West Greenland Commission

WGC(14)4

Report of the Inter-sessional Meeting of the West Greenland Commission

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Fishmongers' Hall, London Bridge, London, UK
14 - 15 April 2014

1. Opening of the Meeting

1.1 The Chairman of the West Greenland Commission (WGC), Mr Ted Potter (EU), opened the meeting and welcomed the participants (Annex 1). The United States made an opening statement (Annex 2). The Co-Chair of the Non-Governmental Organizations (NGOs) also made an opening statement (Annex 3).

1.2 A list of participants is attached as Annex 4.

2. Adoption of the Agenda

2.1 The Chairman proposed that he would like to take item 6b, (the presentation of the report of the *Ad hoc* Scientific Working Group) before item 6a (the presentation of the report on the management regulations at West Greenland). This proposal was agreed and the agenda was adopted with this small change, WGCIS(14)20 (Annex 5).

3. Nomination of the Rapporteur

3.1 Ms Kimberly Blankenbeker (US) was appointed rapporteur.

4. Objectives of the Meeting

4.1 The Chairman briefly recalled the reason why the WGC agreed to hold a special inter-sessional meeting and noted that an important outcome of the meeting would be to identify and discuss principles to help guide decisions related to the conservation and management of the West Greenland fishery. He indicated that relevant information related to stocks exploited by the fishery, the management of fisheries and other conservation measures would be provided and would help create a strong basis for discussion.

5. Status of MSW salmon stocks

5.1 The representative of ICES, Mr Ian Russell, reviewed the relevant scientific information from the 2013 ICES Advisory Committee report relevant to the West Greenland Commission (CNL(13)8). His presentation to the Commission is available as document WGCIS(14)18.

5.2 The Chairman invited Commission members to give updates for 2013 on the status of the multi-sea winter (MSW) stocks in their jurisdictions that contribute to the West

Greenland fishery as well as more detailed information where this would be useful. From the European Union, presentations were made by UK (England and Wales), WGCIS(14)6, UK (Northern Ireland), WGCIS(14)7, UK (Scotland), WGCIS(14)8, and Ireland, WGCIS(14)14. These presentations are appended as Annex 6. The United States also provided a brief update on status and trends for US returns, WGCIS(14)12 (Annex 7).

5.3 Based on the presentations, the Chairman summarized that the status of MSW stocks in North America, particularly in the southern area, was more depleted than stocks from the southern NEAC, with all US stocks and many southern Canadian stocks well below their conservation limits and several other Canadian stocks also below theirs. While, the southern European stock complex has been above (but close to) its conservation limit in recent years, there are several stocks in Europe that contribute to the West Greenland fishery that are severely depleted.

6. Review of the internal use fishery at West Greenland

6.1 The Chairman noted that, in support of the WGC inter-sessional meeting, an *Ad hoc* West Greenland Commission Scientific Working Group was set up to develop a working paper that compiled available data on the West Greenland salmon fishery from 1990 to 2013. The Group worked by correspondence and included one scientist from each of the members of the WGC. Mr Tim Sheehan (US) presented the Group's report (WGCIS(14)4), which is appended as Annex 8. His presentation is available as document WGCIS(14)24.

6.2 The representative of the United States sought clarification on the process used to adjust landings in cases where samplers sampled more fish from a particular region than was reported landed by Greenland. Mr Sheehan explained that samplers are not deployed in all areas during the fishing season and they are only in-country for a portion of the season; therefore, temporal and spatial coverage of the fishery by samplers during the salmon fishing season is not comprehensive. He noted that upward adjustments are only made to catch data if there is an observed discrepancy between total fish sampled for a region and total catches reported by Greenland on a NAFO Division-specific basis. Currently, there is no attempt to apply an expansion factor to the available data to make an estimate of possible underreporting with respect to those times and places where sampling does not occur. The representative of the United States noted that, due to this, the adjustment applied is likely a minimum estimate.

6.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that fishermen that sell in the open-air market are obliged to report their catch but reporting from factory landed fish is considered more accurate. At factories, fish are weighed and catches are reported weekly. Fishermen selling in local markets are obliged to record data on their catches in logbooks and must report by the end of the fishing season (31 October of each year).

6.4 The representative of the United States sought confirmation that catch location information is based on where salmon are caught and not on where they are landed. Mr Sheehan reported that some catch data reflected the landing site rather than the catch site but that any such occurrence is likely not significant so no adjustment is made to account for this issue. The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that catch data are supposed to reflect where fish are harvested.

6.5 With regard to Section 3 of WGCIS(14)4, Mr Sheehan noted in response to a question on Figure 3.7 that the percent contribution of US salmon to the fishery at West Greenland appears to be relatively consistent over the years despite a decrease in overall abundance. He noted that although US stock status has decreased, there has also been a concurrent decline in the Canadian stocks and, therefore, it isn't surprising that the US contribution has remained consistent over the time series available. He also noted that the ongoing genetic analyses will provide the most comprehensive results of the contributions of European and North American stocks to the Greenland fishery.

6.6 In response to another question, Mr Sheehan noted that the United States experienced a 50% loss in spawner returns in 2002, which was linked to the 2001 commercial export fishery at West Greenland. He also noted that 2001 was not a year of higher overall abundance for these populations.

6.7 In his response to a question about whether the relative contributions of salmon from the southern NEAC and from North America to the West Greenland fishery are approximate to PFA estimates for these stocks, Mr Sheehan noted that preliminary analysis suggests this is true for southern NEAC stocks. While this might also be the case for the North American stock complex, there was more uncertainty for these stocks. Mr Sheehan noted that the genetic work being discussed was very preliminary and that genetic assignment groups differ from stock assessment groupings used by ICES. It is expected that this work will be further developed and used to inform stock assessments.

6.8 The representative of the United States noted that the relative contribution of the various stocks to the Greenland fishery was a very important issue. While from a percentage standpoint, the impact on US stocks might not look significant, in fact, in numbers of fish, the impact is highly significant given how low overall returns are to US rivers. In 2013, US returns totalled only 608 individuals. The US noted that, based on the estimates provided, a 60t harvest at Greenland would result in an estimated harvest of approximately 180 US origin salmon.

6.9 The representative of Denmark (in respect of the Faroe Islands and Greenland) asked if there was any explanation for the apparent variable abundance of salmon in Greenland waters. As an example, in 2010 there were large reported landings of salmon in NAFO Division 1A which had not been realized in previous years or since that time. Mr Sheehan responded that there weren't any clear explanations for this. Annual variations in the migration patterns of Atlantic salmon could be one factor influencing the distribution of salmon in Greenlandic waters although we do not have detailed knowledge of these patterns. The Chairman noted that changes in the migration of salmon appear to

be occurring but even in the very early days of harvests at West Greenland a greater proportion of MSW salmon originating from North America than MSW fish originating from Europe were thought to migrate to West Greenland.

6.10 The representative of Denmark (in respect of the Faroe Islands and Greenland) asked if a table had been prepared showing total catches across the North Atlantic. The representative of ICES noted that this harvest level was 1,296t for 2013. The Chairman noted that a more relevant data set for the WGC to consider would be 2013 harvests of North American and southern NEAC multi-sea winter salmon. ICES reported that, of the 166t of harvests (including unreported catch) in North America, 70t were of large salmon (a proxy for and likely over-estimate of MSW fish). For southern NEAC, of the 337t of harvest (including unreported catch), 171t were of MSW salmon. Thus, the total harvest in homewaters of MSW salmon from stocks contributing to the West Greenland fishery was about 241t.

6.11 The representative of the United States asked if it is possible to analyse available genetic and other information in order to explore the feasibility of finer scale management actions, such as adjustment to where and when harvests in the West Greenland fishery might occur to minimise impacts on more vulnerable stocks. Mr Sheehan noted that such information could be provided but that it would need to be caveated given uncertainties. Moreover, risks associated with these uncertainties would have to be carefully considered by managers when evaluating possible conservation and management alternatives.

6.12 A question was asked about the differences in the growth rates of salmon over time. Mr Sheehan noted that growth of salmon at Greenland was exceptional. On average there appears to be an increase of approximately 1.3kg per fish during the fishing season. These types of data could be used in support of the development of future management plans.

6.13 The Secretary presented a paper developed by the WGC Chairman and Secretary that provided an overview of the regulatory measures applying to the West Greenland fishery over the years, WGCIS(14)5 (Annex 9).

6.14 The representative of the United States noted that the management approach agreed in the 2001 regulatory measure was substantially different to that in place for the three prior years. The Secretary noted that there was substantial uncertainty in the PFA estimate and consequently about whether a commercial fishery should be authorized. A management approach was developed that required the collection of CPUE data from the fishery in real time to determine, based on pre-agreed rules, whether or not additional harvests could take place. The Chairman noted that, operationally, this was a difficult approach to implement.

6.15 The representative of Denmark (in respect of the Faroe Islands and Greenland) made a presentation on the management of its fishery, WGCIS(14)15 (Annex 10). In response to a question about how it controls its fishing season, Greenland explained that it sets a three-month season. If the factory landings quota is exhausted before the end of the

season, the factory landings sector would be closed. The personal consumption and local sales components of the fishery, however, do not close until 31 October of each year.

6.16 The Chairman asked why landings to factories stopped before the quota was exhausted in 2012 and 2013. The representative of Denmark (in respect of the Faroe Islands and Greenland) explained that the factories accepting salmon are located in small settlements and that they had accepted all the product they could use. The representative of Denmark (in respect of the Faroe Islands and Greenland) also noted that the reason there was a change between 2012 and 2013 regarding which factories were operational was due to some internal business difficulties related to the ownership and financial soundness of some factories. Greenland reminded the Parties that its commercial fishery started in 1960 but before that time there had still been an internal use fishery in Greenland.

6.17 The representative of the United States noted that the first NASCO regulatory measures establishing an internal consumption fishery for Greenland were in 1998, 1999, and 2000. During this period, Greenland managed its fishery by setting a 20t quota, closely monitoring catches, and closing the fishery when the quota limit was reached. Because the text of the current regulatory measure is virtually identical to those in place in 1998-2000, the representative of the United States asked why Greenland's approach to management had changed so substantially. The representative of Denmark (in respect of the Faroe Islands and Greenland) explained that in the early days of the internal use measure, it had set internal limits but that this was very difficult to administer for such a small administration. Given the size of the fishery and the significant effort it took to manage it, Greenland determined that it was not worth the effort to manage the fishery with output controls, such as a quota. Instead, they adopted input controls, such as effort limitations. In addition, the representative of Denmark (in respect of the Faroe Islands and Greenland) noted that there have been times when the science provided for the possibility of a commercial fishery but these opportunities were not utilised.

6.18 The representative of Denmark (in respect of the Faroe Islands and Greenland) reported that salmon are being caught around Greenland all year long as bycatch in other fisheries, which may indicate a change in stock status or residence time (i.e. salmon remaining at Greenland for longer periods of time). The Chairman noted that if this was occurring, a signal should be picked up in the data - in particular, with regard to increases in older fish in the Greenland catch (3SW fish). Mr Sheehan referred the meeting to Figure 5.2 of the *Ad hoc* Scientific Working Group Report. He stated there was some variability but that the proportions of 1SW to 2SW fish were fairly consistent from the 1990s to the present with the overwhelming proportion of fish being 1SW. He also noted that care should be taken with interpreting these trends as many data points are based on a small number of fish. The Chairman noted that, regardless, the data suggests that there may be some fish staying longer around Greenland and if this is true the question is why such a change in behaviour would occur. The representative of the European Union asked Denmark (in respect of the Faroe Islands and Greenland) if salmon bycatch data was available and could be reported. The representative of Denmark (in respect of the Faroe Islands and Greenland) said he did not have the data yet but it is supposed to be included in logbook reports; he indicated that he would look into getting these data reported to NASCO.

6.19 The representative of the United States, asked Denmark (in respect of the Faroe Islands and Greenland) to explain the local context of Greenland's salmon fishery *vis a vis* other fisheries resources, such as its relative importance and relevance. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that salmon is an important resource for the settlements in mid and southern Greenland. The fishery for Greenland halibut occurs in Disko Bay, and trawlers operate on the west coast of Greenland and land in cities. The representative of Denmark (in respect of the Faroe Islands and Greenland) highlighted Table 1.4 in the *Ad hoc* Scientific Working Group's report, noting that salmon are landed in factories in settlements that don't have much other economic activity. Cod fishing is also done in these settlements but the cod fishery is not sufficiently economically viable at the present time. The Chairman noted that Table 2.1 of the *Ad hoc* Scientific Working Group's report might be more relevant to the discussion as it shows a spread of landings from various components of the fishery across all areas. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it has 2,800 licensed dinghies and that 900 of them are in the north and fish for Greenland halibut. 323 dinghies plus 11 licensed vessels over 6 meters received licences to fish for salmon in West Greenland in 2013.

6.20 The representative of the European Union asked why Greenland had turned to salmon to offset the difficulties caused by the condition of the cod stock when salmon is not recovering either. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that the cod fishery remains important to Greenland. The offshore fishery is in good shape; the inshore fishery needs to rebuild. Because cod is not very valuable at this time, salmon can help supplement needs. This is a key reason why the factories in these areas were opened.

6.21 The representative of the United States drew attention to Table 2.1 in WGCIS(14)15 and asked if output controls, such as bag limits, could be used to control harvests by unlicensed fishermen rather than input controls. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that there was no limit on what this component of the fishery could catch. The representative of the United States asked how Greenland reaches its fishermen to inform them of those aspects of the fishery they need to know about. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it uses TV spots, the fisherman's association (KNAPK), license requirements and other means. The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that KNAPK is fully representative of the licensed fishermen component of its fishery as all licensed fishermen are members of that organization. The representative of Denmark (in respect of the Faroe Islands and Greenland) also noted that it supports KNAPK and that the association has 77 representatives in the country. With regard to rod caught salmon, the representative of Denmark (in respect of the Faroe Islands and Greenland) reported that such harvests are rare and that more harvests of salmon occur as a bycatch in the Arctic charr fishery, which occurs in the fjords.

6.22 The representative of the United States noted that Table 1.5 of the *Ad hoc* Scientific Working Group's report indicates that in 2013 only 66 fishermen reported salmon catches but there are 323 fishermen that are licensed. A question was raised if this discrepancy could indicate underreporting. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it did not indicate a problem with reporting and explained that not all licensed fishermen fish for salmon every year. There may be other fisheries that are more lucrative in a given year, for instance. The representative of Denmark (in respect of the Faroe Islands and Greenland) also confirmed that there is no limit on the number of salmon fishing licenses that can be issued although there are eligibility requirements. The representative of the United States expressed a concern that the current licensing situation in Greenland could lead to a large increase in fishing effort in the salmon fishery if at some point licensed fishermen who have not been active in the fishery decide to enter it. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that this was not a likely scenario given past experience and the size of the market in Greenland. The representative of the United States remarked that, according to Table 1.5, it appeared that the fishery was trending toward fewer participants, which was odd if indeed the cod fishery was not very lucrative at the moment, while the amount of reported catches are increasing. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that it needed to undertake a more detailed analysis of the data in the *Ad hoc* Scientific Working Group paper before it could comment on what it might mean. Mr Sheehan pointed out that in the same Table, 1.3t of salmon was reported sold by unlicensed fishermen, which according to Greenlandic rules, is illegal. The representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that he would look into this.

6.23 The Chairman asked how complete catch reporting is by Greenlandic fishermen given the new and extensive data elements now being required by Greenland in its logbooks. The representative of Denmark (in respect of the Faroe Islands and Greenland) reported that they are having some implementation issues but these are being worked out and that they hope to see significant improvement within two years' time. The representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that in 1997 Greenland began requiring all catches to be reported by both licensed and unlicensed fishermen. In that regard, Greenland also now requires both licensed and unlicensed fishermen to complete and submit a logbook.

6.24 In response to a question from the representative of the United States, the representative of Denmark (in respect of the Faroe Islands and Greenland) explained how the distribution of factory landed salmon works in Greenland. Salmon that are landed to factories in smaller settlements are sold to distributors. These distributors supply fish to cities and settlements throughout Greenland. Most of the salmon, however, is shipped to the north. The distributors supplying Greenland's cities and settlements handle wild caught Atlantic salmon from Greenland, Norwegian farmed salmon and other supplies.

6.25 A question was raised by the representative of the United States about the basis for setting the factory landings quota at 35t. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it had worked with the distributors to

establish an estimate of potential market demand in Greenland. The representative of the United States noted that this decision appears to have been based on economic considerations rather than biological ones. With regard to the effort to displace imported Norwegian farmed salmon in the marketplace with Greenlandic salmon, the representative of Denmark (in respect of the Faroe Islands and Greenland) confirmed that this objective fits in with Greenland's overall policy in place for the last five years to use domestic natural resources rather than imported products, wherever possible. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it is too early to tell if they will reach the sales goal for salmon, but retailers believe they can sell more. Regarding factory involvement in salmon processing and sale, the representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that there is no limit on the number of factories that could accept salmon or their locations but the larger ones likely would not participate as they are fully subscribed with processing other species and to change over operations is likely not economical at this time. In addition, the representative of Denmark (in respect of the Faroe Islands and Greenland) indicated that there remains some price differential between factory landed salmon (lower) and salmon sold as fresh product in local markets, etc.

6.26 The representative of the United States noted that last year Greenland had said that any increase in the factory landings quota would be offset by decreases in the local sales component of the fishery. Several Parties expressed concern that this would not be the case as the incentive would be to increase fishing effort to harvest more so incomes would rise. It appears from the data that the concerns expressed last year are being realised. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it needed to study this matter before commenting fully but that it did not necessarily think that effort in the fishery had increased. The representative of the United States referred to Figure 1.2 in the *Ad hoc* Scientific Working Group's report, which showed that at least commercial landings were up in 2013 and that other components of the fishery remained about the same so no offset occurred. The representative of the United States expressed alarm that Greenland appeared to be pursuing a policy of promoting increased consumption of wild Atlantic salmon domestically and of the potential consequences to the stocks if consumers begin to prefer such salmon on a large scale and management in Greenland changes again.

6.27 The representative of Canada noted concern that the markets in Greenland are new and will develop further and asked whether salmon fisheries were part of Greenland's self sufficiency goal. The representative of Canada also asked if the domestic market for wild salmon could grow to 35t or beyond. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it was not feasible at this time to raise the factory quota as they cannot currently process all 35t allocated for factory landings. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that the salmon harvested by its fishermen do not leave Greenland.

7. Review of management measures for MSW salmon in homewater fisheries

7.1 Each of the members of the WGC presented information on their efforts to conserve and manage salmon in their homewaters. The representative of Canada made the first presentation, WGCIS(14)21 (Annex 11). The representative of the European Union presented an overview of three EU Directives (Habitats Directive, Marine Strategy Framework Directive, Water Framework Directive) and the Common Fisheries Policy to provide the relevant EU context for the conservation and management of Atlantic salmon by European Union Member States, WGCIS(14)23 (Annex 12). The representative of the European Union stressed that foundational concepts supporting its work to conserve and manage fisheries resources are the Precautionary Approach and Ecosystem Approach. Several European Union Member States also made presentations under this agenda item: UK (England and Wales), WGCIS(14)9, UK (Northern Ireland), WGCIS(14)10, UK (Scotland), WGCIS(14)11, and Ireland, WGCIS(14)14. These presentations are appended as Annex 13. The representative of the United States also made a presentation on US efforts to conserve and restore Atlantic salmon, WGCIS(14)13 (Annex 14).

7.2 The NGO Co-Chair expressed some doubt that EU Directives and the relevant fisheries policy regulation were doing what they needed to, noting that Member State implementation needed to be improved. The representative of the European Union responded that a critical review of these documents had just been completed. It was determined that they were sufficient to meet needs but that better integration was needed. The process also recognised that Member State implementation needed to be improved. The representative of the European Union noted that there is now a strong commitment on the part of the European Commission to improve the situation, including the provision of additional resources.

7.3 Regarding the US report, the NGO Co-Chair noted that the total cost associated with the Penobscot River Restoration Project had risen to about $62 million. In response to a question, the representative of the United States noted that there are fewer than 20 documented US Atlantic salmon rivers. All these rivers are actively monitored. Habitat protection occurs even in rivers where no salmon have been documented.

8. Future Regulation and Management of the West Greenland salmon fishery

8.1 The Chairman noted that the information presented and discussed in the previous agenda items clarified the status of the various stocks contributing to the fishery at West Greenland as well as the efforts being undertaken to conserve and manage Atlantic salmon both at West Greenland and in homewaters. While not foreclosing additional discussion on the previous agenda items, he suggested that there was now a strong foundation from which to try to tackle the main objective of the meeting; namely, to identify and discuss principles and approaches with the aim of helping to guide decisions related to the conservation of Atlantic salmon and the management of the West Greenland fishery in 2014 and into the future.

8.2 The representative of the United States asked Denmark (in respect of the Faroe Islands and Greenland) to consider the relevance of the current regulatory measure, how it views its current approach to management in the context of that measure, and where management of this important resource should go. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that Greenland had taken a wide variety of actions to manage its fishery, including limiting it to internal consumption and restricting export, adopting technical measures, such as mesh sizes, restricting the fishing season, restricting who can sell salmon, and expanding data collection requirements, among other actions. The Chairman asked Denmark (in respect of the Faroe Islands and Greenland) if it felt its management approach was consistent with the expectation of the other WGC members and the spirit of the agreement. The representative of Denmark (in respect of Faroe Islands and Greenland) declined to answer and indicated that he did not know who had provided the historical estimate of the internal use harvest of 20t.

8.3 The Chairman noted that that figure was provided by Denmark (in respect of the Faroe Islands and Greenland) in about 1997 and has been in regulatory measures going back to 1998.

8.4 The representative of Canada recalled his surprise from last year when he learned that Greenland had changed its management approach to allow a 35t factory landings quota since it can result in an increase in catch when the science is clear that the stocks cannot take it. The representative of Canada stressed that it is difficult to understand how Greenland can support such a management program in light of the terms of the regulatory measure and the status of the stocks.

8.5 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that Greenland has taken strong measures on the commercial fishery for 30 years, yet the stocks never improve. He did not believe that the West Greenland fishery is the reason for the failure of the stocks to improve. Moreover, homewater fisheries are continuing. The representative of Denmark (in respect of the Faroe Islands and Greenland) suggested that if everyone would agree to suspend fishing across the North Atlantic, they would be ready to discuss decreasing Greenland's harvest.

8.6 The Chairman asked if, based on that remark, Denmark (in respect of the Faroe Islands and Greenland) did not see any of the actions that have been taken in homewaters as meaningful. The representative of Canada noted that they understand Greenland's perspective. Canada has a small aboriginal catch. Still, this fishery is well-managed, including using carcass tags, and data are fully reported. The representative of Canada expressed doubt that the data collection for Greenland's fishery is sufficient and asked Denmark (in respect of the Faroe Islands and Greenland) if they could take steps to improve monitoring for the non-factory component of the fishery. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that improving monitoring in this way would require substantial effort and was not feasible. Moreover, he stressed that it was not possible for consumption in Greenland to increase substantially.

8.7 The Chairman noted his perspective that the issue was less about the 20t figure and more about steps taken by Greenland that allow the fishery to expand. The Chairman reiterated that the fishery has expanded since the advent of the factory landings quota, and there appears to be scope for it to expand further. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it does not expect any increase in effort or landings. He suggested that they might expect to see a small decrease in the open air market sales.

8.8 The representative of Canada recalled the idea of establishing a common understanding of what is meant by internal consumption. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that it sees its internal fishery as stable although it does need to analyse the changes that have been seen over the last two fishing seasons. The representative of Denmark (in respect of the Faroe Islands and Greenland) also reminded the Parties that it is seeing an abundance of fish locally, including those taken as bycatch in various fisheries. The Chairman indicated that we need to be careful not to assume that pockets of local abundance reflect the status of the stocks overall.

8.9 The representative of the United States asked Denmark (in respect of the Faroe Islands and Greenland) how it sets quotas in other fisheries. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that NAFO gives advice on shrimp and Greenland halibut and that these quotas take into account the scientific advice. Greenland implements the NAFO limits in its domestic fisheries and monitors and controls them. He noted that the Greenland shrimp fishery is MSC certified. The representative of the United States pointed out that Greenland takes science into account for other fisheries but does not seem to do so in the case of salmon. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that there are too many uncertainties in the scientific advice for the salmon stocks but they don't have a biologist with them who can speak to this aspect. The representative of the United States underscored that the more uncertainty there is in the science and the more imperfections in implementation of a management measure, the more cautious managers must be when establishing those measures. This idea is a key aspect of fisheries management. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it could not respond as its delegation did not contain a biologist.

8.10 The representative of the European Union reiterated that European Union Member State jurisdictions had taken major steps to regulate and close some fisheries. She also stressed that management should be based on sound scientific advice, not just on perceptions of what we believe. If uncertainties exist, one must apply the Precautionary Approach, as this organization has already agreed to do. This question is not an issue for biologists; it is an issue for managers. Overall, the abundance of stocks contributing to the West Greenland fishery is very low. It is clear there is a clash in how Denmark (in respect of the Faroe Islands and Greenland) understands the current situation compared to the way other Parties understand things. It is not appropriate to be increasing catches. Rather, catches need to be at the lowest level possible. With regard to Greenland's internal consumption fishery, the specific reference to 20t is very important. The science advice

could not be clearer. There should be no fishery at West Greenland. All of these aspects must inform how we understand implementation of the current regulatory measure.

8.11 To stimulate ideas for actions the WGC might take to enhance management of the West Greenland fishery in 2014, the Chairman presented a 'strawman' proposal for discussion reflecting the views expressed by the Parties, (WGIS(14)16). It was presented in the form of an addendum to the current regulatory measure, WGC(12)12, and included a short summary of what the Chairman viewed as key observations arising from the discussion of the updated status and trends data concerning the stocks that contribute to the West Greenland fishery and conservation and management information through 2013 presented by both West Greenland and States of origin concerning actions in their homewaters.

8.12 The representative of the United States indicated, and the Chairman confirmed, that the proposal as written, which does not reference a factory landings quota, would not preclude Greenland from managing the internal fishery as they saw fit, including establishing such a quota. The representative of Canada noted that the 'strawman' was interesting food for thought and that they were supportive of some type of internal consumption fishery for Greenland. He stated, however, that it would be difficult, if not impossible, for Canada to accept a document that explicitly referenced a factory landings quota. Part of the concern was that this would set a bad precedent and could increase pressure in other jurisdictions, including Canada, to re-open fisheries that are currently closed. The representative of the European Union expressed a similar concern in relation to the pressure for reopening some fisheries. The representative of the European Union also noted that they consider the Chairman's 'strawman' to be a good basis for further consideration of how the 2014 fishery at West Greenland might be managed. The representative of the European Union expressed a reservation until its official position is developed. The representative of the European Union also noted that they are ready to help Denmark (in respect of the Faroe Islands and Greenland) by sharing their experiences on how to improve the catch monitoring.

8.13 The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that paragraph 3 of the 'strawman' proposal was not acceptable to them as drafted as they consider it represented an inappropriate reach by NASCO into Greenland's national sovereignty. They also noted that catch levels in Greenland's fishery have been stabilizing over the last few years and that the catches sold at the open air market had decreased by about 11t when the factory landings quota was instituted.

8.14 The representative of the United States mentioned that unreported catch in Greenland was estimated to be 10t but that there was no clear rationale for this figure. He also noted a concern about the latent capacity in the fishery, which, if activated, could substantially increase the catch. He noted the difficulty in agreeing to a catch limit for the West Greenland fishery when effective methods are not in place to monitor and control the fishery.

8.15 The representative of the United States asked Denmark (in respect of the Faroe Islands and Greenland) if any of the monitoring and control measures implemented by Parties in their homewater fisheries, such as Canada's carcass tagging scheme, might be something they would explore to help improve management of the West Greenland fishery. The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that it would need to confer with its control office in Nuuk on this point but that some of the ideas presented could overwhelm their small administration and be a high financial burden. The representative of the United States noted that there may be ways to limit the cost of such programs by using relatively inexpensive electronic technology, such as iPhones and/or perhaps to use the KNAPK network to assist in implementation. The representative of the United States reiterated the need for Greenland to improve monitoring of, and accountability in, the West Greenland fishery before the United States would be able to support a particular harvest level. The NGO Co-Chair stressed once again that the West Greenland fishery should be firmly limited to no more than a 20t subsistence fishery.

8.16 The Chairman thanked the Parties for their comments and noted that his 'strawman' was intended to start the Parties thinking about possible ways forward with regard to the management of the West Greenland fishery for 2014 and beyond. He recognized that there were elements of the proposal that were controversial for some Parties but asked if it could be appended to the report, still as a Chairman's text, so that it could be available for Parties to reference as they continued their discussions of this important issue. The Parties thanked the Chairman for the document and agreed with the proposal to attach the document to the meeting report for this purpose. This document, WGCIS(14)17, is contained in Annex 15.

9. Other Business

9.1 There was no other business.

10. Report of the Meeting

10.1 A report of the meeting was agreed.

11. Close of the Meeting

11.1 The Chairman thanked the participants for contributing to an open dialogue that should facilitate further discussions at the NASCO Annual Meeting. The Parties expressed their sincere gratitude to the Chairman for his excellent organization and leadership leading up to and during the inter-sessional meeting.

11.2 The Chairman closed the meeting.

Annex 1

Opening Statement by the Chairman of the West Greenland Commission

Good morning Ladies and Gentlemen. It is my great pleasure to welcome you all to London, and the magnificent surroundings of Fishmongers' Hall, for this inter-sessional meeting of the West Greenland Commission. I know that some of you have had difficult journeys to be here, and I greatly appreciate your participation.

NASCO's objective is to contribute through consultation and cooperation to the conservation, restoration, enhancement and rational management of salmon stocks, taking into account the best scientific evidence available to it. The past work of this Commission has been characterised by an excellent spirit of international cooperation and a strong commitment to developing regulatory measures that are closely aligned with the scientific advice from ICES. In most years since 1998, the fishery at West Greenland has been restricted to internal-use only harvests in response to the greatly reduced abundance of multi-sea-winter salmon in many rivers in North America and Southern Europe. This has involved major sacrifices for Greenland that we all recognise and appreciate as important conservation measures.

You will recall that in Drogheda, last June, the Commission held initial but fairly detailed discussions on a change in Greenlandic management measures in 2012 which permitted landings to fish factories subject to a quota of 35 tonnes. Different opinions were expressed about how this change would affect harvests in the fishery, and these were well documented in the report of the meeting. We agreed to reconvene once data from the 2013 fishery became available and we now have that information to hand. We are also aware now that the Framework of Indicators has confirmed that re-assessment of the 2012 ICES catch advice was not required for the 2014 fishery so the 2012 regulatory measure will continue to apply.

While the importance of this fishery to Greenland is recognised, there are real concerns about possible increases in the harvest. These concerns are compounded because, since 2007, over 80% of the salmon contributing to the fishery have originated from North America, and some of these stocks are critically endangered. The most recent advice provided by ICES in 2012 is clear - '*There are no mixed-stock fisheries catch options at West Greenland in 2012, 2013 and 2014 and in the absence of fishing mortality there is only a 6% to 8% chance of simultaneously meeting or exceeding the management objectives of the seven management units in 2012 to 2014'*.

So, we have important issues to consider over the next day and a half, and Peter and I very much look forward to working with you all in order to thoroughly review the issues and hopefully find a way forward that is acceptable to all Parties.

I am very keen that our discussions here in London are based upon a full understanding of the present status of MSW salmon stocks and of the management measures applying to the internal-use fishery at West Greenland and the fishery regulations and other conservation measures that have been introduced by States of origin. Our agenda has been structured accordingly. This is consistent with NASCO's Strategic Approach which highlights the need for fairness and balance

in the management of distant-water and homewater fisheries. So, I hope we will have a thorough and open exchange in the cooperative spirit that characterises NASCO's work.

Because the advice on events in the 2013 fishery and on stock status will not be available until May, ICES will provide an overview of the 2013 advice relating to the status of North American and southern European stocks. There will then be an opportunity for the Parties to provide any updates on MSW stock status for 2014 and highlight specific concerns relating to the status of these stocks. Because the ICES advice is not yet available, the Commission agreed to establish a scientific working group to compile available catch data for the West Greenland salmon fishery, including reported and unreported catches; the spatial and temporal breakdown of the catches; the origin of the catches and exploitation rates. A paper providing that information has also been distributed. I would then like to review the NASCO regulatory measures for the West Greenland fishery, their implementation and the terminology used; the Secretariat and I have prepared a paper on this which has been distributed. Greenland will then have an opportunity to describe the management measures relating to the internal-use fishery and the monitoring and surveillance programmes in place. Finally, there will be an opportunity for the States of origin to describe the management measures they have taken, and plan to take, for MSW salmon. With that detailed background, I very much hope that we will be in a much better position to discuss the future regulation and management of the West Greenland fishery.

So, we have much to do in these impressive surroundings over the next two days. I would like to thank the Secretariat for the arrangements made for this meeting and the Fishmongers' Company for allowing us to use their facilities. I would now ask if there are any Opening Statements.

Annex 2

Opening Statement on Behalf of the United States

Mr. Chairman, Mr. Secretary, Distinguished Delegates, Observers, Ladies and Gentlemen:

On behalf of the United States, I would like to begin by thanking our Chairman, Ted Potter, and Secretary, Peter Hutchinson, for their hard work pulling together this inter-sessional meeting of the West Greenland Commission. The extra work needed to organize this meeting undoubtedly comes at a challenging time as the Secretariat is already in preparations for the annual meeting. Please extend our thanks, Peter, to Mairi and Louise, who no doubt helped with your preparations for this meeting.

I also wish to thank the other parties for supporting this meeting. I know it's a busy season for you, as well. I am personally pleased to see you all. I think it's a testament to the importance you place on NASCO and on the work of this Commission that you agreed to carve out the extra time to talk through and work through what are some tough and very important issues. I sincerely appreciate the attendance of our NGO partners, who provide an important reminder that many others beyond the delegations in this room are paying attention to what we do here today and tomorrow.

I know that everyone in the United States who cares about Atlantic salmon, and there are many, is watching what happens here in London as prior to this meeting, I received numerous calls and e-mails from stakeholders concerning the work of this Commission. A key US stakeholder is the State of Maine, which hosts our endangered runs of salmon. Our newly appointed non-federal commissioner, Patrick Keliher, whom you'll meet in June, is the head of the state agency in Maine that manages marine fisheries and sea-run fish. His office and other agencies involved in the enforcement of fishing prohibitions, coordinated management, and other protective activities in our salmon rivers are eager to know what happens here. In addition, dozens of state and national level NGOs and local communities that are investing heavily in the recovery of Atlantic salmon through reopening and improving habitat, are watching. And I cannot forget to mention the interest of the native American Penobscot tribe, who voluntarily suspended their sustenance fishery on the mighty Penobscot River over twenty-five years ago - even before Atlantic salmon populations were listed on the US Endangered Species Act. They, too, are watching.

My delegation is in close touch with our superiors in the National Marine Fisheries Service, NOAA, and the Department of Commerce, as well as senior officials in the US Department of State – to whom we'll be reporting when we return home. As you may know, Ambassador Balton and NOAA's Deputy Assistant Secretary for International Fisheries Russell Smith recently visited Greenland and in the course of their meetings concerning the Arctic to discuss Atlantic salmon with the Premier of Greenland as well as Mr Rosing and other Greenlandic government officials.

The discussion by this Commission over the next two days will be an important step toward determining where the conservation and management of Atlantic salmon should go. As has been the case in the past here in NASCO, an open dialogue, cooperation, and collaboration amongst us

all – even, or especially, on the difficult questions - will be critical to this work. We hope others share our view so that the meeting can be as productive as possible and result in concrete outcomes.

We are committed to NASCO, to science-based management that takes appropriate account of uncertainties, and to the process we have begun here today. As you all know, we are seriously concerned about our critically endangered populations of Atlantic salmon. The risk of extinction of these populations is real, and our responsibility, individually and collectively, to avoid such an outcome cannot be overstated.

It will come as no surprise, therefore, that the marked uptick in landings at West Greenland in 2012 and 2013 is concerning. At the annual meeting last June, we cited the approval of landings to factories as providing an incentive for increasing fishing effort and means to extend the market. It seems that concern has been realized.

So for today and tomorrow, we are keen to further broaden the Commission's dialogue on the conservation and management of Atlantic salmon from where it was last June. We look forward to sharing with you a report on US efforts to conserve and restore Atlantic salmon over the years and an update on the status and trends of US returns. And we look forward to hearing similar reports from the other parties, and, in particular, to enhancing our understanding of the fishery at West Greenland; its importance to Greenland, and how it is managed – all in hopes that we can find common ground on the question of how to effectively conserve and manage this iconic species in line with our responsibilities under the NASCO Convention as well as the various agreements and decisions we have reached over the years.

Thank you, Mr Chairman.

Annex 3

Opening Statement by Non-Governmental Organisations

Preliminary information indicates that the total catch of North American and European salmon at Greenland increased from 34 tonnes in 2012 to 47 tonnes in 2013. In addition, there is an unreported catch assumed to be ten tonnes. The majority of the salmon caught in 2013 (82%) were of North American origin. Salmon from endangered populations in the United States and threatened, endangered and at-risk populations in Canada migrate to West Greenland and are potentially harvested there. The rest of the harvest in 2013 (18%) originated from southern Europe, where many salmon populations are not meeting conservation limits. Millions of dollars in public and private money are spent to recover these salmon populations in their home rivers. For example, a $62 million project focused on dam removal to restore sea-run fish in the Penobscot River in Maine will come to completion in the next couple of years. This huge investment on behalf of wild salmon is jeopardized by an increasing fishery at Greenland to sell to factories.

Advice from the International Council for the Exploration of the Sea (ICES) is that the number of North American two-sea-winter salmon is substantially below the conservation limits, and there should be no harvest where salmon from various rivers are mixed together, which is the case in Greenland waters. The NGOs accredited to NASCO implore all Parties at this WGC meeting to take all necessary steps to reach the goal of reducing the harvest of salmon at Greenland to a well-managed subsistence fishery of no more than 20 tonnes.

Annex 4

List of Participants

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Annex 5

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Objectives of the Meeting
5. Status of MSW salmon stocks
6. Review of the internal-use fishery at West Greenland
    - catches and catch composition
    - management measures
    - monitoring and surveillance
7. Review of management measures for MSW salmon in homewater fisheries
8. Future regulation and management of the West Greenland salmon fishery
9. Other Business
10. Report of the Meeting
11. Close of the Meeting

Annex 6

Background Information from
European Union Member States
on the Status of MSW Salmon Stocks

WGCIS(14)6

Status of MSW salmon stocks contributing to West Greenland fishery in EU - UK (England and Wales)

(Inter-sessional meeting agenda item 5)

Overview

In England and Wales the MSW stock as a whole (assessed using the ICES approach) is estimated to be above the Conservation Limit but this is not the case for each individual river stock.

This reflects marked improvements in the status of some MSW stocks over the past two decades (e.g. the River Tyne), but this has masked the decline of other historically significant MSW salmon stocks, some of which (e.g. the Wye and the Avon) remain in a depleted state.

Detail

There are 64 principle salmon rivers in England and Wales. Information on the status of the salmon stocks and fisheries in these rivers in 2013 has been provided in the national report submitted to ICES in March.

Assessments of these stocks are based, in part, on rod catch returns. Information from rod catch returns is also used to inform estimates of the relative status of 1SW and MSW stock components. The provisional declared rod catch in 2013 of 13,491 fish was the 7th lowest in the available time series (since 1956). Catches of 1SW salmon (grilse) were the lowest since 2003. However catches of MSW salmon, while lower than in 2011 and 2012, remained among the highest for more than 15 years. There has also been a marked increase in the proportion of MSW salmon in the catch in the last three years (despite a poor total catch in 2013).

Conservation Limits, based on total egg deposition requirements, have been set for each of the 64 principal salmon rivers in England and Wales, in line with NASCO requirements. We do not use a separate CL for MSW salmon, but take account of trends in the age composition of the stocks when making management decisions.

In 2013, 40% of the 64 principal salmon rivers in England and 68% of those in Wales were assessed as being ‘at risk’ (<5% probability of achieving the Conservation Limit in four years out of five). Some of these ‘at risk’ rivers, such as the Wye and Hampshire Avon, have traditionally supported predominately MSW runs.

The total England and Wales salmon stock is also assessed annually using the method applied by ICES. This indicates that the MSW component of the national stock is above CL, but the 1SW component is below. This assessment is not used when making local management decisions.

WGCIS(14)7

Status of MSW salmon stocks contributing to West Greenland fishery in EU -UK (Northern Ireland)

(Inter-sessional meeting agenda item 5)

Typically most of the rivers in NI are dominated by grilse stocks with the MSW component averaging around 10-30% in most rivers. The only long term data is from the River Bush where up until 2011 the MSW component was consistently around 10% of the total run (Fig. 1). Over the last two years the MSW component on the River Bush has risen to c. 30 %, although it should be noted that this increase was due in part to reduced returns of 1SW salmon particularly in 2012. The relative (smolt to adult) survival rate of 2SW salmon returning to the River Bush has increased during the last decade from 0.15% in 2002 (2000 smolt year) to 1.34% in 2012 (2010 smolt year) (Fig. 2). Biological sampling on the Lower Bann River (the largest salmon producing river in the DCAL area) indicated that MSW fish composed around 30% of the total run in 2010-11. Recent increases in spawning escapement for MSW fish in Northern Ireland may be influenced by natural processes particularly in the marine environment. However they may also be due, in part, to a range of management measures introduced around 2000-1 which targeted the conservation of MSW stocks (see below).

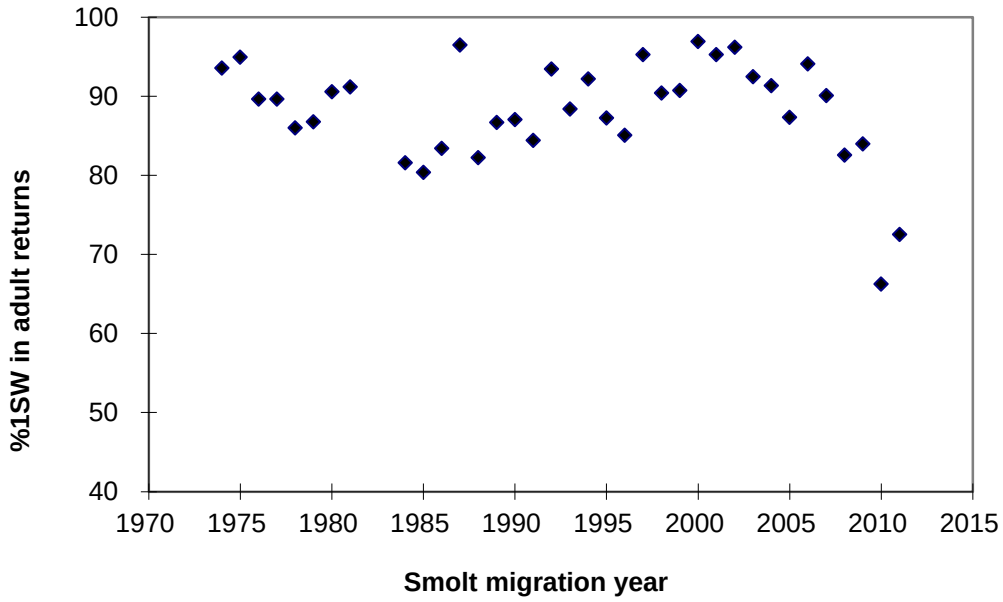

Fig. 1 Percentage of salmon maturing as 1SW adults to the R. Bush from each smolt cohort.

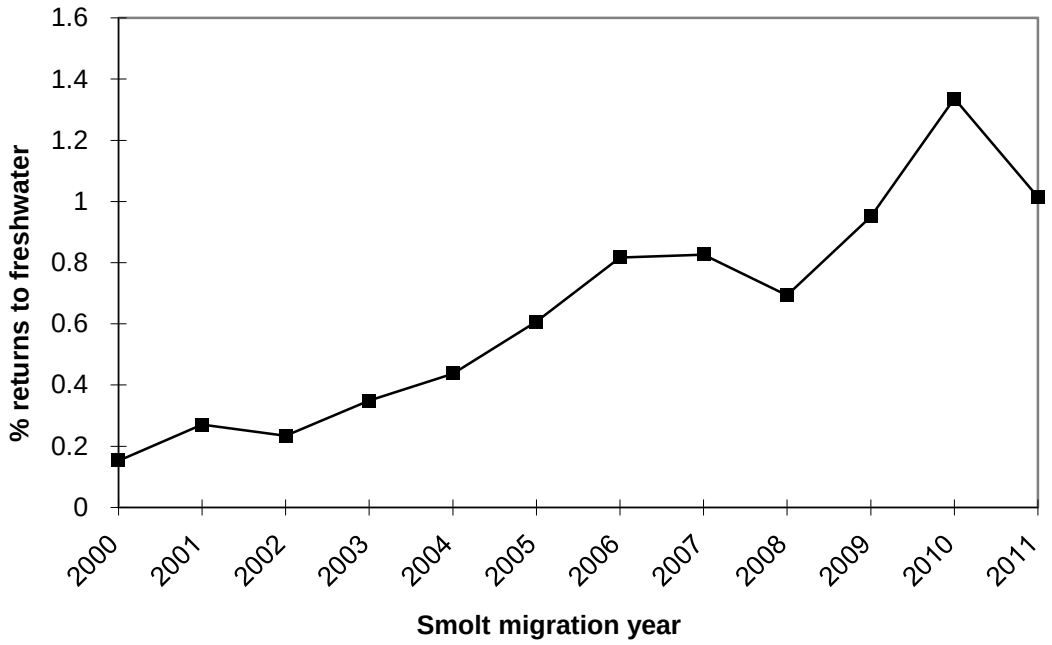

Fig. 2 Returns to freshwater of 2SW wild salmon from the River Bush, N. Ir

WGCIS(14)8

Status of MSW salmon stocks contributing to West Greenland fishery in EU-UK (Scotland)

(Inter-sessional meeting agenda item 5)

1. The Scottish Government (Marine Scotland) are developing CLs/spawning escapement estimates (see Implementation Plan: http://www.nasco.int/pdf/2013%20papers/CNL(13)50%20FINAL.pdf)

2. In the meantime, national assessment is carried out using rod catch data (indirect measure) in conjunction with direct measures of abundance where available (see Scottish Salmon and Sea Trout Fishery Statistics: http://www.scotland.gov.uk/Topics/marine/science/Publications/stats/SalmonSeaTroutCatches and Status of Salmon Stocks: http://www.scotland.gov.uk/Resource/0044/00446406.pdf).

3. The data suggest that it is the early running (spring) component of the MSW stock that is of most concern.

   As the work on developing CLs continues, Scotland, along with a number of other countries, contributes to the stock assessment work of ICES/NASCO by using the NEAC PFA run-reconstruction model which provides stock assessment measures at the national scale (http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WGNAS/wgnas_2013.pdf). However the referenced report makes the following statement regarding the use of stock status measures derived by this method (for large scale assessments) for management in homewaters as follows:

   "The Working Group also emphasized that the national stock CLs are not appropriate to the management of homewater fisheries. This is because fisheries in homewaters usually target individual or smaller groups of river stocks and can therefore be managed on the basis of their expected impact on the status of the separate stocks. Nevertheless, the Working Group agreed that the combined CLs for national stocks exploited by the distant water fisheries could be used to provide general management advice at the level of the stock complexes."

   The output from this model indicates that, for Scotland, both returns and spawners have remained relatively stable since the late 1990s and that spawner values fluctuate around the CL.

WGCIS(14)14

Status of MSW salmon stocks contributing to West Greenland fishery and Management measures for MSW salmon in home water fisheries in EU- Ireland

(Inter-sessional meeting agenda items 5 and 7)

1. Ireland's management measures to support the conservation of salmon stocks

In 2007, Ireland closed its mixed stock salmon fisheries and facilitated the closure of many commercial fisheries with a "Hardship Scheme"; the cost to the Irish government of this scheme was in the region of €25m. It is also at this time that Ireland moved to management of all salmon rivers on a catchment by catchment basis.

Ireland expends a significant amount of resources in researching and providing advice on the status of Ireland's salmon. Each of Ireland's 143 salmon rivers has an established Conservation Limit (CL) and is managed individually. Ireland Standing Scientific Committee on Salmon provides advice each year on the predicted salmon returns by catchment for the year ahead; this information is used to establish any potential surplus/deficit for each river. Based on this advice managers draft and implement legislation to ensure the conservation of salmon stocks.

		Number of Rivers 2014	Number of Rivers 2013
1SW	**Open**	57	57
1SW	**Catch & release**	30	15
1SW	**Closed**	56	71
	Total	143	143
MSW	**Open**	11	11
MSW	**Catch & release**	2	2
MSW	**Closed**	3	3
	Total	16	16

Table 1

Salmon Conservation Funds are generated from the sale of salmon angling and commercial fishing licences which represents a major contribution by licence holders to wild salmon conservation. The revenue generated from the Salmon Conservation Fund is reinvested to promote the recovery and conservation of our salmon stocks. Since 2007 over €3.7m has been generated by this fund with over 140 projects supported, across a diverse range of areas including:

- River Bank Protection
- Spawning Ground Rehabilitation
- In-stream Works
- Weirs and Pools Rehabilitated
- Fish Pass Improvements
- Assessment of Attainment CL
- Removal of Trees/Overgrowth

- Fish counter installation
- Salmonid Research

Projects are assessed based on the river's conservation limit status, its water quality (Q-value) and the maximum potential project benefits to the river with funding prioritised for those rivers in most need of rehabilitation. Inland Fisheries Ireland (IFI) manages this fund and also supports additional measures to salmon habitat restoration though the Environmental Riverine Enhancement Programme (EREP). The EREP programme is a collaborative programme between IFI and the Office of Public Works (OPW) which has spent approximately €2.5m/yr. for the past 6 years on formerly arterially drained channels to restore and preserve salmonid habitat; approximately 90% of these works directly support salmon production. It is also worth noting that expert IFI staff in each River Basin District support the restoration and development of their local salmon catchments.

Inland Fisheries Ireland is tasked with the protection and conservation of Ireland's salmon stocks. The protection element involves the protection of stocks and the enforcement of salmon conservation legislation. This includes patrolling out to 12 miles at sea using IFI's fleet of 22 Ribs and large patrol vessel; the Irish Air Corp and Navy also support this protection activity. It is estimated that Ireland spends in the region of 10 to 12 million euros annually on this activity.

Salmon as a species are protected under EU Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats of wild fauna and flora and under Ireland implementation (S.I. No. 94 of 1997 & S.I. 477 of 2011) of this directive. This legislation required Ireland to take measures to maintain or restore salmon habitat and to strive to maintain or restore salmon to favourable conservation status. Ireland is obliged to monitor and report on the status of salmon under this directive, and has just completed a six year reporting cycle. The implementation of the EU's Habitats and Water Framework Directives and the embedding of their principles have supported the conservation of salmon in Ireland, these achievements have only been garnered through the provision of extensive supports and resources from the state and its citizens.

2. MSW Stocks and management measures for MSW salmon in home water fisheries in Ireland

2.1. MSW Stocks

Each of Ireland's 143 salmon rivers has an established Conservation Limit (CL) and is managed individually. Ireland Standing Scientific Committee on Salmon provides advice each year on the predicted salmon returns by catchment for the year ahead; this information is used to establish any potential surplus/deficit for each river. Based on this advice managers draft and implement legislation to ensure the conservation of salmon stocks. Multi sea winter salmon enter the majority of Irelands 143 salmon rivers either as early running spring fish over the January to May period or as summer or autumn MSW salmon. There are sixteen rivers where there is a significant stock of early running multi sea winter salmon where specific scientific assessment and advice is given annually. For the 214 advice, 11 of these stocks are meeting Conservation Limits (CL) with an exploitable surplus, two stocks are below CL but open for catch and release angling and 3 stocks are significantly below CL and are closed to angling (see table 1).

2.2 Commercial fishery

No commercial fishing takes place until after 12th May as a conservation measure to protect early running multi sea winter salmon in Ireland.

2.3 Angling Regulations

Anglers are only permitted to kill one salmon per day prior to 12th May and may only kill 3 salmon in total from the season opening until 12th May as a conservation measure to protect early running multi sea winter salmon. For multi sea winter salmon entering rivers in the summer or autumn, these fish are present along with the large numbers of one sea winter fish and separate management is not possible for the two sea age groups. There is a season bag limit of 10 salmon per angler and a three salmon per day limit in place on all rivers. In September, anglers are restricted to taking only one salmon per day as a conservation measure.

Annex 7

WGCIS(14)12

Agenda item 5: Status of MSW salmon stocks
Additional US stock status information - brief status and trends update of US returns

Summary:

Atlantic salmon stocks within the United States are currently listed as endangered under the Endangered Species Act (ESA; 74 Federal Register 29344, 19 June 2009). The US population was segregated into three Distinct Population Segments (DPS, Figure 1): Long Island Sound (LIS), Central New England (CNE) and Gulf of Maine (GOM) for the purpose of listing under the ESA. The LIS and CNE segments were extirpated in the 1800's; limited restoration programs are ongoing within these two DPSs.

Estimated Atlantic salmon returns to rivers within the United States totaled 608 individuals in 2013 (Table 1). The 2013 total is 65% of the 2012 total (939) and 26% of the previous 5-year mean (2008-2012; 2,349). Total adult returns in 2012 were 23% of the 2011 total (4,167), which was the highest since 1990 (4,375). Adult abundance of Atlantic salmon declined through the 1990's and early 2000's (Figure 2). With slight increases in marine survival in the late 2000's (Figure 3), adult abundance increased slightly. Marine survival and adult abundance returned to their previous low levels in 2012 and 2013.

All Atlantic salmon within the United States face numerous challenges in both freshwater and marine environments. River-specific management options are tailored to account for river-specific threats and opportunities. In 11 out of the 24 years since 1990, the GOM DPS has replaced itself in subsequent generations (i.e., more adults have returned than returned 5 years prior; Figure 4). Although the overall abundance of U.S. salmon stocks remains low, a combination of management actions and natural reproduction has resulted in population growth in some years. Continued efforts and favorable conditions are required to rebuild U.S. stock stocks to self-sustaining levels.

Table 1. Estimated total US adult returns by Distinct Population Segments (DPS) from 1990-2013. These data are reproduced in Figure 2.

Year	Long Island Sound DPS	Central New England DPS	Gulf of Maine DPS	Total
1990	271	321	3783	4375
1991	208	322	2089	2619
1992	496	203	2671	3370
1993	200	133	2099	2432
1994	328	47	1281	1656
1995	190	70	1531	1791
1996	261	134	2428	2823
1997	202	98	1516	1816
1998	301	151	1411	1863
1999	164	260	1143	1567
2000	78	137	632	847
2001	40	152	894	1086
2002	44	102	821	967
2003	49	190	1188	1427
2004	70	147	1413	1630
2005	188	59	1028	1275
2006	215	121	1120	1456
2007	143	98	1030	1271
2008	141	180	2310	2631
2009	75	92	2192	2359
2010	52	104	1494	1650
2011	115	496	3556	4167
2012	56	139	744	939
2013	94	24	490	608

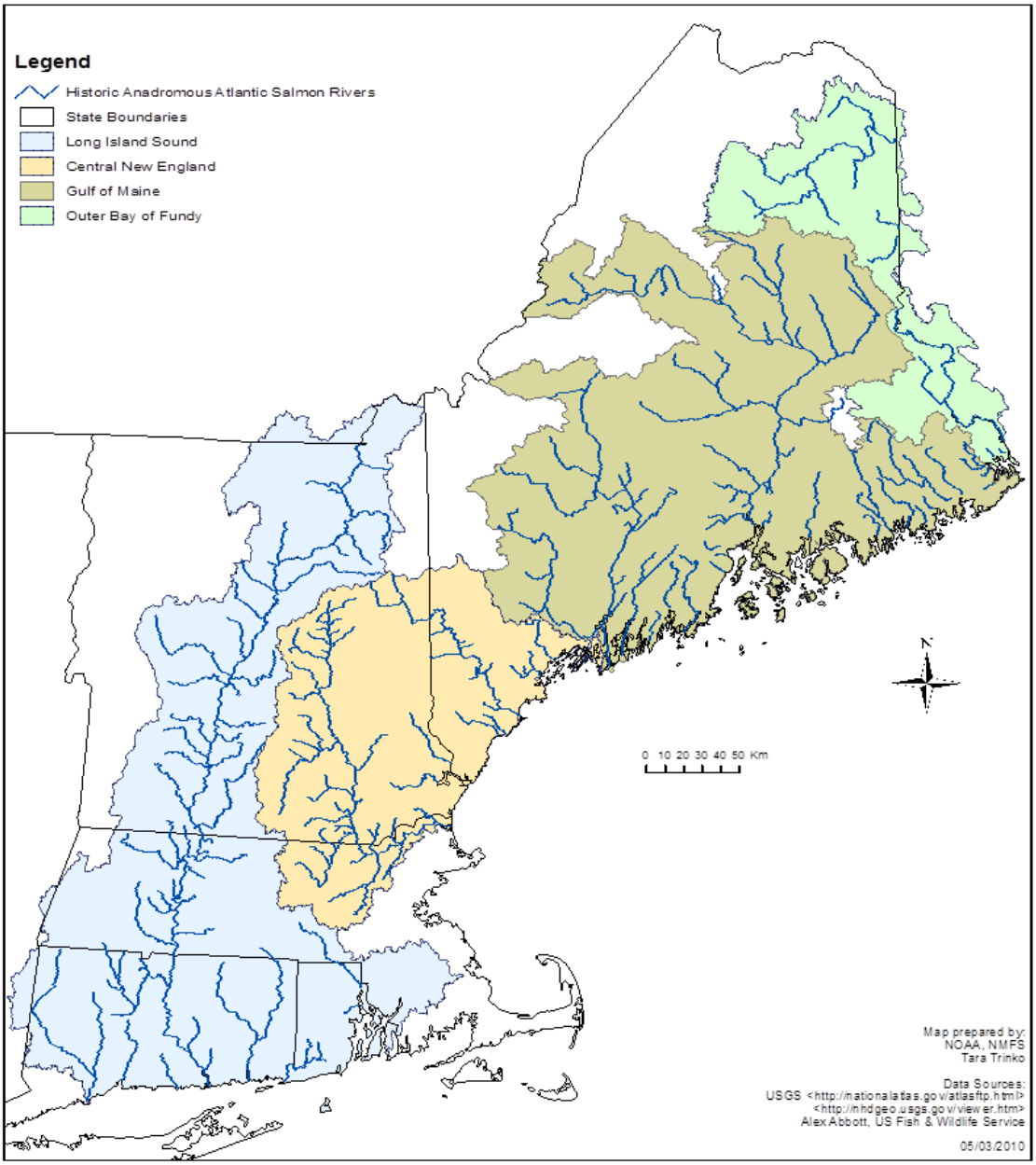

Figure 1. Historical range of U.S. Atlantic populations delineated by Distinct Population Segments (DPS) from north to south: outer Bay of Fundy (OBF), Gulf of Maine DPS (GoM), central New England (CNE), and Long Island Sound (LIS) regions.

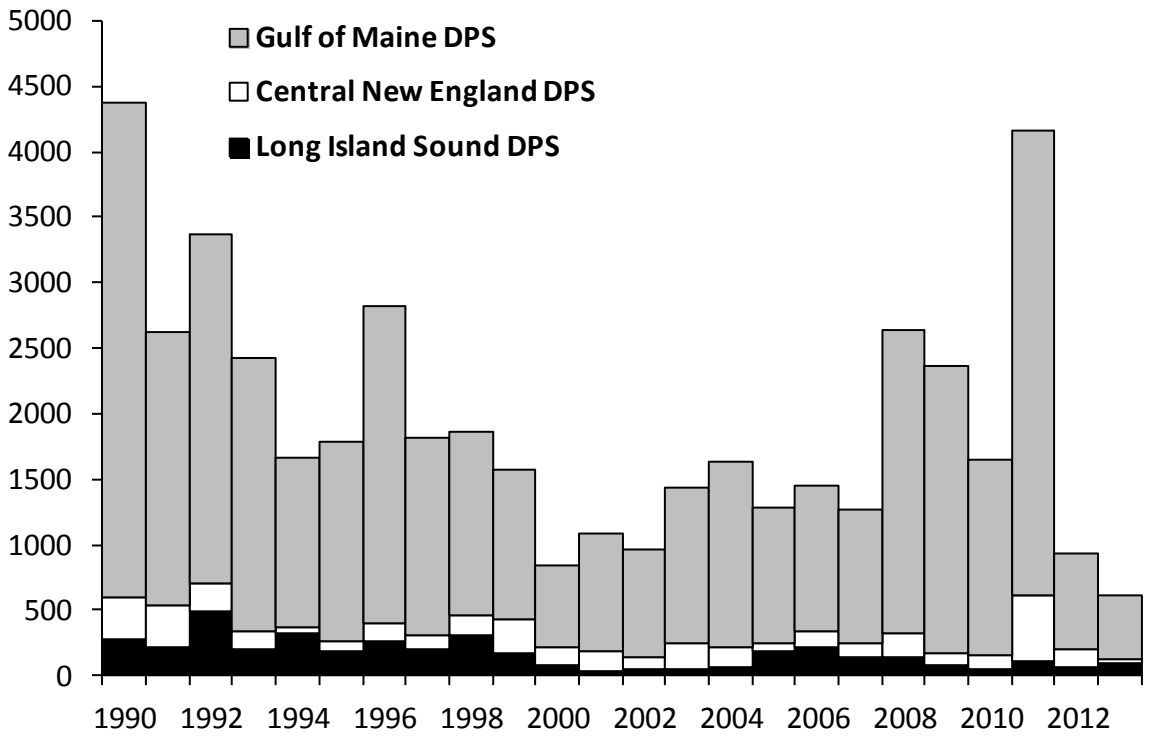

Figure 2. Estimated total US adult returns by Distinct Population Segment (DPS) from 1990-2013.

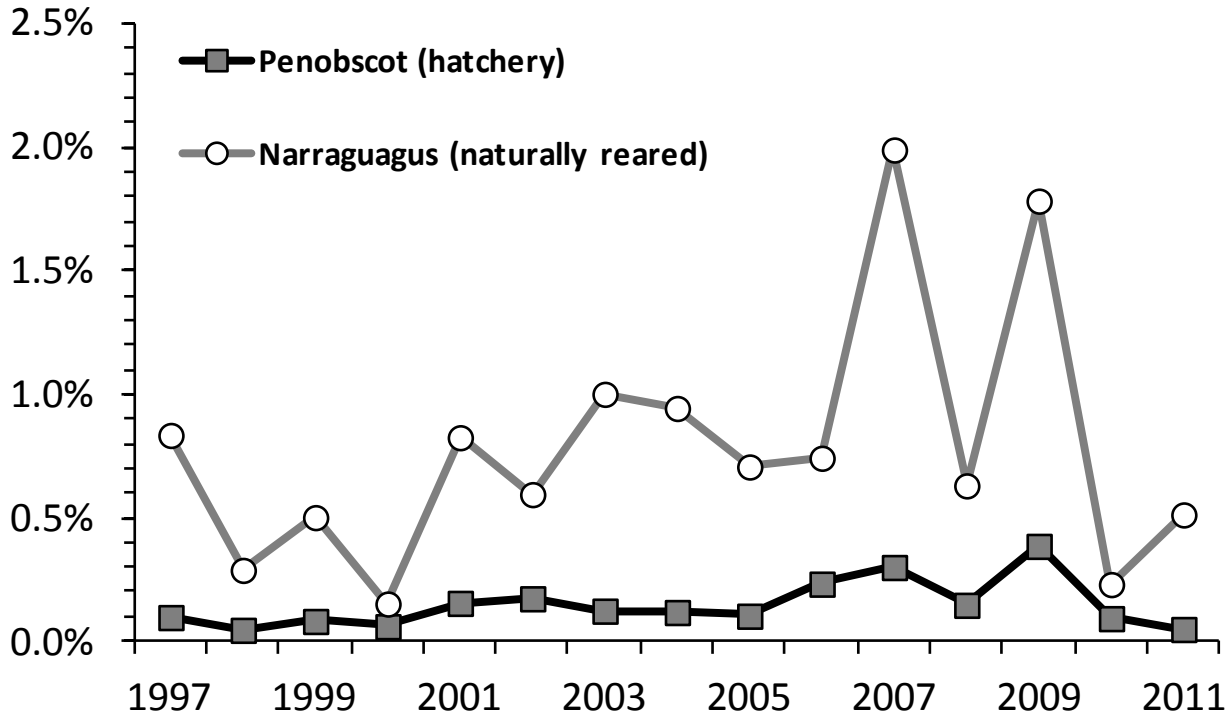

Figure 3. Return rate of 2SW adults to Gulf of Maine area for the Penobscot (hatchery reared smolts) and Narraguagus Rivers (naturally reared smolts) by smolt migration year for the time period 1997-2011. 2SW adult returns in 2013 originated from the 2011 smolt migration year.

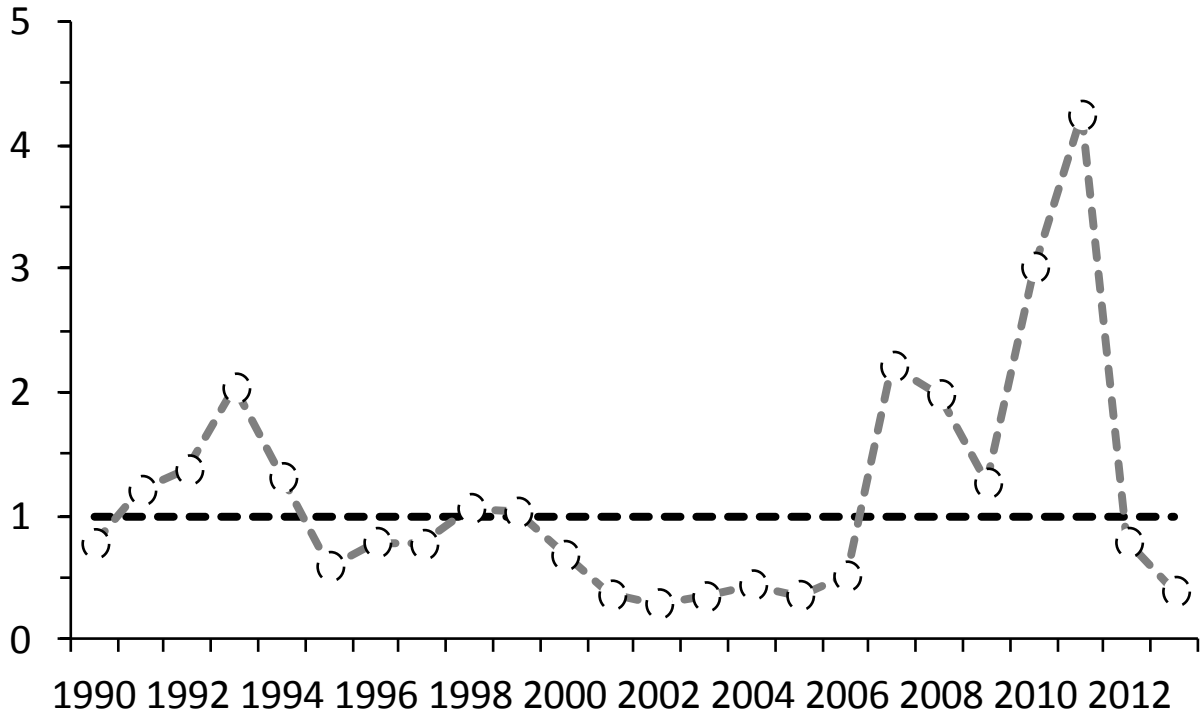

Figure 4. Estimated replacement rates for the Gulf of Maine DPS, 1990-2013. Replacement rate was calculated by dividing the estimated number of naturally reared spawners in $year_t$ by the estimated number of naturally reared spawners in $year_{t-5}$. Estimates greater than 1 represent a growing population; estimates equal to one represent a stable population; and estimates below one represent a declining population.

Annex 8

WGCIS(14)4

Report of NASCO's Ad Hoc West Greenland Commission Scientific Working Group

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INTRODUCTION

Recognising that the 2014 advice from ICES relevant to the West Greenland Commission (WGC), developed in response to the request contained in document CNL(13)10, will not be available to inform discussions at the intersessional meeting of the WGC on 14 and 15 April 2014, the Commission agreed to the following:

To convene a group of scientific representatives, nominated by the Members of the WGC, to develop a working paper to be presented at both the WGNAS and the WGC intersessional meetings. This working paper will not provide catch options or alternative management advice, but will compile available data on catches in the West Greenland salmon fishery from **1990 to 2013**, including:

a) **Reported and unreported catches;**

b) **The spatial and temporal breakdown of the catches;**

c) **The origin of the catches by continent and at finer scales where possible (e.g. country or region of origin);**

d) **Rates of exploitation on contributing stocks or stock complexes; and**

e) **Any additional scientific data related to the fishery.**

This working paper addresses this request from NASCO. The Working Paper is subdivided into five sections addressing each of the terms of references outlined above. Within each section, a series of tables and figures are presented, which present data relevant to the term of reference and is followed by a short text summary. A map of West Greenland displaying the NAFO Divisions boundaries and key communities that have historically reported Atlantic salmon landings is presented in Figure 1. The original term of reference for the group is included in Appendix 1.

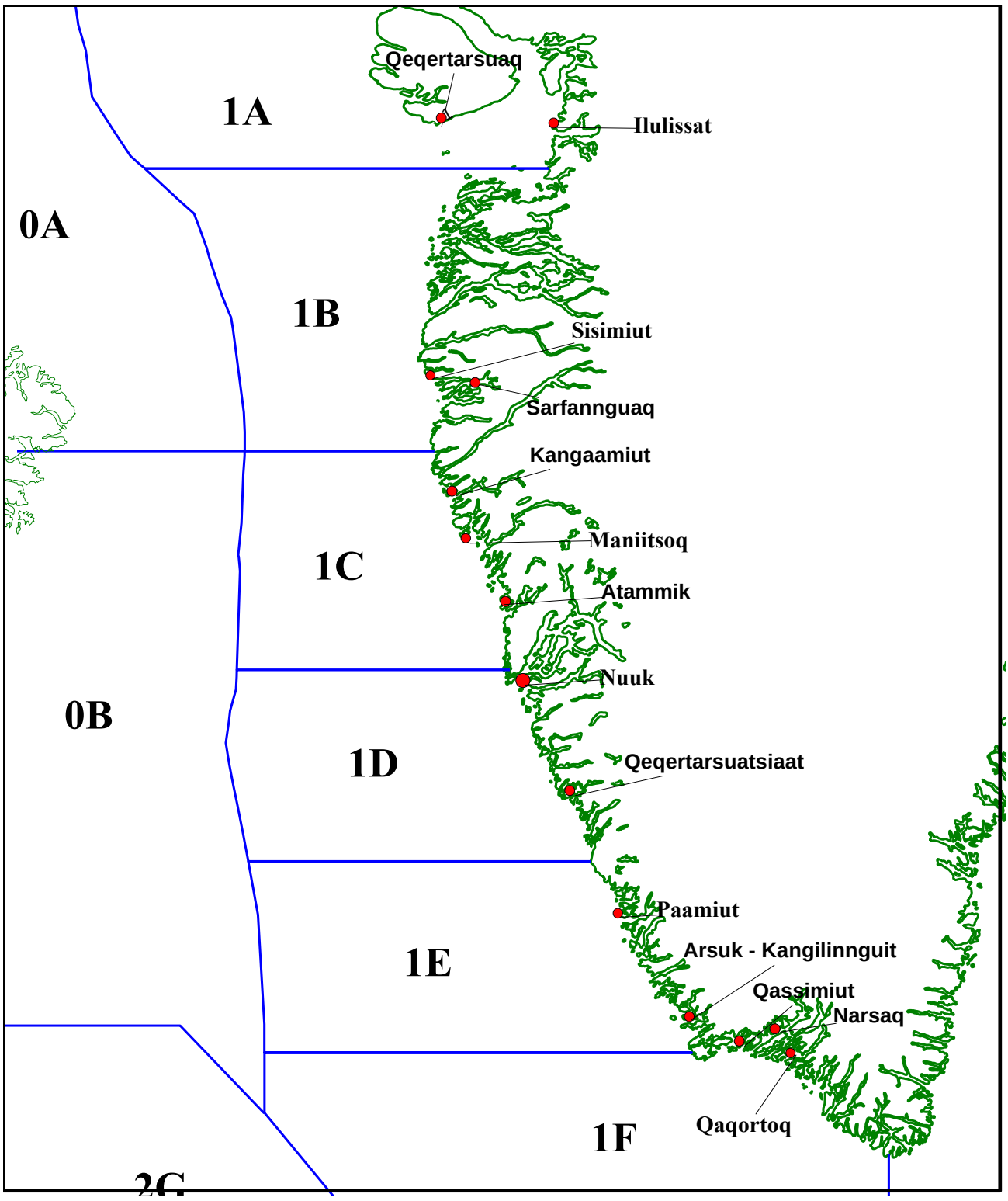


Figure 1. Location of NAFO divisions along the coast of West Greenland.

Section 1: REPORTED AND UNREPORTED CATCHES

Table 1.1. Reported landings (t) for East and West Greenland, unreported catch, adjusted landings, total landings and corresponding quota for the Greenland Atlantic salmon fishery, 1990-2013. Adjusted landings occur when the sampling team documented more fish landed than reported. When this occurs the adjusted landings are carried forth for assessment purposes, but do not supplant the reported landings.

Year	East	West	Total	Unreported	Adjusted	Grand Total	Quota	Comments
1990	-	274	274	-		274	924	
1991	4	472	476	-		476	840	
1992	5	237	242	-		242	258	Quota set by Greenland authorities
1993	-	-	0	< 12		0	89	The fishery was suspended. NASCO adopt a new quota allocation model.
1994	-	-	0	< 12		0	137	The fishery was suspended and the quotas were bought out.
1995	2	83	85	20		105	77	Quota advised by NASCO
1996	0.1	92	92.1	20		112.1	174	Quota set by Greenland authorities
1997	1	58	59	5		64	57	Private (non-commercial) catches to be reported from now
1998	0	11	11	11		22	20	Fishery restricted to catches used for internal consumption in Greenland
1999	0.4	19	19.4	12.5		31.9	20	
2000	0	21	21	10		31	20	
2001	0	43	43	10		53	114	Final quota calculated according to the ad hoc management system
2002	0	9	9	10	0.7	20	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	0	9	9	10	3.6	23		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	0	15	15	10	2.5	27		same as previous year
2005	0	15	15	10	2.0	27		same as previous year
2006	0	22	22	10	0	32		Quota set to nil (no factory landing allowed) and fishery restricted to catches used for internal consumption in Greenland
2007	0	25	25	10	0.2	35		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
2008	0	26	26	10	2.5	38		same as previous year
2009	0	26.3	26.3	10	2.5	39		same as previous year
2010	0	39.7	39.7	10	5.1	55		same as previous year
2011	0	28	28	10	0	38		Quota set to nil (no factory landing allowed) and fishery restricted to catches used for internal consumption in Greenland
2012	0	33	33	10	2.0	45		Quota set to nil (unilateral decision made by Greenland to allow factory landing with a 35 t quota), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments
2013	0	47	47	10	0.7	58		same as previous year
10-yr mean (2004-2013)	**0**	**28**	**28**	**10**	**1.7**	**39**		
Overall	**1**	**73**	**67**	**11**	**2**	**77**		

Table 1.2. Reported landings (t) of Atlantic salmon at Greenland by landings category, 1997-2013. Adjusted landings figures are not available prior to 2002. Average values are shown for 2012-2013 (contemporary factory landings era), 2002-2011 (contemporary pre-factory landings era) and 1997-2001 (historical era). Unreported catch is not included.

	Commercial	**Private**	**Factory**	**Total**	**Adjusted**
1997	1.4	2.8	55.2	59.3	*na*
1998	7.5	3.6	0.0	11.1	*na*
1999	15.4	3.6	0.0	19.0	*na*
2000	*na*	*na*	*na*	*na*	*na*
2001	0.0	8.0	34.5	42.5	*na*
2002	6.4	2.6	0.0	9.0	9.8
2003	6.0	2.7	0.0	8.7	12.3
2004	10.1	4.6	0.0	14.7	17.2
2005	7.4	7.9	0.0	15.3	17.3
2006	13.2	9.8	0.0	23.0	23.0
2007	16.6	8.1	0.0	24.6	24.8
2008	13.2	13.0	0.0	26.1	28.6
2009	14.9	11.4	0.0	26.3	28.8
2010	12.4	27.3	0.0	39.7	44.8
2011	16.5	11.0	0.0	27.5	27.5
2012	5.5	14.1	13.7	33.2	35.1
2013	7.9	13.4	25.6	47.0	47.7
2012-2013 ave.	6.7	13.7	19.6	40.1	41.4
2002-2011 ave.	11.7	9.8	0.0	21.5	23.4
1997-2001 ave.	6.1	4.5	22.4	33.0	*na*

Table 1.3. Reported landings by landings category (kg) of Atlantic salmon for cities (bold) and settlements in Greenland, 2012 and 2013. Unreported catch is not included.

		2012				2013			
NAFO/ICES Area	Landing site	Commercial	Private	Factory	Total	Commercial	Private	Factory	Total
1A	Aappilattoq					52	0	0	52
1A	Kangersuatsiaq					925	89	0	1014
1A	**Upernavik**		224		224	39	0	0	39
1A	Upernavik Kujalleq					40	0	0	40
1A	Illorsuit		180		180				
1A	Ikerasak								
1A	niagornat								
1A	Qaarsut		38		38				
1A	**Uummannaq**		86		86				
1A	**Aasiaat**	331	687		1018	139	12	0	151
1A	Akunnaaq								
1A	Ikamiut		45		45	34	111	0	145
1A	Ilimanaq								
1A	**Ilulissat**	443	114		557	172	487	0	659
1A	kangerluk								
1A	Kitsissuarsuit								
1A	**Qasigiannguit**		111		111				
1A	**Qeqertarsuaq**	499	2595		3094	89	863	0	952
1B	Attu								
1B	Kangaatsiaq		206		206	0	3	0	3
1B	Niaqornaarsuk								
1B	**Sisimiut**	69	506		578	1449	907	0	2356
1C	Atammik			2709	2709	0	0	6891	6891
1C	Kangaamiut	366		3132	3498	609	455	5388	6452
1C	**Manitsoq**	1390	1154	6240	8784	1602	2117	0	3719
1C	Napasoq					0	888	0	888
1D	**Nuuk**	1430	1560	1574	4564	499	4876	0	5375
1D	Qeqertarsuatsiaat					0	0	7981	7981
1E	Arsuk		1377		1377	858	0	5336	6194
1E	Ivittuut		64		64				
1E	Kangilinnguit		452		452				
1E	**Paamiut**	836	1264		2100	41	207	0	248
1F	Alluitsup Paa		521		521	194	0	0	194
1F	Eqalugaarsuit								
1F	Nanortalik		166		166	67	204	0	271
1F	**Narsaq**		1324		1324	956	2220	0	3176
1F	**Qaqortoq**	109	442		551	133	0	0	133
1F	Saarloq		389		389				
XIV	Kulusuk		83		83				
XIV	Kuumiut		253		253				
XIV	Tasiilaq		206		206	28	0	0	28
	TOTALS	**5473**	**14047**	**13655**	**33178**	**7926**	**13439**	**25596**	**46961**

Table 1.4. Total reported landings (t) for the periods 2010-2011 and 2012-2013 by landing type for communities that received factory landings in 2012 or 2013.

	2010-2011			2012-2013		
Community (NAFO Div.)	**Commercial**	**Private**	**Factory**	**Commercial**	**Private**	**Factory**
Atammik (1C)	0.0	0.1	0.0	0.0	0.0	9.6
Kangaamiut (1C)	0.3	0.0	0.0	1.0	0.5	8.5
Manitsoq (1C)	3.6	5.2	0.0	3.0	3.3	6.2
Nuuk (1D)	8.7	8.0	0.0	1.9	6.4	1.6
Qeqertarsuatsiaat (1D)	0.0	0.0	0.0	0.0	0.0	8.0
Arsuk (1E)	0.0	0.5	0.0	0.9	1.4	5.3
TOTAL	12.6	13.7	0.0	6.8	11.5	39.3

Table 1.5. Reported landings (t) by landings type, number of fishers reporting landings and number of reports received by licensed and unlicensed fishers, 2009-2013.

				Reported Landings		
Year	licensed	# of Fishermen	# of Reports	Commercial	Private	Factory	Total
2009	no	45	67	0.1	4.2		4.3
2010	no	98	164	0.1	12.3		12.4
2011	no	56	81	0.0	6.1		6.1
2012	no	43	112	0.0	4.1	0.0	4.1
2013	no	29	72	1.3	0.1	0.0	1.4
2009	yes	100	171	14.8	7.2		22.0
2010	yes	110	225	12.3	15.0		27.3
2011	yes	61	313	16.5	4.9		21.4
2012	yes	79	441	5.5	9.9	13.7	29.1
2013	yes	66	481	6.6	13.4	25.6	45.6

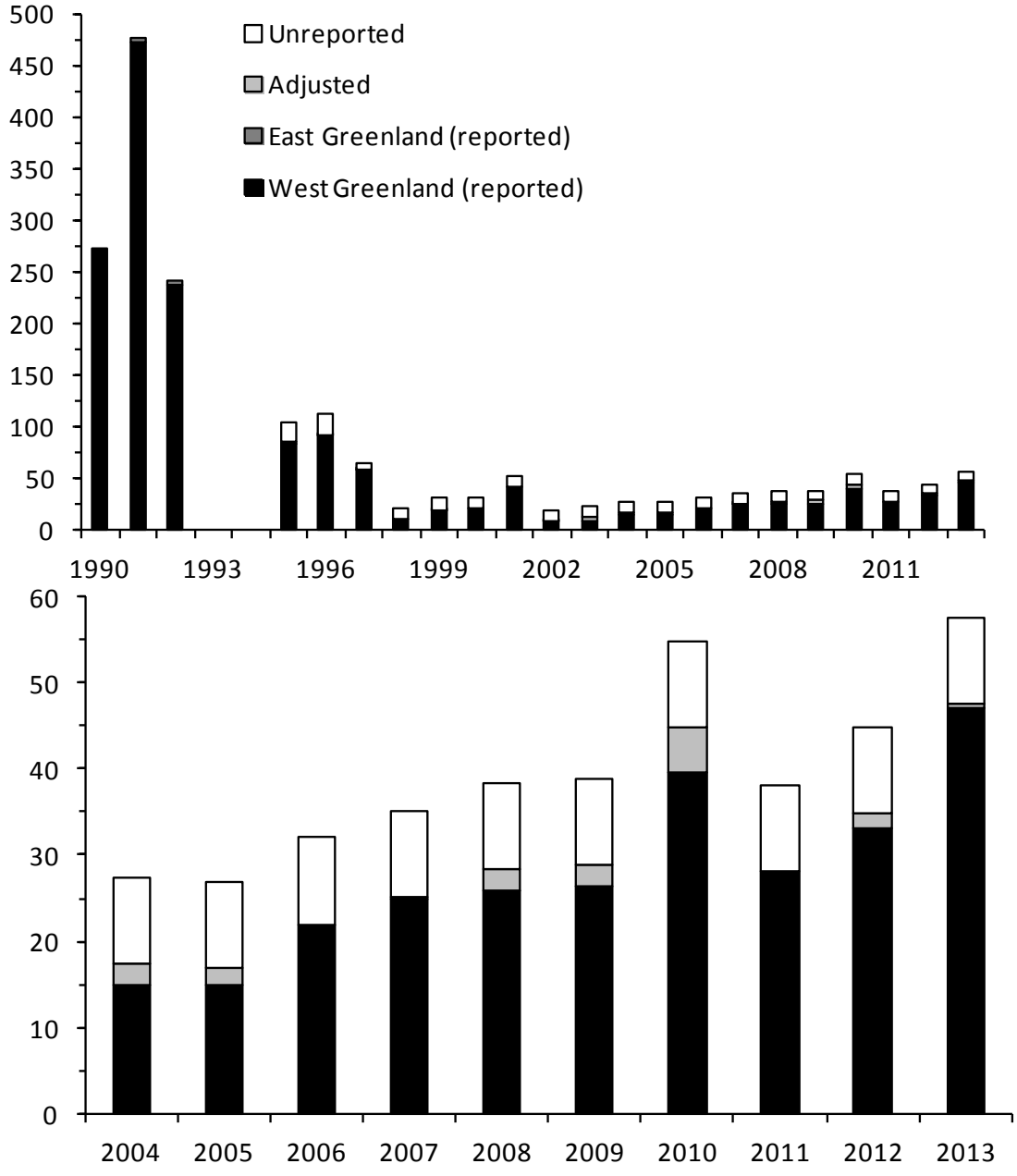


Figure 1.1. Reported landings (t) for East and West Greenland, unreported catch, and adjusted landings, for the Greenland Atlantic salmon fishery, 1990-2013 (top) and 2004-2013 (bottom).

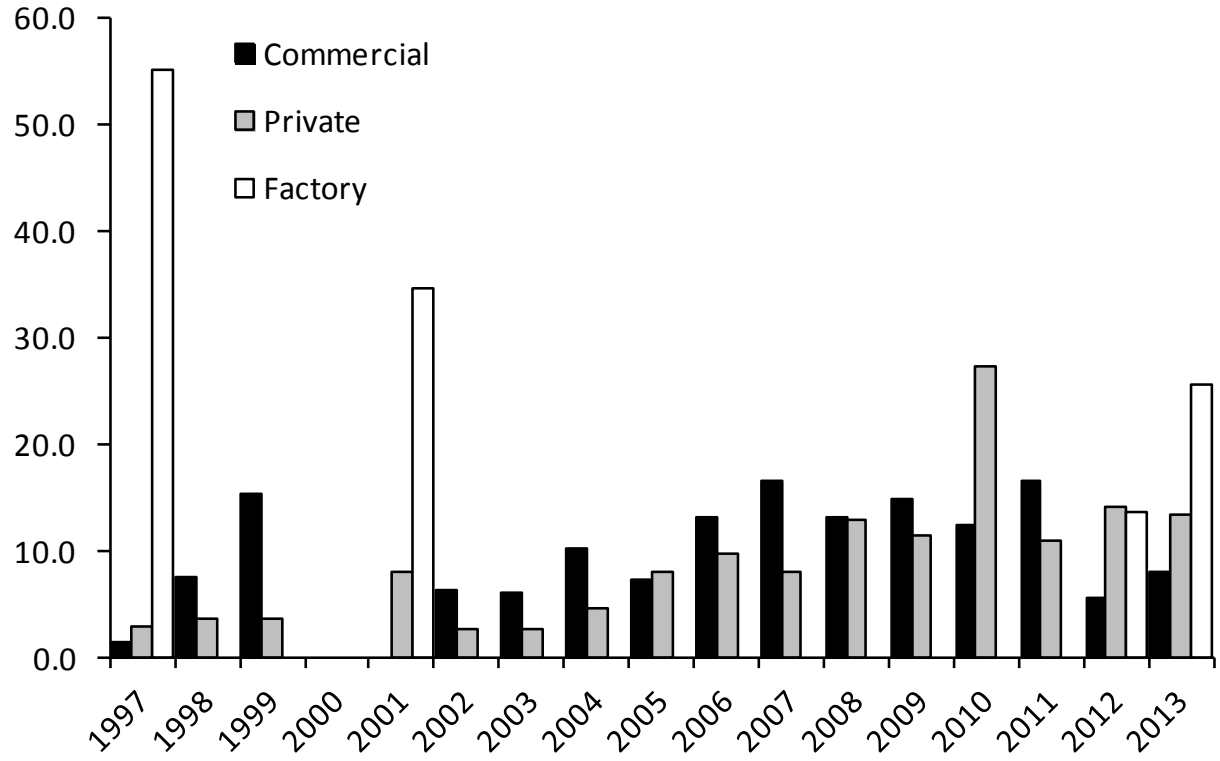


Figure 1.2. Reported landings (t) for Greenland Atlantic salmon fishery by landings category, 1997-2013.

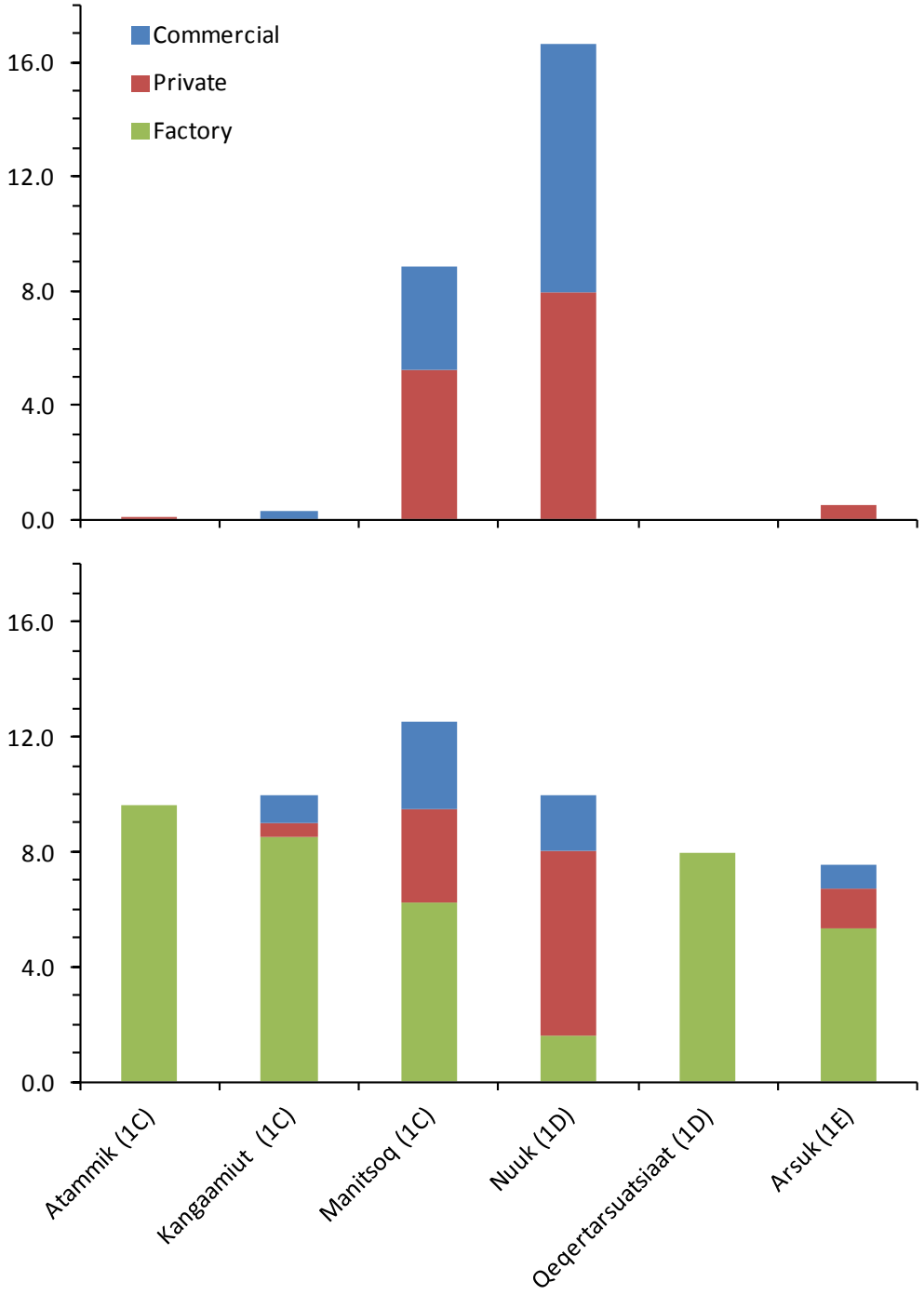


Figure 1.3. Reported landings (t) for the periods 2010-2011 (top) and 2012-2013 (bottom) by landing type for communities that received factory landings in 2012 or 2013.

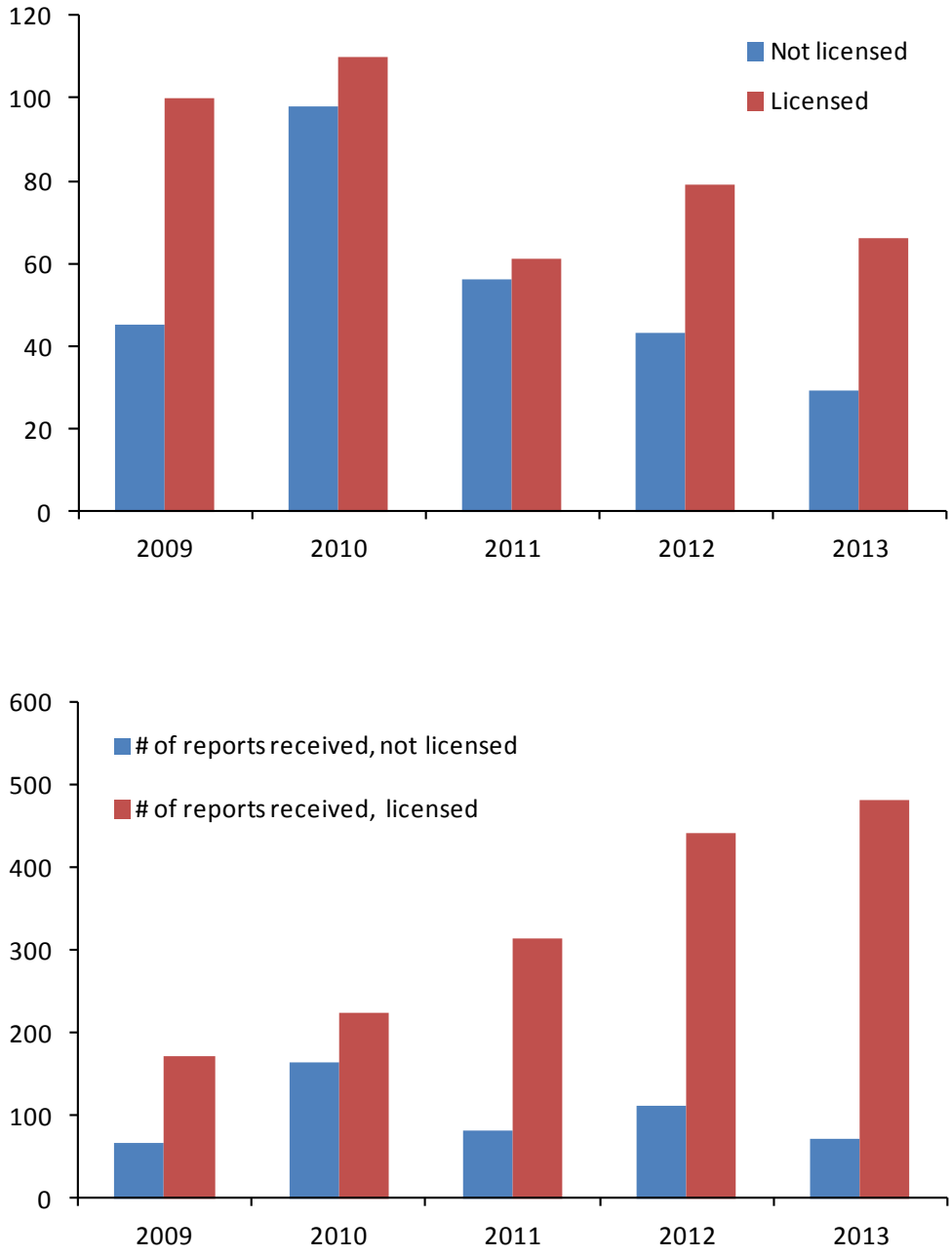


Figure 1.4. Number of licensed and unlicensed fishermen reporting landings (top) and the number of landing reports received (bottom) by licensed and unlicensed fishermen for the 2009-2013 Greenland fisheries.

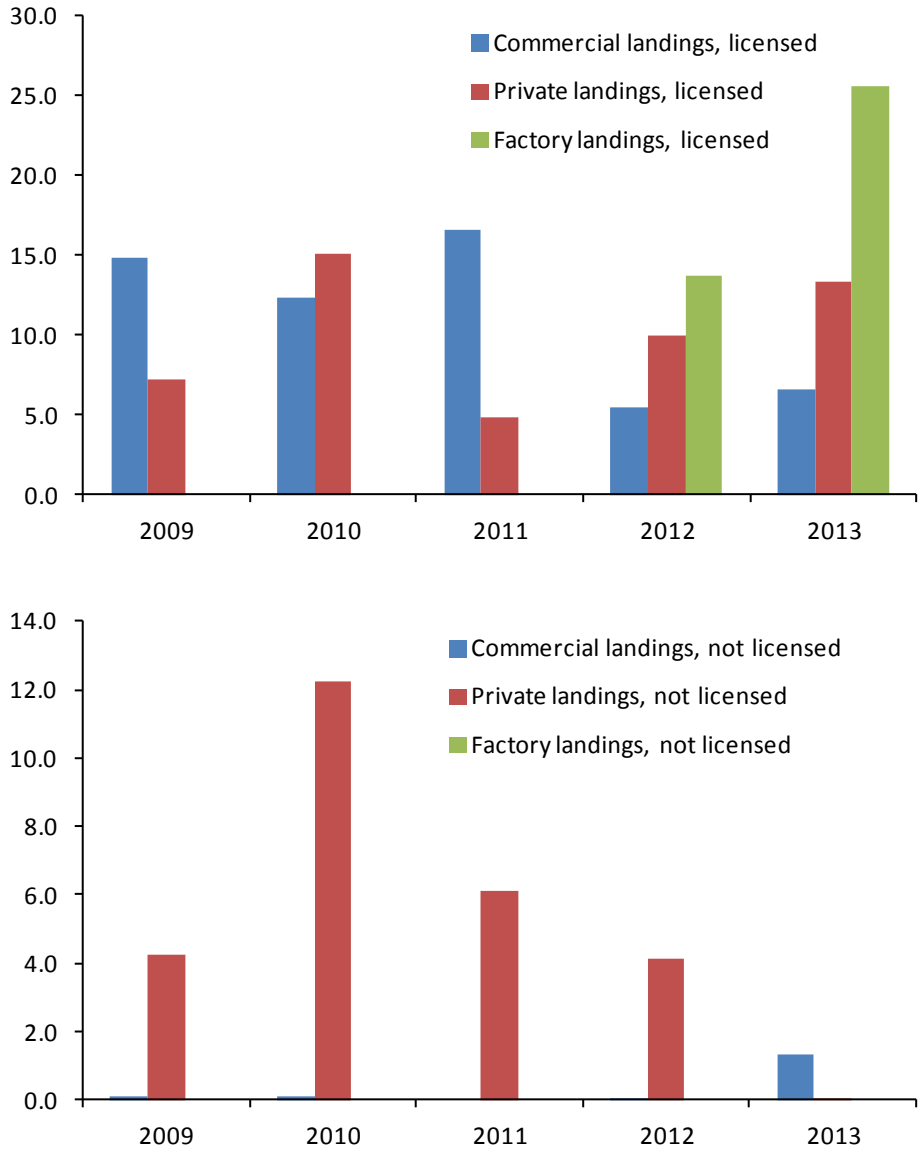


Figure 1.5. Reported landings (t) by landing type for licensed (top) and unlicensed (bottom) fishers during the 2009-2013 Greenland fisheries.

Section 1: REPORTED AND UNREPORTED CATCHES

SUMMARY:

Reported landings have been summarized for the period 1990-2013. The maximum reported landings correspond to 472 t reported in 1991 with a minimum of 9 t in 2002. Overall mean reported landings is 73 t with mean reported landings of 28 t for the recent 10 year period (2004-2013). Negligible reported landings have been reported for East Greenland (in most years <1 t) and the unreported landings have been estimated at 10 t since 2002. In all years since 2002, with the exception of 2006 and 2011, an adjustment to the reported landing has been performed. Adjusted landings occur when the sampling team documented more fish landed than reported. When this occurs the adjusted landings are carried forth for assessment purposes, but the reported landings statistics remained unchanged.

Since 1997, factory landings have only been reported in 4 years (1997, 2001, 2012 and 2013). In 2012-2013 combined, they accounted for 49% of the reported landings whereas commercial and private landings accounted for 17% and 34% respectively. Since 1997, commercial landings have accounted for 36% of the total reported landings, private 34% and factory landings 30%.

Since 2009, information is available on the reported landings by landings type for licensed and unlicensed fishers. Overall, the number of licensed and unlicensed fishers reporting landings since 2010 has decreased; the number of reports from licensed fishers has increased while the number from unlicensed fishers has decreased. The reported landings from unlicensed fishers for private use increased from 2009 to 2010 but have decreased since that time. Private landings from licensed fishers have remained approximately the same since 2009. Commercial landings from licensed fishers remained approximately the same from 2009-2011 and decreased slightly in 2012 and 2013.

Section 2: SPATIAL AND TEMPORAL BREAKDOWN OF THE CATCHES

Table 2.1. Reported landings (t) by NAFO Division for the fishery at West Greenland, 1990-2013.

Year	1A	1B	1C	1D	1E	1F	Unk.	West Greenland	East Greenland	Total
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										
1994										
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	1	3	2	1	3	5	-	15	-	15
2006	6	2	3	4	2	4	-	22	-	22
2007	2	5	6	4	5	2	-	25	-	25
2008	4.9	2.2	10	1.6	2.5	5	0	26.2	0	26
2009	0.2	6.2	7.1	3	4.3	4.8	0	25.6	0.8	26
2010	17.3	4.6	2.4	2.7	6.8	4.3	0	38.1	1.7	40
2011	1.8	3.7	5.3	8	4	4.6	0	27.4	0.1	28
2012	5.4	0.8	15	4.6	4	3	0	32.6	0.5	33
2013	3.1	2.4	17.9	13.4	6.4	3.8	0	47.0	0	47

+ Small catches <5 t.
- No catch.

Table 2.2. Reported NAFO Division-specific factory landings (t), 2012 and 2013. Standard week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov.

	2012			2013			
Standard week	**1C**	**1D**	**Total**	**1C**	**1D**	**1E**	**Total**
31	0	0	**0**	0	0.43	0	**0.43**
32	0	0	**0**	0	1.15	0	**1.15**
33	0	0	**0**	0.44	1.21	0	**1.65**
34	0.97	0	**0.97**	0.62	2.85	0	**3.46**
35	1.42	0	**1.42**	0.49	0.36	0	**0.84**
36	0.90	0	**0.90**	1.76	0.49	0	**2.25**
37	0.99	0.61	**1.61**	3.41	0.27	0	**3.68**
38	1.53	0	**1.53**	2.36	0.47	0	**2.83**
39	3.44	0.75	**4.18**	3.19	0.76	0.97	**4.92**
40	2.44	0	**2.44**	0	0	4.36	**4.36**
41	0	0	**0**	0	0	0	**0**
42	0	0	**0**	0	0	0	**0**
43	0	0	**0**	0	0	0	**0**
Total	**12.40**	**1.36**	**13.76**	**12.26**	**7.98**	**5.33**	**25.58**

Table 2.3. Reported landings (t) by NAFO standard week for the fishery at West Greenland, 1990-2006. Data provided by P. Kanneworff (retired, Greenland Institute of Natural Resources) in April 2004. Spatial segregation of landings data is assumed to be accurate during the time period presented, but is believe to be unreliable post-2006 due to changing fishery dynamics. Minor differences in reported landings are noted between Table 2.3 and Table 1.1, but are still assumed to be reflective of the spatial dynamics of the fishery during the 1990-2006. Standard week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov.

Std wk.	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
26												0.01				
27			0.04													
28																
29	1.22		0.02													
30																
31	29.42	77.51	17.41													0.23
32	11.18	111.14	31.39								0.19			0.11	0.31	1.40
33	37.15	44.57	17.35			27.29	14.50	24.81		0.66	19.49	11.01	2.30	1.82	0.17	0.57
34	39.05	24.34	23.84			27.39	10.28	14.69	2.19	3.73	0.82	8.79	0.64	1.00	1.29	0.40
35	39.04	53.14	16.74			13.66	4.59	3.53	0.77	0.72		5.71	1.03	0.45	0.42	2.10
36	17.71	28.22	12.86				8.72	3.73	1.13	3.68		8.42	0.39	0.16	0.41	1.36
37	21.76	33.38	8.75				10.45	7.86	0.59	1.43		5.38	0.45	0.43	0.27	1.12
38	18.51	20.79	6.34				17.14	3.55	2.40	0.85		1.75	0.61	0.37	1.09	1.52
39	12.15	7.82	25.83				10.52		0.48	3.19		1.33	0.57	0.40	0.35	1.18
40	25.20	47.58	2.41				3.69		0.12	2.04		0.06	0.47	0.28	0.61	1.09
41	8.16	10.71	3.19				0.92		0.13	2.55		0.05	0.43	0.31	0.94	1.09
42	1.99	5.88	2.81				0.37		0.03	0.20				1.88	0.97	0.70
43	5.20	2.32	0.52				0.44		0.35				0.28	0.06	0.57	0.79
44	2.95	4.32	3.90				0.09		0.73					0.44	1.45	0.24
45	1.45	0.19	0.08				0.01		0.11				0.31	0.53	1.15	
46	1.69	0.04	0.05				0.00		1.57				0.35	0.33		
47	0.25	0.02	0.02						0.40				0.66			
48	0.05	0.36	0.62						0.00				0.21			
49	0.03												0.21			
50									0.02				0.11	0.24		
51			0.03						0.04							
52									0.01							
53																
unk															4.74	
TOTAL	**274**	**472**	**174**	**0**	**0**	**68**	**82**	**58**	**11**	**19**	**21**	**43**	**9**	**9**	**15**	**14**

Table 2.4. Number of biological samples collected by NAFO Division and NAFO standard week for the fishery at West Greenland, 1990-2013. Sample size entries were coded with three shades of grey representing small to large sample sizes across all years (dark grey to light grey respectively) to aid in visualization. Standard week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov.

Year/NAFO Div.	Standard Week 31	32	33	34	35	36	37	38	39	40	41	42	43	44	Grand Total
1990 total	98	446	664												**1208**
1A															
1B															
1C		168	151												**319**
1D	98	185	311												**594**
1E		93	202												**295**
1F															
1991 total		177	634	536											**1347**
1A															
1B															
1C		177	173	121											**471**
1D			253	248											**501**
1E			208	167											**375**
1F															
1992 total		387	265	608	352	72									**1684**
1A															
1B															
1C		220		284	167										**671**
1D															
1E		167	96	126	185	72									**646**
1F			169	198											**367**
1995 total			767	1468	236										**2471**
1A															
1B															
1C			183	986											**1169**
1D			133	312	236										**681**
1E			451	170											**621**
1F															
1996 total			618	335	287			57							**1297**
1A															
1B															
1C			426	181	218										**825**
1D			192		57			57							**306**

Year/NAFO Div.	Standard Week 31	32	33	34	35	36	37	38	39	40	41	42	43	44	Grand Total
1E				154	12										**166**
1F															
1997 total				196	59	27									**282**
1A															
1B															
1C					59	27									**86**
1D				196											**196**
1E															
1F															
1998 total		8	181	217											**406**
1A															
1B															
1C															
1D			181	217											**398**
1E		8													**8**
1F															
1999 total				247	145	148	20	28	29						**617**
1A															
1B				17	98	5			8						**128**
1C				7	43	53		28	21						**152**
1D				202	4	52									**258**
1E															
1F				21		38	20								**79**
2000 total			491												**491**
1A															
1B															
1C															
1D			250												**250**
1E															
1F			241												**241**
2001 total			1207	612	683	249	65	45	20						**2881**
1A															
1B															
1C					307										**307**
1D			795	409	131	129									**1464**
1E															
1F			412	203	245	120	65	45	20						**1110**
2002 total			211	459	228	117	145	143	13						**1316**

Year/NAFO Div.	Standard Week 31	32	33	34	35	36	37	38	39	40	41	42	43	44	Grand Total
1A															
1B															
1C					41	62	82	108	13						**306**
1D			211	399			63	35							**708**
1E															
1F				60	187	55									**302**
2003 total		114	512	290	270	453	158					38			**1835**
1A															
1B															
1C			10	2	23	140	118								**293**
1D		22	338	48	125	176						38			**747**
1E															
1F		92	164	240	122	137	40								**795**
2004 total		52	403	136	109	416	279	185	57		22	32			**1691**
1A															
1B															
1C						4	176	185	40						**405**
1D		50	313	65	84	380	98		17		22	32			**1061**
1E															
1F		2	90	71	25	32	5								**225**
2005 total		7	70	259		119	208	90		14					**767**
1A						1									**1**
1B															
1C							71	90							**161**
1D			25	161		118	137			14					**455**
1E															
1F		7	45	98											**150**
2006 total	85	78	3	218	377	114	51	67	126	36	54				**1209**
1A										5	54				**59**
1B															
1C	85					31	11								**127**
1D		78	3	218	342			57	126	31					**855**
1E						12	19	10							**41**
1F					35	71	21								**127**
2007 total		144	273	135	207	97	58	42	91	72	5	1			**1125**
1A						1		1	2		5	1			**10**
1B															
1C								20	89	72					**181**

Year/NAFO Div.	Standard Week 31	32	33	34	35	36	37	38	39	40	41	42	43	44	Grand Total
1D		144	185	47	118	31									**525**
1E			53	68	51										**172**
1F			35	20	38	65	58	21							**237**
2008 total	69	20	64	174	181	558	299	193	131	69	9	54		45	**1866**
1A															
1B					45	184	57	92	131	59					**568**
1C															
1D	69	20	64	112	53	183	46	101		10	9	54		45	**766**
1E															
1F				62	83	191	196								**532**
2009 total			110	137	379	305	96	123	360	141	6	6			**1663**
1A															
1B					117	50		93	259	129					**648**
1C									41						**41**
1D			70	104	174	123	87	30	60	12	6	6			**672**
1E															
1F			40	33	88	132	9								**302**
2010 total			157	187	31	265	97	172	220	103	16	12		5	**1265**
1A															
1B			78	97	15	132	47	87	112	52	10	4		3	**637**
1C															
1D			21	36	8	53	27	32	32	18	2	1			**230**
1E															
1F			58	54	8	80	23	53	76	33	4	7		2	**398**
2011 total		1		37	213	358	181	88	64	24	4				**970**
1A								8	19	24	4				**55**
1B					25	76	89	66	16						**272**
1C															
1D		1			114	197	32	14	29						**387**
1E															
1F				37	74	85	60								**256**
2012 total					72	328	197	144	189	448					**1378**
1A															
1B						154	158	70	72	12					**466**
1C								33	117	436					**586**
1D															
1E															
1F					72	174	39	41							**326**

Year/NAFO Div.	Standard Week 31	32	33	34	35	36	37	38	39	40	41	42	43	44	Grand Total
2013 total					29	107	218	308	259	154	81				**1156**
1A															
1B						4	203	308	167						**682**
1C						34	6		53	128	81				**302**
1D															
1E															
1F					29	69	9		39	26					**172**

Table 2.5. Spatial distribution (NAFO Divisions) of the number of commercial Atlantic salmon fishing licenses issued in Greenland, 1990-2013.

Year	1A	1B	1C	1D	1E	1F	ICES	Unk.	Licenses	Total
1990	32	15	46	52	54	155		0		362
1991	53	39	100	41	54	123		0		410
1992	3	9	73	9	36	82		0		212
1993										
1994										
1995	0	17	52	21	24	31		0		145
1996	1	8	74	15	23	42		0		163
1997	0	16	50	7	2	6		0		80
1998	16	5	8	7	3	30		0		69
1999	3	8	24	18	21	29		0		102
2000	1	1	5	12	2	25		0		43
2001	2	7	13	15	6	37		0	452	76
2002	1	1	9	13	9	8		0	479	41
2003	11	1	4	4	12	10		0	150	42
2004	20	2	8	4	20	12		0	155	66
2005	11	7	17	5	17	18		0	185	75
2006	43	14	17	20	17	30		0	159	141
2007	29	12	26	10	33	22		0	260	132
2008	44	8	41	10	16	24		0	260	143
2009	19	11	35	15	25	31	9	0	294	145
2010	86	17	19	16	30	27	13	0	309	208
2011	25	9	20	15	20	23	5	0	234	117
2012	35	9	32	8	16	16	6	0	279	122
2013	28	8	21	19	7	11	1	0	228	95

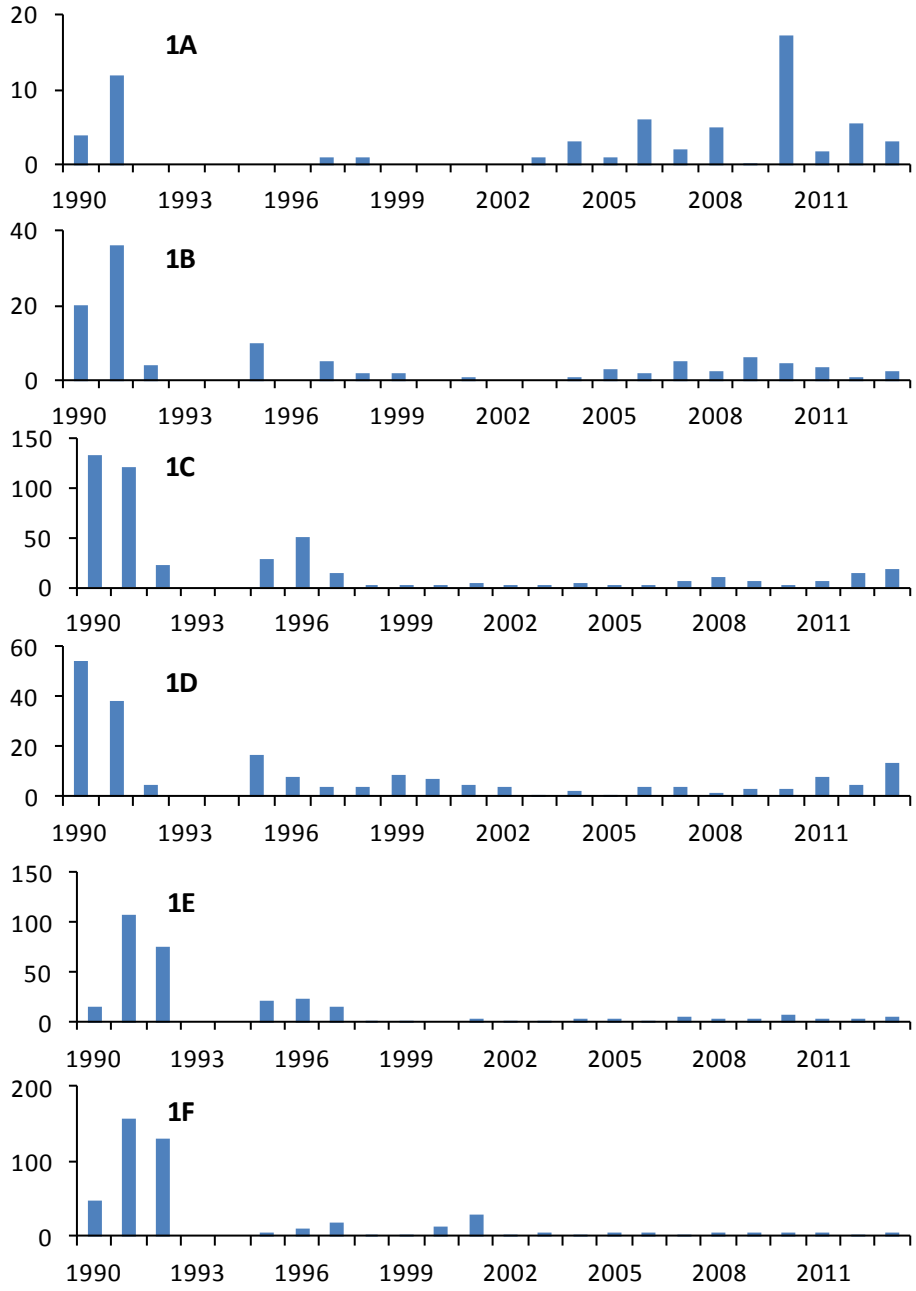


Figure 2.1a. Reported landings (t) by NAFO Division for the fishery at West Greenland, 1990-2013. Note the varying y-axes scales.

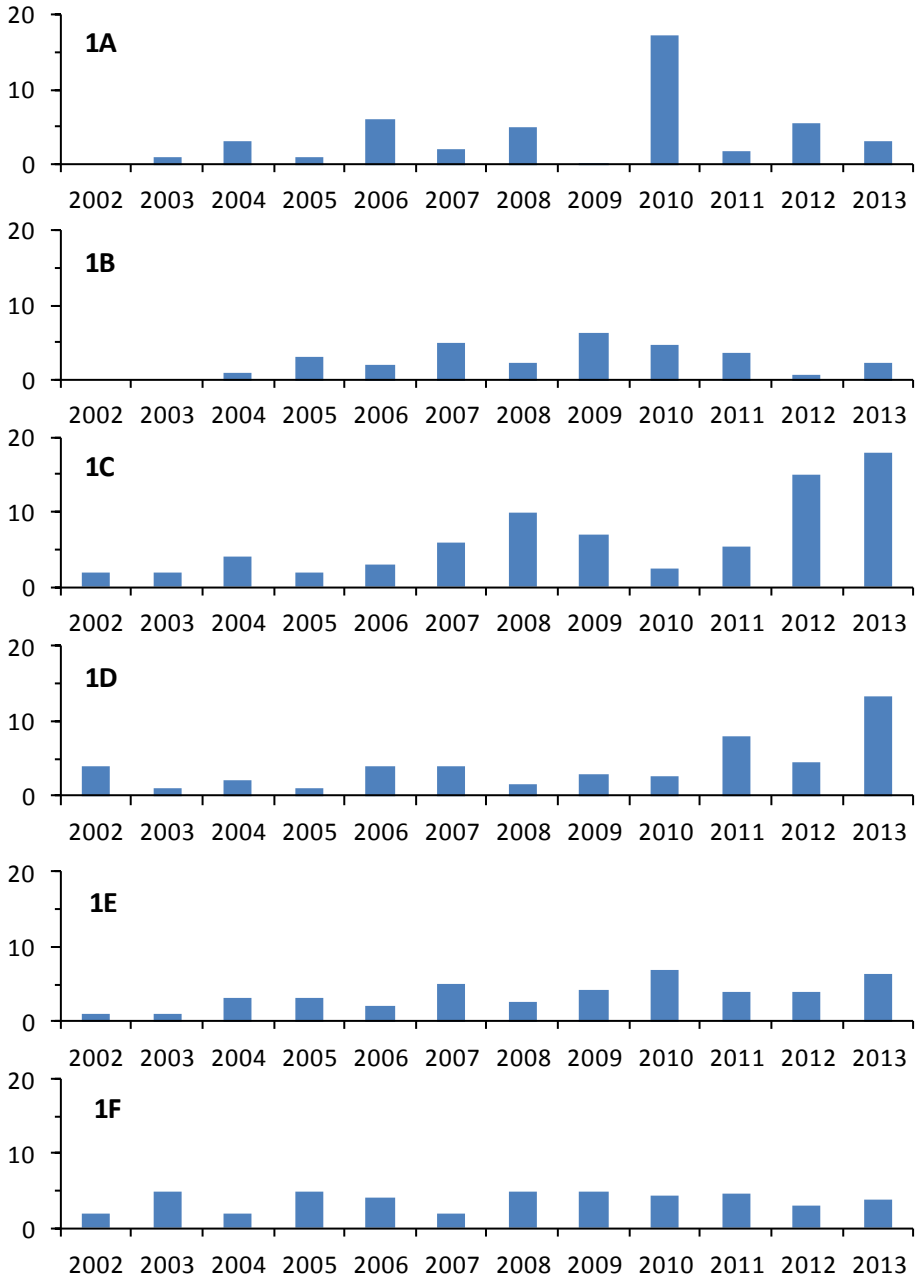


Figure 2.1b. Reported landings (t) by NAFO Division for the fishery at West Greenland, 2002-2013. Note the y-axes scales have been standardized for all plots.

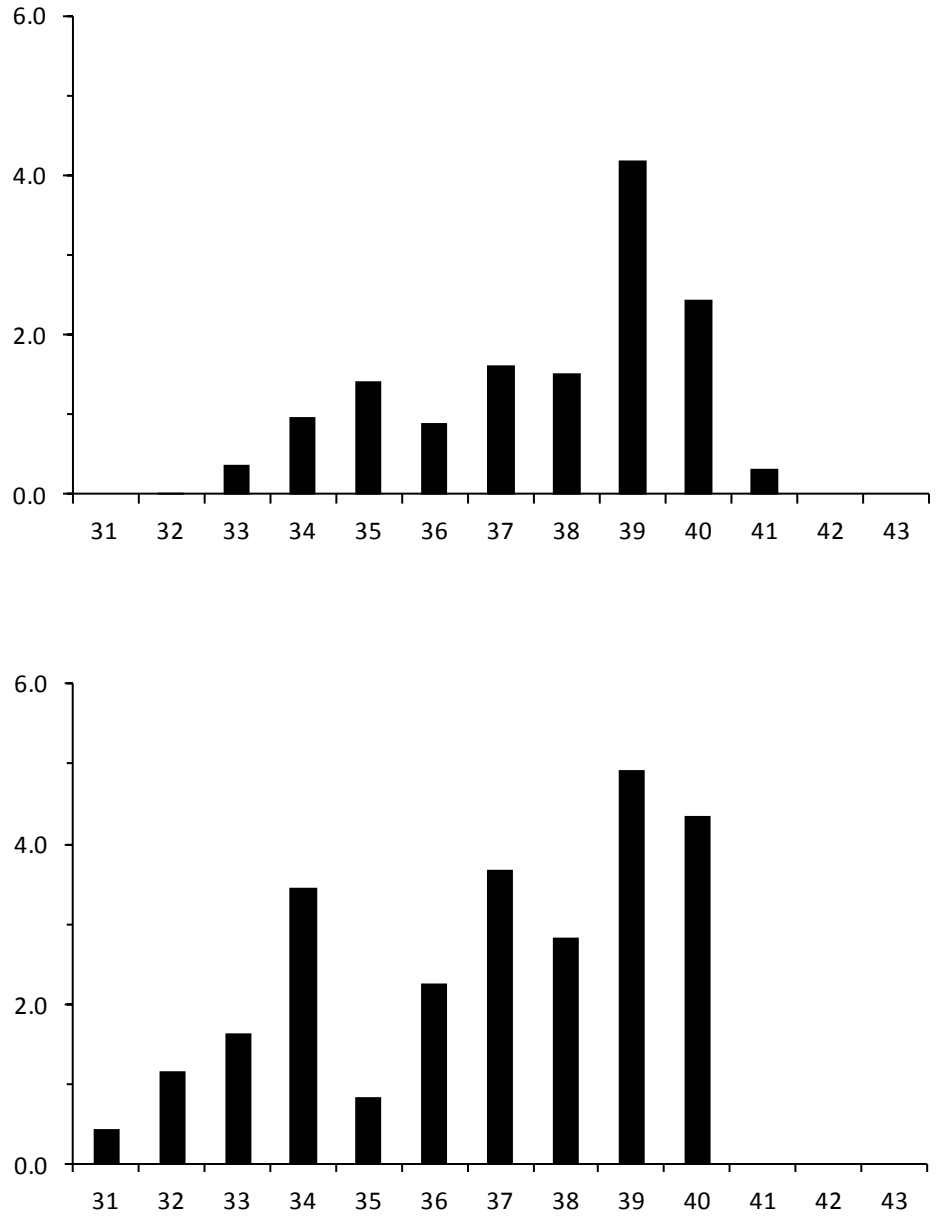


Figure 2.2. Reported factory landings (t) by NAFO standard week for 2012 (top) and 2013 (bottom). Week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov.

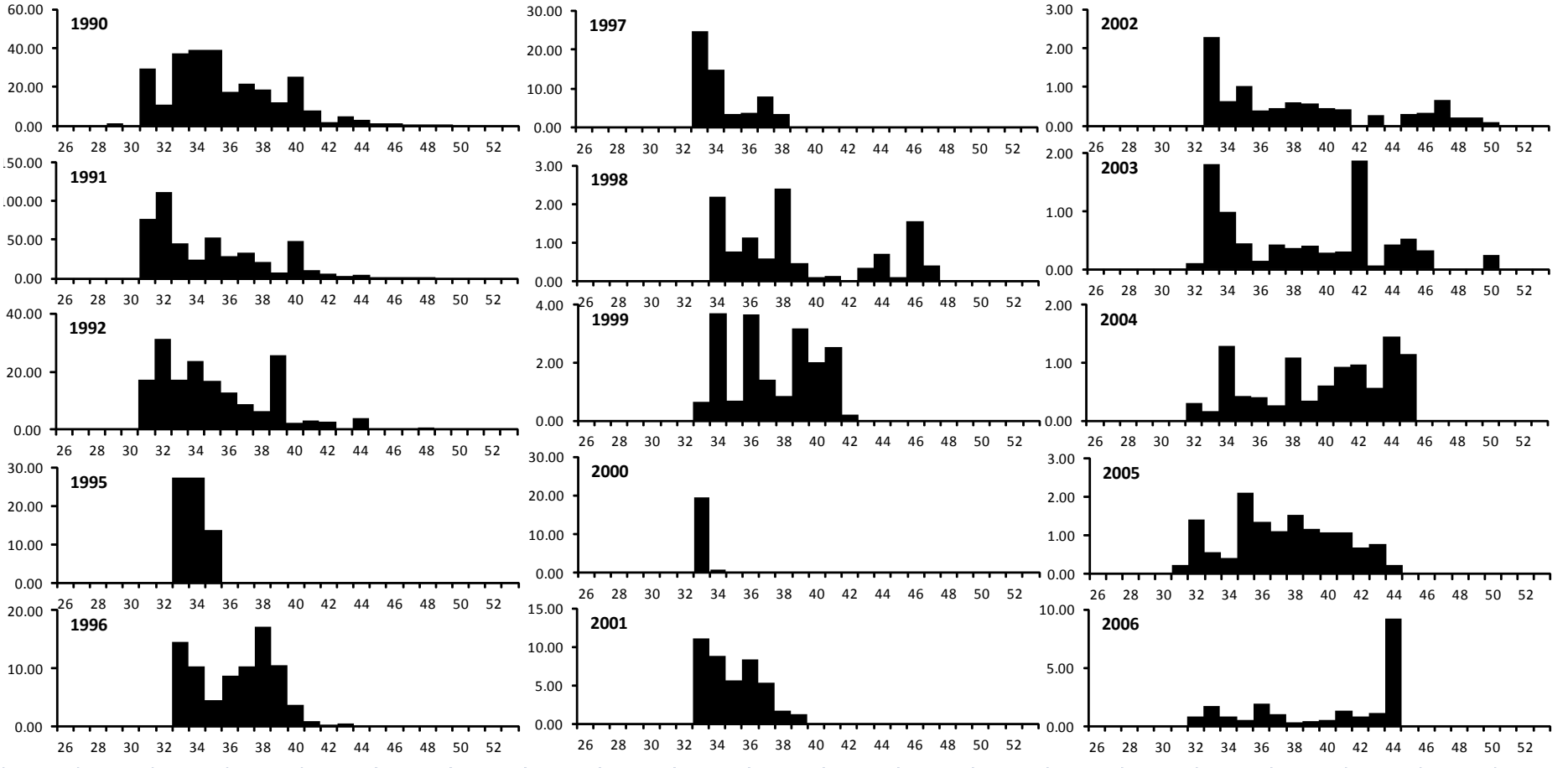


Figure 2.3. Reported landings (t) by NAFO standard week for the fishery at West Greenland, 1990-2006. Data provided by P. Kanneworff (retired, Greenland Institute of Natural Resources) in April 2004. Spatial segregation of landings data is assumed to be accurate during the time period presented, but is believe to be unreliable post-2006 due to changing fishery dynamics. Minor differences in reported landings are noted between Table 2.3 and Table 1.1, but are still assumed to be reflective of the spatial dynamics of the fishery during the 1990-2006. Standard week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov.

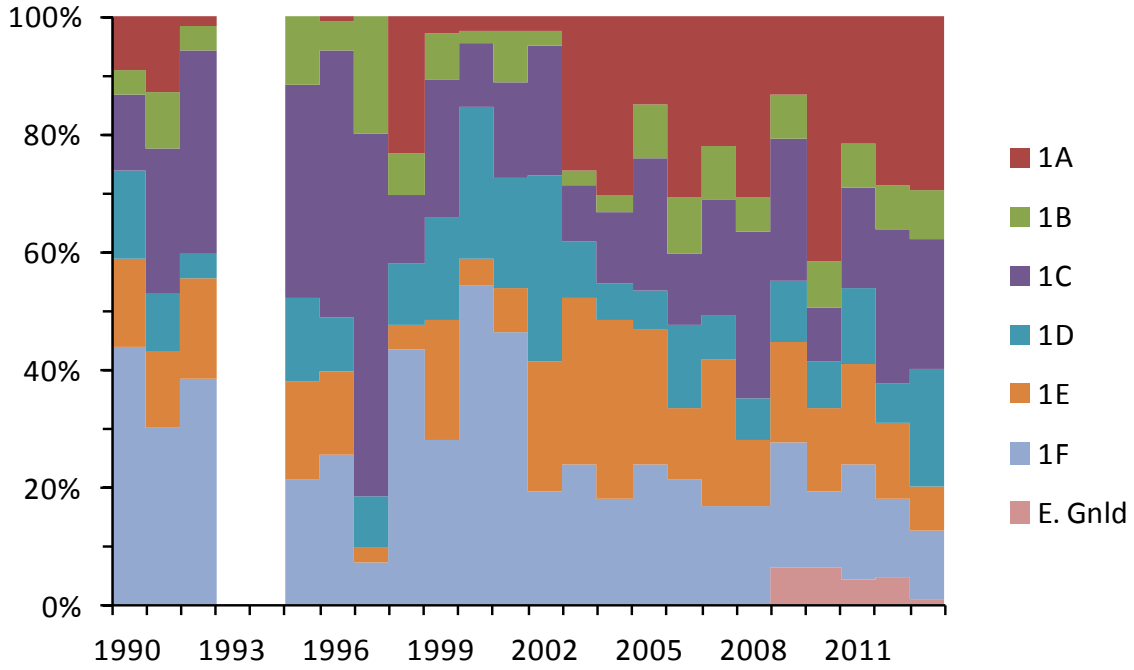


Figure 2.4. Spatial distribution (NAFO Divisions) of commercial fishing licenses issued for Atlantic salmon in Greenland, 1990-2013.

Section 2: SPATIAL AND TEMPORAL BREAKDOWN OF THE CATCHES

SUMMARY:

The spatial and temporal distribution of the Greenland Atlantic salmon fishery has varied over time although broad patterns are detected. In the early part of the 1990-2013 time series, catches were concentrated in NAFO Divisions 1C-1F although all Divisions reported landings. In recent years landings have been concentrated in NAFO Divisions 1C-1D, partially due to the presence of factory landings in these divisions in 2012 and 2013. Relative to the early part of the time series, landings in Division 1A have increased, however all NAFO Divisions still report landings. There has be a wider distribution of fishing licenses issued across all NAFO Divisions since the early 2000's.

Reported landings are temporally variable. The timing of the landings post-2006 isn't reported as the data have become unreliable. However, factory landings data from 2012 and 2013 increased as the fishing seasons progressed.

The International Sampling Program has collected a large number of biological samples (~30K) across a wide array of NAFO standard weeks and NAFO Divisions since 1990. Generally, samples in the earlier part of the time series came from fewer NAFO Division earlier in the fishing season and samples from later in the time series came from a wider range of NAFO Divisions and standard weeks.

SECTION 3: THE ORIGIN OF THE CATCHES BY CONTINENT AND AT FINER SCALES WHERE POSSIBLE (E.G. COUNTRY OR REGION OF ORIGIN)

Table 3.1. Estimated overall continent of origin (weighted by catch weight) and division-specific North American origin (not weighted by catch weight) contributions to the Greenland Atlantic salmon fishery, 1990-2013. Light grey filled cells represent low sample sizes. Dark grey filled cells identify cases where the overall estimates were modified due to a re-analysis of the continent of origins, but the division-specific estimates were not adjusted. Care should be taken when interpreting these specific data points.

	Wt'd overall proportions		Un-wt'd division-specific proportion						
Year	NA	E	1A	1B	1C	1D	1E	1F	Overall
1990	74%	26%			69%	69%	56%		75%
1991	63%	37%			64%	66%	55%		65%
1992	45%	55%			70%		40%	43%	54%
1993									
1994									
1995	67%	33%			65%	72%	59%		65%
1996	70%	30%			42%	49%	42%		42%
1997	85%	15%			59%	57%			60%
1998	79%	21%				71%	29%		79%
1999	91%	9%		79%	99%	93%		83%	90%
2000	65%	35%				89%		50%	70%
2001	67%	33%			98%	91%		55%	68%
2002	69%	31%			70%	89%		37%	68%
2003	64%	36%			80%	82%		50%	68%
2004	72%	28%			79%	75%		53%	73%
2005	74%	26%	100%		81%	78%		67%	76%
2006	69%	31%	56%		64%	74%	61%	77%	72%
2007	76%	24%	50%		71%	88%	66%	88%	81%
2008	86%	14%		85%		87%		85%	86%
2009	89%	11%		93%	85%	95%		81%	91%
2010	80%	20%		85%		82%		70%	80%
2011	93%	7%	96%	95%		95%		86%	93%
2012	79%	21%		95%	74%			77%	82%
2013	82%	18%		83%	82%			74%	82%

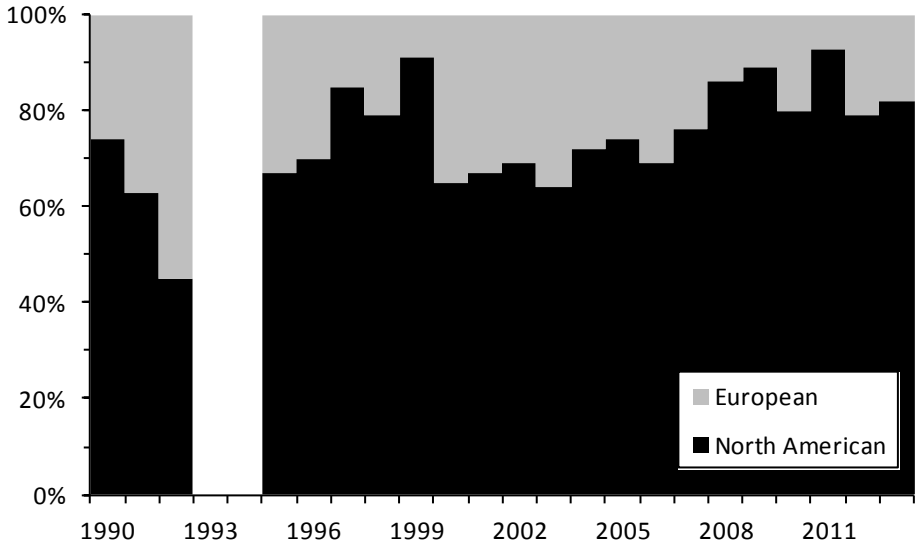


Figure 3.1a. Overall continent of origin proportion (weighted by catch weight) for the Greenland Atlantic salmon fishery, 1990-2013.

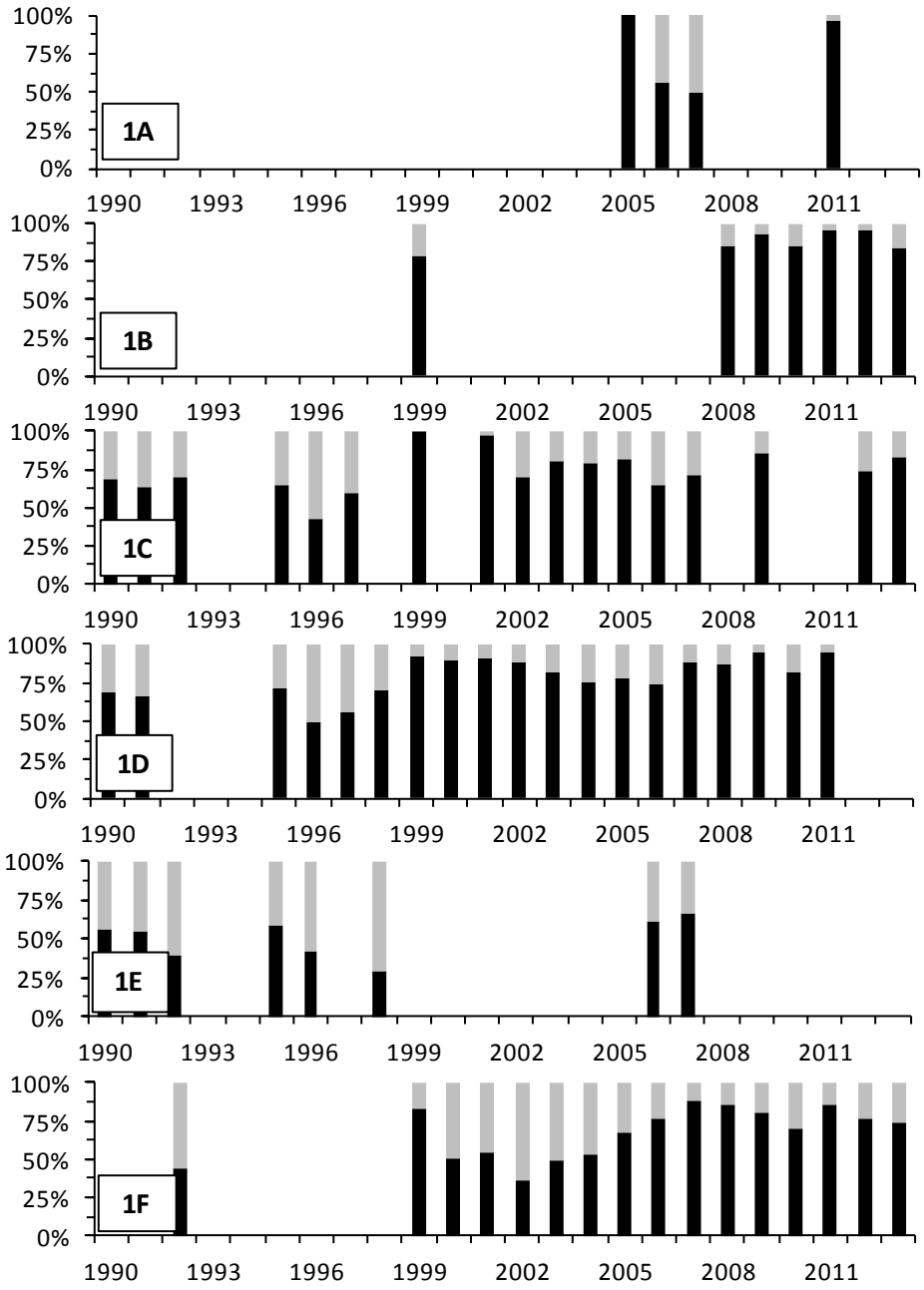


Figure 3.1b. Division-specific North American (black) and European (grey) proportions (not weighted by catch weight) for the Greenland Atlantic salmon fishery, 1990-2013.

Peer reviewed articles

Reddin, D. G, Hansen, L. P., Bakkestuen, V., Russell, I., White, J., Potter, E.C.E. , Sheehan, T. F., Ó Maoiléidigh, N., Dempson, J. B., Smith, G. W., Isaksson, A., Fowler, M., Jacobsen, J. A., Mork, K. A., and Amiro, P. 2012. Distribution of Atlantic salmon (Salmo salar L.) at Greenland, 1960s to present. ICES Journal of Marine Science. 69(9), 1589–1597.

Abstract (copied from Reddin et al. 2012)
In this study, we examined 5481 records of tag recoveries at Greenland from a new tagging database held by ICES that contains information on salmon tagged in Canada, France, Faroes, Greenland, Iceland, Ireland, Norway, Spain, the UK (Northern Ireland, Scotland, England, and Wales), and the United States from the early 1960s to the present. For 4806 of the tag recoveries, latitude and longitude information were available, describing, to varying degrees of accuracy, the location of recovery of tagged fish. Release and recovery dates were variable, but no significant differences over time were noted. The information derived from tag recoveries was used to describe the distribution and growth of salmon of different origins. The proportion of recoveries from East Greenland suggested that potential multi-sea-winter salmon from northern Europe have a more easterly distribution than those from southern Europe. The location of recovery of salmon of North American origin differed from that of European salmon along the west coast of Greenland. Tag recoveries by country were not uniformly distributed across the respective NAFO Divisions. Tags from salmon originating in Canada and the United States were more commonly recovered in northern locations than tags from European-origin salmon. Analysis of rates of tag recovery suggested similar rates before and after the introduction of the NASCO Tag Return Incentive Scheme. The straight-line migration speed of both North American and European salmon changed very little over the time-series, but was ~40% greater for North American salmon (0.43 m s^{-1}) than for European salmon (0.29–0.32 m s^{-1}).

Table 3.2. Numbers of tags recovered at Greenland for which location (NAFO Division) was specified, by country of origin, and the percentage of all recoveries for each country reported from East Greenland (Table 2 copied from Reddin et al. 2012).

Country	W. Greenland	E. Greenland	Total	% East Greenland
USA	2128	30	2158	1.4
Canada	1814	2	1816	0.1
Iceland	16	1	17	5.9
Norway	115	15	130	11.5
Ireland	139	2	141	1.4
UK (Scotland)	273	6	279	2.2
UK (E&W)	195	3	198	1.5
UK (NI)	2	0	2	0
Total	**4682**	**59**	**4741**	**1.2**

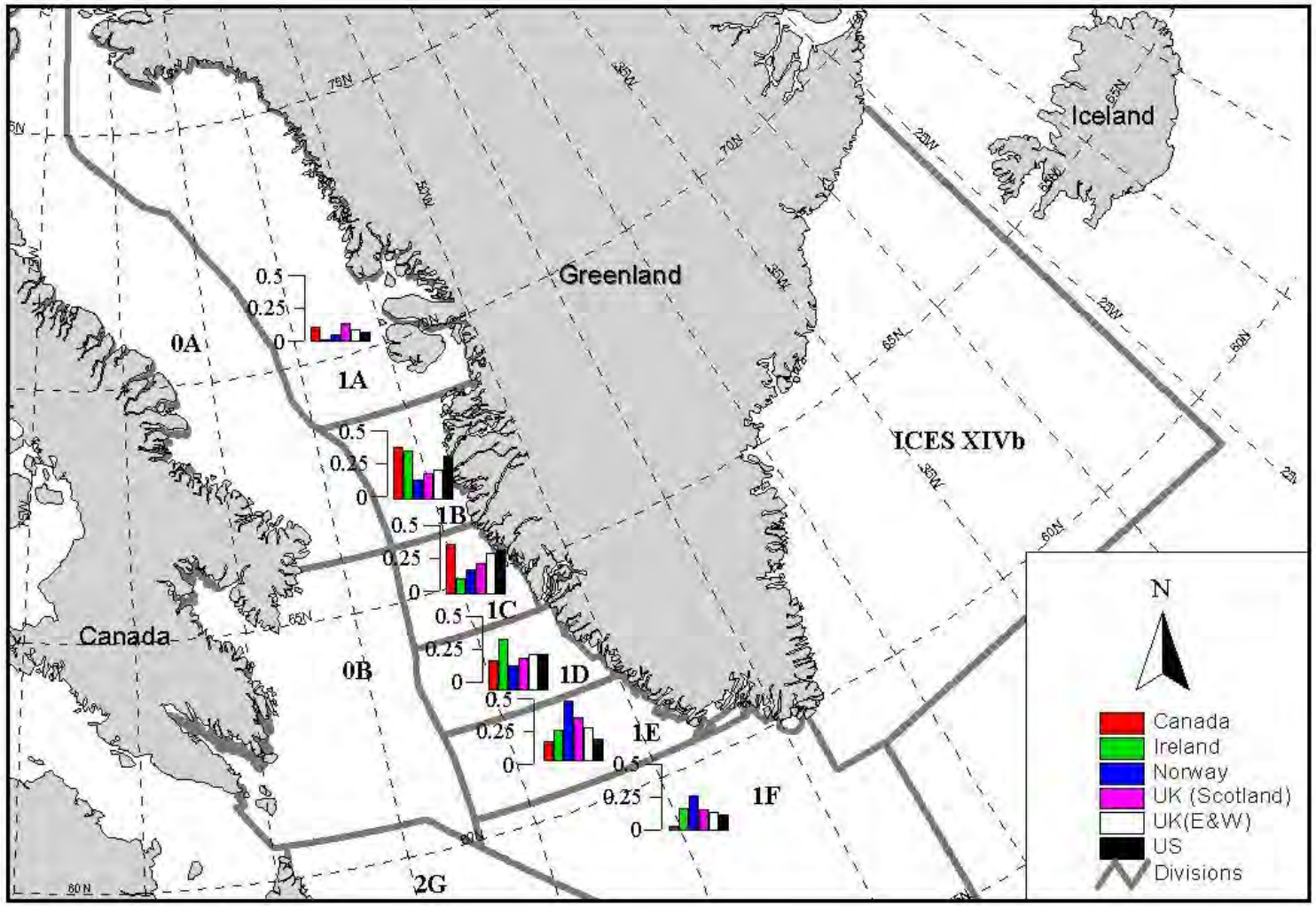


Figure 3.2. Map showing NAFO Divisions at West Greenland, ICES Statistical Area XIVb on the east coast of Greenland, and the relative contributions of tag recoveries by country of origin (Figure 1 copied from Reddin et al. 2012).

Gauthier-Ouellet, M., Dionne, M., Caron, F., King, T.L., and Bernatchez, L. 2009. Spatiotemporal dynamics of the Atlantic salmon (*Salmo salar*) Greenland fishery inferred from mixed-stock analysis. Can. J. Fish. Aquat. Sci. 66(12): 2040-2051.

Abstract (copied from Gauthier-Ouellet et al. 2009)

Mixed-stock fisheries refer to the exploitation of admixed fish stocks coming from different origins. We identified the North American origin of 2835 Atlantic salmon (*Salmo salar*) in the Greenland mixed-stock fishery during 11 years (1995–2006) at three localities using 13 microsatellites. The study included 52 baseline populations representing nine genetically distinct regional groups. The contribution of each group ranged from <1% (Maine) to 40% (Southern Québec). Decreasing temporal contributions were observed for Southern Québec (–22.0%) and New Brunswick (–17.4%), whereas an increasing contribution for Labrador (+14.9%) was observed during the time course of the study. The estimated regional contribution to the Greenland fishery was significantly correlated to the number of multi-sea-winter salmon regionally produced in 2002 (r = 0.79) and 2004 (r = 0.92). No difference in contribution was found between the three Greenland sampling localities. Ungava and Southern Québec regions showed the highest mortality estimates caused by the fishery, ranging from 12.10% to 18.08%, for both years tested. No regional group was overrepresented in landings compared with their respective productivity. Yet, management precautions should still be taken as the fishery strongly selects large females, which could have evolutionary impacts on populations over the long term.

Table 3.3. Number of adult Atlantic salmon sampled per year and per location in the West Greenland fishery (Table 1 copied from Gauthier-Ouellet et al. 2009).

Year	Qaqortoq	Nuuk	Maniitsoq	Total
1995	—	92	—	92
1996	—	106	—	106
2002	48	136	90	274
2003	180	182	166	528
2004	106	270	177	553
2005	92	324	119	535
2006	91	582	74	747

Table 3.4. Regional statistics and the Greenland fishery mortality of Atlantic salmon for the nine North American regional group in 2002 and 2004 (Table 3 copied from Gauthier-Ouellet et al. 2009).

							Mortality (%)			
	% MSW*		Returns* (grilse + MSW)		No. of catches†		2002		2004	
Region	2002	2004	2002	2004	2002	2004	MSW	Grilse + MSW	MSW	Grilse + MSW
Maine	53	80	961	1 602	0	47	0.07	0.04	3.54	2.85
New Brunswick	12	24	56 406	63 999	1 138	1 234	14.52	1.98	7.51	1.89
Southern Québec	48	40	22 293	49 651	2 387	2 717	18.08	9.67	12.10	5.19
Québec City	44	62	2 726	2 996	38	171	3.07	1.38	8.47	5.40
Anticosti	21	44	2 428	2 290	36	77	6.68	1.47	7.12	3.25
Higher North Shore	47	72	11 967	14 787	192	362	3.31	1.58	3.30	2.39
Lower North Shore	30	20	5 691	6 603	8	44	0.47	0.14	3.18	0.66
Labrador	12	11	120 688	116 103	831	1 283	5.52	0.68	9.01	1.09
Ungava	33	30	2 313	5 011	152	262	16.56	6.17	14.96	4.97
Mean							7.59±6.98	2.57±3.22	7.69±4.06	3.08±1.77

Note: MSW, multi-sea-winter.
*Caron and Fontaine 2003; ICES 2005; Caron et al. 2006.
†Absolute number of salmon caught per region.

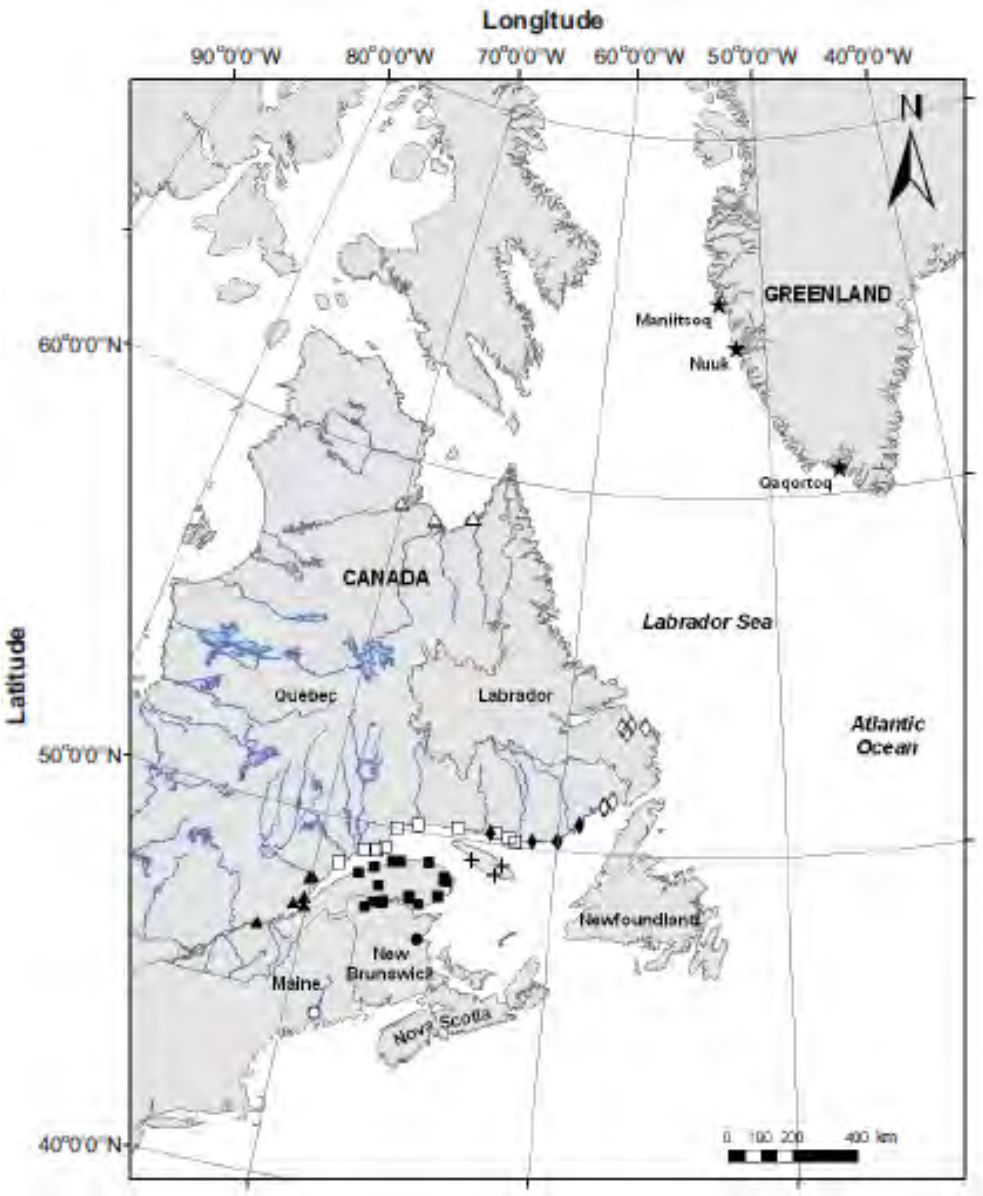


Figure 3.3. Rivers sampled in the regions of Québec, New Brunswick, Labrador (Canada) and Maine (USA) represented in the baseline. Rivers identified by different symbols belong to different regional groups and are indicated as follows: (Maine (open circle), New Brunswick (solid circle), Southern Québec (solid squares), Anticosti (plus sign), Higher North Shore (open square), Lower North Shore (solid diamond), Labrador (open diamond) and Ungava (open triangles, Figure 1 copied from Gauthier-Ouellet et al. 2009).

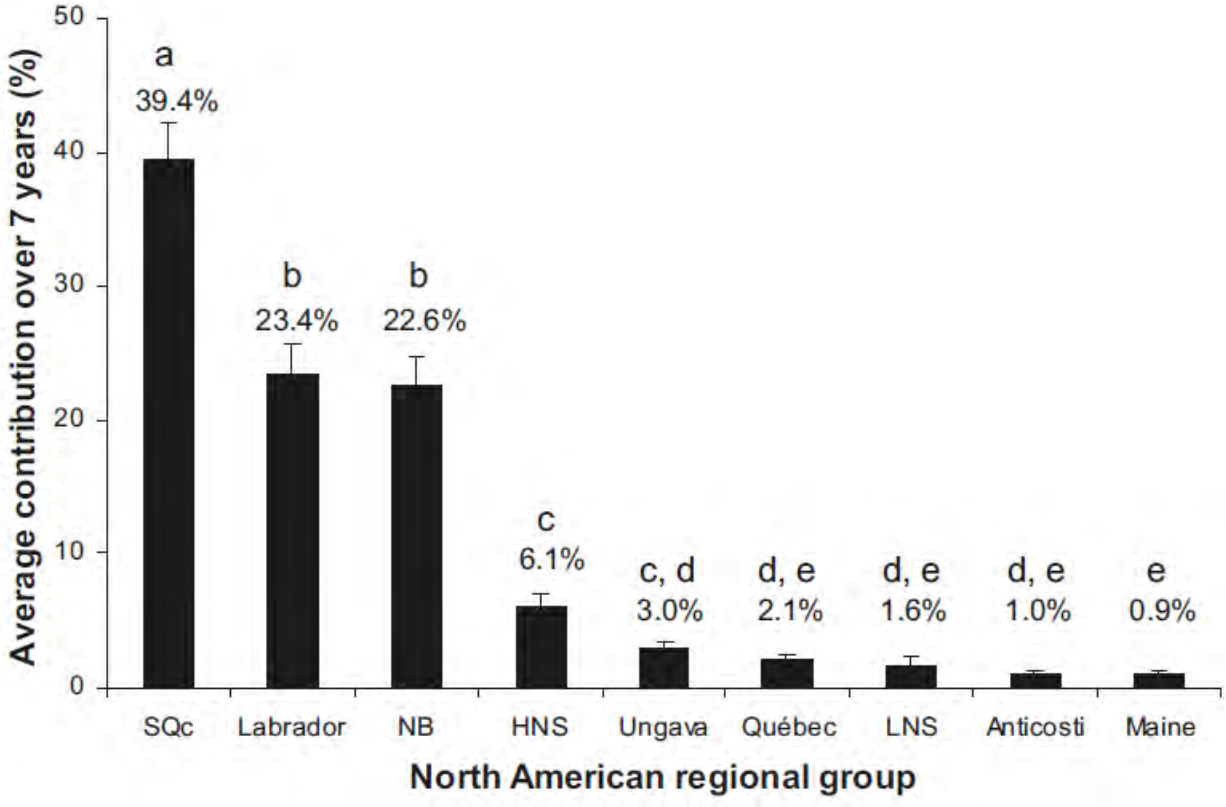


Figure 3.4. Average contributions of the nine Atlantic salmon North American regions to the Greenland fishery for seven years (1995-1996 and 2002-2006), spanning an 11-year period. Mean relative contribution of each region to the fishery and the variation among years are indicated on the top of the bars. Letters indicate significant different contributions as identified by the least-squares means, after a sequential Bonferroni correction. Abbreviations are as follows: SQc (Southern Quebec), NB (New Brunswick), HNS Higher (North Shore) and LNS (Lower North Shore, Figure 2 copied from Gauthier-Ouellet et al. 2009).

Sheehan, T.F., Legault, C.M., King, T.L., and Spidle, A.P. 2010. Probabilistic-based genetic assignment model: assignments to subcontinent of origin of the West Greenland Atlantic salmon harvest. ICES J. Mar. Sci. 67: 537-550.

Abstract (copied from Sheehan et al. 2010)

A multistock Atlantic salmon (Salmo salar) fishery operates off the coast of West Greenland and harvests fish of North American and European origin. Annual landings peaked in 1971 at 2700 t, but declined to 22 t in 2003. Biological data are collected to characterize the catch and its stock composition. Multilocus genotypes, generated via microsatellite DNA analysis, are used to derive statistics on continent of origin and less accurate finer scale assignments. We developed a Probabilistic-based Genetic Assignment model (PGA) to estimate the contribution of salmon from individual North American rivers in the 2000–2003 West Greenland catch. Uncertainty associated with finer scale assignments is addressed by incorporating estimated misclassification rates and by reporting results as distributions generated via Monte Carlo resampling. US-origin fish represented ~1% (by number) of the salmon harvested at West Greenland during the years 2000–2003. The resulting loss of spawners to this stock complex was approximately half the estimated adult returns in 2001, but was below 4% in the other three years. This is the first attempt to partition the US component of the West Greenland mixed-stock fishery to its finer parts. The approach can be used to identify the effects of fishing on individual stocks within any multi-stock complex where genetic samples of known origin are available.

Table 3.5. PGA results of the 2000–2003 West Greenland Atlantic salmon fisheries. Total catches were partitioned by continent of origin. All fish of North American origin were also partitioned by country (subcontinent) of origin. Previously reported percentages by continent of origin are also presented for comparative purposes (Table 5.9.3.2 of ICES, 2005, Table 4 copied from Sheehan et al. 2010).

Year, and continent/country of origin	Estimate	Percentage	90% confidence interval		Previously reported
			Lower	Upper	
2000					
North Atlantic total	7 731	66.0%	7 657	7 808	70.0%
European total	3 983	34.0%	3 906	4 057	30.0%
Canadian total	7 685	99.4%	7 527	7 793	
US total	46	0.6%	0	192	
2001					
North Atlantic total	10 766	64.6%	10 673	10 859	69.0%
European total	5 893	35.4%	5 798	5 985	31.0%
Canadian total	10 402	96.6%	10 046	10 691	
US total	364	3.4%	89	710	
2002					
North Atlantic total	4 782	70.0%	4 728	4 837	68.0%
European total	2 054	30.0%	1 999	2 107	32.0%
Canadian total	4 737	99.1%	4 631	4 817	
US total	45	0.9%	0	141	
2003					
North Atlantic total	4 714	64.2%	4 657	4 771	68.0%
European total	2 634	35.8%	2 577	2 691	32.0%
Canadian total	4 652	98.7%	4 561	4 732	
US total	62	1.3%	5	132	

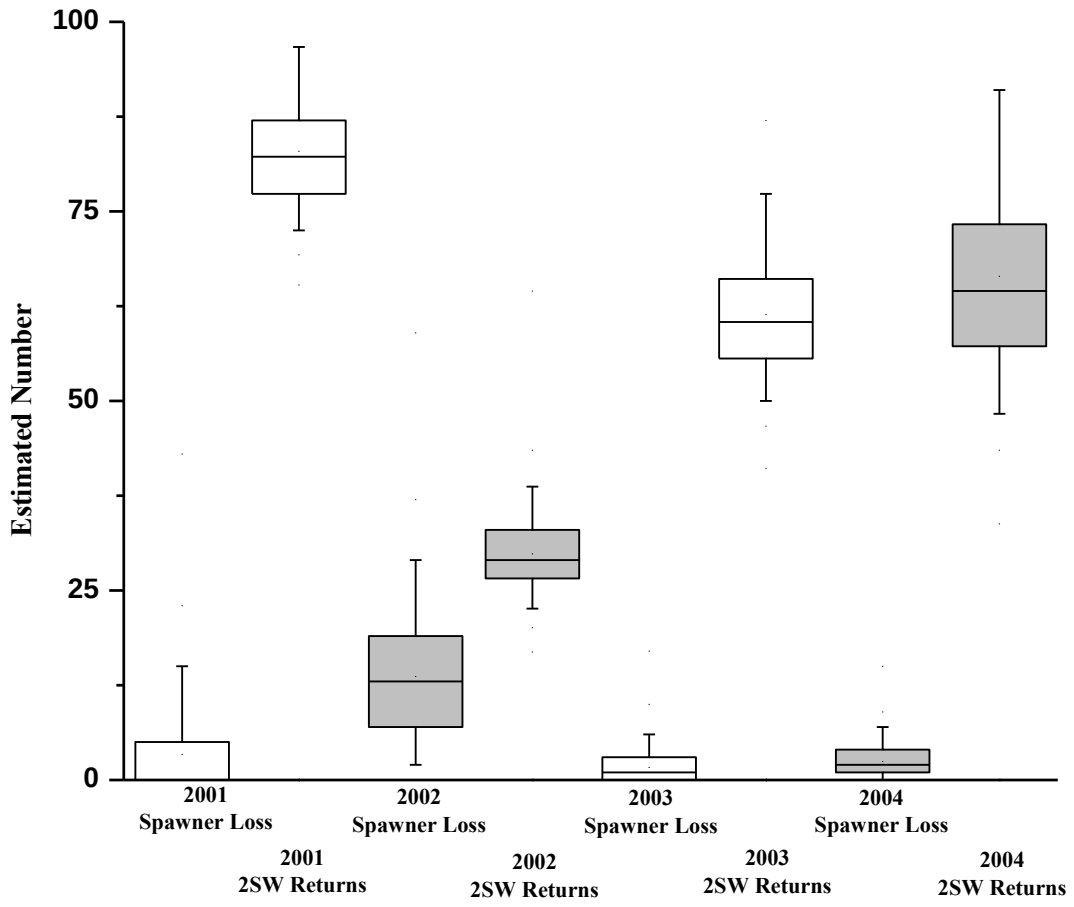


Figure 3.5. Estimated Gulf of Maine Distinct Population Segment (GOM DPS; a group of eight rivers currently protected by the federal government) spawner loss resulting from the 2000–2003 West Greenland Atlantic salmon fisheries contrasted with their subsequent cohort returns the year following the fishery. The box defines the 25th, 50th, and 75th percentiles, and the whiskers represent the 5th and 95th percentiles (Table 5 copied from Sheehan et al 2010).

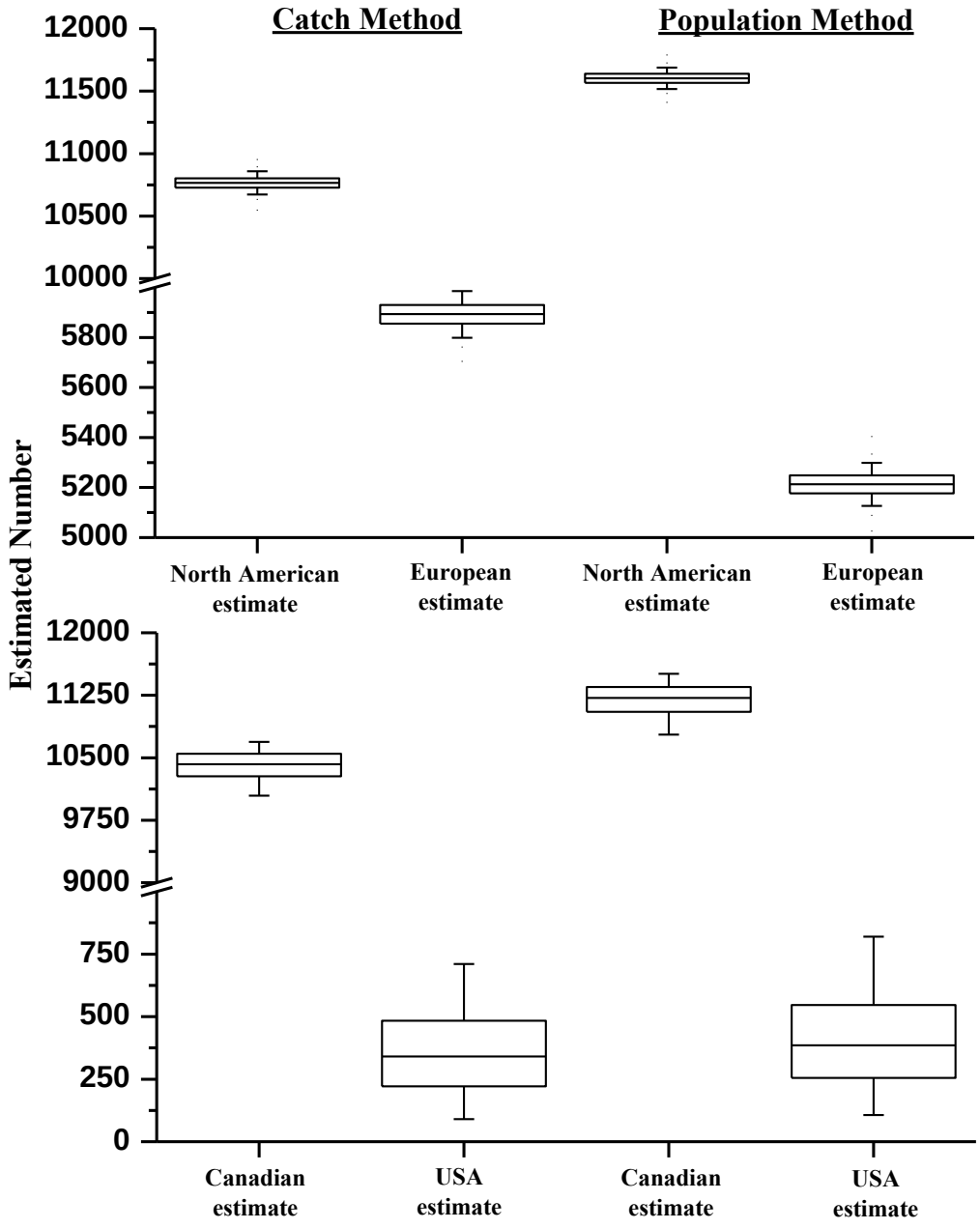


Figure 3.6. Estimated number of fish harvested from the 2001 West Greenland Atlantic fishery according to continent and subcontinent of origin. The catch method estimates assumed that the unreported catch was distributed across NAFO Divisions in the same proportion as the reported catch. The population method estimates assumed that the unreported catch was distributed across NAFO Divisions in the same proportion as the population distribution in Greenland. The box defines the 25th, 50th, and 75th percentiles, and the whiskers represent the 5th and 95th percentiles (Figure 6 copied from Sheehan et al 2010).

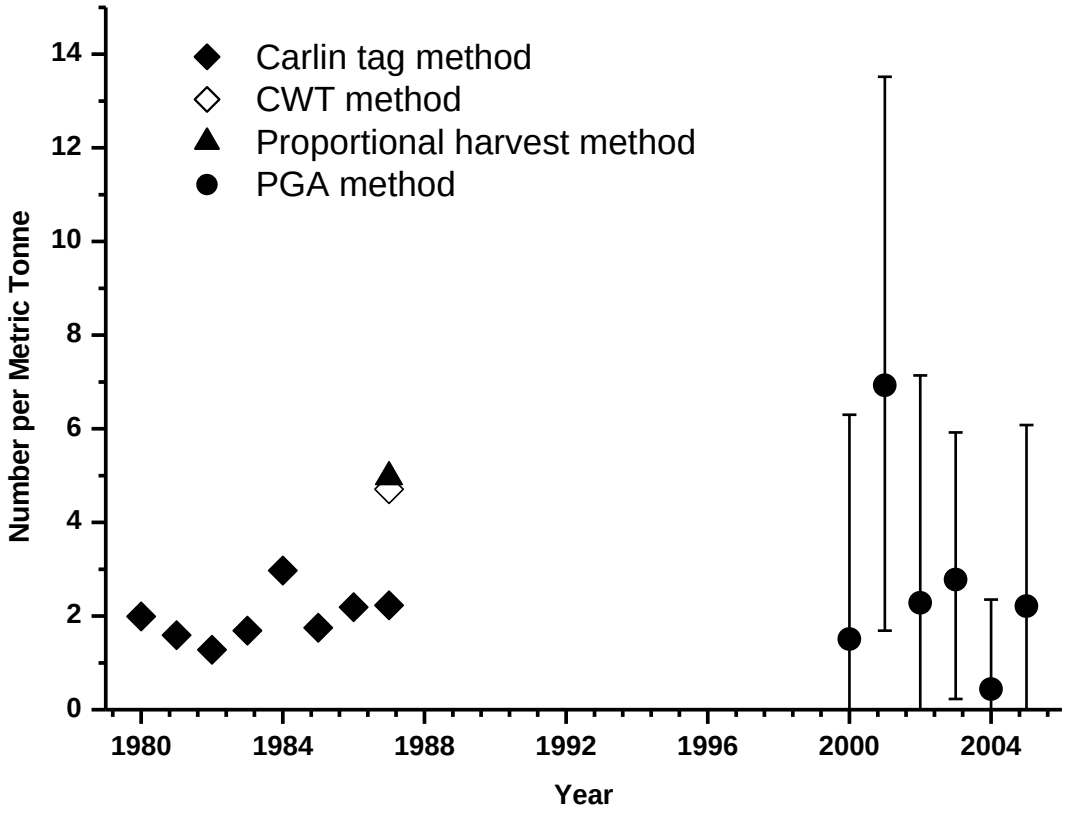


Figure 3.7. Estimated number of US-origin fish contributing to each tonne of Atlantic salmon harvested in the Greenland fishery. Earlier estimates were reported by Jensen (1990), and estimates from 2000 to 2003 were PGA-derived and displayed with their corresponding 90% confidence intervals. The Carlin tag method (external tag) estimated the Maine contribution only, whereas the CWT (internal tag), proportional harvest (smolt age), and PGA methods estimated the total US contribution (Figure 7 copied from Sheehan et al 2010).

Ongoing studies – preliminary results – NOT TO BE CITED

Preliminary results from "A Proposal for Pilot project to undertake genetic stock of origin identification of European salmon captured at West Greenland" (Principle Investigators: Dr. Philip McGinnity, University College Cork, Co. Cork Ireland and Paulo Prodöhl, Queen's University Belfast, Belfast, UK (Northern Ireland))

Overview

The SALSEA-Merge project has facilitated the development of a unique molecular assignment protocol – GRAASP: Genetically-based Regional Assignment of Atlantic Salmon Protocol – based on a suite of 14 microsatellites. The GRAASP database comprises 26,813 Atlantic salmon individuals from 467 locations, in 284 rivers representing ~ 85% of the non-Baltic European salmon production. The GRAASP tool is capable of delivering both broad and medium scale regional assignment. At the broad geographical scale, it currently recognises three regional assignment units (RAUs), namely, Iceland, Northern Europe and Southern Europe. Furthermore, at the finest supportable scale, it can distinguish 17 geographically cohesive regional subdivisions or RAUs. In addition, several high resolution microsatellite databases for genetic stock identification are now available in Ireland, UK (Scotland), UK (N. Ireland), UK (England & Wales), Norway and France that may allow in many instances river-specific assignments.

European origin salmon sampled at Greenland (2002-2012, ~2500 samples) were genotyped at 20 microsatellite genetic markers covering the SALSEA GRAASP and the Irish NGSI baseline panels. Regional assignments to SALSEA Level 1 to Level 4 groupings using the GENECLASS 2 individual assignment algorithm were performed. Assignments were also broken down by country of origin and their proportions compared against the 10 year average of Pre-Fishery Abundance (PFA) estimates for 2002-2012 provided by Working Group on North Atlantic Salmon report (ICES 2013).

The fishery at West Greenland fishery (2002-2012) is dominated by fish originating from British and Irish rivers and there is a high level of consistency in the proportions of North and South complex fish observed over this period. Approximately 90% of the European harvest comes from rivers in the UK and Ireland with approximately 40% of the total harvest originating from salmon populations in southern/eastern Scotland. Contribution of individual LEVEL 4 regional groups to the fishery has not varied substantially between 2002 and 2012. There is also considerable correspondence between the ICES WGNAS pre-fishery abundance estimates for Southern complex stocks over the last ten years. This work is ongoing with the intent of having final results available prior to the 2015 ICES WGNAS meeting

THIS WORK IS ONGOING AND THE RESULT BELOW SHOULD BE CONSIDERED PRELIMINARY.

Table 3.6. Number of fish per year and total (including percentage) from West Greenland fishery assigning to SALSEA Merge LEVEL 1 regional units. See Figure 3.9 for locations of regional groups. This work is ongoing and the result below should be considered preliminary.

LEVEL 1 Grouping	Iceland	North	South	Total
2002	-	4 (2.7%)	146 (97.3%)	150
2004	-	9 (2.2%)	399 (97.8%)	408
2005	-	7 (4.6%)	146 (95.4%)	153
2006	-	12 (3.6%)	318 (96.4%)	330
2007	1 (0.5%)	13 (6.3%)	191 (93.2%)	205
2008	-	6 (2.3%)	251 (97.7%)	257
2009	-	3 (2.4%)	124 (97.6%)	127
2010	-	11 (4.5%)	234 (95.5%)	245
2011	2 (3.6%)	3 (5.4%)	51 (91.1%)	56
2012	1 (0.4%)	13 (5.3%)	233 (94.3%)	247
Average ± SD	1.3 ± 0.6	8.1 ± 4	209.3 ± 100.8	217.8 ± 102.9
Total (2002-2012)	4 (0.2%)	81 (3.7%)	2093 (96.1%)	2178

Table 3.7. Number of fish per year and total (including percentage) from West Greenland fishery assigning to SALSEA Merge LEVEL 2 regional units. This work is ongoing and the result below should be considered preliminary.

LEVEL 2 Grouping	Iceland NW	Russia & N Norway	Mid & South Norway & Sweden	Denmark	Britain, Ireland France & Spain	Total
2002	-	1 (0.7%)	3 (2%)	-	146 (97.3%)	150
2004	-	1 (0.2%)	8 (2%)	-	399 (97.8%)	408
2005	-	-	7 (4.6%)	1 (0.7%)	145 (94.8%)	153
2006	-	1 (0.3%)	11 (3.3%)	1 (0.3%)	317 (96.1%)	330
2007	1 (0.5%)	1 (0.5%)	12 (5.9%)	-	191 (93.2%)	205
2008	-	4 (1.6%)	2 (0.8%)	3 (1.2%)	248 (96.5%)	257
2009	-	-	3 (2.4%)	-	124 (97.6%)	127
2010	-	3 (1.2%)	8 (3.3%)	-	234 (95.5%)	245
2011	2 (3.6%)	-	3 (5.4%)	-	51 (91.1%)	56
2012	1 (0.4%)	1 (0.4%)	12 (4.9%)	-	233 (94.3%)	247
Average ± SD	1.3 ± 0.6	1.7 ± 1.3	6.9 ± 4	1.7 ± 1.2	208.8 ± 100.6	217.8 ± 102.9
Total (2002-2012)	4 (0.2%)	12 (0.6%)	69 (3.2%)	5 (0.2%)	2088 (95.9%)	2178

Table 3.8. Number of fish per year and total (including percentage) from West Greenland fishery assigning to SALSEA-Merge LEVEL 3 regional units. This work is ongoing and the result below should be considered preliminary.

LEVEL 3 Grouping	Iceland NW	N Kola	Finmark	E Norway & Sweden	Mid Norway	S Norway	Denmark	Britain & Ireland	South England	N & W France	S France & Spain	Total
2002	-	1 (0.7%)	-	1 (0.7%)	2 (1.3%)	-	-	142 (94.7%)	-	4 (2.7%)	-	150
2004	-	-	1 (0.2%)	2 (0.5%)	3 (0.7%)	3 (0.7%)	-	392 (96.1%)	-	6 (1.5%)	1 (0.2%)	408
2005	-	-	-	2 (1.3%)	4 (2.6%)	1 (0.7%)	1 (0.7%)	141 (92.2%)	1 (0.7%)	3 (2%)	-	153
2006	-	1 (0.3%)	-	1 (0.3%)	8 (2.4%)	2 (0.6%)	1 (0.3%)	313 (94.8%)	-	4 (1.2%)	-	330
2007	1 (0.5%)	1 (0.5%)	-	2 (1%)	6 (2.9%)	4 (2%)	-	188 (91.7%)	1 (0.5%)	2 (1%)	-	205
2008	-	4 (1.6%)	-	-	2 (0.8%)	-	3 (1.2%)	240 (93.4%)	-	8 (3.1%)	-	257
2009	-	-	-	1 (0.8%)	1 (0.8%)	1 (0.8%)	-	117 (92.1%)	-	7 (5.5%)	-	127
2010	-	3 (1.2%)	-	4 (1.6%)	1 (0.4%)	3 (1.2%)	-	230 (93.9%)	-	2 (0.8%)	2 (0.8%)	245
2011	2 (3.6%)	-	-	1 (1.8%)	2 (3.6%)	-	-	50 (89.3%)	-	1 (1.8%)	-	56
2012	1 (0.4%)	1 (0.4%)	-	3 (1.2%)	4 (1.6%)	5 (2%)	-	230 (93.1%)	-	3 (1.2%)	-	247
Average ± SD	1.3 ± 0.6	1.8 ± 1.3	-	1.9 ± 1.1	3.3 ± 2.3	2.7 ± 1.5	1.7 ± 1.2	204.3 ± 99.6	1 ± 0	4 ± 2.3	1.5 ± 0.7	217.8 ± 102.9
Total (2002-2012)	4 (0.2%)	11 (0.5%)	1 (0%)	17 (0.8%)	33 (1.5%)	19 (0.9%)	5 (0.2%)	2043 (93.8%)	2 (0.1%)	40 (1.8%)	3 (0.1%)	2178

Table 3.9. Number of fish per year and total (including percentage) from West Greenland fishery assigning to SALSEA-Merge LEVEL 4 regional units. See Figure 3.10 for locations of regional groups. This work is ongoing and the result below should be considered preliminary.

LEVEL 4 Grouping	Iceland NW	N Kola	Finmark	E Norway & Sweden	Mid Norway	S Norway	Denmark	N Scotland N&W Ireland	BannLev	Irish Sea	S&E Scotland	South England	N&W France	S France & Spain	Total
2002	-	1 (0.7%)	-	1 (0.7%)	2 (1.3%)	-	-	40 (26.7%)	2 (1.3%)	43 (28.7%)	57 (38%)	-	4 (2.7%)	-	150
2004	-	-	1 (0.2%)	2 (0.5%)	3 (0.7%)	3 (0.7%)	-	96 (23.5%)	12 (2.9%)	123 (30.1%)	161 (39.5%)	-	6 (1.5%)	1 (0.2%)	408
2005	-	-	-	2 (1.3%)	4 (2.6%)	1 (0.7%)	1 (0.7%)	34 (22.2%)	3 (2%)	49 (32%)	55 (35.9%)	1 (0.7%)	3 (2%)	-	153
2006	-	1 (0.3%)	-	1 (0.3%)	8 (2.4%)	2 (0.6%)	1 (0.3%)	95 (28.8%)	9 (2.7%)	80 (24.2%)	129 (39.1%)	-	4 (1.2%)	-	330
2007	1 (0.5%)	1 (0.5%)	-	2 (1%)	6 (2.9%)	4 (2%)	-	49 (23.9%)	8 (3.9%)	56 (27.3%)	75 (36.6%)	1 (0.5%)	2 (1%)	-	205
2008	-	4 (1.6%)	-	-	2 (0.8%)	-	3 (1.2%)	63 (24.5%)	2 (0.8%)	62 (24.1%)	113 (44%)	-	8 (3.1%)	-	257
2009	-	-	-	1 (0.8%)	1 (0.8%)	1 (0.8%)	-	42 (33.1%)	1 (0.8%)	31 (24.4%)	43 (33.9%)	-	7 (5.5%)	-	127
2010	-	3 (1.2%)	-	4 (1.6%)	1 (0.4%)	3 (1.2%)	-	43 (17.6%)	3 (1.2%)	68 (27.8%)	116 (47.3%)	-	2 (0.8%)	2 (0.8%)	245
2011	2 (3.6%)	-	-	1 (1.8%)	2 (3.6%)	-	-	11 (19.6%)	1 (1.8%)	13 (23.2%)	25 (44.6%)	-	1 (1.8%)	-	56
2012	1 (0.4%)	1 (0.4%)	-	3 (1.2%)	4 (1.6%)	5 (2%)	-	76 (30.8%)	6 (2.4%)	54 (21.9%)	94 (38.1%)	-	3 (1.2%)	-	247
Average ± SD	1.3 ± 0.6	1.8 ± 1.3	-	1.9 ± 1.1	3.3 ± 2.3	2.7 ± 1.5	1.7 ± 1.2	54.9 ± 27.4	4.7 ± 3.8	57.9 ± 29.6	86.8 ± 43	1 ± 0	4 ± 2.3	1.5 ± 0.7	217.8 ± 102.9
Total (2002-2012)	4 (0.2%)	11 (0.5%)	1 (0%)	17 (0.8%)	33 (1.5%)	19 (0.9%)	5 (0.2%)	549 (25.2%)	47 (2.2%)	579 (26.6%)	868 (39.9%)	2 (0.1%)	40 (1.8%)	3 (0.1%)	2178

Table 3.10. The proportions (%) of fish assigned to country and the expected proportions of fish based on the 10 year average ICES estimate of non-maturing 1SW salmon (potential MSW returns) PFA 2002 -2011 (ICES 2013). Note: only Southern Complex countries included. This work is ongoing and the result below should be considered preliminary.

Country	Proportion by based on genetic assignment data to country (political)	Proportion expected based 10 year average ICES non maturing 1SW PFA 2002 -2011 (ICES WGNAS (2013)
France/Spain	2.07	2.05
Iceland (SW)	0.2	1.56
Ireland	13.84	8.8
UK (England/Wales)	12.37	16.48
UK (N. Ireland)	1.82	1.84
UK (Scotland)	69.78	69.27

Figure 3.8 GRAASP baseline database. A total of approximately 27K fish from 466 sites across 284 rivers comprise the database.

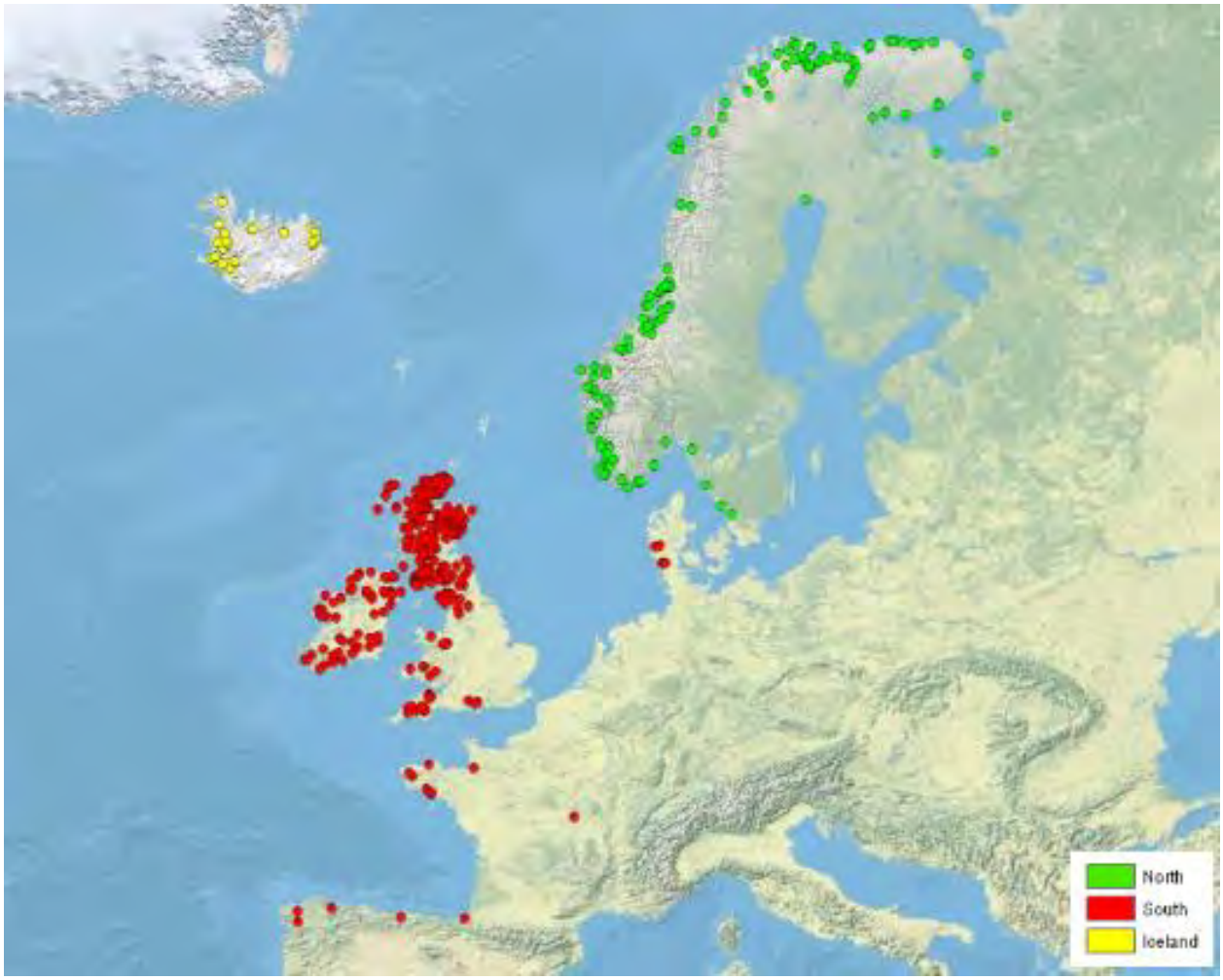


Figure 3.9 LEVEL 1 summation of the GRAASP baseline database.

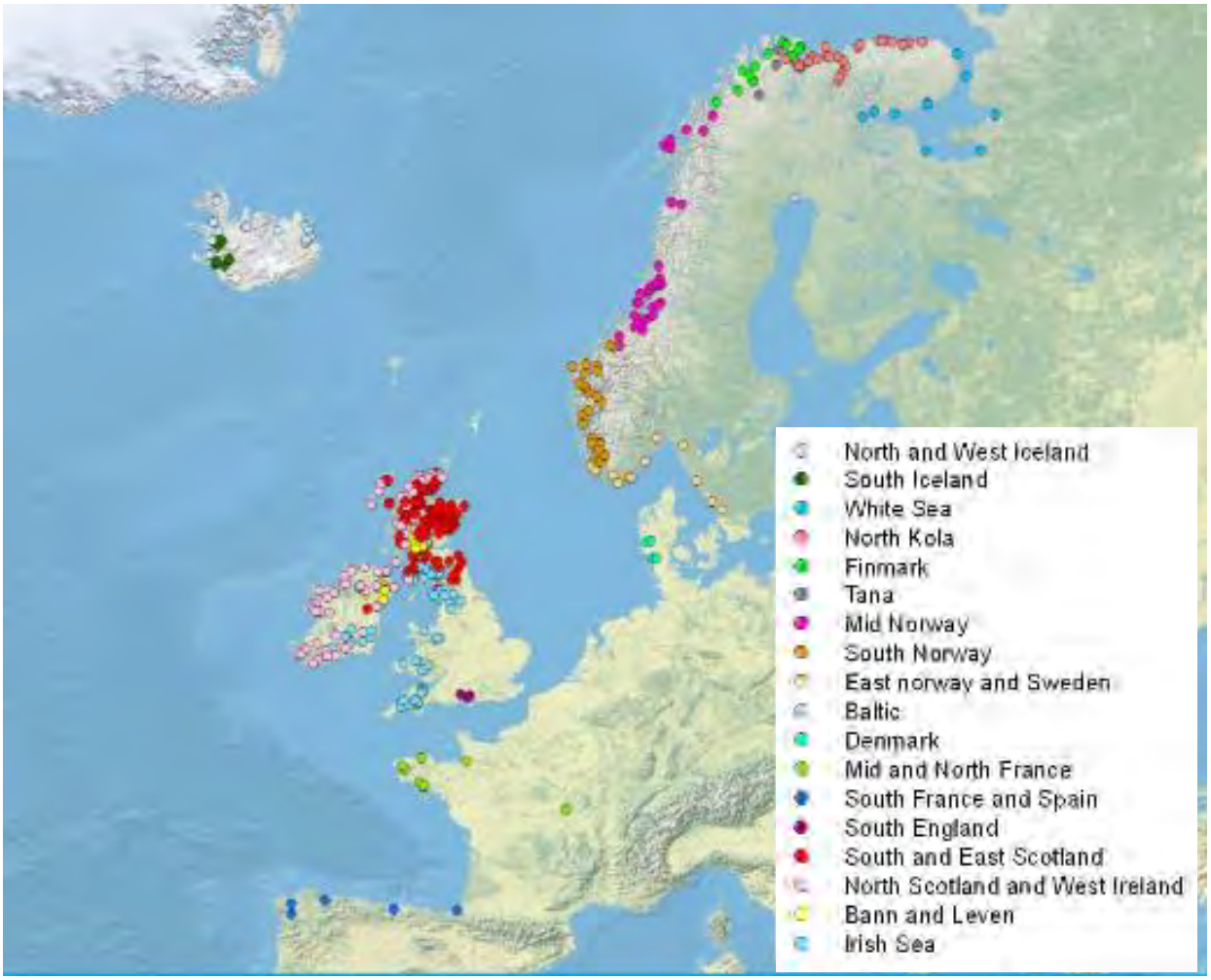


Figure 3.10 LEVEL 4 summation of the GRAASP baseline database.

Preliminary results from "Genetic determination of catch composition and stock exploitation of Atlantic salmon harvested in mixed stock fisheries at West Greenland" (Principle Investigator: Dr. Ian Bradbury, Science Branch, DFO Canada, St. John's NL Canada)

Overview

A Natural Sciences and Engineering Research Council of Canada (NSERC) strategic grant to researchers in Canada (Laval University, Quebec government, DFO Maritimes), USA (USGS) and Norway (CIGENE)) facilitated the development of a genetic North American database using standardized markers across Canada and USA (9042 individuals from 152 sampling locations genotyped at 15 microsatellite loci standardized across three different laboratories). The database was used to define regional groupings of Atlantic salmon rivers and can be used to estimate the contributions of these groupings to mixed-stock fisheries for North American origin fish

A total of 650 North American origin tissues samples obtained from the 2011 Greenland fishery were genotyped at 15 microsatellite loci and assigned to regional groupings. Preliminary results suggest that approximately 60% of the fish were from the Gaspe Peninsula and Maritimes regions. Lower levels of contribution were estimated for all other regional grouping, except for the Inner Bay of Fundy group. These results should be considered preliminary, but if funding is available, further analysis of the 2011 samples and analysis of the 2012-2014 Greenland samples will be pursued with the intent of having final results available prior to the 2015 ICES WGNAS meeting.

THIS WORK IS ONGOING AND THE RESULT BELOW SHOULD BE CONSIDERED PRELIMINARY.

Table 3.11. Sample size of genotyped North American origin Atlantic salmon harvested at Greenland in 2011. Samples were processed and Bayesian and maximum likelihood mixture analyses were performed against the North American baseline.

Community (NAFO Div.)	Sample size
Ilulissat (1A)	53
Sisimiut (1B)	115
Nuuk (1D)	266
Qaqortoq (1F)	215
Total	649

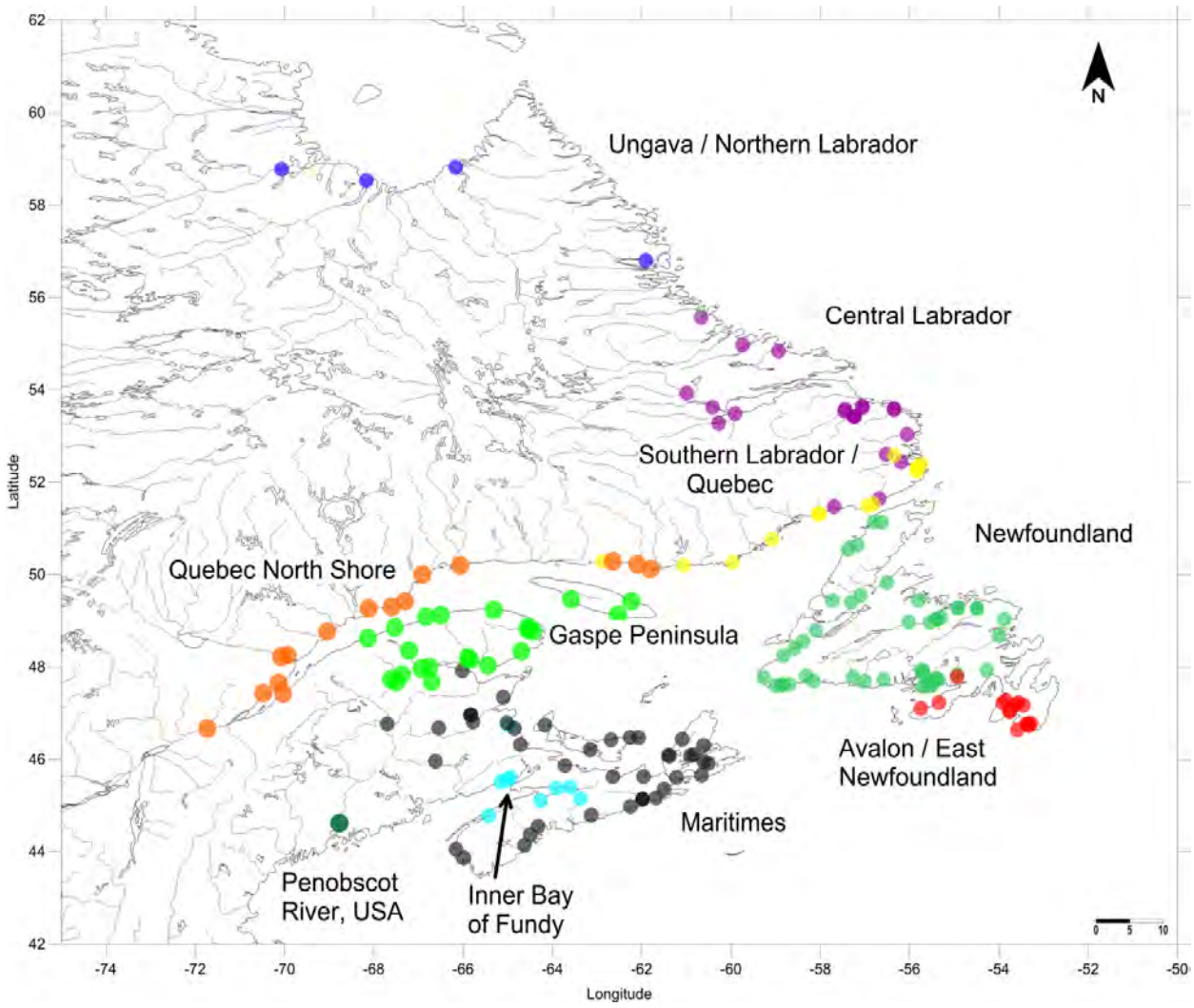


Figure 3.11. North American baseline sample locations and reporting groups used in mixture and assignment analysis. Eleven regional groupings were defined.

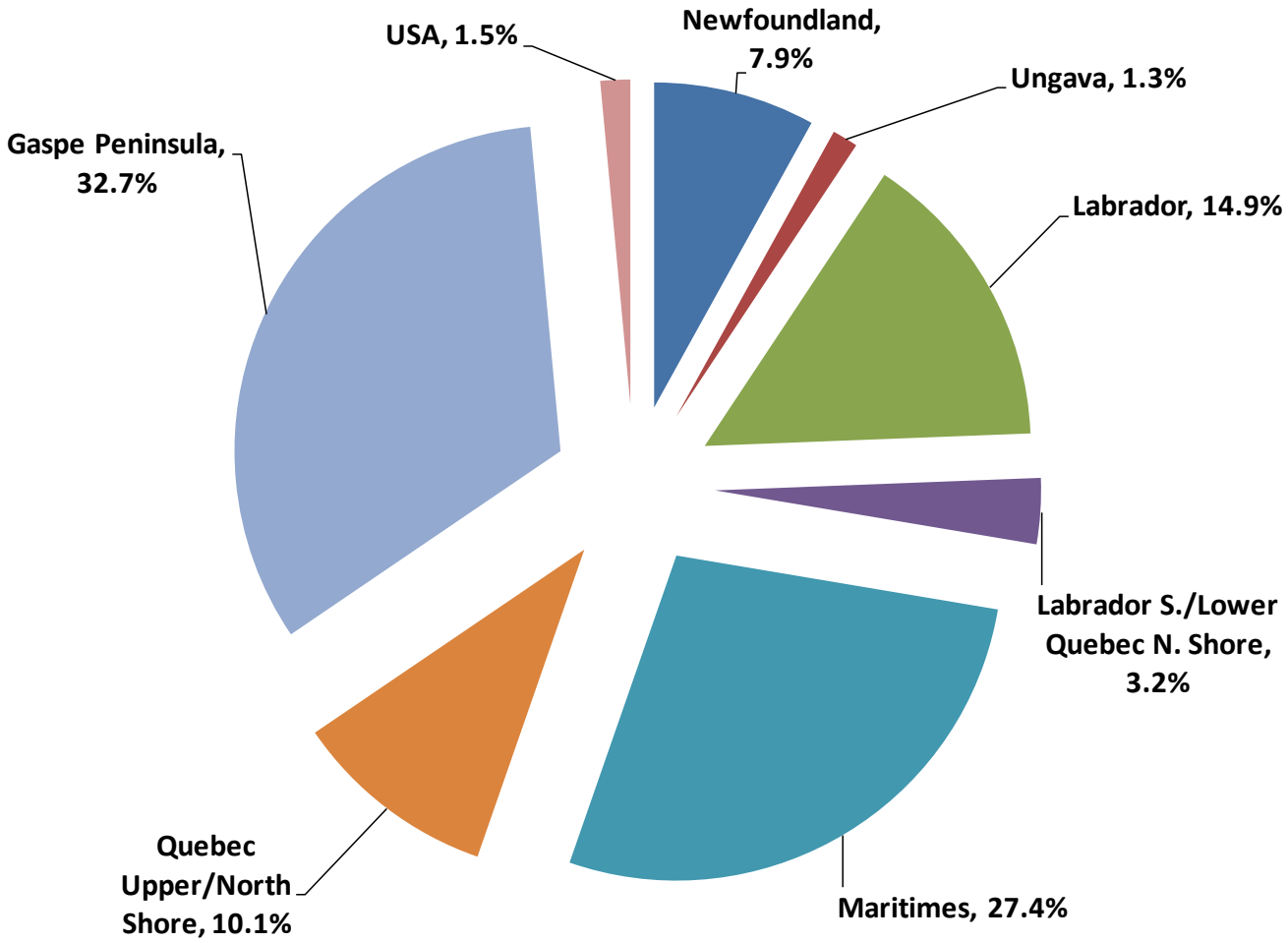


Figure 3.12. Preliminary Bayesian and maximum likelihood mixture analyses results from the 2011 Greenland fishery. Mean contributions, across all four sampling locations, of 11 regional groupings are based on the analysis of approximately 650 American origin fish. Results are very preliminary and will be updated in 2014. See Figure 3.11 for locations of regional groups although some regional group have been combined within this figure. This work is ongoing and the result should be considered preliminary.

SECTION 3: THE ORIGIN OF THE CATCHES BY CONTINENT AND AT FINER SCALES WHERE POSSIBLE (E.G. COUNTRY OR REGION OF ORIGIN)

SUMMARY

The proportion of North American origin salmon sampled from the fishery at West Greenland has increased since the early 2000's. The proportion of North American origin sampled also increases with increasing latitude, although this pattern is variable.

Analysis of historic tag recaptures from the early 1960's to the present documented that most salmon producing countries from across the North Atlantic contribute to the WG stock complex at varying levels. It appears that multi-sea-winter salmon from northern Europe have a more easterly distribution than those from southern Europe given their higher proportion of recaptures at East Greenland. Along the West Greenlandic coast the location of recovery of North American origin salmon differed from that of European salmon. Tag recoveries by country were not uniformly distributed across the NAFO Divisions as salmon originating in Canada and the United States were more commonly recovered in northern locations than tags from European-origin salmon. This conclusion is supported with the contemporary genetic analysis summarized above. The interpretation of tag recapture data is very dependent on the number of tags released; unfortunately these data were not generally available for the tag recaptures at Greenland.

The genetic identification of the North American contributions to the West Greenland fishery from over 7 years (1995-1996 and 2002-2006) reported that the average contributions to the fishery by regional groupings (see Figure 3.3) was as follows: Southern Québec (39.4%), Labrador (23.4%), New Brunswick (22.6%), North Shore (6.1%), Ungava (3.0%), Québec (2.1%), Lower North Shore (1.6%), Anticosti (1.0% and USA (0.9%). In two of the seven years, the contribution to the fishery was significantly correlated to the regional estimates of multi-sea-winter salmon returns. No evidence of differential contribution by sampled community was evident. Sampled communities were Maniitsoq (NAFO Division 1C), Nuuk (1D) and Qaqortoq (1F).

A second genetic based effort, focused on the US contribution to the fishery, also estimated a mean contribution for the period of 2000-2003 of approximately 1% (0.4-2.2%). The resulting estimated loss of spawners was approximately 50% in one year, but less than 4% in the other three years. The estimated contribution of US salmon to the West Greenland fishery is 3.37 fish per metric ton of harvest, which is approximate to historical estimates. Estimates of continent and country (North American only) contributions to the fishery were also shown to be sensitive to assumptions related to the spatial distribution of unreported landings.

Preliminary results from two ongoing genetic studies were also presented. The two studies utilize recently developed genetic baselines for North American and European salmon stocks. These baselines are the most comprehensive range-wide baselines developed to date. These studies are ongoing and the results should be considered preliminary and not cited or used outside of this document.

Preliminary results from both studies generally align with previously reported trends. The European contribution the fishery at West Greenland is primarily from southern European salmon populations with a small proportion from northern European and Icelandic population.

Approximately 90% of the European harvest comes from rivers in the UK and Ireland with approximately 40% of the total harvest originating from salmon populations in southern/eastern Scotland. The estimated contribution of the southern European salmon to the Greenland harvest generally line up with expected contribution based on 1SW non-maturing PFA estimates.

North American contributions were dominated by salmon populations in the following regions: Gaspe (33%), Maritimes (27%), Labrador 15%, Newfoundland (8%), Québec Upper/North Shore (10%). Smaller contributions of <4% for Labrador South/ Québec North Shore, USA and Ungava regions were estimated. No Inner Bay of Fundy fish were identified.

Despite large reductions in fishing effort, the fishery is still harvesting salmon from all regions and from stocks of varying productivity levels. It should also be noted that these preliminary results do not strictly align with the ICES WGNAS regional groupings and therefore do not allow for exploitation rates estimation. Final results of both ongoing projects are expected prior to the 2015 ICES WGNAS and will be incorporated into stock assessment efforts as appropriate.

SECTION 4: RATES OF EXPLOITATION ON CONTRIBUTING STOCKS OR STOCK COMPLEXES

Table 4.1. Exploitation rate (%) for North American 1SW non-maturing and southern NEAC non-maturing Atlantic salmon harvested at West Greenland, 1990-2012. Exploitation rate estimates are only available to 2012, as 2013 exploitation rates are dependent on 2014 2SW NAC or MSW NEAC returns. Average values are provided for the time periods 2002-2012, 1990-2001 and overall.

year	NAC	NEAC
1990	25.4%	3.9%
1991	34.8%	7.7%
1992	20.1%	5.6%
1993	1.8%	0.2%
1994	1.5%	0.2%
1995	15.1%	2.1%
1996	17.9%	2.3%
1997	17.7%	1.1%
1998	6.3%	0.4%
1999	9.0%	0.2%
2000	7.2%	0.8%
2001	15.2%	1.3%
2002	4.2%	0.4%
2003	4.6%	0.4%
2004	5.5%	0.5%
2005	5.6%	0.4%
2006	6.9%	0.7%
2007	8.3%	0.5%
2008	8.0%	0.4%
2009	9.1%	0.2%
2010	6.1%	0.5%
2011	7.9%	0.2%
2012	6.2%	0.5%
2002-2012 ave.	**6.6%**	**0.4%**
1990-2001 ave.	**14.3%**	**2.2%**
Overall ave.	**10.6%**	**1.3%**

Table 4.2. Exploitation rate (%) estimates for NEAC countries assumed to contribute to the Greenland fishery. Estimates were obtained by dividing the country-specific pre-fishery abundance estimates of non-maturing 1SW fish by the country-specific harvest at Greenland. Data are based on outputs from the NEAC run-reconstruction model, not from direct measures of exploitation at Greenland. Average values are provided for the time periods 2002-2012, 1990-2001 and overall. Within the NEAC run-reconstruction model, UK (Northern Ireland) and Russia are assumed to not contribute to the West Greenland fishery based on historic tag data.

	Finland	Iceland	Norway	Sweden	Scotland	Eng. & Wales	Ireland	France
1990	0.04%	0.10%	0.21%	0.66%	3.17%	5.07%	4.33%	7.07%
1991	0.13%	0.22%	0.52%	1.34%	6.35%	15.98%	13.83%	14.26%
1992	0.07%	0.17%	0.33%	0.73%	4.77%	9.49%	9.04%	17.45%
1993	0.00%	0.01%	0.02%	0.05%	0.23%	0.42%	0.35%	0.57%
1994	0.01%	0.01%	0.02%	0.09%	0.23%	0.37%	0.33%	1.04%
1995	0.04%	0.06%	0.10%	0.36%	1.79%	2.24%	2.93%	3.63%
1996	0.03%	0.06%	0.13%	0.43%	2.17%	2.94%	1.92%	5.72%
1997	0.01%	0.03%	0.05%	0.40%	1.07%	2.32%	1.70%	3.54%
1998	0.00%	0.01%	0.02%	0.18%	0.45%	0.38%	0.35%	0.54%
1999	0.00%	0.01%	0.01%	0.02%	0.17%	0.18%	0.14%	0.38%
2000	0.01%	0.10%	0.08%	0.33%	2.74%	2.57%	2.38%	4.91%
2001	0.01%	0.04%	0.04%	0.22%	1.56%	1.32%	0.96%	2.50%
2002	0.01%	0.04%	0.06%	1.13%	1.55%	1.28%	1.13%	2.14%
2003	0.01%	0.02%	0.02%	0.12%	0.41%	0.51%	0.70%	0.39%
2004	0.01%	0.01%	0.02%	0.18%	0.51%	0.46%	0.53%	0.63%
2005	0.01%	0.01%	0.01%	0.14%	0.41%	0.42%	0.60%	0.52%
2006	0.01%	0.03%	0.03%	0.23%	0.62%	0.65%	1.95%	0.80%
2007	0.00%	0.02%	0.02%	0.12%	0.41%	0.43%	0.97%	0.53%
2008	0.01%	0.01%	0.02%	0.11%	0.41%	0.47%	0.73%	0.87%
2009	0.00%	0.00%	0.01%	0.05%	0.15%	0.15%	0.54%	0.49%
2010	0.01%	0.02%	0.02%	0.09%	0.48%	0.38%	1.71%	0.69%
2011	0.00%	0.01%	0.01%	0.01%	0.14%	0.10%	0.36%	0.20%
2012	0.01%	0.01%	0.02%	0.12%	0.51%	0.40%	1.23%	0.68%
2002-2012 ave.	0.01%	0.02%	0.02%	0.21%	0.51%	0.48%	0.95%	0.72%
1990-2001 ave.	0.03%	0.07%	0.13%	0.40%	2.06%	3.61%	3.19%	5.13%
Overall ave.	0.02%	0.04%	0.08%	0.31%	1.32%	2.11%	2.12%	3.02%

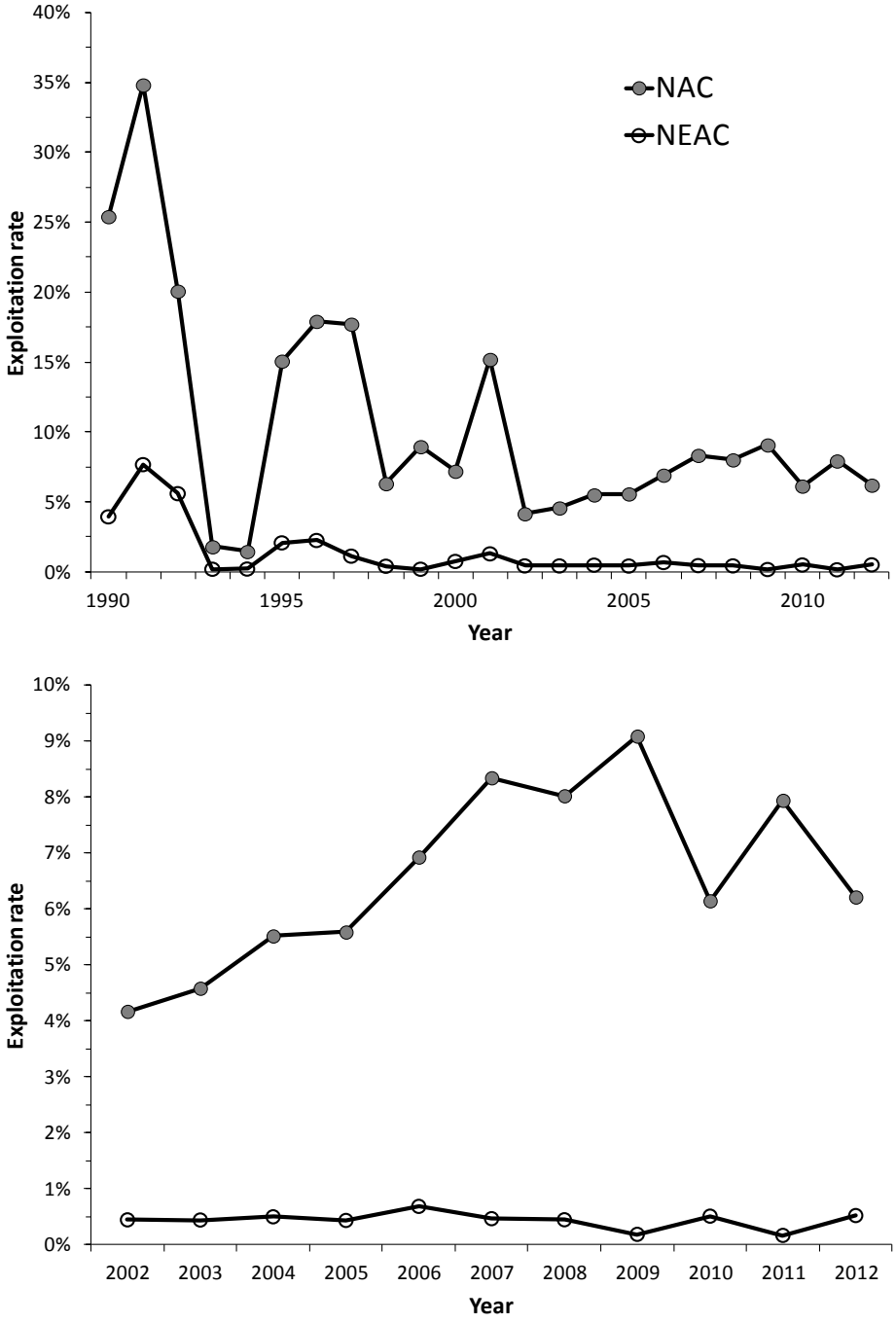


Figure 4.1. Exploitation rate (%) for North American 1SW non-maturing and southern NEAC non-maturing Atlantic salmon harvested at West Greenland, 1990-2012. Exploitation rate estimates are only available to 2012, as 2013 exploitation rates are dependent on 2014 2SW NAC or MSW NEAC returns.

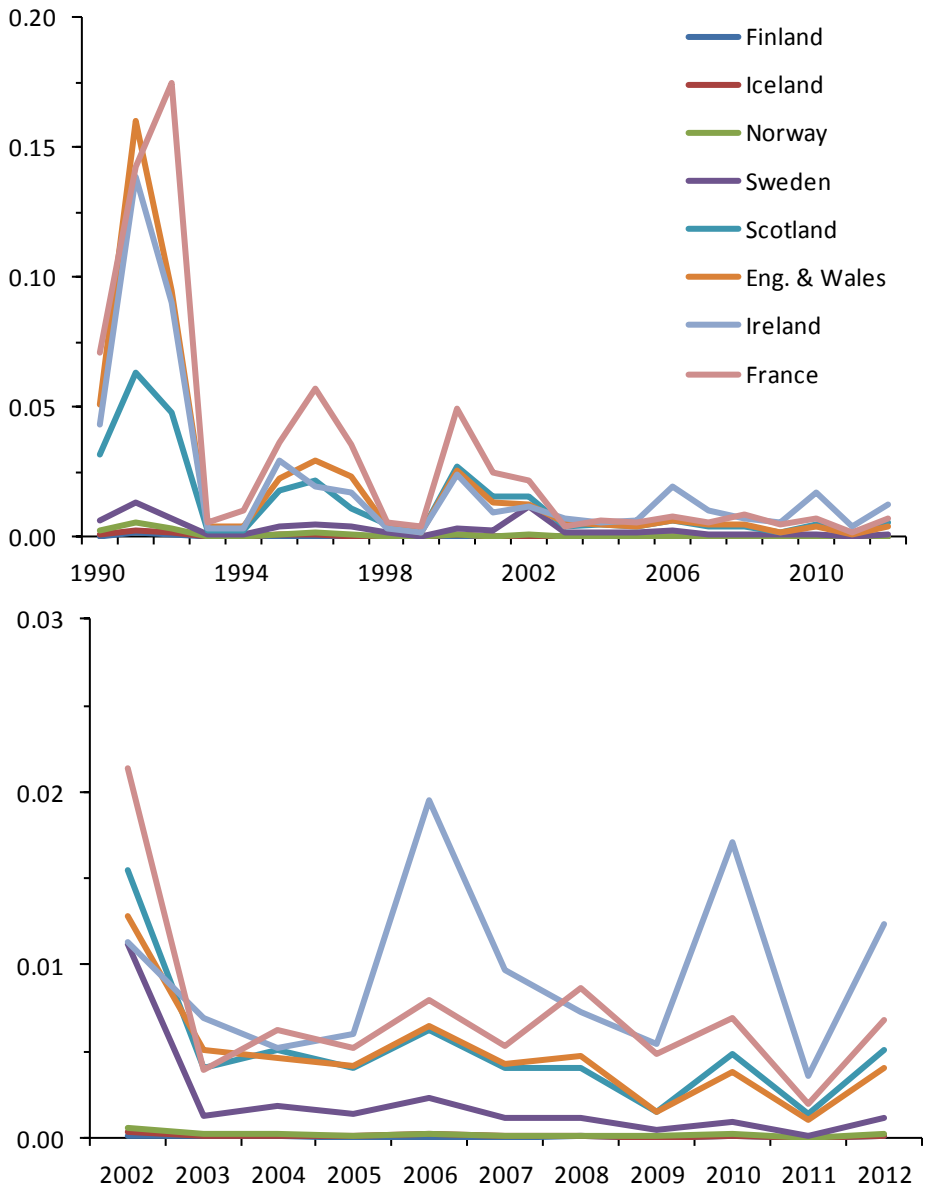


Figure 4.2. Exploitation rate (%) estimates for NEAC countries assumed to contribute to the Greenland fishery. Estimates were obtained by dividing the country-specific pre-fishery abundance estimates of non-maturing 1SW fish by the country-specific harvest at Greenland. Data are based on outputs from the NEAC run-reconstruction model, not from direct measures of exploitation at Greenland. Average values are provided for the time periods 2002-2012, 1990-2001 and overall. Within the NEAC run-reconstruction model, UK (Northern Ireland) and Russia are assumed to not contribute to the West Greenland fishery based on historic tag data.

SECTION 4: RATES OF EXPLOITATION ON CONTRIBUTING STOCKS OR STOCK COMPLEXES

SUMMARY

Exploitation rates for 1SW non-maturing North American and Southern European stock complexes At Greenland have been decreasing through the time period, but are consistently higher for the North American stock complex. Exploitation peaked in 1991 at 34.8% and 7.7%, but has average 6.6% and 0.4% over the past ten years for the North American and Southern European stock complexes respectively. Exploitation of North American stock complex has increased in recent years.

Exploitation for the 1SW non-maturing Southern European stock complex can also be estimated obtained from the NEAC run-reconstruction model. However, the estimates are based on model outputs, not from direct measures of exploitation at Greenland. Estimated exploitation is highest for the UK (Scotland and Eng. & Wales), Ireland and France.

Estimates of exploitation for North American stocks are also presented by Gauthier-Ouellet et al. (2009) and Sheehan et al (2010) in Section 3. These results and the ongoing genetic projects outlined in Section 3 and provide accurate contemporary estimates for exploitation for the various stock complexes contributing to the fishery.

SECTION 5: ANY ADDITIONAL SCIENTIFIC DATA RELATED TO THE FISHERY

Table 5.1a. River age distribution (%) for North American origin salmon harvested at Greenland, 1990-2013. The 2004-2013 and overall mean values are also presented.

North American	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8
1990	8.8	45.3	30.7	12.1	2.4	0.5	0.1	0
1991	5.2	33.6	43.5	12.8	3.9	0.8	0.3	0
1992	6.7	36.7	34.1	19.1	3.2	0.3	0	0
1993								
1994								
1995	2.4	19.0	45.4	22.6	8.8	1.8	0.1	0
1996	1.7	18.7	46.0	23.8	8.8	0.8	0.1	0
1997	1.3	16.4	48.4	17.6	15.1	1.3	0	0
1998	4.0	35.1	37.0	16.5	6.1	1.1	0.1	0
1999	2.7	23.5	50.6	20.3	2.9	0.0	0	0
2000	3.2	26.6	38.6	23.4	7.6	0.6	0	0
2001	1.9	15.2	39.4	32.0	10.8	0.7	0	0
2002	1.5	27.4	46.5	14.2	9.5	0.9	0	0
2003	2.6	28.8	38.9	21.0	7.6	1.1	0	0
2004	1.9	19.1	51.9	22.9	3.7	0.5	0	0
2005	2.7	21.4	36.3	30.5	8.5	0.5	0	0
2006	0.6	13.9	44.6	27.6	12.3	1.0	0	0
2007	1.6	27.7	34.5	26.2	9.2	0.9	0	0
2008	0.9	25.1	51.9	16.8	4.7	0.6	0	0
2009	2.6	30.7	47.3	15.4	3.7	0.4	0	0
2010	1.6	21.7	47.9	21.7	6.3	0.8	0	0
2011	1.0	35.9	45.9	14.4	2.8	0.0	0	0
2012	0.3	29.8	39.4	23.3	6.5	0.7	0	0
2013	0.1	32.6	37.3	20.8	8.6	0.6	0	0
2004-2013 ave.	**1.3**	**25.8**	**43.7**	**22.0**	**6.6**	**0.6**	**0.0**	**0.0**
overall mean	**2.5**	**26.6**	**42.5**	**20.7**	**7.0**	**0.7**	**0.0**	**0.0**

Table 5.1b. River age distribution (%) for European origin salmon harvested at Greenland, 1990-2013. The 2004-2013 and overall mean values are also presented.

European	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8
1990	15.9	56.3	23.0	4.4	0.2	0.2	0	0
1991	20.9	47.4	26.3	4.2	1.2	0	0	0
1992	11.8	38.2	42.8	6.5	0.6	0	0	0
1993								
1994								
1995	14.8	67.3	17.2	0.6	0	0	0	0
1996	15.8	71.1	12.2	0.9	0	0	0	0
1997	4.1	58.1	37.8	0.0	0	0	0	0
1998	28.6	60.0	7.6	2.9	0	1.0	0	0
1999	27.7	65.1	7.2	0.0	0	0	0	0
2000	36.5	46.7	13.1	2.9	0.7	0	0	0
2001	16.0	51.2	27.3	4.9	0.7	0	0	0
2002	9.4	62.9	20.1	7.6	0	0	0	0
2003	16.2	58.0	22.1	3.0	0.8	0	0	0
2004	18.3	57.7	20.5	3.2	0.2	0	0	0
2005	19.2	60.5	15.0	5.4	0.0	0	0	0
2006	17.7	54.0	23.6	3.7	0.9	0	0	0
2007	7.0	48.5	33.0	10.5	1.0	0	0	0
2008	7.0	72.8	19.3	0.8	0.0	0	0	0
2009	14.3	59.5	23.8	2.4	0.0	0	0	0
2010	11.3	57.1	27.3	3.4	0.8	0	0	0
2011	19.0	51.7	27.6	1.7	0.0	0	0	0
2012	9.3	63.0	24.0	3.7	0.0	0	0	0
2013	4.5	68.2	24.4	2.5	0.5	0	0	0
2004-2013 ave.	**12.8**	**59.3**	**23.8**	**3.7**	**0.3**	**0.0**	**0.0**	**0.0**
overall mean	**15.7**	**58.0**	**22.5**	**3.4**	**0.3**	**0.1**	**0.0**	**0.0**

Table 5.2. Sea age distribution (%) for North American and European origin salmon harvested at Greenland, 1990-2013. The 2004-2013 and overall mean values are also presented.

	North American			European		
Year	1SW	2SW	Previous Spawners	1SW	2SW	Previous Spawners
1990	95.7	3.4	0.9	96.3	3.0	0.7
1991	95.6	4.1	0.4	93.4	6.5	0.2
1992	91.9	8.0	0.1	97.5	2.1	0.4
1993						
1994						
1995	96.8	1.5	1.7	97.3	2.2	0.5
1996	94.1	3.8	2.1	96.1	2.7	1.2
1997	98.2	0.6	1.2	99.3	0.4	0.4
1998	96.8	0.5	2.7	99.4	0	0.6
1999	96.8	1.2	2.0	100.0	0	0
2000	97.4	0	2.6	100.0	0	0
2001	98.2	2.6	0.5	97.8	2.0	0.3
2002	97.3	0.9	1.8	100.0	0	0
2003	96.7	1.0	2.3	98.9	1.1	0
2004	97.0	0.5	2.5	97.0	2.8	0.2
2005	92.4	1.2	6.4	96.7	1.1	2.2
2006	93.0	0.8	5.6	98.8	0	1.2
2007	96.5	1.0	2.5	95.6	2.5	1.5
2008	97.4	0.5	2.2	98.8	0.8	0.4
2009	93.4	2.8	3.8	89.4	7.6	3.0
2010	98.2	0.4	1.4	97.5	1.7	0.8
2011	93.8	1.5	4.7	82.8	12.1	5.2
2012	93.2	0.7	6.0	98.0	1.6	0.4
2013	94.9	1.4	3.7	96.6	2.4	1
2004-2013 ave.	95.0	1.1	3.9	95.1	3.3	1.6
overall mean	95.7	1.7	2.6	96.7	2.4	0.9

Table 5.3. Mean lengths (cm), uncorrected for sampling date or NAFO Division, of Atlantic salmon harvested at Greenland by continent of origin and sea age, 1990-2013. The 2004-2013 and overall mean values are also presented.

	North American			European		
	1SW	2SW	Previous Spawners	1SW	2SW	Previous Spawners
1990	62.3	83.4	72.6	62.7	81.1	78.6
1991	61.6	80.6	81.7	62.7	82.2	80.0
1992	62.3	83.4	77.4	63.2	81.1	82.7
1993						
1994						
1995	61.0	81.3	70.9	63.2	81.0	81.3
1996	62.8	81.4	77.1	64.0	81.1	79.4
1997	62.3	85.7	79.4	63.6	84.0	87.0
1998	62.0	84.0	66.3	62.7		76.0
1999	63.8	86.6	70.9	63.5		
2000	60.7		64.7	63.2		
2001	63.1	81.7	75.3	63.7	79.1	72.1
2002	62.6	83.0	75.8	62.1		
2003	63	86.1	71.4	64.4	78.3	
2004	64.7	86.2	77.6	65.0	76.4	88.0
2005	65.9	83.3	73.7	66.4	75.5	62.3
2006	65.3	90.0	76.8	65.3		69.5
2007	63.5	80.9	76.7	63.3	80.6	71.3
2008	64.6	80.1	71.1	63.9	85.5	73.0
2009	64.9	84.6	75.9	65.5	81.7	73.5
2010	66.7	80.0	72.4	65.2	75.0	70.0
2011	65.8	78.6	73.7	64.7	75.0	76.3
2012	65.4	75.9	72.8	64.9	70.4	68.9
2013	66.2	81.0	69.9	64.6	72.8	73.6
2004-2013 ave.	**65.3**	**82.1**	**74.1**	**64.9**	**77.0**	**72.6**
Overall ave.	63.7	82.8	73.8	64.0	78.9	75.8

Table 5.4. Mean whole weights (kg), uncorrected for sampling date or NAFO Division, of Atlantic salmon harvested at Greenland by continent of origin and sea age, 1990-2013. The 2004-2013 and overall mean values are also presented.

	North American			European			Overall		
	1SW	2SW	PS	1SW	2SW	PS	NA	EUR	ALL
1990	2.53	6.47	3.90	2.61	5.78	5.09	2.67	2.72	2.69
1991	2.42	5.82	5.15	2.54	6.23	5.09	2.57	2.79	2.65
1992	2.54	6.49	4.09	2.66	6.01	5.28	2.86	2.74	2.81
1993									
1994									
1995	2.37	6.09	3.71	2.67	5.88	4.98	2.45	2.75	2.56
1996	2.63	6.50	4.98	2.86	6.30	5.44	2.83	2.90	2.88
1997	2.57	7.95	4.82	2.82	6.11	6.9	2.63	2.84	2.71
1998	2.72	6.44	3.28	2.83		4.77	2.76	2.84	2.78
1999	3.02	7.59	4.20	3.03			3.09	3.03	3.08
2000	2.47		2.58	2.81			2.47	2.81	2.57
2001	2.89	6.76	4.41	3.03	5.96	4.06	2.95	3.09	3.00
2002	2.84	7.12	5.00	2.92			2.89	2.92	2.90
2003	2.94	8.82	4.04	3.08	5.58		3.02	3.10	3.04
2004	3.11	7.33	4.71	2.95	5.22	6.48	3.17	3.22	3.18
2005	3.19	7.05	4.31	3.33	4.19	2.89	3.31	3.33	3.31
2006	3.10	9.72	5.05	3.25		3.67	3.25	3.26	3.24
2007	2.89	6.19	4.94	2.87	6.47	3.57	2.98	2.99	2.98
2008	3.04	6.35	3.82	3.03	7.47	3.39	3.08	3.07	3.08
2009	3.28	7.59	5.25	3.40	6.54	4.28	3.48	3.67	3.50
2010	3.44	6.40	4.17	3.24	5.45	3.92	3.47	3.28	3.42
2011	3.30	5.69	4.46	3.18	4.94	5.11	3.39	3.49	3.40
2012	3.34	6.00	4.65	3.38	4.51	3.65	3.44	3.40	3.44
2013	3.33	6.43	3.64	3.16	4.51	5.38	3.39	3.20	3.35
2004-2013 ave.	**3.2**	**6.9**	**4.5**	**3.2**	**5.5**	**4.2**	**3.3**	**3.3**	**3.3**
Overall ave.	**2.9**	**6.9**	**4.3**	**3.0**	**5.7**	**4.7**	**3.0**	**3.1**	**3.0**

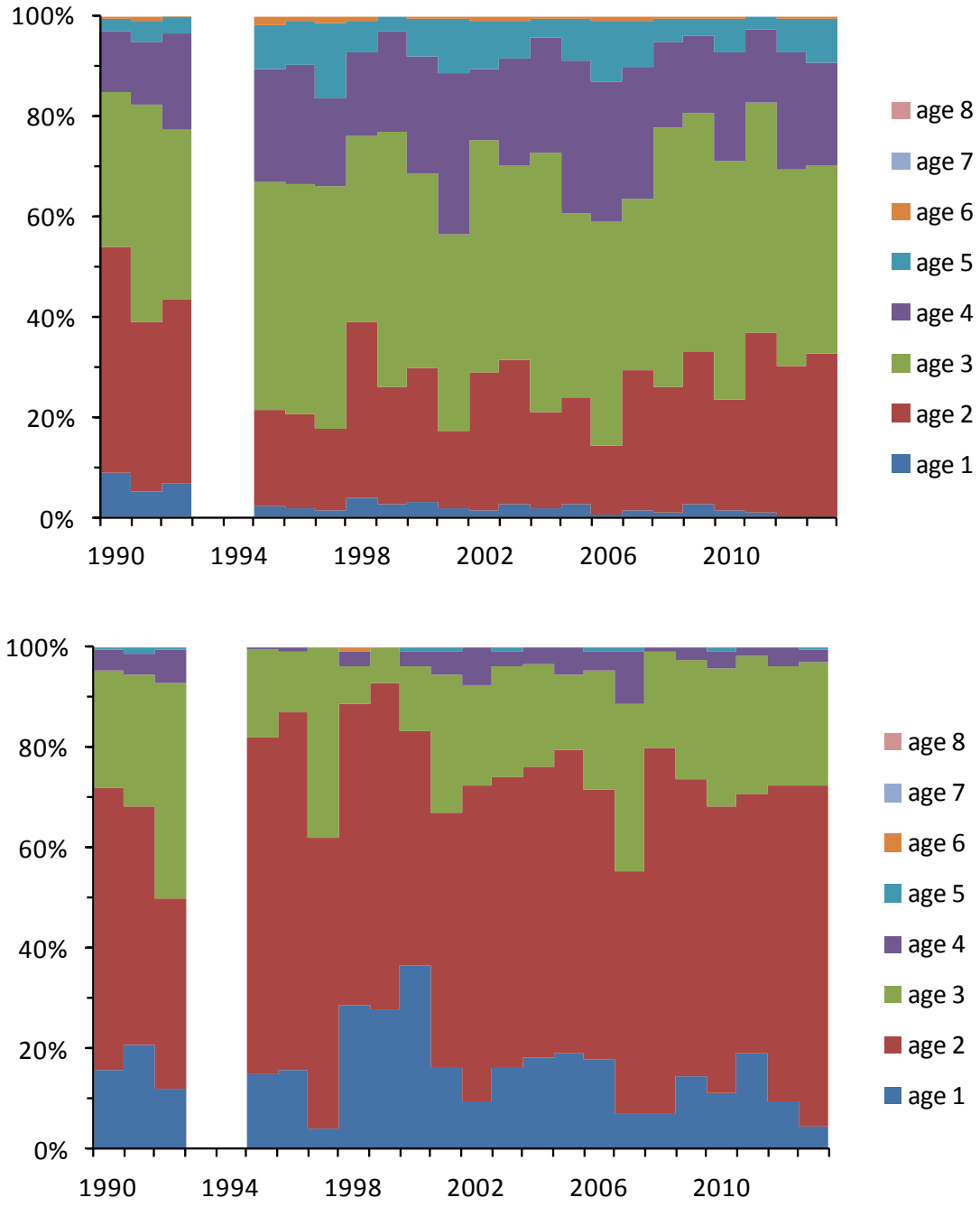


Figure 5.1. River age distribution (%) for North American (top) and European (bottom) origin salmon harvested at Greenland, 1990-2013.

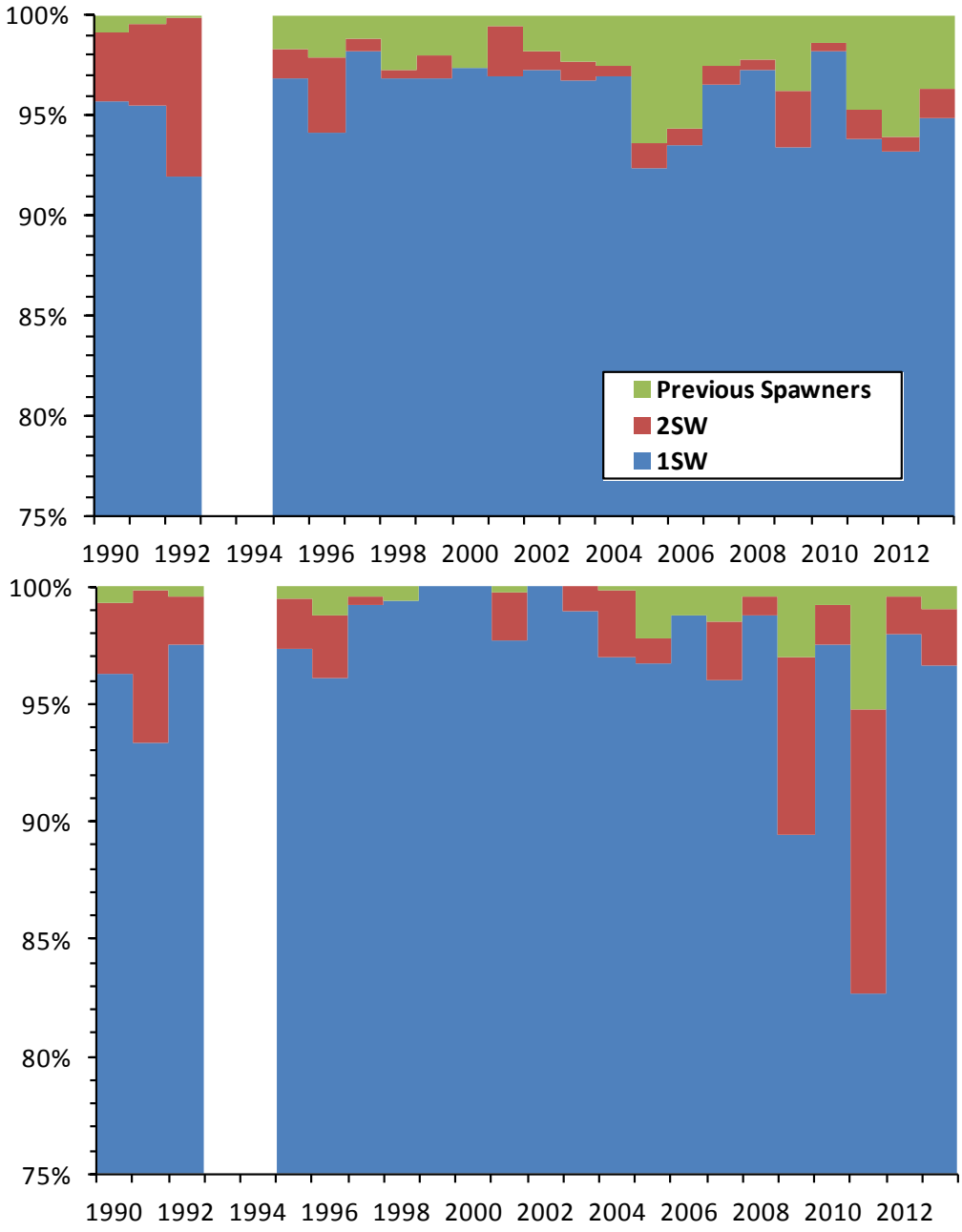


Figure 5.2. Sea age distribution (%) for North American (top) and European (bottom) origin salmon harvested at Greenland, 1990-2013. Note the y-axis scale ranges from 75-100%.

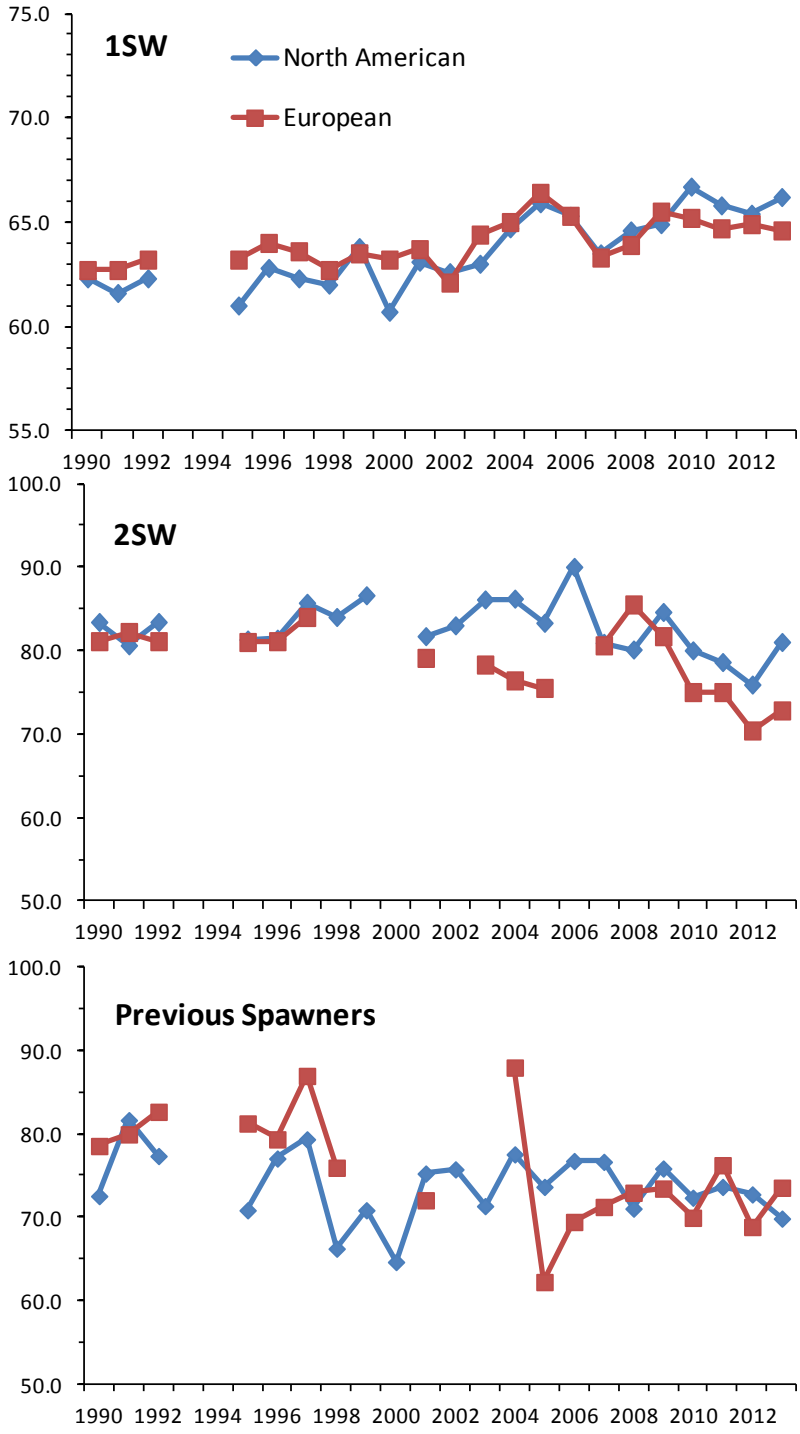


Figure 5.3. Mean lengths (cm) of Atlantic salmon, uncorrected for sampling date or NAFO Division, harvested at Greenland by continent of origin and sea age, 1990-2013.

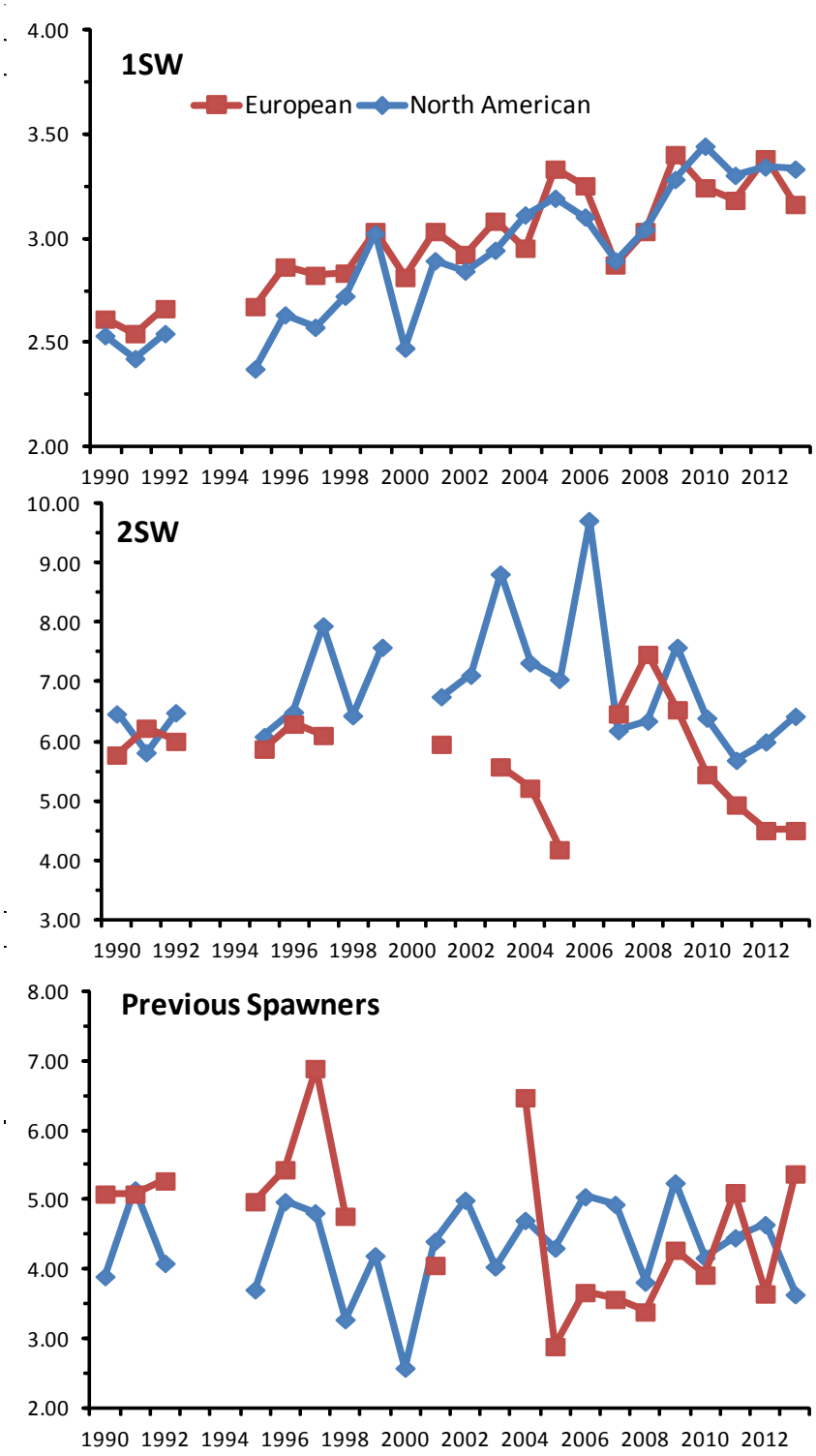


Figure 5.4. Mean gutted weights (kg) of Atlantic salmon, uncorrected for sampling date or NAFO Division, harvested at Greenland by continent of origin and sea age, 1990-2013.

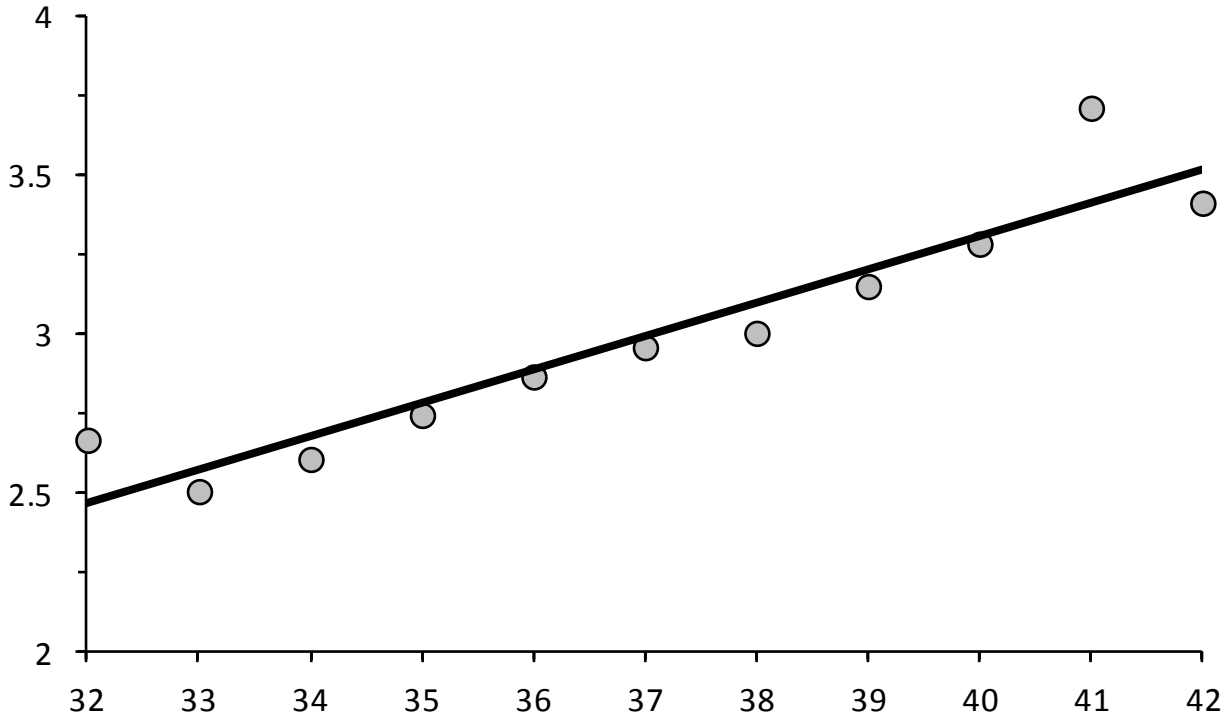


Figure 5.6. Mean gutted weights (kg) of Atlantic salmon, uncorrected for NAFO Division, harvested at Greenland by NAFO standard week, 1990-2013. Data for NAFO standard weeks 31, 43 and 44 were omitted due to low sample sizes. Week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov. A linear trend line is presented to aid visualization.

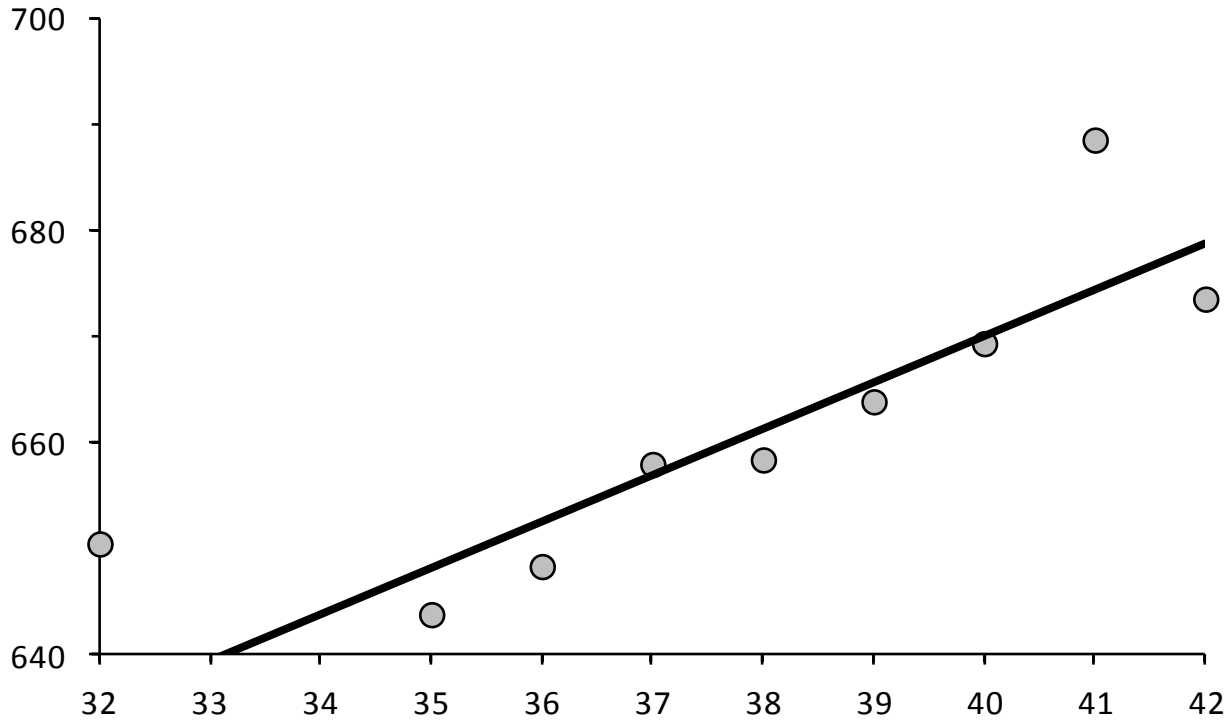


Figure 5.7. Mean fork lengths (cm) of Atlantic salmon, uncorrected for NAFO Division, harvested at Greenland by NAFO standard week, 1990-2013. Data for NAFO standard weeks 31, 43 and 44 were omitted due to low sample sizes. Week 31 corresponds to 30-Jul through 5-Aug and week 44 to 29-Oct through 4-Nov. A linear trend line is presented to aid visualization.

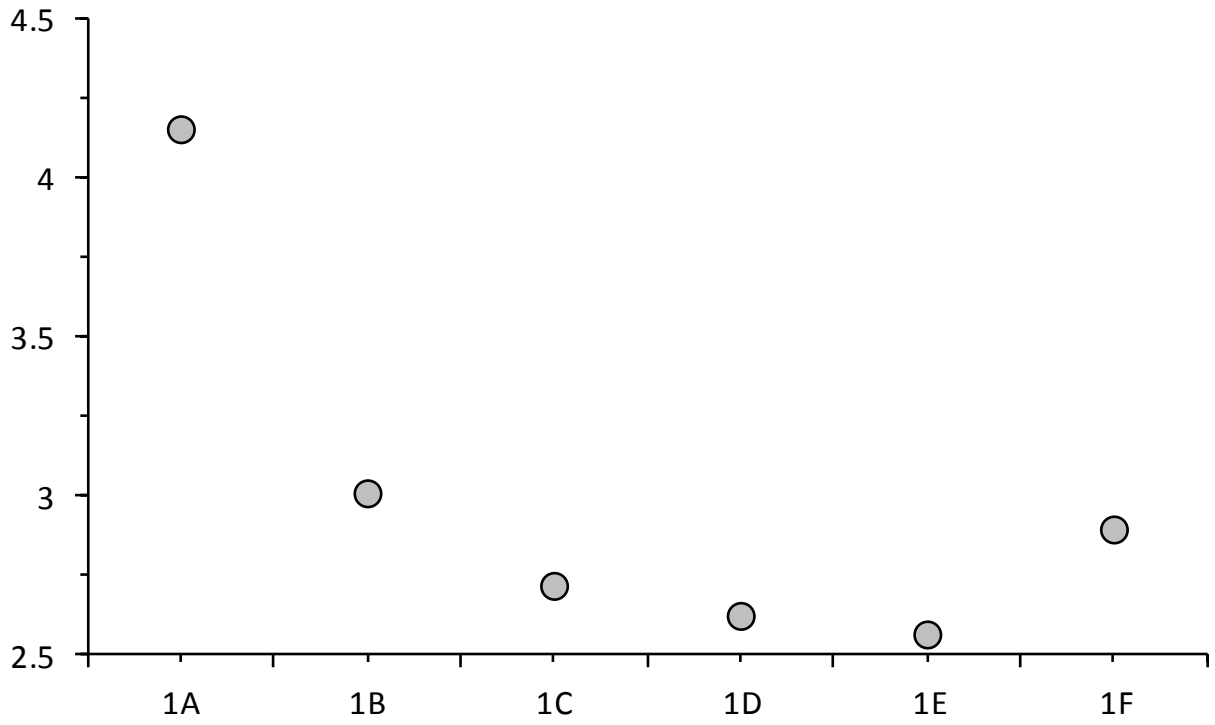


Figure 5.8. Mean gutted weights (kg) of Atlantic salmon, uncorrected for sample date, harvested at Greenland by NAFO Division, 1990-2013.

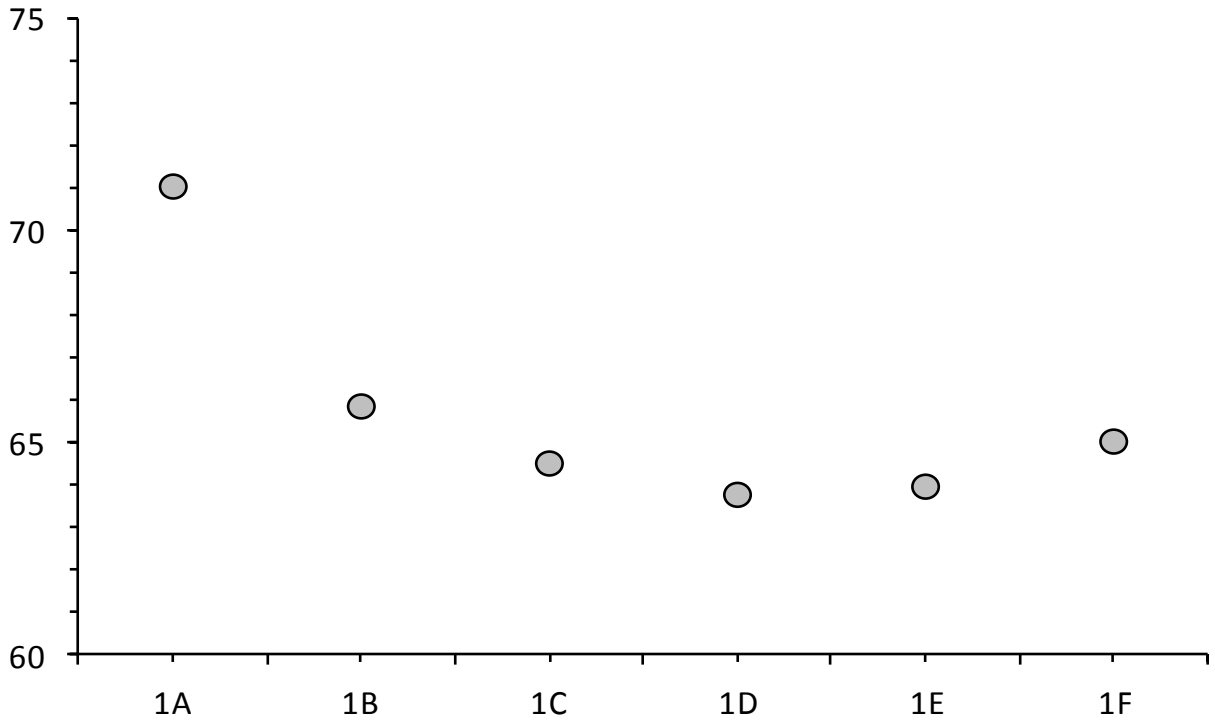


Figure 5.9. Mean fork lengths (cm) of Atlantic salmon, uncorrected for sample date, harvested at Greenland by NAFO Division, 1990-2013.

SECTION 5: ANY ADDITIONAL SCIENTIFIC DATA RELATED TO THE FISHERY

SUMMARY

North American origin fish harvested at Greenland range in river ages from 1-7 but are predominately ages 2-4 (~90%). River ages for European origin salmon harvested at Greenland range from 1-6 but are predominately ages 2-3 (~80%). Both North American and European harvested salmon are primarily 1SW fish destined to return as 2SW or 3SW spawners.

North American and European origin salmon mean lengths and weights, uncorrected for sampling date or locations have remained similar since 1990. Mean lengths and weights of 2SW and previous spawners are variable given the low sample size. Based on the sample data, there has been a significant increase in mean weight (~1.3 kg) and length (~5.5 cm) per individual over the course of the fishing season (August 1 through October 31). There are also large differences in mean length and weight by NAFO Division, although these differences could be related to the timing of the sampling within each division.

Appendix 1

WGCIS(14)3

Terms of Reference for an Ad Hoc West Greenland Committee Scientific Working Group

Recognising that the 2014 advice from ICES relevant to the West Greenland Commission (WGC), developed in response to the request contained in document CNL(13)10, will not be available to inform discussions at the inter-sessional meeting of the WGC on 14 and 15 April 2014, the Commission agrees as follows:

To convene a group of scientific representatives, nominated by the Members of the WGC, to work by correspondence prior to the meeting of ICES WGNAS in March 2014. This group will develop a working paper to be presented at both the WGNAS and the WGC inter-sessional meetings. This working paper will not provide catch options or alternative management advice but will compile available data on catches in the West Greenland salmon fishery from 1990 to 2013, including:

a. *Reported and unreported catches;*

b. *The spatial and temporal breakdown of the catches;*

c. *The origin of the catches by continent and at finer scales where possible (e.g. country or region of origin);*

d. *Rates of exploitation on contributing stocks or stock complexes; and*

e. *Any additional scientific data related to the fishery.*

The group should submit its report to the Secretary of NASCO by the end of March 2014.

In accordance with the MoU between ICES and NASCO the formal, peer reviewed advice from ICES will be available in early May 2014 and will be considered by the WGC at its Annual Meeting in June.

Annex 9

WGCIS(14)5

Overview of the regulatory measures applying to the West Greenland fishery

Background

1. Prior to NASCO's establishment in 1984, the Greenland fishery operated under a quota of 1,190t established through the International Commission for the Northwest Atlantic Fisheries. Under Article 8 of the NASCO Convention, one of the functions of the West Greenland Commission (WGC) is to propose regulatory measures for fishing in the area of fisheries jurisdiction of a member of salmon originating in the rivers of other Parties. Article 9 of the Convention details the factors that the Commissions should take into account in carrying out their functions. These include:
    - the best available information, including advice from ICES and other appropriate scientific organizations;
    - the efforts of States of origin to implement and enforce measures for the conservation, restoration, enhancement and rational management of salmon stocks;
    - the contribution of Parties other than States of origin to the conservation of salmon stocks which migrate into their areas of fisheries jurisdiction by limiting their catches or other measures;
    - the extent to which the salmon stocks concerned feed in the areas of fisheries jurisdiction of the respective Parties; and
    - the interests of communities which are particularly dependent on salmon fisheries.

2. At the outset, quantitative, predictive scientific advice on which to base regulatory measures was lacking and this led to several years of negotiations about the relative importance of the various factors detailed in Article 9 of the Convention. Nonetheless, since NASCO's establishment in 1984, regulatory measures have been agreed for the fishery at West Greenland in all but four years (1985, 1991, 1992 and 1996) and in those years Greenland unilaterally established quotas for the fishery. A major change occurred in 1993 when the WGC adopted an agreement, 'the 1993 Agreement', detailing a mechanism for establishing quotas in the five-year period from 1993 to 1997 based on ICES' estimates of pre-fishery abundance for North American non-maturing 1SW salmon. Since 1998 (with the exception of 2001 and 2002) regulatory measures have been agreed that allow for an internal consumption fishery only at West Greenland. These measures demonstrate the strong commitment of the WGC Parties to base decisions on the scientific advice from ICES.
3. This paper describes the regulatory and other measures adopted by the WGC, briefly outlines the actions taken to implement these measures based on the reports made to by Denmark (in respect of the Faroe Islands and Greenland) in accordance with Article 14 of the Convention and considers the various terminology used in the measures. A listing of all the measures since 1984 is contained in Annex 1 and they are also available at www.nasco.int/wgc_measures.html.

Chronology of Regulatory Measures

1984 -1992 Regulatory Measures, WGC(84)12, WGC(86)21, WGC(88)6

4. The first measure adopted by the WGC was in 1984 when Greenland was still part of the European Economic Community and it established a Total Allowable Catch of 870t. Greenland subsequently withdrew from the EEC and in 1985 Denmark (in respect of Greenland) acceded to the Convention with the effect that Denmark (in respect of the Faroe Islands and Greenland) became a Party to NASCO. No NASCO measure was agreed in 1985 but Greenland unilaterally set a quota of 852t. Under NASCO regulatory measures, the catch was limited to 850t (adjusted if the season commenced after 1 August) in both 1986 and 1987 and to 2,520t (adjusted if the season commenced after 1 August) for the three years 1988 – 1990 combined (with the catch in any year not to exceed the annual average (840t) by more than 10%). These measures did not refer to different components of the fishery (e.g. commercial, subsistence etc.) only to an overall catch limit. No measures were agreed by the WGC in 1991 or 1992. In 1991, Greenland set a quota of 840t and in 1992 no quota was set by Greenland but if the catch in the first fortnight of the fishery had been higher than in the previous year a TAC would have been established.

The 1993 Agreement, WGC(93)9

5. In 1993, in response to the decline in abundance of wild salmon and the need to provide adequate spawning stocks of 2SW salmon to support sustainable populations, a five-year agreement was adopted covering the years 1993 -1997. This Agreement recognised that any quota should adjust up or down relative to the best scientific advice and that there should be a transition period to implement the significant adjustment needed to accommodate that advice. It also recognised the need to take into account the interest of communities which are particularly dependent on salmon fisheries. The agreement set out a mechanism on which the quota in each of the year would be established (without prejudice to new advice from ICES) that included the following four main elements:
   a) The ICES advice on the pre-fishery abundance of potential 2SW salmon of North American origin (and European origin if available);
   b) The ICES advice on the target spawning escapement reserve of potential 2SW salmon necessary to achieve the target spawning escapement, or a different proportion of this reserve as agreed by the Parties;
   c) Any surplus above the target spawning escapement reserve, or the proportion agreed to, may be available for harvest by the Parties;
   d) Allocation of the surplus would be based on the average harvest share of potential 2SW salmon of North American origin salmon caught at West Greenland (40%) in the period 1986 – 1990 or a different share if agreed upon by the Parties.

6. In recognition of the difficulties in establishing a new catch quota at the levels recommended by ICES, the Parties agreed to quotas expected to achieve 72% and 85% of the target spawning escapement reserve in 1993 and 1994 respectively, and thereafter 100% of the target spawning escapement reserve. This led to quotas of 213t, 159t and 77t in 1993, 1994 and 1995, respectively. The 1993 Agreement did not refer to different components of the fishery (e.g. commercial, subsistence etc.) only to an overall catch limit. No agreement was reached on a quota in 1996 but Greenland unilaterally set a

quota of 174t. Following the 1996 Annual Meeting, there were informal meetings of the Commission that led to the development of an addendum to the 1993 Agreement.

The 1997 Addendum to the1993 Agreement, WGC(97)10

7. The addendum to the 1993 Agreement applied to the fishery at West Greenland in 1997 only and provided a new mechanism for setting the quota based on the higher of either the 'calculated quota' (i.e. that calculated according to the 1993 Agreement using the PFA forecast at the 50% probability level) or the 'reserve quota' (an allocation to Greenland of 6% of the forecast PFA). If the PFA of potential 2SW salmon of North American origin fell below 100,000 salmon there would be no harvest of North American origin MSW salmon except in subsistence fisheries or in individual North American river fisheries where the target spawning escapement of MSW salmon is exceeded in that river.
8. The rationale for this quota arrangement was that it facilitated collection of biological information at low stock levels, it provided greater equitability for Greenland until such time as quota measures on stocks occurring in the WGC area 'were coordinated' and it offered greater predictability for the commercial fishery at Greenland. For 1997, a Reserve Quota of 57 tonnes was established. The 1997 Addendum defined a subsistence fishery as 'a fishery which harvests salmon only for community food, social or ceremonial purposes'. It did not define a commercial fishery. The 'reserve quota' would 'include all catches inclusive of the subsistence catch, home sales, and all heretofore unreported catch'. It went on to indicate that the unreported or subsistence catch was estimated to be 20 tonnes in 1996. The WGC agreed that strenuous efforts should be made by all Parties to account for all elements of the salmon catches for inclusion in quota monitoring. The addendum also allowed for review and revision of the quota setting arrangements in the event that biological parameters for European origin salmon became available.

1998 - 2000 Regulatory Measures, WGC(98)9 and WGC(99)8

9. The measures applying to the fishery in the period from 1998 to 2000 noted that the ICES advice highlighted the decline in PFA of non-maturing 1SW salmon of both Southern European and North American origin. The regulatory measures agreed in 1998 (applying to the fishery in 1998) and 1999 (applying to the fishery in 1999 and 2000) restricted the catch at West Greenland to that amount used for internal consumption in Greenland and indicated that in the past this had been estimated at 20 tonnes. Under the 1999 measure, it was stated that there will be no 'commercial export' of salmon. Both measures also noted and commended Greenland for the 'improvement in its monitoring and reporting procedures'. The measures applying in the three years from 1998 – 2000 introduced a new term i.e. a fishery for 'internal consumption' but this was not defined.
10. At the WGC's Annual Meeting in 2000, a Resolution, WGC(00)12, was adopted. This measure recalled that the Parties had worked cooperatively to utilize the scientific advice from ICES in establishing regulatory measures, recognised the status of the stock and the advice from ICES that there should be no exploitation of non-maturing 1SW salmon at Greenland in 2000 or of mature 2SW salmon in North America in 2001 and took into account NASCO's commitment to implement the Precautionary Approach. The Parties resolved to maintain the spirit embodied in previous agreements and agreed that unless there had been a significant improvement in the condition of the salmon stocks available

to the fishery at West Greenland, the catch in 2001 would be restricted to 'the lowest possible level'. The Parties also complimented Greenland for the continued improvement in monitoring and reporting procedures and agreed to provide a comprehensive sampling of the fishery.

2001 and 2002 Regulatory Measures, WGC(01)16 and WGC(02)13

11. In both 2001 and 2002 '*Ad hoc* management programmes' were agreed for the West Greenland salmon fishery. These were rather more complicated measures, not least with regard to their implementation, than previously adopted by the WGC in that they used the relationship between CPUE, measured by the average daily landings in kilograms per licensed fishermen, and the PFA of North American salmon stocks in order to corroborate, in a timely manner, the ICES forecasts. Both agreements recalled that previous regulatory measures had been based on the scientific advice from ICES, they noted the WGC's commitment to implement the Precautionary Approach, and recognised that southern European MSW stocks had been consistently below their conservation limit, that North American stocks were outside safe biological limits and that the PFA of North American salmon was highly uncertain. Furthermore, the agreements resolved to maintain the spirit embodied in previous agreements and to enhance biological sampling of the fishery and sought to take account of the status of stocks of both North American and Southern European origin. The Greenland Home Rule Government agreed to monitor the fishery closely and ensure that licensees' fishing practices were consistent with those in previous years and make the data available during and after the fishery. There would be increased biological sampling. Both measures referred only to the commercial fishery, and no reference was made to a subsistence or internal consumption fishery.
12. In 2001, three harvest periods were established separated by two day closures. The start of the first harvest period was to be no sooner than 13 August as determined by the Greenland Home Rule Government and remained open for seven days or until 28t of salmon were taken in the commercial fishery, whichever came first. The CPUE from this period would determine if a second harvest period would be opened and the additional quota that would be available and similarly for the third period. The maximum quota allocated depended on CPUE and could range between 28t (low CPUE), 92t (medium CPUE) and 200t (high CPUE). If CPUE was low in the first or second periods the fishery would be closed.
13. For the 2002 fishery, two harvest periods were established separated by a two-day closure. The start of the season was to be no sooner than 12 August as determined by the Greenland Home Rule Government and remained open for two weeks or until 20t of salmon was taken, whichever came first. The maximum quota allocated again depended on CPUE and could range between 20t (low CPUE), 38t (medium CPUE) and 55t (high CPUE). If CPUE was low in the first period the fishery would be closed.

2003 – 2005 Regulatory Measures, WGC(03)9, WGC(04)6 and WGC(05)7

14. In each of the three years, 2003, 2004 and 2005 regulatory measures were adopted that noted that the stock complex was outside safe biological limits (2003 and 2004) or outside precautionary limits (2005) and that the Parties had previously worked cooperatively to agree measures utilizing the ICES scientific advice. These measures

restricted the catch at West Greenland to that amount used for internal subsistence consumption (2003 and 2004) or internal consumption (2005) that in the past had been estimated at 20t. The measures also indicated that there would be no commercial export of salmon. They also contained other common elements including acknowledgement of the good work by Greenland to improve estimates of catches of salmon taken for private sales and local consumption in Greenland, and encouraged this work to continue, and a commitment to cooperate in a sampling programme for the fishery.

2006 - 2012 Multi-annual regulatory measures, WGC(06)6, WGC(09)7 and WGC(12)12

15. The 'Next Steps' review had recommended that the possibility of establishing multi-annual measures should be explored. Three-year regulatory measures were adopted by the WGC in 2006, 2009 and 2012, based on multi-annual advice from ICES provided in those years, and that would be used in conjunction with a Framework of Indicators (first adopted in 2007) that would be used to identify any significant change in the previously provided advice. These measures all noted that the status of the stock complex at West Greenland was below the conservation limit and thus suffering reduced reproductive capacity and the previous agreement of the Parties to base regulatory measures on the scientific advice from ICES. They also contained a commitment to continue to cooperate on a sampling programme for the fishery and acknowledged the good work by Greenland to improve estimates of catches taken for private sales and local consumption. These measures restricted the fishery to that amount used for internal consumption in Greenland and noted that in the past this had been estimated to be 20t annually. There would be no commercial export of salmon. The 2009 and 2012 measures encouraged Greenland to obtain the additional information from fishers including catch site, catch date, number of nets, net dimensions and numbers of hours the nets were fished.

Reports on actions taken to implement WGC regulatory measures

16. Consistent with Article 14 of the Convention, Denmark (in respect of the Faroe Islands and Greenland) has reported at the Annual Meetings of the WGC on the measures taken to implement the regulatory measures outlined above. Since 2000, written reports have been tabled annually and these are contained in documents WGC(00)7, WGC(01)5, WGC(02)8, WGC(03)5, WGC(04)5, WGC(05)5, WGC(06)4, WGC(07)4, WGC(08)5, WGC(09)6, WGC(10)9, WGC(11)7, WGC(12)3 and WGC(13)4. A description of the fishery has also been provided in Greenland's Implementation Plans (2007 - 2012 and 2013 -2018) and 2008 Fisheries Focus Area Report (see and IP(07)Final, CNL(13)40Final and IP(08)7rev) and Agenda item 6 allows for a review of the internal consumption fishery at West Greenland. It is anticipated that Greenland will make a presentation on the management of the internal consumption fishery including the fishery in 2013 (which is not described below).

17. The reports indicate that the regulatory measures were implemented through a series of Executive Orders as follows:

- Greenland Home Rule Executive Order No 13 of 12 August 1999 (applying to the fishery in 1999 and 2000);
- Greenland Home Rule Executive Order No 29 of 8 August 2001 (applying to the fishery in 2001);

- Greenland Home Rule Executive Order No. 21 of 10 August 2002 (applying to the fishery in the period 2002 – 2011);
- Government of Greenland Executive Order No 12 of 1 August 2012.

18. The reports indicate that the Greenland Home Rule Executive Order No 21 of 10 August 2002 applied to the fishery in 2002 (under the *Ad Hoc* Management Programme) and in the period 2003 – 2011 (internal consumption only fishery). This Order distinguished between the commercial fishery with landings to fish plants, the subsistence fishery by residents of Greenland, and the rod fishery by tourists/non-residents. In each year, the Greenland Home Rule Government set the national quota for commercial landings of salmon to fishing plants to zero tonnes (except that for the 2011 fishery it was set to zero tonnes for commercial landings of salmon to fishing plants *for export*) and prohibited any export of salmon. Only a subsistence fishery was allowed described variously in the reports during this period as the fishery for private consumption and the fishery for licensed, professional fishermen supplying:
    - local open air markets, hotels, hospitals and restaurants (2003 – 2007 fisheries);
    - local open air markets (2008 fishery);
    - local open air markets, hotels and institutions (2009 fishery); and
    - local open air markets, hotels and institutions etc. (2010 and 2011).
19. The fishery in 2012 was regulated under the Government of Greenland Executive Order No 12 of 1 August 2012. This Order distinguished between the commercial fishery to be landed at fish plants for export, the subsistence fishery by residents of Greenland, and the rod fishery by tourists/non-residents. No export of salmon was allowed in 2012 but the Government of Greenland set a national quota of 35t for landings at fish plants but only a subsistence fishery was allowed described as a fishery for private consumption and a fishery with the aim of supplying supermarkets, local open air markets, hotels and institutions etc. The latter fishery was only permitted for professional fishermen with licences. Greenland's Implementation Plan (2013 – 2018) indicates that the fishery consists of four components: subsistence fisheries for sale in open air markets or to hotels, institutions etc.; quota-based subsistence fisheries for landings at fish factories; subsistence fisheries for personal consumption; and sport and leisure fisheries. The Implementation Plan also indicates that under the 2012 Executive Order catch reporting has been improved in order to provide scientists with more detailed information.

Terminology

20. A variety of terms are used in the NASCO regulatory measures and other WGC documents relating to the fishery at West Greenland but in the main these are not defined. The one exception is that under the 1997 Addendum to the 1993 Agreement, a subsistence fishery is defined as 'a fishery which harvests salmon only for community food, social or ceremonial purposes'. Since 1998, with the exception of two years (2001 and 2002), NASCO regulatory measures have restricted the fishery to the amount used for internal consumption or internal subsistence consumption in Greenland. Neither of these terms, nor any differences between them, have been defined in the regulatory measures and it is not clear if, and how, they differ from a subsistence fishery as defined in the 1997 Addendum. All measures relating to these fisheries (other than in 1998)

specify that there will be no commercial export of salmon and that the amount used for internal consumption or internal subsistence consumption has, in the past, been estimated to be 20t annually.

21. The reports made by Greenland on actions taken to implement these regulatory measures describe the various components of the fishery as indicated in its Executive Orders and other documents. These reports indicate that the Executive Orders distinguish between the commercial fishery for salmon landed at fish plants or landed at fish plants for export (2011 and 2012 only), a subsistence fishery by residents of Greenland and a rod fishery by tourists/non-residents. The subsistence fishery is described as being the 'fishery for private consumption and the fishery with the aim of supplying various markets, shops, institutions etc. The commercial fishery is referred to as the fishery with landings to fish plants or the fishery for landings to fish plants for export.

22. Clarification of, and agreement on, the terms relating to the fishery might assist in future. The terms that might usefully be defined as they relate to these regulatory measures might include: subsistence; internal consumption; internal subsistence consumption; commercial; recreational; and private sales.

Ted Potter (WGC Chair) and Peter Hutchinson (Secretary)
11 April 2014

Summary of Regulatory Measures agreed by NASCO for the West Greenland Salmon Fishery

Year	Allowable catch (tonnes)	Comments/other details in the measures
1984	870	
1985	–	Greenlandic authorities unilaterally established quota of 852t.
1986	850	Catch limit adjusted for season commencing after 1 August.
1987	850	Catch limit adjusted for season commencing after 1 August.
1988 - 1990	2520	Annual catch in any year not to exceed annual average (840t) by more than 10%. Catch limit adjusted for season commencing after 1 August.
1991	–	Greenlandic authorities unilaterally established quota of 840t.
1992	–	No TAC imposed by Greenlandic authorities but if the catch in first 14 days of the season had been higher compared to the previous year a TAC would have been imposed.
1993	213	An agreement detailing a mechanism for establishing annual quota in each of the years 1993 to 1997 was adopted by the Commission.
1994	159	
1995	77	
1996	–	Greenlandic authorities unilaterally established a quota of 174t.
1997	57	An addendum to the 1993 Agreement was agreed by the Commission.
1998	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
1999 - 2000	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t. A Resolution regarding the Fishing of Salmon at West Greenland was agreed by the Commission at its 2000 meeting.
2001	28 - 200	Under an *ad hoc* management programme the allowable catch will be determined on the basis of CPUE data obtained during the fishery.
2002	20 - 55	Under an *ad hoc* management programme the allowable catch will be determined on the basis of CPUE data obtained during the fishery.
2003 - 2008	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
2009 - 2011	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.
2012 - 2014	Internal consumption fishery only	Amount for internal consumption in Greenland has been estimated in the past to be 20t.

Annex 10

WGCIS(14)15

Paper on the internal-use fishery at West Greenland

Management measures and monitoring and surveillance

Photo: Kim Schmidt – Salmon caught with fishing-rod in Qaqortoq.

NAALAKKERSUISUT
GOVERNMENT OF GREENLAND

Government of Greenland

Ministry of Fisheries, Hunting and Agriculture

1. Introduction

Despite its size (2,166,086 km^2), approximately from Bergen in Norway to Malaga in Spain - Greenland only have a population of 56,968 (31 Mar 2014) with a population density of 0.026/km^2 due to the Ice Cap that only make approximately 10% of the landmass habitable. Fisheries are the most important industry in Greenland not only economically but also emotionally. Fishery and hunting play an enormous role in the Greenlandic culture and identity. Many small and isolated villages are dependent on fisheries. The only means of transportation in Greenland between villages and cities are boats, planes and in the wintertime dog sledges. Therefore, people cannot just drive to another city to work, if e.g. the factory in the village closes. Even though, some fisheries such as the shrimp and prawn fishery operate offshore with large trawlers, the main fishery in Greenland is the inshore fishery with dinghies with approximately 2,800 licensed fishermen. The salmon fishery in Greenland is an inshore fishery. Greenland has no salmon fishery beyond 12 nautical miles.

2. Management Measures

Because Greenland only has one salmon river, and the stocks exploited in Greenland therefore mainly originate in other countries, an essential part of the Greenlandic management measures for the salmon fishery are agreed to internationally within NASCO. The following gives an overview of the management measures that Greenland has taken internally.

2.1. Inshore Salmon Fishery

The fishery for Atlantic salmon fishery in Greenland waters started around 1960 and peaked in the early seventies at a catches of more than 2000 tons a year. The fishery was quota regulated from 1972, but due to declining stocks, NASCO in June 1998 agreed that no commercial fishery for salmon should be allowed, but that the catch at West Greenland should be restricted to *'that amount used for internal consumption in Greenland, which in the past has been estimated at 20 tonnes'*. Since then export of salmon from Greenland has been banned by law. After 1997 it has also been mandatory to report private catches of salmon. From 2002 to 2011, licensed fishermen were only allowed to sell salmon to Institutions, local markets and restaurants. Unlicensed fishery for private consumption has been always allowed[1].

[1] Nygaard, Rasmus; *The Salmon Fishery in Greenland 2012 – Working paper 2013/XX.* International Council for The Exploration of the Sea – North Atlantic Salmon Working Group.

The salmon fishery season in West Greenland is August 1 to October 31. The different components in the fishery are the unlicensed fishermen, private people that want to catch salmon for private consumption and licensed fishermen that are professional fishermen, who often have a license for other species as well. These fishermen are mostly small scale fishermen that fish from a dinghy but there are also a few vessels over 6 meters. In 2013, there were 323 licenses for dinghies and 11 licenses for vessels over 6 meters in West Greenland
The minimum mesh size in gillnets are 70 mm and applies for both components in the fishery. The unlicensed fishermen can use 1 salmon net and licensed fishermen can use up to 20 salmon nets. Furthermore, the licensed fishermen are allowed to use driftnets.

All catches must be reported to Greenland Fisheries License Control Authority (GFLK), this entails that both licensed and unlicensed fishermen must report their catches to GFLK.

In 2012, the Government of Greenland allowed factory landings in order to ensure that all citizens get the opportunity to consume salmon and at the same time ensure the fishermen sales chances. The opportunity to land salmon entails employment for both small scale fishermen and employees at the factories. This opportunity can be the difference between closing the factories for longer periods of the time and ensuring the livelihood of fishermen and factory workers. Furthermore, the reporting has become more accurate as the reporting from the factories is regarded as accurate.

The opening of factory landings in 2012 entailed that the factories also have to report the amounts of salmon that is being landed. In 2012 and 2013, a quota for factory landings was set at 35 tons. However the factory quota ceiling was not met in either 2012 or 2013.

Uncertainty with regard to unreported catch is related to private use and catch sold at markets and institutions.

The possibility to land salmon to factories have only existed since 2012, thus, the market is relatively new and have not evolved yet. The Greenlandic retail chains in Greenland both import salmon from Europe, mainly Norway and buy Greenlandic salmon from the factories. However, the percentage of the Greenlandic salmon is very small compared to the entire sale of salmon in Greenland. In 2013, the detail chains bought approximately 37 tons of salmon, whereof approximately 13 tons was Greenlandic salmon, thus, the Greenlandic salmon only comprise 4,8 per cent of the sale.

Export of salmon caught in Greenland is illegal.

2.2. River Fishery

Greenland only has one known spawning population Atlantic salmon, *Salmo salar*, located in the Kapisillit river in the inner part of the Nuuk fjord, in West Greenland. Potentially, other rivers could hold a salmon population, but in general the rivers in Greenland are short, steep and cold.

Although, the contribution of the small Kapisillit population to the salmon fishery around Greenland is persistent, it must be regarded as insignificant[2].

Some rod and reel fishery exists in the Kapisillit river, but the extent, size and catches is currently unknown. Electrofishing in the river in 2012, however revealed several yearclasses of smolts and the stock is persistent (unpublished).

The Ministry of Environment and Nature is currently working on a strategy for the protection of biodiversity in Greenland. The Kapisillit salmon will in connection with this strategy stand out as especially conservation demanding and thus, it will be one of the highest priorities in the future conservation work. The main goal is to increase the protection of the river itself and endemic salmon stock from anthropogenic effects. The river is still almost undisturbed. The only known permanent disturbance to the river is that it, functions as water supply to the local settlement housing around 50 all year citizens. The disturbance involves a wooden structure and a 2.5 km long pipe from one of the lakes to the Kapisillit settlement. As part of the process, the local inhabitants have been heard about their opinion concerning the future of the river, the stock and the surrounding area. The protection plan includes the river, the river mouth, all areas supplying water to the river, the inner part of the fjord from the settlement to the river and surrounding areas. The process for an increased protection plan was started a few years ago and the expectation is a full protection of the area and a new set of rules for the use of the stock and area by 2015.

3. Monitoring and Surveillance

All control, monitoring and surveillance is carried out by the Greenland Fisheries License Control Authority. The GFLK employs 11 wild life officers and fisheries observers, the fisheries observers control the offshore fishery and the wild life officers control the inshore fishery as well as hunting areas.

3.1. Control and Enforcement

The fishermen, licensed or unlicensed must report their catches either when the fishery ceases or closes. The reporting must be in the hands of GFLK at the latest by the fishery's end date i.e. 31 October. The factories report to GFLK every week in line with the reporting of other species and are regarded accurate.

Further to the reporting of the fishermen and reports from the factories, GFLK's wild life officers, who covers the entire coast of West Greenland checks up on the fishery and the fishermen regularly during the fishing season. The wild life officers report any irregularities or

[2] Nygaard, Rasmus; *The Salmon Fishery in Greenland 2012 – Working paper 2013/XX.* International Council for The Exploration of the Sea – North Atlantic Salmon Working Group.

infringements to the GFLK. GFLK and the Ministry report to the police and if necessary the Ministry of Fishery, Hunting and Agriculture takes legal action.

After the fishing season has ended the GFLK and the Ministry runs a series of targeted campaigns in order to ensure that the fishermen remove their nets and other equipment. Furthermore, the wild life officers patrol the normal salmon fishing grounds and occasionally identify and remove nets that are not correctly marked with name and contact information or equipment left by the owner by the end of the season.

3.2. Licensing and Reporting Arrangements

In order to receive a license for the salmon fishery in Greenland, the fishermen have to apply through an application schedule to the Ministry of Fisheries, Hunting and Agriculture. The license office in the Ministry handles all inshore licenses. In order to be eligible for a license, applicants must be professional fishermen involved in other fisheries. Applicants must have permanent association to Greenland[3], own salmon nets and operate a vessel smaller than 42 feet. Furthermore, it is not allowed to use a vessel used in the inshore shrimp fishery to fish salmon. It is illegal to sell salmon without a license.

As mentioned above, both licensed and unlicensed fishermen are obligated to report their catches to GFLK. In order to ease and improve the reporting system and reduce unreported catch, the regulations for the salmon fishery were updated in 2012. The update mainly involved that licensed fishermen were required to keep a journal or log of their catches instead of reporting every day during the season. Rules and regulations about salmon fisheries in Greenland EEZ can be found in: "*Selvstyrets bekendtgørelse nr. 12 af 1. august 2012 om fiskeri efter laks*".http://dk.nanoq.gl/.

The fishermen have to report the following information to GFLK:

- Name, address, and social security number
- License number, vessel name, vessel number and size of the vessel
- Date, fishing area/spot, net type, number of nets, number of hours (effort)
- Number of salmon caught, weight of catch in kilograms
- Sales place or private consumption and further remarks on the catch

KAPISILINNUT PISANUT IMMERSUIFFIK - LAKSE JOURNAL Aalisartup atia / Fiskerens Navn:

najugaa / adresse:

CPR:

(Akuersissutip normua, angallatip aqqa, normua angissusaalu) / (Licensnr, fartøjs navn, fartøjs nr, fartøjs størrelse):

[3] Executive Order on Fisheries: *Landstingslov nr. 18 af 31. oktober 1996 om fiskeri, §3, stk. 4*: " 'permanent association to Greenland' is understood in this law as persons that by purchase of a household, by renting or buying a home or by other arrangements indicates intension to have Greenland as a place of residence.

Ulloq	Aalisarfiup sumiinnera	Qassutit sorliit	Kapisillit pisat qassit	Pisat kiilunngorlugit (niaqullit erlaviikkat)	Qas-sutit qassit	Akunnerit ningisimaf-fiit	Oqaaseqaatit / Sumitunisineq	Oqaaseqaatit / Nammaneqatukkat
Dato	Fiske sted	Garn type	Antal laks fanget	Vægt af fangst i kg (MHUI)	Antal Garn	Antal timer	Bemærkninger / Salgs sted	Bemærkninger / Privat forbrug

Oqaaseqaatit / Bemærkninger:

The schedule has to be filled out by both licensed and unlicensed fishermen.

Annex 11

WGCIS(14)21

Canada's Management Measures for Wild Atlantic Salmon

The purpose of this paper is to provide a broad overview of Canada's Legislative obligations, Regulations, and Polices for fisheries on wild Atlantic salmon. Of which, these components include:

- A broad picture on the status of Canadian stocks throughout its extensive range,
- The designation of sustainable harvest limits on river-systems with healthy stocks, while prohibiting and heavily enforcing harvests on river-systems with less than healthy abundance,
- Canada's Constitutional obligations to Aboriginal peoples, and
- Sustainable harvests where science permits.

International Cooperation - NASCO's Role

Rational management of wild Atlantic salmon throughout its travels across the North Atlantic can only be achieved in large part through international cooperation.

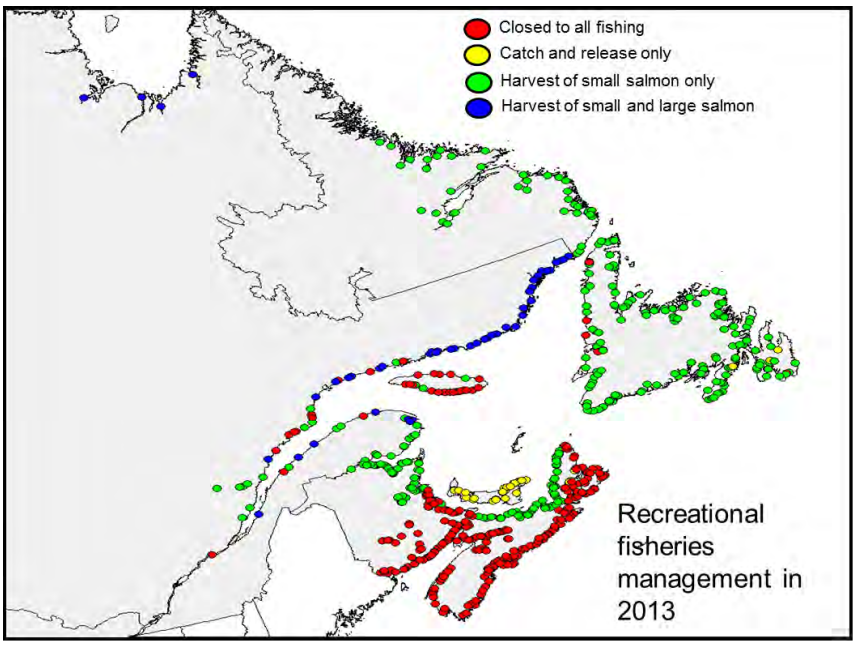
NASCO's web-site states that "The marine migrations of the Atlantic salmon take it from its river of birth to distant-water feeding grounds in the sub-Arctic and into the fisheries zones of other countries where it may be exploited. NASCO Parties have traditionally made management decisions which reflect science for the long-term benefit of the stock, and for the Coastal people who depend on the stocks." Canada is pleased to participate within NASCO towards these shared goals and is proud to say that our management of removals, coupled with measures established in NASCO by Parties, have contributed to reductions of harvests of salmon across the North Atlantic region.

Canadian Stocks – an overview

As displayed below in the below image, there are over 1000 rivers in Eastern Canada, with over 470 of these rivers reporting wild Atlantic salmon populations. Canada carefully and scientifically manages this resource, often region by region and river system by river system.

Harvest levels are based on a mix between scientific analysis and advice (counting fences in some cases, as well as sampling), and traditional knowledge of those fisheries. Canadian conservation requirements for rivers holding Atlantic salmon are considered to be threshold reference points. Canada's conservation requirements have been established for individual rivers based on science.

The stock status is assessed based on the proportion of the conservation egg requirement (from all groups of salmon) achieved in a given year and the trends in abundance of various life stages.



In Labrador and western Newfoundland, there are important large salmon components that contain a mixture of maiden fish that have spent two (2SW) or more years (MSW) at sea before spawning, and repeat spawners which are returning for a second or subsequent spawning. In other Newfoundland rivers, the large salmon component consists mainly of repeat spawners.

Canadian Management - Based on Science and Experience

In Canada, there are three forms of harvests for wild Atlantic salmon:

- Recreational Fisheries,
- Aboriginal Fisheries, and
- Bycatch in Labrador Resident Subsistence Fishery.

Recreational Fisheries

All Canadian Recreational Fisheries are closely monitored, enforced, and reported. Some of the management measures include:

- All recreational fishing must take place with artificial flies,
- In most of eastern Canada, only small salmon (one-sea-winter or grilse) can be retained,
- Where large salmon are permitted for retention, it is only in the province of Quebec (40 rivers) and only allowed in rivers which are assessed for attainment of conservation objectives or which are relatively isolated and fishing pressure is low,
- Daily and seasonal harvest limits are established and there is a daily maximum catch and release limit,
- All harvested fish must be immediately tagged with a carcass tag, and
- Prohibition on selling or bartering salmon.

In the province of Quebec, there are reporting systems in place requiring mandatory reporting within 48 hours of any retained salmon, to mandatory reporting on licence stubs (one page log sheet) to voluntary reporting of fishing activities.

Canada conducts region by region, and often river by river analysis, to make management decisions reflecting these diverse and changing conditions. As an on-going review of Canadian management approaches, we are taking action to conserve the resource.

The following measures, new in 2014, are expected to contribute to reductions in overall mortality of wild Atlantic salmon, and align stock exploitation with stock abundance;

- In New Brunswick, an overall reduction in tags for retention of grilse from 8 to 4,
- In New Brunswick, Salmon Fishing Area 15, the daily grilse retention quota is reduced from 2 to 1,
- In Nova Scotia, a reduction in tags for retention of grilse from 4 to 2, and
- Expanded catch and release measures on the Northwest Miramichi River system.

Canadian Aboriginal Fisheries

Aboriginal access to fisheries for subsistence is written directly into Canada's Constitution Act. These harvests take place in most areas of eastern Canada, though only in areas designated as open (by Fisheries and Oceans Canada) for salmon fishing. No fishing is permitted in closed rivers. This is strictly enforced.

These fisheries are closely monitored, and managed through negotiated agreements with individual communities, under the food, social, and ceremonial fisheries rights of aboriginal peoples.

The agreements are science and traditional knowledge-based, and strictly stipulate the exact location of fishing, the gear to be used, the season and weekly open times, and an allocation in terms of number or weight of fish to be taken.

The catch is regulated (and strongly enforced) by the number of tags issued. Carcass tags are issued and must be used for all harvested fish. These harvests are reported to authorities (Government of Canada/Province of Quebec). For harvests off Labrador, logbooks are utilized. There are also designated harvest seasons as well as a prohibition on selling salmon.

Bycatch in the Residents of Labrador Food Fishery

The Resident Food Fishery occurs in Lake Melville and southern Labrador coastal communities from Cartwright to Cape St. Charles. It is for residents of Labrador and targets sea-run trout and arctic char.
There is no directed harvest of salmon for this fishery. Salmon are a by-catch. There is a maximum season retention of three salmon of any size. All fishing (for trout and char) must end

when the three salmon are retained. Fisheries and Oceans Canada monitors these harvests by issuing carcass tags (3 per resident licence).

For reporting, logbooks are used and submitted at the conclusion of the season.

There is a prohibition on selling or bartering salmon.

Annex 12

WGCIS(14)23

Overview of the main EU legislation relevant to the protection and conservation of Atlantic salmon

Introduction

1. This paper provides a brief overview of three EU Directives (Habitats Directive, Marine Strategy Framework Directive, Water Framework Directive) and the Common Fisheries Policy to provide the relevant EU context for the conservation and management of Atlantic salmon by European Union Member States. Details of the management measures taken by Ireland, UK (England and Wales), UK (Northern Ireland) and UK (Scotland) are contained WGCIS(14)14, WGCIS(14)9, WGCIS(14)10 and WGCIS(14)11, respectively.

The Habitats Directive (1992/43/EEC)

2. The Habitats Directive seeks to protect, value and restore biodiversity in EU Member States through the establishment of the Natura 2000 network of protected sites. The Atlantic salmon is listed (only in freshwater) among species of Community interest and also receive protection indirectly as a result of the protection of habitats and other species that are covered by the Directive.

The Water Framework Directive (2000/60/EC)

3. The Water Framework Directive aims to achieve 'good ecological and chemical status' for all EU waters (inland, transitional and coastal waters up to 1 nautical mile from the baseline) by 2015. It addresses both water quality (pollution) and quantity (abstraction and hydromorphological changes) issues. Management plans and measures for the period 2009 - 2015 are required for each River Basin District; these are scheduled for revision in 2015 (and thereafter every 6 years).

The Marine Strategy Framework Directive (2008/56/EC)

4. The Marine Strategy Framework Directive aims to achieve 'good environmental status' in the marine environment (all marine waters under national jurisdiction according to UNCLOS) by 2020. It requires Member States to develop marine strategies that apply the ecosystem approach to the management of human activities. The Directive defines the general principles, leaving ample flexibility to Member States in implementation.

The Common Fisheries Policy (Regulation (EU) No 1380/2013)

5. The Common Fisheries Policy requires the establishment of a set of rules by the European Union for managing the EU fishing fleet and to conserve fish stocks through incorporation of the Precautionary and Ecosystem Approaches. Some key elements of the new policy are that fish stocks should reach MSY by 2020, there is a ban on discards

(referred to as landing obligation in the Regulation) that will gradually enter into force as from 2015. In addition, the new Regulation contains provisions on the EU external policy, which should act as an integrated part of the Common Fisheries Policy. The Regulation brings also decisions closer to the fishing grounds, clarifying the roles of each actor and creating a framework for the EU Member States to develop the actual implementing measures at regional level.

Annex 13

Background Information from European Union Member States on Management Measures for MSW Salmon in Home Fisheries

WGCIS(14)9

Management measures for MSW salmon in home water fisheries in EU- UK (England and Wales)

(Inter-sessional meeting agenda item 7)

Fishery management measures

There are 64 principle salmon rivers in England and Wales. Conservation Limits have been set for each of these stocks. We haven't set separate Conservation Limits for the Multi Sea Winter component of each stock, but we do seek to address stock diversity issues when making management decisions.

Those management decisions are guided by a national 'Decision Structure', which is applied to each river stock on an annual basis (in April) after undertaking the 'compliance assessment'. This indicates the probability that each stock will achieve its Management Objective (of exceeding the Conservation Limit in 4 years out of 5)[4]. Based on the results, the Decision Structure provides guidance on the extent to which restrictions on exploitation are required, informing the decisions fishery managers make about any changes in management. When doing this consideration is given to the age composition of the stock and the need to protect specific sea age classes.

The range of measures that may be imposed has been described in our Implementation Plan. Many of the measures in place cover the whole river stock, including:

- Restrictions on methods of fishing – only rod, net or trap fishing are allowed;
- The requirement to have the appropriate licence or authorisation to fish via any of these methods;
- Restrictions on fishing seasons, times, methods and areas and, in the case of net fisheries, number of people who may fish; and also
- Catch limits are also in place in some fisheries.

Specific measures are also taken where necessary to protect MSW salmon. These include:

- Delaying the opening of the season:
    - Many MSW salmon[5] return earlier than 1SW fish;
    - To protect these fish all netting for salmon before 1st June has been banned since 1998; and
    - Before 16th June all rod-caught fish must be released.
- Restrictions on fishing methods and baits early in the season:

[4] Recovering rivers that do not yet have CLs set are deemed to be 'at risk'.

[5] Particularly 3+SW fish.

- Particular methods (flies, lures) and baits are restricted to reduce damage to released fish and reduce catches;
- Different restrictions apply in different areas and season times to protect different stocks and subcomponents - including MSW fish.

- Release of female fish:
  - A higher proportion of MSW than 1SW fish are female.
  - Measures in North West England prohibit the retention of female fish from 10 August to 31 October to help protect MSW fish;
- Size limits are in place in some areas:
  - For example on the rivers Taw and Torridge all fish over 70cm must be released after 1st Aug, in order offer enhanced protection to the MSW component of the stock.
- Measures have also been adopted on a voluntary basis by both netsmen and anglers to protect early running and large fish:
  - Anglers on the Tamar have voluntarily agreed to release all fish over 10lbs in weight throughout the season, contributing to protecting MSW stock[6]
  - We are working with netsmen to delay the start to the Tamar and Tavy netting season to June 16th as our data indicates a good run of MSW fish in the first two weeks of June.
  - A voluntary agreement with fisheries on the Avon to implement a voluntary angling temperature threshold. This means that when the water temperature exceeds 19 degrees at 9.00am, angling is suspended. This aids salmon recovery following catch and release.

Conservation measures (e.g. habitat restoration, measures on water abstraction, pollution etc.)

An array of projects and programmes are in place to improve the freshwater habitat for salmon in England and Wales. For the most part these form part of the delivery of River Basin Management Plans[7] to implement the European Water Framework Directive. The aim is to bring rivers to 'good ecological status' which indicates a healthy aquatic ecosystem and presence in suitable abundance of all native species of flora and fauna. This includes fish fauna and hence salmon.

[6] Some MSW fish are smaller than this, especially early in the season.

[7] 11 for England and Wales including the cross-border Solway and Tweed RBD which is partly in Scotland.

Supporting these River Basin Management Plans are sea trout and salmon catchment summaries, which build on the existing individual river Salmon Action Plans for each of the 64 river stocks[8], but also extend to other catchments where salmon are recovering from historic degradation.

The main factors affecting salmon in English and Welsh rivers are problems with channel morphology (including barriers to fish migration), and sediment and hydrology (including abstraction and flow modification). Relevant actions to address these issues are therefore incorporated into the River Basin Management Plans.

- Those actions are largely delivered through environmental programmes such as the £110m Catchment Restoration Fund which has funded action to address issues ranging from obstructions to migration to diffuse pollution. Some funding has also been provided through the EU 'European Fisheries Fund' to support the 'Salmon for tomorrow' programme in Wales.
- A number of different interests have collaborated to put these plans into action. These have included conservation organisations such as the various Rivers Trusts, local angling clubs and the Environment Agency. Private sector organisations have also contributed.
- Examples of actions taken in 2013 include:
    - Opening up or improving access to 900km of rivers at 37 barriers to salmon migration in England – either by removing those barriers or making them passable by installing fish passes or easements.
    - On the River Ehen in NW England a water abstraction has been damaging or reducing habitat for a number of years. The abstraction licence causing these problems was revoked in 2013 and the abstraction point and associated weir removed to help salmon migrate upstream.
    - Flood gates on the River Itchen in S England were modified and the operating regime changed for the benefit of migrating fish.
    - In Wales removal of concrete weirs on the River Sirhhowy has opened up 25km of previously inaccessible salmon habitat, and fish passes have been installed at a flow gauging station on the River Afan to help salmon and other species migrate with that river system.
    - On the river Derwent in NW England erosion and sedimentation worsened by floods and landslips had threatened trout and salmon spawning sites. In 2013 a number local angling clubs, conservation organisations and the Environment Agency worked together to repair the banks and make improvements to help prevent future erosion.
- In 2013, around £5 million in total was spent in England on water bodies that support (or should support) salmon to improve their ecological status[9].

[8] SAPs were developed for each salmon river stock between 1998 and 2004.

- Another project is underway called 'Keeping Rivers Cool' which is focussed on using riparian shade to help protect rivers from the effects of climate change. This four-year project will benefit salmon by reducing river tempartures throughout England and Wales. It works by inspiring action through demonstration projects, guidance and mapping tools. £295k was spent on this programme over the 2013/14 financial year.

[9] This figure includes work on fish passes, fencing, water quality initiatives etc and was arrived at by comparing the WFD database for all water bodies that should support salmon with the expenditure by water body and by all of the following: Environment Agency, Catchment Restoration Fund, Natural England, Rivers Trusts and Wildlife Trusts. The exact figure is £5,015,192.

WGCIS(14)10

Management measures for MSW salmon in home water fisheries in EU- UK (Northern Ireland)

(Inter-sessional meeting agenda item 7)

Regulatory Measures

Commercial fishery buyout DCAL area 2000-1, Loughs Agency commercial cessation 2007. Remaining DCAL nets cessation 2012.

MSW - Catch & Release of salmon up to 1st June has been in place from 2003

Grilse & MSW - from 1st of March 2014 catch and release for rivers in the DCAL area until MTs have been consistently attained. No exploitation of salmon on rivers unless MTs are attained.

Other Measures

Habitat Improvement Works - Aimed at both grilse & MSW stocks – approx. £100 – 200k p.a.

Enforcement – Regular patrols carried out by Fishery protection officers in NI

Salmon stock monitoring by AFBI – including electrofishing surveys, fish counter and adult & smolt trap on the R Bush etc

WGCIS(14)11

Management measures for MSW salmon in home water fisheries in EU- UK (Scotland) (Inter-sessional meeting agenda item 7)

Regulatory measures

1. Voluntary conservation measures.

Members of the Scottish Net Fishing Association for Scotland, the representative body for salmon net interests have, with few exceptions, ceased netting during the 1st 6 weeks of the season to protect spring salmon. Netting effort is at historically low levels (in 2012, fixed engine effort was 5% of the highest recorded and for net and coble this figure was 1% of the highest recorded).

The number of fish caught and subsequently released from rod fisheries has increased from 1994 when data were first collected. In 2012, 74% of all salmon caught, and 91% of all spring salmon caught were released.

2. Fishery management measures

- Salmon fisheries managed at local level by District Salmon Fishery Boards. These are proprietor-led organisations which can be created by statute (but there is no requirement for them to exist).

- Boards are independent of Ministers and Scottish Parliament. They are financed by a levy on salmon proprietors (approx. £4 million brought in annually by 50 Boards).

- Aquaculture and Fisheries (Scotland) Act 2013 introduced obligations on District Salmon Fishery Boards to be more open and accountable. Powers in the Act strengthen the framework for management of salmon fisheries: power to creating carcass tagging scheme; ability to vary annual close times; to carry out investigations and take samples; and require information from proprietors of fisheries.

- As detailed in the Implementation Plan, the independent review of the management of wild fisheries in Scotland has commenced. The review will focus on what is needed to ensure the management system is fit for purpose in the 21st century.

- The review is considering the challenges and opportunities facing wild fisheries management, and how these might be met and exploited respectively

- The Review is expected to report by October 2014.

WGCIS(14)14

Status of MSW salmon stocks contributing to West Greenland fishery and Management measures for MSW salmon in home water fisheries in EU- Ireland

(Inter-sessional meeting agenda items 5 and 7)

1. Ireland's management measures to support the conservation of salmon stocks

In 2007, Ireland closed its mixed stock salmon fisheries and facilitated the closure of many commercial fisheries with a "Hardship Scheme"; the cost to the Irish government of this scheme was in the region of €25m. It is also at this time that Ireland moved to management of all salmon rivers on a catchment by catchment basis.

Ireland expends a significant amount of resources in researching and providing advice on the status of Ireland's salmon. Each of Ireland's 143 salmon rivers has an established Conservation Limit (CL) and is managed individually. Ireland Standing Scientific Committee on Salmon provides advice each year on the predicted salmon returns by catchment for the year ahead; this information is used to establish any potential surplus/deficit for each river. Based on this advice managers draft and implement legislation to ensure the conservation of salmon stocks.

		Number of Rivers 2014	Number of Rivers 2013
1SW	**Open**	57	57
1SW	**Catch & release**	30	15
1SW	**Closed**	56	71
	Total	143	143
MSW	**Open**	11	11
MSW	**Catch & release**	2	2
MSW	**Closed**	3	3
	Total	16	16

Table 1

Salmon Conservation Funds are generated from the sale of salmon angling and commercial fishing licences which represents a major contribution by licence holders to wild salmon conservation. The revenue generated from the Salmon Conservation Fund is reinvested to promote the recovery and conservation of our salmon stocks. Since 2007 over €3.7m has been generated by this fund with over 140 projects supported, across a diverse range of areas including:

- River Bank Protection
- Spawning Ground Rehabilitation
- In-stream Works
- Weirs and Pools Rehabilitated
- Fish Pass Improvements
- Assessment of Attainment CL
- Removal of Trees/Overgrowth
- Fish counter installation
- Salmonid Research

Projects are assessed based on the river's conservation limit status, its water quality (Q-value) and the maximum potential project benefits to the river with funding prioritised for those rivers in most need of rehabilitation. Inland Fisheries Ireland (IFI) manages this fund and also supports additional measures to salmon habitat restoration though

the Environmental Riverine Enhancement Programme (EREP). The EREP programme is a collaborative programme between IFI and the Office of Public Works (OPW) which has spent approximately €2.5m/yr. for the past 6 years on formerly arterially drained channels to restore and preserve salmonid habitat; approximately 90% of these works directly support salmon production. It is also worth noting that expert IFI staff in each River Basin District support the restoration and development of their local salmon catchments.

Inland Fisheries Ireland is tasked with the protection and conservation of Ireland's salmon stocks. The protection element involves the protection of stocks and the enforcement of salmon conservation legislation. This includes patrolling out to 12 miles at sea using IFI's fleet of 22 Ribs and large patrol vessel; the Irish Air Corp and Navy also support this protection activity. It is estimated that Ireland spends in the region of 10 to 12 million euros annually on this activity.

Salmon as a species are protected under EU Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats of wild fauna and flora and under Ireland implementation (S.I. No. 94 of 1997 & S.I. 477 of 2011) of this directive. This legislation required Ireland to take measures to maintain or restore salmon habitat and to strive to maintain or restore salmon to favourable conservation status. Ireland is obliged to monitor and report on the status of salmon under this directive, and has just completed a six year reporting cycle. The implementation of the EU's Habitats and Water Framework Directives and the embedding of their principles have supported the conservation of salmon in Ireland, these achievements have only been garnered through the provision of extensive supports and resources from the state and its citizens.

2. MSW Stocks and management measures for MSW salmon in home water fisheries in Ireland

2.1. MSW Stocks

Each of Ireland's 143 salmon rivers has an established Conservation Limit (CL) and is managed individually. Ireland Standing Scientific Committee on Salmon provides advice each year on the predicted salmon returns by catchment for the year ahead; this information is used to establish any potential surplus/deficit for each river. Based on this advice managers draft and implement legislation to ensure the conservation of salmon stocks. Multi sea winter salmon enter the majority of Irelands 143 salmon rivers either as early running spring fish over the January to May period or as summer or autumn MSW salmon. There are sixteen rivers where there is a significant stock of early running multi sea winter salmon where specific scientific assessment and advice is given annually. For the 214 advice, 11 of these stocks are meeting Conservation Limits (CL) with an exploitable surplus, two stocks are below CL but open for catch and release angling and 3 stocks are significantly below CL and are closed to angling (see table 1).

2.2 Commercial fishery

No commercial fishing takes place until after 12th May as a conservation measure to protect early running multi sea winter salmon in Ireland.

2.3 Angling Regulations

Anglers are only permitted to kill one salmon per day prior to 12th May and may only kill 3 salmon in total from the season opening until 12th May as a conservation measure to protect early running multi sea winter salmon. For multi sea winter salmon entering rivers in the summer or autumn, these fish are present along with the large numbers of one sea winter fish and separate management is not possible for the two sea age groups. There is a season bag limit of 10 salmon per angler and a three salmon per day limit in place on all rivers. In September, anglers are restricted to taking only one salmon per day as a conservation measure.

Annex 14

WGCIS(14)13

Agenda item 7: Review of management measures for MSW salmon in homewater fisheries
A Summary of US Efforts to Conserve and Restore Atlantic Salmon

Over many years, the United States, along with state and tribal authorities, has taken progressively more stringent actions to conserve Atlantic salmon populations:

- The last commercial fishery for Atlantic salmon in the United States was closed in 1947.
- Sustenance fishing by the Penobscot Indian Nation was suspended in 1988.
- The last recreational fishery for sea-run salmon ceased in 2008.

As it became evident that fishery management actions alone would not prevent further decline of the species, even more aggressive management measures and restoration activities began. Following are several examples:

- Atlantic salmon were recognized as endangered under the Federal Endangered Species Act (ESA) in 2000; the initial ESA-listing was revised to include a wider geographic area (over half the state of Maine) in 2009. The ESA-listing:
    - Prohibits activities which may result in the injury, mortality, harm, capture, collection, and harassment of the animals, including adverse modification or destruction of critical habitat;
    - Requires that all federal activities (including issuance of permits or provision of funds) be analyzed for their potential effect on Atlantic salmon, and that the projects be adjusted to avoid or minimize impacts to fish and their habitat, including:
        - Hydroelectric dams
        - Road maintenance
        - Dredging
- The U.S. Government has taken important (and costly) management actions to improve habitat, reduce threats, and work toward the recovery of wild salmon including:
    - Dam removals and fish passage improvements
    - Modifications to hydroelectric dam operations (e.g., turbine shutdowns)
    - Aquaculture regulations
        - Site-specific marks
        - Vaccination of farmed fish prior to stocking in sea cages
        - Mandatory fallowing of stocking sites
        - Single year-class stocking
        - Vessel disinfection protocols

        - Prohibition on the use of non-North American strain salmon in marine cages
        - Required reporting of losses and potential losses and mandatory audits
    - Funding, coordination and oversight of habitat protection and enhancements in collaboration with local conservation groups (see below)
- In cooperation with U.S. Government, the community of non-governmental organizations (NGOs) has taken important steps to support the conservation of Atlantic salmon in the United States, in particular, to improve and connect important habitats (some examples below):
    - Dam removals
        - Penobscot River Restoration Project removed two mainstem dams (Great Works Dam in 2012 and Veazie Dam in 2013; NOAA has invested over $21M; total public/private costs for implementation of this project are approximately $50M) from the Penobscot River (home to roughly 75% of returns to the United States).
        - Edwards Dam (main stem of Kennebec River; over $1M in public sector funds) removed in 1999
        - West Winterport Dam (Marsh Stream; over $100,000 in public sector investment) removed in 2010
        - Fort Halifax Dam (Sebasticook River) removed in 2008
    - Installation of fishways
        - Rock ramp at Fields Pond outlet (Penobscot tributary; over $100,00 in public sector funds) installed in 2009
    - Road-stream crossing improvements
        - Over $1.5M in fish passage improvements in the Machias River alone
    - Habitat protection
        - Machias River Corridor protects roughly 440,000 acres and nearly the entire main stem of the Machias River (over $7.8M in public and private sector funds to date)

- Furthermore, State Governments have:
    - Closed recreational fisheries for sea-run salmon, including catch and release fishing
    - Regulating other recreational fisheries to minimize the potential for incidental catch of Atlantic salmon
    - Implemented pollution control and monitoring measures
    - Implemented surveillance and enforcement activities to limit poaching

Annex 15

WGCIS(14)17

Proposal from the Chair regarding the management of the West Greenland fishery in 2014

Background

The exchange of information at the inter-sessional meeting held on 14 and 15 April 2014 provided an opportunity for all Members of the West Greenland Commission to gain a greater understanding of the critical status of many of the salmon stocks exploited by the West Greenland fishery and the measures that had been taken by all Members to protect and restore them. In particular it was noted that:
Greenland had made major sacrifices in restricting its fishery since 2003 to the amount used for internal consumption in Greenland and has made considerable efforts to improve the reporting of annual catches of salmon in Greenland and to collect effort data concerning the fishery. Nevertheless, Greenland acknowledges that there remain uncertainties about the current catch levels in the fishery.

Considerable sacrifices have also been made by States of origin to reduce or ban landings of the MSW salmon stocks exploited at West Greenland, including:

- In the United States, complete closure of all fisheries for Atlantic salmon;
- In Canada, complete closure of large portions of Scotia-Fundy and New Brunswick to all directed salmon fisheries and banning the recreational landing of large salmon in all other rivers, except in 42 rivers in Quebec which are managed on a river by river basis to protect stocks that are below their conservation limits;
- In the European Union, extensive restrictions including fishery closures targeted at fisheries exploiting depleted MSW stocks.

Very significant efforts and investment have been made by all States of origin to protect and restore habitats for Atlantic salmon including improvements in water quality and nursery habitats and increasing access by installation of fish passes or complete removal of dams and other obstructions. In addition, significant investment has been made on research to underpin the conservation imperative.

The reported catch in the West Greenland fishery has increased from an annual average of around 13 tonnes in 2003-2005 to 36 tonnes in 2011-2013. The Government of Greenland allowed landings to factories in 2012 and 2013 partly in order to improve fishing opportunities in small communities. The landings in these years were two of the three highest recorded since the fishery was limited to the amount used for internal consumption. However, factory landings coincided with a reduction in landings to the open air markets and were believed to be more accurately reported.

Over time, there has been significant variation in the proportion of the catches originating from North America and Europe which cannot be fully explained. In recent years, however, a very

high proportion (~80%) of salmon in the catches has been of North American origin. The remainder of the catch has originated predominantly from UK and Ireland.

The overall level of exploitation of North American MSW salmon stocks in the West Greenland fishery has varied between about 6% and 9% in the past 5 years, but the internal consumption fishery is estimated to have taken about 50% of the US Federally protected MSW salmon stock in 2001. Exploitation rates of Southern European MSW salmon stocks in the fishery are estimated to have been less than 1% for the past 10 years.

In 2012, MSW salmon in all six North American management units contributing to the West Greenland fishery are below their conservation limits, and in US and Scotia-Fundy many river stocks are critically endangered. While the MSW salmon in the Southern European management unit are above their conservation limit in the past three years, a number of individual MSW river stocks are severely depleted.

The International Council for the Exploration of the Sea (ICES) advised in 2012 that in the absence of any fishing mortality there was only a 6% to 8% chance of simultaneously meeting or exceeding the management objectives for salmon stocks in the seven management units contributing to the West Greenland fishery in 2012 to 2014 and there are no mixed-stock fisheries catch options at West Greenland in 2014. The application of the Framework of Indicators in 2014 has not indicated the need for a re-assessment of the catch advice for the West Greenland fishery for 2014, and that the multi-annual measure agreed in 2012 restricting the fishery at West Greenland to the amount used for internal consumption will continue to apply in 2014.

Proposed Addendum to the 2012 Multi-Annual Regulatory Measure, WGC(12)12 for the West Greenland fishery in 2014

RECALLING that the Parties to the West Greenland Commission have previously agreed to regulatory measures for the West Greenland fishery based on the scientific advice from ICES, and most recently the 2012 Regulatory Measure for Fishing for Salmon at West Greenland for 2012, 2013 and 2014;
NOTING that the application of the Framework of Indicators in 2014 has not indicated the need for a re-assessment of the catch advice for the West Greenland fishery for 2014 and that the multi-annual measure agreed in 2012 will continue to apply to the 2014 fishery at West Greenland;
TAKING INTO ACCOUNT the comprehensive new information presented to the inter-sessional meeting of the Commission concerning the status of the MSW salmon stocks contributing to the West Greenland fishery and the conservation initiatives taken by States of origin;
RECOGNISING the need to continue efforts to improve the monitoring and surveillance of the salmon fishery in West Greenland and the experience of States of origin in approaches that may be used;
RECALLING NASCO's agreement to adopt a Precautionary Approach to the conservation and management of Atlantic salmon;
RECOGNISING the commitment made in NASCO's 2013 Action Plan, CNL(13)38, to regularly review the management of salmon fisheries and in particular those exploiting mixed stocks and stocks below their conservation limits;

THE PARTIES agree that:

(1) States of origin will share experiences with Greenland on the development of approaches to improve the monitoring of landings at West Greenland (e.g. through the use of carcass tagging) with a view to ensuring full reporting;

(2) without prejudice to paragraph 3, Greenland will make best efforts to ensure that the total reported catch in 2014 does not exceed the average for 2004 to 2013 (28t);

(3) a new multi-annual regulatory measure may be developed for the West Greenland fishery to apply from 2015 contingent on development and implementation of management controls which include:

- full catch accountability
- timely in-season tracking of landings;
- means for closing the fishery within season based on landings.