 At the first meeting of the Working Group, a letter from the Head of the EU delegation to NASCO had been tabled that stated that the level of Community protection against the importation of *G. salaris* has not been diminished under the new draft EU Fish Health Directive. The Working Group had considered that that would only be the case if the Additional Guarantees were permanently adopted under the new Directive rather than being subject to review. The Working Group had, therefore, requested that the North-East Atlantic Commission of NASCO seek further clarification from the European Commission that the Additional Guarantees will be permanently adopted and not subject to review, so that the protection against import of *G. salaris* is not diminished under the new Directive. The Secretary reported that at NASCO's 2006 Annual Meeting the representative of the European Union had stressed that the safeguards in place would be maintained and would be available to countries in the Community and the European Economic Area. However, the Working Group noted that the existing Additional Guarantees are scheduled to be reviewed in 2009. In the absence of listing of *G. salaris* under the Fish Health Directive, these Additional Guarantees are vital in safeguarding wild Atlantic salmon stocks from this highly damaging parasite and the Group strongly recommends that the Parties of the NEAC and the Secretariat of NASCO make representations to the European Commission seeking the continued availability of all Additional Guarantees, as originally adopted, in perpetuity after 2009. The Working Group noted that these Additional Guarantees could be used to prevent movements of live fish from a zone of lower *G. salaris* status into a higher status zone. Where trade is permissible, trade in disinfected gametes is, however, preferable to trade in live fish since the risks of spreading the parasite are less because for example of issues with certification, monitoring, and diagnostic tests (see paragraph 6.6). Commission Decision 2004/453/EC details the conditions that must be met to obtain area/country freedom from a specific disease. Annex 5 of this Decision also details the conditions to be met before status can be regained after a case of disease in a previously free area/country. The Working Group noted that the 'Road Map' recommends that the minimum approved zone size should be a river catchment not individual farms.

5.10 The Working Group noted that several countries had not been represented at the meeting and that for future meetings it might be useful to consider specifically inviting certain participants working on *G. salaris*, e.g. from Karelia and the Murmansk region, and to consider possible methods to fund such attendance. These participants should also be invited to participate in the Scientific Working Group meeting referred to in paragraph 8.5. The representative of Norway indicated that it is intended to hold joint meetings with Sweden and Finland to improve cooperation on measures to prevent the spread of the parasite.

5.11 The Working Group endorsed the recommendations in the 'Road Map' concerning revisions to international guidelines and believes that there should be urgency in their implementation by NEAC Parties of NASCO and their relevant jurisdictions because the risks posed by *G. salaris* have not diminished in any way.

6. Initiatives to increase awareness of the parasite

6.1 A report on initiatives to increase awareness of *G. salaris* in UK (Scotland) was presented, GSWG(07)10 (Annex 11). These initiatives include the 'Home and Dry Campaign', targeting anglers and the wider public through brochures and posters, articles in the angling press, the work of angling/fisheries organizations in keeping their members advised of the risks from introducing the parasite, and inclusion of information on *G. salaris* on the websites of VisitScotland (the national tourist board) and the Scottish Canoe Association. Consideration is being given to making all the information available on a single website. It was noted that there had been considerable focus on *G. salaris* in the Scottish Parliament at the time that the Aquaculture and Fisheries Bill was being debated.

6.2 The representative of Finland indicated that leaflets concerning *G. salaris* have continued to be distributed at places where licences to fish for salmon are sold and there are also facilities to disinfect angling equipment at these places and along the main routes to the rivers. There had also been articles published in fishing journals to increase awareness of the damaging impacts of the parasite.

6.3 In UK (England and Wales) new leaflets are being produced on individual diseases, including a leaflet about *G. salaris*. Consideration is being given to a campaign in support of the Scottish campaign and a testing of the contingency plan.

6.4 In UK (Northern Ireland) leaflets on *G. salaris* continue to be made available with fishing licences and at ports and will be updated in the future.

6.5 In Norway, initiatives to increase public awareness have continued through distribution of leaflets and posters, particularly at disinfection stations, and information made available on the Food Safety Authority and Directorate for Nature Management websites. The leaflets are available in four languages.

6.6 The Working Group discussed potential mechanisms of spread of the parasite. Concern was expressed that canoeists may inadvertently transfer the parasite on their canoes. A risk assessment conducted in Norway suggested that such transmission was unlikely because even during an epidemic there is less than one parasite per ten cubic meters of water and they are distributed close to the river bottom. Nonetheless, the Working Group recognised that although the risk of transmission with movements of canoes may be low, as with the risk of transmission on fishing equipment, the consequences could be very severe. It would be consistent with the requirements on anglers if efforts were made to ensure that canoeists also take precautions to prevent the spread of the parasite. A requirement to disinfect canoes would increase awareness of the risks associated with spread of the parasite. The Group also noted that netting in infected rivers, both legal and illegal, might be a route of transmission. The risk assessment considered that movements of live fish posed a greater risk of spreading the parasite. In this regard it was recognised that as with any certification system, certification concerning disease-free status for *G. salaris* involves having a certain amount of faith in the authority issuing the certificate. It was noted that some consistency in certification and in diagnostic tests was desirable since at present different States have different approaches and interpretations of the requirements.

6.7 The Working Group felt that it would be useful if information on *G. salaris* was made available on the NASCO website, when it is revised, with links to other sources of information developed by the NEAC Parties and their relevant jurisdictions.

7. Cost-benefit analyses to support research, guarantees, policy decisions, publicity, etc.

7.1 In order to assess the effects of various possible actions in the event of Scottish waters being affected by *G. salaris*, the Scottish Government had commissioned a cost-benefit analysis entitled 'An Economic Evaluation of the Impacts of the Salmon Parasite *Gyrodactylus salaris* (Gs) should it be introduced to Scotland'. A summary of this analysis was presented, GSWG(07)11 (Annex 12). The study had concluded, *inter alia,* that:

- should the Scottish Government take no action to prevent the spread of *G. salaris,* a decrease in net Economic Value capitalised at £633 million could result from the complete loss of salmon angling:
- aquaculture is not as likely to be seriously affected;
- the probability of *G. salaris* entering the UK could be reduced considerably by the provision of disinfection stations at ports and by extensive publicity notifying of the danger of the parasite. A long-term reduction in the likelihood of transmission of 1% is all that would be necessary to justify these measures;
- for a small river (the Luce), eradication is likely to be preferred to containment and the cost-benefit ratio was estimated to be between 1.94 and 2.93 depending on the treatment method used. Containment was costed for a large, complex river system (the Spey). The cost of minimal exclusion was shown to be small (£175,000) but total exclusion would result in a loss of income of £1.75 million annually and the loss of 106 jobs in the area.

7.2 The Working Group noted that the cost-benefit analysis did not include the existence values of salmon which, although hard to estimate, could be very significant.

7.3 A report on a cost-benefit analysis in Norway was presented, GSWG(07)15 (Annex 13). This report assessed socio-economic costs assessed with three different levels of funding for the eradication programme. With the highest allocation of funds the eradication programme would be completed by 2018 at a total cost of NOK 373 million and a total loss of man-years of 4,173. Under the lowest allocation scenario, the eradication programme would take until 2032 and would cost NOK 630 million with a loss of 8,024 man years.

7.4 No cost-benefit analyses in relation to *G. salaris* were presented for Finland, UK (England and Wales) or UK (Northern Ireland). The Working Group recognised that such cost-benefit analyses are valuable in seeking funding for measures to prevent the further spread of the parasite and to eradicate it from areas where it has been introduced.

8. Ongoing and planned research concerning *G. salaris* and research requirements

8.1 At its first meeting, the Working Group had agreed that it would be useful if each Party of relevant jurisdiction provided a summary of the findings of research being conducted in relation to *G. salaris.* The Working Group noted the information provided in GSWG(07)4.

8.2 A report on ongoing and planned research at FRS in UK (Scotland) was presented. A major research focus has been to improve diagnostic methods and validate these among laboratories in Scotland, England and Wales and Northern Ireland. In addition more rapid diagnostic methods have been developed. Studies are also being considered into pathogenic and non-pathogenic forms of the parasite and have been undertaken into reasons for differences in the susceptibility of host species.

8.3 Reports on *G. salaris* research in Finland, GSWG(07)16 (Annex 14) and in Norway, GSWG(07)4 (Annex 9), were presented. In Finland, studies have shown that the parasite is killed rapidly when immersed in hot water (>35^{o}C) and that this method might be an alternative to treatment with disinfectants such as Virkon S. In Norway, additional research is also being undertaken at the universities in Oslo and Tromso and at the National Veterinary Institute. The Directorate for Nature Management is also funding research into host-parasite interactions in infected rivers, on improved eradication methods and on the effects of eradication treatment on aquatic invertebrate fauna. UK (England and Wales) has also taken part in the FRS study referred to above (as is the case for UK (Northern Ireland)) but a number of additional projects are ongoing. For example, a project using GIS is being conducted to identify sites conducive to high *G. salaris* numbers during an epizootic. A mathematical modelling study on the spread of the parasite in relation to movements among trout farms has also been conducted. There are also ongoing studies to understand the factors influencing the transmission of the parasite and to optimise detection methods.

8.4 The Working Group endorsed the recommendations for research in the 'Road Map' and in the report of the first meeting of the Working Group. In particular, the need for research on differentiating harmful and non-harmful forms of the parasite, and the effects of environmental factors on pathogenicity, was stressed. The need for improved coordination of research in different organizations and countries, through regular meetings, was recognised. These aspects could be considered by the Scientific Working Group proposed in paragraph 8.5 below.

8.5 The Working Group noted that in some countries there may be difficulties in obtaining funding for scientific research and cooperation. A mechanism is needed to allow such cooperation on issues, including approaches to identification and monitoring, disinfection, cost benefit analyses, etc. The Working Group therefore recommends to the North-East Atlantic Commission that a Scientific Working Group be established to facilitate exchange of information among scientists working on *G. salaris*, with a view to developing information that could assist in policy decisions. The Working Group developed Terms of Reference for a Scientific Working Group GSWG(07)17 (Annex 15). This Scientific Working Group would report back to the *G. salaris* Working Group and one option would be for the scientific group to meet immediately prior to the next meeting of the Working Group.

9. Other fish health issues of relevance to wild Atlantic salmon

9.1 Under its Terms of Reference the Working Group is asked to consider other fish health issues of relevance to wild Atlantic salmon. At its first meeting the Working Group had agreed that it might review progress in managing interactions between sea lice and wild Atlantic salmon. However, the Group considered that it did not have either sufficient time or appropriate expertise available to review this topic which is being addressed in other fora.

9.2 The representative of ICES noted that at the last WGPDMO meeting there had been increased focus on Proliferative Kidney Disease (PKD) which is of great concern for wild salmonids in Europe. Studies in the River Aelva in northern Norway had indicated very high additional parr mortality (85%) in this river in 2002, 2003, 2004 and 2006. This additional mortality was most likely a result of PKD linked to environmental changes, possibly associated with hydro-power generation in the river or climate change. He noted that at the next WGPDMO meeting there will probably also be discussions on Anisakis infections observed in one-sea-winter Atlantic salmon in the UK and Iceland this year and which causes red vent syndrome. At this stage it is not known if the parasite affects survival or fecundity but there are also potential human health issues associated with such infestations.

10. Any other business

10.1 There was no other business.

11. Date and place of next meeting

11.1 The Working Group decided not to set a date and place for its next meeting but to seek the views of the North-East Atlantic Commission. The Working Group believes that if it is to have an effective exchange of information then it is important that all NEAC Parties and relevant jurisdictions participate in future meetings of the Group. The Working Group also agreed that the Secretariat should be requested to communicate the NEAC's decisions in relation to the recommendations in this report to members of the Working Group following the next Annual Meeting of NASCO.

12. Report of the meeting

12.1 The Working Group agreed a report of its meeting.

Annex 1 to NEA(08)3

List of Participants

European Union

Ms Catherine Collins	FRS Marine Laboratory, Aberdeen, UK
Mr David Dunkley	Scottish Government Marine Directorate, Edinburgh, UK
Dr David Graham	AFBNI, Belfast, UK
Mr Robert Griffin	DARDNI, Belfast, UK
Mr Arthur Griffiths	Scottish Government Marine Directorate, Edinburgh, UK
Dr Perttu Koski	Finnish Food Safety Authority, Oulu, Finland
Mr Stefan Pietrzyk	DEFRA, London, UK
Dr Nick Taylor	CEFAS, Weymouth, UK

Norway

Mr Sturla Brørs	Directorate for Nature Management, Trondheim
Mr Paal-Erik Jensen	Norwegian Food Safety Authority, Brumunddal
Mr Bjorn-Ove Johnsen	Norwegian Institute for Nature Research, Trondheim
Mr Stian Johnsen (Chairman)	Norwegian Food Safety Authority, Brumunddal
Mr Jarle Steinkjer	Directorate for Nature Management, Trondheim

Representatives of other organizations

Prof. Tore Håstein	World Organisation for Animal Health (OIE)
Dr Tor Atle Mo	ICES Working Group on the Pathology and Diseases of Marine Organisms
Mr Finn Erlend Odegaard	Representative of NASCO's accredited NGOs

Secretariat

Dr Malcolm Windsor	Secretary
Dr Peter Hutchinson	Assistant Secretary

GSWG(07)18

Second Meeting of the Working Group on Gyrodactylus salaris in the North-East Atlantic Commission area

Clarion Collection Savoy Hotel, Universitetsgaten 11, Oslo, Norway 10-12 October 2007

Agenda

1. Opening of the Meeting

2. Adoption of the Agenda

3. Consideration of the Terms of Reference

4. Monitoring programmes for, and the distribution of, G. salaris

5. Measures to prevent the spread of the parasite and to eradicate it where it has been introduced
   (a) national and regional initiatives, including progress in developing contingency plans
   (b) international initiatives

6. Initiatives to increase awareness of the parasite

7. Cost-benefit analyses to support research, guarantees, policy decisions, publicity, etc.

8. On-going and planned research concerning G. salaris and research requirements

9. Other fish health issues of relevance to wild Atlantic salmon

10. Any other business

11. Date and place of next meeting

12. Report of the meeting

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)5

Gyrodactylus sampling in Scotland 2006
(Tabled by EU (UK - Scotland))

GSWG(07)5

Gyrodactylus sampling in Scotland 2006

Overview:

No *G. salaris* were identified

Total No. of cases: 124
No. of +ve cases: 14
No. of +ve farms: 12 (2 cases from same farm positive for *Gyrodactylus* parasites)
No. of +ve wild sites: 1

Total No. of fish examined: 2771 fish
Total No. of wild fish sampled: 19 sites, 374 fish
Total No. of Farmed fish examined: 94 sites (6 sites sampled twice and 1 site sampled thrice to give total of 102 farm cases), 2391 fish
Total No. of Fisheries/Estuaries sampled: 3 sites, 6 fish

Details:

Gyrodactylus sampling per fish species

Farmed fish for ≥30 fish per case:

Total number of farms sampled (≥30 fish per farm)	**Number of farms positive for *Gyrodactylus* species**	**Species of *Gyrodactylus* identified**
Atlantic salmon 48 (*Salmo salar*)	4	*G. derjavini*
Rainbow trout 16 (*Oncorhynchus mykiss*)	5	*G. derjavini*
Brown/Sea trout 6 (*Salmo trutta*)	1	*G. derjavini*
Artic Charr 1	0	
Total 71	Total 10	

Farmed fish <30 fish or mixed species:

Species	No. of cases	No. of fish sampled (in each case)	Positive or negative for *Gyrodactylus*
TRO/RTR	2	30	1 case +ve (*G. truttae)*
TRO/RTR	1	4	-ve
CHARR/SAL	2	30	***1 case +ve*** **(G. derjavini)**
RTR	4	1	-ve
RTR	2	2	-ve
RTR	3	3	-ve
RTR	2	4	-ve
RTR	3	5	-ve
RTR	1	7	-ve
RTR	1	8	+ve (*G. derjavini)*
RTR	1	10	-ve
RTR	1	14	-ve
SAL	2	1	-ve
SAL	2	3	-ve
SAL	2	5	-ve
SAL	1	10	-ve
SAL/TRO	1	30	-ve
	Total 31	Total fish 261	

RTR: Rainbow Trout, TRO: Brown Trout/Sea Trout, SAL: salmon.

Wild fish

Species	No. of cases	No. of fish sampled (total)	Positive or negative for *Gyrodactylus*	Species of *Gyrodactylus* identified
SAL	5	92	-ve	
TRO/RTR	1	5	-ve	
TRO/SAL	7	210	1 case (30 fish sample) +ve*	PCR failed
RTR	3	6	-ve	
TRO	3	61	-ve	
	Total 19	Total fish 374		

RTR: Rainbow Trout, TRO:Brown Trout/Sea Trout, SAL: salmon.
*Two parasites found

Other samples received:
2 Fisheries cases: 2 fish, CARP, negative
3 fish, RTR, negative
1 Estuary case: 1 fish, SAL, negative

Gyrodactylus sampling per region from farmed fish

≥30 fish per case (EC testing)

Region	Number of cases/Farms	Total number of cases positive for *Gyrodactylus* species
Highland	25	2
Western Isles	14	0
Dumfries & Galloway	7	2
Strathclyde	8 (7)	1
Shetland	5	1
Tayside	4	1
Orkney	3	2
Lothian	1	0
Grampian	0	0
Borders	3	0
Central	6	3

<30 fish per case (non-EC testing)

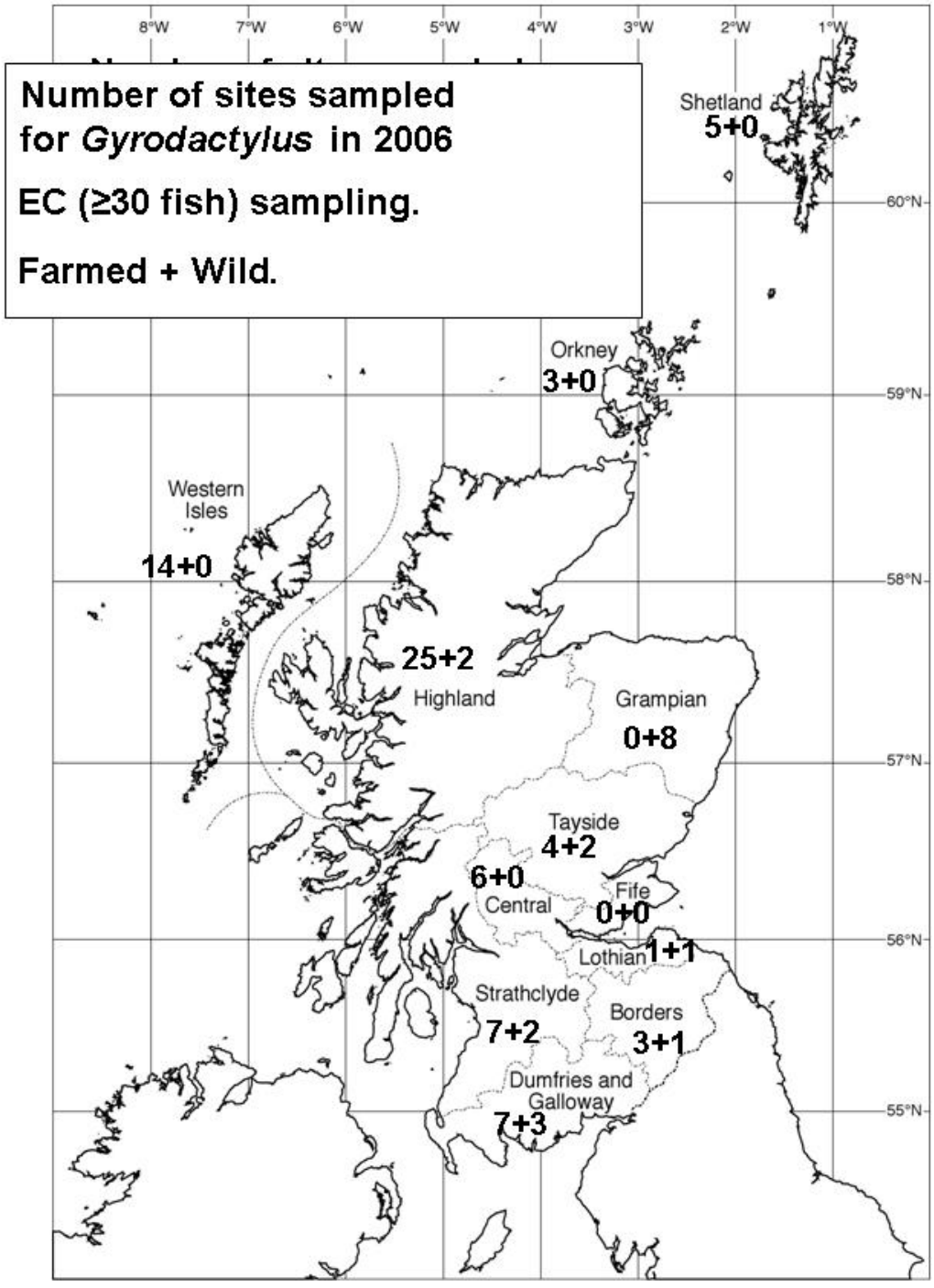
Region	Number of cases/farms	Total number of cases positive for *Gyrodactylus* species
Highland	4 (3)	0
Western Isles	3	0
Dumfries & Galloway	6 (4)	0
Strathclyde	6 (4)	1*
Shetland	0	0
Tayside	3 (2)	0
Orkney	0	0
Lothian	1	0
Grampian	1	0
Borders	0	0
Central	2 (1)	0

* Same farm as that found positive for ≥30 fish samples above.

Gyrodactylus sampling per region from wild fish

Region	Number of sites sampled	Total number of cases positive for *Gyrodactylus* species
Highland	2	0
Western Isles	0	0
Dumfries & Galloway	3	0
Strathclyde	2	0
Shetland	0	0
Tayside	2	0
Orkney	0	0
Lothian	1	0
Grampian	8	1*
Borders	1	0
Central	0	0

*Two parasites found.


Number of sites sampled
for *Gyrodactylus* in 2006
EC (≥30 fish) sampling.
Farmed + Wild.
8°W
7°W
6°W
5°W
4°W
3°W
2°W
1°W
60°N
59°N
58°N
57°N
56°N
55°N
Shetland
5+0
Orkney
3+0
Western
Isles
14+0
25+2
Highland
Grampian
0+8
Tayside
4+2
6+0
Central
Fife
0+0
Lothian
1+1
Strathclyde
7+2
Borders
3+1
Dumfries and
Galloway
7+3

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)6

Gyrodactylus sampling in Scotland January 2007 to August 2007
(Tabled by EU (UK - Scotland))

GSWG(07)6

Gyrodactylus sampling in Scotland January 2007 to August 2007

Overview:

No *G. salaris* were identified

Total No. of cases: 66
No. of farm cases: 55
No. of wild cases: 11
Total No. of Fisheries/Estuaries sampled: 0 sites

Total No. of fish examined: 1582 fish
Total No. of farmed fish sampled: 1438 fish
Total No. of wild fish sampled: 144 fish
Total No. of Fisheries/Estuaries fish sampled: 0 fish

No. of +ve farm cases: 10
No. of +ve wild cases: 2

Details:

***Gyrodactylus* sampling per fish species**

Farmed fish for ≥30 fish per case:

Total number of farms sampled (≥30 fish per farm)	**No. of fish sampled**	**Number of farms positive for *Gyrodactylus* species**	**Species of *Gyrodactylus* identified**
Atlantic salmon 20 (*Salmo salar*)	600	2	*G. derjavini*
Rainbow trout 21 (*Oncorhynchus mykiss*)	630	4	*G. derjavini*
TRO 2	60	1	*G. derjavini*
Salmon/Charr 1	30	1	*G. derjavini*
SAL/TRO 1	30	0	
RTR/TRO 1	30	1	*G. derjavini*
Total 46	Total 1380	Total 9	

Farmed fish <30 fish:

Species	No. of farms/cases	No. of fish sampled (in each case)	Positive or negative for *Gyrodactylus*	Species of *Gyrodactylus* identified
RTR	1	5	-	
RTR	2	1	-	
RTR	1	10	-	
SAL	1	2	-	
SAL	1	4	-	
SAL	1	10	-	
SAL	1	20	+	*G. derjavini*
TRO	1	5	-	
	Total 9	Total fish 58	Total 1	

RTR: Rainbow Trout, TRO: Brown Trout/Sea Trout, SAL: salmon.

Wild fish <30 fish:

Species	No. of cases	No. of fish sampled (total)	Cases positive or negative for *Gyrodactylus*	Species of *Gyrodactylus* identified
SAL	7	52	1	*G. derjavini*
TRO	2	60	1	*G. derjavini*
SAL/BTR	1	30	0	
SAL/MIN	1	2	0	
	Total 11	Total 144	Total 2	

RTR: Rainbow Trout, TRO:Brown Trout/Sea Trout, SAL: salmon.

Other samples received:
1 Fisheries cases: 3 fish, RTR, negative
1 Estuary case: 1 fish, SAL, negative

Gyrodactylus sampling per region from farmed fish

≥30 fish per case (EC testing)

Region	Number of cases/Farms	Total number of cases positive for *Gyrodactylus* species
Highland	10	2
Western Isles	6	0
Dumfries & Galloway	5	2
Strathclyde	11	1
Shetland	3	1
Tayside	6	2
Orkney	1	1
Lothian	1	0
Grampian	0	-
Borders	1	0
Central	2	0

Parasite numbers: 4 to 30+

<30 fish per case (non-EC testing)

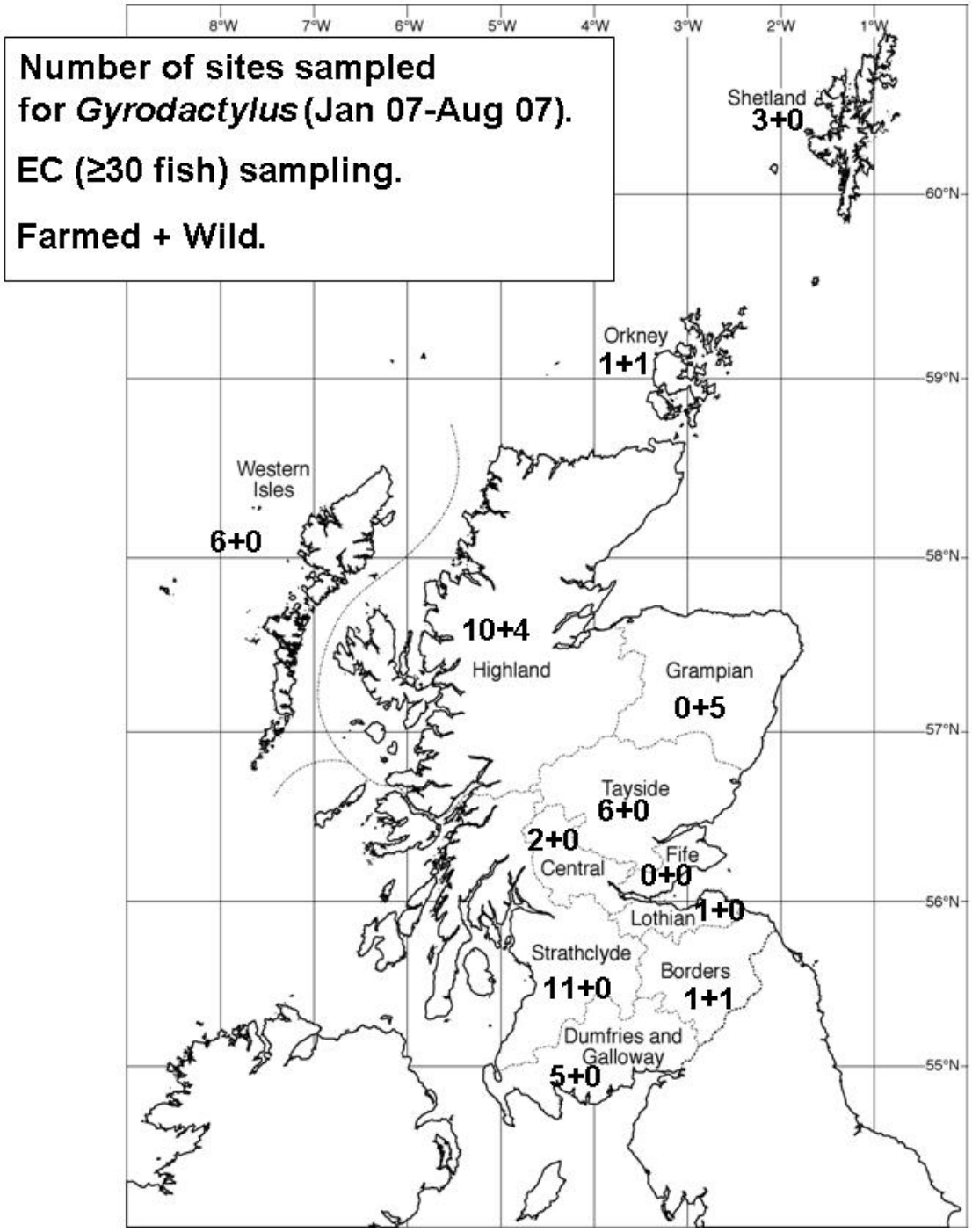
Region	Number of cases/Farms	Total number of cases positive for *Gyrodactylus* species
Highland	5	1
Western Isles	0	-
Dumfries & Galloway	0	-
Strathclyde	1	0
Shetland	0	-
Tayside	1	0
Orkney	0	-
Fife	1	0
Lothian	0	-
Grampian	0	-
Borders	1	0
Central	0	-

*One farm same as sampled for ≥30 fish samples above.
Parasite numbers: 6 individuals from the one infected case.

***Gyrodactylus* sampling per region from wild fish**

Region	Number of sites sampled	Total number of cases positive for *Gyrodactylus* species
Highland	4	0
Western Isles	0	-
Dumfries & Galloway	0	-
Strathclyde	0	-
Shetland	0	-
Tayside	0	-
Orkney	1	1
Fife	0	-
Lothian	0	-
Grampian	5	0
Borders	1	1
Central	0	-

Parasite numbers 3 and 26


Number of sites sampled for *Gyrodactylus* (Jan 07-Aug 07).
EC (≥30 fish) sampling.
Farmed + Wild.
8°W
7°W
6°W
5°W
4°W
3°W
2°W
1°W
60°N
59°N
58°N
57°N
56°N
55°N
Shetland
3+0
Orkney
1+1
Western Isles
6+0
10+4
Highland
Grampian
0+5
Tayside
6+0
2+0
Central
Fife
0+0
Lothian
1+0
Strathclyde
11+0
Borders
1+1
Dumfries and Galloway
5+0

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)7

Gyrodactylus sampling in Scotland 02/08/2006 to 16/08/2007
(Tabled by EU (UK - Scotland))

GSWG(07)7

Gyrodactylus sampling in Scotland 02/08/2006 to 16/08/2007

Overview:

No *G. salaris* were identified

Total No. of cases: 129
No. of farm cases: 103
No. of wild cases: 24
Total No. of Fisheries/Estuaries sampled: 2 sites

Total No. of fish examined: 3006 fish
Total No. of farmed fish sampled: 2552 fish
Total No. of wild fish sampled: 450 fish
Total No. of Fisheries/Estuaries fish sampled: 4 fish

No. of +ve farm cases: 15
No. of +ve wild cases: 3

Details:

Gyrodactylus sampling per fish species

Farmed fish for ≥30 fish per case:

Total number of farms sampled (≥30 fish per farm)	**No. of fish sampled**	**Number of farms positive for Gyrodactylus species**	Species of Gyrodactylus identified
Atlantic salmon 45 (*Salmo salar*)	1350	5	*G. derjavini*
Rainbow trout 27(*Oncorhynchus mykiss*)	810	4	*G. derjavini*
TRO4	120	2	*G. derjavini*
Salmon/Charr 3	90	2	*G. derjavini*
SAL/TRO 1	30	0	
RTR/BTR 1	30	1	*G. derjavini*
Total 81	Total 2430	Total 14	

Farmed fish <30 fish:

Species	No. of farms/cases	No. of fish sampled (in each case)	Positive or negative for *Gyrodactylus*	Species of *Gyrodactylus* identified
RTR	4	5	-	
RTR	1	14	-	
RTR	1	7	-	
RTR	2	2	-	
RTR	3	1	-	
RTR	1	3	-	
RTR	1	4	-	
RTR	1	10	-	
SAL	1	2	-	
SAL	2	3	-	
SAL	1	4	-	
SAL	2	10	-	
SAL	1	20	+	*G. derjavini*
TRO	1	5	-	
	Total 22	Total fish 122	Total 1	

RTR: Rainbow Trout, TRO: Brown Trout/Sea Trout, SAL: salmon.

Wild fish

Species	No. of cases	No. of fish sampled (total)	Cases positive for *Gyrodactylus*	Species of *Gyrodactylus* identified
SAL	10	142	1	*G. derjavini*
TRO	4	120	1	*G. derjavini*
RTR	3	6	0	
SAL/TRO	6	180	1	*G. derjavini*
SAL/MIN	1	2	0	
	Total 24	Total 450	Total 3	

RTR: Rainbow Trout, TRO:Brown Trout/Sea Trout, SAL: salmon, MIN: minnow

Other samples received:

1 Fisheries cases: 3 fish, RTR, negative

1 Estuary case: 1 fish, SAL, negative

Gyrodactylus sampling per region from farmed fish

≥30 fish per case (EC testing)

Region	Number of cases/Farms	Total number of cases positive for *Gyrodactylus* species
Highland	17	3
Western Isles	18	0
Dumfries & Galloway	7	2
Strathclyde	13	1
Shetland	6	2
Tayside	6	2
Orkney	3	2
Lothian	2	0
Grampian	0	-
Borders	2	0
Central	7	2

Parasite numbers: 4 to 30+

<30 fish per case (non-EC testing)

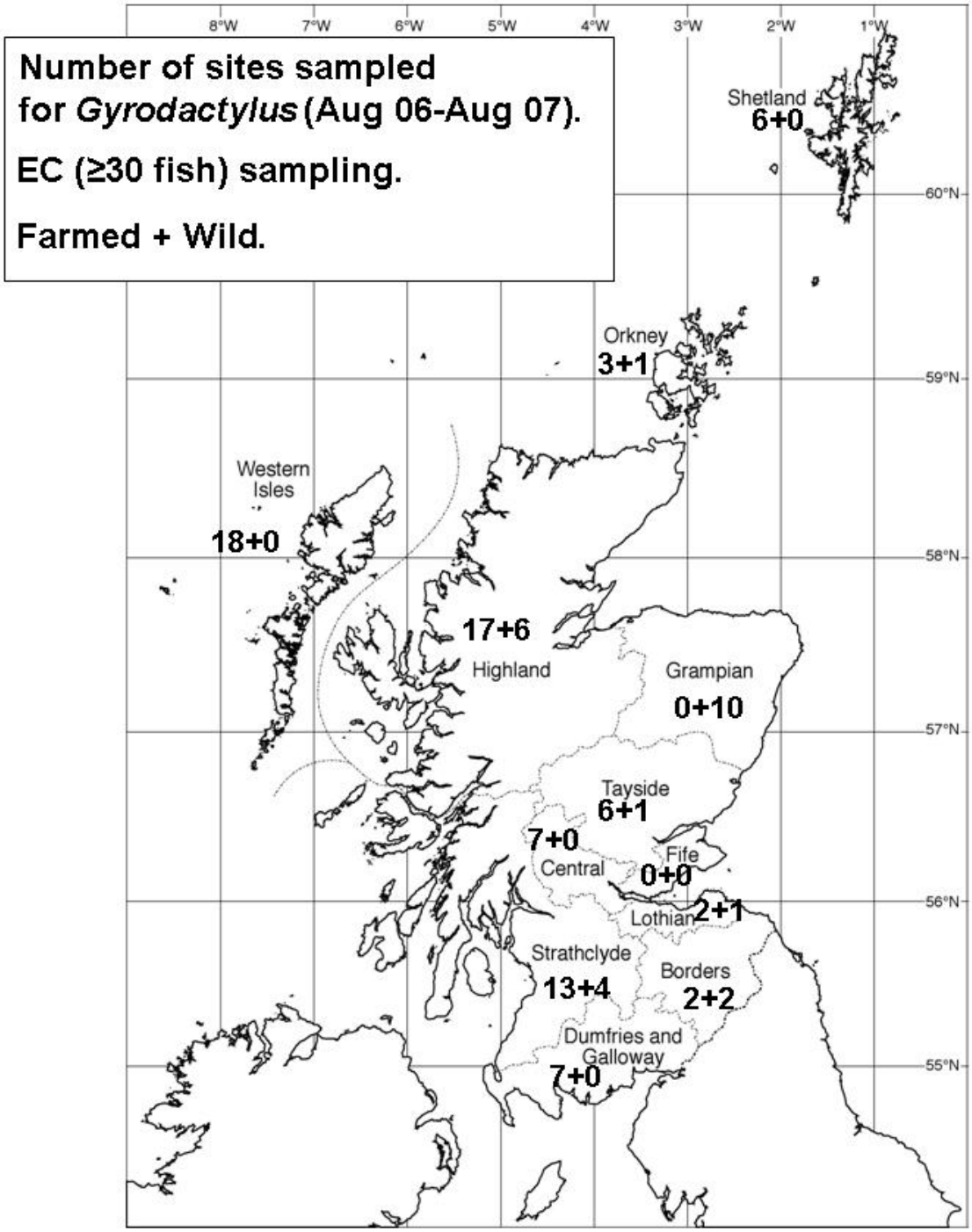
Region	Number of cases/Farms	Total number of cases positive for *Gyrodactylus* species
Highland	8(7)*	1
Western Isles	1	0
Dumfries & Galloway	3	0
Strathclyde	3	0
Shetland	0	-
Tayside	2	0
Orkney	0	-
Fife	1	0
Lothian	1	0
Grampian	1	0
Borders	1	0
Central	1	0

*One farm same as sampled for ≥30 fish samples above.
Parasite numbers: 6 individuals from the one infected case.

Gyrodactylus sampling per region from wild fish

Region	Number of sites sampled	Total number of cases positive for *Gyrodactylus* species
Highland	6	0
Western Isles	0	-
Dumfries & Galloway	0	-
Strathclyde	4	1
Shetland	0	-
Tayside	1	-
Orkney	1	1
Fife	0	-
Lothian	1	0
Grampian	9 + estuary	0
Borders	2	1
Central	0	-

Parasite numbers 3-26


Number of sites sampled
for *Gyrodactylus* (Aug 06-Aug 07).
EC (≥30 fish) sampling.
Farmed + Wild.
8°W
7°W
6°W
5°W
4°W
3°W
2°W
1°W
60°N
59°N
58°N
57°N
56°N
55°N
Shetland
6+0
Orkney
3+1
Western
Isles
18+0
17+6
Highland
Grampian
0+10
Tayside
6+1
7+0
Central
Fife
0+0
Lothian
2+1
Strathclyde
13+4
Borders
2+2
Dumfries and
Galloway
7+0

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)8

Diagnostics of Gyrodactylus species at FRS Marine Lab Aberdeen
(Tabled by EU (UK - Scotland))

GSWG(07)8

Diagnostics of Gyrodactylus species at FRS Marine Lab Aberdeen

Gyrodactylus spp. targeted:

Of the Gyrodactylidae described from salmonid hosts in Europe, *G. salaris* is of obvious concern. *G. derjavini* and *G. truttae* are common in Northern Europe and *G. thymalli* is of interest because of the great similarity to *G. salaris*, although *G. thymalli* has a different natural host; grayling, *Thymallus thymallus* (Platten *et al*., 1994; Shinn *et al*., 1995). Therefore monitoring for *G. salaris* in UK has concentrated on identification of these species and especially the discrimination of *G. salaris* from other types.

Overview of diagnostic method.

Gyrodactylus specimens are removed from fins and examined individually under the light microsope. They are identified to either "*G. salaris* type" or "not *G. salaris* type" based on morphological characteristics of their attachment organ. They are not identified to species level at this stage.
The specimens are then lysed individually in appropriate buffer to release their DNA and the DNA is used in a PCR reaction to amplify the internal spacer (ITS) region of the parasites ribosomal genes.
A Restriction Fragment Length Polymorphism (RFLP) analysis is then carried out using the restriction enzyme *Hae* III. The *Hae* III enzyme cuts the ITS PCR product everywhere a specific nucleotide sequence, recognised by the enzyme, is present. The fragment pattern obtained from the diagnostic samples following restriction with *Hae* III is compared with the pattern obtained from known gyrodactylid species (*G. salaris*, *G. derjavini* and *G. truttae*, the latter two of which are found on salmonids in Scotland). A diagnosis is made based on the pattern obtained.

Numbers Analysed:

In samples where less than 15 parasites have been found, all parasites are analysed.
In cases with more than 15 parasites, a minimum of 15 parasites and a maximum of 30 parasites are analysed. The number analysed in the latter case depends on being able to identify at least 10 parasites morphologically to "G. salaris" type/"not G. salaris" type.

Detailed diagnostic procedure:

Removal of parasites from fins:

- Tubes containing fins in 95% ethanol are received from the Fish Health Inspectors.
- The fins are removed from the tubes containing 95% ethanol and examined under a dissecting microscope for gyrodactylid parasites.
- Gyrodactylids are removed individually and placed in 70% ethanol.

Morphological diagnosis of parasites:

- Parasites are placed individually in a drop of water on microscope slides under coverslips and the morphological features (hooks, anchors and ventral bar) (Fig.1) of their attachment organ are examined under x400-x1000 magnification.

  Note: Formaldehyde-fixed specimens and ammonium-picrate glycerin (Malmberg, 1957) are superior methods for preparing whole mounts of Gyrodactylus for microscopic examination. Neither of these methods is used routinely for Gyrodactylus in the Scottish reference laboratory, as the chemicals used interfere with molecular analysis, and molecular analysis is relatively more important for species identification at FRS.

- The shape and size of the morphological features are diagnostic for different species.
- The parasites are identified where possible into "not *G. salaris*" type specimens or "*G. salaris*" type specimens, based largely on the shape and size of the ventral bar and hooks, or "no I.D." in cases where the attachment organ is damaged or missing.
  Note: *Measurement and detailed analysis of the hard parts of the attachment organ increases the accuracy of this method of identification, but requires careful preparation of the specimen. Due to time restrictions, the Scottish laboratory frequently identifies the parasites to either "G. salaris type" or "not G. salaris type" based on morphological characteristics of their attachment organ. They are not identified to species level at this stage. Species identification by morphology alone is uncommon.*

- Photos are taken of any unusual or ambiguous morphological features.
- The results of the morphological examination are recorded.
- The parasites are then removed from the slide and placed in lysis buffer to release their DNA

Molecular diagnosis of parasites:

Note: Since 1995, the Scottish laboratory has routinely carried out molecular analysis of Gyrodactylus specimens. Methods have been developed to analyse the genes and spacers of the ribosomal RNA gene array to discriminate G. salaris, G. derjavini and G. truttae (Cunningham et al., 1995a; b; Cunningham, 1997; Cunningham et al., 2001). Currently, PCR amplification of the internal transcribed spacer (ITS) followed by restriction fragment length polymorphism (RFLP) is used for species identification.

- The DNA of the parasite is used in a PCR reaction to amplify the internal spacer (ITS) region of the parasite's ribosomal genes.
- A subsample of the ITS PCR product is run on an agarose gel to confirm that amplification has taken place.
- The ITS PCR product is then digested with a restriction enzyme (*Hae* III) that cuts DNA at specific nucleotide sequences in the ITS product. Depending on the sequence of the ITS product, the enzyme will cut it in different places and different fragment sizes will be obtained. Differences in ITS sequence between *G. salaris* and gyrodactylid species such as *G. derjavini* and *G. truttae* will result in different

fragment sizes for each species. The pattern (Restriction Fragment Length Polymorphism -RFLP) of fragment sizes is diagnostic for the species.

- The ITS fragments from diagnostic samples are run on an agarose gel alongside ITS fragments from known species (*G. salaris*, *G. derjavini* and *G. truttae*) (Fig.2).
- The pattern obtained for the diagnostic samples received from the Fish Health inspectors is then compared to the pattern from the known species and the sample specimens identified.
- The results of the molecular diagnosis are recorded and cross-checked with results from the molecular diagnosis.
- Any unusual results are followed up by sequencing the ITS, and then by sequencing the mitochondrial COI gene if necessary (Hansen et al., 2003; Lindenstrøm et al., 2003).
- Phylogenetic analysis is then carried out with COI sequence obtained, and other characterised COI sequences from the public sequence database. The parameters are as described in Hansen et al., (2003).
- The specimen is identified as *G. salaris* or *G. thymalli* depending on insertion into one of seven described clades: clades I-III are currently considered to represent *G. salaris*
  Note: COI sequencing and phylogenetic analysis is necessary to separate G. salaris specimens from G. thymalli specimens.

Morphological Diagnosis:

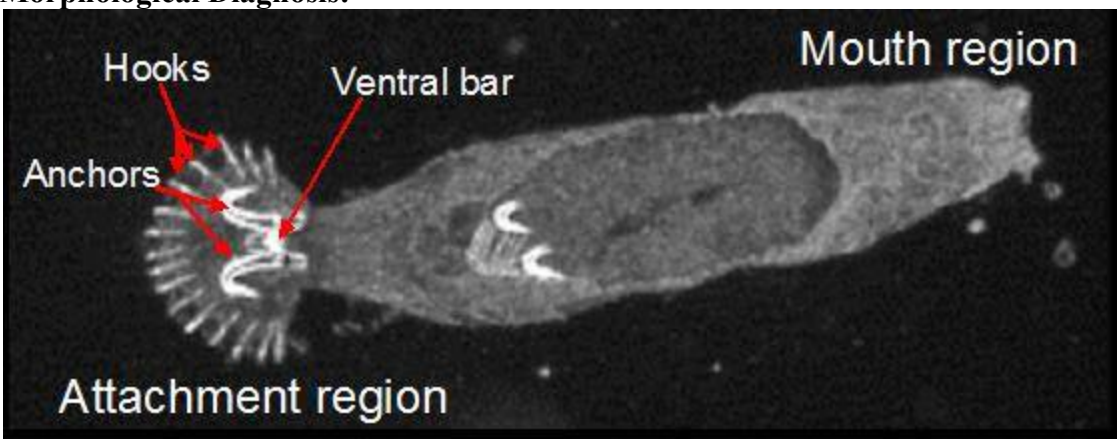


Figure 1: Picture taken from GyroDb: http://www.gyrodb.net/

Molecular Diagnosis:

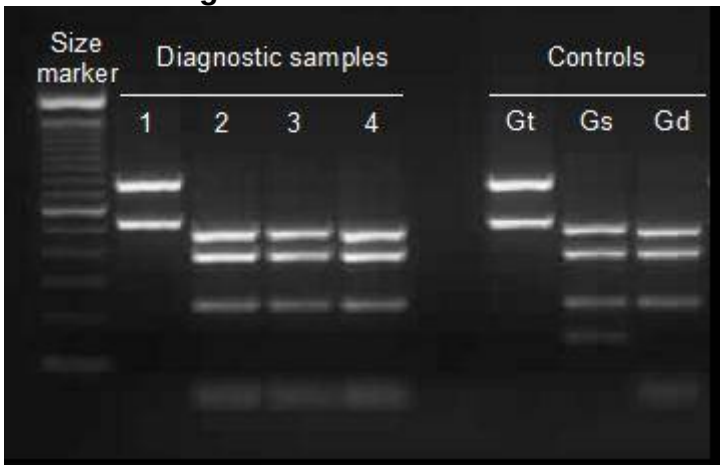


Figure 2: Agarose gel showing ITS PCR fragments after cutting with restriction enzyme *Hae* III. The control patterns are on the right: Gt; *G. truttae*, Gs; *G. salaris* and Gd; *G. derjavini*. The diagnostic samples on the left can be identified as (1)*G. truttae*, (2)*G. derjavini*, (3)*G. derjavini*, and (4)*G. derjavini* respectively.

Acknowledgements:

The author wishes to thank all involved in *Gyrodactylus* monitoring and identification at FRS for providing the data used in this paper.

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Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)13

Monitoring of Gyrodactylus salaris in Finland in 2006-2007
(Tabled by EU - Finland)

GSWG(07)13

Monitoring of Gyrodactylus salaris in Finland in 2006-2007

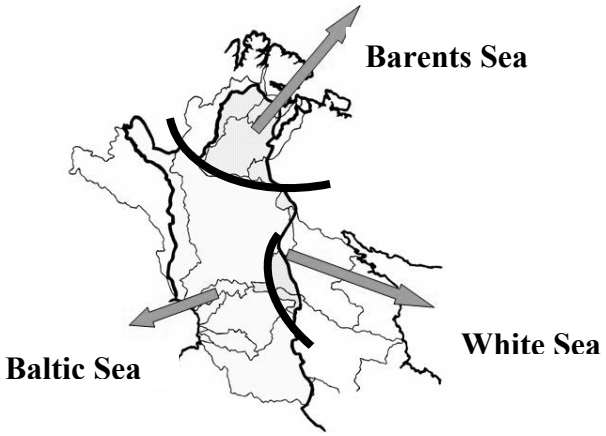

Figure 1: Three main water catchment areas in northern Finland.

The watersheds between the water catchment areas of the Barents Sea, White Sea and Baltic Sea are partly situated in the territory of Finland (see Fig. 1).

This report includes the results of the samples taken during January 1st 2006-June 30th 2007.

Monitoring of the situation in the catchment areas running into the Barents Sea

In accordance with an agreement between Norway and Finland, 150 wild salmon parr per river are to be sampled from the Rivers Teno (Tana in Norwegian) and Näätämö (Neiden in Norwegian) each year. Examination of the samples from a particular river is performed in Finland and Norway in alternating years. There is no fish farming activity in these watercourses.

The number of the examined salmon parr were as follows: in 2006 163 in River Teno and 155 in River Näätämö. *G. salaris* has not been found in these examinations. The results for the year 2007 are not available, yet.

Wild fish of the three other water catchment areas running into the Barents Sea were examined as follows: River Paats 8 grayling in 2006, no samples in 2007. No samples have been taken from River Uutuan (River Munkelva in Norwegian). River Tuuloma 25 grayling in 2006, 15 grayling in 2007. All examinations mentioned in this paragraph have been negative for the presence of *Gyrodactylus* spp.

The two fish farms of the River Paats catchment area were examined with negative results in 2006 (number of fish examined: farm A 150 salmon; farm B 60 arctic charr). The results of the year 2007 are not ready, yet. In the rivers Uutuan and Tuuloma there is no fish farming activity on the territory of Finland.

Monitoring of the catchment areas running into the Baltic and White Seas

There is no regular official monitoring of *G. salaris* in these areas. On wild salmon *G. salaris* was found only in the river Tornio (border river between Finland and Sweden). For the first time for years *G. salaris* was also found from farmed salmon in one farm in 2006. This farm is situated along a river flowing into the Baltic Sea and farms Baltic salmon for stocking into the Baltic Sea. There was no mortality or clinical symptoms in association with the infection. Totally 5 salmon farms in 2006 and 6 salmon farms in 2007 were examined (sample size usually 60 fish/farm/year).

Rainbow trout farms are considered to be quite often infected with *G. salaris* in both these catchment areas. Only a few farms were, however, examined for the presence of *G. salaris* in 2006-2007. In 2006 only 3 rainbow trout farms (0 infected with *G. salaris*) and in 2007 10 farms (3 infected with *G. salaris*) were examined. In addition to *G. salaris* also *G. lavareti* was found at some farms. The examinations of farmed rainbow trout were performed in connection with research or live fish export certification. Usual sample size was 60 fish/farm/year.

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)14

The Surveillance and Control Programme for Gyrodactylus salaris in Atlantic salmon and rainbow trout in Norway
(Tabled by Norway)

The surveillance and control programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway

Tor Atle Mo Kari
Norheim Peder
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Introduction

In 2006, **Gyrodactylus salaris** *was detected in two rivers. No commercial salmon farms were infected*

During the period of 1975 to 2006, *Gyrodactylus salaris* has been detected in Atlantic salmon fi ngerlings/parr from 46 rivers, 13 hatcheries/farms with Atlantic salmon parr/ smolts and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected rivers and farms. In farms, the procedure is to eliminate the hosts (salmon and rainbow trout). By doing so, the parasite is also eliminated because it does not have specialized free-living stages or intermediate hosts. In rivers, acidified aluminium sulphate is now the main chemical used to kill the parasite but not the fish host. By 31 December 2006, *G. salaris* was confi rmed to be eradicated from 15 rivers and from all hatcheries/fish farms. The eradication has not been confirmed for nine additional rivers. The parasite is known to be present still in 22 additional rivers in Norway.
G. salaris is a notifiable (Group B) disease in Norway. It is listed as "Other significant disease" in the Offi ce International des Epizooties (OIE). Surveillance of *G. salaris* has been performed in Norwegian salmon rivers since late 1970s (1, 2, 3, 4, 5). Surveillance is not performed in rivers or farms known to be infected unless measures for eradication of the parasite have just been carried out or other circumstances that justify the need for surveillance.

The Norwegian Food Safety Authority is responsible for sampling rivers and fish farms although County Environmental Departments and other institu-tions/companies are commissioned to do the actual sampling. The National Veterinary Institute in Oslo (the OIE reference laboratory for the disease) is responsible for examination of samples and taxonomical studies if *Gyrodactylus* is detected.

Aim

The surveillance programme aims to trace any spread of *Gyrodactylus salaris* to new river systems or fi sh farms (or to rivers and farms cleared of infection).

Materials and methods

At least 30 Atlantic salmon are sampled from each farm and river. In rivers fingerlings/parr/smolts are caught by means of electrical fishing gear. In some of the large rivers, sampling is done at different dates and at different sampling stations. Farmed fish are caught by net. The fi sh are killed and preserved in 96 % ethanol. The samples are sent to the National Veterinary Institute in Harstad where body surface and fins are examined by a magnifying microscope (10 - 15 times magnifi cation). However, only fi ns (except adipose fin) are sampled and preserved for examination from fish >15 cm.

Results

Altogether, 3,082 specimens from 94 rivers and 1,862 specimens from 57 farms were examined in 2006 (Tables 1 and 2). *G. salaris* was detected in two rivers but no farms were infected.

Conclusion

G. salaris extended its range to river Ranelva while the river Hestdalselva had been rotenone treated in 2003 to eradicate the parasite.

Table 1. Rivers examined for *Gyrodactylus salaris* in 2006

County	No. of rivers	Species	No. of fish examined	Detections
Finnmark	7	Atlantic salmon	310	0
Troms	7	Atlantic salmon	236	0
Nordland	16	Atlantic salmon	496	2[1]
Nord-Trøndelag	14	Atlantic salmon	423	0
Sør-Trøndelag	5	Atlantic salmon	170	0
Møre og Romsdal	15	Atlantic salmon	430	0
Sogn og Fjordane	10	Atlantic salmon	302	0
Hordaland	6	Atlantic salmon	217	0
Rogaland	1	Atlantic salmon	32	0
Vest-Agder	2	Atlantic salmon	61	0
Aust-Agder	1	Atlantic salmon	31	0
Telemark	1	Atlantic salmon	32	0
Vestfold	2	Atlantic salmon	121	0
Buskerud	1	Atlantic salmon	30	0
Akershus	2	Atlantic salmon	65	0
Oslo	3	Atlantic salmon	96	0
Østfold	1	Atlantic salmon	30	0
Total	**94**		**3,082**	**2**

[1] 1 new river and 1 reappearance after rotenone treatment.

Table 2. Fish farms examined for *Gyrodactylus salaris* in 2006

County	No. of farms	Species	No. of fish examined	Detections
Troms	5	Atlantic salmon	150	0
Nordland	9	Atlantic salmon	270	0
Nord-Trøndelag	2	Atlantic salmon, rainbow trout	90	0
Sør-Trøndelag	4	Atlantic salmon, rainbow trout	150	0
Møre og Romsdal	10	Atlantic salmon, rainbow trout	330	0
Sogn og Fjordane	8	Atlantic salmon, rainbow trout	272	0
Hordaland	11	Atlantic salmon, rainbow trout	360	0
Rogaland	5	Atlantic salmon	150	0
Telemark	2	Atlantic salmon	60	0
Buskerud	1	Atlantic salmon	30	0
Total	**57**		**1,862**	**0**

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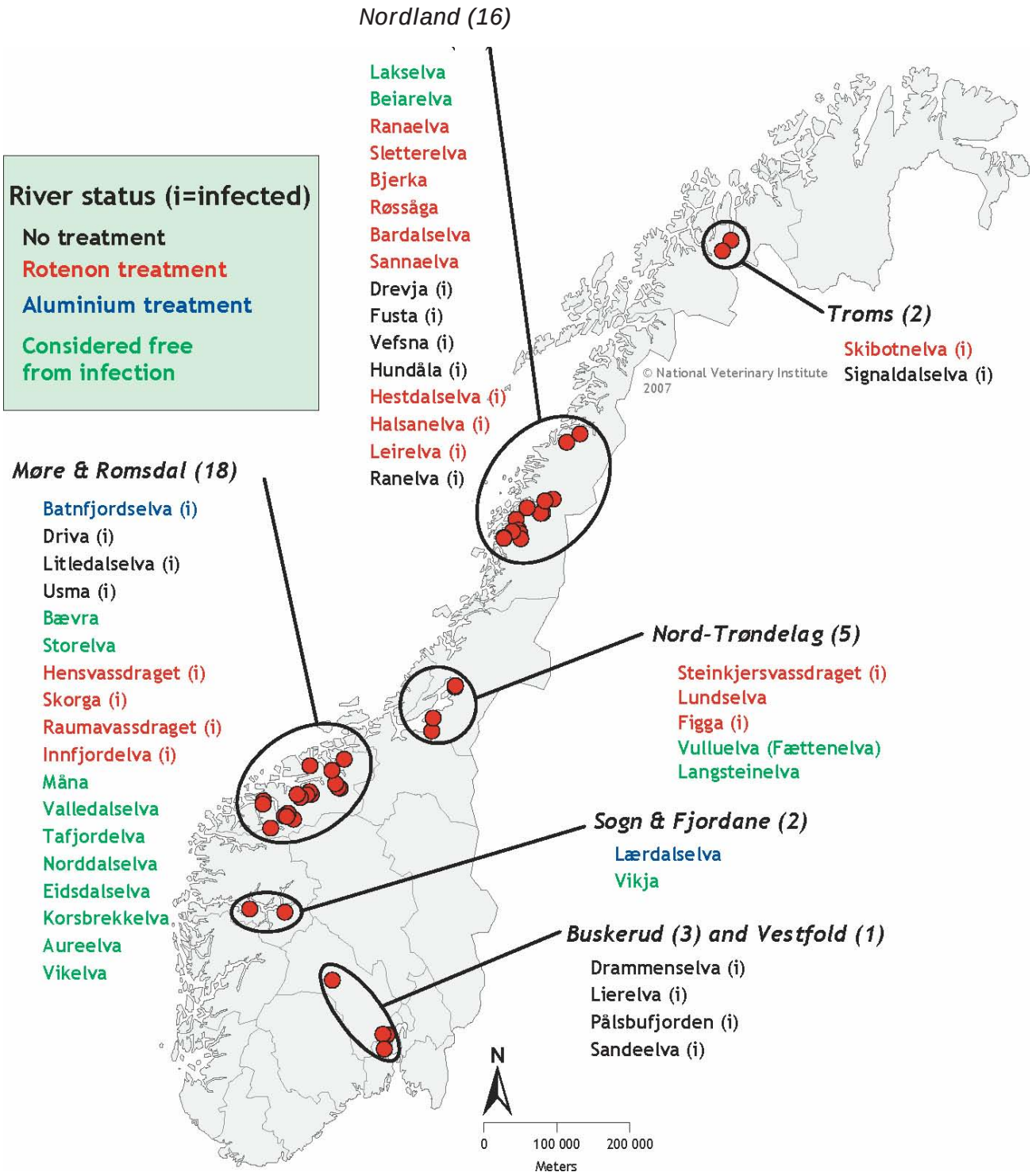
Gyrodactylus salaris
detections 1975 -2006



Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)4

G. salaris in Fennoscandia, Denmark and Russia - monitoring and research
(Tabled by Norway)

GSWG(07)4

G. salaris in Fennoscandia, Denmark and Russia - monitoring and research

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Publications on *G. salaris* epidemics in Norwegian rivers (Johnsen 1978, Heggberget & Johnsen 1982, Johnsen & Jensen 1986, 1988, 1991, 1992) led to great interest and increased research on the *G. salaris* problems in Norway. Successively this increased interest for research also spread to Sweden, Finland, Denmark and Russia. The *Gyrodactylus* project at NINA initiated cooperation with Russian scientists during the 1990's, and this cooperation was successively extended to the other countries. In 2000 the cooperation was strengthened through the project "Host/parasite relationship between Atlantic salmon and *Gyrodactylus salaris* in Denmark, Finland, Norway, Russia and Sweden". The main objective of this project was to study annual and seasonal variations in the prevalence and intensity of *G. salaris* on Atlantic salmon in rivers in northern Europe with special reference to the immigration history of Atlantic salmon and *G. salaris*. Due to lack of financial support this project never "took off". But in spite of this, the cooperation is maintained and important research on *Gyrodactylus* goes on in the respective countries. This research has generated a lot of interesting results and in the following a summary of these results is presented.

Native range

Genetic studies of the host, Atlantic salmon, suggest a large-scale, geographic grouping which has relevance to understanding the host/parasite relationship. Baltic salmon constitute one of the three major groups of the species, the others being the west and east Atlantic groups (Ståhl 1987) or races (Cross *et al.* 1998). Nowadays, Baltic salmon as a whole forms one effectively isolated evolutionary unit of Atlantic salmon and differs clearly from Atlantic salmon of the rivers draining into the Atlantic Ocean and Barents Sea (Ståhl 1987, Koljonen 1989, Kazakov and Titov 1993, Nilsson *et al.* 2001).

Southern Baltic salmon from an inlet river to the Onega lake (Russia) (Shulman *et al.* 2000, 2005) and from the river Neva (Bakke *et al.* 1990) which is the outlet river from the Ladoga lake, showed a response against *G. salaris* while northern Baltic salmon showed an intermediate susceptibility against *G. salaris* (Dalgaard *et al* 2003, 2004, Bakke *et al.* 2004, Lindenstrøm *et al.* 2006).

Based on these observations there are reasons to believe that the Lake Onega is confirmed to belong to the native range of *G. salaris*. Even though the relation between the host and the parasite in the rest of the Baltic is somewhat different from the situation in the Onega lake, *G. salaris* has been in the Baltic for so long that the whole Baltic area should probably be considered as the native range of *G. salaris* (Meinilä *et al.* 2004).

Alien distribution

History of introduction and geographical spread

Observations from the different countries indicate that *G. salaris* does not occur naturally in the Atlantic distribution area of the Atlantic salmon populations. It has been introduced in later years to rivers in Norway (1970's, Johnsen and Jensen 1986), to rivers on the Swedish west coast (1980's, Alenäs *et al.* 1998), and to a Russian river draining into the White Sea (1980's, Ieshko *et al.* 1995).

Pathways of introduction

G. salaris has been spread in the alien range mainly by anthropogenic movement of infected fish between hatcheries/fish farms, between hatcheries/fish farms and rivers and by migration of infected fish in rivers and in brackish water in fiords.

Denmark
In May 1972, *G. salaris* was recorded on *O. mykiss* in a Danish rainbow trout farm (in Køge) (Malmberg and Malmberg (1993). Later, Buchmann and Bresciani (1997) found *G. salaris* on rainbow trout and indicated the presence of an infection reservoir in spawners in Danish freshwater fish farms. *G. salaris* is present in most counties in Jutland on rainbow trout. This could seem quite problematic because a large stocking programme using salmon susceptible to the Norwegian type of *G. salaris* is in progress in Denmark. However, the Danish strain of the parasite shows very low pathogenity to Scottish salmon and Danish salmon and high predilection for rainbow trout.

Russia
In Russia, the epidemic in the river Keret was caused by *G. salaris* transferred from lake Onega, as evidenced by exactly matching mitochondrial haplotypes (J. Lumme and A. Veselov pers. comm.).

In the river Pisto, Kuitozero Lake, Karelia, *G. salaris* was first observed in 2001. The parasite belong to the rainbow trout specific clade and was most probably introduced from upstream fish farms on the Finnish side of the border.

Sweden
In the first investigation carried out at the Swedish west coast in the year 1989, the parasite was found in a salmon hatchery in Laholm at the river Lagan and the same year on wild parr in the river Säveån (a tributary to the river Göta älv) (Malmberg and Malmberg 1991, Karlsson *et al.* 2003b). Since the first finding in 1989, the parasite has spread gradually (Malmberg and Malmberg 1991). It was found in the river Ätran in 1991 (Alenäs 1998). According to Alenäs *et al.* (1998) *G. salaris* might have been introduced to the river Ätran possibly about 1986. In 1997, more comprehensive investigations including almost all salmon rivers on the Swedish west coast from Skåne to the Norwegian border, were conducted, and *G. salaris* was found in 8 rivers. The river Stensån was probably infected later than 1994 since two earlier investigations showed no *G. salaris* (Malmberg 1998). At the end

of 2002, 11 out of 23 wild salmon rivers on the west coast were infected (Karlsson *et al.* 2003b).

Hansen *et al.* (2003) elucidated the mitochondrial haplotypes of *G.salaris* in several rivers on the Swedish West coast. Interestingly, they observed different origins. In the rivers Ätran and Surtan, the mtDNA type was identical to the Norwegian "salmon killer" suggesting introduction from Bothnian Bay by fish transport. In the rivers Suseån and Stensån, the parasite was specific and most closely related to haplotype from Gauja, Latvia. This, as well as the fact that the salmon population in some of the rivers on the Swedish West coast carry a collection of Baltic mitochondrial haplotypes without any Atlantic mixture (Nilsson *et al.* 2001) lead Meinilä *et al.* (2004) to suggest that part of the Swedish West coast parasite population is native. The introduction of alien strains may have induced an observable epidemic.

Norway
Regional investigations of salmon parr (about 50,000) from a large number of rivers in Norway, show that *G. salaris* is not native in Norway. In 139 of the rivers more than 90 salmon parr have been investigated without finding the parasite. If the parasite had occurred with a prevalence of 5 % or more in one of these rivers, there is a 99 % probability that it would have been discovered (Johnsen *et al.* 1999a).

Four anthropogenic introductions of *G. salaris* into Norway along with infected salmonids from hatcheries around the Baltic Sea have been suggested (Johnsen *et al.* 1999a). *G. salaris* was found for the first time in Norway at Sunndalsøra hatchery in July 1975 (Tanum 1983, Malmberg 1989). In August the same year, *G. salaris* was found on salmon parr in the river Lakselva, northern Norway (Johnsen 1978). Later the parasite was discovered in a number of Norwegian rivers (Heggberget and Johnsen 1982, Johnsen and Jensen 1986, 1991, 1992) and the number of rivers where *G. salaris* has been found is now 46, of which 41 can be traced to three sources: 1) stocking of fish from infected hatcheries, 2) infected hatcheries situated by the rivers or 3) spread by migrating fish through brackish from infected rivers.

The colonization of rivers after parasite introduction has been rapid (1 - 3 years). For example in the large salmon river Vefsna the parasite was found in the lower parts in 1978. In 1980 it had spread throughout the entire watercourse. Data from other infected Norwegian rivers such as the Lakselva, Beiarelva, Ranaelva, Steinkjervassdraget, Rauma and Lærdalselva present a similar picture of a very rapid colonization (1 - 3 years) (Johnsen and Jensen 1988).

There are numerous examples of dispersal of *G. salaris* between rivers in fiord regions in Norway. The rivers within these regions are situated so close to each other that the occurrence of *G. salaris* in the neighbouring rivers may be explained as the result of spreading with fish through brackish water in the fiord area (Johnsen and Jensen 1986). This kind of spread has, however, been slower than the dispersal in rivers. For example infection of four new rivers in Romsdalsfiord took 13 years.

Alien status in region

G. salaris probably has its native range in the distribution area of the Baltic salmon, including the rivers draining into the Onega Lake, the Ladoga Lake and the Neva river which flows out of the Ladoga Lake. *G. salaris* is alien in the distribution area of the eastern Atlantic salmon

population. It has been introduced in later years (1970s) to rivers in Norway, to rivers on the Swedish west coast (1980s), and to the Russian river Keret draining into the White Sea (1980s).

Species identification and virulence

The directly transmitted viviparous gyrodactylids have high species richness but low morphological and biological diversity and many species are recorded from only a single host. The group has the widest host range of any monogenean family, being found on 19 orders of bony fish. However, individual species range from narrowly specific (71% of 402 described species recorded from a single host) to extremely catholic (*Gyrodactylus alviga* recorded from 16 hosts) (Bakke *et al*. 2002). The *Gyrodactylus* species are ectoparasitic, attacking various parts of the body of fishes (Bykowsky 1962).

According to Malmberg (1993), 21 different species of *Gyrodactylus* have been described from salmonids. He divided these into six groups and named one of the groups the *G. salaris*-group. This group consists of 10 *Gyrodactylus*-species which Malmberg further divided into three subgroups. *G. salaris* was placed in subgroup 1 together with the species *G. brachymystacis* Ergens 1978, *G. lenoki* Gussev 1953 and *G. asiaticus* Ergens 1978. These three *Gyrodactylus*-species which Malmberg considered to be the closest relatives to *G. salaris*, are all described from the host *Brachiomystax lenok,* which is a freshwater species within the family *Salmonidae* with its distribution in central Asia. On this background Malmberg argued that *G. salaris* has its origin in central Asia, and that it once spread westwards to the Baltic region.

By analyzing mitochondrial DNA sequences (Meinilä *et al*. 2002), *Gyrodactylus salaris* was divided into different evolutionary lineages or clades (Hansen *et al*. 2003, 2004, Meinilä *et al*. 2004). Five of the mtDNA clades were specific for grayling. The others were divided into nine haplotypes found on Atlantic salmon, Baltic salmon, Rainbow trout and Arctic charr (**table 2.1**).

Table 2.1. Haplotypes of *G. salaris*, clade, host fish and rivers and/or hatcheries/fish farms where it has been observed (after Hansen *et al*. 2003 og Meinilä *et al*. 2004).

Haplotype	Clade	Host fish	Observations
A	I	Atlantic salmon	River Røssåga, Vefsna, Byaelva, Ogna, Batnfjordelva, Driva, Litledalselva, Usma, Henselva, Innfjordelva, Rauma (No), Surtan, Ätran (Se)
B	I	Atlantic salmon, Baltic salmon, Arctic charr	River Signaldalselva, Skibotnelva,(No), Torneelv, Vindelelven (Se).
C	I	Atlantic salmon	River Susenån, Nissan, Fylleån, Genevadsån, Stensån (Se)
D	I	Baltic salmon	Hatchery at river Gauja (Latvia)
E	II, I*	Atlantic salmon	River Göta elv (Se)
Sal T Tornio	I	Baltic salmon	River Torneelv (Fi)
Sal Keret 2	I	Atlantic salmon	River Keret (Ru).
Sal Keret 1	I	Atlantic salmon	River Keret (Ru).
F	III	Rainbow trout, Atlantic salmon, Baltic salmon, Arctic charr.	Fish farm in lake Bullaren (Se), river Lærdalselva, Drammenselva, Lierelva (No), Hatcheries/fish farms in Finland, Sweden, Denmark, river Pistojoki (Ru), lake Pålsbufjorden (No).

*Hansen *et al*. (2003) place this haplotype in clade II, while Meinilä *et al*. (2004) include it in clade I.

The pathogenicity of *G. salaris* appears to vary and in the following we have made some comments on how this may vary both between and within haplotypes.

Haplotype A.

This is the most common haplotype found in Norwegian rivers. In most rivers it has turned out to be very pathogenic to the Atlantic salmon, but in the river Batnfjordelva the mortality was much lower compared to the other rivers (Johnsen *et al*. 1999). We do not know why.

On the west coast of Sweden this haplotype was found in the rivers Surtan and Ätran and the most marked reductions in parr density on the Swedish West coast appear to have occurred in the river Ätran. The survival of salmon parr in the river Högvadsån, which is a part of the river Ätran, has decreased steadily, and the average density of salmon parr has been reduced by about 90 % (Alenäs *et al*. 1998).

Haplotype B

Since this haplotype was found in the rivers Torneelv and Vindelelven, it may be ”the original” *G. salaris* described from the Hölle laboratory by Malmberg (1957). It was also found in the Norwegian rivers Skibotnelva and Signaldalselva (Hansen *et al*. 2003) and it was also carried by the Arctic charr in the river Signaldalselva (Robertsen *et al*. 2007a).

Haplotype C
This haplotype was found in several rivers on the west coast of Sweden. The impact of the parasite on salmon parr densities has varied markedly although baseline data on parr densities are limited. It was noted that these Swedish rivers vary in water quality and it is possible that there has been genetic mixing of Atlantic and Baltic salmon.

Haplotype D
This haplotype has so far only been found in a hatchery at river Gauja in Latvia.

Haplotype E
This haplotype was found in Säveån, which is a tributary to the river Göta elv. In the first investigation carried out at the Swedish west coast in the year 1989, the parasite was found in a salmon hatchery in Laholm at the river Lagan and the same year on wild parr in the river Säveån (a tributary to the river Götaälven) (Malmberg & Malmberg 1991, Karlsson *et al*. 2003b). However, since 1997 the parasite has not been found in this river despite eight surveys having been carried out and three different stations were used for collection of parr in 2001 and 2002 (Karlsson *et al*. 2003b).

Haplotype Sal T Tornio
This haplotype has only been found in the Finnish part of the River Torneelv.

Haplotype Sal Keret 2 and Haplotype Sal Keret 1
These haplotypes, both of which were found in the river Keret, matched exactly with the two different haplotypes found in the Lake Onega system, one in river Kusmha the other in river Lizhma (Jaakko Lumme pers. comm.).

Haplotype F
This haplotype was common in rainbow trout farms in Finland, Denmark and Sweden, but it was also found in some populations of salmon: in Lierelva, Drammenselva and Lærdalselva in Norway (Hansen *et al*. 2003) and in the Pistojoki river (lake Kuitozero, Russian Karelia) where it was suggested to be introduced via rainbow trout farms (Meinilä *et al*. 2004). In the river Lærdalselva the mortality of salmon parr was very high (Johnsen *et al*. 1997) while in the rivers Drammenselva and Lierelva the mortality seemed to be slightly lower than in most other Norwegian rivers (Johnsen *et al*. 1999a).

A special variant of this haplotype with mutation both in the ITS and the COI subunits is found in Denmark. This special variant is not pathogenic to salmon from Scotland or Denmark (Kurt Buchmann pers. comm.).

Arctic charr are also infected with *G. salaris* in five salmon-free lakes in central south Norway (Robertsen *et al*. 2006, 2007b). This host seems to be able to support *G. salaris* in species-poor fish communities in the absence of Atlantic salmon or rainbow trout. Recent work by Robertsen *et al*. (2007a, b) has shown that the *G. salaris* strain isolated from charr in the lakes had the same mitochondrial haplotype as rainbow trout parasites isolated from Lake Bullaren, Sweden, but was non-virulent to salmon (Olstad *et al*. 2005). However, the ITS of *G. salaris* from Arctic charr showed a difference of one nucleotide to that previously observed in *G. salaris* populations (Olstad *et al*. 2007).

In addition to the haplotypes mentioned here another haplotype was found in Lake Ladoga which was different from the two haplotypes found in Lake Onega (Jaakko Lumme pers. comm.).

Discussion

Gyrodactylid taxonomy utilizes three classes of characters: (i) morphology, especially the morphometry and shape of the attachment hooks and bars, have been most extensively used, (ii) genetics, molecular loci have been available since the mid-1990s, particularly the internally described spacers (ITS) and lately the mitochondrial cytochrome oxidase subunit 1 (CO1) which are sensitive indicators of gene pool boundaries; (iii) biology, especially host specificity, but also the micro- and macrohabitat preferred. However, there are several unanswered questions in relation to the definition of species boundaries and selection of species concept for gyrodactylids (Harris 2002-2003). One example is *G. thymalli* and *G. salaris* which are very similar based on morphometry and genetics. Traditionally *G. thymalli* and *G. salaris* have been considered as two different species. However, Malmberg (1989) pointed out that *G. thymalli* was morphologically very similar to *G. salaris*. Cunningham (1997) unexpectedly found identical sequences in the ITS (Internal transcribed spacer) of *G. salaris* from Atlantic salmon and *G. thymalli* from grayling and was unable to discriminate between these species by genetical methods (Cunningham *et al*. 1995). The relationship between these species are discussed in several articles (McHugh *et al*. 2000, Soleng & Bakke 2001, Bakke *et al*. 2002, Sterud *et al*. 2002, Zietara & Lumme 2002, Hansen *et al*. 2003, Meinilä *et al*. 2004). According to Hansen *et al*. (2007), the data strongly suggest conspecificity of *G. thymalli* and *G. salaris* (Hansen *et al*. 2003, Meinilä *et al*. 2004, Hansen *et al*. 2006). Currently there is no morphological or molecular marker available that can unambiguously discriminate the two species, and differences in host preference (Soleng & Bakke 2001, Bakke *et al*. 2002, Sterud *et al*. 2002), remain the main argument in favour of considering *G. thymalli* and *G. salaris* valid species (Hansen *et al*. 2006). Bakke *et al* (2007) point out "that there is still a lack of knowledge and that this lack of knowledge is particularly apparent in relation to *G. salaris* in Norway; the precise relationships of the different forms which infect salmonids in Scandinavia, and which are evolving via a series of host shifts, remain obscure and elusive. There is a need to be very careful with nomenclature (which can be legally binding) in such a fluid situation, and we would highlight the potential of this system for evolutionary biologists with an interest in the role of host shifts. The reasons why *G. salaris* is so damaging, when the congener *G. thymalli* and some *G. salaris* strains are not, remain obscure, and much additional research is needed on the role of gyrodactylids as potential biotic invaders. In particular, we need to identify potential future pathogens, particularly of salmonids, to predict their likely impact. This has been given additional urgency by the recent report (You *et al*. 2006) that *G. brachymystacis* can establish pathogenic infections of rainbow trout in China, with the potential that this may also become a significant pest in aquaculture".

Whatever the outcome of these taxonomic discussions might be, still the fishery authorities in the different countries must relate to the different effects of the different "types" of *G. salaris/G. thymalli.*

To further complicate the question, it is well known that different salmon stocks have different resistance against *G. salaris*. Experimentally, Bakke *et al*. (1990) showed that salmon from the river Neva which is the outlet river from Lake Ladoga, showed a response

against *G. salaris*. The hatchery-reared Baltic Neva stock demonstrated both an innate and an acquired resistance towards *G. salaris*, in contrast to the highly susceptible, Norwegian Alta and Lone stocks (Bakke *et al*. 1990). It has also been noted that not all Baltic salmon stocks are resistant to the parasite. Northern Baltic salmon show an intermediate susceptibility against *G. salaris*. A study on the susceptibility of the Baltic salmon from the Swedish river Lule (Dalgaard *et al*. 2003) reports that this strain is susceptible to infection, but to a lesser extent than the Scottish salmon. Although the Lule salmon seems more susceptible to infection compared to previous reports on the Neva salmon, the results support the notion that Baltic salmon strains are generally more resistant than East Atlantic salmon (Dalgaard *et al*. 2003). The susceptibility of a Baltic salmon stock from the river Indalsälv, central Sweden to Norwegian *G. salaris* was experimentally tested and compared with previously obtained results on East Atlantic salmon (Lierelva, SE Norway). Contrary to expectation, the Baltic salmon appeared almost as susceptible as the Norwegian salmon parr (Bakke *et al*. 2004). Laboratory studies on the susceptibility of young salmon from the Mörrum River, Southern Sweden to infection with a Norwegian strain of G. *salaris* showed that the salmon exhibited intermediate susceptibility and low mortality (Dalgaard *et al*. 2004).

It is also well known that environmental factors like for example water quality may influence the relationship between the host and the parasite. For example on the west coast of Sweden the impact of the parasite on salmon parr densities has varied markedly although baseline data on parr densities are limited. The most marked reductions in parr density appear to have occurred in the river Atran, although these were not as marked as reported in Norwegian rivers, whereas in other rivers there has been limited impact. It was noted that these Swedish rivers vary in water quality.

In summary the status of knowledge for the relationship between *Salmo salar* and *Gyrodactylus salaris* is:

- There are different types of *G. salaris* with different virulence towards the host
- There are different types of salmon with varying resistance towards the parasite
- Environmental conditions, for example water quality may have a significant impact on the relationship between host and parasite

Host-parasite interactions are therefore complicated and merit further research in the different countries involved.

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Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)9

Measures to prevent the spread of Gyrodactylus salaris and to eradicate it where it has been introduced
(Tabled by EU (UK - Scotland))

GSWG(07)9

Measures to prevent the spread of Gyrodactylus salaris and to eradicate it where it has been introduced

Actions taken in Scotland

1. Prevention

1.1 *Gyrodactylus salaris* is exotic to Scotland and it is highly improbable that the infection could enter the country by natural means because of the inability of the parasite to survive in full strength seawater. Significant risk is therefore associated with the actions of man both in the trade in fish and fish eggs and via leisure pursuits.

1.2 Commission Decision 2004/453/EC recognises that Great Britain has demonstrated freedom from *G. salaris* and maintains a surveillance programme to determine continued absence of the disease. The Decision therefore provides certain protective measures for GB with regard to *G. salaris* in salmonids.

1.3 The importation of live salmonids from areas of lower health status, with respect to *G. salaris*, is prohibited into Great Britain although importation of disinfected eggs is permitted from areas infected with *G. salaris.* NB Imports can occur from areas of a country that has *G. salaris* providing that the area from which stock are imported meets the requirements of Commission Decision 2004/453/EC.

1.4 Discussions are being held with airports, ferries and seaports, assisted by fishing and leisure organisations to identify the greatest points of risk where *G. salaris,* might enter Scotland. It is intended that an enhanced publicity campaign, by way of displaying posters, could be used to highlight the risks of anglers, canoeists and rafters inadvertently bringing *G. salaris* into Scotland on damp equipment.

1.5 The Association of Salmon Fishery Boards (ASFB) and the Rivers and Fishery Trusts for Scotland are working with individual Boards to discuss with fisheries proprietors the benefits of getting anglers to sign declarations that they have not been fishing abroad or have been and have subsequently disinfected their equipment. ASFB have written to all boards outlining what they should do to raise awareness of *G. salaris,* what preventative measures they should take and some advice on preparing a document that outlines the characteristics of the catchments that will be important in developing an eradication strategy. It is ASFBs intention to audit these actions annually.

1.6 The Scottish Aquaculture Industry produced a Code of Good Practice (CoGP) for fish farmers in 2005. This is not specific to *G. salaris* but does provide advice on sourcing brood stock and the disinfection of imported gametes or eggs into Scotland. The CoGP relies on the latest scientific information and developments from within the industry.
The CoGP can be found at www.scottishsalmon.co.uk/dlDocs/CoGP.pdf

2. Contingency plans

2.1 A draft outline contingency plan to deal with an outbreak of *G. salaris* was produced in May 2002 but a more detailed plan was not developed at that time. Several events since 2002 have led to the production of a more detailed plan being published:-

- A workshop was held in 2005 to discuss the issues surrounding the possible introduction of *G. salaris* into Scotland. The workshop was attended by officials of several Government Agencies, representatives of the fishing industry and other commercial users of water and by officials from England, Ireland, and Norway. It was the unanimous view of the workshop that Government set up a Task Force to investigate and report on a range of issues surrounding *G. salaris* and to produce a contingency plan to deal with any future outbreak.

- Officials had been to Norway in 2004 to observe treatment of several rivers and to gain information on the whole process of dealing with *G.salaris.*

- The Aquaculture and Fisheries Act 2007 provides legal powers to enhance such controls as already existed i.e.:-
    - To eradicate *G. salaris*
    - To authorise or direct the removal of dead and moribund stock
    - To impose standstills on all waters and fish farms
    - To erect barriers and close fish passes
    - To have compulsory access
    - To clear fish farms if they contain a species on which *G. salaris* can reproduce
    - To order mandatory disinfection of recreational gear.

- The disastrous Foot and Mouth outbreak in 2001 had caused officials to rewrite the Scottish Foot and Mouth Contingency Plan in 2002 and to produce a new Scottish Communication strategy document. These two documents formed the template on which the current contingency plan for *G. salaris* was based.

- All of these events provided information and guidelines in developing a new detailed contingency plan to deal with any future outbreak of *G. salaris* if it ever occurs in Scotland

2.2 The remit of the Task Force was based on the outcomes of the workshop and was formalised in the following terms of reference:-

- Develop preventive measures home and abroad to exclude *G. salaris* from Scotland.

- Produce a contingency plan to contain and where possible eradicate the parasite should it be introduced to Scotland.

- Identify the personnel who would form the skeleton of a control organisation and the preparation and training they require such as secondment in Norway.

- Consider other options for intervention including employment of the Norwegian company VESO and recommend accordingly.

- Where control is impractical, to make recommendations for measures to minimise the spread of *G. salaris* and mitigate its impact on freshwater fish and the wider economy.

- Identify and develop proposals for new statutory controls, including necessary powers for compulsory slaughter of wild fish, prohibiting abstraction of water during a river treatment, provision of alternative water supplies for watering livestock and movements of live fish.

- Identify research needs for the identification of *G. salaris*, containment and control measures such as determining the efficacy of disinfectants and investigation of the chemistry of Scottish rivers in preparation for the use of aluminium sulphate.

- Investigate with representatives of Scottish smolt producers the question of the industry providing gene bank facilities for use in restocking rotenone treated rivers.

2.3 The Contingency plan (www.scottishexecutive.gov.uk/Topics/Fisheries/Fish-Shellfish/Gs) assumes that in the event of *G. salaris* being confirmed in Scotland the preferred option will be eradication but also details how an outbreak might be contained if eradication is deemed to be impractical. The plan contains the following sections:-

- Disease response assumptions
- Command and control
- Structures and responsibilities of government headquarters
- Field Operations
- Communications and
- Resources

These overall instructions are supported by 11 appendices that detail:-

- Summary of legislation affecting control of *Gyrodactylus salaris*
- Roles and Responsibilities of Scottish Government Departments, External Enforcement bodies and other Stakeholders
- Factors to be considered when deciding on whether to contain or eradicate disease
- Additional information on disease responses
- Communications issues and strategy
- Command and Control
- Composition and roles of national and local Stakeholder Groups
- Resources
- Gene banking and restoration
- Plans and projects—environmental consents
- Operations Manual

2.4 A table top exercise was carried out over two days in February 2007 to test the robustness of the plan that had been produced. Officials from Norway and England attended together

with all the main departments from the Scottish Government, Enforcement Bodies, fishing, leisure and industrial users of water. The exercise took the form of a series of scenarios using previously assembled data and maps. Participants were divided into a series of groups comprising participants from a number of disciplines. The aim was to test whether the plan would work and where problems were identified to refer them back to the Task Force for further consideration. The main issues that needed resolution can be summarised as follows:-

- Cross border legislative issues with England
- Serving of legal notices to prevent movements of fish etc
- Access to additional staff, call off arrangements and training issues
- Timing of treatment including possibility of early treatments to reduce disease load.
- Access to Rotenone
- Security issues re-water extraction details
- Scope of Scottish Ministers especially in relation to issues for which the UK Government has responsibility e.g. energy including Hydro-electric power
- Strategic Co-ordination Groups and Civil Contingencies Structures
- Amendments to Contingency Plan

The contingency plan was revised and a second edition published in April 2007. Some of the above issues are subject to ongoing review and resources necessary to tackle any outbreak are being sought.

2.5 Officials visited Norway again in August 2007 to observe an aluminium sulphate treatment and were able to obtain information that will be useful in developing training programmes and considering amendments to the contingency plan. The relationship built up with Norwegian officials has been very beneficial and is greatly appreciated.

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)10

Initiatives to increase awareness of Gyrodactylus salaris - actions taken in Scotland (Tabled by EU (UK - Scotland))

GSWG(07)10

Initiatives to increase awareness of Gyrodactylus salaris - actions taken in Scotland

In recent years there has been an increased awareness in Scotland about the dangers that *G. salaris* would pose to both the commercial salmon industry and to salmon anglers if Scottish waters were affected with this parasite. The discovery of *G.salaris* in Scotland would also have severe adverse effects on other users of water. These factors have led to a number of initiatives aimed at increasing public awareness of the parasite, the damage it could cause and ways to reduce the risk.

1. Home and Dry Campaign

The Scottish Government launched a campaign in February 2007 to heighten the awareness of *G.salaris* among anglers and the wider public and to point out the dangers of allowing the parasite into Scotland. The campaign was launched at four major salmon sites simultaneously and was led by a media interview given by Jack Charlton who as well as being a renowned international footballer is also a keen salmon angler.

The campaign featured a poster aimed at fishermen and water sports enthusiasts who have just returned from countries where *G.salaris* is known to exist or may be present and gives advice on precautions to be taken. There is also a leaflet giving details of what the parasite is, which countries are affected, how it could get into Scotland and precautions to take to keep it out of Scotland. Copies of the leaflet and poster have been circulated very widely among the fishing and water sports fraternity as well as hotels, estates and holiday companies who specialise in fishing and water leisure industries. The poster and the leaflet can be found at www.infoscotland.com/gsbug.

The campaign has been widely supported by the fishing and water sports industry. The initial print run of 30,000 copies was quickly used up and a second run was printed.

2. Interest in Fishing Press

Scottish and UK fishing press have published several articles on *G.salaris* and advantage has been taken by several organisations to produce articles to keep up the awareness.

3. Work of Angling/Fisheries Associations

All the angling and commercial fisheries interests were represented on the Task Force that produced the contingency plan and developed the "Home and Dry" campaign. They have been active in promoting the initiatives amongst their own members and in trying to increase public awareness. Two of the organisations led two of the media conferences associated with the campaign. The Association of Salmon Fishery Boards has written to all District Fishery Boards outlining actions that can be taken to enhance awareness and increase preventative measures. They intend to audit what District Fishery Boards do on an annual basis.

4. Visit Scotland

VisitScotland is Scotland's national tourist board which delivers a multi-channelled bookings and information service for visitors to Scotland. To achieve this, the company operates the National Booking and Information Centre where a team of trained advisors deals personally with telephone requests for information and bookings. VisitScotland provides online access to its information and accommodation availability to the 120 Tourist Information Centres networked across the country.

VisitScotland's website contains a section on *G. salaris,* in its advice on salmon fishing that gives advice to visiting anglers and those who have been fishing abroad. It contains information on the risk of introducing *G.salaris* and on preventative measures.

5. Scottish Canoe Association

The Scottish Canoe Association has produced a leaflet on *G salaris* that is specifically targeted at the actions of its members and gives advice on what action to take if they have taken canoes to areas known or thought to be affected with *G.salaris.*

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)11

Cost-benefit analyses to support research, policy decisions, etc. - actions taken in Scotland (Tabled by EU (UK - Scotland))

GSWG(07)11

Cost-benefit analyses to support research, policy decisions, etc. - actions taken in Scotland

In looking at the possibility of *G.salaris* affecting Scottish waters, officials were very aware of the multiple users of Scottish rivers and lochs. Any decision to impose containment or eradication measures on rivers and lochs is likely to have far reaching effects on a number of commercial and leisure activities and to involve up to 20 separate pieces of legislation.

There could be a major impact on any or all of the following depending on the catchment(s) affected:-

- Whisky distilling
- Hydroelectricity generation
- Public water supplies
- Water transfers
- Environmentally designated sites
- Commercial fishery sites
- Salmon anglers
- Leisure anglers
- Canoeing and rafting
- Hotel trade
- Local employment
- Suppliers of fishing equipment

In order to assess the effects of various possible actions in the event of Scottish waters being affected the Scottish Government commissioned a cost-benefit analyses entitled "An Economic Evaluation of the Impact of the Salmon Parasite *Gyrodactylus salaris* (Gs) Should it be Introduced into Scotland". The analysis was carried out by the Institute of Aquaculture, University of Stirling and Caledonian Business School, Glasgow Caledonian University. It can be found at www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18610/GsEclmpSt

The cost-benefit analyses was commissioned by the Scottish Government to provide data that could be used to inform the development of strategies to be deployed if *G. salaris* were ever to be found in Scotland. The study assumed that the parasite will most likely spread by infected fish or by water movements or both. It also evaluated the possibility of parasite transfer on wet clothing, angling and boating equipment. A contingency plan exists for dealing with an outbreak of *G. salaris* in Scotland but no decisions have been taken by Scottish Ministers as which of several options might be used. The analyses thus looked at using rotenone and/ or aluminium sulphate in each of the eradication scenarios studied.

1. The Options

The economic benefits from successful policy initiatives to control *G. salaris* are the avoidance of the adverse economic consequences that would arise if no action were taken. To evaluate the expected economic benefits of any specific strategy, it is necessary to estimate the probability that the strategy will be successful. Factors such as the biology of the parasite,

current practices within the aquaculture and fisheries sectors, and the likely response of different stakeholders to possible policy measures have all been considered in the cost/benefit analysis.

Costs and benefits have been examined for the following policies:

1.1 Prevention
Measures that potentially reduce the probability of *G. salaris* entry.

1.2 Eradication
An eradication strategy might be possible if *G. salaris* reaches Scotland and infests a small river catchment (e.g. the River Luce in the south west). The strategy would have implementation costs, but would also generate Net Economic Value as the river recovers

1.3 Containment
If *G. salaris* infested a large river catchment (e.g. the Spey) and remained undetected until it had spread widely then eradication may not be feasible on economic, political and/or legal grounds. However, a strategy of containment to protect the rest of Scotland from infestation might be appropriate. Such a containment policy might be either limited (Minimal Exclusion), focusing only on the greatest risk of *G. salaris* transfer, or it could involve the Total Exclusion of the public from the water. The size of the infected catchment should not be used as a measure of whether or not eradication is feasible. If the parasite is detected early and/or it is possible to divide the catchment into smaller sectors eradication may still be an option.

1.4 Other Measures
Initiatives that cannot properly be described as containment or eradication measures but which are essentially complementary to these strategic approaches.

2. Summary of Analyses

2.1 Prevention

Two basic approaches to decreasing the probability of *G. salaris* infestation are disinfection at ports, and publicity to anglers, other water users and the general public. The total cost of these measures was estimated at £6m. This is small in comparison with both the Net Economic Value of £633m of keeping Scotland free of *G. salaris* and the protection of the 1,966 full time jobs that could be lost if *G. salaris* was detected in Scotland.

Thus, on the basis of the Net Economic Value alone, a long-term reduction in the likelihood of transmission of 1% is all that would be necessary to justify these measures.

2.2 Eradication: The River Luce case study

The Luce is a small river in South West Scotland with no aquaculture activity. A loss of 600 angler days would follow if it became infected, with a direct economic impact of £12,500 in lost local income. However, overall, there would be a positive economic impact because the cost of eradication is put at around £550,000, with a labour bill of £166,000. During the

process of river treatment, enhanced local employment prospects and raised incomes would be expected before a return to the *status quo*.

The analyses looked at treatment with both Rotenone and aluminium sulphate. In both cases the analyses looked at the cost of treatment, the loss of rents and consumer surplus and the benefits from rents and consumer surplus after treatment plus the avoidance of containment costs once treatment was carried out.

The costs and loss of rents and consumer surplus when using rotenone was assessed at £0.77M. The benefits were assessed at £2.24M giving a Benefit/Cost ratio of 2.93 i.e. for every £1,000 spent in eradicating *G. salaris* there would be an estimated benefit of £2,930. When using aluminium sulphate the costs were estimated at £1.08M, the benefits at £2.11M and the Benefit/Cost ratio at 1.94. Either treatment thus shows a positive economic benefit over a strategy of containment.

2.3 Containment: The River Spey case study

The Spey is a large complex river system, providing habitats for a number of vulnerable species. Aquaculture in the area is almost wholly based on rainbow trout for recreational purposes.
Given that eradication regimes may not be feasible on economic, political, and/or legal grounds, the economic impact of *G. salaris* infection will depend on the containment policies pursued, together with the period taken for economic recovery and the re-employment of those who loose their jobs.

Two containment policies were examined:
• **Minimal Exclusion** where only transport of fish and 'water' are banned, and
• **Total Exclusion** where all activities (except water for cooling in distilleries) are banned.
Policies involving partial exclusions were not studied.

Minimal Exclusion incorporates a pass scheme to ensure disinfection of all boats and equipment when they leave the area, which, along with the ban on fish and water movement, should virtually eliminate the possibility of *G. salaris* transfer to another catchment. The scheme's running cost was found to be surprisingly small in the order of £175,000 per annum. In addition, the Minimal Exclusion policy does generate some jobs in surveillance and in publicity.

Total Exclusion has a more dramatic effect because it stops all angling and water sports. It would also affect the attractiveness of the area for the one million tourists who visit the Cairngorm National Park and lower Spey each year. A conservative estimate of the effect, of the additional constraints, on the local area are over £1.75m in lost income together with a loss of 106 jobs. The impact on Scotland as a whole is much less because it is assumed that most users would simply shift their activities to somewhere else in Scotland.

The Net Economic Value lost to Scotland, in the event of widespread infection with *G. salaris,* is estimated at £633M. The Minimal Exclusion policy has a capitalised value of £5.8M so the policy would only need to reduce the risk of transmission of the parasite by 0.91% (5.8M/633M) to be justified on economic grounds. The Total Exclusion policy has a

capitalised value of £41.1M and would need to reduce the risk of transmission by 6.5% (41.1M/633M) to be justified.

The data does not include the adverse effects that containment policies may have on other water users which maybe very considerably more than on salmon angling. Such costs may justify the option of treatment if it minimises the adverse effects on whisky distilling, hydroelectricity generating and public water supplies.

2.4 Other Measures

The study looked at other measures that might be undertaken immediately, notably:
• Gene-banking and,
• Increased surveillance.

Gene-banking
The principal purpose of gene-banking is to enable re-establishment of natural populations native to specific rivers following successful eradication of *G. salaris*. Currently, there are no live fish gene-banks in the UK, and their establishment is both lengthy and costly.
A gene-bank accommodating a sample of 20 rivers would have a set-up cost of £16m, with a running cost of £1.2m per annum. This gives a total capitalised cost of £56m. There are 381 salmon rivers in Scotland, so the cost of comprehensive gene-banking would be prohibitive. In addition, the value of re-instating salmon quickly in a small river attracting very few anglers will also be low.

Surveillance in the current programme involves sampling 226 sites annually (215 salmon or rainbow trout farms, and 11 rivers on a rolling system of 55 sites over five years).
Surveillance has no economic value if the measures to keep the parasite out succeed. In the event of failure, a value is generated where surveillance limits the spread of *G. salaris* from one river to another. A value is generated if surveillance allows the parasite to be confined and then eradicated within a section of a river system. If increased surveillance and early detection prevented spread from, say, a small to a large river then the saving could be far more than the surveillance costs.

It is difficult to justify extra surveillance if the probability of *G. salaris* entry is very low after the suggested precautions have been taken. However, if *G. salaris* is detected in Scotland (or the UK), transmission probabilities will have increased, the Expected Value of surveillance will increase correspondingly, and additional surveillance might be economically justified. The value of surveillance may also be enhanced if it prevents the loss of other fish species that have a significant financial value.

3. Conclusions

The cost-benefit analyses concluded that:-

3.1 Should the Scottish Government take no action to prevent the spread of *G. salaris* in Scotland, a decrease in Net Economic Value, capitalised at £633m could result from the complete loss of salmon angling.

3.2 Aquaculture is not as likely to be seriously affected because of the incentive for, and ability of the commercial organisations involved to protect their stocks.

3.3 The probability of *G.salaris* entering the UK could be reduced considerably by the provision of disinfection stations at ports, and by extensive publicity identifying the danger of the parasite. The cost of these measures is put at a capitalised value of £6m.

3.4 On entry of *G.salaris* into a river system, the appropriate eradication/containment policy is wholly dependent upon the biological and physical characteristics of the river:

- For a small river, eradication is likely to be preferred to containment. If the salmon catch is relatively large, it is likely that, despite the increased cost, aluminium sulphate will be preferred to rotenone because salmon angling can be resumed more quickly.
- If the river system is large and complex, it is likely that eradication would prove to be economically and, perhaps, legally or politically, infeasible. Further economic analysis of a clearly defined eradication plan in a large system is necessary in order to identify the conditions necessary for eradication to become appropriate. This would need to include the adverse effects on other users of water and the risk that containment would not prevent the gradual spread of disease.

3.5 In the Spey case study on containment, transmission probabilities were identified as a key factor in selecting between Minimal and Total Exclusion strategies. Transmission probabilities are influenced by the number of water sports-persons and visitors. The Total Exclusion strategy becomes more economically attractive with fewer users.

3.6 Further information in three areas would be useful for policy formulation:

- Transmission probabilities and the factors affecting them,
- The relationship between river geography and the potential for *G.salaris* eradication,
- The uses made of rivers in Scotland.

Note

The financial data given in Section 2.2 above includes the capital cost of providing the equipment. Equipment for Rotenone treatment was estimated at £123,764 and for aluminium sulphate treatment at £508,840. These are capital costs for equipment that can be used again. Removing the cost of equipment from the data gives a benefit/cost ratio of 3.68 for rotenone and 4.25 for aluminium sulphate treatment.

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)15

Cost-benefit analyses
(Tabled by Norway)

Cost-benefit analyses

Jarle Steinkjer
Directorate for Nature Management

Directorate for **Nature Management**

Cost-benefit analyses

Krokan, P.S. og Mørkved, O.J. 1994. Nytte-kostnadsanalyse av innsatsen for å bekjempe lakseparasitten *Gyrodactylus salaris* i perioden 1981-1998. Utredning for DN nr. 1994-4, 53 sider.

Mørkved, O.J. og Krokan, P.S. 2000a. Nytte-kostnadsanalyse av prosjektet rotenonbehandling av Steinkjervassdragene. Utredning for DN nr. 2000-3, 38 sider.

Mørkved, O.J. og Krokan, P.S. 2000b. Økonomisk analyse av villaksressursene i nasjonale laksevassdrag. Høgskolen i Nord-Trøndelag, Utredning nr. 24, 37 sider.

Navrud, S. 2001. Samfunnsøkonomisk nytteverdi av villaksressursene i nasjonale laksevassdrag: oppfølgingsstudie. Oslo Energi Konsult, 37 sider.

The general conclusion from an analysis estemated benefits and costs of the fight against G. salaris indicate that the project is very profitable for the society, and considerable more money can be used before the limit of profitability is exeeded

Krokan & Mørkved (1994). Nytte-kostnadsanalyse av innsatsen for å bekjempe lakseparasitten *Gyrodactylus salaris* i perioden 1981-1998. Direktoratet for naturforvaltning. **Utredning for DN 1994-4**: 1-53

Directorate for **Nature Management**

In 2006 the Directorate for nature management calculated the total cost in connection with accomplishment of the *Gyrodactylus* program.

The total cost for the *Gyrodactylus* program depend on the annually allotment.

High annually allotment make it possible to purchase requisite equipment, building fish barriers and treat rivers within a short time period. This will result in quickly reduced expenditures for the gene bank, the total socio-economic loss will be reduced, local man-year will be secured, and the possibility of spreading of the parasite will be reduced.

Low annually allotment will lengthen the program period with considerable increase of the total cost and loss of man-year as result

Directorate for **Nature Management**

Factors considered in the cost-benefit analyse

Eradication: The total cost of mapping, planning and chemical treatment of infested rivers in the different regions

Treatment strategy: 2 treatments in each region

Gene bank: We know the cost for each stock in the gene bank

Research: Constant, highest in the beginning of the period

Equipment: Estimated to 20 mill NOK

Management/unforeseen: 5% of the total budget

New infection/unsuccessful treatment: Each fifth year

Local economic consequences: Factors from NINA report 126 " Assessment of socio-economic value of aquaculture and sport angling for wild salmonids in north-western Europe" among others.

Loss of man-year: 3.3 man-year per 100 fish caught in the river

High annually allotment

Measure	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gene bank	6000	6000	6000	5250	5250	4875	3375	2625	150
Skibotn region	200	200	2000	15000	15000	500	500	500	500
Rana region	500	500	500						
Vefsna region	20000	20000	500	500	500	500	500		
Steinkjer region	15000	500	500	500	500	500			
Driva region	30000	500	500	500	2000	15000	15000	500	500
Romsdal region	1000	15000	15000	500	500	500	500	500	
Lærdal region	500	500	500	500	500				
Research	3000	3000	3000	2000	2000	2000	2000	500	500
Equipment	10000	10000	500	500	500	500	500		
New infection/unsuccessful tr.					10000	10000			
Management/unforeseen	4260	2760	1375	1238	1813	1694	1094	306	225
Sum	90460	58960	30375	26488	38563	36069	23469	4931	3225
Local economic consequences	242000	242000	242000	226000	226000	175000	154000	103000	75000
Total sum	332460	300960	272375	252488	264563	211069	177469	107931	78225
Loss of man-year	552	552	552	516	516	399	352	235	17

Directorate for **Nature Management**

	Annually allotment		
	High*	Middle**	Low***
Treatment cost (mill USD)	56	67	90
End of the project year	2018	2024	2032
Total cost (treatment and socio-economic loss (mill USD)	373	473	630
Total loss of man-year	4173	5402	8024

* 13 mill USD the first three years, then gradual reduction

** 7 mill USD annually within the period

*** 4 mill USD annually within the period

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)16

Research on Gyrodactylus salaris in Finland in 2006-2007
(Tabled by Finland)

GSWG(07)16

Research on Gyrodactylus salaris in Finland in 2006-2007

Scientific research on *Gyrodactylus salaris* during the recent years has mainly been performed at the University of Oulu, Department of Biology, by a group led by docent Jaakko Lumme. Their interest has been on the molecular ecology and evolution of the parasite.

At the Finnish Food Safety Authority Evira there is ongoing research on the epidemiology of *Gyrodactylus salaris* infection in the Baltic Sea salmon river Tornionjoki and on more applied subjects, disinfection of the fishing equipment and the method of monitoring the parasite at fish farms.

Publications in peer reviewed journals in 2006-7:

Ziętara, M. S., Kuusela, J. Veselov, A. and Lumme, J. (in press) Molecular faunistics of accidental infections of *Gyrodactylus* Nordmann, 1832 (Monogenea) parasitic on salmon *Salmo salar* L. and brown trout *Salmo trutta* L. in NW Russia (Monogenea, Platyhelminthes). **Systematic Parasitology** in press
DOI: 10.1007/s11230-007-9121-7

Kuusela, J. Ziętara, M. S.,and Lumme, J. (2007) Hybrid origin of Baltic salmon-specific parasite *Gyrodactylus salaris*: a model for speciation by host switch for hemiclonal organisms. **Molecular Ecology** in press
DOI: 10.1111/j.1365-294X.2007.03562.x

Rokicka, M., Lumme, J. and Ziętara, M. S. (2007). Identification of *Gyrodactylus* ectoparasites in Polish salmonid farms by PCR-RFLP of the nuclear ITS segment of ribosomal DNA (Monogenea: Gyrodactylidae). **Acta Parasitologica** 52: 185-195.
DOI: 10.2478/s11686-007-0032-1

Ziętara, M. S., Kuusela, J. and Lumme, J. (2006). Escape from an evolutionary dead-end: a triploid clone of *Gyrodactylus salaris* is able to revert to sex and switch host (Platyhelminthes, Monogenea, Gyrodactylidae). **Hereditas** 143, 86-92.
DOI: 10.1111/j.2006.0018-0661.01956.x.

Working Group on *G. salaris* in the North-East Atlantic Commission Area

GSWG(07)17

Subgroup recommendations to facilitate coordinated research and monitoring

GSWG(07)17

Subgroup recommendations to facilitate coordinated research and monitoring

Discussions during the main Working Group meeting suggested that a common approach to *G. salaris* monitoring and control was required across member countries. The subgroup agreed that certain areas of work required standardisation between laboratories and that collaboration was required to do this. Such areas include (but are not restricted to): identification of the parasite, monitoring, defining which strains are classed as *G. salaris*, disinfection (how, what and when) and understanding pathogenicity.

One of the problems identified in achieving this was a lack of funding resources available to government research laboratories to conduct research in to *G. salaris*. To facilitate collaborations and exchange of information the subgroup proposed that the Working Group take the following recommendations forward to NASCO:

1. Set up a *G. salaris* scientific Working Group. This should be developed based around appropriate work streams and use the example of the tri-nations Pancreas Disease Working Group that is currently active. The Terms of Reference for the Group should be to:
    a. facilitate the free exchange of information, especially unpublished or 'grey' literature between interested scientists from member countries;
    b. make recommendations to NASCO as to standardised methods that could be adopted across member countries based on this information;
    c. identify and recommend to NASCO areas where collaborative research across government laboratories requires funding.

2. That funding is made available to allow such a group to be set-up and run.

3. That NASCO identify funding sources suitable to facilitate the collaborative research requirements recommended by the *G. salaris* scientific Working Group.

Annex 5

CNL(08)9

Request for Scientific Advice from ICES

1. With respect to Atlantic salmon in the North Atlantic area:

1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched Atlantic salmon in 2008[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 continue the work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance [3];

1.4 provide a compilation of tag releases by country in 2008 and advise on progress with analysing historical tag recovery data from oceanic areas;

1.5 evaluate the results of studies that estimate the level of pre-spawning mortality of salmon caught and released by anglers and the implications for stock assessments;

1.6 identify relevant data deficiencies, monitoring needs and research requirements[4].

2. With respect to Atlantic salmon in the North-East Atlantic Commission area:

2.1 describe the key events of the 2008 fisheries[5];

2.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

2.3 review and report on the development of age-specific stock conservation limits;

2.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2010-2012, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6];

2.5 further develop methods to forecast PFA for northern and southern stocks with measures of uncertainty;

2.6 further investigate opportunities to develop a framework of indicators that could be used to identify any significant change in previously provided multi-annual management advice.

3. With respect to Atlantic salmon in the North American Commission area:

3.1 describe the key events of the 2008 fisheries (including the fishery at St Pierre and Miquelon) [5];

3.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

3.3 update age-specific stock conservation limits based on new information as available;

3.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2009-2012 with an assessment of risks relative to the

objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding [6];

4. With respect to Atlantic salmon in the West Greenland Commission area:

4.1 describe the key events of the 2008 fisheries[5];

4.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

4.3 describe the status of stocks and provide annual catch options or alternative management advice for 2009-2011 with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6,7];

4.4 update the framework of indicators used to identify any significant change in the previously provided multi-annual management advice.

Notes:

1. *With regard to question 1.1, ICES is asked to ensure that the terminology used in presenting the data on ranching is clearly defined. For the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal.*
2. *With regard to question 1.2, ICES is requested to include information on any new research into the migration and distribution of salmon at sea.*
3. *With regard to question 1.3, there is interest in determining if declines in marine survival coincide with changes in the biological characteristics of juveniles in fresh water or are modifying characteristics of adult fish (size at age, age at maturity, condition, sex ratio, growth rates, etc.) and with environmental changes.*
4. *NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea will be provided to ICES to assist it in this task.*
5. *In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the by-catch of other species in salmon gear, and on the by-catch of salmon in any existing and new fisheries for other species is also requested.*
6. *In response to questions 2.4, 3.4 and 4.3 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*
7. *In response to question 4.3, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.4 and 3.4.*

ANNEX 6

NEA(08)00

List of North-East Atlantic Commission Papers

Paper No.	Title
NEA(08)1	Provisional Agenda
NEA(08)2	Draft Agenda
NEA(08)3	Report of the Second Meeting of the Working Group on *Gyrodactylus salaris* in the North-East Atlantic Commission area
NEA(08)4	Draft Decision regarding the salmon fishery in Faroese waters 2009
NEA(08)5	Draft Report
NEA(08)6	Decision regarding the salmon fishery in Faroese waters 2009
NEA(08)7	Agenda
NEA(08)8	Report of the meeting.

REPORT OF THE

TWENTY-FIFTH ANNUAL MEETING

OF THE

WEST GREENLAND COMMISSION

3 – 6 JUNE 2008
Gijón, Asturias, Spain

Chairman:	Mr Guy Beaupré (Canada)
Vice Chairman:	Mr Alan Gray (European Union)
Rapporteur:	Ms Susan Roque (Canada)
Secretary:	Dr Malcolm Windsor

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WGC(08)9

Report of the Twenty-Fifth Annual Meeting of the West Greenland Commission of the North Atlantic Salmon Conservation Organization Tryp Rey Pelayo Hotel Melia, Gijón, Spain 3-6 June, 2008

1. Opening of the Meeting

1.1 The Chairman, Mr. Guy Beaupré (Canada) opened the meeting and welcomed participants to the Twenty-Fifth Annual Meeting of the Commission. He invited opening statements from participants and the opening statement made on behalf of the NGOs is attached as Annex 1.

1.2 A list of participants at the Twenty-Fifth Annual Meeting of the Council and Commissions is included on page 257 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its Agenda, WGC(08)8 (Annex 2).

3. Nomination of a Rapporteur

3.1 Mrs Sue Rocque (Canada) was appointed as rapporteur.

4. Election of Officers

4.1 The current Chairman, Mr Guy Beaupré (Canada) was proposed for re-election by the USA and re-elected. Mr Alan Gray, (EU) currently Vice-Chairman, was proposed for re-election by Canada and was re-elected.

5. Review of the 2007 Fishery and ACOM Report from ICES on Salmon Stocks in the Commission Area

5.1 Mr. Torsteen Overgaard (Denmark (in respect of the Faroe Islands and Greenland)) provided a review of the 2007 fishery, WGC(08)5 (Annex 3). In summary, a variety of multi-year regulatory and management measures have been instituted and continue to be refined. These include, but are not limited to, mandatory reporting of catch and mandatory licensing of all fishermen who wish to sell Atlantic salmon.

5.2 The representative of ICES, Mr. Tim Sheehan, provided a report from ICES on the scientific advice on salmon stocks in the West Greenland Commission area, CNL(08)7. His presentation is available as NASCO document CNL(08)25. The ACOM report, which contains the scientific advice relevant to all Commissions, is included on page 219 of this document.

6. Regulatory Measures

6.1 Mr. Gerald Chaput (Canada) summarized the Report on the Use of the Framework of Indicators in 2008, WGC(08)3. In summary, he reported on the Working Group that had concluded its work with the result that the framework of indicators signalled that no change to the management advice previously provided by ICES is required for the 2008 fishery at West Greenland. This means that the multi-annual regulatory measure currently in place will continue to apply for the 2008 fishery and that there will not be a need for a decision on a new measure. ICES had, therefore, not been required to provide advice on stock status or management options for either the North American Commission or the West Greenland Commission areas for 2008. This report was accepted by the Commission.

6.2 The Parties agreed that the multi-annual regulatory measure adopted in 2006, WGC(06)6, would remain in place for the 2008 salmon fishery at West Greenland.

7. Sampling in the West Greenland Fishery

7.1 The representative of Canada informed the Commission that Canada will provide two samplers again this year, the EU confirmed it will provide three samplers, and the USA confirmed its continued support of the program. The USA tabled a draft West Greenland Fishery Sampling Agreement for 2008. The sampling program agreement, with minor editorial changes, was adopted by the Parties, WGC(08)6 (Annex 4).

8. Announcement of the Tag Return Incentive Scheme Prize

8.1 The Chairman announced that the draw for the West Greenland Commission prize in the NASCO Tag Return Incentive Scheme was made by the Auditor on 13 May. The winning tag was of Canadian origin. The tag was applied at the Fisheries and Oceans Canada trapnet in the Southwest Miramichi River on 27 September 2006. The fish was a male measuring 58cm at the time of tagging and would have spawned in the fall of 2006. It was recaptured at West Greenland in 2007. The winner of the $1,500 prize is Mr Gerth Jack Storer, Nuuk, Greenland.

9. Recommendations to the Council on the Request to ICES for Scientific Advice

9.1 The Commission agreed to the request for scientific advice from ICES prepared by the Standing Scientific Committee in relation to the West Greenland Commission area. The request to ICES, as agreed by the Council, is contained in document CNL(08)9 (Annex 5).

10. Other Business

10.1 A report on the SALSEA West Greenland project, WGC(08)7(revised) (Annex 6) was tabled for information.

11. Date and Place of Next Meeting

11.1 The Commission agreed to hold its next meeting at the same time and place as the Twenty-Sixth Annual Meeting of the Council in 2009.

12. Report of the Meeting

12.1 The Commission agreed a report of the meeting.

Note: The annexes mentioned above begin on page 197, following the French translation of the report of the meeting. A list of West Greenland Commission papers is included in Annex 7.

WGC(08)9

Compte rendu de la Vingt-cinquième réunion annuelle de la Commission du Groenland Occidental de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord Hôtel Melia Tryp Rey Pelayo, Gijón, Espagne 3-6 juin, 2008

1. Séance d'ouverture

1.1 Le Président, M. Guy Beaupré (Canada), a ouvert la réunion et a souhaité la bienvenue aux participants à la Vingt-cinquième réunion annuelle de la Commission. Il a invité les délégués à prononcer leur allocution d'ouverture. L'allocution d'ouverture prononcée au nom des ONG figure à l'annexe 1.

1.2 Une liste des participants à la Vingt-cinquième réunion annuelle du Conseil et des Commissions se trouve à la page 257 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté l'ordre du jour, WGC(08)8 (annexe 2).

3. Nomination d'un Rapporteur

3.1 La Commission a nommé Mme Sue Rocque (Canada) Rapporteur de la réunion.

4. Election des membres du Comité directeur

4.1 Les États-Unis ont proposé la réélection du Président actuel, M. Guy Beaupré (Canada). Celui-ci a été réélu, de même que M. Alan Gray (EU) en tant que Vice-Président. La réélection de M. Alan Gray (EU) avait été suggérée par le Canada.

5. Examen de la pêcherie de 2007 et du rapport de l'ACOM du CIEM sur les stocks de saumons dans la zone de la Commission

5.1 Mr. Torsteen Overgaard du Danemark (pour les Iles Féroé et du Groenland) a soumis un examen de la pêcherie de 2007, WGC(08)5 (annexe 3). En bref, un éventail de mesures de gestion et de réglementation pluriannuelles a été introduit et continue d'être parachevé. Ces mesures incluent, mais ne se limitent pas à, une obligation de compte rendu des captures et l'obtention obligatoire d'un permis par tous les pêcheurs qui désirent vendre des saumons atlantiques.

5.2 Le représentant du CIEM, M. Tim Sheehan, a présenté le rapport du CIEM sur les recommandations scientifiques concernant les stocks de saumons de la zone de la Commission du Groenland Occidental, CNL(08)7. Le document CNL(08)25 de l'OCSAN reproduit sa présentation. Le rapport de l'ACOM du CIEM, contenant les recommandations scientifiques pour l'ensemble des Commissions, figure à la page 219 de ce document.

6. Mesures de réglementation

6.1 Mr. Gerald Chaput (Canada) a présenté brièvement le compte rendu sur l'utilisation du cadre des indicateurs en 2008, WGC(08)3. Il a mentionné que le Groupe de travail avait achevé sa tâche et avait conclu que le cadre des indicateurs signalait qu'il n'y avait aucune nécessité de modifier les recommandations apportées précédemment par le CIEM pour la pêcherie du Groenland Occidental de 2008. Ceci signifiait que la mesure de réglementation pluriannuelle actuellement en vigueur continuera de l'être pour la pêcherie de 2008. Une nouvelle décision ne sera donc pas nécessaire. Il s'ensuivait qu'aucune demande de recommandations n'avait été faite auprès du CIEM à propos de l'état du stock et des options de gestion de 2008 pour les zones des Commissions Nord Américaine et du Groenland Occidental. La Commission a accepté ce rapport.

6.2 Les Parties ont convenu que la mesure de réglementation pluriannuelle adoptée en 2006, WGC(06)6, demeurerait inchangée pour la pêcherie de saumon de 2008 du Groenland Occidental.

7. Echantillonnage de la Pêche du Groenland Occidental

7.1 Le représentant du Canada a informé la Commission que, cette année, son pays contribuerait à nouveau deux échantillonneurs. L'Union européenne a confirmé sa contribution de trois échantillonneurs et les États-Unis ont assuré qu'ils continueraient d'apporter leur soutien au programme. Les États-Unis ont présenté un accord préliminaire sur l'échantillonnage de pêche de 2008 au Groenland Occidental. Les Parties ont adopté l'accord de programme d'échantillonnage, WGC(08)6 (annexe 4), après y avoir apporté quelques modifications mineures.

8. Annonce du Prix du Programme d'encouragement au renvoi des marques

8.1 Le Président a annoncé que le tirage au sort du prix de la Commission du Groenland Occidental du Programme d'encouragement au renvoi des marques de l'OCSAN avait été effectué par le Commissaire aux comptes le 13 mai. La marque gagnante était d'origine canadienne. Elle avait été posée à la station de comptage des Pêches et Océans du Canada (*Fisheries and Oceans*) dans la rivière *Southwest Miramichi River* le 27 septembre 2006. Le poisson était un male mesurant 58 cm de long au moment du marquage. Il aurait frayé en fin d'année 2006. Il a été capturé à nouveau en 2007 au Groenland Occidental. M. Gerth Jack Storer, de Nuuk, au Groenland a remporté le prix de 1 500 dollars (US).

9. Recommandations au Conseil s'inscrivant dans le cadre de la demande au CIEM de recommandations scientifiques

9.1 La Commission a accepté la demande de recommandations scientifiques, préparée par le Comité Scientifique Permanent pour la zone de la Commission du Groenland Occidental. La demande de recommandations scientifiques, approuvée par le Conseil, figure dans le document CNL(08)9 (annexe 5).

10. Divers

10.1 Une présentation a été faite, à titre d'information, d'un rapport sur le projet *SALSEA-West Greenland* (SALSEA Groenland Occidental), WGC(08)7(révision) (annexe 6).

11. Date et lieu de la prochaine réunion

11.1 La Commission a convenu de tenir sa prochaine réunion en même temps que la Vingt-sixième réunion annuelle du Conseil, en 2009.

12. Compte rendu de la réunion

12.1 La Commission a accepté le compte rendu de la réunion.

Note : Une liste des documents de la Commission du Groenland Occidental figure à l'annexe 7.

ANNEX 1

Joint NGO Statement to the West Greenland Commission

Mr. President, Colleagues

I am pleased to present the joint opening statement on behalf of the NGO Group.

ICES advice is that there should be no catch of wild Atlantic salmon off West Greenland in 2008 and 2009. The suspension of Greenland's commercial fishery is very important to the protection of vulnerable Atlantic salmon populations in North America and southern Europe.

We commend Greenland for the conservation leadership displayed at NASCO in accepting a multi-year agreement to keep its commercial salmon quota at zero. We also applaud the endorsement of the Greenland Home Rule Government of the seven-year Conservation Agreement between Greenland hunters and fishermen, the Atlantic Salmon Federation and the North Atlantic Salmon Fund. The NASCO agreement complements the private sector agreement as the extension of the Greenland Conservation Agreement is contingent upon the Greenland Home Rule Government prohibiting all commercial fishing for Atlantic salmon within Greenland's territorial waters.

We also applaud the increased monitoring of the subsistence fishery by the Greenland fishermen, which is financed through the private sector Greenland Conservation Agreement. This is providing more accurate catch data and is recording catches that have previously been classified as unreported. The information is helpful to the conservation and management of Atlantic salmon throughout the North Atlantic.

We are concerned, however, by the expanded scientific sampling program planned for Greenland under the auspices of SALSEA. The Greenland fishermen have reported that this scientific sampling program would result in many more salmon being killed over and above those harvested in their subsistence fishery. The NGOs recognize the importance of sampling to the SALSEA program. We do urge NASCO to take steps to ensure that the scientific sampling program does not allow the Greenland fishermen to kill more salmon. The North Atlantic Salmon Fund has offered assistance in reaching this goal.

ANNEX 2

WGC(08)8

Twenty-Fifth Annual Meeting of the West Greenland Commission
Tryp Rey Pelayo Hotel Melia, Gijón, Spain

3-6 June, 2008

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Election of Officers
5. Review of the 2007 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area
6. Regulatory Measures
7. Sampling in the West Greenland Fishery
8. Announcement of the Tag Return Incentive Scheme Prize
9. Recommendations to the Council on the Request to ICES for Scientific Advice
10. Other Business
11. Date and Place of Next Meeting
12. Report of the Meeting

ANNEX 3

West Greenland Commission

WGC(08)5

The 2007 Fishery at West Greenland
(tabled by Denmark (in respect of Faroe Islands and Greenland))

WGC(08)5

The 2007 Fishery at West Greenland
(tabled by Denmark (in respect of Faroe Islands and Greenland))

At the Annual Meeting of NASCO in June 2007, the West Greenland Commission agreed to restrict the catch of Atlantic salmon at West Greenland to that amount used for internal subsistence consumption in Greenland. Furthermore, no commercial export of salmon was allowed.

In accordance with the Regulatory Measure adopted by the West Greenland Commission, the Greenland Home Rule Government decided to set the national quota for commercial landings of Atlantic salmon to fishing plants to zero tonnes, and prohibited any export of salmon from Greenland in 2007. Only a subsistence fishery was allowed, i.e. fishery for private consumption, and fishery with the aim of supplying local open air markets, hotels, hospitals and restaurants. The latter was only allowed for professional fishermen with licences.

In 2007, the fishery was opened at the beginning of August and closed at the end of October. During this period a total catch of 24.65 tonnes of salmon was reported to the Greenland Fishery Licence Control (GFLK). Of this, 16.56 tonnes were reported by licensed fishermen as sold at open air markets etc, and 8.09 tonnes were reported as used for private consumption.

The fishery is regulated in the Greenland Home Rule Executive Order No 21 of August 10 2002 on Salmon Fishery. The Executive Order distinguishes between 1) commercial fishery for Atlantic salmon to be landed at fish plants, 2) subsistence fishery by residents of Greenland, and 3) rod fishery by tourists/non-residents.

All fishermen who wish to sell Atlantic salmon must hold a licence issued by GFLK. In 2007, 261 licences were issued and 105 of these were utilized for selling according to the reports to GFLK.

All catches of Atlantic salmon must be reported to GFLK. The catches were either sold at local open air markets or to local institutions, hotels etc, or kept for private consumption.

The wildlife and fisheries officers of GFLK make random checks at local markets in towns and settlements along the west coast of Greenland, and in hotels, restaurants, shops etc. in order to compare purchase of salmon with reported catches. In 2007, the wildlife and fisheries officers once again have put a lot of effort into handing out reporting forms to all fishermen whom they have observed fishing for salmon, and informing them that all catches must be reported to GFLK.

The Greenland Home Rule is considering ways of improving the catch reports. First of all the Department of Fisheries, Hunting and Agriculture continue the work of reminding the fishermen to report salmon catches. This will be done by transmitting TV spots during the salmon season to remind the fishermen about the gear allowed and to report catches.

ANNEX 4

West Greenland Commission

WGC(08)6

West Greenland Fishery Sampling Agreement, 2008

WGC(08)6

West Greenland Fishery Sampling Agreement, 2008

The West Greenland Commission recognizes the important contribution of sound biological data to science-based management decisions for fisheries prosecuted in the West Greenland Commission area. The Parties in the West Greenland Commission have worked cooperatively over the past three decades to collect biological data on Atlantic salmon harvested at West Greenland. These data provide critical inputs to the stock assessment completed by the International Council for the Exploration of the Sea (ICES) North Atlantic Salmon Working Group annually.

ICES, the International Atlantic Salmon Research Board and its Scientific Advisory Group, and NASCO all endorse taking additional samples from fish captured in the internal use only fishery in Greenland. This expanded sampling program, SALSEA West Greenland, requires whole fresh fish and is recognized as complementary to SALSEA Merge and SALSEA North America, which collectively hold promise in providing insights into the critical marine portion of the salmon's life cycle. The intention is that the whole fresh fish required for scientific analysis (e.g. stomach content, isotope analysis) would be fish that are part of the existing internal use fishery. Strong coordination and cooperation with the Greenland Home Rule Government and Kalallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK) in carrying out this scientific research program is required to fully integrate the sampling program into the internal use fishery.

The objectives of the sampling programme in 2008 are to:

- Continue the time series of data (1969-2007) on continent of origin and biological characteristics of the salmon in the West Greenland Fishery

- Provide data on mean weight, length, age and continent of origin for input into the North American and European run-reconstruction models

- Collect information on the recovery of internal and external tags

- Collect additional biological samples from fresh whole fish in support of SALSEA West Greenland or other special samples as requested

To this end, the sampling programme in 2008 will collect:

- Biological characteristics data including lengths and weights of landed fish
- Information on tags, fin clips, and other marks
- Scale samples to be used for age and growth analyses
- Tissue samples to be used for genetic analyses
- Various other biological samples (e.g. stomach content, isotope analysis) in support of SALSEA West Greenland
- Other biological data requested by the ICES scientists and NASCO cooperators

External Staffing Inputs:

Parties external to Greenland with interests in the mixed stock fishery at West Greenland, including Canada, the European Union, and the United States, have historically provided personnel and analytical inputs into the cooperative sampling programmes. The NASCO Parties agree to provide the following inputs to the cooperative sampling programme at West Greenland during the 2008 fishing season:

- The European Union[1] agrees to provide a minimum of 6 person weeks[2] to sample Atlantic salmon at West Greenland during the 2008 fishing season
- Canada agrees to provide a minimum of 4 person weeks[2] to sample Atlantic salmon at West Greenland during the 2008 fishing season
- The United States agrees to provide a minimum of 4 person weeks[2] to sample Atlantic salmon at West Greenland during the 2008 fishing season
- The United States agrees to co-ordinate the sampling programme for 2008
- The United States agrees to provide funding for Greenland Institute of Natural Resources staff to provide in-country support of the sampling program
- The Home Rule Government of Greenland, in cooperation with the Greenland Institute of Natural Resources, agrees to provide support for the sampling program by facilitating the sampling of Atlantic salmon by samplers from other NASCO Parties.

In addition, NASCO Parties agree to provide the following technical analysis inputs to analyze samples and data collected at West Greenland:

- The United States agrees to provide microsatellite DNA analysis of tissue samples collected from Atlantic salmon harvested at West Greenland

- The United States agrees to provide oversight for the processing of all collected biological samples

- The United States agrees to report the sampling program results to the ICES North Atlantic Salmon Working Group in support of the stock assessment completed by the ICES North Atlantic Salmon Working Group

- The United States agrees to report the sampling program results to all SALSEA partners

- Canada agrees to provide ageing of scale samples collected from Atlantic salmon harvested at West Greenland

- Canada agrees to maintain the historical West Greenland sampling database

- The European Union (UK (England & Wales)) agrees to act as a clearing house for coded wire tags recovered from the fishery

[1] The Republic of Ireland and the United Kingdom.
[2] For the purposes of this agreement, a person week of sampling is defined as a trained individual who works on site in West Greenland to collect samples of Atlantic salmon for a period of 7 days.

Greenland Home Rule Government Coordination Efforts:

The Home Rule Government of Greenland agrees to identify a mechanism to provide sampling access to landed Atlantic salmon before grading/culling and before fish are subject to health regulations that would restrict or prohibit activities associated with sampling.

The Home Rule Government of Greenland agrees to inform persons designated by cooperating NASCO Parties of important developments in the management of the West Greenland fishery including planned openings and closures of the Atlantic salmon fishery at West Greenland.

The Home Rule Government of Greenland agrees to provide necessary waivers to the regulation that Atlantic salmon must be landed in a gutted condition to allow for the collection of biological samples in support of SALSEA West Greenland. To facilitate land-based collection of these biological samples, the Home Rule Government of Greenland agrees to provide the necessary permits to allow for landing whole fresh salmon.

The allocation of available scientific sampling personnel will be determined annually by ICES scientists to provide spatial and temporal coverage to characterize both the fishery and the Atlantic salmon populations along the West Greenland coast. Parties participating in the cooperative sampling programme will share access to resulting data and work cooperatively in the publication of information.

ANNEX 5

CNL(08)9

Request for Scientific Advice from ICES

1. With respect to Atlantic salmon in the North Atlantic area:

1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched Atlantic salmon in 2008[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 continue the work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance [3];

1.4 provide a compilation of tag releases by country in 2008 and advise on progress with analysing historical tag recovery data from oceanic areas;

1.5 evaluate the results of studies that estimate the level of pre-spawning mortality of salmon caught and released by anglers and the implications for stock assessments;

1.6 identify relevant data deficiencies, monitoring needs and research requirements[4].

2. With respect to Atlantic salmon in the North-East Atlantic Commission area:

2.1 describe the key events of the 2008 fisheries[5];

2.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

2.3 review and report on the development of age-specific stock conservation limits;

2.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2010-2012, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6];

2.5 further develop methods to forecast PFA for northern and southern stocks with measures of uncertainty;

2.6 further investigate opportunities to develop a framework of indicators that could be used to identify any significant change in previously provided multi-annual management advice.

3. With respect to Atlantic salmon in the North American Commission area:

3.1 describe the key events of the 2008 fisheries (including the fishery at St Pierre and Miquelon) [5];

3.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

3.3 update age-specific stock conservation limits based on new information as available;

3.4 describe the status of the stocks and provide annual catch options or alternative management advice for 2009-2012 with an assessment of risks relative to the

objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding [6];

4. With respect to Atlantic salmon in the West Greenland Commission area:

4.1 describe the key events of the 2008 fisheries[5];

4.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

4.3 describe the status of stocks and provide annual catch options or alternative management advice for 2009-2011 with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6,7];

4.4 update the framework of indicators used to identify any significant change in the previously provided multi-annual management advice.

Notes:

1. *With regard to question 1.1, ICES is asked to ensure that the terminology used in presenting the data on ranching is clearly defined. For the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal.*
2. *With regard to question 1.2, ICES is requested to include information on any new research into the migration and distribution of salmon at sea.*
3. *With regard to question 1.3, there is interest in determining if declines in marine survival coincide with changes in the biological characteristics of juveniles in fresh water or are modifying characteristics of adult fish (size at age, age at maturity, condition, sex ratio, growth rates, etc.) and with environmental changes.*
4. *NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea will be provided to ICES to assist it in this task.*
5. *In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the by-catch of other species in salmon gear, and on the by-catch of salmon in any existing and new fisheries for other species is also requested.*
6. *In response to questions 2.4, 3.4 and 4.3 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*
7. *In response to question 4.3, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.4 and 3.4.*

ANNEX 6

West Greenland Commission

WGC(08)7 (rev)

SALSEA West Greenland

WGC(08)7 (rev)

SALSEA West Greenland

The current state of Atlantic salmon in the ocean and the need for a coordinated marine research programme (SALSEA) has been previously well documented and justified (ICR(05)2). The marine survey aspect of the SALSEA programme was developed to concentrate sampling upon areas where stocks from many rivers co-occur since the declines in marine survival are experienced by large groups of stocks. Considering that both Southern European and North American stocks co-occur at West Greenland as non-maturing 1SW fish, it was suggested that an additional survey programme be developed for the West Greenland area (SAL(06)3). The intention is to increase the nature and extent of the current sampling programme at West Greenland and integrate it with marine research survey programmes in other oceanic areas.

Parties to North Atlantic Salmon Conservation Organization's (NASCO) West Greenland Commission (WGC) have worked cooperatively over the past three decades to collect biological data on Atlantic salmon harvested at West Greenland. In 2007 (WGC(07)5), the European Union contributed 3 individuals (from England & Wales, Scotland and Ireland) to the sampling programme. Both Canada and the United States contributed 2 samplers each. Each sampler sampled in Greenland for approximately 2 weeks during which time they collected biological samples from the West Greenland harvest across 5 NAFO Divisions and 11 statistical weeks. Additionally, Greenland Nature Institute staff provided support and additional samples on an *ad hoc* basis. In 2007 approximately 1,100 salmon were sampled providing important information on various biological characteristics (length, weight, and age), continent of origin, and in some cases, river of origin via tag recoveries. This sampling programme provides critical input data for the annual stock assessment activities completed by the International Council for the Exploration of the Sea (ICES) Working Group on North Atlantic Salmon (WGNAS).

An expanded West Greenland sampling programme would conduct extensive and detailed sampling on a set number of fish harvested from the waters off West Greenland. This sampling will be in addition to the standard sampling programme. Arrangements would be made with individual fishermen for the delivery of fresh whole fish to the individual samplers on an agreed upon schedule. Sampling will be organized in both time and space across the fishing season and the coast of West Greenland to maximize the temporal and spatial resolution of the data collected.

The detailed sampling programme will provide biological data related to the health and status of all sampled individuals. Paramount to the sampling programme will be the ability to identify the origin of each individual with a high level of precision to large stock complex groupings through genetic analysis. Once the data can be collated by stock complex groupings, comparisons between complexes can be made and inferences can be developed related to stock complex performance (i.e. marine survival). Data obtained from the expanded West Greenland sampling programme will greatly enhance our understanding of marine phase Atlantic salmon when combined with similar data collected during the concurrent oceanic surveys in both the eastern and western North Atlantic and the similar data collected by in-river monitoring programmes (smolts and adults). This expanded sampling programme will greatly maximize the benefits obtained from the current

government sponsored sampling programme making this effort an extremely cost effective option to collect detailed biological information on marine phase Atlantic salmon.

This expanded sampling programme, SALSEA West Greenland, is recognized as complementary to SALSEA-Merge and SALSEA North America, which collectively hold promise in providing insights into the critical marine portion of the salmon's life cycle. The intention is that the whole fresh fish required for scientific analysis (e.g. stomach content, isotope analysis) would be fish that are part of the existing internal use fishery. Strong coordination and cooperation with the Greenland Home Rule Government and the KNAPK in carrying out this scientific research programme is required to fully integrate the sampling programme into the internal use fishery. ICES, the International Atlantic Salmon Research Board and its Scientific Advisory Group, and NASCO all endorse the SALSEA West Greenland sampling programme.

DETAILS FOR AN EXPANDED SALSEA WEST GREENLAND PROGRAMME

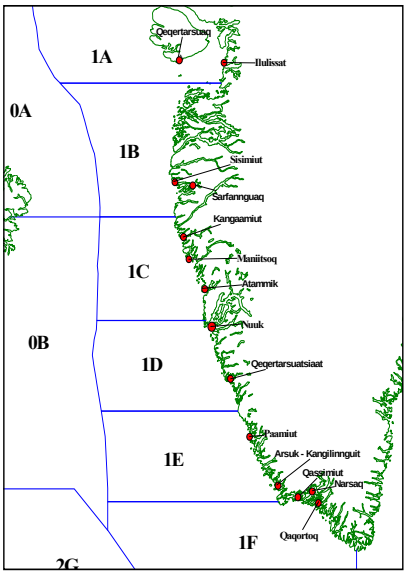
Goal

- To conduct an expanded sampling programme of salmon harvested off the west coast of Greenland in 2008, 2009 and 2010 and combine these data with data collected on these same cohorts of salmon sampled during concurrent oceanic surveys and subsequent in-river sampling programmes in home waters to make inferences related to the causal mechanisms behind stock-specific performance in the ocean (i.e. marine survival).

Investigator and Collaborators

- NOAA Fisheries Service (USA) – Project Coordinator
- United States Geological Survey (USA)
- Greenland Nature Institute (Greenland)
- Greenland Home Rule Government (Greenland)
- Department of Fisheries and Oceans (Canada)
- The Marine Institute (Ireland)
- Fisheries Research Services (UK (Scotland))
- Center for Environment, Fisheries and Aquaculture Science (UK (England & Wales))
- North Atlantic Salmon Fund and the Atlantic Salmon Federation (Iceland, Canada, USA)
- NASCO's International Atlantic Salmon Research Board (UK(Scotland))

SALSEA West Greenland sampling programme



- Expanded sampling will be coordinated and occur concurrently within the standard sampling programme WGC(08)6.
- Samplers will be restricted to NAFO Divisions 1B (Sisimiut), 1D (Nuuk) and 1F (Qaqortoq) to efficiently provide spatial coverage of the fishery with the resources available.
- Over the course of the fishing season, in accordance with the landing dynamics for each division, 2 samplers will be deployed per division.
- Coordination with the Greenland Home Rule Government and KNAPK will occur for the delivery of fresh whole fish to the individual samplers for the purposes of collecting detailed biological and tissue samples within the expanded sampling programme.
- A total 50-300 whole fish per division (150-900 total) over the course of the fishing season will be delivered for sampling. The rate of delivery will be determined by the individual sampler's ability to properly sample each fish.

SALSEA WEST GREENLAND SAMPLING AGENDA

Characteristic	**Data or tissue**	**Equipment**	**Laboratory overseeing processing**	**Reason**
External characteristics	fork length (mm), whole weight (kg), gutted weight (kg), presence of external marks/tags (clips, external tags), presence of external natural marks (scars, scrapes, bites, wounds, fin conditions), photographs of feature of interest	Measuring board, balances, CWT detector	NOAA Fisheries Service (Northeast Fisheries Science Center)	Basic biological characteristics data
	Sea lice	Vials (RNA Later)	To be determined	Preserve samples for future genetic mapping
Stock origin	Fin clips	Vials (RNA Later)	NOAA Fisheries Service (Northeast Fisheries Science Center)	It is essential that fish captured at sea be identified as to their river/region of origin to compare and contrast all results obtained
Determination of age and growth characteristics	Scales from standard location	Forceps and scale envelopes (dry storage)	DFO Canada (Northwest Atlantic Fisheries Centre) and NOAA Fisheries Service (Northeast Fisheries Science Center)	River age, sea age, inter-circuli spacing to quantify growth rate at different stages. To be compared with adult survivors of those stocks to test hypothesis of growth-mediated survival
Disease Sampling	gill filaments, spleen, pyloric caeca, kidney	Whirl pack (freeze)	DFO Canada (Gulf Fisheries Centre)	Prevalence of disease in marine salmon may provide insights into stock-specific performance

Characteristic	Data or tissue	Equipment	Laboratory overseeing processing	Reason
Feeding	Stomach contents	Sample jars (formaldehyde)	NOAA Fisheries Service (Northeast Fisheries Science Center)	Basic information to describe prey relative to size of salmon, location captured, period captured
Condition (using relative lipid content)	Muscle tissue	Whirl pack (freeze)	To be determined	Energy reserves may determine age at maturity and ability to survive, as well as describe previous feeding history
Trophic Ecology (using stable isotopes)	liver, dorsal muscle, caudal tissue and scales	Vials (freeze)	To be determined	Trophic state of salmon in the North Atlantic will inform researchers of the feeding ecology history of sampled fish. Questions related to comparing and contrasting the trophic state of different origins, maturity states, and at different times for migrating Atlantic salmon may help identify critical stages in the marine life cycle of salmon.
	stomachs	Bags (freeze)	To be determined	Stable isotope samples from the prey that Atlantic salmon have recently eaten will provide a baseline for researchers to compare the stable isotope signatures obtained from the tissue samples that represent the recent feeding history.
Sea Age at maturity	Ovary and gonad weights	Vial (Bouins)	DFO Canada (Gulf Fisheries Centre)	Information on gonadal development of ovaries from 1SW non-maturing at West Greenland will provide baseline information for comparisons of ovary samples taken at different life stages.
Parasites	intestines, pyloric caeca, gill arch, liver, spleen and kidney	Bottles (formaldehyde)	To be determined	Parasite loads of sampled salmon will provide insights to the health of salmon at West Greenland.
Indicators of ocean distribution, elemental analysis	Otoliths	Vials (dry storage)	To be determined	Variability in elemental composition reflects ocean chemistry in which salmon are distributed and grow. Compare among stocks.

THE SALSEA CONCEPT

The SALSEA concept consists of a coordinated international effort studying the marine dynamics of Atlantic salmon across the North Atlantic. The SALSEA Programme provides an outline for a fully integrated research program studying freshwater effects on marine survival, additional work on advance technologies, coordinated marine surveys and effective communication. The coordinated marine survey aspect of SALSEA currently consists of three main projects: SALSEA-Merge, SALSEA North America and SALSEA West Greenland. When completed, these 3 projects may provide a comprehensive overview of marine phase Atlantic salmon in the North Atlantic. SALSEA West Greenland is unique in the fact that both European and North American origin salmon will be sampled and the results will provide a critical link tying all SALSEA projects together.

SALSEA West Greenland is dependant on the continued participation of Parties to the West Greenland Commission. SALSEA West Greenland is also dependant on the in-kind contributions of the Parties to fund the coordination of the programme and the analysis of the collected data and samples.

The coordination of SALSEA West Greenland is being undertaken by the US. All the Parties to the West Greenland Commission have obligated significant funds in support of this programme. The total estimated and confirmed obligated funds for SALSEA West Greenland 2008 is approximately $359,263 (USD). In addition, further funding for sample processing is presently being sought and may be contributed by the participating NASCO Parties. Funds have been allocated for the purchase of fish from the individual fishermen; however, investigations toward alternate arrangements for the delivery of fresh whole fish are still ongoing.

		Standard (2007)	Expanded (2008)
USA	coordination	$24,000	$36,000
	samplers[a]	$19,867	$19,867
	purchase of whole fresh fish[b]	$6,000	$45,000[c]
	miscellanious sampling supplies	$4,000	$12,000
	Genetic Analysis (origin)	$24,000	$24,000
	disease sample analysis	$4,500	-
	stomach content analysis[c]	$3,600	$21,600
	parasites analysis	$3,500	-
	scale image analysis	-	$36,000
	in-country (Greenland) coordinator position	-	$25,000
	USA total	**$89,467**	**$219,467**
Canada	samplers[a]	$19,867	$19,867
	Scales	$40,000	$40,000
	disease sample analysis	-	$10,000
	Canada total	**$59,867**	**$69,867**
UK(Scotland)	sampler[a]	$19,867	$19,867
UK(England & Wales)	sampler[a]	$19,867	$19,867
Ireland	sampler[a]	$12,317	$12,317
Denmark (in respect of Greenland)	sampler(s)[a]	$17,880	$17,880
	Grand Total	**$219,263**	**$359,263**

[a] estimated travel and salary cost
[b] estimated amount spent annually
[c] according to maximum number of samples allocated for SALSEA West Greenland (n=900)

In addition to the funds outlined above, all the Parties to NASCO have contributed significant amounts of resources to the SALSEA Programme in support of investigations towards freshwater effects on marine survival as well as direct investigations into marine survival in the ocean. As outlined in inventory of marine research (ICR(08)2), the Parties to NASCO expended 6.7 million pounds on researching marine mortality related issues in 2007. Of particular note is the 4.4 million pounds in support of SALSEA Merge and 0.4 million pounds dedicated for SALSEA North America.

Additional funds have been dedicated to the SALSEA Programme since the publishing of ICR(08)2. Of particular note is the obligation of funds by the United States and Canada in support of SALSEA West Greenland noted in the table above. These funds are additional to the ongoing and recently completed and ongoing research activities investigating marine mortality issues outlined in ICR(08)2. These projects are highlighted in the table below. In addition to ongoing research into marine mortality of salmon, the US granted a total of $150,000 (USD) to the International Atlantic Salmon Research Board in 2004 to further support the Board's work.

ANNEX 7

WGC(08)0

List of West Greenland Commission Papers

Paper No.	Title
WGC(08)1	Provisional Agenda
WGC(08)2	Draft Agenda
WGC(08)3	Report on the Use of the Framework of Indicators in 2008
WGC(08)4	Proposed Text For Sampling Agreement (Tabled by the US)
WGC(08)5	The 2007 Fishery at West Greenland (tabled by Denmark (in respect of Faroe Islands and Greenland).
WGC(08)6	West Greenland Sampling Agreement
WGC(08)7	SALSEA West Greenland
WGC(08)7(rev)	SALSEA West Greenland
WGC(08)8	Agenda
WGC(08)9	Report of the Meeting.

Report of the ICES Advisory Committee (Sections 3 to 6 only)

Conservation limits (CLs) have been defined by ICES as the level of stock that will achieve long-term average maximum sustainable yield (MSY). NASCO has adopted this definition of CLs (NASCO, 1998). The CL is a limit reference point; having populations fall below these limits should be avoided with high probability. However, management targets have not yet been defined for all Atlantic salmon stocks.

Therefore:

ICES considers homewater stocks in the NEAC Commission to be at full reproductive capacity only if the lower boundary of the confidence interval of the most recent spawner estimate is above the CL. In a similar manner, the status of stocks prior to the commencement of distant water fisheries has been interpreted to be at full reproductive capacity only if the lower boundary of the confidence interval of the most recent PFA estimate is above the Spawner Escapement Reserve (SER).

ICES considers a stock to be at risk of suffering reduced reproductive capacity when the lower boundary of the confidence limit is below the CL/ SER, but the midpoint is above.

ICES considers a stock to be suffering reduced reproductive capacity when the midpoint is below the CL/SER.

For catch advice on fish exploited at West Greenland (non-maturing 1SW fish from North America and non-maturing 1SW fish from Southern NEAC), ICES has used the risk level of 75% that is part of the agreed management plan (ICES, 2003).

For stock assessment purposes, ICES groups NEAC stocks into two stock groupings: Northern and Southern NEAC stocks. The composition of these groups is shown below:

Southern European countries:	Northern European countries:
Ireland	Finland
France	Norway
UK (England & Wales)	Russia
UK (Northern Ireland)	Sweden
UK (Scotland)	Iceland (north/east regions) [1]
Iceland (south/west regions)[1]	

3.1 Status of stocks/exploitation

The status of stocks is shown in Figure 3.1.1.

ICES classifies the status of stock complexes prior to the commencement of distant water fisheries with respect to the SER requirements as follows:

Northern European 1SW stock complex is considered to be at full reproductive capacity.

Northern European MSW stock complex is considered to be at full reproductive capacity.

Southern European 1SW stock complex is considered to be at full reproductive capacity.

Southern European MSW stock complex is considered to be suffering reduced reproductive capacity.

[1] The Iceland stock complex was spilt into two separate complexes for stock assessment purposes in 2005. Prior to 2005, all regions of Iceland were considered to contribute to the Northern European stock complex.

Estimated exploitation rates have generally been decreasing over the time period for both 1SW and MSW stocks in Northern and Southern NEAC areas (Figures 3.1.2 and 3.1.3). Exploitation on Northern 1SW stocks is higher than on Southern 1SW and considerably higher for MSW stocks. However, the current estimates for both stock complexes are amongst the lowest in the time-series.

3.2 Management objectives

This Commission area is subject to the general NASCO management objectives as outlined in Section 1.3.

3.3 Reference points

Section 1.4 describes the derivation of reference points for these stocks and stock complexes.

3.3.1 National conservation limits

The national model has been run for all countries that do not have river-specific CLs (i.e. all countries except France, Ireland, and UK (England & Wales)).

Iceland, Russia, Norway, UK (N. Ireland), and UK (Scotland) have provided regional input data for the PFA analysis (1971–2007). For these countries the lagged spawner analysis has been conducted by region. The regional results were combined to estimate CLs based on a pseudo stock–recruitment relationship for the country. Outputs from the national model are only designed to provide a provisional guide to the status of stocks in the NEAC area.

To provide catch options to NASCO, CLs are required for stock complexes. These have been derived either by summing of individual river CLs to national level, or by taking overall national CLs, as provided by the national model and then summing to the level of the 4 NEAC stock complexes. For the NEAC area, the CLs have been calculated by ICES as:

Northern NEAC 1SW spawners – 242 688

Northern NEAC MSW spawners – 126 398

Southern NEAC 1SW spawners – 662 652

Southern NEAC MSW spawners – 294 638

3.3.2 Progress with setting river-specific conservation limits

Specific progress in individual countries is summarized below:

In UK (England and Wales), where river-specific CLs have been in use for a number of years, effort data derived from the catch returns is used to estimate angling exploitation on salmon, and to derive estimates of egg deposition for use in the CL compliance procedure. As many anglers fish for both salmon and sea trout, it is important to understand what proportion of the total effort is targeted at each species. To this end, a short questionnaire was sent to all holders of a migratory salmonid fishing licence in 2006 (approximately 22 000 anglers). The results of this survey indicate that around a quarter (27%) of angler effort nationally is directed at sea trout only. These results will be used to refine effort data and assessments in the future.

In UK (Scotland), work has continued to develop procedures for setting catchment-specific CLs. GIS applications, in conjunction with field-based observation and a literature review of salmon distribution, have been used to develop a map-based useable wetted area model for salmon which can be used to transport CLs among catchments. A CL has been derived for the North Esk and this has been transported, using the useable wetted area model, to each of the 109 defined salmon fishery districts in Scotland to provide provisional CLs. Estimates of spawning escapement in each of these catchments are being developed in order to assess compliance with respect to the CLs. Refinements to the useable wetted area transport model

will be undertaken over the next year. Estimates of spawning escapement in each of these catchments are being developed in order to assess compliance with respect to the CLs.

In Iceland, work is progressing on several rivers to derive river-specific CLs. Several datasets and techniques (catch data, counter data, habitat mapping, wetted area and juvenile surveys) are being used to estimate salmon production, run size, and spawning escapement. To date work has indicated highly variable spawning reference levels. The next stage of the work will explore if and how CLs can be transported to recipient rivers.

In Norway, CLs have been set for 180 rivers. This work is based on stock–recruitment relationships in nine rivers, and further transportation to data-poor rivers based on similarities in productivity and stock age structure. Productivity is mostly based on catch statistics, and scale samples used to assess the river and sea age structure in a sub set of the populations. To derive the CLs, wetted area has been computed for the rivers based on digital maps and knowledge of how far salmon can migrate in the rivers. Spawning targets for salmon populations in Norway was grouped into four categories of egg densities being, respectively, approximately 1, 2, 4, and 6 eggs m^{-2} wetted area. Most of the rivers fall into the 2 and 4 eggs m^{-2} wetted area categories.

So far only France, Ireland, and UK (England & Wales) have implemented river-specific CLs.

3.4 Management advice

ICES has been asked to provide catch options or alternative management advice, if possible based on a forecast of PFA, with an assessment of risks relative to the objective of exceeding stock CLs in the NEAC area.

ICES emphasized that the national stock CLs discussed above are not appropriate for the management of homewater fisheries, particularly where these exploit separate river stocks. This is because of the relative imprecision of the national CLs and because they will not take account of differences in the status of different river stocks or sub-river populations. Nevertheless, ICES agreed that the combined CLs for the main stock groups (national stocks) exploited by the distant water fisheries could be used to provide general management advice to the distant water fisheries.

Given the status of the stocks ICES provides the following advice on management:

Northern European 1SW stocks: ICES considers that in the absence of specific management objectives for this stock complex the precautionary approach is to fish only on maturing 1SW salmon from rivers where stocks have been shown to be at full reproductive capacity. ICES considers that reductions in exploitation are required for as many stocks as possible, to increase the probability of the complex meeting CLs. Furthermore, due to the different status of individual stocks within the stock complex, mixed-stock fisheries present particular threats to stock status.

Northern European MSW stocks: ICES considers that in the absence of specific management objectives for this stock complex the precautionary approach is to fish only on non-maturing 1SW salmon from rivers where stocks have been shown to be at full reproductive capacity. Furthermore, due to the different status of individual stocks within the stock complex, mixed-stock fisheries present particular threats to stock status.

Southern European 1SW stocks: ICES considers that in the absence of specific management objectives for this stock complex the precautionary approach is to fish only on maturing 1SW salmon from rivers where stocks have been shown to be at full reproductive capacity. ICES considers that reductions in exploitation are required for as many stocks as possible, to increase the probability of the complex meeting CLs. Furthermore, due to the different status of individual stocks within the stock complex, mixed-stock fisheries present particular threats to stock status.

Southern European MSW stocks: The quantitative PFA midpoint forecasts for 2008–2011 are below the SER and therefore there should be no fishing on this complex at West Greenland or Faroes. ICES considers that in the absence of specific management objectives for this stock complex, with the exception of the West Greenland fishery, the precautionary approach is to fish only on non-maturing 1SW salmon from rivers where stocks have been shown to be at full reproductive capacity. ICES considers that reductions in exploitation are required for as many stocks as possible, to increase the probability of the complex meeting CLs. Furthermore, due to the different status of individual stocks within the stock complex, mixed-stock fisheries present particular threats to stock status.

3.5 Relevant factors to be considered in management

ICES considers that management for all fisheries should be based on assessments of the status of individual stocks. Fisheries on mixed stocks, either in coastal waters or distant waters, pose particular difficulties for management as they cannot target stocks that are at full reproductive capacity. Conservation would be best achieved if fisheries target stocks that have been shown to be at full reproductive capacity. Fisheries in estuaries and rivers are more likely to meet this requirement. It should be noted that the inclusion of farmed fish in the Norwegian data would result in the stock status being overestimated.

NEAC PFAs from the national models are combined to provide NASCO with catch advice or alternative management advice for the distant water fisheries at West Greenland and Faroes. These groups were deemed appropriate by ICES as they fulfilled an agreed set of criteria established to define stock groups for the provision of management advice, criteria that were considered in detail at the 2002 meeting (ICES, 2002) and re-evaluated at the 2005 meeting (ICES, 2005).

Consideration of the level of exploitation of national stocks in the Faroes and the West Greenland fisheries resulted in the proposal that advice for the Faroes fishery (both 1SW and MSW) should be based on all NEAC area stocks, but that advice for the West Greenland fishery should be based on Southern European MSW salmon stocks only (comprising UK, Ireland, France, and Iceland (south/west regions)).

3.6 Pre-Fishery Abundance forecast for 2008–2011

To develop quantitative catch options for NEAC stock complexes, forecasts of PFA are required for each stock complex and for each sea age component. These are currently only available for the non-maturing 1SW component of the Southern European stock complex. The forecast of this PFA for 2008 has been used to provide management advice for West Greenland and Faroes (Section 3.4) for 2008. ICES has adopted a model to forecast the pre-fishery abundance (PFA) of non-maturing (potential MSW) salmon from the Southern European stock group (ICES, 2002, 2003). Model options were re-evaluated in 2008 when ICES explored the relative contribution of several variables to predictions of PFA. As in the past three years, ICES decided to apply a model that uses only the *Year* and *Spawner* terms to predict the PFA of non-maturing salmon. This model was fed data from 1978–2006 and used to update the PFA in 2007 and to forecast the PFA in 2008–2011 (Figure 3.6.1).

Provision of 3-year management advice for the Faroese fishery requires that PFA forecasts be extended to 2011. This has been achieved by estimating the *Spawner* term for the 1-year old smolts in 2011 for each homewater country as the average of the previous five years. The quantitative prediction for the Southern NEAC MSW stock component gives a projected PFA (at 1st January each year) for catch advice in 2007–2011 (Figure 3.6.1). No projections are available for other stock components or complexes in the NEAC area.

The midpoint forecasts and 95% confidence limits of the projections are shown below:

YEAR	PFA	LOWER	UPPER	SER
2007	465 300	311 582	694 854	498 216
2008	445 204	297 331	666 617	498 216
2009	423 444	281 978	635 883	498 216
2010	410 961	272 969	619 330	498 216
2011	389 742	257 969	588 829	498 216

All PFA midpoint estimates are less than the SER and therefore there is no surplus available for exploitation.

3.7 Comparison with previous assessment

3.7.1 National PFA model and national conservation limit model

With the closure of the marine mixed-stock fishery in Ireland the majority of the reported catch in 2007 is accounted for by the rod fisheries. Consequently, the method for estimating returns and spawners is now based on rod catch as opposed to the previously used nominal catch.

Provisional catch data for 2006 were updated where appropriate. In addition, changes were made to the input data from Iceland. In 2007, exploitation rates were reduced in recent years to take into account the increasing practice of catch-and-release in the rod fishery (ICES, 2007). These data were further modified in 2008 in light of new information.

Unreported rates for Greenland were modified to standardize run-reconstruction analyses between commission areas, as were estimates of the proportion of the Greenland catch originating from countries in the Northeast Atlantic (Section 2.3.2).

3.7.2 PFA forecast model

The midpoints of updated forecasts of the Southern NEAC MSW PFA for the years 2007 to 2010 were all within 3% of the forecasts provided last year (ICES, 2007).

3.8 NASCO has requested ICES to describe the key events of the 2007 fisheries and the status of the stocks

3.8.1 Fishing at Faroes in 2006/2007

No fishery for salmon has been carried out since 2000. No buyout arrangement has been in force since 1999.

3.8.2 Significant events in NEAC homewater fisheries in 2007

In several countries, measures aimed at reducing exploitation were implemented or strengthened in 2007. These include a reduction of net fisheries in UK (England & Wales), a reduction in the extent of mixed-stock interceptory fisheries and the introduction of bag limits in some districts in UK (N. Ireland), and the closure of the driftnet fishery in Ireland.

3.8.3 Gear and effort

No significant changes in the types of gear used for salmon fishing were reported in the NEAC area in 2007. The number of licensed gear units has, in most cases, continued to fall, and in the case of Ireland, where the driftnet fishery was closed, effort was completely removed for this fishery. There are no such consistent trends for the rod fishing effort in NEAC countries over this period.

3.8.4 Catches

The NEAC area has seen a general reduction in catches since the 1980s (Section 2.1.1). This reflects the decline in fishing effort as a consequence of management measures as well as a reduction in the size of stocks. The provisional reported catch in the NEAC area in 2007 was 1394 tonnes, substantially lower than both the 2006 value (1878 t) and the previous 5-year mean. The catch in the Southern area has declined over the period from about 4500 t in 1972–1975 to below 1500 t since 1986, and is now below 400 t. The catch declined particularly sharply in 1976 and again in 1989–91. The catch in the Northern area also shows an overall decline over the time-series, but this decline is less pronounced than for the Southern area. The catch in the Northern area varied between 1850 t and 2700 t from 1971 to 1986, fell to a low of 962 t in 1997, and then increased to over 1600 t in 2001. Since then the catch has again shown a downward trend. The catch in the Southern area, which in the early 1970s comprised around two-thirds of the NEAC total, has thus since 1999 been lower than the catch in the Northern area.

3.8.5 Catch per unit effort (cpue)

Cpue can be influenced by various factors, and it is assumed that the cpue of net fisheries is a more stable indicator of the general status of salmon stocks than rod cpue since the latter may be more affected by varying local factors.

An overview of the cpue data for the NEAC area was undertaken. In the Southern NEAC area, cpue show a general decrease in UK (Scotland) and UK (England & Wales) net fisheries. Cpue for the net fishery showed mostly lower values compared to 2006 and the previous 5-year averages. In the Northern NEAC area, there has been an increasing trend in the cpue values for Norwegian net fisheries and Russian rod fisheries in Barents Sea rivers. A decreasing trend was noted for rod fisheries in Finland (River Teno). In comparison with the previous year, most cpue values were down and lower than the previous 5-year means.

3.8.6 Age composition of catches

1SW salmon comprised 50% of the total catch in the Northern area in 2007 which was below the 5- and 10-year means (61% and 64%, respectively). In general, there has been greater variability in the proportion of 1SW fish between countries in recent years (since 1994) than prior to this time. For the Southern European countries, the overall percentage of 1SW fish in the catch (60%) is the same as the 5- and 10-year mean (60% in both cases).

3.8.7 Farmed and ranched salmon in catches

The contribution of farmed and ranched salmon to national catches in the NEAC area in 2007 was again generally low (<2% in most countries) and is similar to the values stated in previous reports (eg. ICES, 2007). Thus, the occurrence of such fish is usually ignored in assessments of the status of national stocks. However, in Norway farmed salmon continued to form a large proportion of the 2007 catch in coastal (29%), fjordic (30%), and rod fisheries (9%). An assessment of the likely effect of these fish on the output data from the PFA model has been reported previously (ICES, 2001).

3.8.8 National origin of catches

In the course of collecting coded wire tagged salmon from Irish tagging programmes, tags have also been recovered from salmon that originate from other countries where coded wire tagging takes place. However, with the closure of the Irish driftnet fishery in 2007, the recovery of tags originating from fish released in other countries largely ceased. In 2007, just one tag originating from UK (N. Ireland) was recovered in Irish fisheries.

3.8.9 Trends in the PFA for NEAC stocks

In the evaluation of the status of stocks in Figure 3.1.1, estimated recruitment (PFA) values should be assessed against the SER values, while the estimated spawning escapement values should be compared with the CL.

Northern European 1SW and MSW stocks: Recruitment patterns of maturing 1SW salmon and of non-maturing 1SW recruits for Northern Europe (Figure 3.1.1) show broadly similar patterns. The general decline over the time period is interrupted by a short period of increased recruitment from 1998 to 2003. Both stock complexes have been at full reproductive capacity prior to the commencement of distant water fisheries throughout the time-series. Trends in spawner number for the Northern stock complexes for both 1SW and MSW are similar. Throughout most of the time-series, both 1SW and MSW spawners have been either at full reproductive capacity or at risk of reduced reproductive capacity. However, in 2007, the 1SW spawner estimate indicated that the stock complex was suffering reduced reproductive capacity for the first time in the series. This is broadly consistent with the general pattern of decline in marine survival of 1SW and 2SW returns in most monitored stocks in the area (Section 3.8.10).

Southern European 1SW and MSW stocks: Recruitment patterns of maturing 1SW salmon and of non-maturing 1SW recruits for Southern Europe (Figure 3.1.1) show broadly similar declining trends over the time period. The maturing 1SW stock complex has been at full reproductive capacity over the time period with the exception of 2006 when it was at risk of suffering reduced reproductive capacity before homewater fisheries took place. The non-maturing 1SW stock has been at full reproductive capacity over most of the time period, but in five of the nine years between 1997 and 2005 it was at risk of suffering reduced reproductive capacity after homewater fisheries took place and it was suffering reduced reproductive capacity for the first time in 2006. Declining trends in spawner number are evident in the Southern stock complexes for both 1SW and MSW. However, the 1SW stock has been at risk of reduced reproductive capacity or suffering reduced reproductive capacity for most of the time-series. In contrast, the MSW stock has been at full reproductive capacity for most of the time-series until 1997 when the stock was either at risk of reduced reproductive capacity or suffering reduced reproductive capacity. This is broadly consistent with the general pattern of decline in marine survival of 1SW and 2SW returns in most monitored stocks in the area (Section 3.8.10).

3.8.10 Survival indices for NEAC stocks

An overview of the trends of marine survival for wild and hatchery-reared smolts returning to homewaters (i.e. before homewater exploitation) for the 2005 and 2004 smolt year classes (returning 1SW and 2SW salmon, respectively) is presented in Figure 3.8.10.1. The survival indices presented are the annual rates of change in marine survival.

An overall trend in both Northern and Southern NEAC areas, both wild and hatchery smolts, show a decline in marine survival with the annual decline varying between 1% and 20% (Figure 3.8.10.1). When looking at the individual river data, most of the survival indices for wild and reared smolts were lower than those of the previous year and below the previous 5- and 10-year averages. One of the few exceptions was the River Bush (UK, N. Ireland) where both wild and reared smolts showed higher survival rates than in the previous year and the 5- and 10-year average values. Results from these analyses are consistent with the information on estimated returns and spawners as derived from the PFA model (Section 3.8.9), and suggest that returns are strongly influenced by factors in the marine environment.

3.9 NASCO has requested ICES to provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved

Most management measures introduced in recent years in relation to international, national, and local objectives have aimed to reduce levels of exploitation on NEAC stocks, to increase fresh-water

escapement, and in some countries specifically to meet river-specific CLs. Many of the inputs relate specifically to national plans or strategies or to commitments under National or EU directives. Although some local measures have had notable success (Table 3.9.1), ICES notes that three of the four NEAC stock complexes are currently either suffering, or at risk of suffering, reduced reproductive capacity after homewater fisheries have taken place (Figure 3.1.1).

3.10 Bycatch of salmon in non-targeted catches in 2007

Although not specifically directed at salmon, pelagic research fishing was carried out by Norwegian vessels in 2007. Only 5 adult salmon (farm escapees) and 1 post-smolt were captured as a bycatch in 4 separate pelagic research cruises in the Northern parts of the Norwegian Sea between 25th July and 23rd August, 2007. There were no reports of salmon captures from the commercial fisheries in Norway in 2007, nor were there any reports from Russian research or commercial vessels in the Norwegian or Barents Sea.

Table 3.9.1 Summary of national objectives, recent management measures, and attainment of management objectives.

Country	Objective	Introduced	Assessed	Measure	Assessment	Outcome/extent achieved	Further consideration
Russia	Reduce commercial fishing effort and enhance recreational catch and release fisheries	1997 - 2001	2002-2006	Various management measures including prohibition of some important commercial in-river fisheries and allocation quotas for fisheries	Examination of catch statistics	Mean total commercial catch reduced by 38% and mean in-river commercial catch reduced by 67% (2002-2006 compared to 1997-2001). Catch and release increased twice in past 5 years	Further reductions unlikely to be introduced. However, restrictions to fisheries which take mixed stocks and stocks below their CLs will be considered.
Ireland	Reduce exploitation rates and increase freshwater returns leading to simultaneous attainment of CLs in all rivers	2002	2002 to 2006	TAC imposed in 2002 which has been reduced by 17%, 11%, 14% and 35% annually or 58% in total. Restrictions in angling catch including bag limits and mandatory catch and release operated from the 1st of September in 8 fishery districts which were assessed as being below their CLs	Fish counter data for 19 rivers. Mandatory logbooks for all fishing methods. Coded wire tagging returns to Irish and UK rivers pre and post imposition of TACs. Juvenile indices of salmon abundance	Exploitation rate reduced from 61% (pre-2002) to 46% (post 2002) for wild salmon, 82% to 69% for hatchery salmon. Exploitation rate on UK stocks reduced by up to 50% following management measures in 1997 and imposition of TACs	Mixed stock marine fisheries will not operate in 2008 and hereafter.
	Maintain salmon stocks in SAC rivers at favorable conservation status			As above	Examination of counter (14 rivers) or rod catch (16 rivers) data to assess CL compliance for 30 SAC rivers.	Following re-appraisal in 2007 and with the closure of the Irish coastal and marine mixed stock fishery, 19 of 30 SAC rivers are estimated to be meeting CLs	Under the EU Water Framework Directive water quality and fish passage are expected to improve
	As above	2006	post 2006	Closure of mixed stock fishery in marine and coastal waters	As above	Commercial catch reduced from over 70% of total catch. Rod catch now 63% of total catch. Catch and release 41% of total rod catch. Increase in river returns and spawners in virtually all rivers with counters or traps.	53 of 150 rivers only meeting CL. Specific in-river problems need to be examined.
UK (England & Wales)	Meet objectives of National Salmon Management Strategy (launched 1n 1996) and ensure stocks meet or exceed CLs in at least 4 years out of 5.	1996	annually	Programme of Salmon Action Plans (SAPs) for each of the 64 principal salmon rivers to provide prioritized list of actions for each river.	Examination of catch statistics, monitoring data and completion of annual compliance assessment	Programme of SAPs was finalized in 2004 and these are now subject to review to ensure they match current circumstances and provide a realistic programme to address issues facing each river.	Continue with targeted actions identified in SAPs and review annually.
	Safeguard MSW stock component	1999	2007	National spring salmon measures introduced in 1999 (restricted net fishing before June and required compulsory catch & release by anglers up to June 16)	Estimated 800 salmon saved from net fisheries and 1,600 saved from rod fisheries in 2007 due to these measures	Spawning escapement of spring salmon may have increased by up to one third on some rivers due to measures	Measures will remain in place until at least 2008. Proposals for continuation to be advertised in 2008.
	Phase out mixed stock fisheries	1993	annually	Mixed stock fishery measures imposed since 1993, including phase outs, closures, buy outs and reductions in fisheries.	Examination of catch statistics, monitoring data and completion of annual compliance assessment	Coastal fishery catch reduced from average of 41,000 (88-92) to under 32,000 (98-02) and to about 9,000 (03-07) Declared rod catch in 5 north east rivers 56% higher on average in the 5 years since net buy out in 2003, relative to average of 5 years before buy out. Recorded runs (salmon & sea trout) into the Tyne 87% higher since NE net buy out in 2003 compared with mean of previous 5 years.	Continuing to phase out remaining mixed stock fisheries and focus on other limiting factors. Annual application of decision structure to assess need for effort controls.
	Reduce exploitation rates and increase freshwater returns leading to compliance with CLs.	1993	annually	Promote catch and release (mainly voluntary), including 100% catch and release in some catchments.	Examination of catch statistics, release rates and annual compliance	Catch and release increased to over 50% of rod caught fish in recent years & 100% C&R on some catchments. Estimated to have contributed an extra 31 million eggs in 2007.	Continuing promotion of C&R at national and local levels.

Table 3.9.1 Cont'd. Summary of national objectives, recent management measures, and attainment of management objectives.

Country	Objective	Introduced	Assessed	Measure	Assessment	Outcome/extent achieved	Further consideration
UK (England & Wales)	To meet a management target on the River Lune of 14.4 million eggs or about 5,000 adults	2000	annually	Regulations on River Lune introduced in 2000 to reduce exploitation in net and rod fisheries by 50% and 25% respectively.	Assessment of counter data, catch statistics and juvenile monitoring data	Increase in salmon spawning and management target exceeded in all years since the regulation. Increases in juvenile production and net catch.	Continue to meet management objectives
	Maintain salmon stocks in SAC rivers at favorable conservation status	1996	annually	Fishing controls, catch and release and addressing issues identified in Salmon Action Plans as appropriate.	Examination of counter/rod data to assess CL compliance for 18 rivers designated as SACs	2 rivers are currently considered to be complying with the management objective of passing the CL 4 years out of 5.	Continue with management plan to meet management objectives. Targeted actions as identified in Salmon Action Plans.
UK (Northern Ireland)	To conserve, enhance, restore and manage salmon stocks in catchments throughout UK (NI) through two salmon management plans (FCB and Loughs Agency areas).	2001-07	2002-07	Voluntary net buyout scheme initiated in FCB area in 2001/2. Cessation of coastal fisheries in LA area in 2007.	Examination of fish counter & rod catch data to assess spawning escapement on index rivers with defined CLs. Examination of CWT data to assess exploitation / survival rates. Assessment of commercial exploitation through a carcass tagging scheme in both LA and FCB areas.	FCB buyout decreased salmon catch by 73% during 2002-07. Analysis of CWT data indicated the FCB measure conserved 1SW R. Bush salmon to a level of around 42% of the R. Bush CL between 2002-07. Netting restrictions in coastal areas of LA area reduced catch in 2007 by around 80% on previous 5 year average. Most monitored rivers in FCB and LA areas exhibited increased escapement in 2007	Continue monitoring and management protocols under the salmon management plans.
		2007	Not yet evaluated	Introduction of conservation policies in angling byelaws. New byelaws in LA area in 2007 include limit of 1 salmon per day between 1st March and 31st May, 2 salmon per day thereafter and no more than 25 salmon or sea trout per season.	Assessment of recreational exploitation through a carcass tagging scheme in both FCB and Loughs Agency areas.	Ongoing	Further develop monitoring mechanisms and define/refine CLs.
		2005-07	2008-2010	Habitat enhancement measure funded by European Economic Area (EEA) on several selected catchments in Loughs Agency and FCB areas.	Fully quatitative electro-fishing	Ongoing	Monitor effect of habitat enhancement schemes.
UK (Scotland)	Improve status of early running MSW salmon	2000	2007	Agreement by Salmon Net Fishing Association (most, but not all, net fishing operations are members) to delay fishing until the beginning of April. Introduced in 2000	Examination of catch statistics	Annual assessment. Reduction in MSW net fishery catch in February to March relative to period prior to 2000.	Further reduction in exploitation
		2003	Not yet evaluated	Bervie, N.and S. Esk salmon district net fishery delayed until 1st May with catch and release only in the rod fishery until 1st June	Examination of catch statistics	Exploitation removed for both nets and rods for respective periods.	Measure in place for 5 years. Re-evaluation after this period

Table 3.9.1 Cont'd. Summary of national objectives, recent management measures, and attainment of management objectives.

Country	Objective	Introduced	Assessed	Measure	Assessment	Outcome/extent achieved	Further consideration
France	Reduce exploitation on MSW in particular and increase escapement and compliance with river specific CLs	1994	2007	Closure since 1994 of Loire-Allier sport and commercial fisheries	Measured against compliance objectives for the area	This did not seem to enhance salmon numbers to the expected level	Physical obstructions (noticeably Poutès-Monistrol Hydropower Dam) and other environmental factors, including higher temperatures, also being considered
		1996, 2000	2000 to 2003	TACs introduced in 1996 in Brittany and Lower Normandy and MSW TACs introduced in 2000 that have lead to temporary closures on some rivers	Examination of catch statistics	Reduced catch have probably increased spawning numbers. Reduced catch in MSW catch in Brittany since 2000 and Lower Normandy since 2003 but MSW TACS are exceeded each year on some rivers.	Monitored river (Scorff) has failed to meet CL consistently since 1994. However, the Scorff is non typical of exploitation pattern in the area (small fishery)
		1999	2007	Closure for two days each week with days varying since 1999	Examination of catch statistics	Some reduction in rod catch but current regulations have been unable to reduce the exploitation rate on MSW stocks as expected	Specific limitations on MSW catches should be considered
Germany	Reintroduction of Atlantic salmon stocks extinct since the middle of 20th century but improvements in conditions and water quality were thought to be sufficient to support salmon	1988	Annually	Restocking of rivers running into North Sea (Rhine, Ems, Weser and Elbe). 2 million juveniles (mainly fry) released annually	Trap and counter data (Sieg, upper Rhine)	300-700 adults recorded annually. Return rates of less than 1%. Records of natural production in some tributaries show an Increase.	Low return rates thought to reflect obstructions to upstream and downstream migration in the Rhine and its delta as well as spawning tributaries and probably due to bye-catch in non-target fisheries
	Establish free migration routes for salmon and other migratory fishes, protection of downstream migrants at power plants and rehabilitation of habitat in rivers basins	1988	Annually	Collaborative programme has started e.g. Rheinprogramm 2020 (ICPR) International Commission for the Protection of the River Rhine	Assessment in progress	Assessment in progress	

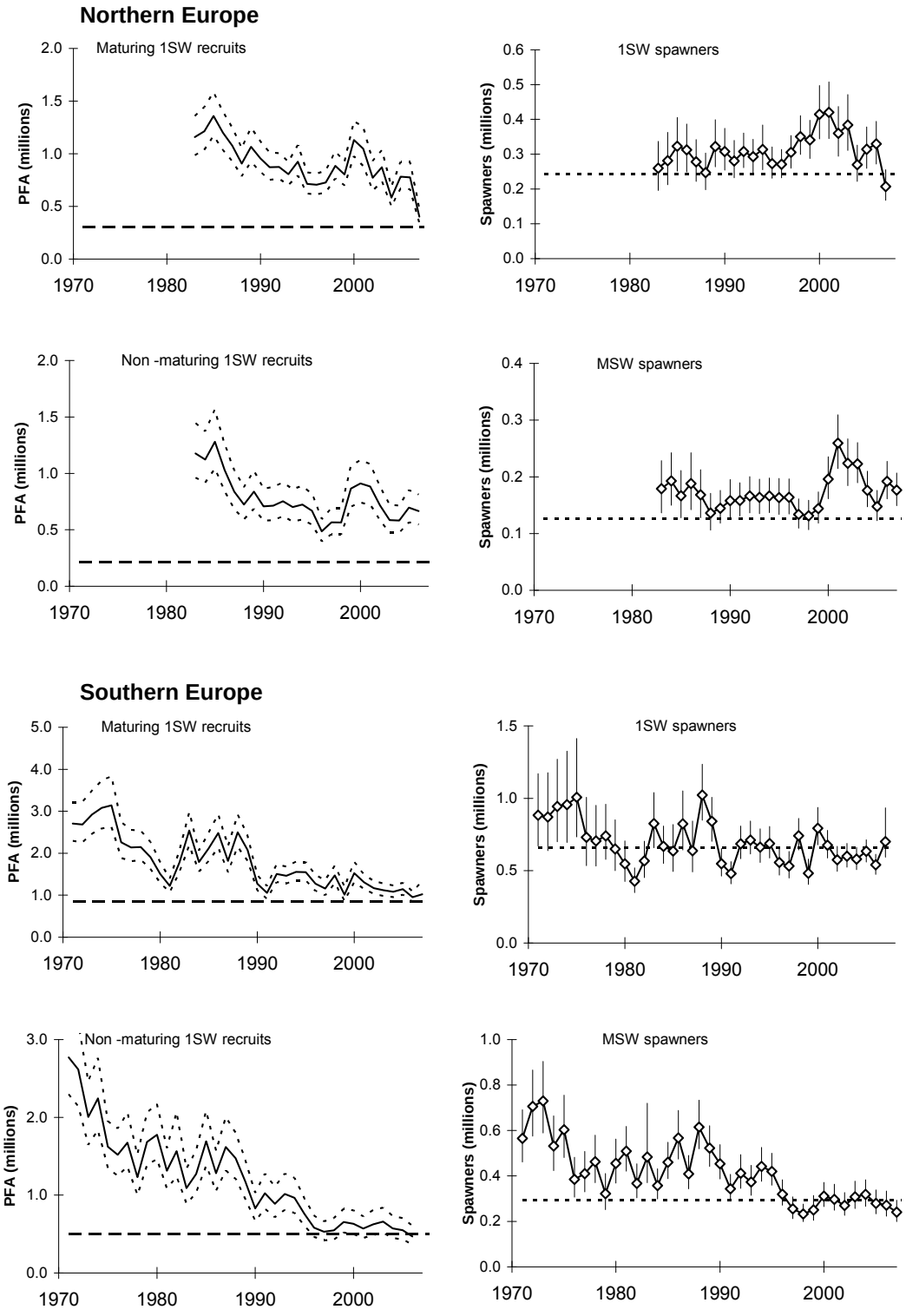


Figure 3.1.1 Estimated PFA (recruits, left panels) and spawning escapement (right panels), with 95% confidence limits, for maturing 1SW and non-maturing 1SW salmon in Northern and Southern Europe.

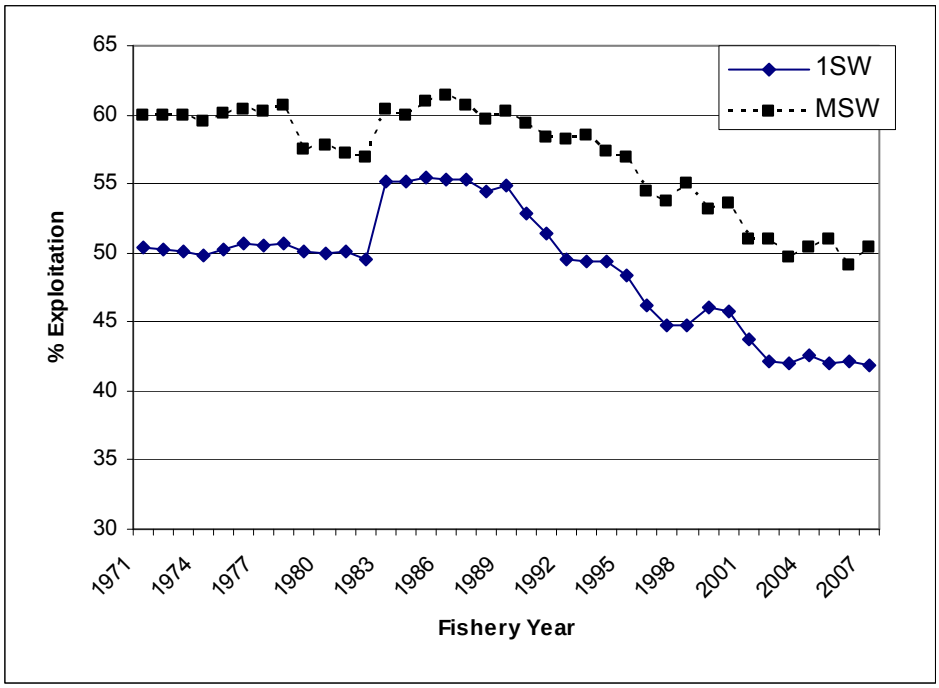


Figure 3.1.2 Exploitation rates of wild 1SW and MSW salmon by commercial and recreational fisheries in the Northern NEAC area 1971–2007.

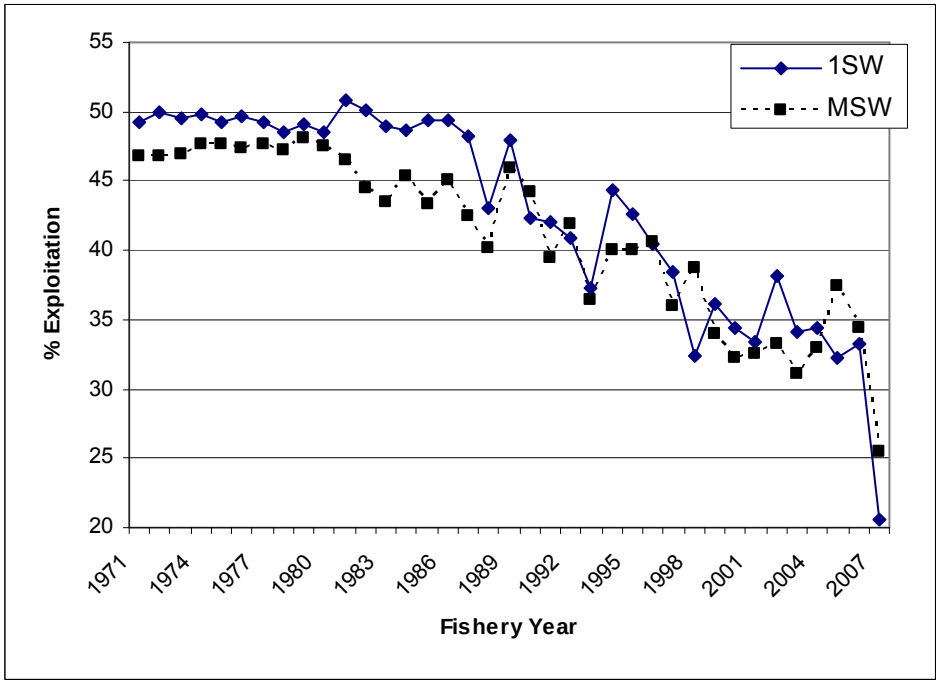


Figure 3.1.3 Exploitation rates of wild 1SW and MSW salmon by commercial and recreational fisheries in the Southern NEAC area 1971–2007.

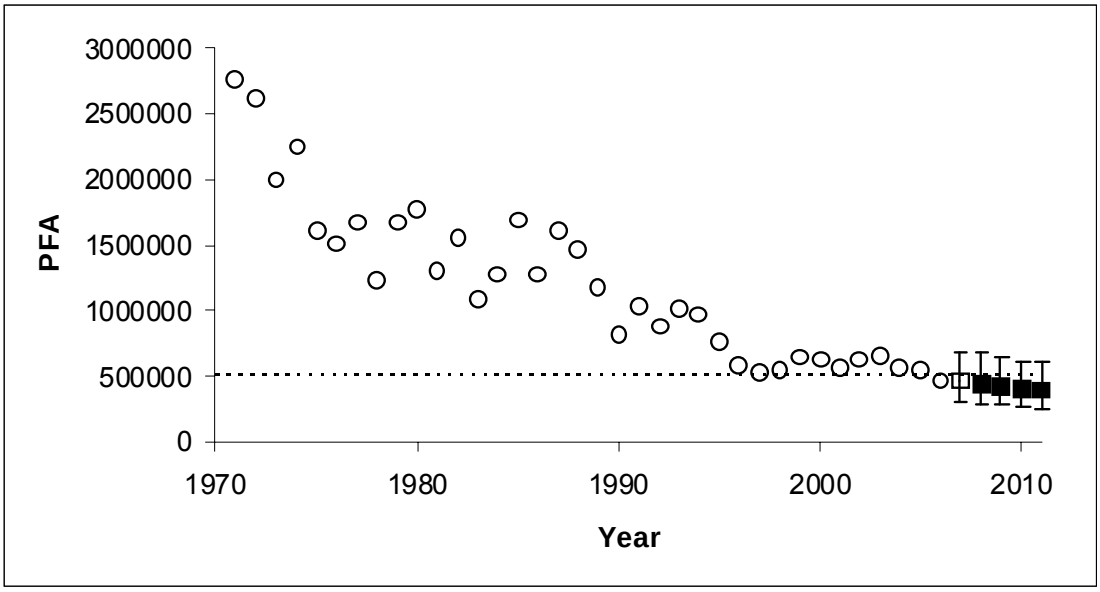


Figure 3.6.1 PFA estimates and predictions (95% confidence limits) for non-maturing 1SW European stock. Note: open square is 2007 update and blocked squares are 2008 to 2011 forecasts.

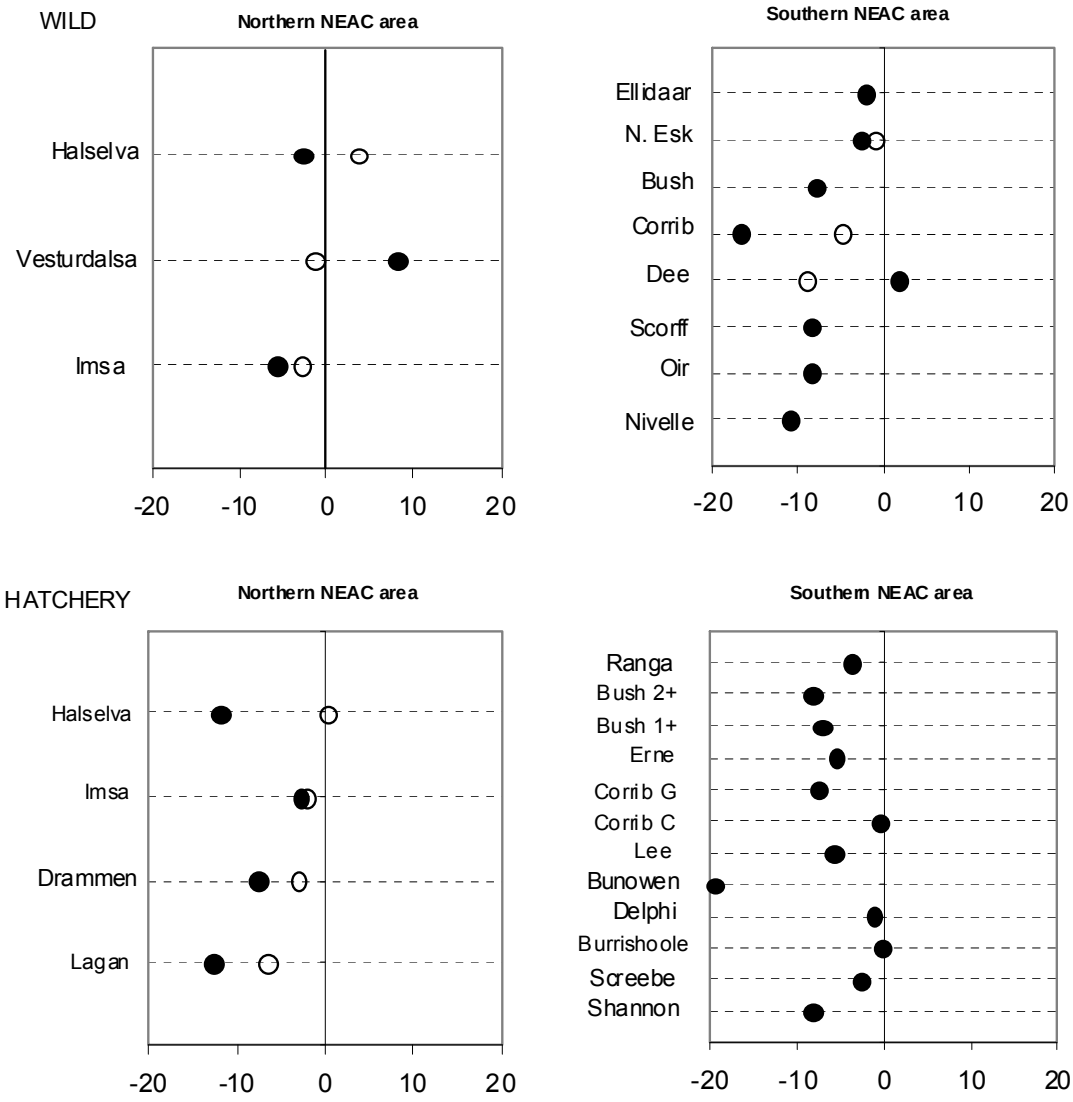


Figure 3.8.10.1 Annual rates of change (%) in marine survival indices of wild and hatchery smolts to adult returns to homewaters (prior to coastal fisheries) in different rivers in Northern and Southern NEAC areas. Filled circle = 1SW salmon; open circle = 2SW salmon. NB. The annual rates of change presented come from data sets of variable durations. Therefore comparisons between rivers are not appropriate.

4 North American Commission

4.1 NASCO has requested ICES to update age-specific stock conservation limits based on new information as available

There are no changes recommended in the 2SW salmon conservation limits (CLs) from those identified previously. CLs for 2SW salmon are 123 349 for Canada and 29 199 for the USA, giving a combined total of 152 548.

4.2 NASCO has requested ICES to describe the key events of the 2007 fisheries (including the fishery at St Pierre and Miquelon)

4.2.1 Key events of the 2007 fisheries

The majority of the harvest fisheries were directed at small salmon;

The total harvest was 47 796 salmon in 2007, down 21% from the five-year mean;

Catches remain low relative to pre-1990 values.

4.2.2 Gear and effort

Canada

The 23 areas for which the Department of Fisheries and Oceans (DFO) manages the salmon fisheries are called Salmon Fishing Areas (SFAs); for Québec, the management is delegated to the Ministère des Ressources Naturelles et de la Faune and the fishing areas are designated by Q1 through Q11 (Figure 4.2.2.1). Harvest (fish which are retained) and catches (including harvests and fish caught-and-released in recreational fisheries) are categorized in two size groups: small and large. Small salmon, generally 1SW, in the recreational fisheries refer to salmon less than 63 cm fork length, whereas in commercial fisheries, it refers to salmon less than 2.7 kg whole weight. Large salmon, generally MSW, in recreational fisheries refer to salmon greater than or equal to 63 cm fork length and in commercial fisheries refer to salmon greater than or equal to 2.7 kg whole weight.

Three groups exploited salmon in Canada in 2007; (1) Aboriginal peoples, (2) residents fishing for food in Labrador, and (3) recreational fishers. There were no commercial fisheries in Canada in 2007.

In 2007, four subsistence fisheries harvested salmonids in Labrador: (1) Nunatsiavut Government (NG) members fishing in the northern Labrador communities of Rigolet, Makkovik, Hopedale, Postville, and Nain and in Lake Melville; (2) Innu Nation members fishing in Natuashish and in Lake Melville from the community of Sheshatshiu; (3) Labrador residents fishing in Lake Melville and coastal communities in southern Labrador from Cartwright to Cape St. Charles, and (4) LMN (Labrador Métis Nation) members fishing in southern Labrador from Fish Cove Point to Cape St. Charles. The NG, Innu, and LMN fisheries were jointly regulated by Aboriginal Fishery Guardians administered under the Aboriginal Fisheries Strategy Program with the Department of Fisheries and Oceans (DFO) as well as by DFO Fishery Officers and Guardian staff. The new Nunatsiavut Government is directly responsible through the Torngat Fisheries Board for regulating its fishery through its Conservation Officers. The fishing gear is multifilament gillnets of 15 fathoms in length of a stretched mesh size ranging from 3 to 4 inches. Although nets are mainly set in estuarine waters some nets are also set in coastal areas, usually within bays. However, most catches (>90%, Figure 2.1.1.2) in North America now take place in

rivers or in estuaries and fisheries are principally managed on a river-by-river basis. Catch statistics are based on logbook reports and fisheries guardians. The overall reporting rate for subsistence fisheries was 79% in 2005 and 2006. To date, reporting rates for 2007 are 66%.

The following management measures were in effect in 2007:

Aboriginal peoples' food fisheries

In Québec, Aboriginal peoples' food fisheries took place subject to agreements or through permits issued to the bands. There are 10 bands with subsistence fisheries in addition to the fishing activities of the Inuit in Ungava (Q11), who fished in estuaries or within rivers. The permits generally stipulate gear, season, and catch limits. Catches in food fisheries have to be reported collectively by each Aboriginal user group. However, if reports are not available, the catches are estimated. In the Maritimes (SFAs 15 to 23), food fishery harvest agreements were signed with several Aboriginal peoples groups (mostly First Nations) in 2007. The signed agreements often included allocations of small and large salmon and the area of fishing was usually in-river or estuaries. Harvests that occurred both within and outside agreements were obtained directly from the Aboriginal peoples. In Labrador (SFAs 1 and 2), food fishery arrangements with the Nunatsiavut Government, the Innu First Nation, and the LMN Nation, resulted in fisheries in estuaries and coastal areas. There are further details on the Labrador Aboriginal fisheries in Section 4.2.4.1. By agreement with First Nations there were no food fisheries for salmon in Newfoundland in 2007. Harvest by Aboriginal peoples with recreational licenses is reported under the recreational harvest categories.

Residents food fisheries in Labrador

In 2007, a licensed food fishery for local residents took place, using gillnets, in Lake Melville (SFA 1) and in estuary and coastal areas of southern Labrador (SFA 2). Residents who requested a license were permitted to retain a maximum of four salmon of any size while fishing for trout and charr; four salmon tags accompanied each license. All licensees were requested to complete logbooks. DFO is responsible for regulating the Resident Fishery.

Recreational fisheries

Licenses are required for all persons fishing recreationally for Atlantic salmon. Gear is generally restricted to fly fishing and there are restrictive daily/seasonal bag limits. Recreational fisheries management in 2007 varied by area and large portions of the southern areas remained closed to all directed salmon fisheries. Except in Québec and Labrador (SFA 1 and some rivers of SFA 2), only small salmon could be retained in the recreational fisheries.

USA

In the USA there was a one-month fall catch-and-release recreational fishery for sea-run Atlantic salmon on a 2 km reach on one river. This was the second year for this fishery which re-opened in 2006 after closure from 1999 to 2005. A total of 90 licenses were sold and 83 angler trips were reported.

France (Islands of Saint-Pierre and Miquelon)

ICES received no information on the number of professional and recreational gillnet licenses issued in 2007 at Saint-Pierre and Miquelon.

4.2.3 Catches in 2007

Canada

The provisional harvest of salmon in 2007 by all users was 112 t, about 18% lower than the 2006 harvest (Table 2.1.1.1; Figure 4.2.3.1). The 2007 harvest was 37 540 small salmon and 10 256 large salmon, 20% less small salmon and 7% less large salmon, compared to 2006.

Aboriginal peoples' food fisheries

The total harvest by Aboriginal people in 2007 was 47.6 tonnes (Table 4.2.3.1). Harvests (by weight) were down 22% from 2006 and 12% lower than the previous 5-year average harvest.

Residents fishing for food in Labrador

The estimated total catch for the fishery in 2007 was 1.7 t, about 733 fish (13% large salmon by number).

Recreational fisheries

Harvest in recreational fisheries in 2007 totalled 30 247 small and large salmon (approximately 63 t), 18% below the previous 5-year average, 18% below the 2006 harvest level, and the lowest total harvest reported (Figure 4.2.3.2). The small salmon harvest of 26 750 fish was 21% below 2006 and 31% below the previous 5-year mean. The large salmon harvest of 3497 fish was 8% below the previous five-year mean and 16% above 2006. The small salmon size group has contributed 88% on average of the total harvests since the imposition of catch-and-release recreational fisheries in the Maritimes and insular Newfoundland (SFA 3 to 14B, 15 to 23) in 1984.

In 2007, about 42 820 salmon (about 23 134 large and 19 686 small) were caught and released (Table 4.2.3.2), representing about 59% of the total number caught, including retained fish. This was a 29% decrease from the number released in 2006. There is some mortality on these released fish, which is accounted for in rivers assessed for their attainment of CLs.

Commercial fisheries

All commercial fisheries for Atlantic salmon remained closed in Canada in 2007 and the catch therefore was zero.

Unreported catches

There was no total unreported catch estimate available for Canada in 2007.

USA

There are no commercial fisheries for Atlantic salmon in USA and the catch therefore was zero. Unreported catches in the USA were estimated to be 0 t.

France (Islands of Saint-Pierre and Miquelon) harvests

The harvest of 1.95 t of salmon in 2007 was the lowest annual total since 1997 and the 5th lowest in the 18-year time-series (Table 2.1.1.1).

There are no unreported catch estimates for France (Islands of Saint-Pierre and Miquelon).

4.2.4 NASCO has requested ICES to report on the biological characteristics (size, age, origin) of the catch in coastal fisheries and potential impacts on non-local salmon stocks

The Aboriginal Peoples' and resident food fisheries that exist in Labrador intercepted one salmon originally tagged in the Miramichi River as a returning 1SW salmon tagged on September 23, 2006 and reported caught at Makkovik (Labrador) on August 23, 2007. Only twelve fish (all >71 cm) were sampled in 2007 from the Saint-Pierre and Miquelon landings. None were reported to have been tagged and their country of origin is unknown.

Results of a sampling programme for Labrador subsistence fisheries

A sampling programme was in place for the subsistence fisheries in Labrador in 2007. Landed fish were sampled opportunistically for fork length, weight, sex (if possible), scales, and marks or tags. In southern Labrador, Aboriginal Fishery Guardians hired by the LMN conducted the sampling. In northern Labrador, Conservation Officers of the Nunatsiavut Government conducted the sampling.

In total, 196 samples were collected. Scale reading indicated that the sample consisted of 82% 1SW, 10% 2SW, and 8% previously spawned salmon. Small and large salmon based on a 2.7 kg cut-off, similar to that used in the Aboriginal fishery, indicated small salmon were 97% 1SW, 1% 2SW, and 2% previously spawned salmon and large salmon were 36% 1SW, 40% 2SW, and 24% previously spawned salmon.

The river ages (Figure 4.2.4.1) for the subsistence fisheries (for food, social, and ceremonial purposes (FSC)) samples were compared to ages from scales obtained from adults at four assessment facilities in Labrador. Fresh-water assessment facility samples numbered 1946 from north Labrador and 975 in south Labrador.

There was a difference in river age distribution of adults from fisheries compared to returns to rivers in North (Chi-square=23.10, P=0.0003) but possibly not South Labrador (Chi-square=10.61, P=0.06). Further, the fresh-water age distribution did not differ (Chi-square=2.32, P=0.80) between the two regions of Labrador.

The absence of age 1 and rarity of age 2 smolts in the catches in 2007 suggests that these fisheries did not exploit southern North America stocks to any great extent. The presence of river age 5 to 7 years in the samples provides evidence that the fisheries are exploiting northern area (predominantly Labrador) stocks. However, the presence of a relatively higher number of river age 3 salmon compared to the fresh-water samples suggests that salmon from other regions of Canada were exploited in northern Labrador in 2007.

ICES notes that the sampling programme conducted in 2007 provided biological characteristics of the harvest and that the information may be useful for updating parameters used in the Run-reconstruction Model for North America. In addition it provides material to assess the origin of salmon in this fishery. ICES recommends that sampling be continued and expanded.

4.2.5 Exploitation rates

Canada

In the Newfoundland recreational fishery, exploitation rates for retained small salmon ranged from a high of 16% on Middle Brook to a low of 5% on Gander River. Overall, exploitation of small salmon in these rivers declined from 30% in 1986 to 11% in 2007 and was the second lowest in 24 years. In Labrador, exploitation on small

salmon was 4% at Sand Hill River. Exploitation on large salmon was zero as no large salmon were retained.

In Quebec for 2007, the total fishing exploitation rate was around 20%, about the average of the five previous years. Native peoples' fishing exploitation rate was 7% of the total return. Recreational fishing exploitation rate was 13% on the total run, 16% for the small and 10% for the large salmon, down from the previous five-year average of 18% for small salmon and 9% for large salmon.

USA

There was no exploitation of USA salmon in home waters, and no tagged salmon of USA origin were reported in Canadian fisheries in 2007.

4.3 NASCO has requested ICES to evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved

No significant management measures have been introduced within the NAC in recent years.

Table 4.2.3.1 Aboriginal peoples' food fishery harvests (t) and percentage of large salmon by weight and by number, 1990 to 2007.

ABORIGINAL PEOPLES' FOOD FISHERIES			
Year	Harvest (t)	% large	
		by weight	by number
1990	31.9	78	
1991	29.1	87	
1992	34.2	83	
1993	42.6	83	
1994	41.7	83	58
1995	32.8	82	56
1996	47.9	87	65
1997	39.4	91	74
1998	47.9	83	63
1999	45.9	73	49
2000	45.7	68	41
2001	42.1	72	47
2002	46.3	68	43
2003	44.3	72	49
2004	60.8	66	44
2005	56.7	57	34
2006	61.4	60	39
2007	47.6	61	40

Table 4.2.3.2. The numbers of caught and released salmon in the angling fisheries of Eastern Canada.

Year	Newfoundland			Nova Scotia			New Brunswick					Prince Edward Island			Quebec			CANADA*		
	Small	Large	Total	Small	Large	Total	Small Kelt	Small Bright	Large Kelt	Large Bright	Total	Small	Large	Total	Small	Large	Total	SMALL	LARGE	TOTAL
1984				939	1,655	2,594	661	851	1,020	14,479	17,011							**2,451**	**17,154**	**19,605**
1985		315	315	1,323	6,346	7,669	1,098	3,963	3,809	17,815	26,685			67				**6,384**	**28,285**	**34,669**
1986		798	798	1,463	10,750	12,213	5,217	9,333	6,941	25,316	46,807							**16,013**	**43,805**	**59,818**
1987		410	410	1,311	6,339	7,650	7,269	10,597	5,723	20,295	43,884							**19,177**	**32,767**	**51,944**
1988		600	600	1,146	6,795	7,941	6,703	10,503	7,182	19,442	43,830	767	256	1,023				**19,119**	**34,275**	**53,394**
1989		183	183	1,562	6,960	8,522	9,566	8,518	7,756	22,127	47,967							**19,646**	**37,026**	**56,672**
1990		503	503	1,782	5,504	7,286	4,435	7,346	6,067	16,231	34,079			1,066				**13,563**	**28,305**	**41,868**
1991		336	336	908	5,482	6,390	3,161	3,501	3,169	10,650	20,481	1,103	187	1,290				**8,673**	**19,824**	**28,497**
1992	5,893	1,423	7,316	737	5,093	5,830	2,966	8,349	5,681	16,308	33,304			1,250				**17,945**	**28,505**	**46,450**
1993	18,196	1,731	19,927	1,076	3,998	5,074	4,422	7,276	4,624	12,526	28,848							**30,970**	**22,879**	**53,849**
1994	24,442	5,032	29,474	796	2,894	3,690	4,153	7,443	4,790	11,556	27,942	577	147	724				**37,411**	**24,419**	**61,830**
1995	26,273	5,166	31,439	979	2,861	3,840	770	4,260	880	5,220	11,130	209	139	348		922	922	**32,491**	**15,188**	**47,679**
1996	34,342	6,209	40,551	3,526	5,661	9,187						472	238	710		1,718	1,718	**38,340**	**13,826**	**52,166**
1997	25,316	4,720	30,036	713	3,363	4,076	3,457	4,870	3,786	8,874	20,987	210	118	328	182	1,643	1,825	**34,748**	**22,504**	**57,252**
1998	31,368	4,375	35,743	688	2,476	3,164	3,154	5,760	3,452	8,298	20,664	233	114	347	297	2,680	2,977	**41,500**	**21,395**	**62,895**
1999	24,567	4,153	28,720	562	2,186	2,748	3,155	5,631	3,456	8,281	20,523	192	157	349	298	2,693	2,991	**34,405**	**20,926**	**55,331**
2000	29,705	6,479	36,184	407	1,303	1,710	3,154	6,689	3,455	8,690	21,988	101	46	147	445	4,008	4,453	**40,501**	**23,981**	**64,482**
2001	22,348	5,184	27,532	527	1,199	1,726	3,094	6,166	3,829	11,252	24,341	202	103	305	809	4,674	5,483	**33,146**	**26,241**	**59,387**
2002	23,071	3,992	27,063	829	1,100	1,929	1,034	7,351	2,190	5,349	15,924	207	31	238	852	4,918	5,770	**33,344**	**17,580**	**50,924**
2003	21,379	4,965	26,344	626	2,106	2,732	1,555	5,375	1,042	7,981	15,953	240	123	363	1,238	7,015	8,253	**30,413**	**23,232**	**53,645**
2004	23,430	5,168	28,598	828	2,339	3,167	1,050	7,517	4,935	8,100	21,602	135	68	203	1,291	7,455	8,746	**34,251**	**28,065**	**62,316**
2005	33,129	6,598	39,727	933	2,617	3,550	1,520	2,695	2,202	5,584	12,001	83	83	166	1,116	6,445	7,561	**39,476**	**23,529**	**63,005**
2006	30,491	5,694	36,185	1,014	2,408	3,422	1,071	4,186	2,638	5,538	13,433	128	42	170	1,091	6,185	7,276	**37,981**	**22,505**	**60,486**
2007	17,168	3,892	21,060	883	1,471	2,354	1,106	2,963	1,850	7,040	12,959	63	41	104	951	5,392	6,343	**23,134**	**19,686**	**42,820**

* totals for all years prior to 1997 are incomplete and are considered minimal estimates
blank cells indicate no information available

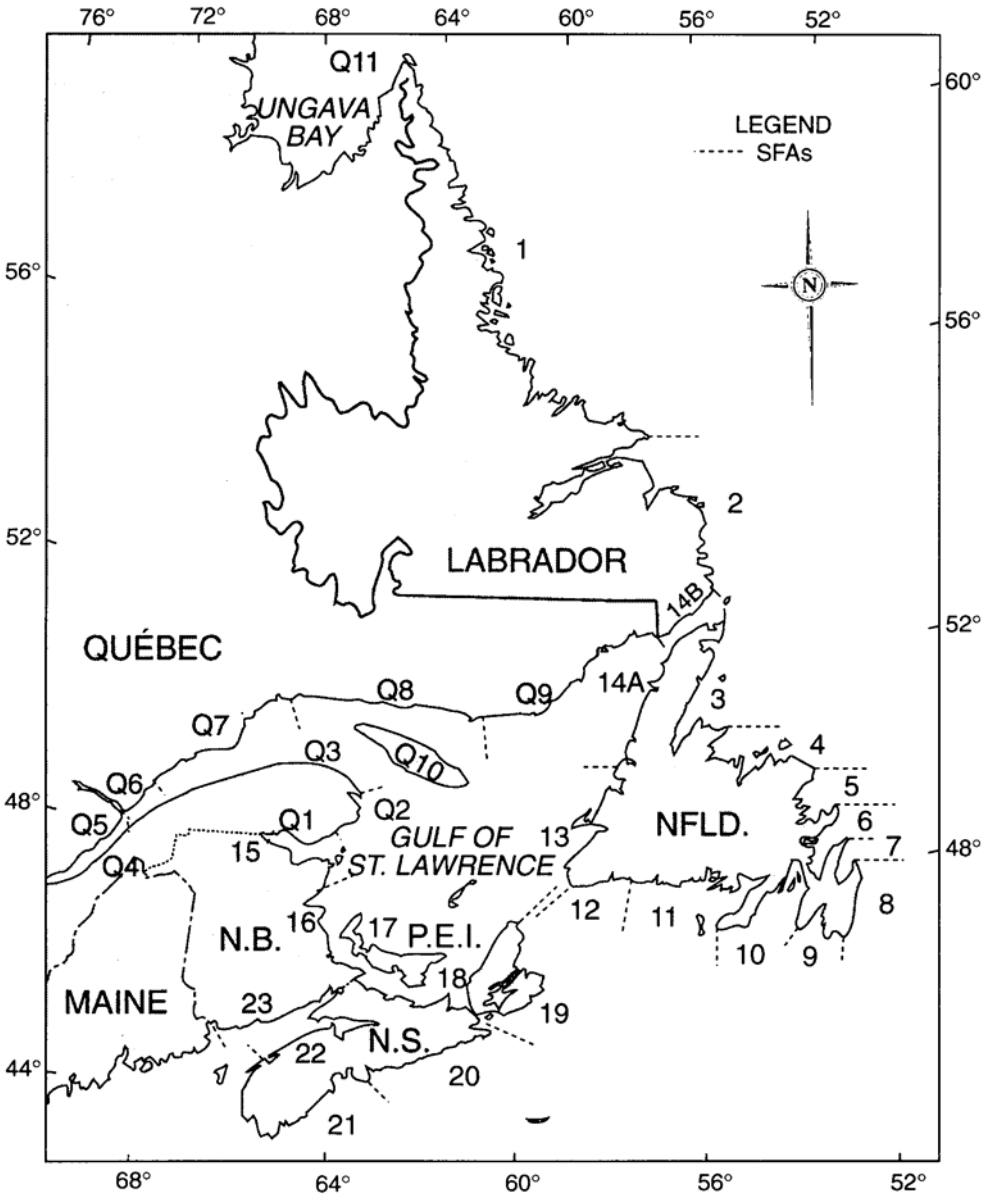


Figure 4.2.2.1 Map of Salmon Fishing Areas (SFAs) and Québec Management Zones (Qs) in Canada (NFLD. = Newfoundland, P.E.I. = Prince Edward Island, N.B. = New Brunswick, and N.S. = Nova Scotia).

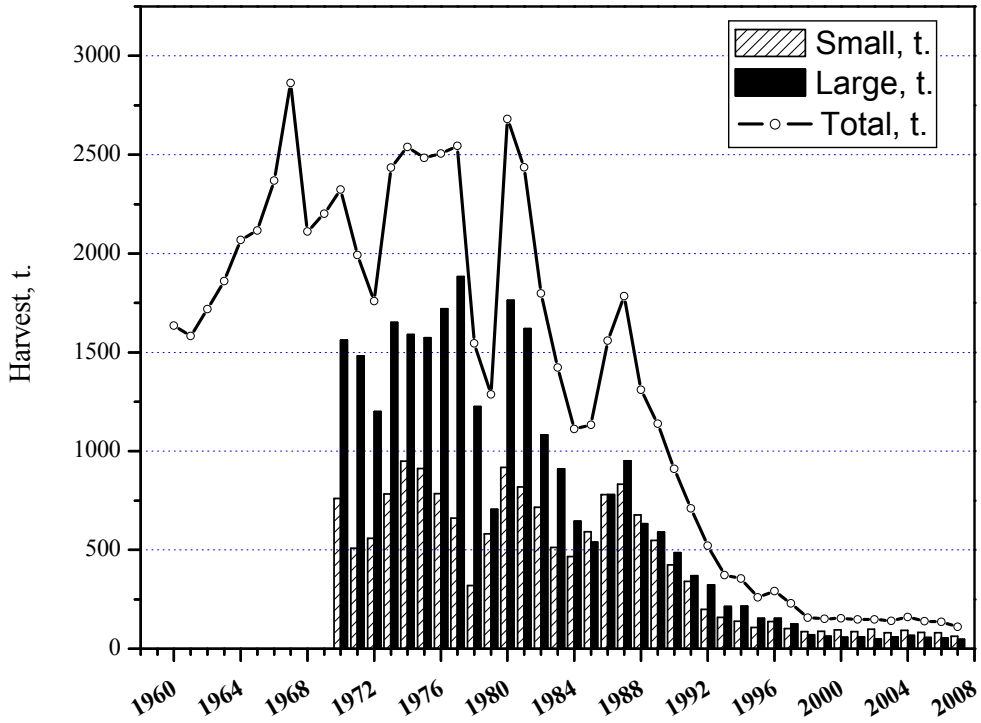


Figure 4.2.3.1 Harvest (t) of small salmon, large salmon, and both sizes combined for Canada, 1960–2007 by all users.

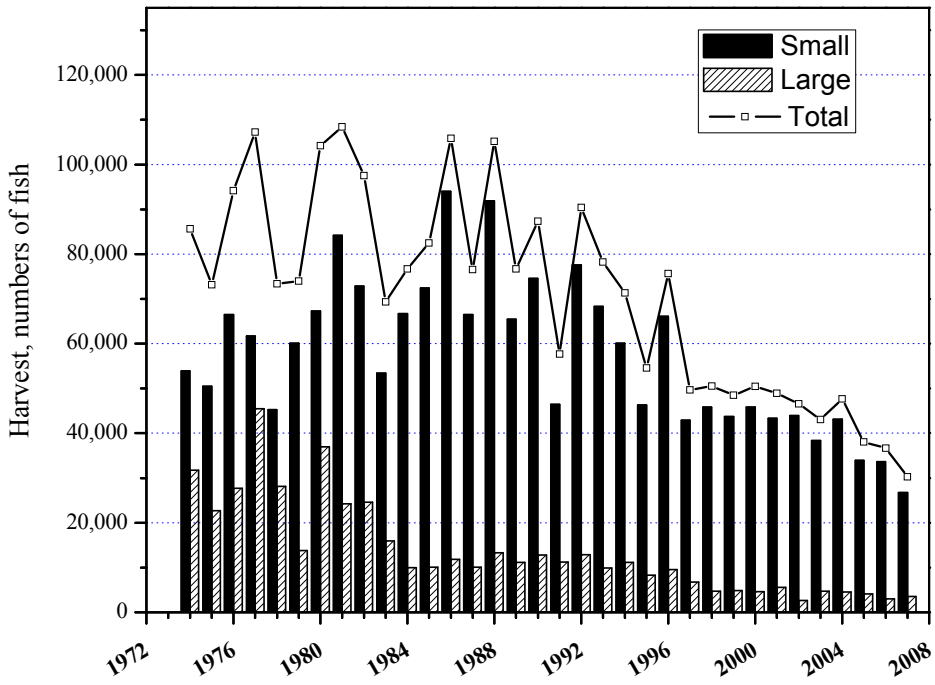


Figure 4.2.3.2 Harvest (number) of small salmon, large salmon, and both sizes combined in the recreational fisheries of Canada, 1974–2007.

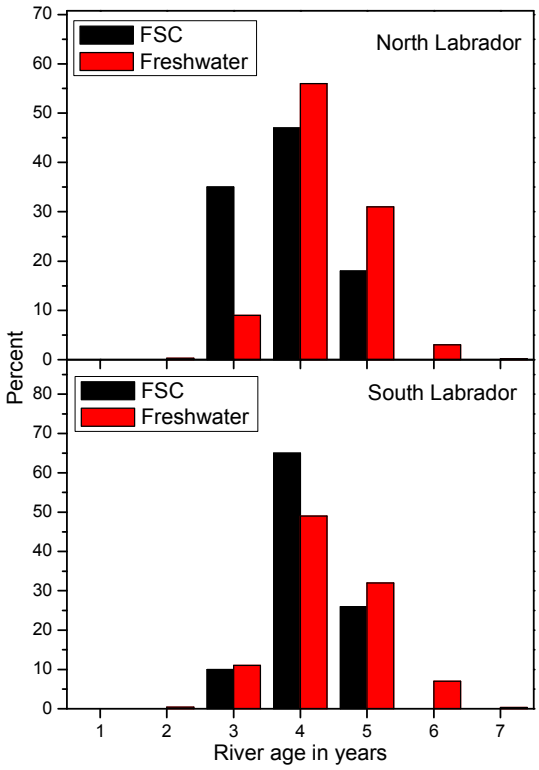


Figure 4.2.4.1 A comparison of the river age distribution of river ages of salmon from FSC fisheries in North and South Labrador in 2007 to those at assessment facilities in 2000–2005.

5 Atlantic salmon in the West Greenland Commission

5.1 NASCO has requested ICES to describe the key events of the 2007 fishery

At its annual meeting in June 2007, NASCO agreed to restrict the fishery at West Greenland to the amount used for internal subsistence consumption. This assumed that the Framework of Indicators would determine that no change to the management advice previously provided by ICES was required. Consequently, the Greenlandic authorities set the commercial quota to nil, i.e. landings to fish plants, resale in grocery shops/markets, and commercial export of salmon from Greenland was forbidden. Licensed fishers were allowed to sell salmon at the open markets, to hotels, restaurants, and institutions. A private fishery for personal consumption without a license was allowed. All catches, licensed and private were to be reported to the License Office on a daily basis. In agreement with the Organization for Fishermen and Hunters in Greenland the fishery for salmon was allowed from August 1 to October 31.

5.1.1 Catch and effort in 2007

A total of 24.6 t of landed salmon were reported during the 2007 fishery (Table 5.1.1.1). Catches were distributed among the six NAFO divisions at West Greenland (Figure 5.1.1.1), with approximately 80% of the catches coming from Divisions 1B–1E (Table 5.1.1.2). The 2005 and 2006 landings data reported previously (ICES, 2007) were mistakenly reported as gutted weights instead of whole weights. This error was corrected and all the landings data reported in Tables 5.1.1.1 and 5.1.1.2 represent whole weight. There is currently no quantitative approach to estimating the unreported catch. However, in 2007 it is likely to have been at the same level proposed in recent years (10 t).

Seasonal distribution of catches has previously been reported through ICES. However, it has become clear that the data to support this breakdown is no longer available. The reporting of fishing date is not required and some reported landings represent catches occurring on multiple days. As such, the seasonal distribution of reported landings is no longer provided.

In total, 234 reports were received in 2007; the same number received in 2006. A total of 132 people landed salmon as compared to the 136 in 2006. The number of fishers reporting catches over the past few years has steadily increased from a low of 41 in 2002 to the current level. These levels remain well below the 400 to 600 people reporting landings in the commercial fishery from 1987 to 1991.

5.1.2 Biological characteristics of the catches

The international sampling programme at West Greenland initiated by NASCO in 2001 was continued in 2007. The sampling teams from Canada, Greenland, Ireland, UK (Scotland), UK (England & Wales), and United States were in place at the start of the fishery and throughout the fishing season. Tissue and biological samples were collected from five landing sites: Qaqortoq (NAFO Division 1F), Paamiut (1E), Nuuk (1D), Maniitsoq (1C), and Ilulissat/Qeqertarsauq (1A) (Figure 5.1.1.1). In total, 1162 salmon were inspected, which represents 16% of the reported landings (by weight). Of these, 1116 were measured for fork length, 880 measured for gutted weight, 236 for whole weight, scales were collected from 1119, and tissue samples were taken from 1126 salmon for DNA analysis. The broad geographic distribution of the subsistence fishery caused practical problems for the sampling teams. However, the spatial and temporal coverage of the sampling programme was adequate to assess the fishery. As in previous years, ICES did need to adjust the total landings by replacing the reported catch with the weight of fish sampled for use in assessment calculations (Table 5.1.2.1). In 2007 this adjustment was limited to one division only (1F) and represented a very small proportion of the reported landings (~150 kg).

The average whole weight of a fish from the 2007 catch was 2.98 kg across all ages, with North American 1SW fish averaging 63.5 cm and 2.89 kg and European 1SW salmon averaging 63.3 cm and

2.87 kg (Table 5.1.2.2). The mean lengths and mean weights for the 2007 samples dropped from the 2006 values but remained close to the 10-year mean. It should be noted that these average weights are not adjusted for the time of sampling and may not represent the true trend across the time-series.

North American salmon up to river age 6 were caught at West Greenland in 2007 (Table 5.1.2.2), with >70% being river age 3 or older. The river ages of European salmon ranged from 1 to 5 (Table 5.1.2.2). Almost half (48.5%) of the European fish in the catch were river-age 2 and 33.0% were river age 3.

In 2007, 1SW salmon dominated (96.5%) the North American component, with previous spawners decreasing to 2.5% from the 2006 value of 5.6% (Table 5.1.2.2). 95.6% of the European samples were 1SW salmon, with previous spawners representing 1.5% of the samples (Table 5.1.2.2).

As part of the sampling programme, whole fresh fish were obtained to support a variety of complementary sampling efforts. In total, 150 fish were obtained from Nuuk (1D) and sampled for sex identification, disease (kidney tissue samples), feeding and parasites (stomach and intestines), and lipid/stable isotope analysis (liver, caudal, and muscle tissue). Sex was determined through direct gonad examination; 19 (12.7%) were males and 131 (87.3%) were females. All disease samples were tested for the presence of ISAv by RT-PCR assay and all test results were negative. Stomach, parasite, and lipid/stable isotope samples are currently being processed and analyzed.

Of the 1126 samples collected for genetic characterization, three samples were removed from the analysis. The remaining samples were either genotyped at three (n=8) or four (n=1115) microsatellites. A database of approximately 5000 Atlantic salmon genotypes of known origin was used as a baseline to assign these salmon to continent of origin. In total, 81.7% of the salmon sampled from the 2007 fishery were of North American origin and 18.3% of the fish were of European origin.

The continent of origin proportions of the samples varied among the divisions (see table below). ICES recommends the continuation of a broad geographic sampling programme (multiple NAFO divisions) to accurately estimate the continent of origin in this mixed-stock fishery.

	North America		Europe	
NAFO division	Number	%	Number	%
1A	5	50.0%	5	50%
1C	128	70.7%	53	29.3%
1D	462	88.3%	61	11.7%
1E	112	65.5%	59	34.5%
1F	210	88.2%	28	11.8%
Total	917	81.7%	206	18.3%

Applying the continental percentages for the NAFO division catches resulted in estimates of 18.5 t of North American origin and 6.3 t of European origin fish (6100 and 1900 individuals rounded to the nearest 100 fish, respectively) landed in West Greenland in 2007 (Table 5.1.2.3).

5.2 NASCO has requested ICES to provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved

NASCO's present management is directed towards reducing exploitation to increase spawning escapement to allow river-specific CLs to be achieved. It is not possible to evaluate the extent to which the objectives of any significant management measures for the West Greenland Commission have been achieved, as an assessment of the status of the stocks for the North American Commission in 2007 was not performed. A full assessment is scheduled to occur in 2009 and the extent to which the objectives of any significant management measures for the West Greenland Commission have

been achieved can be evaluated at that time. The North American stock complex is the primary contributor to the West Greenland fishery.

Table 5.1.1.1 Nominal catches of salmon, West Greenland 1971–2007 (metric tonnes round fresh weight).

YEAR	TOTAL	QUOTA	COMMENTS
1971	2689	-	
1972	2113	1100	
1973	2341	1100	
1974	1917	1191	
1975	2030	1191	
1976	1175	1191	
1977	1420	1191	
1978	984	1191	
1979	1395	1191	
1980	1194	1191	
1981	1264	1265	Quota set to a specific opening date for the fishery.
1982	1077	1253	Quota set to a specific opening date for the fishery.
1983	310	1191	
1984	297	870	
1985	864	852	
1986	960	909	
1987	966	935	
1988	893	840	Quota for 1988-90 was 2 520 t with an opening date of August 1. Annual catches were not to exceed an annual average (840 t) by more than 10%. Quota adjusted to 900 t in 1989 and 924 t in 1990 for later opening dates.
1989	337	900	
1990	274	924	
1991	472	840	
1992	237	258	Quota set by Greenland authorities.
1993		895	The fishery was suspended.
1994		137	The fishery was suspended and the quotas were bought out.
1995	83	77	
1996	92	174	Quota set by Greenland authorities.
1997	58	57	
1998	11	206	
1999	19	206	
2000	21	206	
2001	43	114	Final quota calculated according to the *ad hoc* management system.
2002	9	55	Quota bought out, quota represented the maximum allowable catch (no factory landing allowed), and higher catch figures based on sampling programme information are used for the assessments.
2003	9		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.
2004	15		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.
2005	15		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.

YEAR	TOTAL	QUOTA	COMMENTS
2006	22		Quota set to nil (no factory landing allowed) and fishery restricted to catches used for internal consumption in Greenland.
2007	25		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments.

Table 5.1.1.2 Distribution of nominal catches (rounded to nearest metric tonne) by Greenland vessels (1977-2007).

	NAFO Division								Total	
Year	1A	1B	1C	1D	1E	1F	NK	West Greenland	East Greenland	Greenland
1977	201	393	336	207	237	46	-	1 420	6	1 426
1978	81	349	245	186	113	10	-	984	8	992
1979	120	343	524	213	164	31	-	1 395	+	1 395
1980	52	275	404	231	158	74	-	1 194	+	1 194
1981	105	403	348	203	153	32	20	1 264	+	1 264
1982	111	330	239	136	167	76	18	1 077	+	1 077
1983	14	77	93	41	55	30	-	310	+	310
1984	33	116	64	4	43	32	5	297	+	297
1985	85	124	198	207	147	103	-	864	7	871
1986	46	73	128	203	233	277	-	960	19	979
1987	48	114	229	205	261	109	-	966	+	966
1988	24	100	213	191	198	167	-	893	4	897
1989	9	28	81	73	75	71	-	337	-	337
1990	4	20	132	54	16	48	-	274	-	274
1991	12	36	120	38	108	158	-	472	4	476
1992	-	4	23	5	75	130	-	237	5	242
1993[1]	-	-	-	-	-	-	-	-	-	-
1994[1]	-	-	-	-	-	-	-	-	-	-
1995	+	10	28	17	22	5	-	83	2	85
1996	+	+	50	8	23	10	-	92	+	92
1997	1	5	15	4	16	17	-	58	1	59
1998	1	2	2	4	1	2	-	11	-	11
1999	+	2	3	9	2	2	-	19	+	19
2000	+	+	1	7	+	13	-	21	-	21
2001	+	1	4	5	3	28	-	43	-	43
2002	+	+	2	4	1	2	-	9	-	9
2003	1	+	2	1	1	5	-	9	-	9
2004	3	1	4	2	3	2	-	15	-	15
2005[2]	1	3	2	1	3	5	-	15	-	15
2006[2]	6	2	3	4	2	4	-	22	-	22
2007	2	5	6	4	5	2	-	25	-	25

[1] The fishery was suspended.

[2] Values reported in ICES (2007) were gutted weight. Values have been corrected to represent whole weight.

+ Small catches <0.5 t.

- No catch.

Table 5.1.2.1 Reported landings (kg) for the West Greenland Atlantic salmon fishery (2002–2007) by NAFO Division as reported by the Home Rule Government and the division-specific adjusted landings where the sampling teams observed more fish landed than were reported.

		NAFO DIVISION						
YEAR		1A	1B	1C	1D	1E	1F	Total
2002	Reported	14	78	2100	3752	1417	1661	9022
	Adjusted						2408	9769
2003	Reported	619	17	1621	648	1274	4516	8694
	Adjusted			1782	2709		5912	12 312
2004	Reported	3476	611	3516	2433	2609	2068	14 712
	Adjusted				4929			17 209
2005[1]	Reported	1294	3120	2240	756	2937	4956	15 303
	Adjusted				2730			17 276
2006[1]	Reported	5427	2611	3424	4731	2636	4192	23 021
	Adjusted							
2007	Reported	2019	5089	6148	4470	4828	2093	24 647
	Adjusted						2252	24 806

[1] **Values reported in ICES (2007) were gutted weight. Values have been corrected to represent whole weight.**

Table 5.1.2.2 Biological characteristics of Atlantic salmon sampled during the 2007 West Greenland Atlantic salmon fishery.

RIVER AGE DISTRIBUTION (%) OF ATLANTIC SALMON BY ORIGIN SAMPLED FROM THE 2007 WEST GREENLAND FOOD FISHERY

	1	2	3	4	5	6	7	8
NA	1.6	27.7	34.5	26.2	9.2	0.9	0	0
E	7	48.5	33	10.5	1	0	0	0

BIOLOGICAL CHARACTERISTICS OF ATLANTIC SALMON SAMPLED FROM THE 2007 WEST GREENLAND FOOD FISHERY

Continent of Origin (%)	
North America	Europe
81.7	18.3

Sea age composition by continent of origin: North America (NA) and Europe (E)

	Sea-age composition (%)		
	1SW	2SW	Previous Spawners
NA	96.5	1.0	2.5
E	95.6	2.5	1.5

LENGTH AND WEIGHT OF ATLANTIC SALMON BY ORIGIN AND SEA AGE. FROM THE 2007 WEST GREENLAND FOOD FISHERY

	1 SW		2 SW		Previous spawners		All sea ages	
	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)	Fork length (cm)	Whole weight (kg)
NA	63.5	2.89	80.9	6.19	76.7	4.94	64.1	2.98
E	63.3	2.87	80.6	6.47	71.3	3.57	63.9	2.99

Table 5.1.2.3 The catch weighted numbers of North American (NA) and European (E) Atlantic salmon caught at West Greenland 1971-1992 and 1995–2007 and the proportion of the catch by weight. Numbers are rounded to the nearest hundred fish.

YEAR	NUMBERS OF		PROPORTION WEIGHTED	
	Salmon caught		by catch in number	
	NA	E	NA	E
1971	291 166	565 204	34	66
1972	221 128	393 116	36	64
1973	274 423	285 624	49	51
1974	230 254	305 221	43	57
1975	286 282	364 359	44	56
1976	166 201	220 313	43	57
1977	199 065	243 302	45	55
1978	126 304	167 427	43	57
1979	208 832	208 832	50	50
1980	192 820	177 988	52	48
1981	235 256	163 483	59	41
1982	130 900	204 700	57	43
1983	314 900	302 500	40	60
1984	229 000	425 300	54	46
1985	291 200	56 5300	47	53
1986	221 200	393 200	59	41
1987	274 500	285 700	59	41
1988	230 300	305 300	43	57
1989	286 300	364 400	55	45
1990	166 300	220 400	74	26
1991	199 100	243 400	63	37
1992	126 400	167 500	45	55
1993	-	-	-	-
1994	-	-	-	-
1995	22 100	10 400	67	33
1996	23 400	8700	70	30
1997	17 200	4300	85	15
1998	3200	900	79	21
1999	5600	700	91	9
2000	5800	2500	65	35
2001	9900	4500	67	33
2002	2300	1100	72	28
2003	2800	1300	65	35
2004	4000	1500	72	28
2005	3700	1200	76	24
2006	4000	1800	69	31
2007	6100	1900	76	24

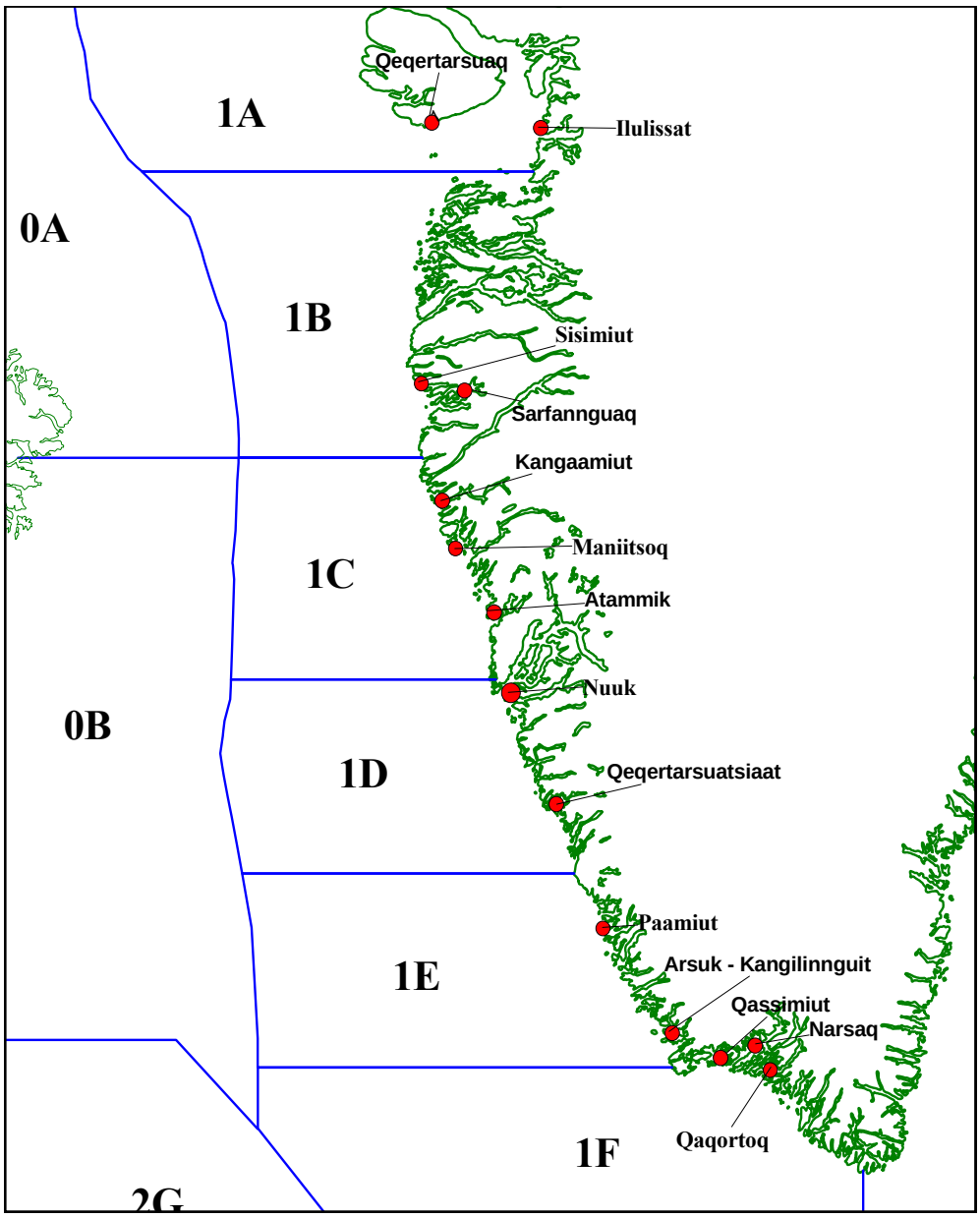


Figure 5.1.1.1 Location of NAFO divisions along the west coast of Greenland.

6 NASCO has requested ICES to identify relevant data deficiencies, monitoring needs, and research requirements, taking into account NASCO's international Atlantic salmon research board's inventory of on-going research relating to salmon mortality in the sea

ICES recommends that the Working Group on North Atlantic salmon should meet in 2009 to address questions posed by ICES and NASCO. ICES intends for the Working Group to convene in the headquarters of the **ICES in Copenhagen, Denmark from 30th March to 8th April 2009**.

6.1 Prioritized list of recommendations

1) ICES recommends that efforts are continued to identify and collate further information on biological characteristics from river populations and fisheries throughout the North Atlantic. It is proposed that a study group be commissioned to facilitate a unified effort to further develop and investigate these datasets for changes in biological characteristics and stock performance.
2) ICES recommends a study group be commissioned to facilitate the development of PFA modeling approaches for both NAC and NEAC prior to the 2009 WGNAS.
3) ICES recognises that river-specific management requires extensive monitoring and recommends expanded monitoring programmes across both stock complexes.
4) ICES recommends the completion of a metadata directory of datasets from the West Greenland fishery, which should be referenced in the quality handbook. This data would be informative to the study group on biological characteristics recommended above.
5) ICES recommends that the data which forms the allocation of the Faroese catch amongst home water countries be re-examined, some progress towards this action will be generated from the WKSHINI (Section 2.8.2).

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List of Participants

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