WORKING GROUP ON NORTH ATLANTIC SALMON (WGNAS)

VOLUME 6 | ISSUE 36

ICES SCIENTIFIC REPORTS

RAPPORTS SCIENTIFIQUES DU CIEM

ICES INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA
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ISSN number: 2618-1371

ICES Scientific Reports

Volume 6 | Issue 36

WORKING GROUP ON NORTH ATLANTIC SALMON (WGNAS)

Recommended format for purpose of citation:

ICES. 2024. Working group on North Atlantic Salmon (WGNAS).
ICES Scientific Reports. 6:36. 415 pp. https://doi.org/10.17895/ices.pub.25730247

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Contents

i Executive summary

WGNAS met to consider the status of, and threats to, Atlantic salmon in the North Atlantic Salmon Conservation Organization (NASCO) commission areas: West Greenland (WGC), North American (NAC), and Northeast Atlantic (NEAC). Information on the catch and exploitation, including salmon caught and released, and nominal harvest, as well as tagged and marked fish releases are provided by country and jurisdiction. Emerging threats are presented, including updates to Norway's evaluating new offshore farming sites, and potential risks to pre-spawning adult salmon from a rubber-tyre derived antioxidant as evidenced for some Pacific salmon stocks. New scientific advancements reported on include ongoing work to create a more spatially resolved genetic baseline for European salmon, a new method for estimating salmon returns to rivers, and updates on tracking studies of salmon tagged in marine waters of Canada and Greenland.

WGNAS evaluated the status of stock complexes and stock-units using the Run-Reconstruction Model, and for the first time, used the recently benchmarked Life-cycle Model to investigate catch options for distant water fisheries.

In 2023, the two returning age classes of the Northern NEAC stock complex were considered to be at full reproductive capacity, but lower than the previous five-year mean and the second lowest in the time-series. The 2023 estimate of 1SW spawners was determined to be at risk of suffering reduced reproductive capacity and amongst the lowest in the time-series. No clear trends were evident for MSW spawners.

The southern NEAC 1SW returns stock component was suffering reduced reproductive capacity, with the estimate being the lowest in the time-series. The MSW returns stock component was at risk of suffering reduced reproductive capacity, and was the second lowest in the time-series. The 1SW spawners stock component was estimated to be suffering reduced reproductive capacity and the lowest in the time-series. No clear trends were evident for MSW spawners but this component was considered to be at risk of suffering reproductive capacity.

Catch advice for the Faroes fishery was developed for the 2024/2025 to 2026/2027 fishing seasons. In the Northern NEAC stock complex, the MSW component has a high probability (≥95%) of achieving its CL for TACs at Faroes for a catch option of ≤40 t in the 2024/2025 season and for a catch option of ≤20 t in the 2025/2026 and 2026/2027 season. All other management units, at the stock complex level, each have less than 95% probability of achieving their CLs with any TAC option in any of the forecast seasons. Therefore, there are no catch options that ensure a greater than 95% probability of each stock complex achieving its CL.

The probabilities of the 1SW national management units achieving their CLs in 2024/2025 vary from 3% (France) to 99% (Norway) for the different countries, assuming zero catch at Faroes. These probabilities decline very little with increasing TAC options, reflecting the expected low harvest rate on maturing 1SW stocks at Faroes. The probabilities are also generally lower for the two subsequent seasons. The probabilities of the MSW national management units achieving their CLs in 2024/2025 vary between 6% (Ireland) and 99% (Norway) assuming zero catch allocated for the Faroes fishery, and decline with increasing TAC options. The only countries to have a greater than 95% probability of achieving their CLs with catch options for Faroes are Norway (TACs ≤20 t) and Russia (TACs ≤160 t). In most countries, these probabilities are lower in the subsequent two seasons. There are, therefore, no TAC options at which all management units would have a greater than 95% probability of achieving their CLs.

In 2023, the median estimates of 2SW salmon returns and spawners to rivers were above the respective 2SW CLs (i.e. at full reproductive capacity) in two stock-units of NAC (Labrador and Quebec). All other regions were at risk of suffering or were suffering reduced reproductive capacity. Estimates of PFA indicate continued low abundance of North American adult Atlantic salmon. The continued low and declining abundance of salmon stocks across North America, despite significant fishery reductions, strengthens the conclusions that factors acting on survival in the first and second years at sea, at both local and broad ocean scales, are constraining abundance of Atlantic salmon. Declines in smolt production in some rivers of eastern North America are now being observed and are also contributing to lower adult abundance.

Assessment of risks from exploitation in the mixed-stock fisheries for NAC for 2024-2027 are based on the application of the LCM. Catch options are only considered for the non-maturing 1SW and maturing 2SW components, as the maturing 1SW component is not fished outside homewaters, and in the absence of significant marine interceptory fisheries this component is managed in homewaters. As the predicted number of 2SW salmon returning to North America in 2024 to 2027, even with no fishing mortality in the North Atlantic, is substantially lower than the 2SW CL/MO, there are no catch options for the composite stock in the North American fisheries. Where river-specific spawning requirements are being achieved, there are no biological reasons to restrict the catch.

Catch options for the West Greenland fishery for 2024 to 2026 are based on application of the LCM in a risk analysis framework that considers CLs or alternate MOs of the NAC and NEAC areas, and the risks are developed in parallel and combined into a single catch options table. None of the stated management objectives would allow a mixed-stock fishery at West Greenland to take place in 2024, 2025, or 2026.

WGNAS updated information on the abundance and distribution of pink salmon (*O. gorbuscha*) in the North Atlantic.

ii Expert group information

Expert group name	Working Group on North Atlantic Salmon (WGNAS)
Expert group cycle	Annual
Year cycle started	2024
Reporting year in cycle	1/1
Chair(s)	Alan Walker (UK)
Meeting venue(s) and dates	11-21 March 2024, Galway, Ireland and Online, 39 participants

1 Introduction

1.1 Main tasks

On 29 January 2024, ICES resolved in 2023/AT/FRSG18 that the Working Group on North Atlantic Salmon (WGNAS) would meet from 11-21 March 2024 in Galway, Ireland chaired by Alan Walker (UK).

WGNAS met according to this schedule, to address questions posed to ICES by the North Atlantic Salmon Conservation Organization (NASCO).

The terms of reference were met.

The sections of the report which provide the answers to the questions posed by NASCO are identified below:

Question posed by NASCO		Report section
No.		
1	**With respect to Atlantic salmon in the North Atlantic area:**	Section 2
1.1	provide an overview of salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2023;[1]	2.1, 2.2 and Annex 4
1.2	report on significant new or emerging threats to, or opportunities for, salmon conservation and management;[2]	2.4
1.3	provide a compilation of tag releases by country in 2023;	2.8
1.4	provide an update on the distribution and abundance of pink salmon across the North Atlantic through 2023; and	2.9
1.5	identify relevant data deficiencies, monitoring needs and research requirements.	2.5
2	**With respect to Atlantic salmon in the Northeast Atlantic Commission area:**	Section 3
2.1	describe the key events of the 2023 fisheries;[3]	3.1
2.2	review and report on the development of age-specific stock conservation limits, including updating the time-series of the number of river stocks with established CLs by jurisdiction;	3.2

[1] With regard to ToR 1.1, for the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal. Numbers of salmon caught and released in recreational fisheries should be provided.

[2] With regard to ToR 1.2, ICES is requested to include reports on any significant advances in understanding of the biology of Atlantic salmon that is pertinent to NASCO.

[3] In the responses to ToRs 2.1, 3.1 and 4.1, ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Information on any other sources of fishing mortality for salmon is also requested. For ToR 4.1, if any new surveys are conducted and reported to ICES, ICES should review the results and advise on the appropriateness of incorporating resulting estimates into the assessment process.

Question posed by NASCO		Report section
2.3	describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction; and	3.3
2.4	provide catch options or alternative management advice for the 2024 / 2025–2026 / 2027 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[4].	3.4
3	**With respect to Atlantic salmon in the North American Commission area:**	Section 4
3.1	describe the key events of the 2023 fisheries (including the fishery at Saint Pierre and Miquelon)[3];	4.1
3.2	update age-specific stock conservation limits based on new information as available, including updating the time-series of the number of river stocks with established CLs by jurisdiction;	4.2
3.3	describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction;	4.3
3.4	provide catch options or alternative management advice for 2024–2027 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[4].	4.4
4	**With respect to Atlantic salmon in the West Greenland Commission area:**	Section 5
4.1	describe the key events of the 2021 and 2022 fisheries[3];	5.1
4.2	describe the status of the stocks[5]; and	5.3
4.3	provide catch options or alternative management advice for 2024-2026 with an assessment of risk relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[4].	5.4
5	**Provide input to and feedback on the development of draft formats and materials for providing advice.**	Section 6
6	**Address relevant points in the Generic ToRs for Regional and Species Working Groups for each salmon stock complex.**	Section 7

[4] In response to ToRs 2.4, 3.4 and 4.3, provide a detailed explanation and critical examination of any changes to the models used to provide catch advice and report on any developments in relation to incorporating environmental variables in these models. Also provide a detailed explanation and critical examination of any concerns with salmon data collected in 2023 which may affect the catch advice considering the restrictions on data collection programmes and fisheries due to the COVID 19 pandemic.

[5] In response to ToR 4.2, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to ToRs 2.3 and 3.3.

1.2 Participants

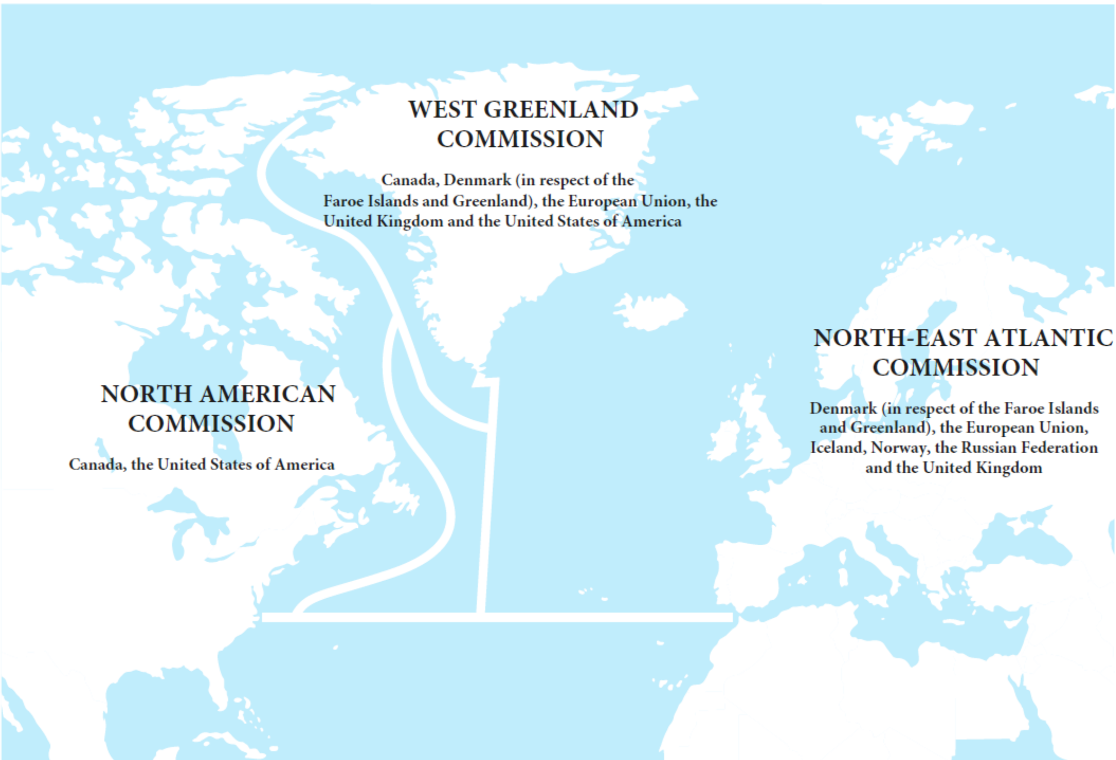
Member	Country
Ida Ahlbeck Bergendahl	Sweden
Julien April	Canada
Jan Arge Jacobsen	Faroe Islands
Hlynur Bárðarson	Iceland
Geir Bolstad	Norway
Ian Bradbury	Canada
Cindy Breau	Canada
Colin Bull	UK
Gérald Chaput	Canada
Anne Cooper	Denmark (ICES)
Gaspard Dubost	France
Dennis Ensing	UK (Northern Ireland)
Jaakko Erkinaro	Finland
Peder Fiske	Norway
Marko Freese	Germany
Jonathan Gillson	UK (England & Wales)
Stephen Gregory	UK (England & Wales)
Nora Hanson	UK (Scotland)
David Hardie	Canada
Derek Hogan	Canada
Niels Jepsen	Denmark
Nicholas Kelly	Canada
Seán Kelly	Ireland
Richard Kennedy	UK (Northern Ireland)
Clément Lebot	France
Hugo Maxwell	Ireland
Michael Millane	Ireland
Rasmus Nygaard	Greenland

Member	Country
James Ounsley	UK (Scotland)
Rémi Patin	France
Stig Pedersen	Denmark
Etienne Rivot	France
Martha Robertson	Canada
Kjell Rong Utne	Norway
Timothy Sheehan	USA
Tom Staveley	Sweden
Alan Walker (Chair)	UK (England & Wales)
Vidar Wennevik	Norway
Jonathan White	Ireland

1.3 Management framework for salmon in the North Atlantic

The advice generated by ICES in response to the Questions posed by the North Atlantic Salmon Conservation Organization (NASCO), is pursuant to NASCO's role in international management of salmon. NASCO was set up in 1984 by international convention (the Convention for the Conservation of Salmon in the North Atlantic Ocean), with a responsibility for the conservation, restoration, enhancement, and rational management of wild salmon in the North Atlantic. While sovereign states retain their role in the regulation of salmon fisheries for salmon originating in their own rivers, distant water salmon fisheries, such as those at Greenland and Faroes, which take salmon originating in rivers of another Party are regulated by NASCO under the terms of the Convention. NASCO now has eight Parties that are signatories to the Convention, including the European Union which represents its Member States.

NASCO discharges these responsibilities via three Commission areas shown below:



1.4 Management objectives

NASCO has identified the primary management objective of that organization as:

"To contribute through consultation and cooperation to the conservation, restoration, enhancement and rational management of salmon stocks taking into account the best scientific advice available".

NASCO further stated that "the Agreement on the Adoption of a Precautionary Approach states that an objective for the management of salmon fisheries is to provide the diversity and abundance of salmon stocks" and NASCO's Standing Committee on the Precautionary Approach interpreted this as being "to maintain both the productive capacity and diversity of salmon stocks" (NASCO, 1998).

NASCO's Action Plan for Application of the Precautionary Approach (NASCO, 1999) provides interpretation of how this is to be achieved, as follows:

- "Management measures should be aimed at maintaining all stocks above their conservation limits by the use of management targets"
- "Socio-economic factors could be taken into account in applying the Precautionary Approach to fisheries management issues"
- "The precautionary approach is an integrated approach that requires, inter alia, that stock rebuilding programmes (including, as appropriate, habitat improvements, stock enhancement, and fishery management actions) be developed for stocks that are below conservation limits".

1.5 Reference points and application of precaution

Conservation Limits (CLs) for North Atlantic salmon stock complexes have been defined as the level of stock (number of spawners) that will achieve long-term average maximum sustainable yield (MSY). In many regions of North America, the CLs are calculated as the number of spawners required to fully seed the wetted area of the river. The definition of conservation in Canada varies by region and in some areas, historically, the values used were equivalent to maximizing/optimizing freshwater production. These are used in Canada as limit reference points and they do not correspond to MSY values. In Iceland and the Russian Federation, pseudo stock–recruitment observations are used to calculate a hockey-stick relationship, with the inflection point defining the CLs. In the remaining regions, the CLs are calculated as the number of spawners that will achieve long-term average MSY, as derived from the adult-to-adult stock and recruitment relationships (Ricker, 1975; ICES, 1993). NASCO has adopted the region-specific CLs (NASCO, 1998). These CLs are limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability.

Atlantic salmon has characteristics of short-lived fish stocks; mature abundance is sensitive to annual recruitment because there are only a few age groups in the adult spawning stock. Incoming recruitment is often the main component of the fishable stock. For such fish stocks, the ICES MSY approach is aimed at achieving a target escapement (MSY $B_{escapement}$, the amount of biomass left to spawn). No catch should be allowed unless this escapement can be achieved. The escapement level should be set so there is a low risk of future recruitment being impaired, similar to the basis for estimating B_{pa}, the biomass according to the precautionary approach. In short-lived stocks, where most of the annual surplus production is from recruitment (not growth), MSY $B_{escapement}$ and B_{pa} might be expected to be similar.

It should be noted that this is equivalent to the ICES precautionary target reference points (S_{pa}). Therefore, stocks are regarded by ICES as being at full reproductive capacity only if they are above the precautionary target reference point. This approach parallels the use of precautionary reference points used for the provision of catch advice for other fish stocks in the ICES area.

Management objectives (MO) have not yet been defined for all North Atlantic salmon stocks.

For the assessment of the status of stocks and advice on management of national components and geographical groupings of the stock complexes in the NEAC area, where there are no specific management objectives:

- ICES requires that the lower bound of the confidence interval of the current estimate of spawners is above the CL for the stock to be considered at full reproductive capacity
- When the lower bound of the confidence limit is below the CL, but the midpoint is above, then ICES considers the stock to be at risk of suffering reduced reproductive capacity
- Finally, when the midpoint is below the CL, ICES considers the stock to be suffering reduced reproductive capacity.

For catch advice on fish exploited at West Greenland (primarily non-maturing one-sea-winter (1SW) fish from North America and non-maturing 1SW fish from Southern NEAC), ICES has adopted a risk level of 75% of simultaneous attainment of MOs (ICES, 2003) as part of a management plan agreed by NASCO. ICES applies the same level of risk aversion for catch advice for homewater fisheries on the NAC stock complex.

NASCO has not formally agreed a management plan for the fishery at Faroes. However, WGNAS has developed a risk-based framework for providing catch advice for fish exploited in this fishery (mainly multi-sea-winter (MSW) fish from NEAC countries). Catch advice is currently provided by ICES at both the stock complex and country/jurisdiction levels (for NEAC stocks only) and catch options tables provide both individual probabilities and the probability of simultaneous attainment of meeting proposed management objectives for both. ICES has recommended (ICES, 2013) that management decisions should be based principally on a 95% probability of attainment of CLs in each stock complex/country individually. The simultaneous attainment probability may also be used as a guide, but managers should be aware that this will generally be quite low when large numbers of management units are used.

1.6 Introduction to the new Life Cycle Model approach

1.6.1. Background

In assessing and forecasting stock status, the WGNAS has to date followed a series of processes. Regional data compilations, starting from the beginning of the 1970's, for groups of countries/stock-units, are standardised and submitted to WGNAS. Data are provided for 25 stock-units (SU) through the three stock complexes (NAC, northern and southern North East Atlantic Commission, respectively N-NEAC and S-NEAC).

Data are then processed through "Run Reconstruction Models" (RRM). These models process catch data and exploitation rates together with biological characteristics of stocks (e.g. proportion of smolt ages, fecundity of fish) at stock-unit scales to provide standardised data of returns, spawners, lagged eggs or lagged spawners for two sea-age classes (1SW, MSW) for the 25 stock-units.

These were then subsequently used in NAC, N-NEAC and S-NEAC "Pre-Fisheries Abundance" (PFA) forecast models to develop ICES advice on fishing opportunities, last implemented in ICES (2021a). These models were designed to reconstruct long term time-series (starting in the early

1970's) of annual abundance at sea, estimating population sizes before any marine fisheries take place, i.e. pre-fisheries abundance, and to forecast the returns of adult salmon to their homewaters (riverine, estuarine and marine waters out to 12 nautical miles of countries producing salmon) over three years following the year of assessment. These models were incorporated in a risk analysis framework to assess the consequences of mixed salmon stock marine fisheries, at West Greenland and the Faroes, on the homewater returns and to assess the compliance of realized spawning escapement (the number of salmon arriving back to a management unit) to spawn, to CLs (biological references point below which the stock should not pass) at the stock complex (SC) and at the stock-unit scales.

1.6.2. Life cycle model

WKBSalmon (ICES, 2023d) reviewed the implementation of a Life cycle Model (LCM) for wild Atlantic salmon covering their natal North Atlantic range. It is used for the first time by WGNAS in 2024 to forecast Atlantic salmon stock status throughout the North Atlantic area. Implementation of the LCM moves the hindcasting and forecasting elements of the assessments away from three independent PFA forecast models aligned to the three management units of NAC, S-NEAC and N-NEAC, to a single unified model-based North Atlantic-wide hindcasting and forecasting approach (Figure 1.6.1).

The LCM is a time iterative, Bayesian hierarchical model incorporating salmon records of the 25 stock-units through the three NAC, S-NEAC and N-NEAC stock complexes. The LCM uses estimates of returns and total catches derived from the NAC and NEAC Run-Reconstruction Models as input data.

The LCM tracks salmon of two explicit sea-age classes (1SW and MSW), SU-specific smolt ages, numbers of salmon returning to stock-unit, proportions maturing, survival at sea by month and SU-specific post-smolt survival rates, and proportion maturing at 1SW. The MSW age class 'considered' by the LCM is strictly calculated as fish spending two years at sea (2SW), however it may be considered a "plus-group", concordantly combining salmon of two, three and older first-time spawning age groups, and repeat spawners. The LCM includes mixing of stocks at West Greenland and the Faroes, the two mixed-stock fishing areas considered by NASCO. Mixed-stock catches at West Greenland and Faroes, as well as those in North America, are designated to stock-units based on observed historic tag data, genetic identification and assumed harvest distributions.

The LCM forecasts returning salmon abundance by stock-units based on the post-smolt survival and proportion maturing parameters, forecast forward as a random-walk, from the most recent observations. Forecast returns to stock-units and subsequent egg deposition may be compared to Conservation Limit (CL) reference points at national and international levels to quantify the risk to the salmon stocks under different mixed-fisheries catch levels.

Outputs of the LCM are in line with the previously employed PFA forecast models, providing for S-NEAC, N-NEAC and NAC, by country and stock-unit, assessment time-series and five years forecasts (the current and previous years – necessary to forecast owing to data requirements in back calculations of MSW salmon – and forward three years) of total PFA, PFA maturing (1SW), PFA non-maturing (MSW), productivity (post-smolt survival), proportion maturing as 1SW, returns of 1SW, returns of MSW and eggs in returns/spawners of 1SW, MSW and all sea-age groups. Comparisons made during the benchmark between the results provided by PFA forecast models and the LCM revealed that the LCM provides estimates of stock status and forecasts in line with perceptions and previously used modelling frameworks and to be robust to a range of settings and uncertainties (ICES, 2023d). Retrospective patterns of the primary model variables (Total PFA, maturing PFA, non-maturing PFA, post-smolt survival and probability of maturing as 1SW) for all stock-units were investigated using Mohn's rho and time series graphing using the full time-series and five "peels", each produced by running the assessment model with a further proceeding year's data removed (ICES, 2023d). These showed the model to be stable, with retrospective patterns within acceptable bounds (ICES, 2020b).

1.6.3. The advantages of using a unified model

The LCM brings three main improvements to the Atlantic salmon stock assessment.

First, the main advantage of the LCM is that it provides a single, unified assessment framework, data-framework and workflow, linking the productivity and maturation processes at sea hierarchically among all stock-units. This provides a more realistic representation of the life-cycle and interactions of salmon stocks and fisheries that share a common, albeit large, marine environment and improved stock-unit biology (biological characteristics). In the LCM, the dynamics of all stock-units in NAC, S-NEAC and N-NEAC are considered within a single model where all SU follow a similar life history process. This is a critical advantage compared to the three different and independent PFA models historically developed for these three stock complexes. Some core demographic hypotheses were not harmonized among these models. Specifically, the two European PFA models explicitly considered 1SW and MSW fish in the population dynamics, while the PFA model for NAC, which was developed for catch advice purposes at West Greenland, only considered the dynamics of 2SW fish with no comparable consideration of 1SW salmon sea productivity as expressed in the European stock complexes. The NAC model also implicitly assumes that 2SW spawners only produce 2SW fish in future cohorts and therefore excludes contributions of 1SW and any fish older than 2SW. The underlying rationale for this simplification is that non-maturing 1SW, potentially 2SW salmon returns, comprise the vast majority of North American salmon caught at West Greenland. However, because of these differences in model structure, the commonality in temporal trends between all stock-units in the North Atlantic could not be evaluated with the previous PFA estimation method. The LCM provides a singular harmonized framework to simultaneously assess two sea-age classes of Atlantic salmon for all stock-units in NAC and NEAC and hence allows for analysing the commonality in the population dynamics. It therefore provides a tool for exploring the commonality in temporal trends among all stock-units of the North Atlantic basin and for evaluating the consequences of scenarios on multiple stock complexes simultaneously, both mixed-stock fisheries and environmental factors.

Second, the LCM uses an integrated Bayesian modelling framework that is expandable and provides an opportunity to assimilate new sources of data to make the best use of all available biological and ecological information. The framework incorporates likelihood functions to consider uncertainty in the data. For instance, the likelihood component of the LCM includes time-series estimates (approximated as log-normal distributions) of returns and homewater catches for each stock-unit by sea-age class, and mixed-stock catches (West Greenland and Faroes) operating sequentially on combinations of stock-units and using additional data on the SU-origin of the catches. It also incorporates the possibility to provide time-series of biological characteristics data to capture any potential trends (for instance, any trend in the average fecundity of females that would result from a trend in body size). It includes terms to assimilate genetic data to allocate mixed-stock fisheries to the different stock complexes. A two-stage likelihood function is used to allocate catches at West Greenland; first between the NAC and NEAC stock complexes and then between the N-NEAC and S-NEAC stock complexes. The structure is flexible and could be enhanced to make the best use of the available data.

Third, the same LCM is used for both the hindcasting (e.g., fitting the model on time series of historical data) and forecasting phases (forecast of the dynamics in future years after the last year of fitting). All model properties are readily integrated into the forecast process:

i) The model is used to forecast the population dynamics of all stock-units simultaneously, which is of particular interest when assessing catch options for mixed-stock fisheries operating on a mixture of stocks from both NAC and NEAC;

ii) Temporal variations in post-smolt survivals and in the proportions of fish maturing as 1SW incorporate the covariation among stock-units in both the hindcasting and forecasting phases.

iii) All sources of variation in the model (temporal variability) and parameter uncertainties (joint posterior distribution) are readily integrated in the inference and are propagated in the forecasting phase.

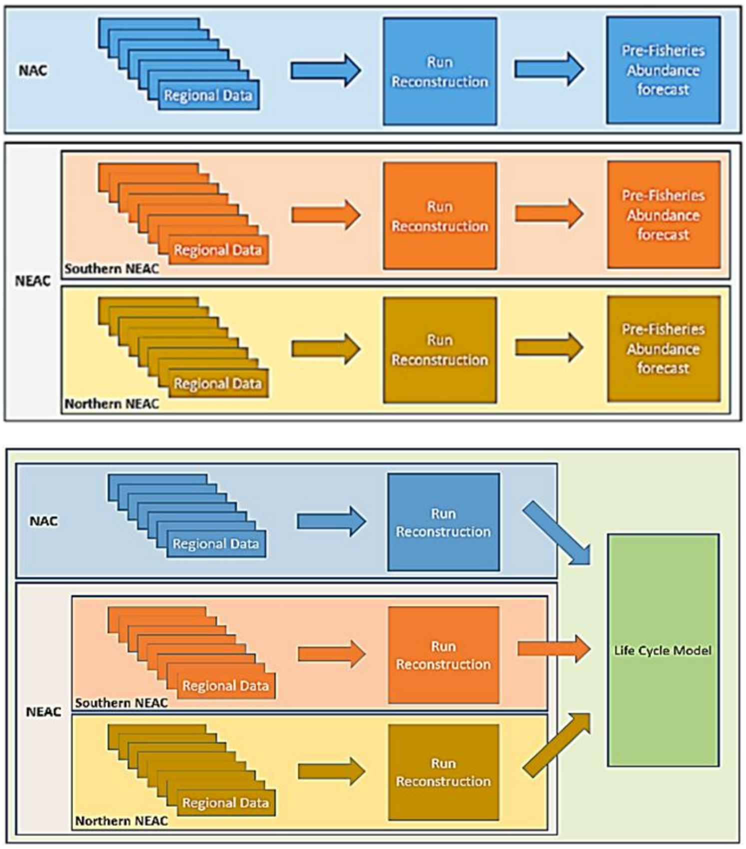


Figure 1.6.1. Representation of North Atlantic Salmon assessment framework with (top) three independent Pre-Fisheries Abundance (PFA) Forecast models and (bottom) single unified North Atlantic Life-cycle Model (Source: ICES, 2023d).

2 Atlantic salmon in the North Atlantic area

2.1 Catches of North Atlantic salmon

2.1.1 Nominal catches of salmon

The nominal catch of a fishery is defined as the round, fresh weight of fish that are caught and retained, and reported. Total nominal catches of salmon reported by country in all fisheries for 1960–2023 are given in Table 2.1.1.1. Catch statistics in the North Atlantic also include fish-farm escapees and, in some Northeast Atlantic countries, ranched fish (see Section 2.2.2). Catch and release has become increasingly commonplace in some countries, but these fish do not appear in the nominal catches (see Section 2.1.2).

Icelandic catches have traditionally been split into two categories, wild and ranched, reflecting the fact that Iceland has been the main North Atlantic country where large-scale ranching has been undertaken with the specific intention of harvesting all returns at the release site and with no prospect of wild spawning success. The release of smolts for commercial ranching purposes ceased in Iceland in 1998 but ranching for rod fisheries in two Icelandic rivers continued into 2023 (Table 2.1.1.1). Catches in Sweden are split between wild and ranched categories over the entire time-series. The latter fish represent adult salmon which have originated from hatchery-reared smolts, and which have been released under programmes to mitigate for hydropower development schemes. These fish are also exploited very heavily in homewaters and have no possibility of spawning naturally in the wild. While ranching does occur in some other countries (Ireland, UK (Northern Ireland)), this is on a much smaller scale. Some of these operations are experimental and at others harvesting does not occur solely at the release site. The ranched component in these countries has therefore been included in the nominal catch.

Figure 2.1.1.1 shows the total reported nominal catch of salmon grouped by the following areas: 'Northern NEAC (N-NEAC)' (Norway, Russia, Finland, all Iceland, Sweden and Denmark); 'Southern NEAC (S-NEAC)' (Ireland, UK (Scotland), UK (England & Wales), UK (Northern Ireland), France and Spain); 'North America (NAC)' (Canada, USA and St Pierre and Miquelon (France)); and 'Greenland and Faroes '.

The total nominal catch for 2023 (provisional) was 524 t (no catch data available for the Russian Federation, at the time of writing). The 2023 nominal catch was 167 t below the updated 2022 catch (691 t) and below the previous five- and ten-year means by 308 t and 496 t, respectively. Catches in all countries/jurisdictions in 2023 were below the previous five- and ten-year means (Table 2.1.1.1).

Nominal catches in homewater fisheries were split, where available, by sea age or size category (Table 2.1.1.2). The data for 2023 are provisional and, as in Table 2.1.1.1, include both wild and reared salmon and fish-farm escapees in some countries. A more detailed breakdown, providing both numbers and weight for different sea-age groups for most countries, is provided in Annex 4. Countries use different methods to partition their catches by sea-age class (outlined in the footnotes to Annex 4). The composition of catches in different areas is discussed in more detail in Sections 3, 4, and 5.

ICES recognizes that mixed-stock fisheries present particular threats to stock status (ICES, 2019a). These fisheries predominantly operate in coastal areas and NASCO specifically requests that the nominal catches in homewater fisheries be partitioned according to whether the catch is taken in coastal, estuarine, or riverine (in-river) areas. Figure 2.1.1.2 presents these data on a country-by-country basis. It should be noted, however, that the way in which the nominal catch is partitioned by categories varies among countries, particularly for estuarine and coastal fisheries. For example, in some countries these catches are split according to particular gear types whereas in other countries the split is based on whether fisheries operate inside or outside headlands. While it is generally easier to allocate the freshwater (riverine) component of the catch, it should also be noted that catch and release (C&R) is now in widespread use in many countries (Section 2.1.2) and these fish are excluded from the nominal catch. Noting these caveats, these data are considered to provide the best available indication of catch in these different fishery areas. Figure 2.1.1.2 shows that there is considerable variability of the distribution of the catch among individual countries. There have been no coastal fisheries in Iceland, Spain, or Denmark throughout the time-series. Coastal fisheries ceased in Ireland in 2007 and no fishing has occurred in coastal waters of UK (Northern Ireland) since 2012, in UK (Scotland) since 2016, or in the UK (England & Wales) since 2019 (England) and 2020 (Wales). In most countries in recent years, the majority of the catch has been taken in rivers and estuaries.

Coastal, estuarine and in-river catch data for the whole time-series are presented in Table 2.1.1.3 and data for the period 2009 to 2023 aggregated by region are presented in Figure 2.1.1.3.

In the Northern NEAC area, catches in coastal fisheries have declined from 306 t in 2009 to 113 t in 2023, and in-river catches have declined from 595 t in 2009 to 241 t in 2023. At the beginning of the time-series about half the catch was taken in coastal waters and half in rivers, whereas since 2008, the coastal catch represents around 33%–44% of the total.

In the Southern NEAC area, catches in coastal and estuarine fisheries have declined over the period. While coastal and estuarine fisheries have historically made up the largest component of the catch, coastal fisheries dropped sharply in 2007 (from 306 t in 2006 to 70 t in 2007) and remained at lower levels to 2018; there have been no coastal catches since 2019. Estuarine fisheries have also declined, from 72 t in 2007 to 15 t in 2023. The reduction in more recent years in coastal and estuarine fisheries reflects widespread measures to reduce exploitation in a number of countries. At the beginning of the time-series about half the catch was taken in coastal waters and one third in rivers. In 2023, about one third of the catch was from estuarine fisheries and two thirds from in-river fisheries.

In North America, the total catch has fluctuated between 78 and 178 t over the period 2009 to 2023. Around 60% of the total catch in this area has been taken by in-river fisheries during 2009-2023, although since 2018 in-river fisheries have taken just under half of the total catch. The estuarine catch has fluctuated between about 23% and 54% of the total catch. The catch in coastal fisheries has been typically less than 10% of the catch each year with the biggest catch taken in 2020 (10 t).

In Greenland, the total coastal catch increased steadily from 25 t in 2007 to 56 t in 2015, and has since fluctuated between 26 and 42 t (see Section 5). A small number of salmon have been caught in the estuary near the Kapisillit River (19 salmon (total weight 81 kg) caught in 2019, no catch in 2020, one salmon caught in 2022 and one salmon caught in 2023). Genetic studies have shown this river stock is very isolated from other stocks in the North Atlantic but is an outgroup of the NEAC phylogenetic group, and salmon caught in the estuary were exclusively from the Kapisillit River (Krohn 2013 unpublished; Arnekleiv *et al.*, 2019).

2.1.2 Catch and release

The practice of catch and release in rod fisheries has become increasingly common. This has occurred in part as a consequence of salmon management measures aimed at conserving stocks while maintaining opportunities for recreational fisheries, but also reflects increasing voluntary release of fish by anglers. In some areas of Canada and USA, the mandatory release of large

(MSW) salmon has been in place since 1984. Since the beginning of the 1990s, it has also been widely used in many European countries.

The nominal catches presented in Section 2.1.1 do not include salmon that have been caught and released. Table 2.1.2.1 presents catch and release information from 1991 to 2023 for countries that have records. Catch and release may also be practised in other countries while not being formally recorded or where figures are only recently available. There are large differences in the percentage of the total rod catch that is released: in 2023 this ranged from 4% in France to 96% in UK (Scotland), reflecting varying management practices and angler attitudes among these countries. There are no restrictions on the total numbers of fish that may be caught and released in most countries, although in Ireland some rivers are closed completely to recreational angling owing to low conservation status, whereas there are some daily limits for individual fishers in some Canadian fisheries. For all countries, the percentage of fish released has increased over time. There is also evidence from some countries that larger MSW fish are released in greater proportions than smaller fish. Overall, about 133 000 salmon were reported to have been released from rod fisheries around the North Atlantic in 2023, lower than the previous five-year mean (approximately 179 000).

Summary information on how catch and release levels, and estimates of post-release mortality rates, are incorporated into national assessments was provided by ICES (ICES, 2010) and is summarised in the Stock Annex.

2.1.3 Unreported catches

Unreported catches by year (1987 to 2023) and Commission Area are presented in Table 2.1.3.1 and are presented relative to the total nominal catch in Figure 2.1.3.1. A description of the methods used to derive the unreported catches was provided by ICES (2000) and updated for the NEAC Region in ICES (2002). Detailed reports from different countries were also submitted to NASCO in 2007 in support of a special session on this issue. There have been no estimates of unreported catch for Russia since 2008, for Canada in 2007 and 2008, and for France since 2016. The unreported catches for Canada for 2009, 2010 and since 2019 are incomplete as estimates are not available for all regions. There are also no estimates of unreported catch for Spain, where total catches are typically small.

In general, despite the methods used by each country to derive estimates of unreported catch remaining relatively unchanged, incompleteness and inconsistencies in annual reporting mean that comparisons over time may not be appropriate (see Stock Annex). Over recent years, efforts have been made to reduce the level of unreported catch in a number of countries (e.g. through improved reporting procedures and the introduction of carcass tagging and logbook schemes).

The total unreported catch in Commission Areas in 2023 was estimated to be 121 t. The unreported catch in the NEAC area in 2023 was estimated at 95 t and that for West Greenland was 10 t and the NAC area was 16 t. The 2023 unreported catches by country are provided in Table 2.1.3.2. It is not possible to fully partition the unreported catches into coastal, estuarine, and in-river areas due to incomplete information.

Summary information on how unreported catches are incorporated into national and international assessments was provided to ICES in 2010 (ICES, 2010).

2.2 Farming and sea ranching of Atlantic salmon

2.2.1 Production of farmed Atlantic salmon

The estimate of farmed Atlantic salmon production in the North Atlantic area for 2022 was 1958 kt, and the provisional estimate for 2023 was 1921 kt. These are slight decreases from production in 2021 (2007 kt) but higher than the previous five-year mean (1820 kt). The production of farmed Atlantic salmon in this area has been over one million tonnes since 2009 (Table 2.2.1.1 and Figure 2.2.1.1). Norway continues to produce the majority of the farmed salmon in the North Atlantic (79%), followed by UK (Scotland; 10%). Farmed salmon production in 2023 was above the previous five-year mean in all countries reporting. Data for UK (Northern Ireland) since 2001, data for east coast USA since 2012 and Russia since 2021 are not reported to ICES, as the data are not publicly available. This is also the case for some regions within countries in some years.

Worldwide production of farmed Atlantic salmon has been over one million tonnes since 2001 and has been over two million tonnes since 2012. It is difficult to source reliable production figures for all countries outside the North Atlantic area and as data for 2022 and 2023 are not available, the WGNAS has used 2021 data for some countries and assumed the same levels of production for 2022 and 2023 (FAO Fisheries and Aquaculture Department database), to estimate worldwide production. The total worldwide production in 2023 was provisionally estimated at around 2814 kt (Table 2.2.1.1 and Figure 2.2.1.1), which was lower than in 2022 (2851 kt) but higher than the previous five-year mean (2702 kt). Production of farmed Atlantic salmon outside the North Atlantic is estimated to have accounted for one third of the worldwide total in 2023 and is still dominated by Chile. Atlantic salmon are produced in land-based and closed containment facilities around the world and the figures provided in Table 2.2.1.1 may not include all countries where such production occurs.

The worldwide production of farmed Atlantic salmon in 2023 was over 5000 times the reported nominal catch of wild Atlantic salmon in the North Atlantic.

2.2.2 Harvest of ranched Atlantic salmon

Ranching has been defined as the production of salmon through smolt releases with the intent of harvesting the total population that returns to freshwater (harvesting can include fish collected for broodstock) (ICES, 1994). The release of smolts for commercial ranching purposes ceased in Iceland in 1998, but ranching with the specific intention of harvesting by rod fisheries has been practised in two Icelandic rivers since 1990 and these data are now included in the ranched catch (Table 2.1.1.1). A similar approach has been adopted, over the available time-series, for one river in Sweden (River Lagan). These hatchery-origin smolts are released under programmes to mitigate for hydropower development schemes with no possibility of spawning naturally in the wild. These have therefore also been designated as ranched fish and are included in Figure 2.2.2.1. In Ireland, ranching is currently only carried out in a small number of salmon rivers.

The total reported harvest of ranched Atlantic salmon in countries bordering the North Atlantic in 2023 was 15 t (Iceland and Sweden; Table 2.2.2.1; Figure 2.2.2.1) with the majority of catch taken in Iceland. The total harvest was 44% below the previous five-year mean (27 t). No estimates of ranched salmon harvest are provided for Ireland or UK (Northern Ireland) where the proportions of ranched fish in the catches are more difficult to assess. However, in both instances ranched catches are considered to be an insignificant proportion of the overall harvest.

2.3 The Life-cycle Model (LCM)

2.3.1 A unified Life-cycle Model to assess Atlantic salmon in the North Atlantic

2.3.1.1 One unified model

Implementation of the LCM moves the hindcasting and forecasting elements of the assessments away from three independent PFA models to a unified model providing a hindcasting (based on historical observations) and forecasting approach.

The LCM provides a unified assessment framework that links the productivity and maturation processes at sea hierarchically among all stock-units (SUs). In the LCM, the dynamics of all 25 stock-units in NAC, S-NEAC and N-NEAC are considered, with all stock-units following a similar life history process (Figure 2.3.1). The LCM considers two sea-age class groups, 1SW and MSW, and the mixing of stocks at West Greenland and the Faroes, the two mixed-stock fishing areas considered by NASCO. This provides a more realistic representation of the life-cycle and interactions among salmon stocks and fisheries that share a common albeit large marine environment and improved stock-unit biology (biological characteristics).

The LCM forecasts estimates of returning salmon by stock-unit based on the post-smolt survival and proportion maturing parameters, forecast forward as a random-walk, from the most recent observations and accounting for "banked" maturing and non-maturing salmon. Forecast returns to stock-unit and subsequent egg depositions may be compared to Conservation Limit (CL) reference points at national and international levels to quantify the risk to the salmon stocks under different mixed-fisheries catch levels.

Outputs of the LCM are in line with the previously employed Pre-Fisheries Abundance (PFA) forecast models, providing for S-NEAC, N-NEAC and NAC, by country and stock-unit, assessment time-series and forecasts of four years of total PFA, PFA maturing (1SW), PFA non-maturing (MSW), productivity (post-smolt survival), proportion maturing as 1SW, returns of 1SW, returns of MSW and eggs in returns/spawners of 1SW, MSW and all sea-age groups.

2.3.1.2 The Life-cycle Model overview

2.3.1.2.1 Spatial structure

The model considers the dynamics of 25 stock-units, quantifying salmon abundance at sea based on returns and catches. The 25 stock-units are grouped within three large stock complexes: North America (NAC), Southern Europe (S-NEAC) and Northern Europe (N-NEAC), as defined by NASCO (Table 2.3.1.):

- 6 stock-units for NAC: Labrador, Newfoundland, Quebec, Gulf, Scotia-Fundy, USA;
- 8 stock-units for S-NEAC: France, UK (England & Wales), Ireland, UK (Northern Ireland) River Foyle (Loughs Agency), UK (Northern Ireland) DAERA areas, UK (Scotland) East, UK (Scotland) West, Iceland South-West;
- 11 stock-units for N-NEAC: Iceland North-East, Sweden, Norway South-East, Norway South-West, Norway Middle, Norway North, Finland, Russia (Kola Barents), Russia (Kola White Sea), Russia (Arkhangelsk Karelia) and Russia (River Pechora).

The N-NEAC is further separated into two sub-complexes to consider differences in the migration routes (which in particular results in different availability of the fishes at the Faroes fisheries):

- The southern part of the N-NEAC (NNEAC-south) comprises Iceland North-East, Sweden, Norway South-East, Norway South-West and Norway Middle;
- The northern part of the N-NEAC (NNEAC-north) comprises Norway North, River Tana/Teno (Finland and Norway), Russia (Kola Barents), Russia (Kola White Sea), Russia (Arkhangelsk Karelia) and Russia (River Pechora).

Note that the Netherlands, Germany, Spain, Portugal (all being part of the S-NEAC complex) and Denmark (stock complex allocation to be determined) are not considered in the current version of the assessment model because no complete series of data are available. Salmon stocks from the Inner Bay of Fundy (Canada) are also not considered within the current version of the assessment as these populations are assumed to not migrate to distant waters.

2.3.1.2.2 Stage structure and variability of life histories

The LCM is a stage-based population model formulated in a Bayesian hierarchical state-space framework that incorporates stochasticity in population dynamics as well as observation errors (Olmos et al., 2019).

The population dynamics of each of the 25 stock-units are represented by an age- and stage-structured life-cycle model (Figure 2.3.1). The model is built in discrete annual time-steps. It tracks the abundance of fish, males and females confounded for each stock-unit by year and life stage, sequentially from eggs to 1SW or MSW spawners for the period considered (starting in 1971, the year of return to rivers). Spawners are fish that contribute to reproduction and therefore those that survived all sources of natural and fishing mortality.

All salmon within a stock-unit are assumed to have the same demographic parameters and to undertake a similar migration route at sea. The assessment assumes no exchange of abundance in homewaters among the different stock-units. The population dynamics are not however, independent among stock-units as the model includes the possibility of covariations in the temporally varying key transition rates (e.g. marine survival and the proportion of fish that mature as 1SW) to represent the effect of common drivers (e.g. environmental factors) that might influence multiple populations simultaneously (Olmos et al. 2020).

For each stock-unit, the model incorporates expected variations in the age of smolts and the sea-age of returning adults. Smolts migrate to sea after one to six years in freshwater (with variations among stock-units). An important model condition is that there is no tracking of smolt-age once at sea, meaning that all transition rates applied to post-smolts only depend on the migration year and are independent of the smolt age.

Only two sea-age classes are considered: maiden salmon that return to homewaters to spawn after one year at sea, referred to as one-sea-winter (1SW) salmon or grilse, and maiden salmon that return after two or more winters at sea (multi-sea-winter; MSW). The MSW age class is strictly calculated in the model as fish spending two years at sea (2SW), however it may be considered a “plus-group”, concordantly combining salmon of two, three and older first-time spawning age groups, and repeat spawners. This is a simplification of the larger diversity of life history traits but the six smolt-ages combined with the maiden 1SW and MSW spawners (12 potential combinations total) represent the essence of life history variation in North America and Europe. Also note that not all combinations exist for all stock-units as the smolt-ages are generally concentrated on two or three ages in each stock-unit (for instance, mostly age-1 and age-2 smolts in France; versus mostly age-4 and age-5 in Labrador).

The model is not structured by sex. The abundance at each life-stage represents both sexes confounded. The proportion of females is only used to calculate the egg deposition based on the spawner abundances and biological characteristics (separately for the two sea-age classes).

Another fundamental model condition and difference from the PFA model for the NAC is that there is no heritability in the life histories. In particular, 1SW and MSW spawners contribute to a single pool of eggs each year with all eggs considered equivalent, independent of spawner life history.

2.3.1.2.3 Hypotheses to help partition the sources of temporal variability when estimating transition rates

As recognized by the data constraints already expressed in the PFA models and discussed by Chaput (2012), Massiot-Granier *et al.* (2014) and Olmos *et al.* (2019), the information provided by the data is limited, which restricts the number of transition rates that can be estimated.

The framework is primarily designed to provide estimates of:

- Abundance at various stages along the life-cycle;
- Exploitation rates of all fisheries;
- Post-smolt marine survival rates from out-migrating smolts to the PFA stage;
- Proportion of fish that mature at the PFA stage.

To partition the temporal variability in the natural and fishing mortalities during the freshwater and marine phases and in the proportion of fish that mature at the PFA stage, the LCM uses the framework described by Massiot-Granier *et al.* (2014) and Olmos *et al.* (2019):

- The survival rate from eggs to smolts is variable among years (lognormal) but the average value and variance are fixed and homogeneous among all SU. Lognormal stochastic variations are independent across time (no temporal autocorrelation) and across stock-units (no spatial covariation).
- The allocation of the total number of smolts in a cohort to different smolt ages is deterministic using fixed proportions of smolt ages.
- Temporal variability of the transition rates of the marine phase only occurs between smolt migration and the PFA stage (defined as abundance of post-smolts at 01 January of their first winter at sea). This transition is partitioned into two components: natural survival rate from smolt to the PFA stage and the proportion of fish that are destined to mature as 1SW. After the PFA stage, all transition rates result from the combination of the fishing and natural mortality. The natural mortality (mortality rate per month) after the PFA stage is fixed and homogenous among all stock-units. The fishing mortality rates are estimated and can vary over time.

The LCM explicitly incorporates temporal covariation among all stock-units in the post-smolt survival and the proportion of fish maturing as 1SW, both modelled as multivariate random walks in the logit scale which captures spatial covariation associated with environmental stochasticity.

2.3.1.2.4 Data flow

Important consideration on the sea-age classes.

Importantly, the equations of the population dynamics model consider only two sea-age classes termed 1SW and 2SW. Other life histories exist such as 3SW and repeat spawners (consecutive and alternate years) that are not explicitly represented in the dynamics. However, the data used to represent the dynamics of 2SW fish (returns, homewater catches, biological characteristics) actually concern all fish older than maiden 1SW fish, being considered a "plus group" or MSW fish. A limitation of the present approach is therefore a mismatch between the way the population dynamics are represented versus the data used to inform what is considered in the model as the 2SW component. Future development of the model could consider options to better align the population dynamics hypotheses with the data (e.g. expanding the model to include other sea-age life histories).

Two different pathways are used to integrate data in the modelling approach: i) data that are directly integrated as fixed values; and ii) data that are integrated through likelihood functions that incorporate observation errors (the observation process).

Data integrated as fixed values

- The mean value and the coefficient of variation (CV) of the eggs-to-smolt survival rate are fixed at 0.7% and 0.4%, respectively;
- The proportions at smolt-age (between one and six) are specific to each stock-unit and may vary among years within a stock-unit;
- The natural mortality rate at sea (after the PFA stage) is fixed to M = 0.03 month^{-1} (ICES 2004);
- The duration (in months) of the different periods separating the sequential fisheries at sea are used to calculate the natural mortality loss during the different periods at sea. They are fixed over time (no variation among years) but may vary among stock-units;
- Additional mortality rates between returns and spawners are specific to each stock-unit and may vary in time (so far, 0 for all stock-units except UK (Scotland West and East));
- Delayed spawners are fish that return in year t but delay spawning to the year after (t+1). The proportions of these are specific to each stock-unit and may vary among years. Currently they are assumed to only occur in Russia;
- The biological characteristics of fish at the spawner stage include the proportion of females and the average egg deposition per female. These are defined for 1SW and MSW fish separately, specific for each stock-unit and may vary among years.

Observation equations (likelihood)

The model is fitted to time series of data with observation errors. These include:

- Abundance at the return stage (1SW and MSW);
- Homewater (coastal, estuarine, in-river) catches (1SW and MSW);
- Catches in marine fisheries (West Greenland, Faroes, Labrador, Newfoundland, St Pierre and Miquelon; SPM) of 1SW maturing, 1SW non-maturing and MSW maturing;
- Proportion of the SU origins in the catches in marine fisheries.

The full likelihood function for the general state-space model is built from the combination of all observation equations for the returns, homewater catches and catches in marine fisheries, for 1SW and MSW separately.

To integrate observation errors, a plug-in approach is used that consists of: (i) run-reconstruction models to generate uncertainty distributions for the time-series of catches and returns for the 25 stock-units; and (ii) using these distributions as pseudo-likelihood approximations in the population dynamics state-space model.

This plug-in approach represents a trade-off between model realism and computational efficiency but has two main advantages. First, it enhances computational efficiency because building an integrated model that explicitly integrates specific observation models for each stock-unit would dramatically increase the complexity of the full model. Secondly, it enhances modelling flexibility. Indeed, separating out the population dynamics from the models that integrate the raw data to provide estimates of returns or catches at the scale of each stock-unit provides a flexible framework where any improvements of the observation models can be made without impacting the structure of the population dynamics model. Hence, continuous improvement of the models developed locally to maximize the use of available data and knowledge to provide the best estimates of returns and biological characteristics can be envisaged with minimum impacts on the population dynamics model and on the entire workflow.

Catch allocations for the distant water fisheries

As an important evolution from the PFA modelling framework, the catches in the distant water fisheries at Faroes and West Greenland are now allocated using updated genetic data (ICES, 2023d).

Faroes fishery

For maturing 1SW, non-maturing 1SW and maturing MSW fish, annual catches are parameterised with lognormal errors.

Catches of maturing 1SW, non-maturing 1SW and maturing MSW fish at Faroes (assumed in the model to comprise NEAC fish, after removing 7.6% 1SW and 13.0% MSW fish of NAC origin) are allocated to the different SU following a two-level allocation rule:

- **Level 1**. The catches are allocated to three large groups of SU using proportions based on the relative harvest rate estimated from genetic assignment data:
    - The Southern European stock complex (France, UK (England & Wales), Ireland, UK (Northern Ireland) River Foyle (Loughs Agency), UK (Northern Ireland) DAERA areas, UK (Scotland) East, UK (Scotland) West and Iceland South-West);
    - The southern part of the Northern European stock complex, that comprises Iceland North-East, Sweden, Norway South-East, Norway South-West and Norway Middle;
    - The northern part of the Northern European stock complex, that comprises Norway North, River Tana/Teno (Finland and Norway), Russia (Kola Barents), Russia (Kola White Sea), Russia (Arkhangelsk Karelia) and Russia (River Pechora).
- **Level 2**. Within each of the three groups, catches are assigned to the different stock-units within those groups assuming that exploitation rates are homogeneous among stock-units.

West Greenland fishery

This fishery is assumed to operate on the 1SW non-maturing component (destined to mature as MSW) of the populations. Catches at West Greenland may originate from any of the 25 stock-units. The catches at West Greenland are parameterised with lognormal errors, with a CV of 5%; a conservative measure of uncertainty relative to the one that would result from the conversion from catch in weight to number of fish (low uncertainty due to the large sample size (~1 000 fish per year) available to calculate the mean weight of fish).

Total catches are then allocated to the different stock-units following a three-level allocation rule:

- **Level 1**. Total catches are allocated to NAC or NEAC stock complexes using proportions calculated from a compilation of individual assignment data based on discriminant analyses of scale characteristics and genetic analyses;
- **Level 2**. Within NEAC, catches are allocated to the Southern or Northern European stock complexes using proportions calculated from a compilation of individual genetic assignments (ICES 2023d);
- **Level 3**. Within each of the three stock complexes, catches are assigned to the different stock-units assuming that exploitation rates are homogeneous.

2.3.1.2.5 MCMC simulation using Nimble

Bayesian posterior distributions were approximated using Monte Carlo Markov Chain (MCMC) algorithms in *Nimble* (https://r-nimble.org/) through the *rnimble* (www.Rproject.org) package.

A suite of programs in R have been developed that provide a consolidated streamline from hindcasting to forecasting (Figure 2.3.2.; Lemaire-Patin *et al*., 2023).

2.3.1.3 Use of the LCM for forecasting

Once fitted to the data, the LCM is used to forecast the population dynamics starting from the last year of the assessment.

An advantage of the LCM framework is that the same model is used for fitting the historical time series and for forecasting. All model properties are therefore integrated into the forecast process:

- The model is used to forecast the population dynamics of all stock-units simultaneously, which is of particular interest when assessing catch options for mixed-stock fisheries;
- Temporal variation in post-smolt survival and in the proportion of fish maturing as 1SW incorporate the covariation among stock-units in both the hindcasting and forecasting phases;
- Sources of temporal variation in the model and parameter uncertainties are integrated in the inference and are propagated in the forecasting phases;
- Use of the same model for hindcasting and forecasting ensures consistency between these two phases and limits errors as no recoding is required.

Forecasts are probabilistic and allow the computation, for any scenario, of the probability distributions of quantities in the model that integrates process and parameter uncertainties. The probabilistic forecasts from the model are used to evaluate the probability that future returns of adult fish and the subsequent egg deposition (after the last years of the hindcasting phase) exceed management objectives for different catch options in the West Greenland or the Faroes fisheries.

2.3.1.3.1 Propagation of uncertainty in the forecasts and differences with regards to the PFA models

Forecasts integrate and propagate all sources of uncertainty from the hindcasting phase. Forecasts integrate process errors, e.g. temporal variation in life-stage transition rates, and parameter uncertainties quantified by the joint Bayesian posterior distribution of all estimated parameters.

Uncertainty is integrated through Monte Carlo simulations, by simulating a large number of population trajectories (typically 1000) with parameters and the abundance in different life stages randomly drawn in the joint posterior distribution; this captures the covariance structure among all unknowns in the model.

Most of the uncertainty in the forecasts comes from the uncertainty in life-stage transition rates that control the smolt-to-PFA survival (the marine productivity) and the proportion of fish at the PFA stage that mature in their first year at sea. Smolt-to-PFA survival and the proportion of maturing PFA are forecasted using a multivariate random walk. Because of the random walk hypothesis, the forecasted smolt-to-PFA survival and proportion maturing PFA during the forecasting period will remain at the same mean value as the most recent year of the fitted time series, but with an uncertainty that increases quickly with time due to error propagation through the random walk.

As reviewed during the benchmark process (ICES, 2023d), the LCM uses a different framework to incorporate uncertainty compared to the PFA forecast models. These structural differences change how the uncertainty is propagated through the latent variables and parameters.

In the LCM, all latent variables through the entire time series are correlated through the life-cycle structure. This is a strong difference with regards to the PFA forecast models where there was no demographic link between the different cohorts. Also, in the LCM, the likelihood functions include the distribution of returns, the distribution of both homewater and distant water fisheries catches and the proportion to allocate the catches to each stock-unit. Whereas in the PFA forecast models, only the returns were associated with a likelihood function. The stock abundances (lagged eggs for NEAC and lagged spawners for NAC) and distant water catches are defined in the models through a prior distribution which is not updated within the models (no likelihood associated with these data). For the PFA forecast models, the prior uncertainties were propagated through the other latent variables and parameters. As a consequence, the LCM produces more precise estimates of abundance and demographic parameters and more precise forecasts compared to the PFA forecast models.

2.3.1.3.2 Use of the LCM for provision of catch advice

LCM forecasts are used to evaluate the probability that future returns of adult fish and subsequent egg deposition reach CL/MOs for different catch options in the West Greenland and the Faroes fisheries for all SU. Catch scenarios for the West Greenland and the Faroes fisheries are considered separately. LCM forecasts can also be used to evaluate the probability that future returns of adult fish and subsequent egg deposition reach CL/MOs for NAC.

Catch scenarios

Faroes fishery: Following the approach used by WGNAS for developing catch advice, catch scenarios for the Faroes fishery range from 0 to 200 tonnes, with one scenario every 20 t (11 scenarios). NAC fish form part of the catch and are accounted for in the catch advice for NEAC.

West Greenland fishery: Catches scenarios for the West Greenland fishery range from 0 to 100 t with scenarios every 10 t (11 scenarios).

For each scenario, catch options are converted to total number of fish caught using mean weight of fish. There is no uncertainty in this conversion.

Sharing agreement

Following the approach used by ICES, the catch options incorporate a 'sharing agreement'. The sharing agreements establish the proportion of any harvestable surplus that could be made available to the West Greenland or Faroes fishery through the total allowable catch (TAC). For any TAC option being evaluated for these fisheries, it is assumed that the total harvest would be the TAC divided by the catches share.

For the Faroes fishery, a baseline period of 1984–1988 for the share of catches between NEAC and Faroes is used to define the share allocation of 8.4% to Faroes and 91.6% to NEAC (ICES, 2012). Therefore, a scenario of 100 t corresponds to 100/0.084 = 1190 t of fish caught in the Northeast Atlantic.

For the West Greenland fishery, the sharing agreement rule was defined as 40% to West Greenland fisheries and 60% partitioned between NAC and NEAC fisheries (ICES, 2003). Therefore, a scenario of 100 t corresponds to 100/0.4 = 250 t of fish caught.

In the LCM implementation, and in consideration of the sharing agreement, this consists of setting homewater catches and all other distant water fisheries to zero and scaling the total catches at Faroes or West Greenland.

Allocation of the catches to the different sea ages

For all scenarios, catches are allocated to the different sea ages impacted by the fishery.

Catches within the Faroes fishery are allocated to non-maturing 1SW, maturing 1SW and maturing MSW fish following the proportions of these different components in the catches used in the hindcast (fixed proportions, no time variation). Hence, the MSW component in the model is potentially harvested as non-maturing 1SW fish and then as maturing MSW fish sequentially (the year after). Based on sea age composition in historical samples, the majority (>97.5%) of the catch are MSW maiden fish.

All of the catches at the West Greenland fishery are assumed to be maturing MSW fish.

Allocation of the catches to the different stock complexes and stock-units

In forecasting, catches at Faroes and West Greenland from the scenarios are allocated to the different stock complexes and stock-units in the same way as Faroes and West Greenland catches are partitioned in the model during the hindcasting phase.

The proportions used to allocate the catches among stock complexes (proportions at Level 1 for the Faroes fisheries and at Levels 1 and 2 for the West Greenland fishery) are set to the mean proportions of the most recent five years of the hindcasting phase. The posterior uncertainty around these proportions is therefore considered in the simulations. Within each stock complex, proportions used to allocate the catches among stock-units (proportions at Level 2 for the Faroes fishery and at Level 3 for the West Greenland fishery) are calculated in the model as the relative proportions of abundance before the fishery. This is, therefore, equivalent to the homogeneous harvest rate hypotheses used in the hindcasting phase. The posterior uncertainty of these proportions is also considered in the simulations.

Other settings

All other parameters needed to define the population dynamics during the forecasting phase (e.g. smolt-age proportions, proportion of females in returns, fecundity, etc) are set to their mean values of the most recent five years of the hindcasting phase.

Probability to reach Conservation Limits or Management Objectives

An important change to the previous assessment approach is that CLs/MOs are defined in terms of number of eggs and are directly deduced from the values provided to ICES by the different countries/jurisdictions.

For any scenario, the forecasted egg deposition by spawners (e.g. after all potential fisheries) is then compared to the CLs/MOs. Forecasts are probabilistic and provide the probability that the egg deposition meets or exceeds the CLs/MOs. All probabilities are calculated from Monte Carlo samples. The advice is presented as a probability of meeting or exceeding the objectives relative to the harvest levels evaluated.

The compliance to the CLs/MOs can be provided for both sea-age classes combined or separately that allows an investigation of the sensitivity of this component of populations to the catch scenarios. This is important as the West Greenland fishery primarily harvests the 1SW non-mature component, whereas the Faroes fishery harvests primarily MSW fish on their return migration to homewaters.

NAC provide CLs/MOs specific for the maiden 2SW component of the population. For NAC stock-units, the probability to achieve the 2SW CL/MO is calculated by adjusting for the proportion of MSW returns that are maiden 2SW salmon. These proportions are provided for each stock-units as fixed or annually varying values from the run-reconstruction inputs.

The LCM is structured at the scale of the 25 stock-units, but results can be aggregated at higher-level scales. This allows for evaluating the aggregated and simultaneous achievement of CLs/MOs at the stock-unit, country/jurisdiction or stock complex scales. Importantly, the LCM integrates spatial covariation in the returns among stock-units when calculating aggregated and simultaneous probabilities of achieving CL/MO.

For the Faroes fishery, the risk framework is applied to the four management units (1SW and MSW to each of Southern NEAC and Northern NEAC) and also for the same age groups for each NEAC country/jurisdiction. The risk framework estimates the probability that the egg depositions of 1SW and MSW salmon in each of the management units will meet or exceed their respective CL/MO at different catch levels (TAC options). ICES have advised that the MO should have a greater than 95% probability of meeting or exceeding the CL in each management unit (see Section 1). As NASCO has not yet adopted a MO for the Faroes fishery, the draft advice tables provide the probabilities for each management unit and the probabilities of simultaneous attainment of all CL for each TAC option.

For the West Greenland fishery, the risk framework is applied to the stock complexes that are of relevance to the management of the West Greenland fishery: non-maturing 1SW fish from NAC and southern NEAC. No analysis of the impact of West Greenland fishery on N-NEAC management units is provided as the proportion of fish from N-NEAC in the West Greenland fishery is low. The risk framework estimates the probability that the returns of 2SW salmon after the West Greenland fishery simultaneously meet or exceed the 2SW CLs/MOs in the seven management units (6 regions in NAC and the S-NEAC complex). The draft advice tables provide the probabilities for each of the seven management units to attain their CL/MO, and the probabilities of this being achieved by all management units simultaneously (i.e. in the same given year) for each TAC option.

2.3.2 Assessment of Atlantic salmon in the North Atlantic according to the LCM

When examining trends at the scale of stock complexes (NAC, N-NEAC, S-NEAC) and the entire North Atlantic, time-series of total PFA in each stock complex show very similar continuous declines (by a factor of 3) between the 1970s and the 2020s (Figure 2.3.3). The decline in PFA is similarly marked by a strong decrease in abundances from the 1990s onwards, mostly attributed to a decline in the post-smolt survival (over the 1975-2022 period) (Figure 2.3.4). However, numbers of spawners (Figure 2.3.5) and subsequent total eggs deposited and smolt output (Figure 2.3.6) appear to have remained relatively stable over the same period.

Overall, the three stock complexes exhibit similar temporal trends in the probability to mature as 1SW salmon, showing increases from the 1970s to the 1990s, followed by a levelling off and then a decline from the 2000s (Figure 2.3.4.). This is consistent with the decline observed in the proportion of 2SW fish in the returns from the 1970s to the 1990s, and then with the increase in this proportion of 2SW fish in the returns observed since then. Overall, the average probability to mature as 1SW is lower in N-NEAC, which is consistent with the high proportion of fish spending more than one winter at sea in N-NEAC stock-units. The S-NEAC stock complex has the highest average probability to mature as 1SW.

Further details on the output of the LCM for the stock complexes, and stock-units, can be found in subsequent sections.

2.4 NASCO has asked ICES to report on significant, new or emerging threats to, or opportunities for, salmon conservation and management

2.4.1 Threats

2.4.1.1 Offshore fish farming in Norway

WGNAS has previously reported on developing plans in Norway for opening offshore areas for aquaculture (ICES 2023a). A number of suggested areas along the coast have been evaluated for suitability for farming of salmon, and also for potential conflict with other natural resources such as deep-sea coral reefs and spawning areas for marine species, as well as other activities that may use these areas such as fishing. Through a formal consultation process with a number of institutions and agencies, many of the initially proposed areas were excluded but three areas were selected for further evaluation: one off southwest Norway, one in Mid-Norway and one in northern Norway (http://www.fiskeridirektoratet.no/Akvakultur/Dokumenter/Rapporter/anbefaling-av-tre-omrader-for-havbruk-til-havs). A program for evaluation of the consequences of the planned offshore farming has been developed (https://www.fiskeridir.no/media/Files/akvakultur/dokumenter/hoeringer-akva/2023/forslag-til-utredningsprogram-for-havbruk-til-havs-Norskerenna-sør-Frøyabanken-nord-Trænabanken.pdf), and a process of selecting scientific institutions for conducting this evaluation has been initiated.

Depending on the technology being developed for the offshore fish farms, the level of production in the areas, and their proximity to migration routes of wild post-smolts, aquaculture in these areas may have an effect on out-migrating post-smolts, not only originating from rivers in Norway, but potentially also from rivers further south in Europe. Further development of migration models for post-smolts from all regions would be needed to assess the potential impact.

2.4.1.2 Urban runoff mortality caused by 6PPD-quinone

The urban runoff mortality syndrome (URMS) describes a phenomenon, first reported in USA west coast urban creeks, where exposure to stormwater led to unexplained acute mortality as high as 60-90% in adult coho salmon ascending U.S. Pacific Northwest rivers during their annual reproduction migration (Feist *et al*. 2017). Characteristic symptoms of susceptibility to the toxic effects of URMS in fish include increased ventilation rates, spiraling, gasping and loss of equilibrium before death (McIntyre *et al*. 2018; Brinkmann *et al*. 2022). Recent investigations have shown that the worldwide rubber-tyre derived antioxidant N-(1,3-Dimethylbutyl)-N′-phenyl-p-phenylenediamine-quinone (6PPD-quinone) was the responsible compound for URMS in coho salmon (Tian *et al*. 2021). However, in line with further investigations, adult coho salmon were shown to be particularly sensitive to the chemicals in toxic urban runoff, with a median lethal concentration (LC50) of less than 0.1 μg/L. Subsequent studies provided further evidence for varying sensitivity among different fish species including chum salmon, rainbow trout, brook trout, Arctic char, white sturgeon, zebrafish, brown trout and Atlantic salmon (Hiki *et al*. 2021, 2022; McIntyre *et al*. 2021; Brinkmann *et al*. 2022; Foldvik *et al*. 2022).

A study investigating the acute toxicity of 6PPD-quinone on alevins of Atlantic salmon and brown trout showed no effects (mortalities or substantial behavioural changes) of 6PPD-quinone on these early life stages, even at elevated concentrations ranging from 0.095 to 12.16 μg/L (Foldvik *et al*. 2022). Experimental data on the sensitivity of adult Atlantic salmon and brown trout to toxic effects (e.g. acute toxicity or reproductive impairment) of 6PPD-quinone, however, are unknown.

2.4.2 Opportunities

2.4.2.1 Developing a new genetic baseline for NEAC

There is a need for an enhanced genetic baseline which covers salmon distribution across the rivers in the entire eastern Atlantic, but at a much greater resolution than that which is currently available. New stock assessment initiatives and associated management such as the LCM would benefit substantially from stock discrimination and assignment units across the range with a single European reference baseline at a much finer resolution. Also, determining the origin of salmon caught at sea will aid in identifying important migration corridors and feeding areas, provide a more detailed estimate of which European populations are exploited in the fisheries at Greenland, and in general increase the understanding of the marine ecology of Atlantic salmon.

There are several genetic reference baselines in use across the Atlantic salmon species range facilitating stock assignment at different levels of resolution. At a continental level of resolution, fish have been assigned with high accuracy to either North American or European rivers using microsatellites (e.g. Sheehan *et al*., 2010), and Single Nucleotide Polymorphisms (SNPs) (e.g. Jeffery *et al*., 2018). In the NAC area, a SNP baseline is also used to assign fish from the Northwest Atlantic at a relatively high-resolution to 22 regional groups (Bradbury *et al*., 2021). In the NEAC area, assignment using a microsatellite genetic baseline originally developed for the SALSEA-Merge project (Gilbey *et al*., 2017) provides accurate individual assignment of fish to 18 European regional stock groups. However, the SALSEA reference baseline of Gilbey *et al*., (2017) has relatively coarse spatial assignment units in some areas of its coverage e.g., the salmon populations of UK and Ireland are assigned to a single group, and it is difficult to separate populations and regional groups in large parts of Norway.

Within Europe there are also several other reference genetic baselines which provide enhanced resolution at a within-country level but are not based on standardised marker panel sets and as a result have limited applicability across the range. For example, in Scotland a 288 SNP marker baseline allows Scottish fish to be assigned to 18 assignment units (Gilbey *et al.*, 2016). In Ireland a 17-microsatellite panel baseline has been used to assign fish to individual rivers (P McGinnity *pers. comm.*). In the northern European part of the range, a 31-microsatellite baseline is available that enables assignment to 26 reporting groups (Ozerov *et al.*, 2017) within northern Norway and Russia. The coverage of this baseline has now been extended to include also southern Norway and is expected to increase the number of reporting groups in Norway significantly (analysis ongoing at present). The same marker set has also been applied to extend the number of markers for a select set of Scottish and Irish rivers that were included in the SALSEA-Merge baseline.

A project to plan the way forward towards a functional pan-European baseline has been initiated. The project plan outlines two workshops; a planning workshop to develop a draft plan for issues to be discussed and a virtual workshop planned for late 2024. A summary of the issues discussed at the planning meeting was presented to WGNAS during the 2024 meeting. The preliminary plan will be presented in advance to representatives with genetic expertise from all countries with salmon rivers in the eastern Atlantic and Baltic Sea. Preliminary discussions have already taken place with these representatives, and a high level of interest has been expressed in the development of a new baseline, from Denmark, England, Finland, France, Germany, Iceland, Ireland, Northern Ireland, Norway, Portugal, Scotland, Spain, Sweden, and Wales. A virtual workshop will be held where collaborators can discuss the draft plan and outline what data/coverage/markers they have, the issues they would like to be able to address, and the preferred methods of taking things forward. Discussions will also consider technical issues around the development of a new baseline (marker choice, platforms for screening, etc). Following the meeting the principal project partners will circulate an updated draft project proposal aiming to address all issues raised at the virtual workshop and outline the approach to be taken going forward.

2.4.2.2 Atlantic salmon in the Eastern Canadian offshore regions: timing, duration and the effects of environmental variability and climate change

A large collaborative research project is being conducted in Canada to determine the migration routes of Atlantic salmon at sea. The project is funded through the "Environmental Studies Research Fund" that collects levies from active oil and gas companies operating on Canada's lands. The main objective of the study is to determine when, where and how long Atlantic salmon are present in offshore areas to inform regulatory decision-making related to oil and gas exploration and development. Telemetry techniques were used to obtain migration and marine habitat use data from post-smolts and kelts migrating from Canadian rivers as well as fish returning from West Greenland. Tagging occurred from 2021 to 2023 with a total of 4627 smolts and 679 kelts from 42 Canadian rivers, and 386 sub-adults at Greenland. Using a North Atlantic Ocean circulation model and an individual-based model, the influence of annual and predicted future physical oceanographic conditions to infer salmon migration routes will be examined. A preliminary coupled model has been developed to simulate the migratory behaviour of sub-adults returning from Greenland based on water temperature, swimming speed and orientation. The study will aim to identify the main migration routes and define their spatial distribution, from the time they leave their feeding grounds to their return to coastal areas near their native rivers. Various model simulations were analysed and a sensitivity analysis of the numerical parameters impacting the inferred migration routes and timing was conducted. The influence of water temperature and main oceanic features such as fronts location, mixed layer depth and currents transport, were further examined with a specific focus on the overall distance travelled and return time to coastal waters. The study also explored potential modifications in oceanic conditions including current intensity and direction, and water temperature as they are predicted to be affected by climate change. Next steps include developing similar models for smolt and kelt migration routes.

2.4.2.3 A new method for estimating adult salmon returns to UK (England & Wales) rivers

The Centre for Environment, Fisheries and Aquaculture Science (Cefas), the Environment Agency, Natural Resources Wales, and the Game and Wildlife Conservation Trust have developed a new method for estimating salmon returns to the 64 principal salmon rivers in the UK (England & Wales) rivers, as part of the salmon stock assessment process (Gregory *et al*., 2023).

The new method uses the fish counter-derived, fishery-independent estimates of returning salmon numbers to 12 rivers, to estimate the run sizes from the other 52 rivers that only have fishery-dependent rod catch data, while accounting for factors that affect those catches, such as angling effort and river conditions.

The code for the work has been published on the Cefas GitHub repository at https://github.com/CefasRepRes/salmon-rod-exploitation, and is publicly available.

A final but important step in this process will be to operationalize the method so that it can be easily re-run for each annual salmon stock assessment, and this is in the process of being completed, alongside the translation of other parts of the UK (England and Wales) assessment to more Open Access tools, such as R.

2.4.2.4 Pop-off satellite tagging Atlantic salmon at Greenland (2018-2023)

A primary gap in our understanding of the North Atlantic decline in wild Atlantic salmon is in the ocean phase of their migration and telemetry is a tool that can be used to address this gap. With a better understanding of the spatial and temporal distribution of Atlantic salmon in the marine environment, researchers can begin linking the physical and biological mechanisms that are contributing to mortality. A five-year pop-off satellite tagging (PSAT) study on Atlantic salmon was initiated in 2018 with the goal of mapping the marine distribution and migration patterns for Atlantic salmon caught and released at West Greenland so that oceanographic features (physical and biological) may be evaluated to assess how they may influence survival.

This is a collaborative research program involving the ASF, Fisheries and Oceans Canada and NOAA Fisheries Service. Additional funding has been provided by Equinor (an international private company invested in oil and gas exploration), the government of Canada's Atlantic Salmon Research Joint Venture (ASRJV) and Environmental Studies Research Fund (ESRF; see Section 2.4.2.2). Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK), the Organization of Fishermen and Hunters in Greenland, also provided logistical support.

Tagging occurred in the southwest of Greenland in 2018-2019 and 2021-2023 during the months of September and October. To date, 459 Atlantic salmon have been captured and 441 have been tagged and released.

Tagging Overview						
Tag type	**2018**	**2019**	**2021**	**2022**	**2023**	**Total**
Acoustic	2	4		110	27	143
PSAT	12	20	70	96	13	211
Double tagged (PSAT and acoustic)	-	-	-	19	68	87
Total	14	24	70	225	108	441

Overall, the fork length of tagged salmon ranged from 555-930 mm with an average of 661 mm and whole weight ranged from 1.4-11.2 kg with an average of 3.65 kg. The majority (~96%) of the tagged salmon were 1SW non-maturing salmon and 67% were North American origin, 30% European origin and 3% had inconclusive continent of origin assignments and require additional follow-up. Preliminary analysis of region of origin suggests that 15 regional reporting groups from North America and five from Europe are represented. Further work on the continent and region of origin analyses is continuing.

Data collection is ongoing as a large number of PSAT tags released in 2023 may still be active and data from acoustic tags detections have yet to be downloaded from all potential receiver units. Pre-programmed pop-off dates were set for the spring following release, but a number of tags pop-off early for a variety of reasons. After pop-off, the PSAT surfaces and transmits its data to the researchers via satellite connections. PSAT pop-offs have occurred across the North Atlantic (Figure 2.4.1) and to date, marine migration data have been collected for over 20 000 migration days. Data collected by the PSATs are temperature, depth profiles and light intensity data, all of which can be used to reconstruct the individual migration tracks. Data processing and analysis are ongoing.

2.5 Relevant data deficiencies, monitoring needs and research requirements

There were no reported impacts of the COVID-19 pandemic on data collected in 2023 that would affect the catch advice provided in each Commission area.

Management of fishing for Atlantic salmon has changed in recent years with large increases in catch and release fishing and major reductions in both commercial and recreational retained catch. There are two main implications of these changes for stock assessment: first, as nominal (retained) catch declines, estimated exploitation rates used to estimate return abundance in some countries could be impacted. Second, fewer retained fish may be available for sampling of biological characteristics, and monitoring is more reliant on indirect sampling (e.g. length estimation from passive monitoring) or fewer samples (e.g. from fish that are subsequently released).

Methods for estimating stock abundance are changing in some cases to account for this evolution, and use an array of best available information in statistical models suited to transportation of inference from data-rich to data-poor areas. Some of the data collated by WGNAS (e.g. return rates and catch per unit effort) come from long-term annual surveys in so called index-rivers. The number of rivers in which such long-term data series are being maintained has decreased in the most recent years, for example the number of rivers in NEAC where CPUE is estimated has reduced from 18 to eight (Tables 3.1.5.1 – 3.1.5.6), and the number of rivers where return rates are estimated is currently 21 (11 from wild origin and 10 from hatchery) which is a reduction of six index rivers at its peak of 27 (Tables 3.3.2.1 and 3.3.2.2).

The following relevant data deficiencies, monitoring needs, and research requirements were identified:

North Atlantic

Complete and timely reporting of catch statistics from all fisheries, including by-catch, for all areas is recommended.

Data call submissions were not received for the following countries/jurisdictions with known/historic salmon fisheries or farmed salmon production: Faroe Islands, Portugal. Equivalent data from Faroe Islands were received via national reports to WGNAS. ICES recommends that all countries/jurisdictions submit salmon data through the data call process as this is the most effective and efficient way for WGNAS to automate the data collation, quality assurance, analyses, and reporting.

Northeast Atlantic Commission

Data on catch numbers, exploitation rates and unreported catch rates were not available to WGNAS for the stock years 2021, 2022 and 2023 for any of the four Russian stock-units. A method for estimating the required data inputs for estimating stock status from total reported catch was derived for WGNAS 2023 and is detailed in the Stock Annex. Data on the total catch for Russia in 2023 was not available to WGNAS in 2024 so the mean of the total annual catch 2018-2022 was used as input in Run-Reconstruction and Life-cycle Models. The method developed to fill these data gaps might be improved with time, but if the true data cannot be used in future years, then the levels of uncertainty in the derived data will increase and at some time point will reach a level that means the process should not be applied.

No river-specific CLs have been established for Russia, Denmark, Germany, and Spain. Iceland has developed provisional CLs and continues to work towards finalising an assessment process for determining CL attainment.

North American Commission

Improved sampling of all aspects of the Labrador and SPM fishery across the fishing season will improve the information on biological characteristics and stock origin of salmon caught in these mixed-stock fisheries. A sampling rate of at least 10% of catches across the fishery season would be required to achieve a relatively unbiased estimate.

Additional monitoring in Labrador should be considered to estimate stock status for that region. Additionally, efforts should be undertaken to evaluate the utility of other available data sources (e.g. Indigenous and recreational catches and effort) to describe stock status in Labrador.

West Greenland Commission

No recommendations specific to this section were made.

2.6 Data Call for the overview of catches and landings, farmed and ranched fish, and pink salmon

The terms of reference set by ICES to answer the scientific request from NASCO largely defines the work of WGNAS. Other than for the catch data, the terms of reference are not specific as to what type of information would be used by ICES to develop the status of stocks.

2.6.1 Process for collating catch data

The request from NASCO for catch data is specific as to the type of information to be compiled:

- provide an overview of Atlantic salmon catches and landings by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2023.

In each Commission Area, the request includes:

- describe the key events of the 2023 fisheries (ToR 2.1, 3.1, 4.1)

2.6.2 Review of the 2024 Data Call

On 26 January 2024, ICES communicated the Data Call for Atlantic salmon from the North Atlantic to ICES Member Countries. The salmon call was contained within the wider "ICES 2024 Joint Fisheries Data Call: Landings, discards, biological sample, catch and effort data from 2023 in support of the ICES fisheries advice in 2024" (see Data calls (ices.dk)). Subsequently on 07 February 2024, the chair of WGNAS copied the ICES Data Call to members of WGNAS. The Data Call included instructions in a covering letter and a template spreadsheet in Excel as attachments (DC_Annex_WGNAS1 template.xlsx). The request was for ICES members to return the catch data for 2023 to ICES by 01 March 2024.

The Data Call was specific to the compilation of catches as defined in the scientific request from NASCO. However, data on the distribution and abundance of pink salmon, *Oncorhynchus gorbuscha*, were requested for the first time in relation to WGNAS.

The Data Call should provide data that can be used by WGNAS to address the NASCO request, i.e. for the primary catch tables in WGNAS report (Tables 2.1.1.1, 2.1.1.2, 2.1.1.3, 2.1.2.1, 2.1.3.1, 2.1.3.2, 2.2.1.1, 2.2.2.1, Annex 4; Figures 2.1.1.1a,b, 2.1.1.2, 2.1.1.3, 2.1.3.1, 2.2.1.1, 2.2.2.1). The future Data Call request would also provide catch data that are used in the LCM (see below).

In previous years, the data now requested in the Data Call would have been compiled by members of WGNAS from national working papers and summarized in the report. The ICES Data Call has resulted in more prompt and comprehensive reporting for some countries where in the past the collation of catch data had been difficult and incomplete.

The following country/jurisdiction reports were received:

- NAC: Canada, USA, France (reporting for Saint Pierre and Miquelon);
- NEAC: Iceland, Spain, France, Ireland, UK (England & Wales), UK (Scotland), UK (Northern Ireland), Denmark, Sweden, Norway, Finland, Germany;
- WGC: Greenland.

Some reports were received after the deadline because of time pressures brought about by the WGNAS meeting commencing earlier than usual, or issues with the communication of the official request. The communication issues have been noted by ICES, and solutions will be found to make the process more successful in future years.

Data call submissions were not received for the following jurisdictions with known/historic salmon fisheries or farmed salmon production: Faroe Islands, Portugal. Equivalent data from the Faroe Islands were received via national reports to WGNAS.

2.7 Reports from ICES expert group and other investigations relevant to North Atlantic salmon

2.7.1 WKSALMON2

Analysis of ICES data on pelagic fishing activity in the NE Atlantic in relation to bycatch risk for Atlantic salmon

This work will focus on the analysis of a comprehensive dataset of commercial pelagic fishing activity in the northeast Atlantic region from eight fishing nations, collected from an ICES data call associated with the WKSALMON2 workshop (September 2022). The aim of the data call was to provide information to examine possible spatial and temporal trends in potential bycatch risks for Atlantic salmon during their marine migrations. Monthly catch data of the main pelagic species from each nation span two decades and are geolocated. These data will be analysed alongside emerging knowledge on the migration routes taken by Atlantic salmon, and data on the interannual variation in the marine return rates from multiple monitored salmon populations in the NEAC region. This offers a unique opportunity to examine the possible interactions between pelagic fishing activity and salmon marine survival in the northeast Atlantic region over recent decades. Following investigation of the main methods used in commercial fishing across the sampled period, appropriate risk indices will be developed to fit pelagic catch data. Multivariate spatial and temporal analyses will be carried out to assess the relative influence of pelagic fishing in determining the overall patterns of salmon marine return rates recorded over the past few decades. This knowledge will be used in wider collaborative assessments of the factors driving salmon marine mortality. The work will be carried out in May-August 2024 by a researcher at the University of Strathclyde, Scotland, under the supervision of an expert group from the WKSALMON2 workshop. Outputs from the project will be prepared into a report, that will be shared with WGNAS, alongside data analysis source code.

2.7.2 WGDIAD

The Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species (WGDIAD) provides a forum for the coordination of ICES activities relating to species which use both freshwater and marine environments to complete their life-cycles, such as eel, Atlantic salmon, sea trout, lampreys, shads, smelts, etc. WGDIAD considers progress and future requirements in the field of diadromous science and management and organizes Expert Groups (EGs), Theme Sessions and Symposia. There is also a significant role in coordinating with other science and advice Working Groups in ICES.

The annual meeting of WGDIAD in Bilbao, Spain was held as hybrid format both remotely (by WebEx) and in-person, from 12-13 of September 2023, and chaired by Hugo Maxwell (Ireland) and Dennis Ensing (UK). There were 23 participants in total from 12 countries who participated in the meeting for at least one day. The following topics relevant to Atlantic salmon were discussed:

- Outcomes and deliverables from ICES EGs on diadromous fish during the last year;
- A progress report of the work of the Intersessional Sub-Group Diadromous fish (ISSG Diad) of the Regional Coordination Groups (RCGs). The sub-group has a coordinating function and identifies data collection needs for diadromous species in relation to the EU Data Collection Multi-Annual Programme (DC-MAP);
- A discussion on outcomes from IYS & ICES/NPAFC Pink salmon expert group meeting in Vancouver, Canada;

- Report from the DiadES project regarding the scientific knowledge and tools for the international management of diadromous species;
- Progress report on the Strategic Infrastructure for Improved Animal Tracking in European Seas (STRAITS).

The next meeting of WGDIAD will be held during the 2024 ICES ASC in Gateshead, United Kingdom, 09-12 September – WGDIAD meeting date to be confirmed.

2.8 NASCO has asked ICES to provide a compilation of tag releases by country in 2023

Data on releases of tagged, fin-clipped and other marked salmon in 2023 were provided to WGNAS and are compiled as a separate report (ICES, 2024b). In summary (Table 2.8.1), approximately 1.07 million salmon were marked in 2023. This was a decrease from the 1.50 million fish marked in 2022. In 2023, the adipose clip was the most used primary mark (0.804 million). Coded wire microtags (CWT) were the second most used primary mark with around 127 000 tagged. In 2023, most marks were applied to hatchery-origin juveniles (0.985 million), while 77 986 wild juveniles, 2031 wild adults and 7109 hatchery adults were also marked.

Since 2003, WGNAS has reported information on marks being applied to farmed salmon to facilitate tracing the origin of farmed salmon captured in the wild in the case of escape events. In the USA, genetic "marking" procedures have been adopted where brood stock are genetically screened, and the resulting database is used to match genotyped escaped farmed salmon to a specific parental mating pair and subsequent hatchery of origin, stocking group, and marine site the individual escaped from. This has also been developed in Iceland and Norway, where in recent years farmed escapees could be traced to the pens/farms they escaped from by matching their genotypes to known parental genotypes stored in genetic database.

2.9 NASCO has asked for an update on the distribution and abundance of pink salmon across the North Atlantic through 2023

WGNAS has collated pink salmon abundances up to 2023 provided by WGNAS members. These numbers are presented from 2017 to 2023 in Table 2.9.1 and from 2017, 2019, 2021 and 2023 in Figures 2.9.1 and 2.9.2. These abundance data are from reports and observations, which includes, both commercial and recreational fisheries catch data, as well as removals and counts. Data are from both fresh- and marine waters.

There was a substantial increase in the abundance of pink salmon in 2023 in Norway, compared to previous 'odd' years, predominantly reported from the northern region of Troms and Finnmark. Large increases were also reported by Finland, for the Tana/Teno river system. Iceland and Greenland reported an increase in numbers, whilst all other jurisdictions reported similar or lower numbers, compared to previous years.

Table 2.1.1.1. Total reported nominal catch of salmon by country (in tonnes round fresh weight), 1960-2023 (2023 figures include provisional data).

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
1960	1636	1		1659	1100	100		40	0			743	283	139	1443		33			60		7237		
1961	1583	1		1533	790	127		27	0			707	232	132	1185		20			127		6464		
1962	1719	1		1935	710	125		45	0			1459	318	356	1738		23			244		8673		
1963	1861	1		1786	480	145		23	0			1458	325	306	1725		28			466		8604		
1964	2069	1		2147	590	135		36	0			1617	307	377	1907		34			1539		10759		
1965	2116	1		2000	590	133		40	0			1457	320	281	1593		42			861		9434		
1966	2369	1		1791	570	104	2	36	0			1238	387	287	1595		42			1370		9792		
1967	2863	1		1980	883	144	2	25	0			1463	420	449	2117		43			1601		11991		
1968	2111	1		1514	827	161	1	20	0			1413	282	312	1578		38	5		1127	403	9793		
1969	2202	1		1383	360	131	2	22	0			1730	377	267	1955		54	7		2210	893	11594		
1970	2323	1		1171	448	182	13	20	0			1787	527	297	1392		45	12		2146	922	11286		
1971	1992	1		1207	417	196	8	17	1			1639	426	234	1421		16			2689	471	10735		
1972	1759	1		1578	462	245	5	17	1		32	1804	442	210	1727	34	40	9		2113	486	10965		

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
1973	2434	3		1726	772	148	8	22	1		50	1930	450	182	2006	12	24	28		2341	533	12670		
1974	2539	1		1633	709	215	10	31	1		76	2128	383	184	1628	13	16	20		1917	373	11877		
1975	2485	2		1537	811	145	21	26	0		76	2216	447	164	1621	25	27	28		2030	475	12136		
1976	2506	1	2	1530	542	216	9	20	0		66	1561	208	113	1019	9	21	40	<1	1175	289	9328		
1977	2545	2		1488	497	123	7	9	1		59	1372	345	110	1160	19	19	40	6	1420	192	9414		
1978	1545	4		1050	476	285	6	10	0		37	1229	349	148	1323	20	32	37	8	984	138	7681		
1979	1287	2		1831	455	219	6	11	1		26	1027	261	99	1076	10	29	119	<0.5	1395	193	8048		
1980	2680	6		1830	664	241	8	16	1		34	947	360	122	1134	30	47	536	<0.5	1194	277	10127		
1981	2437	6		1656	463	147	16	25	1		44	685	493	101	1233	20	25	1025	<0.5	1264	313	9954		
1982	1798	6		1348	364	130	17	24	1		54	993	286	132	1092	20	10	606	<0.5	1077	437	8396		
1983	1424	1	3	1550	507	166	32	27	1		58	1656	429	187	1221	16	23	678	<0.5	310	466	8756		
1984	1112	2	3	1623	593	139	20	39	1		46	829	345	78	1013	25	18	628	<0.5	297	101	6913		
1985	1133	2	3	1561	659	162	55	44	1		49	1595	361	98	913	22	13	566	7	864		8108		

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
1986	1559	2	2	1598	608	232	59	52	2		37	1730	430	109	1271	28	27	530	19	960		9255	315	
1987	1784	1	2	1385	564	181	40	43	4		49	1239	302	56	922	27	18	576	<0.5	966		8160	2788	
1988	1310	1	2	1076	420	217	180	36	4		36	1874	395	114	882	32	18	243	4	893		7737	3248	
1989	1139	2	2	905	364	141	136	25	4		52	1079	296	142	895	14	7	364		337		5904	2277	
1990	911	2	2	930	313	146	280	27	6	13	60	567	338	94	624	15	7	315		274		4924	1890	180-350
1991	711	1	1	876	215	129	346	34	4	3	70	404	200	55	462	13	11	95	4	472		4106	1682	25-100
1992	522	1	2	867	167	174	462	46	3	10	77	630	171	91	599	20	11	23	5	237		4118	1962	25-100
1993	373	1	3	923	139	157	499	44	12	9	70	541	248	83	547	16	8	23				3696	1644	25-100
1994	355	0	3	996	141	136	313	37	7	6	49	804	324	91	648	18	10	6				3944	1276	25-100
1995	260	0	1	839	128	146	303	28	9	3	48	790	295	83	588	10	9	5	2	83		3629	1060	
1996	292	0	2	787	131	118	243	26	7	2	44	685	183	77	427	13	7		<0.5	92		3136	1123	

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
1997	229	0	2	630	111	96	59	15	4	1	45	570	142	93	296	8	3		1	58		2364	827	
1998	157	0	2	740	131	118	46	10	5	1	48	624	123	78	283	8	4	6	0	11		2396	1210	
1999	152	0	2	811	103	111	35	11	5	0	63	515	150	53	199	11	6	0	<0.5	19		2247	1032	
2000	153	0	2	1176	124	73	11	24	9	5	96	621	219	78	275	11	7	8	0	21		2914	1270	
2001	148	0	2	1267	114	74	14	25	7	6	126	730	184	53	251	11	13	0	0	43		3068	1180	
2002	148	0	2	1019	118	90	7	20	8	5	94	682	161	81	191	11	9	0	0	9		2655	1039	
2003	141	0	3	1071	107	99	11	15	10	4	78	551	89	56	193	13	7	0	0	9		2457	847	
2004	161	0	3	784	82	112	18	13	7	4	39	489	111	48	247	19	7	0	0	15		2158	686	
2005	139	0	3	888	82	129	20	9	6	8	47	422	96	52	217	11	13	0	0	15		2157	700	
2006	137	0	3	932	91	93	17	8	6	2	67	326	80	28	193	13	11	0	0	22		2030	670	
2007	112	0	2	767	62	93	36	6	10	3	59	85	67	30	171	11	9	0	0	25		1548	475	
2008	157	0	4	807	73	132	69	8	10	9	71	89	64	21	161	12	9	0	0	26		1720	443	
2009	126	0	3	595	71	126	44	7	10	8	38	68	54	16	121	5	2	0	1	26		1322	343	

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
2010	153	0	3	642	88	147	42	9	13	13	49	99	109	12	180	10	2	0	2	38		1610	382	
2011	179	0	4	696	89	98	30	20	19	13	44	87	136	10	159	11	7	0	<0.5	27		1630	441	
2012	126	0	3	696	82	50	20	21	9	12	64	88	58	9	124	10	8	0	0	33		1412	403	
2013	138	0	5	475	78	116	31	10	4	11	46	87	84	4	119	11	4	0	0	47		1269	306	
2014	118	0	4	490	81	50	18	24	6	9	58	56	54	5	84	12	6	0	<0.5	58		1133	287	
2015	140	0	4	583	80	94	31	11	7	9	45	63	68	3	68	16	5	0	1	56		1284	326	
2016	135	0	5	612	56	71	34	6	3	9	51	58	86	5	27	6	5	0	2	26		1196	335	
2017	110	0	3	667	47	66	24	9	10	12	32	59	49	5	27	10	2	0	<0.5	28		1159	353	
2018	79	0	1	594	80	60	22	12	4	11	24	46	42	4	19	10	3	0	1	39		1052	312	
2019	100	0	1	513	57	37	14	13	8	13	21	45	5	2	13	15	5	0	1	28		889	259	
2020	103	0	2	527	49	42	28	7	7	9	16	46	3	2	14	8	5	0	1	31		899	275	
2021	98	0	2	295	49	41	16	6	5	2	1	51	1	2	7	7	4	0	1	42		627	164	
2022	90	0	1	389	55	37	20	7	2		1	40	1	1	6	7	3	0	1	30		691	201	

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)
2023	88	0	1	297		34	11	6	4		1	33	1	2	5	5	1	0	1	33		524	112	
Mean																								
2018 - 2022	94	0	1	464	58	43	20	9	5	9	13	45	10	2	12	9	4	0	1	34		832	242	
2013 - 2022	111	0	3	515	63	61	24	10	5	9	30	55	39	3	38	10	4	0	1	38		1020	282	

1. Includes estimates of some local sales, and, prior to 1984, bycatch.

2. Before 1966, sea trout and sea charr included (5% of total).

3. Figures from 1991 to 2000 do not include catches taken in the recreational (rod) fishery.

4. From 1990, catch includes fish ranched for both commercial and angling purposes.

5. Improved reporting of rod catches in 1994 and data derived from carcase tagging and logbooks from 2002.

6. Catch on River Foyle allocated 50% Ireland and 50% UK (NI).

7. Angling catch (derived from carcase tagging and logbooks) first included in 2002.

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes and Greenland					Unreported catches	
						Iceland		Sweden																
	Canada (1)	USA	St P&M	Norway (2)	Russia (3,16)	Wild	Ranch (4)	Wild	Ranch (15)	Denmark (17)	Finland	Ireland (5,6)	UK (E&W)	UK (NI) (6,7)	UK (Scot)	France (8)	Spain (9)	Faroes (10)	East Gnld.	West Gnld. (11)	Other (12)	Total	NASCO (13)	International (14)

8. Data for France include some unreported catches.

9. Spanish data until 2018 (inclusive), weights estimated from mean weight of fish caught in Asturias (80% - 90% of Spanish catch). Weight from 2019 for all Spain, supplied via data call.

10. Between 1991 & 1999, there was only a research fishery at Faroes. In 1997 & 1999, no fishery took place; the commercial fishery resumed in 2000, but has not operated since 2001.

11. Includes catches made in the West Greenland area by Norway, Faroes, Sweden and Denmark in 1965-1975.

12. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.

13. No unreported catch estimate available for Canada in 2007 and 2008. Data for Canada in 2009, 2010 and 2019 are incomplete. No unreported catch estimate available for Russia since 2008.

14. Estimates refer to season ending in given year.

15. Catches from hatchery-reared smolts released under programmes to mitigate for hydropower development schemes; returning fish unable to spawn in the wild and exploited heavily.

16. Data extracted from NASCO website at https://nasco.int/conservation/third-reporting-cycle-2/ for 2021 and 2022. Not available for 2023 as of March 2024

17. No catch weight data provided for 2022 or 2023.

Table 2.1.1.2. Total reported nominal catch of salmon in homewaters by country (in tonnes round fresh weight), 1960-2023 (2023 figures include provisional data). Sm=small; L=Large; T=Total = MSW + 1SW or L + Sm. Note that sea ages are as reported, based on size distributions specific to each jurisdiction (see Stock Annex for details).

Year	NAC Area				NEAC (N. Area)												NEAC (S. Area)										
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T
1960			1636	1			1659	1100	100		40	0							743	283	139	971	472	1443		33	7177
1961			1583	1			1533	790	127		27	0							707	232	132	811	374	1185		20	6337
1962			1719	1			1935	710	125		45	0							1459	318	356	1014	724	1738		23	8429
1963			1861	1			1786	480	145		23	0							1458	325	306	1308	417	1725		28	8138
1964			2069	1			2147	590	135		36	0							1617	307	377	1210	697	1907		34	9220
1965			2116	1			2000	590	133		40	0							1457	320	281	1043	550	1593		42	8573
1966			2369	1			1791	570	104	2	36	0							1238	387	287	1049	546	1595		42	8422
1967			2863	1			1980	883	144	2	25	0							1463	420	449	1233	884	2117		43	10390
1968			2111	1			1514	827	161	1	20	0							1413	282	312	1021	557	1578		38	8258
1969			2202	1	801	582	1383	360	131	2	22	0							1730	377	267	997	958	1955		54	8484
1970	1562	761	2323	1	815	356	1171	448	182	13	20	0							1787	527	297	775	617	1392		45	8206
1971	1482	510	1992	1	771	436	1207	417	196	8	17	1							1639	426	234	719	702	1421		16	7574
1972	1201	558	1759	1	1064	514	1578	462	245	5	17	1				32	200	1604	1804	442	210	1013	714	1727	34	40	8356

Year	NAC Area				NEAC (N. Area)												NEAC (S. Area)										
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T
1973	1651	783	2434	3	1220	506	1726	772	148	8	22	1				50	244	1686	1930	450	182	1158	848	2006	12	24	9767
1974	1589	950	2539	1	1149	484	1633	709	215	10	31	1				76	170	1958	2128	383	184	912	716	1628	13	16	9566
1975	1573	912	2485	2	1038	499	1537	811	145	21	26	0				76	274	1942	2216	447	164	1007	614	1621	25	27	9603
1976	1721	785	2506	1	1063	467	1530	542	216	9	20	0				66	109	1452	1561	208	113	522	497	1019	9	21	7821
1977	1883	662	2545	2	1018	470	1488	497	123	7	9	1				59	145	1227	1372	345	110	639	521	1160	19	19	7755
1978	1225	320	1545	4	668	382	1050	476	285	6	10	0				37	147	1082	1229	349	148	781	542	1323	20	32	6514
1979	705	582	1287	2	1150	681	1831	455	219	6	11	1				26	105	922	1027	261	99	598	478	1076	10	29	6340
1980	1763	917	2680	6	1352	478	1830	664	241	8	16	1				34	202	745	947	360	122	851	283	1134	30	47	8119
1981	1619	818	2437	6	1189	467	1656	463	147	16	25	1				44	164	521	685	493	101	844	389	1233	20	25	7351
1982	1082	716	1798	6	985	363	1348	364	130	17	24	1		49	5	54	63	930	993	286	132	596	496	1092	20	10	6275
1983	911	513	1424	1	957	593	1550	507	166	32	27	1		51	7	58	150	1506	1656	429	187	672	549	1221	16	23	7298
1984	645	467	1112	2	995	628	1623	593	139	20	39	1		37	9	46	101	728	829	345	78	504	509	1013	25	18	5882
1985	540	593	1133	2	923	638	1561	659	162	55	44	1		38	11	49	100	1495	1595	361	98	514	399	913	22	13	6667
1986	779	780	1559	2	1042	556	1598	608	232	59	52	2		25	12	37	136	1594	1730	430	109	745	526	1271	28	27	7742

Year	NAC Area				NEAC (N. Area)													NEAC (S. Area)										
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T
1987	951	833	1784	1	894	491	1385	564	181	40	43	4		34	15	49	127	1112	1239	302	56	503	419	922	27	18	6611
1988	633	677	1310	1	656	420	1076	420	217	180	36	4		27	9	36	141	1733	1874	395	114	501	381	882	32	18	6591
1989	590	549	1139	2	469	436	905	364	141	136	25	4		33	19	52	132	947	1079	296	142	464	431	895	14	7	5197
1990	486	425	911	2	545	385	930	313	146	280	27	6	13	41	19	60			567	338	94	423	201	624	15	7	4327
1991	370	341	711	1	535	342	876	215	129	346	34	4	3	53	17	70			404	200	55	285	177	462	13	11	3530
1992	323	199	522	1	566	301	867	167	174	462	46	3	10	49	28	77			630	171	91	361	238	599	20	11	3847
1993	214	159	373	1	611	312	923	139	157	499	44	12	9	53	17	70			541	248	83	320	227	547	16	8	3659
1994	216	139	355	0	581	415	996	141	136	313	37	7	6	38	11	49			804	324	91	400	248	648	18	10	3927
1995	153	107	260	0	590	249	839	128	146	303	28	9	3	37	11	48			790	295	83	364	224	588	10	9	3530
1996	154	138	292	0	571	215	787	131	118	243	26	7	2	24	20	44			685	183	77	267	160	427	13	7	3035
1997	126	103	229	0	389	241	630	111	96	59	15	4	1	30	15	45			570	142	93	182	114	296	8	3	2300
1998	70	87	157	0	445	296	740	131	118	46	10	5	1	29	19	48			624	123	78	162	121	283	8	4	2371
1999	64	88	152	0	493	318	811	103	111	35	11	5	0	29	33	63			515	150	53	142	57	199	11	6	2220
2000	58	95	153	0	673	504	1176	124	73	11	24	9	5	56	39	96			621	219	78	161	114	275	11	7	2873

Year	NAC Area				NEAC (N. Area)												NEAC (S. Area)											
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T
2001	61	86	148	0	850	417	1267	114	74	14	25	7	6	105	21	126			730	184	53	150	101	251	11	13	3016
2002	49	99	148	0	770	249	1019	118	90	7	20	8	5	81	12	94			682	161	81	118	73	191	11	9	2636
2003	60	81	141	0	708	363	1071	107	99	11	15	10	4	63	15	78			551	89	56	122	71	193	13	7	2435
2004	68	94	161	0	577	207	784	82	112	18	13	7	4	32	7	39			489	111	48	159	88	247	19	7	2133
2005	56	83	139	0	581	307	888	82	129	20	9	6	8	31	16	47			422	96	52	126	91	217	11	13	2133
2006	55	82	137	0	671	261	932	91	93	17	8	6	2	38	29	67			326	80	28	118	75	193	13	11	1999
2007	49	63	112	0	627	140	767	62	93	36	6	10	3	52	6	59			85	67	30	100	71	171	11	9	1511
2008	57	100	157	0	637	170	807	73	132	69	8	10	9	65	6	71			89	64	21	110	51	161	12	9	1680
2009	52	74	126	0	460	135	595	71	126	44	7	10	8	25	13	38			68	54	16	83	37	121	5	2	1282
2010	53	100	153	0	458	184	642	88	147	42	9	13	13	37	13	49			99	109	12	111	69	180	10	2	1554
2011	69	110	179	0	556	140	696	89	98	30	20	19	13	29	15	44			87	136	10	126	33	159	11	7	1579
2012	52	74	126	0	534	162	696	82	50	20	21	9	12	31	33	64			88	58	9	84	40	124	10	8	1368
2013	66	72	138	0	358	117	475	78	116	31	10	4	11	32	14	46			87	84	4	74	45	119	11	4	1217
2014	41	77	118	0	319	171	490	81	50	18	24	6	9	31	26	58			56	54	5	58	26	84	12	6	1071

Year	NAC Area				NEAC (N. Area)												NEAC (S. Area)										
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T
2015	54	86	140	0	430	153	583	80	94	31	11	7	9	32	13	45			63	68	3	39	29	68	16	5	1224
2016	56	79	135	0	495	117	612	56	71	34	6	3	9	37	14	51			58	86	5	18	8	27	6	5	1164
2017	55	55	110	0	503	164	667	47	66	24	9	10	12	27	5	32			59	49	5	19	7	27	10	2	1128
2018	39	39	79	0	427	167	594	80	60	22	12	4	11	13	11	24			46	42	4	12	8	19	10	3	1012
2019	47	53	100	0	391	122	513	57	37	14	13	8	13	17	4	21			45	5	2	8	5	13	15	5	858
2020	51	52	103	0	384	143	527	49	42	28	7	7	9	13	3	16	3	43	46	3	2	9	5	14	8	5	866
2021	40	58	98	0	214	81	295	49	41	16	6	5	2	1	0	1	5	46	51	1	2	4	3	7	7	4	582
2022	45	45	90	0	272	118	389	55	37	20	7	2		1	0	1	6	33	40	1	1	4	2	6	7	3	660
2023	52	36	88	0	214	83	297		34	11	6	4		1	0	1	5	29	33	1	2	3	2	5	5	1	489
Mean																											
2018 - 2022	44	49	94	0	337	126	464	58	43	20	9	5	9	9	4	13	5	40	45	10	2	7	5	12	9	4	795
2013 - 2022	49	62	111	0	379	135	515	63	61	24	10	5	9	20	9	30	5	40	55	39	3	24	14	38	10	4	978

Year	NAC Area				NEAC (N. Area)													NEAC (S. Area)										
	Canada (1)			USA	Norway (2)			Russia (3,7)	Iceland Wild	Iceland Ranch	Sweden Wild	Sweden Ranch	Denmark (8)	Finland			Ireland (4,5)			UK (E&W)	UK (NI)(4,6)	UK (Scot)			France	Spain	Total
	Lg	Sm	T	T	MSW	1SW	T	T	T	T	T	T	T	MSW	1SW	T	MSW	1SW	T	T	T	MSW	1SW	T	T	T	T

1. Includes estimates of some local sales, and, prior to 1984, bycatch.

2. Before 1966, sea trout and sea charr included (5% of total).

3. Figures from 1991 to 2000 do not include catches taken in the recreational (rod) fishery.

4. Catch on River Foyle allocated 50% Ireland and 50% UK (NI).

5. Improved reporting of rod catches in 1994 and data derived from carcase tagging and logbooks from 2002.

6. Angling catch (derived from carcase tagging and logbooks) first included in 2002.

7. Data extracted from NASCO website at https://nasco.int/conservation/third-reporting-cycle-2/. No data available for 2023 as of March 2024.

8. No catch weight data provided for 2022 or 2023.

Table 2.1.1.3. Available time-series of nominal catch (tonnes round fresh weight) and percentages of total catches taken in coastal, estuarine and in-river fisheries by country, 1996 to 2023. The way in which the nominal catch is partitioned among categories varies between countries, particularly for estuarine and coastal fisheries, see text for details.

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
Canada								
	2000	2	2	29	19	117	79	148
	2001	3	2	28	20	112	78	143
	2002	4	2	30	20	114	77	148
	2003	5	3	36	27	96	70	137
	2004	7	4	46	29	109	67	161
	2005	7	5	44	32	88	63	139
	2006	8	6	46	34	83	60	137
	2007	6	5	36	32	70	63	112
	2008	9	6	47	32	92	62	147
	2009	7	6	40	33	73	61	119
	2010	6	4	40	27	100	69	146
	2011	7	4	56	31	115	65	178
	2012	8	6	46	36	73	57	127
	2013	8	6	49	36	80	58	137
	2014	7	6	28	24	83	71	118
	2015	8	6	35	25	97	69	140
	2016	8	6	34	25	93	69	135
	2017	7	6	35	32	68	62	110
	2018	7	9	35	45	36	46	79
	2019	6	6	40	40	54	54	100
	2020	8	7	45	44	50	49	103
	2021	7	8	40	41	50	51	98
	2022	7	8	42	46	41	46	90
	2023	7	8	48	54	33	37	88

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
Denmark (8)								
	2008	0	1	0	0	9	99	9
	2009	0	0	0	0	8	100	8
	2010	0	1	0	0	13	99	13
	2011	0	0	0	0	13	100	13
	2012	0	0	0	0	12	100	12
	2013	0	0	0	0	11	100	11
	2014	0	0	0	0	9	100	9
	2015	0	0	0	0	9	100	9
	2016	0	0	0	0	10	100	10
	2017	0	1	0	0	12	99	12
	2018	0	1	0	0	11	99	11
	2019	0	1	0	0	13	99	13
	2020	0	0	0	0	9	100	9
	2021	0	0	0	0	2	100	2
Finland								
	1996	0	0	0	0	44	100	44
	1997	0	0	0	0	45	100	45
	1998	0	0	0	0	48	100	48
	1999	0	0	0	0	63	100	63
	2000	0	0	0	0	96	100	96
	2001	0	0	0	0	126	100	126
	2002	0	0	0	0	94	100	94
	2003	0	0	0	0	75	100	75
	2004	0	0	0	0	39	100	39
	2005	0	0	0	0	47	100	47
	2006	0	0	0	0	67	100	67
	2007	0	0	0	0	59	100	59

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
	2008	0	0	0	0	71	100	71
	2009	0	0	0	0	38	100	38
	2010	0	0	0	0	49	100	49
	2011	0	0	0	0	44	100	44
	2012	0	0	0	0	64	100	64
	2013	0	0	0	0	46	100	46
	2014	0	0	0	0	58	100	58
	2015	0	0	0	0	45	100	45
	2016	0	0	0	0	51	100	51
	2017	0	0	0	0	32	100	32
	2018	0	0	0	0	24	100	24
	2019	0	0	0	0	21	100	21
	2020	0	0	0	0	16	100	16
	2021	0	0	0	0	1	100	1
	2022	0	0	0	0	1	100	1
	2023	0	0	0	0	1	100	1
France (1,4)								
	1996			4	31	9	69	13
	1997			3	38	5	62	8
	1998	1	12	2	25	5	62	8
	1999	0	0	4	35	7	65	11
	2000	0	4	4	35	7	61	11
	2001	0	4	5	44	6	53	11
	2002	2	14	4	30	6	56	12
	2003	0	0	6	44	7	56	13
	2004	0	0	10	51	9	49	19
	2005	0	0	4	38	7	62	11
	2006	0	0	5	41	8	59	13

		Coastal		Estuarine		In-river		Total
Country	**Year**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**
	2007	0	0	4	42	6	58	11
	2008	1	5	5	39	7	57	12
	2009	0	4	2	34	3	62	5
	2010	2	22	2	26	5	52	10
	2011	0	3	6	54	5	43	11
	2012	0	1	4	44	5	55	10
	2013	0	3	4	40	6	57	11
	2014	0	2	5	43	7	55	12
	2015	4	23	5	32	7	45	16
	2016	0	2	3	45	3	52	6
	2017	0	5	3	36	6	59	10
	2018	0	0	5	47	6	53	11
	2019	0	2	8	54	6	44	15
	2020	0	2	4	48	4	50	8
	2021	0	1	3	38	4	61	7
	2022	0	0	3	47	4	53	7
	2023	0	0	3	62	2	38	5
Germany								
	2023	0	0	0	0	0	100	0
Greenland								
	2020	32	100					32
	2021	43	100					43
	2022	30	97					31
	2023	34	100					34
Iceland (6)								
	1996	10	9	0	0	111	91	122
	1997	0	0	0	0	156	100	156
	1998	0	0	0	0	164	100	164

		Coastal		Estuarine		In-river		Total
Country	**Year**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**
	1999	0	0	0	0	146	100	146
	2000	0	0	0	0	85	100	85
	2001	0	0	0	0	88	100	88
	2002	0	0	0	0	97	100	97
	2003	0	0	0	0	110	100	110
	2004	0	0	0	0	130	100	130
	2005	0	0	0	0	149	100	149
	2006	0	0	0	0	111	100	111
	2007	0	0	0	0	129	100	129
	2008	0	0	0	0	200	100	200
	2009	0	0	0	0	171	100	171
	2010	0	0	0	0	190	100	190
	2011	0	0	0	0	128	100	128
	2012	0	0	0	0	70	100	70
	2013	0	0	0	0	146	100	146
	2014	0	0	0	0	68	100	68
	2015	0	0	0	0	125	100	125
	2016	0	0	0	0	105	100	105
	2017	0	0	0	0	90	100	90
	2018	0	0	0	0	82	100	82
	2019	0	0	0	0	51	100	51
	2020	0	0	0	0	70	100	70
	2021	0	0	0	0	44	100	44
	2022	0	0	0	0	57	100	57
	2023	0	0	0	0	45	100	45
Ireland								
	1996	440	64	134	20	110	16	684
	1997	380	67	100	18	91	16	571

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
	1998	433	69	92	15	99	16	624
	1999	335	65	83	16	97	19	515
	2000	440	71	79	13	102	16	621
	2001	551	75	109	15	70	10	730
	2002	514	75	89	13	79	12	682
	2003	403	73	92	17	56	10	551
	2004	342	70	76	16	71	15	489
	2005	291	69	70	17	60	14	421
	2006	206	63	60	18	61	19	327
	2007	0	0	31	37	52	63	83
	2008	0	0	29	33	60	67	89
	2009	0	0	21	31	47	69	68
	2010	0	0	38	39	60	61	98
	2011	0	0	32	37	55	63	87
	2012	0	0	28	32	60	68	88
	2013	0	0	38	44	49	56	87
	2014	0	0	26	46	31	54	57
	2015	0	0	21	33	42	67	63
	2016	0	0	19	33	39	67	58
	2017	0	0	18	31	41	69	59
	2018	0	0	15	33	31	67	46
	2019	0	0	15	35	29	65	45
	2020	0	0	17	36	29	64	46
	2021	0	0	17	35	33	65	51
	2022	0	0	11	28	29	72	40
	2023	0	0	11	33	22	67	33
Norway								
	1996	520	66	0	0	267	34	787

		Coastal		Estuarine		In-river		Total
Country	**Year**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**
	1997	394	63	0	0	235	37	629
	1998	410	55	0	0	331	45	741
	1999	483	60	0	0	327	40	810
	2000	619	53	0	0	557	47	1176
	2001	696	55	0	0	570	45	1266
	2002	596	58	0	0	423	42	1019
	2003	597	56	0	0	474	44	1071
	2004	469	60	0	0	316	40	785
	2005	463	52	0	0	424	48	888
	2006	512	55	0	0	420	45	932
	2007	427	56	0	0	340	44	767
	2008	382	47	0	0	425	53	807
	2009	284	48	0	0	312	52	595
	2010	260	41	0	0	382	59	642
	2011	302	43	0	0	394	57	696
	2012	255	37	0	0	440	63	696
	2013	192	40	0	0	283	60	475
	2014	213	43	0	0	277	57	490
	2015	233	40	0	0	350	60	583
	2016	269	44	0	0	343	56	612
	2017	290	44	0	0	376	56	666
	2018	323	54	0	0	271	46	594
	2019	219	43	0	0	293	57	513
	2020	215	41	0	0	312	59	527
	2021	98	33	0	0	197	67	295
	2022	134	34	0	0	256	66	389
	2023	113	38	0	0	185	62	297

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
Russia (7)								
	1996	64	49	21	16	46	35	130
	1997	63	57	17	15	32	28	111
	1998	55	42	2	2	74	56	131
	1999	48	47	2	2	52	51	102
	2000	64	52	15	12	45	36	124
	2001	70	61	0	0	44	39	114
	2002	60	51	0	0	58	49	118
	2003	57	53	0	0	50	47	107
	2004	46	56	0	0	36	44	82
	2005	58	70	0	0	24	30	82
	2006	52	57	0	0	39	43	91
	2007	31	50	0	0	31	50	62
	2008	33	45	0	0	40	55	73
	2009	22	31	0	0	49	69	71
	2010	36	41	0	0	52	59	88
	2011	37	42	0	0	52	58	89
	2012	38	46	0	0	44	54	82
	2013	36	46	0	0	42	54	78
	2014	33	41	0	0	48	59	81
	2015	34	42	0	0	46	58	80
	2016	24	42	0	0	32	58	56
	2017	13	28	0	0	34	72	47
	2018	36	45	0	0	44	55	80
	2019	22	38	0	0	35	62	57
	2020	16	34	0	0	32	66	49
	2021	17	35	0	0	32	65	49
	2022	19	35	0	0	36	65	55

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
Spain (5)								
	1996	0	0	0	0	7	100	7
	1997	0	0	0	0	4	100	4
	1998	0	0	0	0	4	100	4
	1999	0	0	0	0	6	100	6
	2000	0	0	0	0	7	100	7
	2001	0	0	0	0	13	100	13
	2002	0	0	0	0	9	100	9
	2003	0	0	0	0	7	100	7
	2004	0	0	0	0	7	100	7
	2005	0	0	0	0	13	100	13
	2006	0	0	0	0	10	100	10
	2007	0	0	0	0	9	100	9
	2008	0	0	0	0	9	100	9
	2009	0	0	0	0	2	100	2
	2010	0	0	0	0	2	100	2
	2011	0	0	0	0	7	100	7
	2012	0	0	0	0	7	100	7
	2013	0	0	0	0	5	100	5
	2014	0	0	0	0	6	100	6
	2015	0	0	0	0	5	100	5
	2016	0	0	0	0	5	100	5
	2017	0	0	0	0	2	100	2
	2018	0	0	0	0	3	100	3
	2019	0	0	0	0	5	100	5
	2020	0	0	0	3	5	97	5
	2021	0	0	0	1	4	99	4
	2022	0	0	0	0	3	100	3

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
	2023	0	0	0	0	1	100	1
SPM								
	2019	1	100					1
	2020	2	100					2
	2021	2	100					2
	2022	1	100					1
	2023	1	100					1
Sweden (3)								
	1996	19	58	0	0	14	42	33
	1997	10	56	0	0	8	44	18
	1998	5	33	0	0	10	67	15
	1999	5	31	0	0	11	69	16
	2000	10	30	0	0	23	70	33
	2001	9	27	0	0	24	73	33
	2002	7	25	0	0	21	75	28
	2003	7	28	0	0	18	72	25
	2004	3	16	0	0	16	84	19
	2005	1	7	0	0	14	93	15
	2006	1	7	0	0	13	93	14
	2007	0	1	0	0	16	99	16
	2008	0	1	0	0	18	99	18
	2009	0	3	0	0	17	97	17
	2010	0	0	0	0	22	100	22
	2011	10	26	0	0	29	74	39
	2012	7	24	0	0	23	76	30
	2013	0	0	0	0	15	100	15
	2014	0	0	0	0	30	100	30
	2015	0	0	0	0	17	100	17

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
	2016	0	0	0	0	9	100	9
	2017	0	0	0	0	18	100	18
	2018	0	0	0	0	17	100	17
	2019	0	0	0	0	20	100	20
	2020	0	0	0	0	14	100	14
	2021	0	0	0	0	11	100	11
	2022	0	0	0	0	8	100	8
	2023	0	0	0	0	10	100	10
UK (E&W)								
	1996	83	45	42	23	58	31	183
	1997	81	57	27	19	35	24	142
	1998	65	53	19	16	38	31	123
	1999	101	67	23	15	26	17	150
	2000	157	72	25	12	37	17	219
	2001	129	70	24	13	31	17	184
	2002	108	67	24	15	29	18	161
	2003	42	47	27	30	20	23	89
	2004	39	35	19	17	53	47	111
	2005	32	33	28	29	36	37	97
	2006	30	37	21	26	30	37	80
	2007	24	36	13	20	30	44	67
	2008	22	34	8	13	34	53	64
	2009	20	37	9	16	25	47	54
	2010	64	59	9	8	36	33	109
	2011	93	69	6	5	36	27	136
	2012	26	45	5	8	27	47	58
	2013	61	73	6	7	17	20	84
	2014	41	75	4	8	9	17	54

		Coastal		Estuarine		In-river		Total
Country	Year	Weight (t)	% of total	Weight (t)	% of total	Weight (t)	% of total	Weight (t)
	2015	55	82	4	6	8	12	68
	2016	71	82	6	6	10	11	86
	2017	36	73	3	7	10	19	49
	2018	36	84	3	8	4	8	42
	2019	0	0	1	12	4	88	5
	2020	0	0	0	0	3	100	3
	2021	0	0	0	0	1	100	1
	2022	0	0	0	0	1	100	1
	2023	0	0	0	0	1	100	1
UK (NI)								
	1999	44	83	9	17			53
	2000	63	82	14	18			77
	2001	41	77	12	23			53
	2002 (2)	40	49	24	29	18	22	81
	2003	25	45	20	35	11	20	56
	2004	23	48	11	22	14	29	48
	2005	25	49	13	25	14	26	52
	2006	13	45	6	22	9	32	28
	2007	6	21	6	20	17	59	30
	2008	4	19	4	22	12	59	21
	2009	4	24	2	15	10	62	16
	2010	5	39	0	0	7	61	12
	2011	2	24	0	0	8	76	10
	2012	0	0	0	0	9	100	9
	2013	0	1	0	0	4	99	4
	2014	0	0	0	0	5	100	5
	2015	0	0	0	0	3	100	3
	2016	0	0	0	0	4	100	4

		Coastal		Estuarine		In-river		Total
Country	**Year**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**	**% of total**	**Weight (t)**
	2017	0	0	0	0	5	100	5
	2018	0	0	0	0	4	100	4
	2019	0	0	0	0	2	100	2
	2020	0	0	0	0	2	100	2
	2021	0	0	0	0	2	100	2
	2022	0	0	0	0	1	100	1
	2023	0	0	0	0	2	100	2
UK (Scot)								
	1996	129	30	80	19	218	51	427
	1997	79	27	33	11	184	62	296
	1998	60	21	28	10	195	69	283
	1999	35	18	23	11	141	71	199
	2000	76	28	41	15	157	57	274
	2001	77	30	22	9	153	61	251
	2002	55	29	20	10	116	61	191
	2003	86	45	23	12	83	43	193
	2004	67	27	20	8	160	65	247
	2005	62	29	27	12	128	59	217
	2006	57	30	17	9	119	62	193
	2007	40	24	17	10	113	66	171
	2008	38	24	11	7	112	70	161
	2009	27	22	14	12	79	66	121
	2010	44	25	38	21	98	54	180
	2011	48	30	23	15	87	55	159
	2012	40	32	11	9	73	59	124
	2013	50	42	26	22	43	36	119
	2014	41	49	17	20	26	31	84
	2015	31	45	9	14	28	41	68

Country	Year	Coastal Weight (t)	Coastal % of total	Estuarine Weight (t)	Estuarine % of total	In-river Weight (t)	In-river % of total	Total Weight (t)
	2016	0	0	10	37	17	63	27
	2017	0	0	7	27	19	73	26
	2018	0	0	12	63	7	37	19
	2019	0	0	2	13	11	87	13
	2020	0	0	3	19	11	81	14
	2021	0	0	2	30	5	70	7
	2022	0	0	2	30	4	70	6
	2023	0	0	1	25	4	75	5

1. An illegal net fishery operated from 1995 to 1998, catch unknown in the first 3 years but thought to be increasing. Fishery ceased in 1999. 2001/2 catches from the illegal coastal net fishery in Lower Normandy are unknown.

2. Rod catch data for river (rod) fisheries in UK (NI) from 2002.

3. Estuarine catch included in coastal catch.

4. Coastal catch included in estuarine catch.

5. Spain catch to 2018 was Asturias catch raised, 2019 data for All Spain.

6. Iceland total catch includes ranched fish.

7. Data extracted from NASCO website at https://nasco.int/conservation/third-reporting-cycle-2/. Data for 2023 not available as of March 2024

8. No catch weight data provided for 2022 or 2023.

Table 2.1.2.1. Numbers of fish caught and released in rod fisheries along with the % of the total rod catch (released + retained) for countries in the North Atlantic where records are available, 1991 - 2023. Figures for 2023 are provisional.

	Canada(4)		USA		Iceland		Russia(1,5)		UK (E&W)		UK (Scot)		Ireland		UK (NI)(2)		France		Denmark		Sweden		Norway(3)	
Year	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish
1991	28	22167	50	239			51	3211																
1992	29	37803	67	407			73	10120																
1993	36	44803	77	507			82	11246	10	1448														
1994	43	52887	95	249			83	12056	13	3227	8	6595												
1995	46	46029	100	370			84	11904	20	3189	14	12151												
1996	41	52166	100	542	2	669	73	10745	20	3428	15	10413												
1997	50	50009	100	333	5	1558	87	14823	24	3132	18	10944												
1998	53	56289	100	273	7	2826	81	12776	30	4378	18	13464												
1999	50	48720	100	211	10	3055	77	11450	42	4382	28	14849												
2000	56	64482	-	0	11	2918	74	12914	42	7470	32	21072												
2001	55	59387	-	0	12	3611	76	16945	43	6143	38	27724												
2002	52	50924	-	0	18	5985	80	25248	50	7658	41	24058												
2003	55	53645	-	0	16	5361	81	33862	56	6425	55	29170												
2004	57	62316	-	0	16	7362	76	24679	48	13211	50	46279							19	255				
2005	62	63005	-	0	17	9224	87	23592	56	11983	55	46165	12	2553					27	606				

Year	Canada(4)		USA		Iceland		Russia(1,5)		UK (E&W)		UK (Scot)		Ireland		UK (NI)(2)		France		Denmark		Sweden		Norway(3)	
	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish
2006	62	60486	100	1	19	8735	82	33380	56	10959	55	47669	22	5409	18	302			65	794				
2007	58	41192	100	3	18	9691	90	44341	55	10917	61	55670	44	15113	16	470			57	959				
2008	53	54887	100	61	20	17178	86	41881	55	13035	62	53366	38	13563	20	648			71	2033			5	5512
2009	59	52151	-	0	24	17514			58	9096	67	48436	39	11422	21	847			53	1709			6	6696
2010	53	55895	-	0	29	21476	56	14585	60	15012	70	78459	40	15142	25	823			60	2512			12	15041
2011	57	71358	-	0	32	18593			62	14406	73	65330	38	12688	36	1197			55	2153	5	424	12	14303
2012	57	43287	-	0	28	9752	43	4743	65	11952	74	63628	35	11891	59	5014			55	2153	6	404	14	18611
2013	59	50630	-	0	34	23133	39	3732	70	10458	80	54003	37	10682	64	1507			57	1932	9	274	15	15953
2014	54	41613	-	0	40	13616	52	8479	78	7992	82	37355	37	6537	50	1065			61	1918	15	982	19	20281
2015	64	65440	-	0	31	21914	50	7028	79	8113	84	46837	37	9383	100	111			70	2989	16	690	19	25433
2016	65	68925	-	0	43	22751	76	10793	80	9700	90	50186	43	10934	100	280			72	3801	17	362	21	25198
2017	66	57357	-	0	42	19667	77	10110	83	11255	90	45652	45	12562	100	126			69	4435	15	680	20	25924
2018	82	56011	-	0	43	19409	73	10799	88	6857	93	35066	43	9249	49	3247			79	4613	18	806	22	22024
2019	72	60636	-	0	52	15185	74	12762	89	8171	91	43825	48	9790	85	5000			70	3913	15	747	20	21178
2020	72	56618	-	0	51	21277	65	9508	93	11893	92	42854	53	12177	89	7333	8	72	67	4375	16	587	23	28753
2021	75	67056	-	0	54	18734	71	10727	95	5534	95	34858	54	14272	89	5132	4	43	70	4016	21	680	27	21357

	Canada(4)		USA		Iceland		Russia(1,5)		UK (E&W)		UK (Scot)		Ireland		UK (NI)(2)		France		Denmark		Sweden		Norway(3)	
Year	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish	%	No. fish
2022	76	52127	-	0	53	23029	64	10324	96	6110	96	41477	56	13623	86	3578	1	10	73	4344	28	730	28	27189
2023	78	42595	-	0	63	20069			95	4644	96	31295	51	8786	84	2981	4	18	69	3015	29	941	27	18879
5-year mean																								
2018 - 2022	75	58490			51	19527	68	10340	92	7713	93	39616	51	11822	80	4858	4	42	72	4252	20	710	24	24100

1. Since 2009 data are either unavailable or incomplete, however catch and release is understood to have remained at similar high levels as before.

2. Data for 2006 - 2009, 2014 are for the Department of Culture, Arts and Leisure area only; the figures from 2010 are a total for UK (NI). Data for 2015, 2016 and 2017 are for R. Bush only.

3. The statistics were collected on a voluntary basis, the numbers reported must be viewed as a minimum.

4. Released fish in the kelt fishery of New Brunswick are not included in the totals for Canada.

5. Data extracted from NASCO website at https://nasco.int/conservation/third-reporting-cycle-2/.

Table 2.1.3.1. Estimates of unreported catches by various methods in tonnes within national EEZs in the Northeast Atlantic, North American and West Greenland Commission areas of NASCO, 1987 - 2023.

Year	Northeast Atlantic	North America	West Greenland	Total
1987	2554	234		2788
1988	3087	161		3248
1989	2103	174		2277
1990	1779	111		1890
1991	1555	127		1682
1992	1825	137		1962
1993	1471	161	<12	1644
1994	1157	107	<12	1276
1995	942	98	20	1060
1996	947	156	20	1123
1997	732	90	5	827
1998	1108	91	11	1210
1999	887	133	12	1032
2000	1136	124	10	1270
2001	1089	81	10	1180
2002	946	83	10	1039
2003	719	118	10	847
2004	575	101	10	686
2005	605	85	10	700
2006	604	56	10	670
2007	465	0	10	475
2008	433	0	10	443
2009	317	16	10	343
2010	357	15	10	382
2011	382	49	10	441
2012	363	30	10	403
2013	272	24	10	306
2014	256	21	10	287

Year	Northeast Atlantic	North America	West Greenland	Total
2015	299	17	10	326
2016	298	27	10	335
2017	318	25	10	353
2018	278	24	10	312
2019	238	12	10	259
2020	238	27	10	275
2021	135	19	10	164
2022	174	18	10	202
2023	95	16	10	121
Mean				
2018 - 2022	212	20	10	242
1. No estimates available for Canada in 2007 - 2008 and estimates for 2009, 2010 and 2019 are incomplete.				
2. No estimates have been available for Russia since 2008.				
3. Unreported catch estimates are not provided for Spain or St Pierre & Miquelon.				
4. No estimates were available for France for 2018.				

Table 2.1.3.2. Estimates of unreported catches by various methods in tonnes by country within national EEZs in the Northeast Atlantic (NEAC), North American (NAC) and West Greenland (WGC) Commissions of NASCO for 2023.

Commission Area	Country	Unreported Catch (t)	Unreported as % of Total North Atlantic Catch (Unreported + Reported)	Unreported as % of National Catch (Unreported + Reported)
NAC	Canada	16	2.6	16
NEAC	Denmark			
NEAC	Finland	0	0.0	9
NEAC	Germany	0	0.0	0
NEAC	Iceland	1	0.1	2
NEAC	Ireland	3	0.5	10
NEAC	Norway	89	14.1	23
NEAC	Sweden	1	0.2	9
NEAC	UK (E&W)	0	0.0	9
NEAC	UK (NI)	0	0.0	12
NEAC	UK (Scot)	<1	0.1	9
WGC	West GRL	10	0.0	10
Total unreported catch		121	23	
Total reported nominal North Atlantic catch		524		

Table 2.2.1.1. Production of farmed salmon in the North Atlantic area and in areas other than the North Atlantic (in tonnes round fresh weight), 1980 - 2023.

Year	North Atlantic Area											Outside the North Atlantic Area (6)						
	Norway	UK (Scot)	Faroes	Canada	Ireland	USA	Iceland	UK (NI) (7)	Russia	Spain (8)	Total	Chile	West Coast USA (3)	West Coast Canada (4)	Australia (5)	Turkey	Total	Worldwide Total
1980	4153	598	0	11	21	0	0	0	0	0	4783	0	0	0	0	0	0	4783
1981	8422	1133	0	21	35	0	0	0	0	0	9611	0	0	0	0	0	0	9611
1982	10266	2152	70	38	100	0	0	0	0	0	12626	0	0	0	0	0	0	12626
1983	17000	2536	110	69	257	0	0	0	0	0	19972	0	0	0	0	0	0	19972
1984	22300	3912	120	227	385	0	0	0	0	0	26944	0	0	0	0	0	0	26944
1985	28655	6921	470	359	700	0	91	0	0	0	37196	0	0	0	0	0	0	37196
1986	45675	10337	1370	672	1215	0	123	0	0	0	59392	0	11	0	10	0	21	59413
1987	47417	12721	3530	1334	2232	365	490	0	0	0	68089	41	196	0	62	0	299	68388
1988	80371	17951	3300	3542	4700	455	1053	0	0	0	111372	165	925	0	240	0	1330	112702
1989	124000	28553	8000	5865	5063	905	1480	0	0	0	173866	1860	1122	1000	1750	0	5732	179598
1990	165000	32351	13000	7810	5983	2086	2800	<100	5	0	229135	9478	696	1700	1750	300	13924	243059
1991	155000	40593	15000	9395	9483	4560	2680	100	0	0	236811	14957	1879	3500	2653	1500	24489	261300
1992	140000	36101	17000	10380	9231	5850	2100	200	0	0	220862	23715	4238	6600	3300	680	38533	259395
1993	170000	48691	16000	11115	12366	6755	2348	<100	0	0	267375	29180	4254	12000	3500	791	49725	317100

Year	North Atlantic Area											Outside the North Atlantic Area (6)						
	Norway	UK (Scot)	Faroes	Canada	Ireland	USA	Iceland	UK (NI) (7)	Russia	Spain (8)	Total	Chile	West Coast USA (3)	West Coast Canada (4)	Australia (5)	Turkey	Total	Worldwide Total
1994	204686	64066	14789	12441	11616	6130	2588	<100	0	0	316416	34175	4834	16100	4000	434	59543	375959
1995	261522	70060	9000	12550	11811	10020	2880	259	0	0	378102	54250	4868	16000	6192	654	81964	460066
1996	297557	83121	18600	17715	14025	10010	2772	338	0	0	444138	77327	5488	17000	7647	193	107655	551793
1997	332581	99197	22205	19354	14025	13222	2554	225	0	0	503363	96675	5784	28751	7648	50	138908	642271
1998	361879	110784	20362	16418	14860	13222	2686	114	0	0	540325	107066	2595	33100	7069	40	149870	690195
1999	425154	126686	37000	23370	18000	12246	2900	234	0	0	645590	103242	5512	38800	9195	0	156749	802339
2000	440861	128959	32000	33195	17648	16461	2600	250	0	0	671974	166897	6049	49000	10907	0	232853	904827
2001	436103	138519	46014	36514	23312	13202	2645		0	0	696309	253850	7574	68000	12724	0	342148	1038457
2002	462495	145609	45150	40851	22294	6798	1471		0	0	724668	265726	5935	84200	14356	0	370217	1094885
2003	509544	176596	52526	38680	16347	6007	3710		300	0	803710	280301	10307	65411	15208	0	371227	1174937
2004	563914	158099	40492	37280	14067	8515	6620		203	0	829190	348983	6645	55646	16476	0	427750	1256940
2005	586512	129588	18962	45891	13764	5263	6300		204	0	806484	385779	6110	63369	16780	0	472038	1278522
2006	629888	131847	11905	47880	11174	4674	5745		229	0	843342	376476	5811	70181	20710	0	473178	1316520
2007	744222	129930	22305	36368	9923	2715	1158		111	0	946732	331042	7117	70998	25336	0	434493	1381225
2008	737694	128606	36000	39687	9217	9014	330		51	0	960599	388847	7699	73265	25737	0	495548	1456147

Year	North Atlantic Area											Outside the North Atlantic Area (6)						
	Norway	UK (Scot)	Faroes	Canada	Ireland	USA	Iceland	UK (NI) (7)	Russia	Spain (8)	Total	Chile	West Coast USA (3)	West Coast Canada (4)	Australia (5)	Turkey	Total	Worldwide Total
2009	862908	144247	51500	43101	12210	6028	742		2126	0	1122862	233308	7923	68662	29893	0	339786	1462648
2010	939575	154164	45391	43612	15691	11127	1068		4500	0	1215128	123233	8408	70831	31807	0	234279	1449407
2011	1065974	158018	60967	41448	12196	6031	1083		8500		1354217	264349	7467	83144	36662	0	391622	1745839
2012	1232095	162223	76596	52951	12440		2923		8754		1547982	399678	8696	79981	43982	0	532337	2080319
2013	1168324	163234	77184	47649	9125		3018		16097		1484631	492329	6834	74673	42776	0	616612	2101243
2014	1258356	179022	86490	29988	9368		3965		18675		1585864	644459	6368	54971	41591	0	747389	2333253
2015	1303346	171722	80629	48684	13116		3260		3232	8	1623997	608546	10431	92926	48331	0	760234	2384231
2016	1233619	162817	83291	33011	16300		8420		12857	5	1550320	532225	8017	90511	56115	0	686868	2237188
2017	1237762	189707	86830	34945	19305		11265		13016	25	1592855	613611	6520	85608	52580	0	758319	2351174
2018	1278596	156025	78973	36174	12200		13448		20566		1595982	660645	8326	87010	61227	0	817208	2413190
2019	1361747	203881	94993	43925	11333		26957		32343	12	1775191	701331	6311	88874	56989	0	853505	2628696

Year	North Atlantic Area											Outside the North Atlantic Area (6)						
	Norway	UK (Scot)	Faroes	Canada	Ireland	USA	Iceland	UK (NI) (7)	Russia	Spain (8)	Total	Chile	West Coast USA (3)	West Coast Canada (4)	Australia (5)	Turkey	Total	Worldwide Total
2020	1388434	192129	88961	36421	13400		34341		10855		1764541	786905	5552	91808	66919	0	951184	2715725
2021	1562415	205393	115683	51919	12844		44503		14959		2007716	724835		84171	84045		893051	2900767
2022	1564948	169194	108679	44088	11916		44934		14959		1958718	724835		84171	84045		893051	2851769
2023	1520713	187725	98164	44088	12338		43523		14959		1921510	724835		84171	84045		893051	2814561
Mean																		
2018 - 2022	1431228	185324	97458	42505	12339		32837		18736	12	1820430	719710	6730	87207	70645	0	881600	2702029
% change; recent year relative to mean																		
	6	1	1	4	0		33		-20		6	1		-3	19		1	4

Year	North Atlantic Area											Outside the North Atlantic Area (6)						
	Norway	UK (Scot)	Faroes	Canada	Ireland	USA	Iceland	UK (NI) (7)	Russia	Spain (8)	Total	Chile	West Coast USA (3)	West Coast Canada (4)	Australia (5)	Turkey	Total	Worldwide Total

1. Data for 2022 are provisional for many countries.

2. Where production figures were not available for 2022, values for the most recent year were used.

3. West Coast USA = Washington State.

4. West Coast Canada = British Columbia.

5. Australia = Tasmania.

6. Source of production figures for non-Atlantic areas:
Copyright FAO 2023. Global Production. Fisheries and Aquaculture Division [online]. Rome. [Cited Saturday, April 1st 2023].
https://www.fao.org/fishery/en/collection/global_production, 2022 most recent data.

7. Data for UK (NI) since 2001 and data for East coast USA since 2012 are not publicly available.

8. Data for Spain first provided in 2019, no data reported for 2020-2022.

Table 2.2.2.1. Harvest of ranched salmon in the North Atlantic (tonnes round fresh weight), 1980 - 2023.

Year	Iceland (1)	Ireland (2,4)	UK (NI) River Bush (2,3,4)	Sweden (2)	Norway various facilities (2)	Total harvest
1980	8.0			0.8		9
1981	16.0			0.9		17
1982	17.0			0.6		18
1983	32.0			0.7		33
1984	20.0			1.0		21
1985	55.0	16.0	17.0	0.9		89
1986	59.0	14.3	22.0	2.4		98
1987	40.0	4.6	7.0	4.4		56
1988	180.0	7.1	12.0	3.5	4.0	207
1989	136.0	12.4	17.0	4.1	3.0	172
1990	285.1	7.8	5.0	6.4	6.2	310
1991	346.1	2.3	4.0	4.2	5.5	362
1992	462.1	13.1	11.0	3.2	10.3	500
1993	499.3	9.9	8.0	11.5	7.0	536
1994	312.8	13.2	0.4	7.4	10.0	344
1995	302.7	19.0	1.2	8.9	2.0	334
1996	243.0	9.2	3.0	7.4	8.0	271
1997	59.4	6.1	2.8	3.6	2.0	74
1998	45.5	11.0	1.0	5.0	1.0	64
1999	35.3	4.3	1.4	5.4	1.0	47
2000	11.3	9.3	3.5	9.0	1.0	34
2001	13.9	10.7	2.8	7.3	1.0	36
2002	6.7	6.9	2.4	7.8	1.0	25
2003	11.1	5.4	0.6	9.6	1.0	28
2004	18.1	10.4	0.4	7.3	1.0	37
2005	20.5	5.3	1.7	6.0	1.0	34
2006	17.2	5.8	1.3	5.7	1.0	31
2007	35.5	3.1	0.3	9.7	0.5	49

Year	Iceland (1)	Ireland (2,4)	UK (NI) River Bush (2,3,4)	Sweden (2)	Norway various facilities (2)	Total harvest
2008	68.6	4.4		10.4	0.5	84
2009	44.3	1.1		9.9		55
2010	42.3	2.5		13.0		58
2011	30.2	2.5		19.1		52
2012	20.0	5.3		8.9		34
2013	30.7	2.8		4.2		38
2014	17.9	2.8		6.2		27
2015	31.4	4.7		6.6		43
2016	33.6	3.0		3.1		40
2017	24.4	2.8		9.6		37
2018	21.7	3.0		4.1		29
2019	13.7	3.6		7.7		25
2020	28.2	3.3		7.0		38
2021	15.9			4.6		20
2022	20.8			1.7		23
2023	11.5			3.8		15
5-yr mean						
2018 - 2022	20	3	0	5		27
% change; recent year relative to mean						
	-43			-24		-44

1. From 1990 to 2000, catch includes fish ranched for both commercial and angling purposes. No commercial ranching since 2000.

2. Total yield in homewater fisheries and rivers.

3. The proportion of ranched fish was not assessed between 2008 and 2018 due to a lack of microtag returns.

4. No estimates of ranched catch available for 2021 or 2022, but catches are considered to have been very few.

Table 2.3.1. Details of stock complexes and stock-units (SU) used within the Life-cycle Model.

Stock complex	Country	Stock-unit	Abbreviation
North America (NAC)	Canada	Labrador	LB
North America (NAC)	Canada	Newfoundland	NF
North America (NAC)	Canada	Quebec	QC
North America (NAC)	Canada	Gulf of St Lawrence	GF
North America (NAC)	Canada	Scotia-Fundy	SF
North America (NAC)	USA	USA	US
Northern Northeast Atlantic (N NEAC)	Finland & Norway	River Tana/Teno	
Northern Northeast Atlantic (N NEAC)	Iceland	Northeast	Iceland.NE
Northern Northeast Atlantic (N NEAC)	Norway	Southeast	Norway_SE
Northern Northeast Atlantic (N NEAC)	Norway	Southwest	Norway_SW
Northern Northeast Atlantic (N NEAC)	Norway	Mid	Norway_MI
Northern Northeast Atlantic (N NEAC)	Norway	North	Norway_NO
Northern Northeast Atlantic (N NEAC)	Russia	Archangelsk	Russia_AK
Northern Northeast Atlantic (N NEAC)	Russia	Kola / White Sea	Russia_KW
Northern Northeast Atlantic (N NEAC)	Russia	Kola / Barents Sea	Russia_KB
Northern Northeast Atlantic (N NEAC)	Russia	Pechora River	Russia_RP
Northern Northeast Atlantic (N NEAC)	Sweden	Sweden	
Southern Northeast Atlantic (S NEAC)	France	France	
Southern Northeast Atlantic (S NEAC)	Ireland	Ireland	
Southern Northeast Atlantic (S NEAC)	Iceland	Southwest	Iceland.SW
Southern Northeast Atlantic (S NEAC)	U.K. (England & Wales)	U.K. (England & Wales)	
Southern Northeast Atlantic (S NEAC)	U.K. (Northern Ireland)	River Foyle (Loughs Agency)	Ireland.N_FO
Southern Northeast Atlantic (S NEAC)	U.K. (Northern Ireland)	DAERA areas	Ireland.N_FB
Southern Northeast Atlantic (S NEAC)	U.K. (Scotland)	East	Scotland_EA
Southern Northeast Atlantic (S NEAC)	U.K. (Scotland)	West	Scotland_WE

Table 2.8.1. Summary of Atlantic salmon tagged and marked in 2023 - 'Hatchery' and 'Wild' juvenile refer to smolts and parr.

		Primary Tag or Mark				
Country	Origin	Microtag	External mark[2]	Adipose clip	Other[1]	Total
Canada	Hatchery Adult	0	1143	241	417	1801
	Hatchery Juvenile	0	0	1 148	60	1208
	Wild Adult	0	482	19	295	796
	Wild Juvenile	0	11 823	14 688	1856	28 367
	Total	**0**	**13 448**	**16 096**	**2628**	**32 172**
Denmark	Hatchery Adult	0	0	0	308	308
	Hatchery Juvenile	0	0	298 990	0	298 990
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**0**	**298 990**	**308**	**299 298**
France	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	62 899	8445	0	71 344
	Wild Adult	0	0	0	200	200
	Wild Juvenile	0	0	0	2656	2656
	Total	**0**	**62 899**	**8445**	**2856**	**74 200**
Iceland	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	0	0	0
	Wild Adult	0	218	0	0	218
	Wild Juvenile	1873	0	0	2784	4657
	Total	**1873**	**218**	**0**	**2784**	**4875**
Ireland	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	109 540	0	0	0	109 540
	Wild Adult	0	0	0	0	0
	Wild Juvenile	1153	0	0	3072	4225
	Total	**110 693**	**0**	**0**	**3072**	**113 765**
Norway	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	0	10 803	10 803

		Primary Tag or Mark				
Country	Origin	Microtag	External mark[2]	Adipose clip	Other[1]	Total
	Wild Adult	0	234	0	24	258
	Wild Juvenile	0	0	0	9602	9602
	Total	**0**	**234**	**0**	**20 429**	**20 663**
Russia	Hatchery Adult					
	Hatchery Juvenile					
	Wild Adult					
	Wild Juvenile					
	Total					
Spain	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	66 400	0	66 400
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**0**	**66 400**	**0**	**66 400**

[1] **Includes other (PIT, ultrasonic, radio, DST, Satellite tags etc.)**

[2] **Includes Carlin, spaghetti, streamers, VIE etc.**

Table 2.8.1. (continued) Summary of Atlantic salmon tagged and marked in 2023 - 'Hatchery' and 'Wild' juvenile refer to smolts and parr.

		Primary Tag or Mark				
Country	Origin	Microtag	External mark[2]	Adipose clip	Other[1]	Total
Sweden	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	163 027	0	163 027
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	384	384
	Total	**0**	**0**	**163 027**	**384**	**163 411**
UK (England &	Hatchery Adult	0	0	0	0	0
Wales)	Hatchery Juvenile	0	0	0	0	0
	Wild Adult	0	315	0	20	335
	Wild Juvenile	3686	0	0	10 270	13 956
	Total	**3686**	**315**	**0**	**10 290**	**14 291**
UK (N. Ireland)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	10 357	0	56 961	0	67 318
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**10 357**	**0**	**56 961**	**0**	**67 318**
UK (Scotland)	Hatchery Adult	0	22	0	0	22
	Hatchery Juvenile	0	0	40 482	0	40 482
	Wild Adult	0	111	0	0	111
	Wild Juvenile	0	870	0	13 269	14 139
	Total	**0**	**1003**	**40 482**	**13 269**	**54 754**
Germany	Hatchery Adult	0	0	10	0	10
	Hatchery Juvenile	0	1230	58 550	5	59 785
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**1230**	**58 560**	**5**	**59 795**
Greenland[3]	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	0	0	0

		Primary Tag or Mark				
Country	Origin	Microtag	External mark[2]	Adipose clip	Other[1]	Total
	Wild Adult	0	0	0	107	107
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**0**	**0**	**107**	**107**
USA	Hatchery Adult	0	424	0	4544	4968
	Hatchery Juvenile	0	0	95 580	50	95 630
	Wild Adult	0	0	6	0	6
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**424**	**95 586**	**4594**	**100 604**
All Countries	Hatchery Adult	0	1589	251	5269	7109
	Hatchery Juvenile	119 897	64 129	789 583	10 918	984 527
	Wild Adult	0	1360	25	646	2031
	Wild Juvenile	6712	12 693	14 688	43 893	77 986
	Total	**126 609**	**79 771**	**804 547**	**60 726**	**1 071 653**

[1] **Includes other (PIT, ultrasonic, radio, DST, Satellite tags etc.)**

[2] **Includes Carlin, spaghetti, streamers, VIE etc.**

[3] **Individuals tagged in Greenland by Atlantic Salmon Federation, details within Canada's Tag**

Table 2.9.1 Numbers of pink salmon reported to ICES in NASCO commission areas (2017-2023). These numbers are from catches, removals, counts or observations.

Country/Jurisdiction	2017	2018	2019	2020	2021	2022	2023
Canada	4		5		14		3
Denmark	10				8		4
Faroe Islands	1		6		7		
Finland*	5000		5000		49500	20	170000
France	3				4		
Germany	3		1		1		2
Greenland	6	4	78		62		1021
Iceland	79	1	251		340	5	492
Ireland	36		11		45		1
Netherlands	3				6		
Norway	11654		14633	254	151437	219	403519
Russia (north-west)**	220000		223529		352941		
Sweden	44		5		70		13
UK (England & Wales)	208	1	3		26		2
UK (Northern Ireland)	2		3		3		2
UK (Scotland)	131		18		171	1	47

*** Figures for Finland are for the River Tana/Teno.**

**** Russian numbers estimated from t caught; assume a mean weight of 1.7 kg per fish as per ICES (2018). Russian data for 2018 and 2020 not currently available but catches were relatively much lower than 'odd-years' as per graph in Prusov and Zubchenko (2021). Data from 2022 and 2023 are not available.**

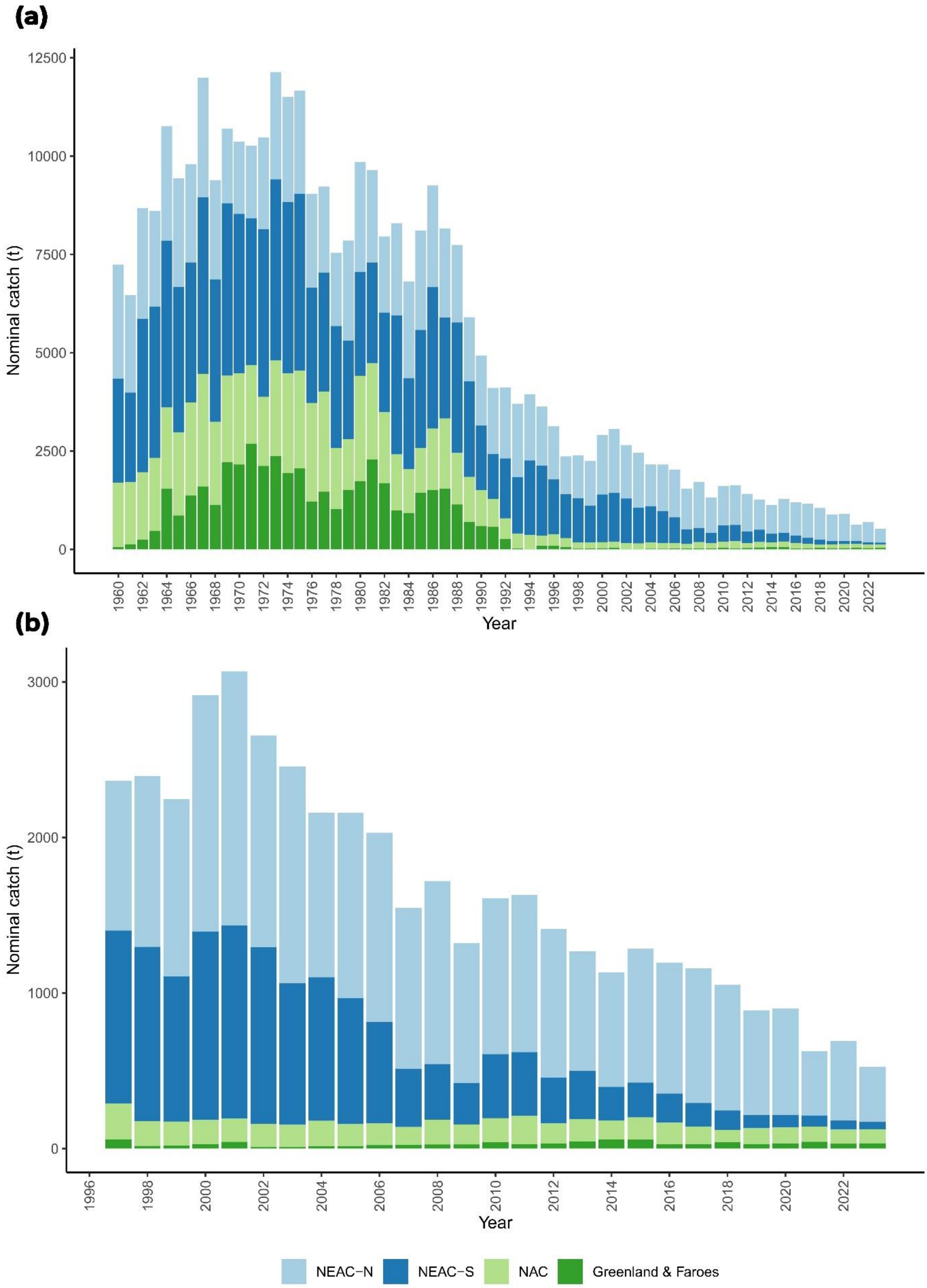


Figure 2.1.1.1. (a) Total reported nominal catches of salmon (tonnes round fresh weight) in four North Atlantic regions, 1960–2023, (b) Total reported nominal catches of salmon (tonnes round fresh weight) in four North Atlantic regions, 1997–2023. No 2023 catch data available for the Russian Federation at time of writing.

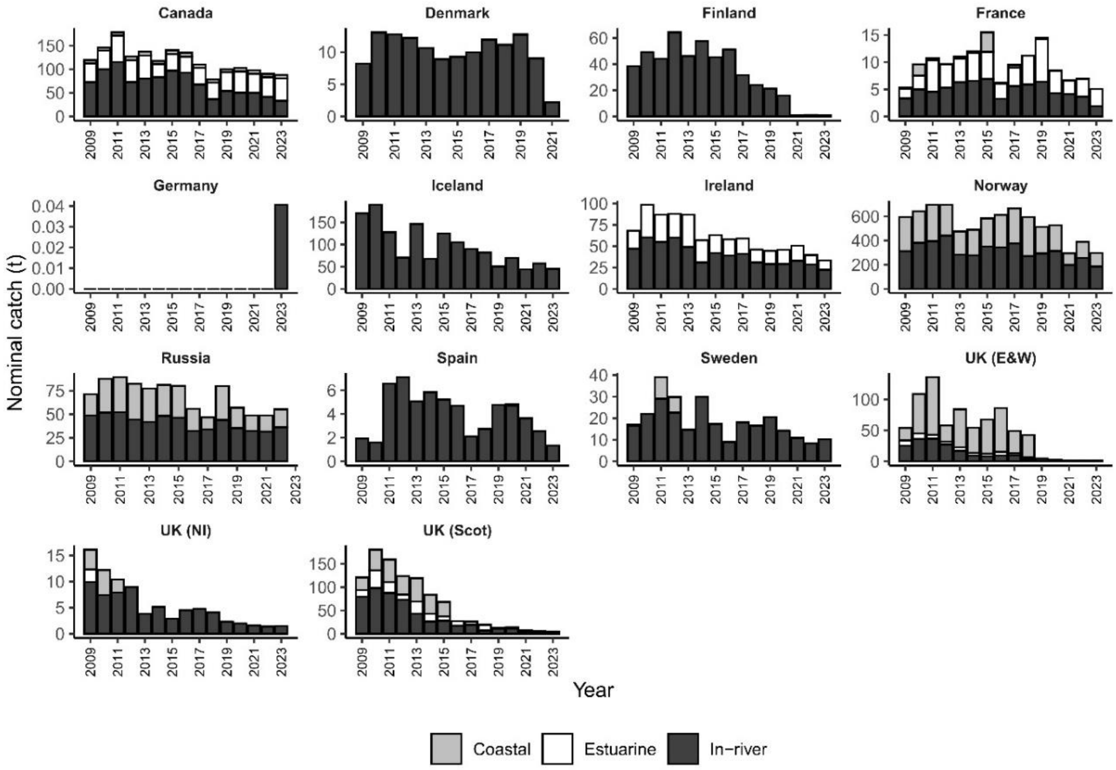


Figure 2.1.1.2. Nominal catch (tonnes round fresh weight) taken in coastal, estuarine and in-river fisheries by country/jurisdiction, 2009–2023. (Note for Germany, catch data was only available for 2023 and annual values prior to this are unknown. No catch weight data was provided by Denmark for 2022 or 2023).

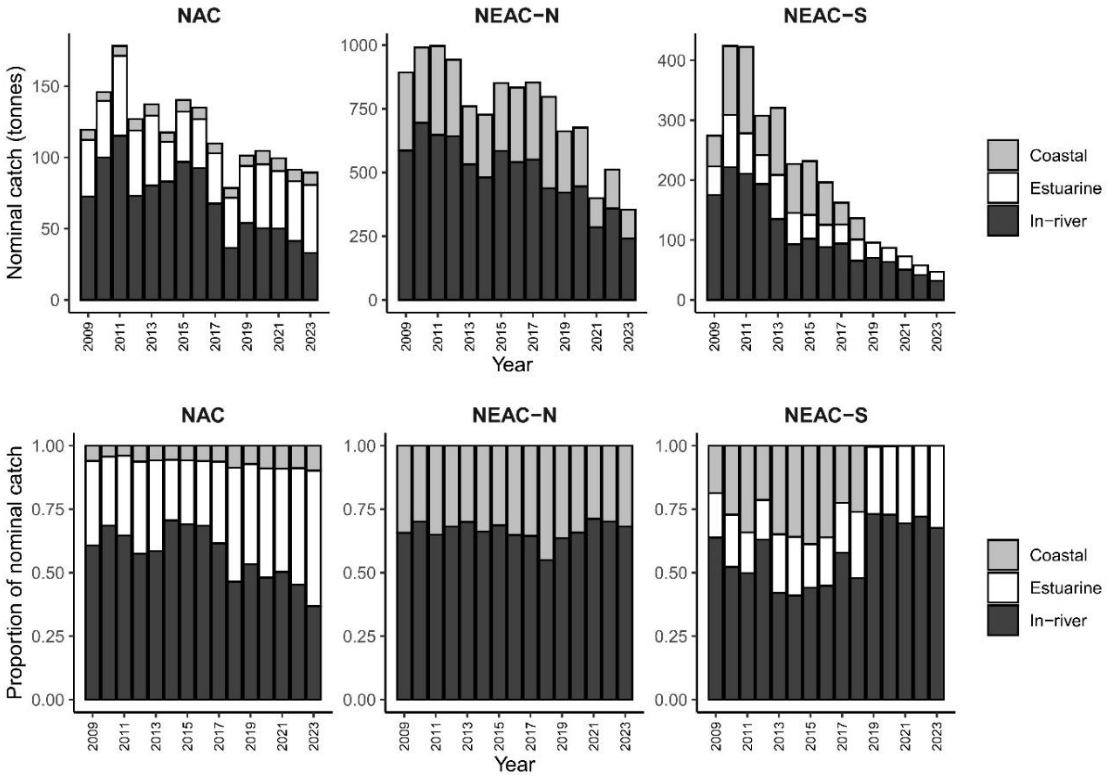


Figure 2.1.1.3. Top panel - Nominal catches (tonnes round fresh weight) taken in coastal, estuarine and in-river fisheries for the NAC area (2009–2023) and for NEAC Northern (NEAC-N) and Southern (NEAC-S) areas (2009–2023). Bottom panel - Percentages of nominal catch taken in coastal, estuarine and in-river fisheries in each commission area, 2009–2023. Note that y-axes in the top panel vary.

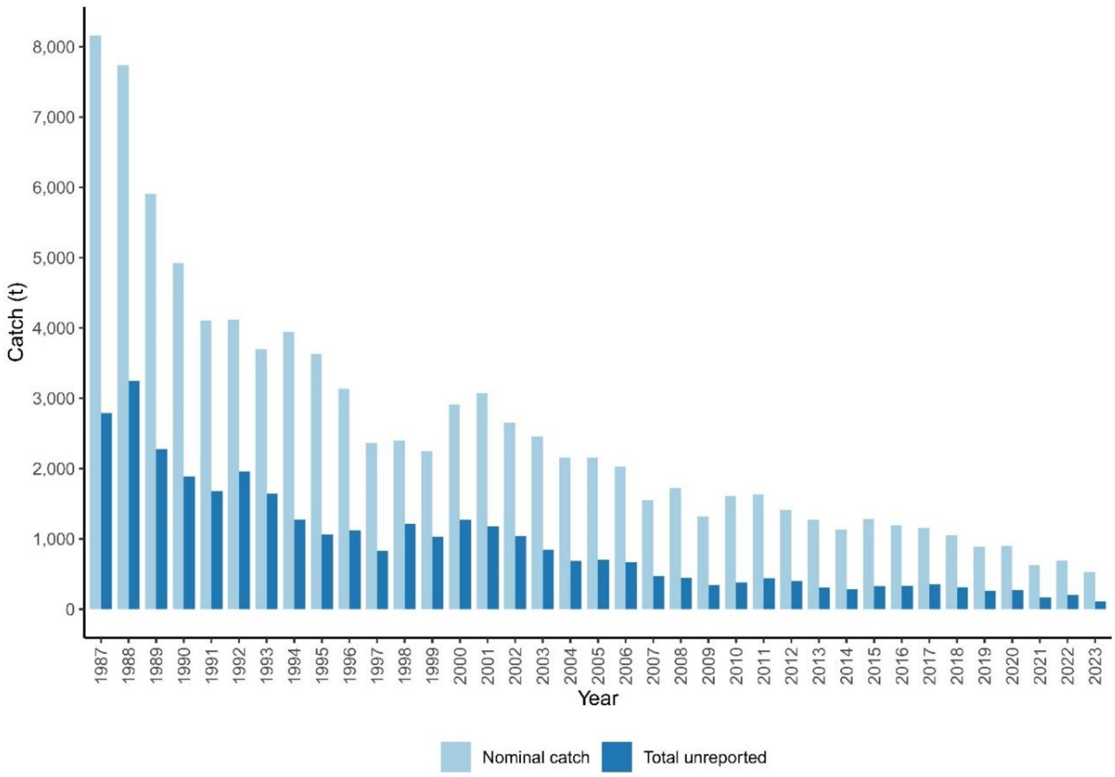


Figure 2.1.3.1. Nominal North Atlantic salmon catch (tonnes round fresh weight) and unreported catch (tonnes round fresh weight) in NASCO Areas, 1987–2023.

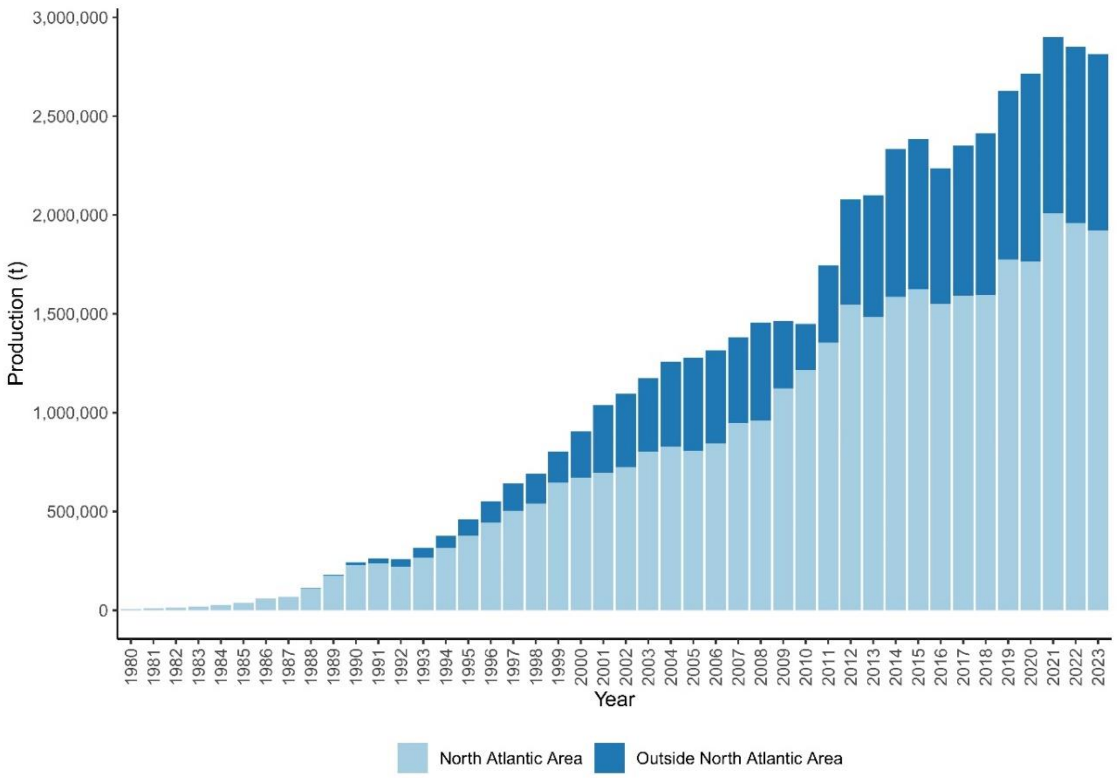


Figure 2.2.1.1. World-wide farmed Atlantic salmon production (tonnes round fresh weight) 1980–2023. Note no data available for USA West coast production at time of writing.

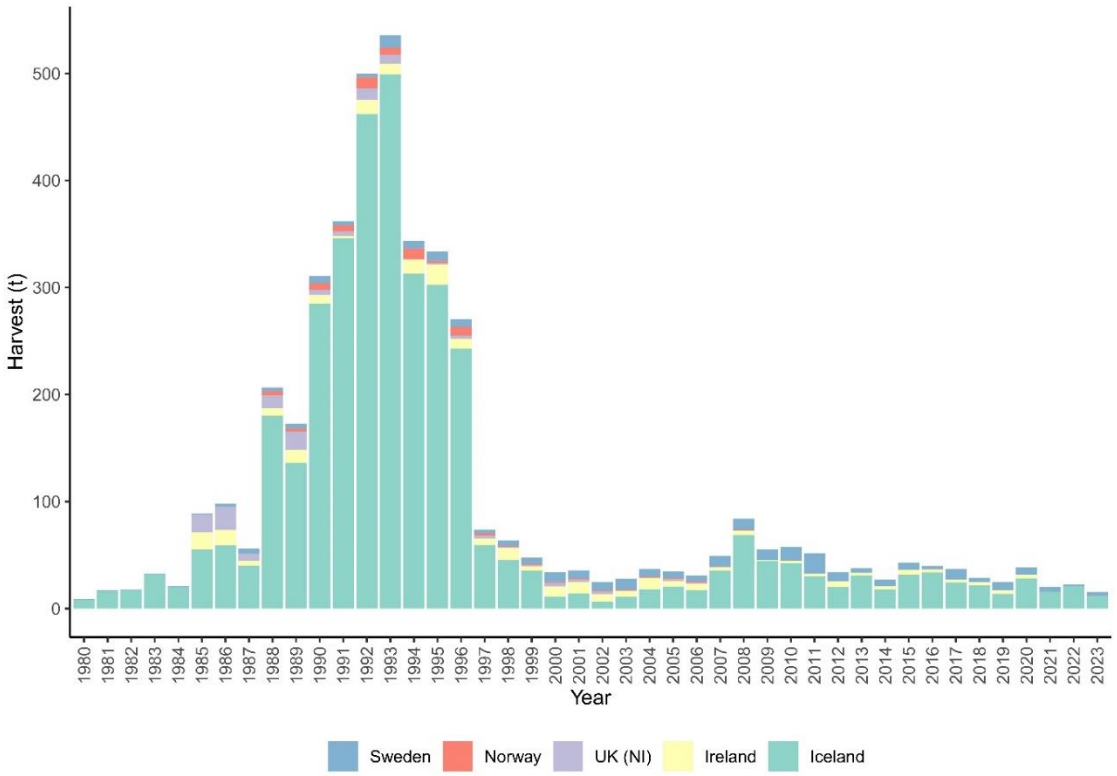


Figure 2.2.2.1. Harvest of ranched salmon (tonnes round fresh weight) in the North Atlantic, 1980–2023.

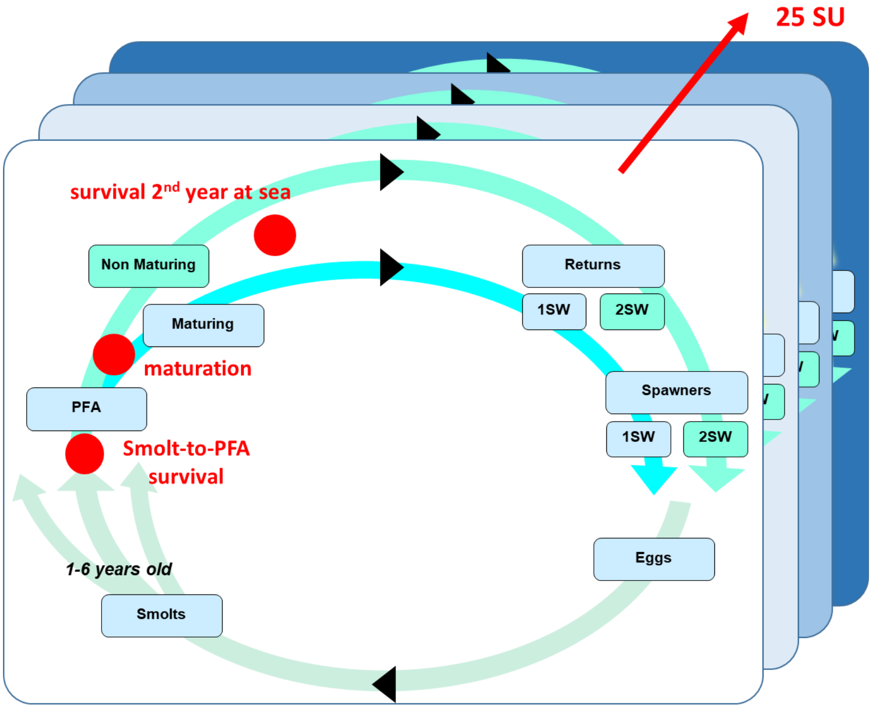


Figure 2.3.1. Scheme of the stage-based structured Life-cycle Model for the 25 stock-units (SUs). Blue boxes in the front panel: different life stages. For each SU, the model tracks the abundance of fish, males and females confounded by year and life stage, sequentially from eggs to 1SW or MSW spawners (fish that survived all sources of natural and fishing mortality and that contribute to reproduction). The model incorporates variations in the age of out-migrating smolts (after 1 to 6 years in freshwater) and the sea-age of returning adults. Only two sea-age classes are considered: maiden salmon that return to homewaters to spawn after one year at sea (1SW) and maiden salmon that return after two winters at sea (2SW, although this is a proxy for all MSW). All fish within a SU are assumed to have the same demographic parameters and to undertake a similar migration route at sea. There is no exchange of fish among the different SU (i.e. no straying between SU). Red dots indicate the key demographic transition rates that are the main target of the statistical estimation: survival between smolt and PFA stage; the proportion of fish maturing at the PFA stage (fish that will return as maiden 1SW fish); and, the survival during the second year at sea. Mortality during the second year at sea results from the combination of natural mortality (fixed) and fishing mortality (estimated).

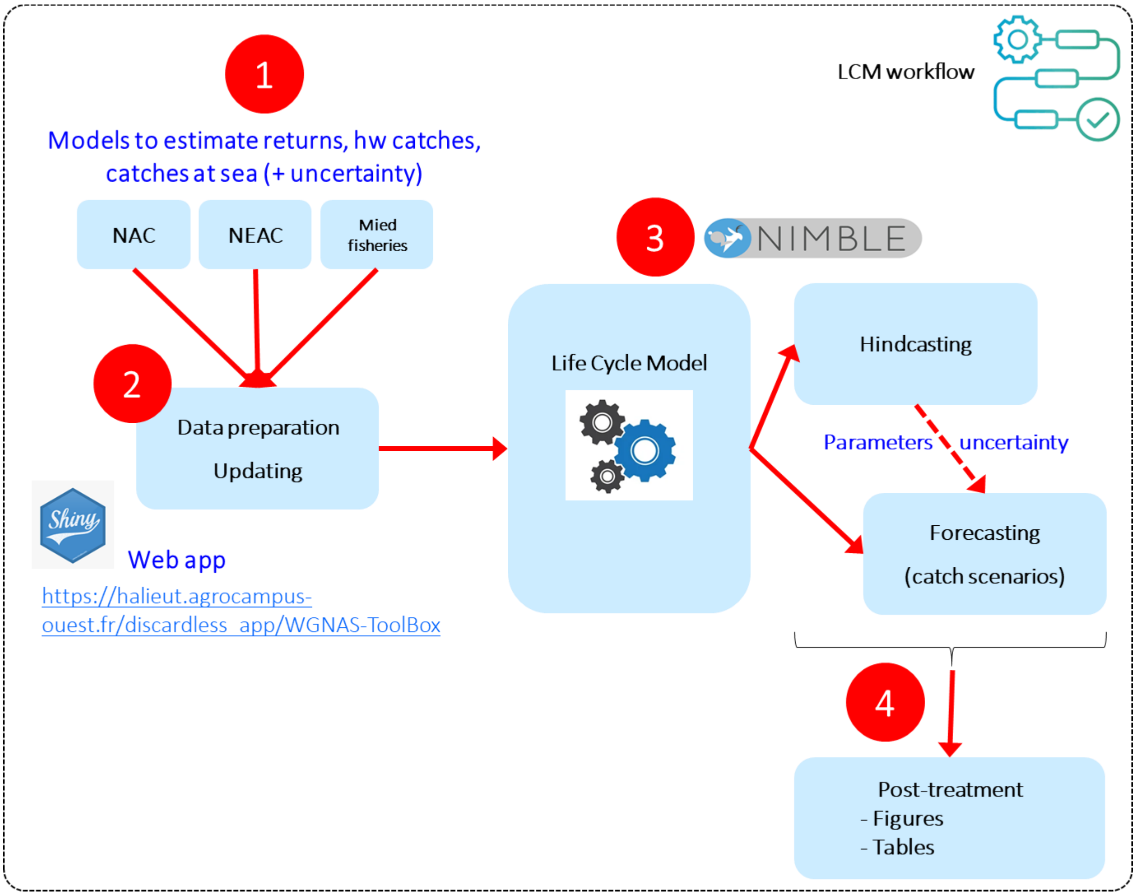


Figure 2.3.2. Workflow for stock assessment and catch advice using the Life-cycle Model.

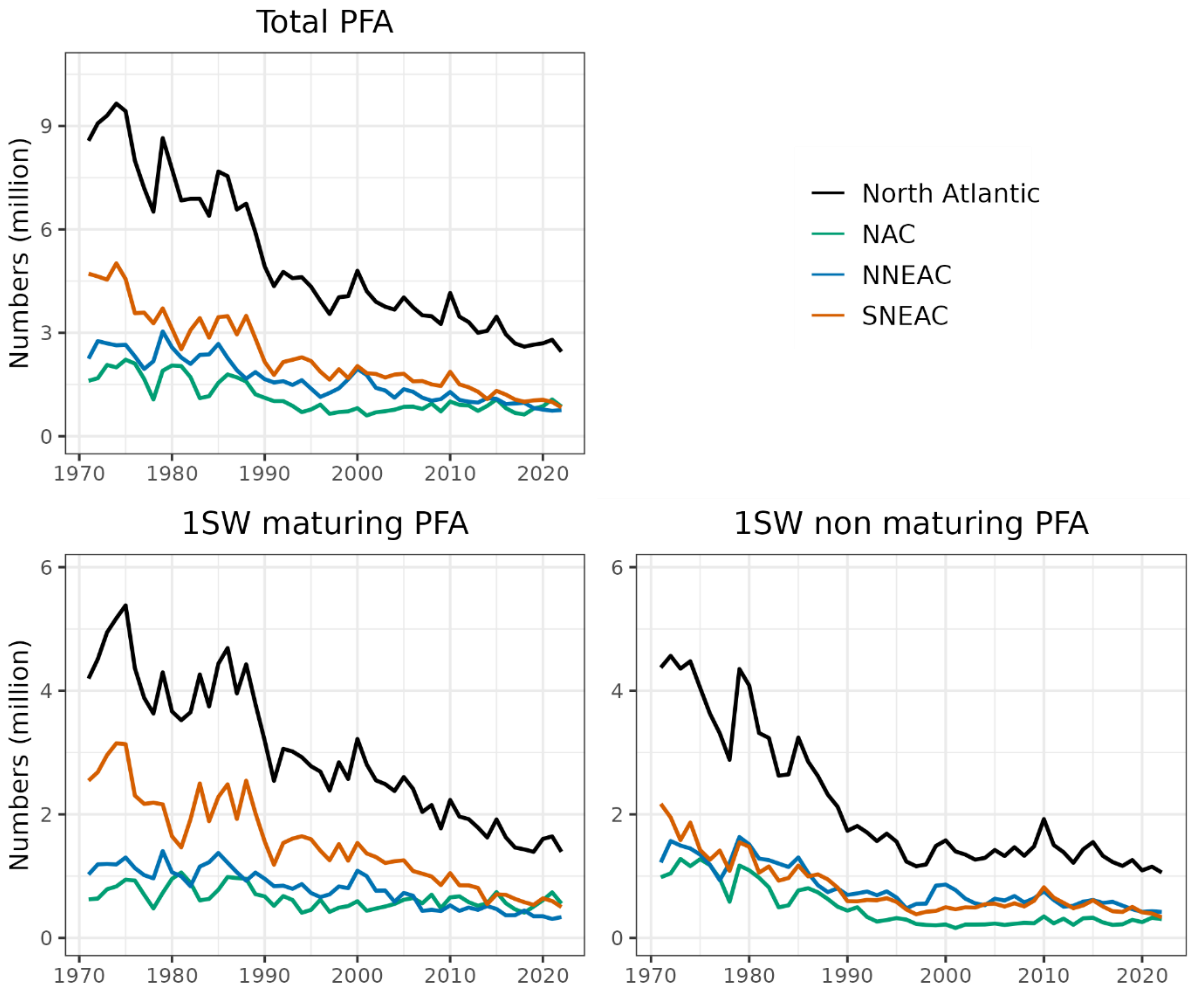


Figure 2.3.3. Trends in the abundance at the PFA stage for 1SW maturing and 1SW non-maturing salmon, for the North Atlantic as a whole, and the NAC, S-NEAC and N-NEAC stock complexes. Year is PFA year. Values are the medians of the marginal posterior distributions derived from the LCM.

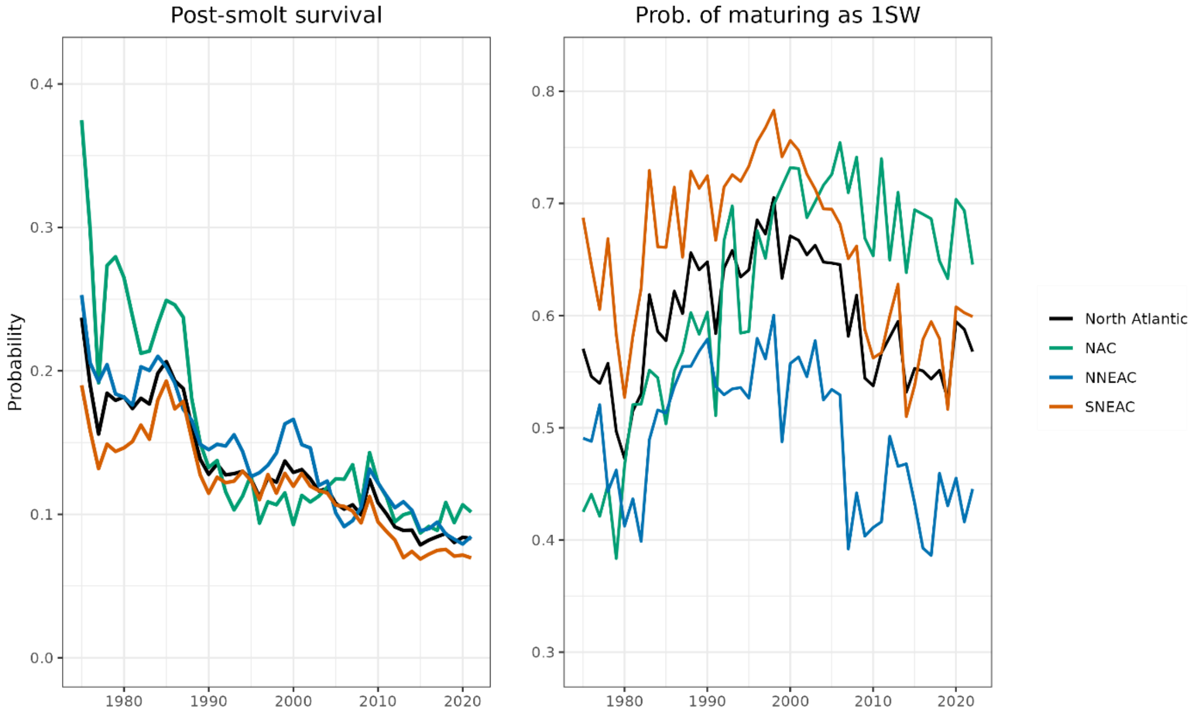


Figure 2.3.4. Trends in smolt-PFA survival and probability to mature as 1SW derived from the LCM, for the North Atlantic as a whole, and the NAC, S-NEAC and N-NEAC stock complexes. Post-smolt-survival: Year are smolt migration year (smolt migration year is PFA year -1). Probability to mature as 1SW: Year are PFA years. Values are the medians of the marginal posterior distributions.

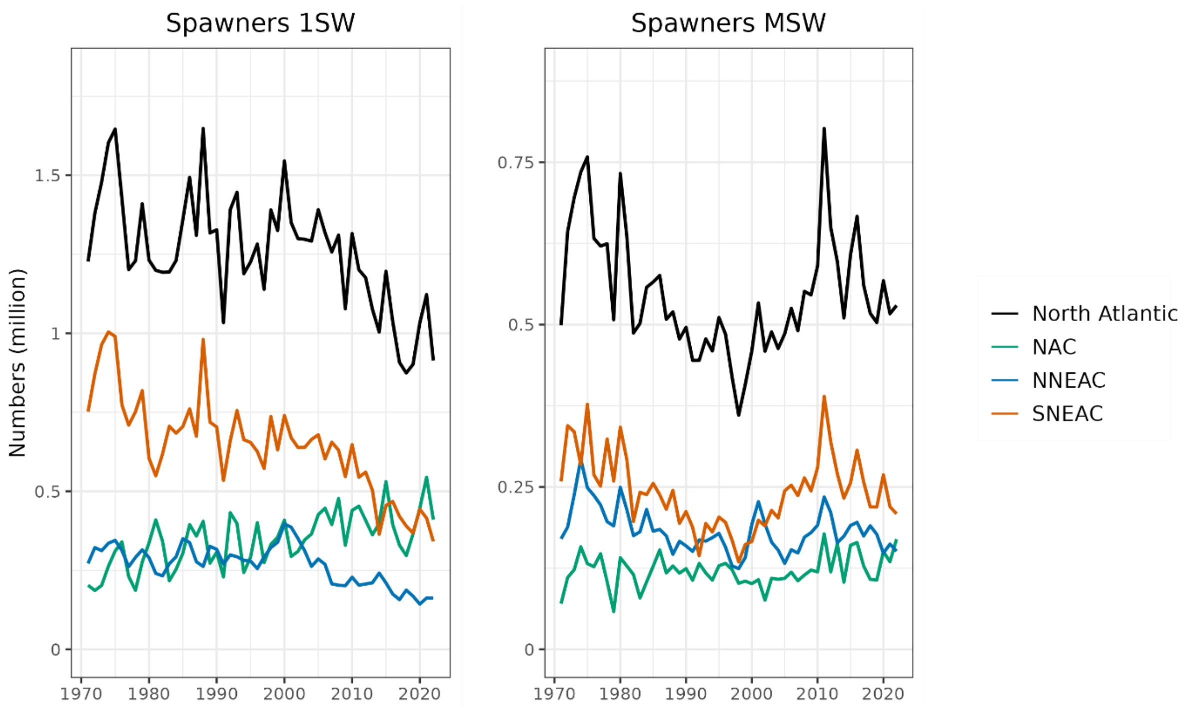


Figure 2.3.5. Trends in the abundance of spawners (1SW and MSW), derived from the LCM, for the North Atlantic as a whole, and the NAC, S-NEAC and N-NEAC stock complexes.

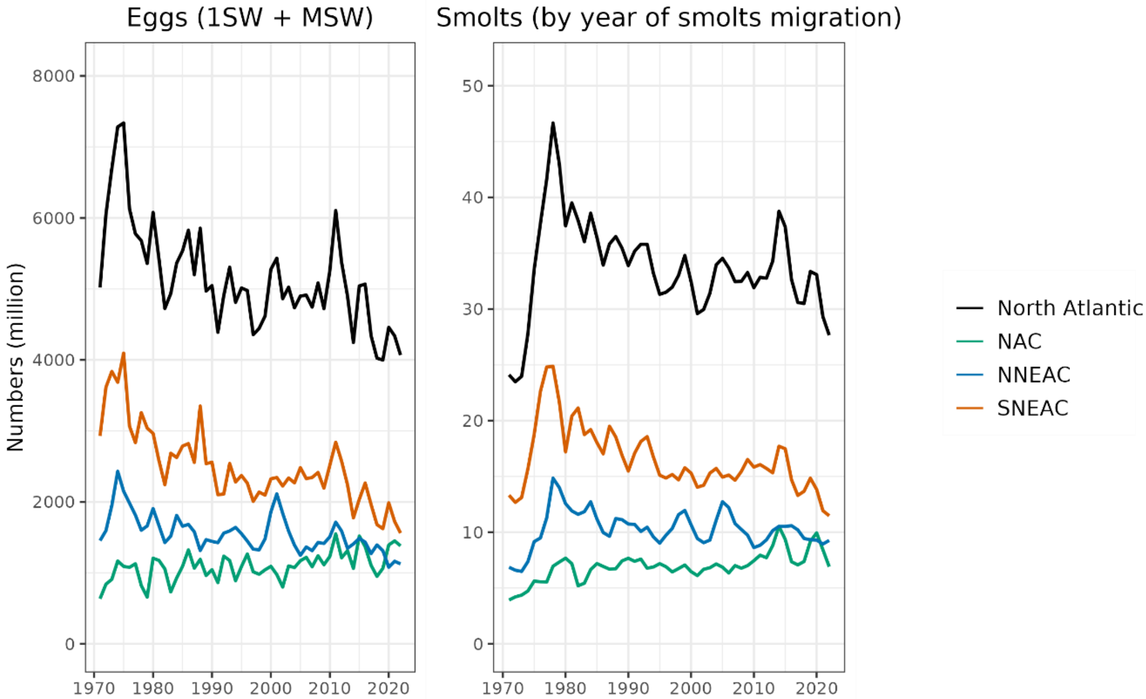


Figure 2.3.6. Trends in the abundance of eggs (1SW + MSW) and smolts, derived from the LCM, for the North Atlantic as a whole, and the NAC, S-NEAC and N-NEAC stock complexes. (Year shown for smolt abundance is smolt migration year (i.e. PFA year -1)). Values 1970 – 1980 should be ignored as they are affected by model "burn in".

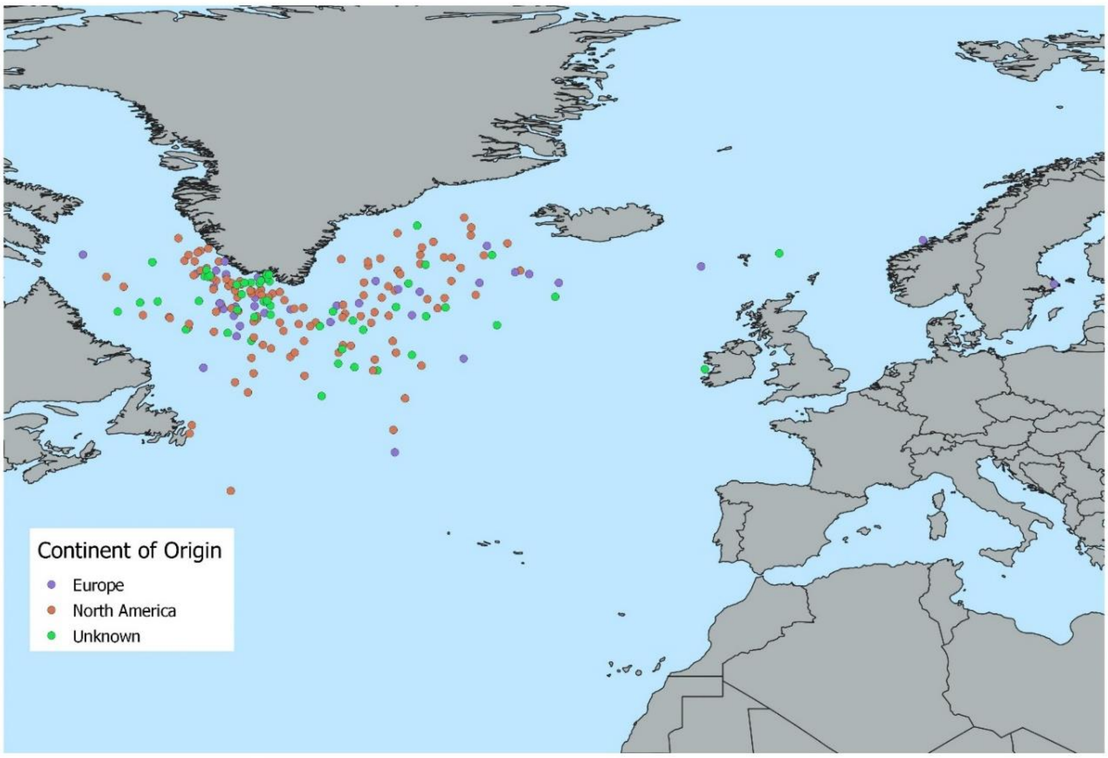


Figure 2.4.1. Pop-off location of all PSAT tags released at West Greenland from 2018-2023 by continent of origin. Results are considered preliminary as data processing is ongoing and a number of tags released in 2023 are still active. The Unknown continent of origin assignment group represents inconclusive assignments from 2018-2022 and all of the 2023 samples as processing of these samples is ongoing.

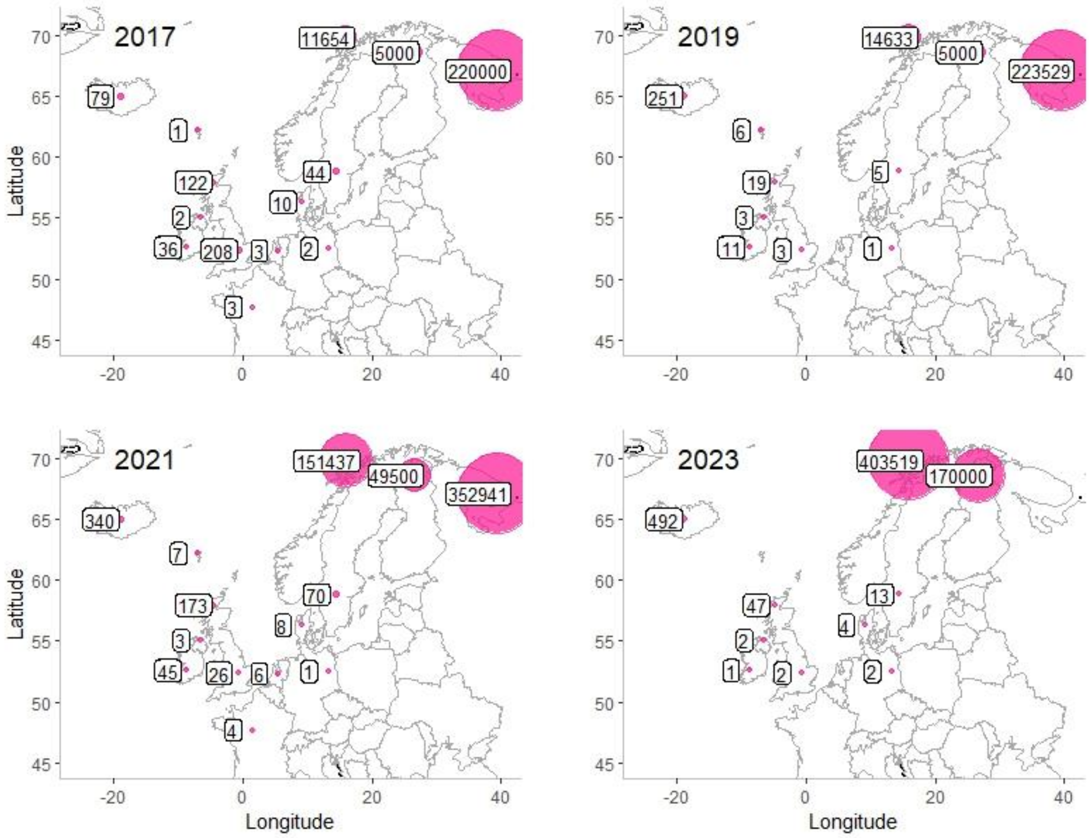


Figure 2.9.1. Numbers of pink salmon reported by countries/jurisdictions in the NEAC area (2017, 2019, 2021 and 2023). These numbers are from catches, removals, counts or observations. No data available from Russia in 2023.

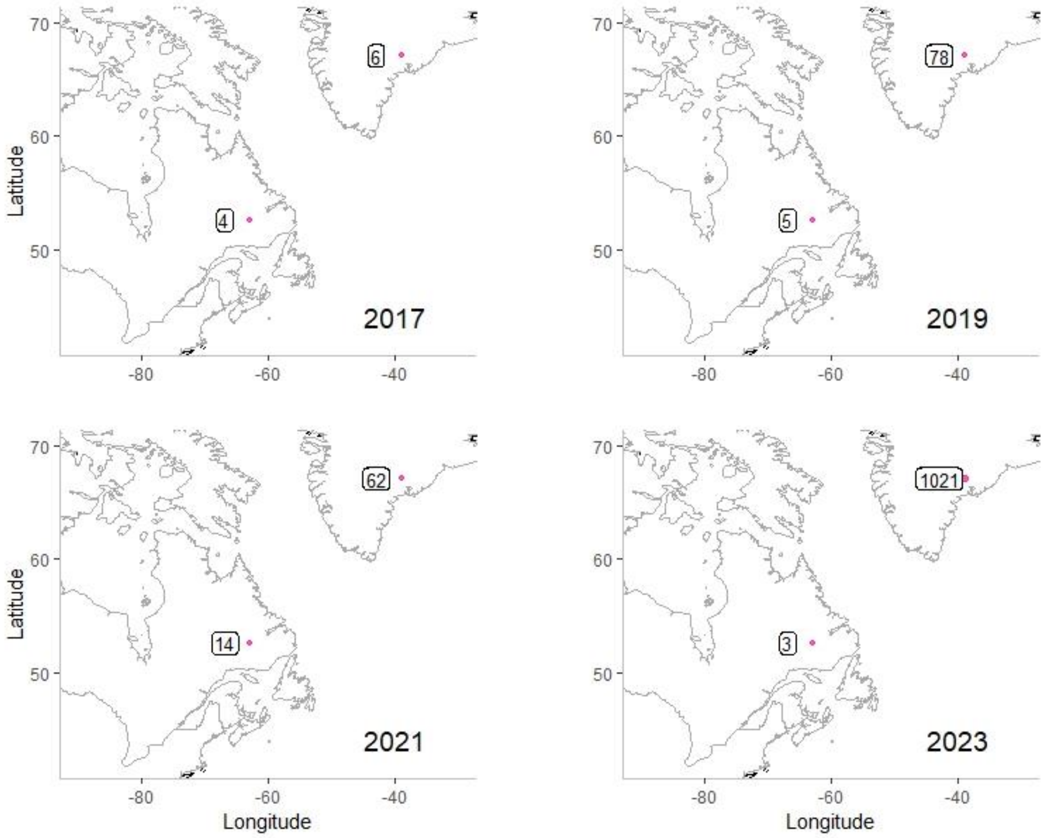


Figure 2.9.2. Numbers of pink salmon reported by countries in the NAC and WGC area (2017, 2019, 2021 and 2023). These numbers are from catches, removals, counts or observations.

3 Northeast Atlantic Commission area

3.1 NASCO has requested ICES to describe the key events of the 2023 fisheries

3.1.1 Fishing at Faroe Islands

No fishery for salmon has been prosecuted since 2000.

3.1.2 Key events in NEAC home-water fisheries

France: In 2023, new management measures have been implemented to regulate the rod-and-line recreational fishery of Brittany, France. Fishing has been prohibited for 11 out of 32 rivers due to either conservation issues or to the lack of data available to assess conservation. For the remaining 21 rivers, to ensure unselective exploitation, the total TAC of MSW has been decreased by 22% (from 513 to 402) and the TACs of 1SW have been removed. The effects of the new management measures on the population dynamics will be assessed every three years and they could be revised depending on the results of the assessment.

3.1.3 Gear and effort

No notable changes in gear type used were reported in 2023, however, changes in effort were recorded. The number of gear units licensed or authorised in several of the NEAC area countries provides a partial measure of effort (Table 3.1.3.1), but does not take into account other restrictions, for example, closed seasons. In addition, there is no indication from these data of the actual number of licences actively utilised or the time each licensee fished.

The numbers of gear units used to take salmon with nets and traps have declined markedly over the available time-series in all NEAC countries. This reflects the closure of many fisheries and increasingly restrictive measures to reduce levels of exploitation in many countries. There are fewer measures of effort in respect of in-river rod fisheries, and these indicate differing patterns over the available time-series. However, anglers in all countries are increasingly practicing catch and release (C&R: see below). Catch and release is also practised in some commercial salmonid net fisheries, for example in UK (England & Wales) and UK (Scotland), where gears that previously targeted and retained salmon and sea trout, and kept the fish alive until retrieval, are now only allowed to retain sea trout and must release any salmon alive. Trends in effort are shown in Table 3.1.3.1 for the NEAC area and in Figures 3.1.3.1 and 3.1.3.2 for the Northern and Southern NEAC countries, respectively.

In the Northern NEAC area, the number of bagnets and bendnets in Norway has decreased during the past 15–20 years. Since 2021, the numbers were substantially reduced from previous years, and the use of bendnets was phased out in 2022. In 2023, the number of bagnets showed a slight increase from 2022. No effort information is available from Russia since 2020. The number of anglers and fishing days in the River Tana/Teno showed a dramatic decrease in 2017 following a new fishery agreement between Finland and Norway, and in 2021-2023, all salmon fishing has been closed in this river. The number of anglers has stayed relatively stable at the River Näätämöjoki in Finland but showed a decline from the most recent years in 2023.

In the Southern NEAC area, the numbers of gear units licensed for net fisheries in UK (England & Wales; Scotland; Northern Ireland) and Ireland have shown clear long-term declines. The numbers of gear units in 2023 were among the lowest reported in the time-series. In UK (England & Wales), licences were only issued for sea trout fishing and therefore, no net fishing for salmon has taken place following the introduction of the National Salmon and Sea Trout Protection by-laws in 2019. In UK (Northern Ireland) no commercial fishing activity has occurred in coastal Northern Irish waters since 2012. In France, the number of nets in estuaries and in freshwater have decreased over the time-series during the latest years. The number of estuarine drift net licences has remained relatively stable over the most recent years. No data from freshwater nets were available for France in 2021-2023.

Rod licence numbers have decreased in UK (England & Wales), but 2023 showed a slight increase from the previous year. In Ireland, there has been a decrease in the numbers of licences issued since 2002, but they have varied at a lower level over recent years. In France, the rod-and-line effort in freshwater has been relatively stable over recent years, but the amount in 2023 was below long-term averages.

3.1.4 Catches

NEAC area catches are presented in Table 3.1.4.1 (note no 2023 catch was available for the Russian Federation, at time of writing). The nominal catch in the NEAC area in 2023 (400 t) was lower than the updated catch for 2022 (569 t) and represents a 75% and 117% decrease compared to the five-year (2018-2022) and ten-year (2013-2022) means, respectively. It should be noted that changes in nominal catch may reflect changes in exploitation rates and the extent of catch and release in rivers, in addition to stock size, and thus cannot be regarded as a direct indicator of abundance. The provisional total nominal catch in Northern NEAC in 2023 (353 t) was lower than the updated catch for 2022 (511 t) and the previous five-year and ten-year means (619 t, 717 t, respectively). In the Southern NEAC area, the provisional total nominal catch in 2023 (47 t) was lower than the updated catch for 2022 (58 t) and below the previous five-year (83 t) and ten-year (151 t) means, respectively. Figure 3.1.4.1 shows the trends in nominal catches of salmon in the Southern and Northern NEAC areas from 1970 to 2023. The catch in the Southern NEAC area has declined over the period, from an average of 3705 t per annum during the first 10 years of the time-series (1970-1979) to an average of 124 t per annum during the most recent decade (2014-2023). The catch fell sharply in 1976, and between 1989 and 1991, and has steadily decreased by an order of magnitude over the last 20 years, from over 1000 t in the early 2000s to currently below 100 t. The catch in the Northern NEAC area declined over the time-series, although this decrease was less distinct than the reductions noted in the Southern NEAC area. The catch in the Northern NEAC area varied between 2000 t and 2800 t from 1970 to 1988, fell to a low of 961 t in 1997, and then increased to over 1600 t in 2001. Catch in the Northern NEAC area has exhibited a downward trend since and has been consistently below 1000 t since 2012. Thus, the catch in the Southern NEAC area, which comprised around two thirds of the total NEAC catch in the early 1970s, has been lower than that in the Northern NEAC area since 1999, and has been around one fifth of the total catch in the NEAC area in recent years.

3.1.5 Catch per unit of effort (CPUE)

CPUE can be influenced by various factors, such as fishing conditions, perceived likelihood of success and experience. Both CPUE of net and rod fisheries might be affected by measures taken to reduce fishing effort, for example, changes in regulations affecting gear. If changes in one or more factors occur, a pattern in CPUE may not be immediately evident, particularly over larger areas. It is, however, expected that for a relatively stable effort, CPUE can reflect changes in the status of stocks and stock size. CPUE may be affected by increasing rates of catch and release in rod fisheries.

The CPUE data are presented in Tables 3.1.5.1 to 3.1.5.6. The CPUE for rod fisheries have been derived by relating the catch to rod-days or angler season. CPUE for net fisheries were calculated as catch per licence-day, gear-day, licence-tide, trap-month or crew-month.

In the most recent years, several CPUE data time-series have been discontinued because of fishery regulations or information being otherwise not available (Tables 3.1.5.1. to 3.1.5.6). Therefore, Figure 3.1.5.1 shows long-term trends for only five CPUE data sets in contrast to the numerous trends that were earlier presented from various fisheries in the NEAC area.

In the Northern NEAC area, a general increasing trend was observed for the CPUE in the Norwegian bagnet fisheries (Figure 3.1.5.1). In Finland, the CPUE in 2021-2022 has been estimated only for the River Näätämöjoki because of the recent salmon fishery moratorium at the River Teno. The CPUE of the Näätämöjoki rod fishing has been relatively stable over time (Figure 3.1.5.1).

In the Southern NEAC area, UK (England & Wales) measures introduced under the Salmon and Sea Trout Byelaws since 2019 required the closure of several net fisheries and prohibition on retention in other net fisheries, and therefore, CPUE figures could not be calculated for 2019-2023 (Table 3.1.5.3). The CPUE for the net and coble fisheries in UK (Scotland) show a general decline over the time-series (Figure 3.1.5.1). CPUE for fixed engine fisheries in UK (Scotland) are not available since 2016 due to changes in gear used not comparable with previous reporting (Table 3.1.5.5). The CPUE values for rod fisheries in UK (England & Wales) show a general positive trend (Figure 3.1.5.1) but a decrease in 2023 from the previous year (Table 3.1.5.4). In France, the CPUE for rod fisheries shows an overall decline over the time-series (Figure 3.1.5.1), and the 2023 figure was lower than in the previous year and the long-term mean (Table 3.1.5.1).

3.1.6 Age composition of catches

The percentage of 1SW salmon in catches is presented by NEAC country alongside the weighted average by region (Table 3.1.6.1, Figure 3.1.6.1). Except for Iceland, the proportion of 1SW salmon has declined for all countries over the period 1987–2023, especially so for Spain. There were no catches in Finland in 2021-2023.

In Northern NEAC, the overall (weighted average) percentage of 1SW fish in catches remained reasonably consistent in the period 1987–2000 (mean 66%, range 63% to 71%), but has fallen in recent years (2001–2023) to 60% (range 53% to 68%), where greater variability among countries and years has also been evident. Comparing the two periods, the proportion of 1SW fish has decreased in Russia, Norway, Finland and Sweden, whereas an increase was apparent for Iceland. On average, 1SW fish comprise a higher percentage of the catch in Iceland than in the other Northern NEAC countries in the period 2001–2023 (Table 3.1.6.1), this may be related to increased C&R of MSW fish in Iceland.

In the Southern NEAC area, the weighted proportion of 1SW salmon is higher than in the northern area, largely driven by relatively high catches and high proportions of 1SW salmon in Ireland. 1SW fish comprise a higher percentage of the catch in Ireland than in the other Southern NEAC countries during the entire period. The percentage of 1SW fish in catches averaged 80% (range 74% to 84%) in 1987–2000 and 76% (range 60% to 86%) in 2001–2023 in the Southern NEAC area. Comparing the two periods, the percentage of 1SW salmon has decreased in all Southern NEAC countries presented (Table 3.1.6.1), least so for Scotland and most for Spain.

3.1.7 Farmed and ranched salmon in catches

The contribution of farmed and ranched salmon to national catches in the NEAC area in 2023 was again generally low in most countries. Farmed and ranched fish are included in assessments of the status of national stocks (Section 3.3) for Norway.

The number of farmed salmon that escaped from Norwegian farms in 2023 was reported to be approximately 1 500 fish (provisional figure). The number is well below the average of the previous ten years (138 000 fish). An assessment of the likely effect of these fish on the estimates of PFA has been reported previously (ICES, 2001).

The estimated proportion of farmed salmon in Norwegian angling catches in 2023 (1%) was the lowest in the time-series, and the proportion in samples taken from Norwegian rivers in autumn in 2023 (4%), was also among the lowest values in the time-series. No data are available for the proportion of farmed salmon in coastal fisheries in Norway. A small proportion of the catch in UK (Scotland) (1.63% of retained, 0.08 of all catch including catch and released salmon) in 2023 were reported to be of farmed origin.

An escapee event was reported on 20 August 2023 in one of the sea-pens in the Westfjords of Iceland. The number of salmon in the pen at that time was around 72 500 between 5.0-6.0 kg. The estimated number of escapees from this event was approximately 3500 salmon. Following the event, escapees being caught in the salmon angling fisheries started to be reported and the numbers increased quickly. The Directorate of Fisheries along with the Icelandic Food and Veterinary Authority put measures in place with the focus on removal of farmed fish from rivers across West and Northwest Iceland. This was done with rods, nets and with help from two teams of Norwegian snorkelling experts. A total of 439 escapees were caught and removed from rivers. All 297 of the samples tested, were identified by DNA-methods to be salmon from the escapee event; 142 have yet to be analysed. The unexpectedly high proportion of salmon from the escape event arriving in rivers was because salmon in this pen had a relatively high proportion of sexually mature fish. A team from the Marine and Freshwater Research Institute in Iceland measured sexual maturity from samples taken at the site. A total of 35% of the fish were sexually mature indicating their ability to spawn in the autumn. The high maturity percentage is believed to have resulted from malfunction of the artificial light setting that is put in place to reduce the reproductive development of farmed salmon. In addition to the targeted removal measures, 29 escapees were caught in an annual monitoring survey carried out during spawning by the research company Laxfiskar in rivers Fífustaðadalsa, Selardalsa, and Bakkadalsa located close to the farm site (Sturlaugsson and Palsson unpublished data).

The release of smolts for commercial ranching purposes ceased in Iceland in 1998 but ranching for rod fisheries in two Icelandic rivers continued in 2023. Icelandic catches have traditionally been split into two separate categories, wild and ranched (Table 2.2.2.1). In 2023, 11 t of catch were reported as ranched salmon in contrast to 20 t harvested as wild. Similarly, Swedish catches have been split into two separate categories, wild and ranched (Table 2.2.2.1). In 2023, 7 t of catch were reported as ranched salmon in contrast to 4 t harvested as wild. Ranching occurs on a much smaller scale in Ireland and UK (Northern Ireland).

3.1.8 National origin of catches

3.1.8.1 Catches of Russian salmon in northern Norway

The WGNAS has previously reported on catches of Russian salmon in northern Norway based on results from the Kolarctic Salmon project (Kolarctic ENPI CBC programme 2007–2013) (ICES, 2020a).

In 2020, the Kolarctic ENI CBC project CoASal "*Conserving our Atlantic salmon as a sustainable resource for people in the North; fisheries and conservation in the context of growing threats and a changing environment* (KO4178)" was started. The project aimed to document and examine the effect of new coastal salmon fishery regulations, study the effects of growing threats Atlantic salmon populations face today with climate change, growing cage culture industry and emerging diseases. Project partners were from Norway: the County Governor of Troms and Finnmark (Lead Partner) and Institute of Marine Research, from Russia: Polar branch of VNIRO (PINRO), from Finland: University of Turku, Biodiversity Unit and from Sweden: Swedish University of Agricultural Sciences. The project was conducted in the period from January 2020 to January 2023. The project was funded through the EU's Kolarctic ENI CBC programme, national funding and funding from the partners. The project followed up and built on the results from the "Kolarctic salmon (KO197)" project (2011–2013).

Results from the project have been reported at a web-site hosted by the county governor of Troms and Finnmark (https://www.statsforvalteren.no/nb/troms-finnmark/miljo-klima/internasjonalt-samarbeid/atlantisk-laks-i-barentsregionen--atlantic-salmon-in-the-barents-region/). In these reports, the contribution of Russian populations to the coastal fishery in northern Norway is presented and compared to earlier results from the Kolarctic salmon project. In general, the results showed a reduced contribution of Kola Peninsula populations to the costal fishery, as well as a marked reduction of the Tana stock in the catches in both the Tana-fjord and adjacent areas. Beyond this, the results were comparable to the results from the previous Kolarctic Salmon project.

Due to the conflict in Ukraine, Russia's participation in the project was suspended, and no new data or samples were received from Russia.

Due to the current political situation, there were no meetings in 2023 of the Working Group on Atlantic salmon in Finnmark County and the Murmansk Region, established under the Memorandum of Understanding between the Ministry of Climate and Environment (Norway) and the Federal Agency for Fishery (the Russian Federation).

3.1.9 Exploitation indices of NEAC stocks

Exploitation rates have been plotted for 1SW and MSW salmon from the Northern NEAC and Southern NEAC areas (1971 to 2023) and are displayed in Figure 3.1.9.1. National exploitation rates are an output of the NEAC Run-Reconstruction Model (RRM). These were combined as appropriate by weighting each individual country's exploitation rate to the reconstructed returns.

The exploitation of 1SW salmon in both Northern NEAC and Southern NEAC areas has shown a general decline over the time-series (Figure 3.1.9.1). A notable sharp decline in 2007 was a result of the closure of the Irish driftnet fisheries in the Southern NEAC area. The decline in 2021 in the Northern NEAC was due to large reductions in the Norwegian sea-fisheries, and closure of salmon fisheries in the River Tana/Teno, as well as in adjacent sea-areas. The weighted exploitation rate on 1SW salmon in the Northern NEAC area was 30% in 2023, which was lower than the previous five-year (36%) and ten-year (39%) means. Exploitation on 1SW fish in the Southern NEAC complex was 7% in 2023, which was at the same level as the previous five-year mean (7%) but lower than the previous ten-year mean (9%).

The exploitation rate of MSW fish also exhibited an overall decline over the time-series in both Northern NEAC and Southern NEAC areas (Figure 3.1.9.1), with notable sharp declines in 2008 and 2021 in Northern NEAC. The decline in 2021 was caused by the same reductions in Norwegian and Finnish fisheries as explained for 1SW salmon. Exploitation on MSW salmon in the Northern NEAC area was 34% in 2023, which was lower than the previous five-year (38%) and the ten-year means (41%). Exploitation on MSW fish in Southern NEAC was 3% in 2023, which was at the same level as the previous five-year (3%) and lower than ten-year (5%) means.

The rate of change of exploitation of 1SW and MSW salmon in NEAC countries over the time periods 1971 to 2023 for Northern NEAC and Southern NEAC is shown in Figure 3.1.9.2. This was derived from the slope of the linear regression between time and natural logarithm transformed exploitation rate. The relative rate of change of exploitation over the entire time-series indicates an overall reduction of exploitation in most Northern NEAC countries for 1SW and MSW salmon (Figure 3.1.9.2). The greatest rate of decrease in Northern countries was shown for MSW fish in Iceland (northeast), while the lowest rate of decrease was shown for MSW fish in Russia during the time-series. The Southern NEAC countries have also shown a general decrease in exploitation rate (Figure 3.1.9.2) on both 1SW and MSW components, except for 1SW salmon in France where exploitation for 1SW salmon has increased over the time-series. The greatest rate of decrease was shown in UK (Scotland, England & Wales and Northern Ireland), while Iceland showed relative stability in exploitation rates during the time-series.

3.2 Management objectives and reference points

3.2.1 NEAC Conservation Limits

River-specific Conservation Limits (CLs) have been derived for salmon stocks in most countries in the NEAC area (France, Ireland, UK (England & Wales), UK (Northern Ireland), UK (Scotland), Finland, Norway and Sweden). Conservation Limit estimates for individual rivers are summed to provide estimates at the national level for these countries.

River-specific CLs have also been derived for a number of rivers in Russia and Iceland, but these are not yet used in national assessments. An interim approach has been developed for countries that do not use river-specific CLs in their national assessment. This approach is based on the establishment of pseudo-stock–recruitment relationships for national salmon stocks; further details are provided in the Stock Annex.

Conservation Limit estimates for all individual countries are summed to provide estimates for the Northern and Southern NEAC stock complexes (Table 3.2.1.1). These data are also used to estimate the Spawner Escapement Reserves (SERs; the CL increased to take account of natural mortality between the recruitment date of 01 January in the first sea winter and return to home waters). SERs are estimated for maturing and non-maturing 1SW salmon from individual countries as well as the Northern NEAC and Southern NEAC stock complexes (Table 3.2.1.1). The WGNAS considers that the current national CL may be less appropriate for evaluating the historical status of stocks (e.g. pre-1985), which in many cases have been estimated with less precision.

3.2.2 Progress with setting river-specific Conservation Limits

3.2.2.1 France

In 2023, the CLs for the 47 French salmon rivers were updated, or provided if they were previously missing, using the most recent data available. The CLs in numbers of eggs were derived for each river from CLs expressed in terms of egg density (eggs per m^2 of suitable nursery and rearing habitat for juvenile salmon) and the surface area of suitable nursery and rearing habitat for juvenile salmon. The three main changes consisted of:

(i) CLs (expressed as egg density per m^2) for the rivers of Brittany were modified to account for the new definition adopted in 2019 by the managers of this region;

(ii) the surface area of suitable nursery and rearing habitat for juvenile salmon was updated using the most recent cartographic analyses; and

(iii) CLs were set for 6 new rivers.

As a result, the French national CL (the sum of river-specific CLs) increased from 55 616 500 to 77 676 434 eggs.

3.3 Status of stocks

3.3.1 Compliance with river-specific Conservation Limits

In the NEAC area, nine jurisdictions have established river-specific CLs. Compliance with these and associated trends per jurisdiction are summarised below and presented in Figure 3.3.1.1 and Tables 3.3.1.1 and 3.3.1.2. Attainment of CLs is assessed based on spawners, after fisheries, unless otherwise indicated.

- For the River Tana/Teno (Norway & Finland), the number of major tributary stocks with established CLs rose from nine between 2007 and 2012 (with five annually assessed against CL), to 24 (25 including the main stem) since 2013 (with seven to 15 assessed against CL). No stocks met CL prior to 2013. A declining trend is evident in assessed stocks attaining CL from 40% in 2018 to 7% (a single stock) in 2023;
- CLs were established for 439 Norwegian salmon rivers in 2009, with CL attainment retrospectively assessed for 165–220 river stocks back to 2005. The estimated level of attainment has increased in recent years. In 2023, 72 % of evaluated rivers had spawning stocks larger than their CL. Since 2014, this has fluctuated between 72% and 86%;
- Since 1999, CLs have been established for 85 river stocks in Russia (Murmansk region). In the period 1999 to 2019, eight of these have been annually assessed for CL attainment, of which 88% have consistently met their CL. However, in 2020, only two stocks were assessed with one of these meeting CL. No data are available since that time;
- Sweden established CLs in 2016 for 23 stocks which rose to 24 stocks since 2017. Eight of the 21 stocks assessed (38%) met CL in 2016. Since 2021, between 13% and 17% of assessed stocks annually, have met CL, which is lower than the preceding mean of 29%;
- In France, river-specific CLs were established for 38 stocks in 2001 rising up to 47 in 2023. However, compliance with CL has not been assessed to date. In previous reports, the number of rivers assessed actually corresponded to the number of rivers with TACs, and France assessed the number of rivers that reached or exceeded the TACs;
- Ireland established CLs for all 141 stocks in 2007, rising to 144 since 2020 to include sub-catchments associated with hydrodams. The mean percentage of stocks meeting CLs is 36% over the time-series, with the highest attainment of 41% achieved in 2011 and 2012. In 2022 and 2023, 33% of assessed stocks, respectively, attained CL;
- UK (England & Wales) established CLs in 1993 for 61 rivers, increasing to 64 from 1997 with an overall mean of 40% assessed stocks meeting CL over the time-series. In 2022 and 2023, only 14% and 8%, respectively, of assessed stocks met CL, the latter which is the lowest since assessments began;
- Data on UK (Northern Ireland) river-specific CLs are presented from 2002, when CLs were assigned to ten river stocks. Since 2012, 19 stocks have established CLs with up to 17 of these assessed annually for CL attainment. A mean of 40% have met their CLs over the time-series. A downward trend in CL attainment is evident from 2020 (67%) to 2023 (12%), the latter which is the lowest since assessments began;
- UK (Scotland) have established CLs for 173 assessment groups (rivers and small groups of rivers) with retrospective assessment conducted to 2011. For domestic management,

stock status is expressed as the probability of achieving CL and attainment is set at 60%. Mean attainment over the time-series was 48%. In 2022, the most recent reporting year available, 37% of assessment groups met CL, which is moderately higher than 2021 (32%) but moderately lower than 2019 and 2020 (44% and 45%, respectively).

No river-specific CLs have been established for Denmark, Germany and Spain. Iceland has set provisional CLs for all salmon producing rivers and continues to work towards finalising an assessment process for determining CL attainment.

3.3.2 Return rates in index rivers

These estimates are reported as "return rates" rather than "marine return rates" to account for their potential confounding with estuarine and freshwater survival rates due to the varied circumstances under which their data are collected and used for estimation. For a more complete discussion about return rates see Section 2.4 in the 2023 WGNAS report (ICES, 2023a).

There were additions and omissions to the dataset up to 2022. Passive-Integrated Transponder (PIT) tagging programmes started on three rivers in Norway (R. Vigda [NINA], R. Sylte / Moaelva [NINA], and R. Etne [IMR]) in 2016 have now yielded seven 1SW and six 2SW return rate estimates, which were deemed sufficient to be included in the dataset.

An overview of return rates for wild- and hatchery-reared smolts returning to homewaters (i.e. before homewater exploitation) are presented in Tables 3.3.2.1 and 3.3.2.2, and Figure 3.3.2.1. The figure shows the proportional change in five-year mean return rates for smolt-to-1SW (smolt years 2018-2022) and smolt-to-2SW (smolt years 2017-2021) returns to rivers of Northern and Southern NEAC areas compared to their mean returns for the previous five-year period. It should be noted that: (1) although Norwegian rivers Vigda, Sylte/ Moaelva, and Etne are included in the dataset, Northern NEAC is represented only by the River Imsa (1SW and 2SW) until they provide sufficient annual estimates to calculate two consecutive five-year means; and (2) the scale of change in some rivers is influenced by low return numbers creating high uncertainty, which might have a large consequence on the proportional change.

In Northern NEAC, the recent five-year mean return rate of wild smolts to the River Imsa (Norway) as 1SW returns has increased marginally compared to the previous five years from 2.74% to 3.3%, and as 2SW returns has decreased over the same period from 1.46% to 0.74%. The same pattern is seen in hatchery smolts returning to the River Imsa.

In Southern NEAC, the pattern in five-year mean return rates of wild smolts as 1SW returns compared to the previous five years was mixed, with two rivers increasing and six rivers decreasing. The largest decrease was on the River Corrib (Ireland) from 4.23% to 1.83%, and the largest increase was on the River Ellidaar (Iceland) from 8.22% to 11.1%. The pattern in hatchery smolts returning as 1SW returns compared to the previous five years was also mixed, with six rivers decreasing and three rivers increasing, of which the River Erne (Ireland) saw the largest increase from 0.37% to 2.8%. Five-year mean return rates of wild smolts as 2SW returns were mixed, with three rivers increasing and three rivers decreasing. The River Corrib (Ireland) saw the largest increase from 0.4% to 1.87%, while the rivers Bush (UK (Northern Ireland)) and Scorff (France) saw similar decreases among 2SW returns. The River Dee (UK (England & Wales)) did not have sufficient annual estimates between 2017 and 2022 to calculate reliable five-year mean return rates for 1SW or 2SW returns.

The annual return rates for different rivers and experimental facilities are presented in Tables 3.3.2.1 and 3.3.2.2. From these data, least squared (or marginal) mean annual return rates were estimated to provide indices of survival for Northern and Southern NEAC 1SW and 2SW returning adult wild and hatchery salmon groups from 1980 (Figure 3.3.2.2). To account for variation due to the number of contributing experimental groups, mean annual return rates were estimated using a GLM (Generalised Linear Model) with return rates related to smolt year and river, each as factors, with a quasi-Poisson distribution (log-link function). All reported annual return rates were used to estimate the mean annual return rates, i.e. there was no restriction on the numbers of years reported, to ensure the maximum number of rivers could contribute. Note that estimated year effects are presented on a log-scaled y-axis.

Return rates of wild and hatchery smolts to Northern NEAC are variable. They have generally decreased since 1980, although rates of 1SW returns from wild smolts have stabilised since 2010, and from hatchery smolts have increased since 2005 (Figure 3.3.2.2). Rates of 2SW returns from smolts to Northern NEAC are highly variable, but have continued to decline since 2010 and 2005 for wild and hatchery smolts, respectively. Mean return rates of wild and hatchery smolts to Southern NEAC are less variable, primarily because they are estimated from more rivers. They too have generally decreased since 1980, although rates of 2SW returns from wild smolts started to increase since 2005, and rates of 1SW returns from hatchery smolts have stabilised since 2010.

The low return rates in recent years highlighted in these analyses are broadly consistent with the trends in estimated returns and spawners as derived from the Run-Reconstruction Model (Section 3.3.4), and suggest that abundance is strongly influenced by factors in the marine environment.

3.3.3 Changes to the national input data and the NEAC Run-Reconstruction Model

Model inputs are described in detail in Section 2.2 of the Stock Annex. In addition to adding new data for 2023, the following changes were made to the national/regional input data for the Run-Reconstruction Model (RRM):

UK (Scotland): Prior to WGNAS 2024, a correction factor for the rod catch, used to derive estimates of returns to home-waters, was provided to the RRM. This ensured alignment with national estimates of returns to home-waters. In 2024, this correction factor for the rod catch was replaced with estimates of returns to freshwater that align with national estimates. This simplifies the run reconstruction and is a more interpretable data stream. Returns to freshwater are now provided directly to the RR model in the form of the mean and variance of a log normal distribution.

The unreported catch rate of the net fishery is not included in the national estimate of home-water returns. As a consequence, the change to the provision of returns to freshwater has resulted in an increase in the historic estimates of returns to homewaters from the run reconstruction, equal to the unreported net catch. This also results in a corresponding reduction in the derived exploitation rate, and increase in spawner abundance. Returns to homewaters for UK (Scotland) are now derived by adding the net catch, corrected for unreporting, to the freshwater returns (including a proportion of the net catch from UK (England & Wales) for the east coast).

Russia: Run reconstruction input data have not been provided to WGNAS for the years 2021, 2022 and 2023. A method for estimating the required data inputs from total reported catch was derived for WGNAS 2023 and is detailed in the Stock Annex. Data on the total catch for Russia in 2023 were not available to WGNAS in 2024 and so the mean of the total catch from 2018-2022 was used as input.

3.3.4 Description of national stocks and NEAC stock complexes

The stock abundance models used by WGNAS provide an overview of the status of salmon stocks in the Northeast Atlantic at the stock complex and national levels. They do not capture variation in the status of stocks in individual rivers or small groups of rivers. This has been addressed, in part, by the regional splits within some countries and the analysis set out in Section 3.3.1.

Modelled estimates of 1SW and MSW returns and spawners (as derived from the RRM) for each stock complex and country are provided in Tables 3.3.4.1 – 3.3.4.8, with CLs provided in Table 3.2.1.1. The hindcasted estimates of these values as derived from the LCM are provided in Figures 3.3.4.1, 3.3.4.2 and 3.3.4.4a – 3.3.4.4k. These estimates provide an index of the current status and historical trends in stocks based on fisheries data, and model assumptions. It should be noted that the results for the full time-series can change when the assessment is re-run from year to year and as the input data are refined (see Section 3.3.3 for changes to input data).

3.3.4.1 NEAC stock complexes

The status of stocks was assessed relative to the probability of returns and spawners exceeding CLs according to the management targets set out in Section 1.5. Differences in CL attainment between returns and spawners are due to exploitation from homewater fisheries.

Hindcast estimates of 1SW and MSW returns to Northern NEAC show a general decline over the period in both age classes, with the decline more pronounced in the 1SW age class (Figure 3.3.4.1). In 2023, the two returning age classes were considered to be at full reproductive capacity (i.e. the 5th percentile of the estimate was above the CL). However, 1SW and MSW return estimates were lower than the previous five-year mean and the second lowest in the time-series (Tables 3.3.4.1 and 3.3.4.2). A decline in the hindcast 1SW spawner estimates was evident from around 2000 (Figure 3.3.4.1). This is reflected in the 2023 estimates of spawners from the RRM which were determined to be at risk of suffering reduced reproductive capacity and are amongst the lowest in the time-series (Table 3.3.4.3). No clear trends were evident for MSW spawners (Figure 3.3.4.1). In 2023, the MSW spawner abundance estimate from the run reconstruction was similar to the previous five-year mean and the stock was considered to be at full reproductive capacity (Table 3.3.4.4).

Hindcast estimates of 1SW and MSW returns to Southern NEAC show a general decline over the period in both age classes, with the decline more marked in the 1SW age class (Figure 3.3.4.2). In 2023, the 1SW returns stock component was suffering reduced reproductive capacity (i.e. the median estimate was below the CL) and the estimate was the lowest in the time-series – nearly a one third decrease on the previous five-year mean (Table 3.3.4.5). In 2023, the MSW returns stock component was the second lowest in the time-series and below the previous five-year mean, and this stock component was at risk of suffering reduced reproductive capacity (Table 3.3.4.6). A decline in the hindcast of 1SW spawners was also evident over the period (Figure 3.3.4.2) with this stock component in 2023 estimated from the RRM to be suffering reduced reproductive capacity and the lowest in the time-series (Table 3.3.4.7). No clear trends were evident for MSW spawners (Figure 3.3.4.2) but in 2023 the spawner abundance estimate from the RRM decreased by 25% from the previous five-year mean and this stock component was considered to be at risk of suffering reproductive capacity (Table 3.3.4.8).

3.3.4.2 National stocks

The assessment of 1SW and MSW returns and spawners against CLs for all countries in Northern and Southern NEAC can be found in Figure 3.3.4.3. Two main patterns are apparent, which are also reflected in the complex-level assessments above. First, more stocks in Southern NEAC countries were suffering, or at risk of suffering, reduced reproductive capacity compared to Northern NEAC countries. This was true for both 1SW and MSW stock components. Secondly, 1SW stocks were more likely to be suffering, or at risk of suffering, reduced reproductive capacity compared to MSW stocks.

Within Northern NEAC countries, returning 1SW and MSW stocks in Norway, Sweden and Iceland were at full reproductive capacity in 2023 (Figure 3.3.4.3a). However, returns in the remaining countries were either suffering, or at risk of suffering, reduced reproductive capacity. There were changes to stock status between returns and spawners in Iceland (1SW and MSW), Sweden (1SW) and Russia (1SW and MSW), showing the impact of home-water exploitation on CL attainment in these areas. In all Northern NEAC countries, 1SW return and spawner estimates were among the lowest in the time-series (Tables 3.3.4.1 and 3.3.4.2). This was also the case for MSW returns in most countries. However, MSW spawner estimates in 2023 were not ranked among the lowest values (Tables 3.3.4.3 and 3.3.4.4). Note that there are deficiencies in Russian data since 2021 (see Section 3.3.3) and therefore, these results should be interpreted with caution.

The trends in return and spawner hindcast estimates as derived from the LCM for Northern NEAC countries are presented in Figures 3.3.4.4a – 3.3.4.4e.

With respect to Southern NEAC countries, all 1SW and MSW stocks were suffering reduced reproductive capacity in 2023, except for UK (Scotland) and MSW UK (England & Wales). In UK (Scotland), there was a change in stock status between returns and spawners for the 1SW component (Figure 3.3.4.3a). In all Southern NEAC countries, 1SW return and spawner estimates were either the lowest, or second lowest, in the time-series (Tables 3.3.4.5 and 3.3.4.6). MSW return and spawner estimates were among the lowest in the time-series for all countries except UK (England & Wales) (Tables 3.3.4.7 and 3.3.4.8).

Hindcast estimates of 1SW and MSW returns and spawners as derived from the LCM for Southern NEAC countries are presented in Figures 3.3.4.4f – 3.3.4.4k.

3.3.4.3 List of notable results

1SW returns

- In 2023, estimates of total 1SW returns to Northern NEAC (268 851) and Southern NEAC (354 960) ranked as the second lowest and lowest, respectively, of the 53-year time-series;
- 1SW returns to Northern NEAC in 2023 decreased from the previous five-year mean in all regions (-18% to -40%), except for Russia (10% increase);
- 1SW returns to Southern NEAC in 2023 decreased from the previous five-year mean in all regions (-22% to -64%) and were the lowest in the time-series for UK (England & Wales), Iceland (southwest), Ireland, and UK (Northern Ireland);
- On average (2018-2022), the largest percentage contribution to the total 1SW returns to Northern NEAC were provided by Norway (65%) and Russia (23%);
- On average (2018-2022), the largest percentage contribution to total 1SW returns to Southern NEAC were provided by UK (Scotland) (46%) and Ireland (31%).

MSW returns

- In 2023, estimates of total MSW returns to Northern NEAC (263 730) and Southern NEAC (223 817) both ranked as the second lowest of the 53-year time-series;
- In Northern NEAC, MSW returns in 2023 decreased from the previous five-year mean in all regions (-3% to -20%), except for Russia (10% increase);
- In Southern NEAC, MSW returns in 2023 decreased from the previous five-year mean in all regions (-11% to -58%), except for Iceland (southwest) (4% increase);

- On average (2018-2022), the vast majority of MSW returns (92%) to Northern NEAC were from Norway (73%) and Russia (19%). There were relatively few MSW returns to Northern NEAC from Finland (4%), Sweden (2%), and Iceland (northeast) (1%);
- On average (2018-2022), in Southern NEAC, most of the MSW returns were from UK (Scotland) (56%) and UK (England & Wales) (31%). Relatively few MSW returns to Southern NEAC were from Ireland (7%), France (2%), Iceland (southwest) (2%), and UK (Northern Ireland) (1%).

1SW spawners

- Estimates of total 1SW spawners in 2023 for Northern NEAC (188 420) and Southern NEAC (319 529) ranked as the seventh lowest and lowest, respectively, of the 53-year time-series;
- 1SW spawners in Northern NEAC in 2023 decreased from the previous five-year mean in all regions (-6% to -33%), except for Russia (22% increase);
- 1SW spawners in Southern NEAC in 2023 decreased from the previous five-year mean in all regions (-21% to -64%);
- 1SW spawners in 2023 were the lowest on record for UK (England & Wales), Iceland (southwest), and UK (Northern Ireland);
- On average (2018-2022), the majority of 1SW spawners in Northern NEAC were from Norway (57%) and Russia (29%);
- On average (2018-2022), most 1SW spawners in Southern NEAC were from UK (Scotland) (46%) and Ireland (32%).

MSW spawners

- Estimates of total MSW spawners in 2023 for Northern NEAC (172 131) and Southern NEAC (205 637) ranked as the twenty-fourth and nineth lowest of their respective time-series;
- MSW spawners in Northern NEAC in 2023 increased from previous five-year mean in all areas (5% to 33%), except for Norway (-10%) and Sweden (-9%).
- MSW spawners in Southern NEAC in 2023 decreased from the previous five-year mean in all areas (-7% to -58%);
- On average (2018-2022), over three-quarters of the MSW spawners in Northern NEAC were from Norway (76%);
- On average (2018-2022), most MSW spawners in Southern NEAC (88%) were from UK (Scotland) (54%) and UK (England & Wales) (34%).

3.3.5 Forecasts of NEAC stock complexes and national stocks as derived from the LCM

3.3.5.1 NEAC stock complexes

In Northern NEAC (Figure 3.3.4.1, Tables 3.3.5.1 and 3.3.5.2), the median estimates of maturing and non-maturing PFA are forecast to increase slightly in 2024 and remain stable for the years 2025 to 2027. The 5th percentile is forecast to remain above SER for the years 2024 to 2027 with the exception of the non-maturing PFA in 2027.

In Southern NEAC (Figure 3.3.4.2, Tables 3.3.5.3 and 3.3.5.4), the median estimates of maturing and non-maturing PFA are forecast to remain relatively stable for the years 2024 to 2027, though they remain amongst the lowest estimates in the time-series. For the maturing PFA, the median is forecast to be below the SER for the years 2024 to 2027. For the non-maturing PFA, the median is forecast to remain above the SER for the years 2024 to 2027 whilst the 5th percentile is below the SER for the same period.

3.3.5.2 National stocks

Figures 3.3.4.4a – 3.3.4.4k and Tables 3.3.5.1 – 3.3.5.4 provide estimates of the maturing and non-maturing PFA hindcasts and forecasts aggregated to the national level for the years 2024 to 2027.

Of note in the forecasts of Northern NEAC national stocks:

- River Tana/Teno (Norway & Finland): for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline to the lowest estimates in the time-series and be below the SER for the years 2024 to 2027;
- Iceland (northeast): for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline to the lowest estimates in the time-series. The median maturing PFA is forecast to remain above SER for the years 2024 to 2027, with the 5th percentile below the SER. The median non-maturing PFA is forecast to fall below SER from 2025 to 2027. Uncertainty in the forecasts of the maturing PFA is large relative to the range of PFA observed in the hindcast;
- Norway: for both maturing and non-maturing stocks, the median of the PFA is forecast to remain stable for the years 2024 to 2027, continuing the relative stability in PFA observed in the hindcast since around 2012. The 5th percentile is forecast to remain above the SER for both maturing and non-maturing PFA for the years 2024 to 2027, with the exception of the non-maturing PFA in 2027 which falls just below SER;
- Russia: the median estimate for maturing PFA is forecast to remain at the lowest levels in the time-series and below the SER for years 2024 to 2027. The median estimate for non-maturing PFA is forecast to remain at the lowest levels in the time-series and above the SER for the years 2024 to 2027, though the 5th percentile is forecast to fall below the SER for same period. Note that there are deficiencies in Russian data since 2021 (see Section 3.3.3) and therefore, these results should be interpreted with caution;
- Sweden: for both maturing and non-maturing stocks, the median of the PFA is forecast to remain stable and above SER for the years 2024 to 2027, continuing the relative stability in PFA observed in the hindcast. The 5th percentile is forecast to be below SER for the same period. Uncertainty in the forecast PFA is large relative to the hindcast.

Of note in the forecasts of Southern NEAC national stocks:

- France: for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline, reaching the lowest values in the time-series for maturing stocks and being amongst the lowest values in the time-series for non-maturing stocks. Both stocks are forecast to be below the SER for the years 2024 to 2027;
- Iceland (southwest): for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline to amongst the lowest estimates in the time-series but remain above the SER for the years 2024 to 2027. The 5th percentile of both maturing and non-maturing PFA is forecast to be below the SER for the years 2024 to 2027;
- Ireland: for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline to the lowest estimates in the time-series and be below the SER for the years 2024 to 2027;
- UK (England & Wales): the median estimate for maturing PFA is forecast to remain stable but below the SER for years 2024 to 2027. The median estimate for non-maturing PFA is forecast to remain stable and above the SER for the years 2024 to 2027, though the 5th percentile is forecast to fall below the SER for same period. Uncertainty in the forecast of both maturing and non-maturing PFA from 2024 is large relative to the hindcast;
- UK (Northern Ireland): for both maturing and non-maturing stocks, the median estimate of PFA is forecast to be below the SER for the years 2024 to 2027 and be amongst the lowest estimates in the time-series.
- UK (Scotland): for both maturing and non-maturing stocks, the median estimate of PFA is forecast to decline but remain above the SER for the years 2024 to 2027, with the exception of the non-maturing PFA in 2027. The 5th percentile of both maturing and non-maturing PFA are forecast to be below the SER for the years 2024 to 2027.

3.3.5.3 Population dynamics

Figures 3.3.5.1 to 3.3.5.4 show hindcast estimates and forecasts of the post-smolt survival and probability of maturing as 1SW parameters derived from the LCM, aggregated to the level of stock complex and to the national level (where the national stock consists of multiple stock-units).

At the stock-unit level, the LCM projects parameters using a random walk process and so the median estimate will be largely constant. However, when forecasts of parameters are aggregated (weighted by relative abundance amongst stock-units), trends can be observed in the median estimates. This is because relative abundance among stock-units changes during the forecast period.

Post-smolt survival

Hindcast estimates of the post-smolt survival parameter aggregated to the level of the Northern NEAC stock complex (Figure 3.3.5.1) show a general decline over the time-series from around 0.25 in 1975 to a low of around 0.08 in 2020. This decline is generally observed also at the national level. Post-smolt survival for River Tana/Teno (Norway & Finland) and Russia have generally been lower than the complex-level aggregation over the whole time-series. This low survival may be an artefact of the relatively large fraction of MSW salmon older than 2SW in these regions (the LCM model assumes that all MSW fish are 2SW fish).

Forecasts of the post-smolt survival parameter in Northern NEAC have large uncertainty relative to the hindcast.

Hindcast estimates of the post-smolt survival parameter aggregated to the level of the Southern NEAC stock complex (Figure 3.3.5.3) show a general decline from a high of around 0.18 in 1985 to a low of around 0.07 in 2013, after which they are relatively stable. The parameter estimates show a similar pattern at the national level, though a continuation of the decline after 2013 is particularly evident for UK (Northern Ireland). Of note is a period of increased post-smolt survival in the early to mid-2000s, observable in UK (Scotland), Iceland (southwest) and France, in particular.

Forecasts of the post-smolt survival parameter in Southern NEAC reach high levels of uncertainty by 2027, relative to the hindcast.

Probability of maturing as 1SW

Estimates of the probability of maturing as 1SW parameter aggregated to the level of the Northern NEAC stock complex (Figure 3.3.5.2) are relatively consistent, between around 0.4 and 0.6 over the time-series, but have been less than 0.5 since 2007. Similar values are seen in the national level estimates for Norway, River Tana/Teno (Norway & Finland) and Russia.

Iceland (northeast) and Sweden diverge from the complex-level trend. In Iceland (northeast), a continual increase is observed, from a low of around 0.25 in 1980 to a high of around 0.75 in 2005, whereas in Sweden a continual decline is observed, from around 0.9 in 1975 to a low of around 0.25 in 2017. The forecasts of the probability of maturing for the years 2024 to 2027 have large uncertainty in Sweden and Russia in particular.

Hindcast estimates of the probability of maturing aggregated to the level of the Southern NEAC stock complex (Figure 3.3.5.4) generally decline from a peak of around 0.75 in the late 1990s to between 0.5 and 0.63 since 2010. At the national level, there is significant variation in the probability of maturing, with estimates consistently in excess of 0.75 in UK (Northern Ireland) and estimates of around 0.25 in UK (England & Wales) since 2014.

3.4 Catch options or alternative management advice for the 2024 / 2025 – 2026 / 2027 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these for stock rebuilding

3.4.1 Catch advice for Faroes

The Faroes risk framework, originally developed by ICES (2013) and updated for the LCM based on the 2023 benchmark review (ICES, 2023d; see also Section 2 of this report and the Stock Annex), has been used to evaluate catch options for the Faroes fishery in the 2024/2025, 2025/2026 and 2026/2027 fishing seasons (October to May).

The risk framework was applied to four management units (1SW and MSW returns to home-waters for Northern and Southern NEAC) and also to the two age groups in 10 NEAC countries (with Iceland split between S-NEAC and N-NEAC). Germany, the Netherlands, Spain and Denmark are not currently included in the catch advice assessments. North American fish form part of the catch and are accounted for in the catch advice for NEAC. The risk framework estimates the probability that the expected egg deposition of 1SW and MSW salmon in each of the management units will meet or exceed their respective CLs at different catch levels (TAC options). ICES have advised that the management objective should have a greater than 95% probability of meeting or exceeding the CL in each management unit. As NASCO has not yet adopted a management objective, the advice tables provide the probabilities for each management unit and the probabilities of simultaneous attainment of all CLs for each TAC option (Table 3.4.1.1 and 3.4.1.4).

As an example, a 20 t TAC option would result in a catch of about 5000 fish in the Faroes. The great majority (>97.5%) of these would be expected to be MSW fish. Once the sharing allocation (8.4% to Faroes) is applied, this equates to about 1500 1SW and 60 000 MSW fish assumed to be caught by fisheries in NEAC. The maturing and non-maturing 1SW components are split according to the catch composition estimates, and after taking into account natural mortality upon return to homewaters, the numbers of 1SW and MSW returns are converted to numbers of eggs according to the biological characteristics of each individual stock (see Stock Annex), before being compared to their respective CLs (Table 3.2.1.1). Note that the non-maturing 1SW component caught at Faroes will affect the MSW returns the following year. This is taken into account in the probability for attainment of CLs for each TAC option.

3.4.1.1 Catch advice based on stock complexes

The probabilities of the Northern and Southern NEAC stock complexes achieving their aggregated CLs for different catch options are shown in Table 3.4.1.1 and Figure 3.4.1.1. The probabilities with a zero TAC are the same as the values generated directly by the forecast (Section 3.3.5). In the Northern NEAC stock complex, over the forecast period, the MSW component has a high probability (≥95%) of achieving its CL for TACs at Faroes for a catch option of ≤40 t in the 2024/2025 season and for a catch option of ≤20 t in the 2025/2026 and 2026/2027 season. All other management units, at the stock complex level, each have less than 95% probability of achieving their CLs with any TAC option in any of the forecast seasons. Therefore, there are no catch options that ensure a greater than 95% probability of each stock complex achieving its CL.

The slope of the curves in the catch option figures (Figure 3.4.1.1) is mainly a function of the level of exploitation on the stocks resulting from a particular TAC in the Faroes fishery and the uncertainty in the parameter values used in the model. The relative flatness of some of the risk curves, particularly for the 1SW component, indicates that the risk to these management units is affected very little by any harvest at Faroes, principally because the exploitation rates on these stock components in the fishery are low (Table 3.4.1.2).

3.4.1.2 Catch advice based on national jurisdictions

The probabilities of the NEAC national 1SW and MSW management units achieving their CLs for different catch options are shown in Tables 3.4.1.3 and 3.4.1.4, respectively. The probabilities of the 1SW national management units achieving their CLs in 2024/2025 vary from 3% (France) to 99% (Norway) for the different countries with zero catch at Faroes. These probabilities decline very little with increasing TAC options, reflecting the expected low harvest rate on maturing 1SW stocks at Faroes (Table 3.4.1.5). The probabilities are also generally lower for the two subsequent seasons.

The probabilities of the MSW national management units achieving their CLs in 2024/2025 vary between 6% (Ireland) and 99% (Norway) with zero catch allocated for the Faroes fishery and decline with increasing TAC options. The only countries to have a greater than 95% probability of achieving their CLs with catch options for Faroes are Norway (TACs ≤20 t) and Russia (TACs ≤160 t). The risk to the stocks of Russia is considered low because they are largely absent in the

Faroese fishery, based on genetic data from the fishery in the 1980s and 1990s (Table 3.4.1.5). In most countries, these probabilities are lower in the subsequent two seasons. There are, therefore, no TAC options at which all management units would have a greater than 95% probability of achieving their CLs.

The exploitation rates on national stocks of 1SW fish are low (≤6.4%), at TACs up to 200 t (Table 3.4.1.5). Assuming any fishery at Faroes would be operated as in the past, and efforts would be made to minimize catches of 1SW fish, the stocks represented by these management units would be largely unaffected by a fishery. This is not the case for the MSW fish where exploitation rates can be up to 99% (Iceland (northeast)), at TACs up to 200 t (Table 3.4.1.6). Note that these exploitation rates reflect all fisheries (i.e. after the sharing allocation is applied).

3.4.2 River specific assessments and relevant factors to be considered in management

ICES (2012) emphasised the problem of basing the risk analysis on management units comprising large numbers of river stocks and recommended that in providing catch advice at the age- and stock-complex levels for Northern and Southern NEAC, consideration should be given to the recent performance of the river stocks within individual countries. At present, insufficient monitoring occurs to assess performance of all individual stocks in all countries or jurisdictions in the NEAC area (see Section 3.2). In some instances, CLs are in the process of being developed (e.g. Iceland).

The percent of stocks attaining their CLs within each jurisdiction in the NEAC area for which data are available is given in Table 3.3.1.1 (Northern NEAC) and Table 3.3.1.2 (Southern NEAC). The total number of stocks in each jurisdiction which can be assessed against a stock-specific CL are also shown. For Northern NEAC, the percent of assessed stocks within each jurisdiction meeting their CLs ranges between 7% (River Tana/Teno (Norway & Finland)) to 84% (Norway) in the two most recent years (2022 and 2023). For Southern NEAC, this range goes from 0% (France) to 33% (Ireland). Despite the absence of a fishery at Faroes since 1999, and reduced exploitation at West Greenland on the MSW Southern NEAC component, the abundance of a substantial proportion of stocks in the NEAC area is likely to have been below their stock-specific CLs.

There are no catch options for the Faroes fishery that would allow all national or stock complex management units to achieve their CLs with a greater than 95% probability in any of the seasons up to 2026/2027. As the abundance of stocks remains low, even in the absence of a fishery at Faroes, particular care should be taken to ensure that fisheries in homewaters are managed to protect stocks that are below their CLs. The most recent catch advice in 2021 concluded that there were no catch options at the Faroes for the 2021/2022 to 2023/2024 fishing seasons (ICES, 2021a). The current assessment and forecast results in similar advice.

The management of a fishery should ideally be based upon the status of all river stocks exploited in the fishery. Fisheries on mixed-stocks pose particular difficulties for management, when they cannot target only stocks that are at full reproductive capacity. Management objectives would be best achieved if fisheries target stocks that are at full reproductive capacity. Fisheries in estuaries, and especially rivers, are more likely to meet this requirement. WGNAS also emphasises 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.

Table 3.1.3.1.a. Number of gear units licensed or authorized by country and gear type (UK (England & Wales, Scotland, Northern Ireland), Ireland, and France)

Year	UK (England & Wales)					UK (Scotland)		UK (Northern Ireland)			Ireland				France		
	Gillnet licences	Sweepnet	Hand-held net	Fixed engine	Rod & Line	Fixed engine (1)	Net and coble (2)	Driftnet	Draftnet	Bagnets and boxes	Driftnets No.	Draftnets	Other nets commercial	Rod	Rod and line licences in freshwater	Commercial nets in fresh-water (5)	Driftnet licences in estu-ary (6,7)
1971	437	230	294	79	-	3080	800	142	305	18	916	697	213	10 566	-	-	-
1972	308	224	315	76	-	3455	813	130	307	18	1156	678	197	9612	-	-	-
1973	291	230	335	70	-	3256	891	130	303	20	1112	713	224	11 660	-	-	-
1974	280	240	329	69	-	3188	782	129	307	18	1048	681	211	12 845	-	-	-
1975	269	243	341	69	-	2985	773	127	314	20	1046	672	212	13 142	-	-	-
1976	275	247	355	70	-	2862	760	126	287	18	1047	677	225	14 139	-	-	-
1977	273	251	365	71	-	2754	684	126	293	19	997	650	211	11 721	-	-	-
1978	249	244	376	70	-	2587	692	126	284	18	1007	608	209	13 327	-	-	-
1979	241	225	322	68	-	2708	754	126	274	20	924	657	240	12 726	-	-	-
1980	233	238	339	69	-	2901	675	125	258	20	959	601	195	15 864	-	-	-
1981	232	219	336	72	-	2803	655	123	239	19	878	601	195	15 519	-	-	-
1982	232	221	319	72	-	2396	647	123	221	18	830	560	192	15 697	4145	55	82
1983	232	209	333	74	-	2523	668	120	207	17	801	526	190	16 737	3856	49	82

Year	UK (England & Wales)					UK (Scotland)		UK (Northern Ireland)			Ireland				France		
	Gillnet licences	Sweepnet	Hand-held net	Fixed engine	Rod & Line	Fixed engine (1)	Net and coble (2)	Driftnet	Draftnet	Bagnets and boxes	Driftnets No.	Draftnets	Other nets commercial	Rod	Rod and line licences in freshwater	Commercial nets in fresh-water (5)	Driftnet licences in estu-ary (6,7)
1984	226	223	354	74	-	2460	638	121	192	19	819	515	194	14 878	3911	42	82
1985	223	230	375	69	-	2010	529	122	168	19	827	526	190	15 929	4443	40	82
1986	220	221	368	64	-	1955	591	121	148	18	768	507	183	17 977	5919	58 (8)	86
1987	213	206	352	68	-	1679	564	120	119	18	768	507	183	17 977	5724 (9)	87 (9)	80
1988	210	212	284	70	-	1534	385	115	113	18	836	507	183	11 539	4346	101	76
1989	201	199	282	75	-	1233	353	117	108	19	801	507	183	16 484	3789	83	78
1990	200	204	292	69	-	1282	340	114	106	17	756	525	189	15 395	2944	71	76
1991	199	187	264	66	-	1137	295	118	102	18	707	504	182	15 178	2737	78	71
1992	203	158	267	65	-	851	292	121	91	19	691	535	183	20 263	2136	57	71
1993	187	151	259	55	-	903	264	120	73	18	673	457	161	23 875	2104	53	55
1994	177	158	257	53	37 278	749	246	119	68	18	732	494	176	24 988	1672	14	59
1995	163	156	249	47	34 941	729	222	122	68	16	768	512	164	27 056	1878	17	59

Year	UK (England & Wales)					UK (Scotland)		UK (Northern Ireland)			Ireland				France		
	Gillnet licences	Sweepnet	Hand-held net	Fixed engine	Rod & Line	Fixed engine (1)	Net and coble (2)	Driftnet	Draftnet	Bagnets and boxes	Driftnets No.	Draftnets	Other nets commercial	Rod	Rod and line licences in freshwater	Commercial nets in fresh-water (5)	Driftnet licences in estu-ary (6,7)
1996	151	132	232	42	35 281	643	201	117	66	12	778	523	170	29 759	1798	21	69
1997	139	131	231	35	32 781	680	194	116	63	12	852	531	172	31 873	2953	10	59
1998	130	129	196	35	32 525	542	151	117	70	12	874	513	174	31 565	2352	16	63
1999	120	109	178	30	29 132	406	132	113	52	11	874	499	162	32 493	2225	15	61
2000	110	103	158	32	30 139	381	123	109	57	10	871	490	158	33 527	2037	16	51
2001	113	99	143	33	24 350	387	95	107	50	6	881	540	155	32 814	2080	18	63
2002	113	94	147	32	29 407	426	102	106	47	4	833	544	159	35 024	2082	18	65
2003	58	96	160	57	29 936	363	109	105	52	2	877	549	159	31 809	2048	18	60
2004	57	75	157	65	32 766	450	118	90	54	2	831	473	136	30 807	2158	15	62
2005	59	73	148	65	34 040	381	101	93	57	2	877	518	158	28 738	2356	16	59
2006	52	57	147	65	31 606	364	86	107	49	2	875	533	162	27 341	2269	12	57
2007	53	45	157	66	32 181	238	69	20	12	2	0	335	100	19 986	2431	13	59
2008	55	42	130	66	33 900	181	77	20	12	2	0	160	0	20 061	2401	12	56
2009	50	42	118	66	36 461	162	64	20	12	2	0	146	38	18 314	2421	12	37

Year	UK (England & Wales)					UK (Scotland)		UK (Northern Ireland)			Ireland				France		
	Gillnet licences	Sweepnet	Hand-held net	Fixed engine	Rod & Line	Fixed engine (1)	Net and coble (2)	Driftnet	Draftnet	Bagnets and boxes	Driftnets No.	Draftnets	Other nets commercial	Rod	Rod and line licences in freshwater	Commercial nets in fresh-water (5)	Driftnet licences in estu-ary (6,7)
2010	51	40	118	66	36 159	189	66	2	1	2	0	166	40	17 983	2200	12	33
2011	53	41	117	66	36 991	201	74	2	1	2	0	154	91	19 899	2540	12	29
2012	51	34	115	73	35 135	237	79	1	1	2	0	149	86	19 588	2799	12	25
2013	49	29	111	62	33 301	238	59	0	0	0	0	181	94	19 109	3010	12	25
2014	48	34	109	65	31 605	204	56	0	0	0	0	122	37	18 085	2878	12	20
2015	52	33	102	63	30 847	127	65	0	0	0	0	100	6	18 460	2850	12	20
2016	49	34	105	62	30 214	13	43	0	0	0	0	98	4	18 303	3015	19	20
2017	46	32	112	57	35 162	10	41	0	0	0	0	105	5	18 212	4214	20	20
2018	38	30	87	57	31 655	0	26	0	0	0	0	97	8	16 755	3937	19	20
2019 (10)	14	13	60	49	29 126	2	18	0	0	0	0	67	10	17 238	3786	19	20
2020	17	13	64	43	28 387	3	17	0	0	0	0	68	10	14 138	3379	19	17
2021	15	16	71	41	23 530	11	34	0	0	0	0	87	10	15 547	3526	-	17
2022	16	14	61	39	21 574	14	23	0	0	0	0	76	18	17 318	3237	-	17

Year	UK (England & Wales)					UK (Scotland)		UK (Northern Ireland)			Ireland				France		
	Gillnet licences	Sweepnet	Hand-held net	Fixed engine	Rod & Line	Fixed engine (1)	Net and coble (2)	Driftnet	Draftnet	Bagnets and boxes	Driftnets No.	Draftnets	Other nets commercial	Rod	Rod and line licences in freshwater	Commercial nets in fresh-water (5)	Driftnet licences in estu-ary (6,7)
2023	14	13	59	40	22 029	8	20	0	0	0	0	80	11	16 045	2987		18
Mean																	
2018-2022	20	17	69	46	29 572	6	23	0	0	0	0	79	11	16 199	3573	19	18
% change (3)	-30.0	-23.5	-14.5	-13.0	-27.0	-33.3	-15.2	0.0	0.0	0.0	0.0	1.3	0.0	-1.0	-16.4	-	0.0
Mean																	
2013-2022	34	25	88	54	29 540	62	38	0	0	0	0	100	20	17 317	3383	17	20
% change (3)	-58.8	-48.0	-33.0	-25.9	-25.4	-87.1	-48.7	0	0	0	0	-20.0	-45.0	-7.3	-11.7	-	-10.0

Notes:

1. Number of gear units expressed as trap months.
2. Number of gear units expressed as crew months.
3. (2023/mean - 1) * 100.
4. Dash means "no data."
5. Lower Adour only since 1994 (Southwestern France), due to fishery closure in the Loire Basin.
6. Adour estuary only (Southwestern France).
7. Number of fishermen or boats using driftnets: overestimates the actual number of fishermen targeting salmon by a factor 2 or 3.
8. Common licence for salmon and sea trout introduced in 1986, leading to a short-term increase in the number of licences issued.
9. Compulsory declaration of salmon catches in freshwater from 1987 onwards.
10. Allowable effort in 2019 was zero throughout England and 1025 days were utilised in Wales

Table 3.1.3.1.b. Number of gear units licensed or authorized by country and gear type (Norway; Finland; Russia)

Year	Norway				Finland				Russia		
					The Teno River			R. Näätämö	Kola Peninsula	Archangel region	
					Recreational Fishery Tourist anglers		Local rod and net fishery (fishers)	Recreational fishery (fishers)		Commercial number of gears	
	Bagnet	Bendnet	Liftnet	Driftnet (No. nets)	Fishing days	Fishers			Catch and release (fishing days)	Coastal	In-river
1971	4608	2421	26	8976	-	-	-	-	-	-	-
1972	4215	2367	24	13 448	-	-	-	-	-	-	-
1973	4047	2996	32	18 616	-	-	-	-	-	-	-
1974	3382	3342	29	14 078	-	-	-	-	-	-	-
1975	3150	3549	25	15 968	-	-	-	-	-	-	-
1976	2569	3890	22	17 794	-	-	-	-	-	-	-
1977	2680	4047	26	30 201	-	-	-	-	-	-	-
1978	1980	3976	12	23 301	-	-	-	-	-	-	-
1979	1835	5001	17	23 989	-	-	-	-	-	-	-
1980	2118	4922	20	25 652	-	-	-	-	-	-	-
1981	2060	5546	19	24 081	16 859	5742	677	467	-	-	-
1982	1843	5217	27	22 520	19 690	7002	693	484	-	-	-
1983	1735	5428	21	21 813	20 363	7053	740	587	-	-	-

Year	Norway				Finland				Russia		
					The Teno River			R. Näätämö	Kola Peninsula	Archangel region	
					Recreational Fishery Tourist anglers		Local rod and net fishery (fishers)	Recreational fishery (fishers)		Commercial number of gears	
	Bagnet	Bendnet	Liftnet	Driftnet (No. nets)	Fishing days	Fishers			Catch and release (fishing days)	Coastal	In-river
1984	1697	5386	35	21 210	21 149	7665	737	677	-	-	-
1985	1726	5848	34	20 329	21 742	7575	740	866	-	-	-
1986	1630	5979	14	17 945	21 482	7404	702	691	-	-	-
1987	1422	6060	13	17 234	22 487	7759	754	689	-	-	-
1988	1322	5702	11	15 532	21 708	7755	741	538	-	-	-
1989	1888	4100	16	0	24 118	8681	742	696	-	-	-
1990	2375	3890	7	0	19 596	7677	728	614	-	-	-
1991	2343	3628	8	0	22 922	8286	734	718	1711	-	-
1992	2268	3342	5	0	26 748	9058	749	875	4088	-	-
1993	2869	2783	-	0	29 461	10 198	755	705	6026	59	199
1994	2630	2825	-	0	26 517	8985	751	671	8619	60	230
1995	2542	2715	-	0	24 951	8141	687	716	5822	55	239
1996	2280	2860	-	0	17 625	5743	672	814	6326	85	330
1997	2002	1075	-	0	16 255	5036	616	588	6355	68	282
1998	1865	1027	-	0	18 700	5759	621	673	6034	66	270

Year	Norway				Finland				Russia		
					The Teno River			R. Näätämö	Kola Peninsula	Archangel region	
					Recreational Fishery Tourist anglers		Local rod and net fishery (fishers)	Recreational fish-ery (fishers)		Commercial number of gears	
	Bagnet	Bendnet	Liftnet	Driftnet (No. nets)	Fishing days	Fishers			Catch and release (fishing days)	Coastal	In-river
1999	1649	989	-	0	22 935	6857	616	850	7023	66	194
2000	1557	982	-	0	28 385	8275	633	624	7336	60	173
2001	1976	1081	-	0	33 501	9367	863	590	8468	53	121
2002	1666	917	-	0	37 491	10 560	853	660	9624	63	72
2003	1664	766	-	0	34 979	10 032	832	644	11 994	55	84
2004	1546	659	-	0	29 494	8771	801	657	13 300	62	56
2005	1453	661	-	0	27 627	7776	785	705	20 309	93	69
2006	1283	685	-	0	29 516	7749	836	552	13 604	62	72
2007	1302	669	-	0	33 664	8763	780	716		82	53
2008	957	653	-	0	31 143	8111	756	694		66	62
2009	978	631	-	0	29 641	7676	761	656		79	72
2010	760	493	-	0	30 646	7814	756	615		55	66
2011	767	506	-	0	31 269	7915	776	727		78	52
2012	749	448	-	0	32 614	7930	785	681		72	53

Year	Norway				Finland				Russia		
					The Teno River			R. Näätämö	Kola Peninsula	Archangel region	
					Recreational Fishery Tourist anglers		Local rod and net fishery (fishers)	Recreational fishery (fishers)		Commercial number of gears	
	Bagnet	Bendnet	Liftnet	Driftnet (No. nets)	Fishing days	Fishers			Catch and release (fishing days)	Coastal	In-river
2013	786	459	-	0	33 148	8074	785	558		110	71
2014	700	436	-	0	32 852	7791	746	396		57	74
2015	724	406	-	0	33 435	7809	765	232		81	62
2016	798	438	-	0	31 923	7273	712	512		42	59
2017	854	419	-	0	10 074	2468	506	405		29	54
2018	900	411	-	0	10 556	2586	507	512		56	58
2019	936	418	-	0	10 476	2931	481	524		53	25
2020	975	419	-	0	10 360	2462	490	541		41	22
2021	522	212	-	0	0	0	0	557		-	-
2022	461	0	-	0	0	0	0	509		-	-
2023	520	0	-	0	0	0	0	404		-	-

Year	Norway				Finland				Russia		
					The Teno River			R. Näätämö	Kola Peninsula	Archangel region	
					Recreational Fishery Tourist anglers		Local rod and net fishery (fishers)	Recreational fishery (fishers)		Commercial number of gears	
	Bagnet	Bendnet	Liftnet	Driftnet (No. nets)	Fishing days	Fishers			Catch and release (fishing days)	Coastal	In-river
Mean											
2018-2022	759	292						529		45	40
% change (3)	-31.5	-100						-23.6		-	-
Mean											
2013-2022	766	362			20 544	4932	578	475		60	53
% change (3)	-32.1	-100						-14.9		-	-

Notes:

3. (2023/mean - 1) * 100.

4. Dash means "no data”.

Table 3.1.4.1. Nominal catch of salmon in the NEAC Area (in tonnes round fresh weight), 1960–2023 (2023 figures are provisional, no data available from the Russian Federation).

Year	Southern NEAC	Northern NEAC (1)	Faroes (2)	Other catches in international waters	Total reported catch	Unreported catches	
						NEAC Area (3)	International waters (4)
1960	2641	2899	-	-	5540	-	-
1961	2276	2477	-	-	4753	-	-
1962	3894	2815	-	-	6709	-	-
1963	3842	2434	-	-	6276	-	-
1964	4242	2908	-	-	7150	-	-
1965	3693	2763	-	-	6456	-	-
1966	3549	2503	-	-	6052	-	-
1967	4492	3034	-	-	7526	-	-
1968	3623	2523	5	403	6554	-	-
1969	4383	1898	7	893	7181	-	-
1970	4048	1834	12	922	6816	-	-
1971	3736	1846	-	471	6053	-	-
1972	4257	2340	9	486	7092	-	-
1973	4604	2727	28	533	7892	-	-
1974	4352	2675	20	373	7420	-	-
1975	4500	2616	28	475	7619	-	-
1976	2931	2383	40	289	5643	-	-
1977	3025	2184	40	192	5441	-	-
1978	3102	1864	37	138	5141	-	-
1979	2572	2549	119	193	5433	-	-
1980	2640	2794	536	277	6247	-	-
1981	2557	2352	1025	313	6247	-	-
1982	2533	1938	606	437	5514	-	-
1983	3532	2341	678	466	7017	-	-
1984	2308	2461	628	101	5498	-	-
1985	3002	2531	566	-	6099	-	-

Year	Southern NEAC	Northern NEAC (1)	Faroes (2)	Other catches in international waters	Total reported catch	Unreported catches	
						NEAC Area (3)	International waters (4)
1986	3595	2588	530	-	6713	-	-
1987	2564	2266	576	-	5406	2554	-
1988	3315	1969	243	-	5527	3087	-
1989	2433	1627	364	-	4424	2103	-
1990	1645	1775	315	-	3735	1779	180-350
1991	1145	1677	95	-	2917	1555	25-100
1992	1522	1806	23	-	3351	1825	25-100
1993	1443	1853	23	-	3319	1471	25-100
1994	1895	1685	6	-	3586	1157	25-100
1995	1775	1504	5	-	3284	942	-
1996	1392	1358	-	-	2750	947	-
1997	1112	961	-	-	2073	732	-
1998	1120	1099	6	-	2225	1108	-
1999	934	1139	0	-	2073	887	-
2000	1211	1518	8	-	2737	1135	-
2001	1242	1633	0	-	2875	1089	-
2002	1135	1361	0	-	2496	946	-
2003	909	1395	0	-	2304	719	-
2004	921	1059	0	-	1980	575	-
2005	811	1189	0	-	2000	605	-
2006	651	1216	0	-	1867	604	-
2007	373	1036	0	-	1409	465	-
2008	356	1179	0	-	1535	433	-
2009	266	899	0	-	1165	317	-
2010	412	1003	0	-	1415	357	-
2011	410	1009	0	-	1419	382	-
2012	297	954	0	-	1251	363	-

Year	Southern NEAC	Northern NEAC (1)	Faroes (2)	Other catches in international waters	Total reported catch	Unreported catches	
						NEAC Area (3)	International waters (4)
2013	309	771	0	-	1080	272	-
2014	217	736	0	-	953	256	-
2015	223	860	0	-	1083	298	-
2016	187	842	0	-	1029	298	-
2017	152	867	0	-	1019	318	-
2018	124	807	0	-	931	279	-
2019	85	676	0	-	761	237	-
2020	78	685	0	-	763	238	-
2021	72	415	0	-	487	135	-
2022	58	511	0	-	569	174	-
2023(5)	47	353	0	-	400	94	-
Mean							
2018–2022	83	619	0	-	702	213	-
2013–2022	151	717	0	-	868	251	-

Notes:

1. All Iceland has been included in Northern NEAC.

2. Since 1991, fishing carried out at the Faroes has only been for research purposes.

3. No unreported catch estimate available for Russia since 2008.

4. Estimates refer to season ending in given year.

5. No catch data available from Russia in 2023, at the time of writing.

Table 3.1.5.1. Catch per unit of effort (CPUE) for salmon rod fisheries in Finland (rivers Teno, Näätämöjoki, Finnish parts), France, and UK (Northern Ireland) (Bush).

Year	Finland (R. Teno)		Finland (R. Näätämö)		France	UK (Northern Ireland) (Bush)
	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (number)	Catch per rod day (number)
1974		2.8				
1975		2.7				
1976		-				
1977		1.4				
1978		1.1				
1979		0.9				
1980		1.1				
1981	3.2	1.2				
1982	3.4	1.1				
1983	3.4	1.2				0.248
1984	2.2	0.8	0.5	0.2		0.083
1985	2.7	0.9	n/a	n/a		0.283
1986	2.1	0.7	n/a	n/a		0.274
1987	2.3	0.8	n/a	n/a	0.39	0.194
1988	1.9	0.7	0.5	0.2	0.73	0.165
1989	2.2	0.8	1.0	0.4	0.55	0.135
1990	2.8	1.1	0.7	0.3	0.71	0.247
1991	3.4	1.2	1.3	0.5	0.60	0.396
1992	4.5	1.5	1.4	0.3	0.94	0.258
1993	3.9	1.3	0.4	0.2	0.88	0.341
1994	2.4	0.8	0.6	0.2	2.32	0.205
1995	2.7	0.9	0.5	0.1	1.15	0.206
1996	3.0	1.0	0.7	0.2	1.57	0.267
1997	3.4	1.0	1.1	0.2	0.44 (1)	0.338

Year	Finland (R. Teno)		Finland (R. Näätämö)		France	UK (Northern Ireland) (Bush)
	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (number)	Catch per rod day (number)
1998	3.0	0.9	1.3	0.3	0.67	0.569
1999	3.7	1.1	0.8	0.2	0.76	0.27
2000	5.0	1.5	0.9	0.2	1.06	0.26
2001	5.9	1.7	1.2	0.3	0.97	0.44
2002	3.1	0.9	0.7	0.2	0.84	0.18
2003	2.6	0.7	0.8	0.2	0.76	0.24
2004	1.4	0.4	0.9	0.2	1.25	0.25
2005	2.7	0.8	1.3	0.2	0.74	0.32
2006	3.4	1.0	1.9	0.4	0.89	0.46
2007	2.9	0.8	1.0	0.2	0.74	0.60
2008	4.2	1.1	0.9	0.2	0.77	0.46
2009	2.3	0.6	0.7	0.1	0.50	0.14
2010	3.0	0.8	1.3	0.2	0.87	0.23
2011	2.4	0.6	1.0	0.2	0.65	0.12
2012	3.6	0.9	1.7	0.4	0.61	0.15
2013	2.5	0.6	0.7	0.2	0.57	0.27
2014	3.3	0.8	1.4	0.3	0.73	0.15
2015	2.6	0.6	1.7	0.3	0.77	0.07
2016	2.9	0.7	1.1	0.2	0.60	0.05
2017	5.7	1.4	0.8	0.2	0.35	-
2018	2.6	0.6	0.9	0.2	0.25	-
2019	2.7	0.8	1.3	0.3	0.31	-
2020	3.2	0.8	0.7	0.2	0.28	-
2021	n/a (2)	n/a (2)	0.5	0.1	0.27	-
2022	n/a (2)	n/a (2)	0.8	0.2	0.22	-
2023	n/a (2)	n/a (2)	0.6	0.2	0.15	

Year	Finland (R. Teno)		Finland (R. Näätämö)		France	UK (Northern Ireland) (Bush)
	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (kg)	Catch per angler day (kg)	Catch per angler season (number)	Catch per rod day (number)
Overall mean	**3.1**	**1.0**	**1.0**	**0.2**	**0.7**	**0.3**
Mean: 2018–2022	**2.8**	**0.7**	**0.8**	**0.2**	**0.3**	**-**

Notes:

1. Large numbers of new, inexperienced anglers in 1997 because cheaper licence types were introduced.

2. For the 2021 - 2023 seasons, all salmon fishing has been closed at the River Teno catchment.

Table 3.1.5.2. Catch per unit of effort (CPUE) for salmon in coastal and in-river fisheries in the Archangelsk region (tonnes/gear) and catch and release rod fishery (fish/rod-day) in rivers of the Russian Kola peninsula.

Year	Archangelsk region commercial fishery		Barents Sea basin			White Sea basin
	Coastal	In-river	Rynda	Kharlovka	Eastern Litsa	Ponoi
1992			2.37	1.45	2.95	4.50
1993	0.34	0.04	1.18	1.46	1.59	3.57
1994	0.35	0.05	0.71	0.85	0.79	3.30
1995	0.22	0.08	0.49	0.78	0.94	3.77
1996	0.19	0.02	0.70	0.85	1.31	3.78
1997	0.23	0.02	1.20	0.71	1.09	6.09
1998	0.24	0.03	1.01	0.55	0.75	4.52
1999	0.22	0.04	0.95	0.77	0.93	3.30
2000	0.28	0.03	1.35	0.77	0.89	3.55
2001	0.21	0.04	1.48	0.92	1.00	4.35
2002	0.21	0.11	2.39	0.99	0.89	7.28
2003	0.16	0.05	1.16	1.14	1.04	8.39
2004	0.25	0.08	1.07	0.98	1.31	5.80
2005	0.17	0.08	1.18	0.82	1.63	4.42
2006	0.19	0.05	0.92	1.46	1.46	6.28
2007	0.14	0.09	0.92	0.78	1.46	5.96
2008	0.12	0.08	1.27	1.14	1.52	5.73
2009	0.09	0.05	1.18	1.29	1.35	5.72
2010	0.21	0.08	1.10	0.99	0.98	4.78
2011	0.15	0.07	0.60	0.90	0.99	4.01
2012	0.17	0.09	1.10	0.87	0.97	5.56
2013	0.12	0.09	0.98	0.85	1.09	4.37
2014	0.22	0.10	1.25	1.42	1.55	5.20
2015	0.16	0.09	1.04	1.33	1.70	3.94
2016	0.31	0.08	1.05	1.28	1.42	3.35
2017	0.36	0.07	1.07	1.88	2.03	3.83

Year	Archangelsk region commercial fishery		Barents Sea basin			White Sea basin
	Coastal	In-river	Rynda	Kharlovka	Eastern Litsa	Ponoi
2018	0.29	0.09	1.07	1.54	1.92	3.62
2019	0.18	na	2.11	1.95	2.38	3.17
2020	0.28	0.02	2.54	1.82	2.69	9.58
2021	n/a	n/a	n/a	n/a	n/a	n/a
2022	n/a	n/a	n/a	n/a	n/a	n/a
2023	n/a	n/a	n/a	n/a	n/a	n/a
Overall mean	**0.22**	**0.06**	**1.22**	**1.12**	**1.40**	**4.89**
Mean: 2018–2022	**0.25**	**0.06**	**1.91**	**1.77**	**2.33**	**5.46**

Table 3.1.5.3. Catch per unit of effort (CPUE) data for net and fixed engine salmon fisheries by region in UK (England & Wales). Data expressed as catch per licence-tide, except the Northeast, for which the data are recorded as catch per licence-day.

Year	Northeast driftnets	Region (aggregated data, various methods)				
		Northeast	Southwest	Midlands	Wales	Northwest
1988		5.49				-
1989		4.39				0.82
1990		5.53				0.63
1991		3.20				0.51
1992		3.83				0.40
1993	8.23	6.43				0.63
1994	9.02	7.53				0.71
1995	11.18	7.84				0.79
1996	4.93	3.74				0.59
1997	6.48	4.40	0.70	0.48	0.07	0.63
1998	5.92	3.81	1.25	0.42	0.08	0.46
1999	8.06	4.88	0.79	0.72	0.02	0.52
2000	13.06	8.11	1.01	0.66	0.18	1.05
2001	10.34	6.83	0.71	0.79	0.16	0.71
2002	8.55	5.59	1.03	1.39	0.23	0.90
2003	7.13	4.82	1.24	1.13	0.11	0.62
2004	8.17	5.88	1.17	0.46	0.11	0.69
2005	7.23	4.13	0.60	0.97	0.09	1.28
2006	5.60	3.20	0.66	0.97	0.09	0.82
2007	7.24	4.17	0.33	1.26	0.05	0.75
2008	5.41	3.59	0.63	1.33	0.06	0.34
2009	4.76	3.08	0.53	1.67	0.04	0.51
2010	17.03	8.56	0.99	0.26	0.09	0.47
2011	19.25	9.93	0.63	0.14	0.10	0.34
2012	6.80	5.35	0.69		0.21	0.31
2013	11.06	8.22	0.54		0.08	0.39

Year	Northeast driftnets	Region (aggregated data, various methods)				
		Northeast	Southwest	Midlands	Wales	Northwest
2014	10.30	6.12	0.43		0.07	0.31
2015	12.93	7.22	0.64		0.08	0.39
2016	10.95	9.98	0.78		0.10	0.38
2017	7.58	5.64	0.58		0.15	0.26
2018	6.27	6.05	1.07		0.15	0.92
2019					0.15	
2020 (1)						
Mean	**8.98**	**5.73**	**0.77**	**0.84**	**0.11**	**0.60**

Notes:

1. Since 2020, no CPUE for net fisheries was available because there was no fishing effort for salmon.

Table 3.1.5.4. Catch per unit of effort (CPUE) for salmon rod fisheries in each region in UK (England & Wales), 1997–2023. CPUE is expressed as number of salmon (including released fish) caught per 100 days fished.

Year	Region						NRW Wales	UK (England & Wales)
	Northeast	Thames	Southern	South-west	Midlands	Wales		
1997	5.0	0.6	3.1	5.2	1.7	2.6	2.6	4.0
1998	6.5	0.0	5.9	7.5	1.3	3.9	3.9	6.0
1999	7.4	0.3	3.1	6.3	2.1	3.5	3.5	5.5
2000	9.2	0.0	5.2	8.8	4.9	4.4	4.4	7.9
2001	11.3	0.0	11.0	6.6	5.4	5.5	5.5	8.7
2002	9.4	0.0	18.3	6.0	3.5	3.6	3.6	6.8
2003	9.7	0.0	8.8	4.7	5.2	2.9	2.9	5.7
2004	14.7	0.0	18.8	9.6	5.5	6.6	6.6	11.4
2005	12.4	0.0	12.7	6.2	6.6	4.5	4.5	9.0
2006	14.2	0.0	15.6	8.7	6.6	5.9	5.9	10.1
2007	11.7	0.0	18.0	8.7	5.7	6.0	6.0	9.6
2008	12.7	0.0	21.8	10.9	5.8	7.3	7.3	10.5
2009	9.5	0.0	13.7	5.7	3.6	3.6	3.6	6.6
2010	16.7	2.8	17.1	9.9	4.3	6.5	6.5	10.2
2011	17.5	0.0	14.5	9.4	6.5	6.0	6.0	10.9
2012	15.4	0.0	17.3	9.2	6.3	6.5	6.5	10.6
2013	16.7	0.0	10.0	5.9	7.9	5.7	5.7	8.9
2014	12.1	0.0	11.9	4.8	5.0	6.9	4.4	7.1
2015	8.7	0.0	16.6	8.8	9.0	7.0	4.8	7.1
2016	13.5	0.0	16.8	7.8	9.5	8.5	6.4	9.1
2017	13.5	0.0	13.6	8.7	8.0	9.3	6.6	9.4
2018	10.5	0.0	5.0	4.9	6.7	9.0	4.0	7.2
2019	12.0	1.6	6.6	4.2	5.4	7.7	3.4	7.0
2020	13.2	0.0	13.7	6.6	10.4	7.0	12.5	10.4
2021	9.1	0.0	7.6	5.6	5.7	6.4	3.9	6.3
2022	14.0	0.0	7.3	4.7	4.2	4.3	8.3	8.4

Year	Region						NRW Wales	UK (England & Wales)
	Northeast	Thames	Southern	South-west	Midlands	Wales		
2023	9.4	0.0	6.0	4.0	4.2	3.6	5.9	6.1
Overall mean	**11.7**	**0.2**	**12.0**	**7.0**	**5.6**	**5.7**	**5.4**	**8.2**
Mean: 2018–2022	**11.8**	**0.3**	**8.2**	**5.2**	**6.5**	**6.9**	**6.4**	**7.9**

Table 3.1.5.5. Catch per unit of effort (CPUE) data for UK (Scotland) net fisheries. Catch in numbers of fish per unit of effort.

Year	Fixed engine cpue Catch/trap month [(1)]	Net and coble CPUE Catch/crew month
1952	33.9	156.4
1953	33.1	121.7
1954	29.3	162.0
1955	37.1	201.8
1956	25.7	117.5
1957	32.6	178.7
1958	48.4	170.4
1959	33.3	159.3
1960	30.7	177.8
1961	31.0	155.2
1962	43.9	242.0
1963	44.2	182.9
1964	57.9	247.1
1965	43.7	188.6
1966	44.9	210.6
1967	72.6	329.8
1968	47.0	198.5
1969	65.5	327.6
1970	50.3	241.9
1971	57.2	231.6
1972	57.5	248.0
1973	73.7	240.6
1974	63.4	257.1
1975	53.6	235.7
1976	42.9	150.8
1977	45.6	188.7
1978	53.9	196.1

Year	Fixed engine cpue Catch/trap month [1]	Net and coble CPUE Catch/crew month
1979	42.2	157.2
1980	37.6	158.6
1981	49.6	183.9
1982	61.3	180.2
1983	55.8	203.6
1984	58.9	155.3
1985	49.6	148.9
1986	75.2	193.4
1987	61.8	145.6
1988	50.6	198.4
1989	71.0	262.4
1990	33.2	146.0
1991	35.9	106.4
1992	59.6	153.7
1993	52.8	125.2
1994	92.1	123.7
1995	75.6	142.3
1996	57.5	110.9
1997	33.0	57.8
1998	36.0	68.7
1999	21.9	58.8
2000	54.4	105.5
2001	61.0	77.4
2002	35.9	67.0
2003	68.3	66.8
2004	42.9	54.5
2005	45.8	80.9
2006	45.8	73.3

Year	Fixed engine cpue Catch/trap month (1)	Net and coble CPUE Catch/crew month
2007	47.6	91.5
2008	56.1	52.5
2009	42.2	73.3
2010	77.0	179.3
2011	62.6	80.7
2012	50.2	46.7
2013	64.6	129.4
2014	60.6	79.2
2015	74.8	50.2
2016	0*	65.4
2017	0*	52.4
2018	0*	147.1
2019	0*	23.2
2020	0*	47.3
2021	0*	17.1
2022	0*	20.7
2023	0*	12.6
Overall mean	**50.8**	**143.0**
Mean: 2017–2021	-	**51.1**

Notes:

1. Excludes catch and effort for Solway Region.

*** No information on effort for fixed engine presented due to fishery regulation.**

Table 3.1.5.6. Catch per unit of effort (CPUE) number of salmon in three size groups caught per gear-day in marine fisheries in Norway.

Year	Bagnet			Bendnet		
	< 3kg	3-7 kg	> 7 kg	< 3kg	3-7 kg	> 7 kg
1998	0.88	0.66	0.12	0.80	0.56	0.13
1999	1.16	0.72	0.16	0.75	0.67	0.17
2000	2.01	0.90	0.17	1.24	0.87	0.17
2001	1.52	1.03	0.22	1.03	1.39	0.36
2002	0.91	1.03	0.26	0.74	0.87	0.32
2003	1.57	0.90	0.26	0.84	0.69	0.28
2004	0.89	0.97	0.25	0.59	0.60	0.17
2005	1.17	0.81	0.27	0.72	0.73	0.33
2006	1.02	1.33	0.27	0.72	0.86	0.29
2007	0.43	0.90	0.32	0.57	0.95	0.33
2008	1.07	1.13	0.43	0.57	0.97	0.57
2009	0.73	0.92	0.31	0.44	0.78	0.32
2010	1.46	1.13	0.39	0.82	1.00	0.38
2011	1.30	1.98	0.35	0.71	1.02	0.36
2012	1.12	1.26	0.43	0.89	1.03	0.41
2013	0.69	1.09	0.25	0.38	1.30	0.29
2014	1.83	1.08	0.24	1.27	1.08	0.29
2015	1.32	1.61	0.30	0.41	1.16	0.22
2016	0.84	1.40	0.35	0.55	1.83	0.42
2017	1.65	1.35	0.30	1.02	1.49	0.45
2018	2.05	1.56	0.30	1.08	1.51	0.41
2019	0.97	1.59	0.26	0.72	1.02	0.28
2020	1.18	1.12	0.21	0.37	0.96	0.34
2021	1.02	0.76	0.19	0.54	0.71	0.32
2022	2.06	1.16	0.27	n/a (1)	n/a (1)	n/a (1)
2023	1.36	0.90	0.25	n/a	n/a	n/a

Year	Bagnet			Bendnet		
	< 3kg	3-7 kg	> 7 kg	< 3kg	3-7 kg	> 7 kg
Overall mean	**1.24**	**1.13**	**0.27**	**0.74**	**1.00**	**0.32**
Mean: 2018–2022	**1.46**	**1.24**	**0.25**	**0.68**	**1.05**	**0.34**

Notes:

1. **From 2022, bendnet fisheries were banned for whole of Norway.**

Table 3.1.6.1. Percentage of 1SW salmon in catches from countries in the Northeast Atlantic, 1987–2023.

Year	Iceland	Finland	Norway	Russia[1]	Sweden	Northern Countries (weighted)	UK (Scot)	UK (E&W)	France	Ireland	Spain (Asturia)	Southern Countries (weighted)
1987	64	60	60	65	91	**63**	61	68	77	93		**81**
1988	78	55	62	55	89	**64**	57	69	29	95		**82**
1989	69	73	72	70	41	**71**	63	65	33	92		**79**
1990	66	64	66	69	75	**67**	48	52	45	92	71	**74**
1991	72	64	67	62	74	**67**	53	71	39	92	37	**76**
1992	73	72	61	71	69	**66**	55	77	48	92	45	**78**
1993	77	63	62	66	67	**65**	57	81	74	92	33	**79**
1994	66	50	69	69	67	**68**	54	77	55	92	61	**80**
1995	77	60	58	69	85	**63**	53	72	60	92	22	**80**
1996	75	72	51	81	68	**63**	53	65	51	92	22	**80**
1997	75	66	64	84	57	**68**	54	73	51	92	21	**82**
1998	83	71	65	84	66	**71**	58	82	71	92	49	**84**
1999	70	80	62	79	81	**67**	45	68	27	91	13	**83**
2000	85	69	66	77	69	**69**	54	79	58	92	63	**84**
2001	78	52	59	77	54	**61**	55	75	51	92	36	**84**
2002	83	40	51	72	62	**57**	54	76	69	92	33	**85**
2003	78	50	62	73	79	**64**	52	66	51	92	14	**84**
2004	84	50	52	66	50	**60**	51	81	40	92	59	**83**
2005	87	74	63	67	59	**68**	58	76	41	92	15	**83**
2006	87	73	53	76	61	**62**	57	78	50	91	16	**81**
2007	90	35	42	68	34	**57**	57	78	45	85	25	**71**
2008	89	37	47	55	36	**58**	48	76	42	89	11	**72**
2009	91	72	47	57	40	**64**	49	72	31	84	30	**69**
2010	83	56	56	54	49	**63**	55	78	65	88	33	**73**
2011	85	68	41	58	32	**55**	36	57	31	85	2	**64**
2012	86	75	46	75	30	**59**	49	50	38	88	18	**69**
2013	89	65	52	67	38	**68**	55	58	46	83	13	**67**
2014	77	70	59	66	46	**63**	49	54	38	77	4	**60**

Year	Iceland	Finland	Norway	Russia[1]	Sweden	Northern Countries (weighted)	UK (Scot)	UK (E&W)	France	Ireland	Spain (Asturia)	Southern Countries (weighted)
2015	90	60	51	70	30	**63**	60	47	33	83	4	**67**
2016	79	53	42	72	36	**53**	50	42	51	85	30	**68**
2017	86	41	49	43	35	**55**	46	40	54	86	29	**74**
2018	83	77	51	57	48	**58**	60	58	39	81	21	**71**
2019	79	45	49	65	26	**54**	57	44	29	83	10	**76**
2020	83	49	54	75	40	**59**	51	44	41	94	25	**86**
2021	89	0	53	63	47	**60**	56	39	30	86	2	**83**
2022	87	0	55	63	40	**61**	54	41	14	86	7	**83**
2023	77	0	54	63	34	**58**	51	34	22	86	7	**84**
Means												
1987-2000	73	66	63	72	71	**66**	55	71	51	92	40	**80**
2001-2023	84	50	52	65	44	**60**	53	59	41	87	19	**76**

Notes:

1. **Since 1989, only three rivers are included for Russia rather than four rivers previous to this. For 2021, 2022 and 2023 values for Russia are the mean from the period 2016-2020.**

Table 3.2.1.1. Conservation Limits for NEAC stock units in numbers of eggs and fish, and the Spawner Escapement Reserve (SER) in numbers of maturing (Mat.) and non-maturing (Non-mat.) 1SW fish.

Stock Unit	Conservation Limits					Spawner Escapement Reserve (SER)	
	Total eggs	1SW eggs	MSW eggs	1SW fish	MSW fish	1SW mat.	1SW non-mat.
Iceland NE*	23 516 862	9 022 899	14 493 964	4571	1972	5640	3386
Sweden	14 085 976	1 768 946	12 317 030	1833	2648	2352	4757
Norway SE	85 098 198	9 536 612	75 561 586	10 756	15 282	13 637	27 369
Norway SW	35 828 123	2 454 878	33 373 245	2769	6750	3500	12 016
Norway MI	230 635 712	37 307 214	193 328 498	35 545	37 702	44 660	66 714
Norway NO	92 459 310	4 585 729	87 873 581	10 191	13 168	12 804	23 582
Finland	104 274 286	7 939 038	96 335 248	13 232	9624	16 085	16 526
Russia AK*	58 862 797	1 952 966	56 909 831	4340	5928	5436	10 810
Russia KW*	167 702 714	137 976 468	29 726 245	51 102	7078	65 966	12 713
Russia KB*	81 425 947	3 666 083	77 759 864	10 475	7776	12 926	13 555
Russia RP*	92 815 086	549 689	92 265 397	1222	8787	1553	16 023
Northern NEAC Stock Complex	**986 705 011**	**216 760 522**	**769 944 489**	**146 036**	**116 715**	**184 559**	**207 451**
France	77 676 434	32 512 098	45 164 336	20 731	10 137	26 761	18 765
UK (E&W)	262 754 562	104 570 366	158 184 196	42 195	36 843	53 657	63 264

Stock Unit	Conservation Limits					Spawner Escapement Reserve (SER)	
	Total eggs	1SW eggs	MSW eggs	1SW fish	MSW fish	1SW mat.	1SW non-mat.
Ireland#	710 711 690	431 400 840	279 310 850	211 471	46 943	268 911	78 223
UK (Northern Ireland) FO	66 500 000	54 060 733	12 439 267	27 419	3057	33 331	5095
UK (Northern Ireland) DAERA	27 300 000	21 091 058	6 208 942	10 697	1526	13 200	2581
UK (Scotland) EA	426 323 670	118 458 025	307 865 645	73 791	70 692	93 835	117 796
UK (Scotland) WE	134 749 652	68 656 415	66 093 237	42 646	15 150	54 230	26 807
Iceland SW*	51 587 556	37 471 865	14 115 691	14 985	2296	18 491	3942
Southern NEAC Stock complex	**1 757 603 564**	**868 221 400**	**889 382 164**	**443 935**	**186 644**	**562 416**	**316 473**

*** Conservation Limits derived from a pseudo stock-recruitment relationship based on a hockey stick model.**
 # Conservation Limits provided in numbers of fish.

Table 3.3.1.1. Time-series of jurisdictions in the Northern NEAC area with established CLs and trends in the number of stocks meeting CLs.

Year	River Tana/Teno (Norway & Finland)				Norway				Russia				Sweden			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1999									85	8	7	88				
2000									85	8	7	88				
2001									85	8	7	88				
2002									85	8	7	88				
2003									85	8	7	88				
2004									85	8	7	88				
2005					0	167*	70	42	85	8	7	88				
2006					0	165*	73	44	85	8	7	88				
2007	9	5	0	0	80	167*	76	46	85	8	7	88				
2008	9	5	0	0	80	170*	87	51	85	8	7	88				
2009	9	5	0	0	439	176	68	39	85	8	7	88				
2010	9	5	0	0	439	179	114	64	85	8	7	88				
2011	9	5	0	0	439	177	128	72	85	8	7	88				
2012	9	5	0	0	439	187	139	74	85	8	7	88				
2013	25	7	2	29	439	185	111	60	85	8	7	88				

Year	River Tana/Teno (Norway & Finland)				Norway				Russia				Sweden			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
2014	25	10	4	40	439	181	131	72	85	8	7	88				
2015	25	10	2	20	439	192	150	78	85	8	7	88				
2016	25	11	4	36	439	200	170	85	85	8	7	88	23	21	8	38
2017	25	15	4	27	439	206	178	86	85	8	7	88	24	22	6	27
2018	25	15	6	40	439	211	170	81	85	8	7	88	24	23	7	30
2019	25	15	5	33	439	216	160	74	85	8	7	88	24	24	6	25
2020	25	15	3	20	439	220	178	81	85	2	1	50	24	24	6	25
2021	25	8	2	25	439	215	154	72	NA	NA	NA	NA	24	23	3	13
2022	25	8	1	12	439	217	182	84	NA	NA	NA	NA	24	24	4	17
2023	25	14	1	7	439	212	153	72	NA	NA	NA	NA	24	24	4	17

*** CL attainment retrospectively assessed; NA = data pending.**

Table 3.3.1.2. Time-series of jurisdictions in the Southern NEAC area with established CLs and trends in the number of stocks meeting CLs.

Year	France				Ireland				UK (England & Wales)				UK (Northern Ireland)				UK (Scotland)			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1993									61	61	33	54								
1994									63	63	42	67								
1995									63	63	26	41								
1996									63	63	33	52								
1997									64	64	21	33								
1998									64	64	31	48								
1999									64	64	21	33								
2000									64	64	26	41								
2001	38	0	0	0					64	58	20	34								
2002	38	0	0	0					64	64	27	42	10	10	4	40				
2003	38	0	0	0					64	64	19	30	10	10	4	40				
2004	38	0	0	0					64	64	40	62	10	10	3	30				
2005	38	0	0	0					64	64	31	48	10	10	4	40				
2006	38	0	0	0					64	64	36	56	10	10	3	30				
2007	38	0	0	0	141	141	45	32	64	64	33	52	10	6	2	33				
2008	38	0	0	0	141	141	54	38	64	64	41	64	10	5	3	60				

Year	France				Ireland				UK (England & Wales)				UK (Northern Ireland)				UK (Scotland)			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
2009	38	0	0	0	141	141	56	40	64	64	23	36	10	6	2	33				
2010	38	0	0	0	141	141	56	40	64	64	38	59	10	7	2	29				
2011	38	0	0	0	141	141	58	41	64	64	39	61	11	9	3	33	173	173	112	65
2012	38	0	0	0	141	141	58	41	64	64	34	53	19	15	7	47	173	173	110	64
2013	38	0	0	0	143	143	57	40	64	64	21	33	19	16	8	50	173	173	96	55
2014	38	0	0	0	143	143	57	40	64	64	14	22	19	17	4	24	173	173	83	48
2015	38	0	0	0	143	143	55	38	64	64	23	36	19	17	7	41	173	173	92	53
2016	38	0	0	0	143	143	48	34	64	64	21	33	19	17	13	76	173	173	90	52
2017	38	0	0	0	143	143	44	31	64	64	31	48	19	15	7	47	173	173	81	47
2018	38	0	0	0	143	143	43	30	64	64	13	20	19	16	7	44	173	173	52	30
2019	38	0	0	0	143	143	43	30	64	62	10	16	19	17	6	35	173	173	76	44
2020	38	0	0	0	144	144	46	32	64	64	23	36	19	15	10	67	173	173	78	45
2021	38	0	0	0	144	144	49	34	64	62	11	18	19	17	9	53	173	173	56	32
2022	38	0	0	0	144	144	48	33	64	59	8	14	19	15	2	13	173	173	64	37
2023	47	0	0	0	144	144	48	33	64	62	5	8	19	16	2	12	173	173	NA	NA

NA = data pending.

Table 3.3.2.1. Estimated return rates of wild smolts (%) to home-waters (prior to coastal fisheries) for various monitored rivers in the NE Atlantic area.

Smolt migration Year	Iceland[1]			Norway								Ireland		
	Ellidaar	R.Vesturdalsa[2]		Imsa[3]		Etne[4]		Sylte / Moaelva[4]		Vigda[4]		Corrib		Burrishoole
	1SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	MSW	1SW
1975	20.8													
1976														
1977														
1978														
1979														
1980												17.90	1.06	5.30
1981				17.30	4.00							9.24	3.76	12.30
1982				5.30	1.20							20.89	3.33	12.20
1983				13.50	1.30							9.97	1.84	8.60
1984				12.10	1.80							26.19	1.98	19.80
1985	9.40			10.20	2.10							18.94	1.75	19.30
1986				3.80	4.20									20.00
1987				17.30	5.60							16.60	0.71	26.90
1988	12.70			13.30	1.10							14.59	0.69	22.90
1989	8.10	1.10	2.00	8.70	2.20							6.67	0.71	7.10

Smolt migration Year	Iceland[1]			Norway								Ireland		
	Ellidaar	R.Vesturdalsa[2]		Imsa[3]		Etne[4]		Sylte / Moaelva[4]		Vigda[4]		Corrib		Burrishoole
	1SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	MSW	1SW
1990	5.40	1.00	1.00	3.00	1.30							5.01	0.62	16.00
1991	8.80	4.20	0.60	8.70	1.20							7.25	1.26	21.70
1992	9.60	2.40	0.80	6.70	0.90							7.27		15.90
1993	9.80			15.60								10.82	0.07	23.90
1994	9.00											9.79	1.35	26.90
1995	9.40	1.60	1.20	1.80	1.50							8.44	0.07	14.60
1996	4.60	1.40	0.30	3.50	0.90							6.46	1.17	18.30
1997	5.30	0.70	0.50	1.70	0.30							12.75	0.75	15.60
1998	5.30	1.04	1.04	7.20	1.00							5.48	1.06	12.40
1999	7.70	1.30	0.92	4.20	2.20							6.45	0.91	14.90
2000	6.30	0.76	0.53	12.50	1.70							9.43		22.50
2001	5.10	2.83	1.07	3.60	2.20							7.23	1.08	16.60
2002	4.40	0.83	0.83	5.50	0.90							5.97	0.54	12.30
2003	9.10	1.18	0.17	3.50	0.70							8.27	2.05	19.40
2004	7.70	1.66	0.60	5.90	1.40							6.27	0.84	12.80
2005	6.40	2.47	0.91	3.70	1.80									9.80

Smolt migration Year	Iceland[1]			Norway								Ireland		
	Ellidaar	R.Vesturdalsa[2]		Imsa[3]		Etne[4]		Sylte / Moaelva[4]		Vigda[4]		Corrib		Burrishoole
	1SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	MSW	1SW
2006	7.12	1.75	0.95	0.80	5.80							3.63	0.73	12.90
2007	19.30	0.89	0.30	0.80	0.60							1.31	1.58	8.40
2008	14.90	2.59	1.07	1.10	2.30							1.72	1.03	8.20
2009	14.20	1.33	1.57	2.40	3.10							6.03	0.99	8.90
2010	8.60	1.97	1.11	1.70	1.10							2.91	1.25	7.50
2011	6.10	1.31	0.57	3.90	2.90							2.36		10.50
2012	10.90	2.06		3.50	1.70							1.49		9.43
2013	4.30		0.33	1.70	2.10							2.23	0.34	4.55
2014	7.20	1.62		3.00	0.80							2.85	0.49	7.98
2015	10.90			1.40	1.40							5.47	0.58	7.79
2016	7.90		2.00	4.10	1.30	1.20	2.00	6.00	4.10	13.80	0.60	6.95	0.19	7.38
2017	10.80	2.30		3.50	1.60	1.50	1.10	4.00	1.00	3.30	0.60	3.65	0.38	6.45
2018	7.80		0.35	3.10	0.80	0.60	1.10	5.10	3.00	4.90	0.60	2.81	5.40	7.11
2019	14.10	0.90	0.30	2.10	0.50	2.60	1.20	2.30	0.80	10.90	0.70	4.71	0.61	10.66
2020	11.80	0.60		0.30	0.30	0.50	1.00	2.40	1.60	5.80	0.60	0.20	2.82	7.16
2021	11.00	0.60	0.60	8.70	0.50	0.80	0.30	1.10	0.60	11.20	0.60	0.20	0.12	5.96

Smolt migration Year	Iceland(1)			Norway								Ireland		
	Ellidaar	R.Vesturdalsa(2)		Imsa(3)		Etne(4)		Sylte / Moaelva(4)		Vigda(4)		Corrib		Burrishoole
	1SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	2SW	1SW	MSW	1SW
2022	10.80	0.40		2.30		0.80		2.30		5.10		1.21		5.38
Mean	9.26	1.53	0.83	5.68	1.75	1.14	1.12	3.31	1.85	7.86	0.62	7.50	1.23	13.12
Five-year mean	11.10	0.62	0.42	3.30	0.52	1.06	0.90	2.64	1.50	7.58	0.62	1.83	2.24	7.25
Ten-year mean	9.66	1.07	0.72	3.02	1.03	1.14	1.12	3.31	1.85	7.86	0.62	3.03	1.21	7.04

Notes:

1. Iceland uses microtags (CWT)
2. Vesturdalsa estimates are survival to rod fishery
3. Imsa uses Carlin tags, not corrected for tagging mortality
4. Etne, Sylte / Moaelva and Vigda use Passive Integrated Transponder (PIT) tagging
5. North Esk time-series stops in 2009
6. Bush 2SW, Scorff (1SW & 2SW) and Bresle (1SW & 2SW) estimates based on returns to freshwater

Table 3.3.2.1 Cont'd. Estimated return rates of wild smolts (%) to home-waters (prior to coastal fisheries) for various monitored rivers in the NE Atlantic area.

Smolt migration year	UK (Scotland)[5] North Esk		UK (Northern Ireland) Bush		UK (England & Wales) R. Dee		R. Tamar		R. Frome		France[6] Scorff		Bresle	
	1SW	MSW	1SW	2SW[6]	1SW	MSW	1SW	MSW	1SW	MSW	1SW	2SW	1SW	2SW
1975														
1976														
1977														
1978														
1979														
1980	13.70	10.20		0.59										
1981	8.30	3.90		0.92										
1982	11.20	4.80												1.14
1983				1.69									1.65	0.84
1984	6.00	3.90		1.45									3.55	1.22
1985	13.70	5.50		1.92									3.69	0.86
1986			31.40	1.94									6.59	1.70
1987	10.50	3.40	35.10	0.44									6.10	2.44
1988			36.20	0.85										
1989	6.70	4.10	25.00	1.44										

Smolt migration year	UK (Scotland)[5]		UK (Northern Ireland)		UK (England & Wales)						France[6]			
	North Esk		Bush		R. Dee		R. Tamar		R. Frome		Scorff		Bresle	
	1SW	MSW	1SW	2SW[6]	1SW	MSW	1SW	MSW	1SW	MSW	1SW	2SW	1SW	2SW
1990	6.00	3.70	34.70	1.76										
1991	7.60	2.80	27.80	2.22										
1992	11.00	6.30	29.00	1.99									2.62	1.00
1993	14.50	5.90		1.99	6.30	2.50							2.59	0.40
1994	10.90	3.60	27.10	0.75	1.30	1.20							4.44	1.06
1995	8.40	3.90		2.50	2.70	0.40					9.35	0.46	1.85	0.69
1996	6.10	2.90	31.20	2.14	4.80	2.10					20.35	1.05	1.41	0.64
1997	7.20	3.80	19.80	0.72	6.20	3.40					5.05	0.66	3.57	0.91
1998	2.60	1.40	13.36	0.52	2.30	3.70					4.85	0.13	1.73	0.72
1999	6.80	3.80	16.47	0.75	5.00	12.40					10.04	1.19	6.92	1.94
2000	6.10	2.70	10.10	0.15	2.00	0.90					9.26	0.69	5.37	1.93
2001	4.70	3.00	12.40	0.27	4.30						4.86	0.33		
2002	2.30	2.10	11.33	0.23	2.90	0.70	3.64	1.41	5.60	1.74	17.78	4.23	1.71	0.78
2003			6.77	0.35	2.60	0.40	6.13	1.78	4.83	0.94	10.05	0.93	2.83	1.65
2004			6.80	0.44	4.50	1.00	6.04	1.54	5.29	2.90	5.27	0.96	3.44	1.54
2005	6.70	2.80	5.90	0.61	5.10	0.50	6.42	1.18			7.57	0.72	2.02	0.38

Smolt migration year	UK (Scotland)[5]		UK (Northern Ireland)		UK (England & Wales)						France[6]			
	North Esk		Bush		R. Dee		R. Tamar		R. Frome		Scorff		Bresle	
	1SW	MSW	1SW	2SW[6]	1SW	MSW	1SW	MSW	1SW	MSW	1SW	2SW	1SW	2SW
2006	3.30	3.50	14.00	0.82	4.30	1.50	3.76	5.31	5.11	2.22	5.93	0.99	2.61	0.44
2007	5.00	3.80	8.10	0.83	1.30	0.90	7.57	3.31	5.69	1.30	3.64	1.36	2.32	0.85
2008	6.50	5.30	3.94	0.69	2.50	1.30	1.61	0.93	3.13	1.63	2.51	0.60	1.27	0.67
2009	9.00	8.60	5.69	0.95	4.80	1.10	8.23	1.93	7.68	2.58	5.09	1.42	11.75	2.96
2010			2.72	1.34	1.90	0.65	3.39	5.03	8.64	2.76	3.34	1.11	4.49	1.16
2011			2.67	0.53		0.26	1.14	1.93	1.23	1.75	3.96	1.09	1.99	1.12
2012			11.70	1.79	4.80		2.46		3.09	2.04	7.07	1.52	2.05	0.81
2013			4.60	0.91	1.90	1.36		4.68	1.50	2.12	7.47	1.64	3.82	2.43
2014			2.89	0.52		0.54			2.01	2.66	5.12	0.64	5.52	1.03
2015			6.66	0.33	0.50	1.82	4.17	2.31	5.93	3.01	7.28	1.85	2.99	0.83
2016			3.76	0.66	0.40	3.85	3.47	1.59	4.38	2.00	7.75	1.27	4.05	1.01
2017			3.18	0.68			4.95	5.19	2.60	1.94	4.51	0.54	9.06	2.15
2018			2.80	0.09	1.00	6.18	3.70	3.20	1.56	1.95	4.18	0.73	3.19	0.98
2019			7.10	0.38	1.90		6.33	1.49	4.65	1.80	8.28	0.65	3.56	0.73
2020			4.58	0.46					2.24	2.47	4.25	0.91	5.26	1.79
2021			2.86	0.35		3.59	2.37	1.83	1.70	2.73	2.35	0.48	5.03	2.39

Smolt migration year	UK (Scotland)[5]		UK (Northern Ireland)		UK (England & Wales)						France[6]			
	North Esk		Bush		R. Dee		R. Tamar		R. Frome		Scorff		Bresle	
	1SW	MSW	1SW	2SW[6]	1SW	MSW	1SW	MSW	1SW	MSW	1SW	2SW	1SW	2SW
2022			2.09				1.06		0.69		1.95		1.65	
Mean	7.79	4.23	13.42	0.97	3.14	2.18	4.25	2.63	3.88	2.13	6.75	1.04	3.79	1.23
Five-year mean			3.89	0.32	1.45	4.88	3.37	2.17	2.17	2.24	4.20	0.69	3.74	1.47
Ten-year mean			4.05	0.49	1.14	2.89	3.72	2.90	2.73	2.30	5.31	0.97	4.41	1.48

Notes:

1. Iceland uses microtags (CWT)
2. Vesturdalsa estimates are survival to rod fishery
3. Imsa uses Carlin tags, not corrected for tagging mortality
4. Etne, Sylte / Moaelva and Vigda use Passive Integrated Transponder (PIT) tagging
5. North Esk time-series stops in 2009
6. Bush 2SW, Scorff (1SW & 2SW) and Bresle (1SW & 2SW) estimates based on returns to freshwater

Table 3.3.2.2. Estimated return rates of hatchery smolts (%) to home-waters (prior to coastal fisheries) for various monitored rivers in the NE Atlantic area.

Smolt migration year	Iceland[(1)]	Norway[(2)]				Sweden	
	R. Ranga	R. Imsa[(3)]		R. Drammenselva[(4)]		R. Lagan[(5)]	
	1SW	1SW	2SW	1SW	2SW	1SW	2SW
1980							
1981		10.10	1.30				
1982		4.20	0.60				
1983		1.60	0.10				
1984		3.80	0.40	3.50	3.00	11.80	1.1
1985		5.80	1.30	3.40	1.90	11.80	0.9
1986		4.70	0.80	6.10	2.20	7.90	2.5
1987		9.80	1.00	1.70	0.70	8.40	2.4
1988		9.50	0.70	0.50	0.30	4.30	0.6
1989	1.58	3.00	0.90	1.90	1.30	5.00	1.3
1990	0.84	2.80	1.50	0.30	0.40	5.20	3.1
1991	0.02	3.20	0.70	0.10	0.10	3.60	1.1
1992	0.37	3.80	0.70	0.40	0.60	1.50	0.4
1993	0.66	6.50	0.50	3.00	1.00	2.60	0.9
1994	1.22	6.20	0.60	1.20	0.90	4.00	1.2

Smolt migration year	Iceland[1] R. Ranga	Norway[2] R. Imsa[3]		R. Drammenselva[4]		Sweden R. Lagan[5]	
	1SW	1SW	2SW	1SW	2SW	1SW	2SW
1995	1.09	0.40	0.00	0.70	0.30	3.90	0.6
1996	0.17	2.10	0.20	0.30	0.20	3.50	0.5
1997	0.32	1.00	0.00	0.50	0.20	0.60	0.5
1998	0.46	2.40	0.10	1.90	0.70	1.60	0.9
1999	0.36	12.00	1.10	1.90	1.60	2.10	
2000	0.91	8.40	0.10	1.10	0.60		
2001	0.37	3.30	0.30	2.50	1.10		
2002	0.35	4.50	0.80	1.20	0.80		
2003	0.20	2.60	0.70	0.30	0.60		
2004	0.60	3.60	0.70	0.40	0.40		
2005	1.04	2.80	1.20	0.30	0.70		
2006	1.00	1.00	1.80	0.10	0.60		
2007	1.78	0.60	0.70	0.20	0.10		
2008	2.38	1.80	2.20	0.10	0.30		
2009		1.30	3.30				
2010	0.49	2.60	1.90				

Smolt migration year	Iceland[1]	Norway[2]				Sweden	
	R. Ranga	R. Imsa[3]		R. Drammenselva[4]		R. Lagan[5]	
	1SW	1SW	2SW	1SW	2SW	1SW	2SW
2011	0.93	1.70	0.80				
2012	0.90	1.90	0.20				
2013	0.29	3.00	0.70				
2014	1.10	1.60	0.30				
2015	0.29	1.60	0.80				
2016	0.30	2.00	0.30				
2017	0.70	4.40	0.20				
2018	0.30	1.20	0.40				
2019	0.60	3.00	0.20				
2020	0.60	0.40	0.60				
2021	1.00	6.80	0.10				
2022	0.70	3.40					

Smolt migration year	Iceland[1]	Norway[2]				Sweden	
	R. Ranga	R. Imsa[3]		R. Drammenselva[4]		R. Lagan[5]	
	1SW	1SW	2SW	1SW	2SW	1SW	2SW
Mean	0.72	3.72	0.75	1.34	0.82	4.86	1.2
Five-year mean	0.64	2.96	0.32				
Ten-year mean	0.59	2.74	0.40				

Notes:

1. Iceland uses microtags (CWT)
2. Norway uses Carlin tags, not corrected for tagging mortality
3. Imsa estimates from one-year old smolts only since 1999
4. Drammenselva time-series stops in 2008
5. Lagan estimates uses Carlin-tagged, not corrected for tagging mortality and time-series stops in 1999
6. Burrishoole estimates to rod fishery with constant effort
7. Corrib / Cong and Corrib / Galway are different release sites
8. Bush hatchery age 1 and age 2 smolts are microtagged

Table 3.3.2.2 Cont'd. Estimated return rates of hatchery smolts (%) to home-waters (prior to coastal fisheries) for various monitored rivers in the NE Atlantic area.

Smolt migration year	Ireland										UK (Northern Ireland)[8]	
	Bur-rishoole[6]	Shannon	R. Screebe	R. Delphi/ R. Burrishoole	R. Delphi	R. Bunowen	R. Lee	Corrib / Cong [7]	Corrib / Galway [7]	R. Erne	Bush age 1 smolts	Bush age 2 smolts
1980	5.60	8.60					8.30	0.90				
1981	8.10	2.80					2.00	1.50				
1982	11.00	4.00					16.30	2.70	16.10			
1983	4.60	3.90						2.80	4.10			8.10
1984	27.10	5.00	10.40				2.30	5.20	13.20	9.40	13.30	
1985	31.10	17.80	12.30				15.70	1.40	14.50	8.20	15.40	17.50
1986	9.40	2.10	0.40				16.40		7.70	10.80		9.70
1987	14.10	4.70	8.40				8.80		2.20	7.00	6.50	19.40
1988	17.20	4.90	9.20				5.50	4.50		2.90	4.91	6.03
1989	10.50	5.00	1.80				1.70	6.00	4.80	1.20	8.20	23.20
1990	11.40	1.30			0.20		2.50	0.20	2.30	2.60	5.60	5.60
1991	13.60	4.20	0.30	10.80	6.19		0.80	4.90	4.00	1.30	5.40	8.80
1992	7.40	4.40	1.30	10.00	1.67	4.20		0.90	0.60		6.04	7.82
1993	12.00	2.90	3.40	14.30	6.48	5.40		1.00			1.10	5.80
1994	14.30	5.20	1.90	3.90	2.71	10.80			5.30		1.59	

Smolt migration year	Ireland										UK (Northern Ireland)[8]	
	Bur-rishoole[6]	Shannon	R. Screebe	R. Delphi/ R. Burrishoole	R. Delphi	R. Bunowen	R. Lee	Corrib / Cong [7]	Corrib / Galway [7]	R. Erne	Bush age 1 smolts	Bush age 2 smolts
1995	6.60	3.60	4.10	3.40	1.73	3.50		2.40			3.10	2.41
1996	5.30	2.90	1.80	10.60	6.74	3.40					2.01	2.32
1997	13.30	6.00	0.40	17.30	5.64	5.30	7.00			7.70		4.10
1998	4.90	3.10	1.30	7.20	3.13	2.90	4.90	3.30	2.90	2.60	2.28	4.49
1999	8.20	1.00	2.80	19.90	8.25	2.00			3.60	3.30	2.70	5.80
2000	11.80	1.20	3.80	19.50	13.24	5.40	3.60	6.70		4.00	2.85	4.36
2001	9.70	2.00	2.50	17.20	7.40	3.20	2.00	3.40		6.00	1.10	2.20
2002	9.20	1.00	4.10	12.60	4.90	2.00	1.90		2.00	1.90	0.59	2.65
2003	6.00	1.20		3.70	1.48	1.60	4.30		1.20	1.00	2.45	1.87
2004	9.40	0.40	1.80	7.60	2.31	1.80	2.20		4.40	3.10	0.71	1.89
2005	4.40	0.60	3.40	11.00		1.00	1.00		4.80	0.90	1.79	1.67
2006	5.20	0.30	1.30	3.70	1.48		0.20		0.20	0.90	2.00	3.75
2007	7.10	0.50	0.80		3.64				3.50	0.70		
2008	1.30		0.20		1.38		0.10		1.60			
2009	2.30	0.30	0.20		1.48		0.10		1.30	1.10		
2010	3.00	0.20	0.10		1.90		0.10	1.40	1.40	0.90		
2011	5.20	0.40			1.30		0.10	2.00	0.40	0.50	0.80	1.86

Smolt migration year	Ireland										UK (Northern Ireland)[8]	
	Bur-rishoole[6]	Shannon	R. Screebe	R. Delphi/ R. Burrishoole	R. Delphi	R. Bunowen	R. Lee	Corrib / Cong [7]	Corrib / Galway [7]	R. Erne	Bush age 1 smolts	Bush age 2 smolts
2012	3.20	0.50			1.80		0.20	6.60		1.90	2.19	3.46
2013	3.18	0.20	0.30		1.70		0.10	1.40	0.90	0.73	1.34	1.21
2014	4.30	0.10	0.70		2.30		0.10	1.60	1.20	0.12	0.75	0.67
2015	3.52	0.40			0.30		0.10	2.20	1.10	0.11	2.89	1.44
2016	3.60	0.60			2.40		0.03	2.20		0.08	0.52	2.61
2017	5.60	0.40			0.80		0.02	1.30	0.70	0.80	0.51	0.89
2018	3.30	0.10			0.30		0.00	2.10		3.30	0.31	0.42
2019	6.50	0.20			0.50		0.02	2.60		3.80	0.93	1.04
2020	3.20	0.20			1.10		0.02	2.90		4.40		0.20
2021	1.50	0.40			1.70		0.04	2.50		2.00	0.28	0.42
2022	3.20	0.40			1.80		0.04	2.50		0.50	0.31	0.28

Smolt migration year	Ireland										UK (Northern Ireland)[8]	
	Bur-rishoole[6]	Shannon	R. Screebe	R. Delphi/ R. Burrishoole	R. Delphi	R. Bunowen	R. Lee	Corrib / Cong [7]	Corrib / Galway [7]	R. Erne	Bush age 1 smolts	Bush age 2 smolts
Mean	8.17	2.50	2.93	10.79	3.06	3.75	3.10	2.73	3.93	2.90	3.14	4.82
Five-year mean	3.54	0.26			1.08		0.02	2.52		2.80	0.46	0.47
Ten-year mean	3.79	0.30	0.50		1.29		0.05	2.13	0.98	1.58	0.87	0.92

Notes:

1. Iceland uses microtags (CWT)

2. Norway uses Carlin tags, not corrected for tagging mortality

3. Imsa estimates from one-year old smolts only since 1999

4. Drammenselva time-series stops in 2008

5. Lagan estimates uses Carlin-tagged, not corrected for tagging mortality and time-series stops in 1999

6. Burrishoole estimates to rod fishery with constant effort

7. Corrib / Cong and Corrib / Galway are different release sites

8. Bush hatchery age 1 and age 2 smolts are microtagged

Table 3.3.4.1 Estimated number (in thousands) of returning 1SW salmon by year for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction model. The last four years are forecasted from the Life-cycle Model under the zero catch scenario.

Year	Finland median	Iceland(NE) median	Norway Median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	24.4	9.4	564.1*	154.1	17.2	772.0	17.7	8.0	478.9	132.8	12.7	681.1	34.9	11.5	667.0	185.0	23.6	880.2
1972	95.4	8.6	659.2*	117.4	13.6	898.0	69.0	7.3	559.2	102.6	10.1	791.1	136.1	10.5	777.6	138.1	18.9	1025.9
1973	44.3	10.3	645.9*	173.3	16.9	894.8	32.1	8.8	549.0	150.8	12.5	791.1	63.3	12.6	760.2	204.1	23.4	1015.0
1974	60.9	10.3	617.1*	172.3	24.6	889.2	44.2	8.7	523.6	151.3	18.2	788.8	87.3	12.6	728.1	201.5	33.7	1005.0
1975	73.4	12.5	617.7*	264.5	26.6	1000.2	53.2	10.6	525.2	229.6	19.6	893.0	105.6	15.3	731.1	313.4	36.7	1122.7
1976	67.0	12.6	582.4*	183.9	15.0	866.4	48.5	10.7	493.6	159.7	11.1	768.4	95.6	15.4	690.5	218.4	20.7	976.9
1977	37.6	17.5	600.0*	117.5	6.8	781.7	27.2	14.9	509.8	102.3	5.0	689.3	54.0	21.4	709.0	139.0	9.4	892.9
1978	35.6	17.8	490.5*	118.5	8.0	673.7	25.9	15.1	416.7	102.9	5.9	595.7	51.1	21.8	580.1	141.0	11.2	765.4
1979	32.0	17.1	884.3*	164.3	8.3	1109.6	23.3	14.5	749.8	142.1	6.1	971.0	45.9	20.8	1044.3	195.8	11.5	1272.5
1980	25.6	2.6	618.1*	116.9	10.6	775.1	19.7	2.2	523.1	102.2	7.8	678.8	33.7	3.2	732.3	138.0	14.7	892.6
1981	22.9	13.3	609.0*	96.7	19.4	763.1	17.6	11.3	518.8	83.8	14.3	671.0	30.1	16.2	722.0	115.1	26.6	878.0
1982	13.6	6.1	474.0*	84.9	17.0	597.5	10.5	5.2	401.3	74.2	12.6	523.2	17.9	7.5	559.7	99.9	23.6	683.8
1983	33.3	9.1	699.3	142.0	22.7	909.2	25.7	7.7	607.3	124.3	16.8	814.0	43.7	11.0	807.2	166.9	31.4	1019.4
1984	36.4	3.3	728.1	153.2	32.1	955.8	28.0	2.8	631.4	133.9	23.7	855.8	47.9	4.0	845.1	178.5	44.4	1075.3
1985	48.2	22.7	741.8	209.1	38.1	1064.8	37.2	19.2	647.9	181.3	28.2	961.7	63.9	27.6	855.5	249.1	52.9	1183.5
1986	38.0	28.3	646.2	178.6	39.6	934.5	29.2	23.9	566.7	155.6	29.4	847.8	50.1	34.4	739.4	211.7	55.0	1034.4
1987	45.9	16.6	543.7	190.9	31.6	833.0	35.4	14.1	479.3	165.4	23.4	758.4	60.7	20.3	618.7	226.6	43.9	915.9
1988	27.0	24.0	498.8	131.9	26.5	710.3	20.8	20.4	439.1	121.5	19.6	648.5	35.5	29.3	568.8	144.2	36.6	781.6
1989	58.8	13.0	548.9	196.9	7.7	826.3	46.4	11.0	475.7	183.3	5.7	749.9	75.5	15.8	639.9	212.5	10.7	919.5
1990	58.8	9.7	491.7	163.2	18.0	743.5	46.4	8.2	428.8	150.1	13.3	676.5	75.3	11.8	569.5	177.8	26.0	823.5
1991	57.8	14.1	429.5	138.5	22.5	665.1	45.7	11.9	372.7	125.1	16.8	603.7	74.2	17.2	498.4	155.2	32.9	736.4
1992	81.5	26.5	361.8	171.4	25.1	671.0	64.3	22.5	315.6	150.2	18.7	613.6	104.9	32.4	416.9	199.5	36.5	734.4
1993	55.0	21.7	363.4	147.3	25.0	615.9	43.5	18.5	322.2	127.4	18.5	565.5	70.6	26.6	411.3	173.8	36.2	672.3
1994	30.6	7.0	491.0	173.3	19.3	725.2	24.2	5.9	429.1	148.7	14.3	654.5	39.2	8.5	570.0	207.7	28.0	808.9
1995	30.5	18.3	320.4	155.6	28.0	557.5	24.1	15.5	284.0	135.1	20.9	510.4	39.0	22.3	363.9	183.9	40.7	608.5
1996	46.8	9.8	244.8	212.5	16.7	533.6	36.6	8.3	217.1	182.9	12.5	488.2	61.0	11.9	276.3	252.6	24.3	585.2
1997	42.9	13.3	282.9	208.7	7.6	558.1	33.5	11.3	251.4	176.7	5.7	509.4	55.4	16.3	318.4	250.5	11.0	612.4
1998	53.7	22.7	367.9	227.9	6.2	681.9	42.0	19.3	325.6	193.2	4.6	621.2	69.6	27.7	416.9	275.9	8.9	749.9
1999	78.9	11.5	342.4	176.7	9.7	622.5	62.3	9.7	301.9	149.7	7.2	568.3	101.6	14.2	388.0	210.4	14.0	681.5
2000	85.8	12.2	562.6	193.6	17.9	876.2	67.6	10.2	497.9	163.5	13.3	796.9	110.2	14.9	641.4	232.4	25.9	964.5
2001	61.9	11.0	486.0	260.2	11.0	837.2	49.0	9.3	430.4	203.7	8.2	747.3	79.3	13.6	554.4	352.4	16.1	946.2
2002	38.5	19.1	297.0	237.3	10.6	607.0	30.0	16.0	264.2	184.2	7.9	538.2	50.0	23.8	335.7	323.1	15.4	698.5
2003	38.0	10.2	412.8	212.0	5.8	682.7	29.5	8.5	363.4	162.9	4.3	607.5	49.1	12.6	470.5	283.9	8.4	771.8
2004	16.1	27.2	249.9	148.3	4.8	450.0	12.5	22.8	223.6	116.2	3.6	404.0	20.8	34.2	280.2	197.7	7.0	505.8
2005	35.3	24.5	370.5	168.9	4.7	608.5	27.6	20.3	330.6	131.4	3.5	547.1	45.9	30.6	416.8	227.6	6.9	681.2
2006	57.8	25.7	300.0	204.6	5.3	597.4	47.2	21.4	267.3	158.6	3.9	534.6	72.0	32.1	336.4	272.8	7.7	673.7

Year	Finland median	Iceland(NE) median	Norway Median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2007	16.9	19.0	167.7	110.0	1.7	317.3	13.8	15.8	149.7	85.6	1.2	284.0	20.9	24.0	188.3	146.2	2.4	358.1
2008	18.2	17.4	210.4	114.8	2.5	366.3	15.0	14.3	186.3	89.7	1.8	328.0	22.7	22.1	237.9	152.9	4.3	411.8
2009	32.3	27.9	168.6	108.8	2.7	342.3	26.3	24.0	149.4	84.1	1.9	308.6	40.1	33.7	190.7	141.2	4.6	381.4
2010	25.8	22.4	249.9	123.9	4.6	429.1	21.2	19.2	219.7	98.7	3.2	387.8	32.1	27.0	285.5	158.2	7.8	478.1
2011	29.4	18.6	175.7	131.9	5.1	362.8	24.2	15.7	155.3	105.0	3.6	326.6	36.4	22.5	199.5	167.4	8.3	405.5
2012	51.1	9.6	195.6	152.9	5.5	418.0	41.8	8.2	173.0	123.1	3.9	376.0	63.4	11.6	220.4	200.7	9.4	470.5
2013	29.6	23.0	184.2	118.7	3.2	362.4	24.1	19.5	161.1	95.2	2.2	324.6	36.7	28.0	211.9	158.7	5.9	408.4
2014	41.9	10.9	251.8	111.6	9.6	430.8	34.3	9.2	216.7	89.4	6.9	381.7	52.0	13.2	296.4	150.3	15.4	487.1
2015	26.1	30.3	221.7	116.5	2.5	401.3	21.3	25.5	194.3	93.2	1.8	360.6	32.4	37.6	255.5	157.0	4.1	453.0
2016	20.4	13.0	171.8	82.8	2.3	292.7	16.6	10.8	151.0	67.1	1.7	263.6	25.3	16.2	196.9	109.6	3.6	327.5
2017	13.0	12.6	226.7	29.8	2.9	286.7	10.2	10.5	197.9	24.9	2.1	256.5	17.2	15.9	262.6	38.2	4.6	323.2
2018	33.0	13.5	232.4	99.7	7.8	390.8	25.9	11.2	202.2	79.5	5.4	348.8	43.5	17.0	267.4	135.2	14.2	439.3
2019	10.7	8.1	181.3	71.8	3.8	278.6	8.5	6.6	158.7	58.1	2.6	249.1	14.1	10.7	207.8	94.9	7.0	311.4
2020	9.4	9.8	222.6	52.0	4.2	299.3	7.3	8.0	194.3	43.2	3.0	269.1	12.4	12.7	256.4	63.3	6.8	335.0
2021	19.5	8.1	154.0	62.3	5.0	255.6	11.4	6.5	130.8	31.7	3.5	208.7	37.8	10.7	182.9	139.1	8.2	334.0
2022	10.3	9.6	210.3	73.2	4.1	313.8	6.0	7.5	178.3	36.1	2.9	257.1	20.1	13.6	249.5	158.2	6.7	402.9
2023	10.0	6.8	164.1	79.2	3.3	268.9	5.3	5.2	138.9	37.7	2.3	214.5	25.4	10.4	196.4	173.5	5.4	366.9
Previous five-year mean:																		
	16.6	9.8	200.1	71.8	5.0	307.6												
Change (recent year relative to previous five-year mean):																		
	-40 %	-30 %	-18 %	10 %	-34 %	-13 %												
Rank of recent year (highest = 1 to lowest):																		
	52/53	50/53	52/53	48/53	46/53	52/53												
Forecast:																		
2024	9.9	6.8	218.5	50.6	4.1	289.9	3.2	1.9	112.9	21.5	0.7	140.2	32.2	25.8	452.2	131.6	17.8	659.6
2025	9.2	5.9	210.3	46.3	3.7	275.4	2.5	1.3	97.4	17.4	0.5	119.1	36.6	26.8	462.1	127.6	19.5	672.6
2026	8.3	5.7	211.0	40.4	3.7	269.1	1.8	0.9	89.9	13.1	0.4	106.1	37.1	28.0	511.9	133.9	26.5	737.4
2027	10.2	5.3	207.5	41.7	4.4	269.1	2.0	0.7	79.9	10.8	0.3	93.7	57.4	33.9	567.1	165.0	38.5	861.9

Notes:

*** Data underlying from 1971-1982 are more uncertain than the rest of the time-series.**

Table 3.3.4.2 Estimated number (in thousands) of returning MSW salmon by year for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction model. The last four years are forecasted from the Life-cycle Model under the zero catch scenario.

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	22.8	9.6	346.5*	132.7	0.6	513.2	15.7	8.6	297.0	117.6	0.5	460.0	34.2	11.1	407.8	150.0	0.9	577.4
1972	23.7	15.1	476.6*	134.7	0.5	651.8	16.5	13.3	408.4	119.3	0.4	581.2	35.2	17.3	559.2	152.4	0.7	736.9
1973	38.2	14.1	547.3*	223.2	2.2	828.0	26.4	12.5	469.3	196.1	1.7	742.6	57.2	16.2	641.7	255.7	3.1	926.8
1974	65.4	13.4	513.7*	210.2	1.4	806.8	45.0	11.8	438.8	186.1	1.1	723.0	96.7	15.3	602.4	237.9	1.9	901.5
1975	83.7	14.8	440.6*	225.6	0.4	768.0	57.4	13.1	377.2	201.2	0.3	692.8	124.9	16.9	516.9	253.8	0.5	856.0
1976	65.7	12.2	455.2*	194.9	1.2	732.6	45.5	10.8	391.6	173.6	0.9	659.3	99.2	13.9	536.0	219.2	1.6	819.5
1977	45.4	17.0	454.9*	134.3	0.5	653.3	31.4	15.0	390.3	120.2	0.4	585.2	68.3	19.5	533.9	150.6	0.7	737.1
1978	23.1	21.9	299.3*	116.2	0.6	462.5	16.0	19.4	256.1	102.0	0.5	415.4	34.6	25.1	350.1	133.4	0.9	516.3
1979	22.9	14.4	528.5*	101.5	1.7	670.5	15.3	12.8	452.4	89.6	1.2	593.3	36.6	16.6	620.8	115.9	2.3	764.4
1980	22.6	20.1	621.7*	168.8	3.2	837.9	16.1	17.8	532.4	147.0	2.4	745.9	33.6	23.1	730.4	195.5	4.4	950.8
1981	26.9	7.0	546.2*	96.7	0.7	678.7	18.9	6.2	466.8	85.5	0.5	598.0	39.8	8.1	639.6	110.2	1.0	773.7
1982	35.6	8.1	442.7*	85.3	3.5	577.0	25.4	7.2	379.7	75.9	2.6	511.4	52.9	9.3	520.9	96.2	4.7	657.8
1983	39.4	6.2	428.2	124.1	2.3	602.6	28.1	5.5	375.7	111.4	1.7	545.8	58.9	7.1	489.7	138.4	3.1	666.4
1984	32.9	7.9	439.4	123.8	3.2	608.9	23.4	7.0	385.9	111.4	2.4	552.6	49.1	9.1	502.6	137.6	4.3	673.6
1985	31.7	5.1	405.8	135.6	1.2	581.4	22.6	4.5	357.3	119.6	0.9	527.7	47.4	5.9	461.2	154.8	1.6	640.4
1986	26.1	14.0	485.9	133.8	0.6	662.3	18.6	12.4	426.4	117.0	0.5	598.8	39.0	16.0	554.8	154.9	0.8	735.1
1987	34.3	14.4	367.2	99.7	2.7	520.6	24.4	12.8	324.6	87.4	2.1	472.8	51.4	16.6	420.0	114.0	3.7	575.4
1988	24.2	9.3	306.7	99.7	2.9	444.2	17.2	8.2	270.7	90.0	2.2	405.9	36.2	10.7	348.8	111.0	4.0	488.7
1989	23.7	7.9	219.9	97.2	10.2	360.2	17.5	7.0	192.7	90.4	7.7	330.7	33.3	9.1	252.3	105.9	13.9	394.7
1990	26.2	8.3	260.2	124.7	5.3	425.9	19.3	7.4	227.8	117.7	4.0	391.3	36.9	9.5	299.8	133.0	7.4	467.3
1991	35.1	5.8	220.1	122.2	7.2	392.0	26.0	5.1	192.9	113.9	5.4	361.2	49.4	6.6	251.7	131.9	9.9	427.6
1992	34.1	8.6	239.1	116.3	10.0	409.7	25.1	7.6	209.6	109.4	7.5	376.6	47.9	9.9	273.2	124.0	13.9	445.5
1993	35.7	9.7	229.7	137.8	11.3	425.9	26.3	8.6	204.5	129.5	8.6	396.7	50.2	11.2	258.4	147.1	15.8	457.9
1994	33.7	8.2	224.9	121.9	8.6	399.0	24.8	7.3	199.1	110.4	6.5	368.3	47.5	9.5	253.5	138.1	12.0	434.4
1995	22.1	5.2	240.7	138.7	4.3	412.5	16.3	4.6	213.1	128.0	3.2	381.4	31.1	6.0	272.2	152.6	5.9	447.0
1996	20.5	6.9	240.9	104.5	7.0	381.3	14.9	6.1	214.9	95.0	5.3	351.6	29.2	7.9	271.4	117.5	9.7	414.8
1997	24.6	3.9	159.3	85.2	5.0	279.5	17.9	3.4	141.4	77.1	3.8	257.6	35.7	4.4	179.8	95.5	7.0	303.8
1998	23.6	5.6	191.3	105.4	2.8	330.0	17.1	5.0	170.1	97.2	2.1	305.7	33.8	6.5	215.9	115.8	3.9	357.8
1999	28.0	6.5	204.4	93.2	2.0	335.2	21.6	5.7	179.5	83.4	1.5	306.5	36.9	7.5	233.9	106.6	2.7	368.0
2000	53.4	3.8	282.4	162.4	7.1	511.1	41.3	3.3	250.8	148.1	5.4	472.9	69.7	4.4	320.4	182.9	9.8	555.5
2001	64.6	4.3	333.3	114.7	8.4	527.9	50.4	3.8	296.3	100.5	6.4	482.6	83.7	5.1	376.2	134.0	11.6	577.3
2002	56.8	4.1	288.7	125.2	5.7	482.4	44.4	3.6	255.3	111.0	4.4	442.2	73.6	4.8	328.5	144.6	8.0	528.6
2003	40.6	4.3	255.8	87.3	1.4	391.5	31.9	3.7	227.6	77.5	1.1	358.3	52.8	5.2	288.4	102.0	1.9	426.9
2004	18.6	4.2	231.6	67.2	4.2	326.8	14.5	3.6	205.0	59.1	3.2	297.8	24.1	5.1	263.9	77.6	5.9	360.3
2005	15.4	5.3	212.9	80.8	2.8	318.3	12.0	4.5	190.1	71.0	2.2	292.5	20.0	6.3	240.1	93.3	4.0	348.0
2006	22.6	5.0	270.4	77.4	3.0	379.1	18.5	4.2	241.2	69.1	2.3	348.2	27.9	6.3	303.5	87.8	4.1	414.0

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2007	32.8	4.8	230.1	80.6	2.8	351.9	26.9	4.1	205.1	74.0	2.1	324.9	40.6	6.0	258.4	88.6	3.8	381.6
2008	33.0	6.2	265.1	126.0	3.9	436.4	27.1	5.2	232.3	112.2	2.9	399.2	41.0	7.8	304.9	147.7	6.0	481.1
2009	14.2	5.0	207.5	106.9	3.4	338.9	11.6	4.2	181.0	96.4	2.5	308.9	17.6	6.2	240.2	121.8	5.3	373.8
2010	22.7	7.1	228.9	132.9	4.0	397.3	18.6	6.1	198.5	119.0	2.9	362.6	28.3	8.7	264.1	152.2	6.1	438.0
2011	17.5	8.0	319.2	131.7	9.4	487.9	14.3	6.6	276.6	118.6	6.9	442.7	21.8	9.9	368.7	151.9	14.2	540.4
2012	21.1	4.5	279.6	65.0	10.7	381.8	17.3	3.7	243.2	58.7	7.9	344.5	26.3	5.6	321.6	72.7	16.4	425.6
2013	20.4	5.1	197.6	74.3	4.5	302.9	16.7	4.2	171.7	66.9	3.3	275.2	25.4	6.6	227.9	83.3	7.4	334.7
2014	22.1	6.1	202.2	73.6	9.7	315.2	18.1	5.0	172.4	66.3	7.3	283.6	27.4	8.0	237.6	82.8	14.4	351.3
2015	21.3	5.9	256.1	69.2	5.9	359.5	17.4	4.8	221.2	63.1	4.3	323.6	26.5	7.4	299.6	76.8	9.5	403.6
2016	22.8	8.3	280.9	59.0	4.0	376.3	18.6	6.7	244.3	54.5	2.9	338.4	28.3	10.8	324.5	64.4	6.3	419.5
2017	16.4	4.7	284.5	54.5	5.4	366.6	13.2	3.6	246.8	50.6	3.9	327.8	21.1	6.7	329.2	59.8	8.4	411.8
2018	10.1	5.1	267.8	71.9	6.7	363.2	8.1	3.9	231.2	64.5	4.9	324.9	12.9	7.5	312.2	82.2	10.5	408.5
2019	14.2	3.9	226.5	56.3	10.7	313.3	11.4	3.0	195.8	51.9	7.3	281.3	18.3	5.6	263.9	61.6	19.5	351.5
2020	8.5	3.5	228.8	48.4	6.5	296.4	6.8	2.8	196.8	45.4	4.6	264.3	10.9	4.7	265.7	51.9	10.5	333.6
2021	9.0	2.5	170.7	52.3	5.7	242.7	5.2	2.0	141.9	35.7	4.0	206.6	17.5	3.6	208.3	73.8	9.2	285.4
2022	11.4	2.9	203.6	60.2	6.3	287.8	6.7	2.1	169.4	40.9	4.5	245.5	22.1	4.4	248.3	86.3	10.1	339.5
2023	10.3	3.3	175.2	63.7	6.3	263.7	6.0	2.1	142.8	43.5	4.5	221.6	19.9	7.6	223.8	98.4	10.2	321.2
Previous five-year mean:																		
	10.6	3.6	219.5	57.8	7.2	300.7												
Change (recent year relative to previous five-year mean):																		
	-3 %	-7 %	-20 %	10 %	-12 %	-12 %												
Rank of recent year (highest = 1 to lowest):																		
	50/53	51/53	51/53	47/53	15/53	52/53												
Forecast:																		
2024	7.1	2.6	195.7	54.3	9.4	269.1	3.2	0.9	123.2	28.9	3.0	159.2	17.2	7.2	327.5	101.6	27.8	481.3
2025	6.7	2.2	193.3	54.4	6.6	263.2	2.0	0.5	104.2	22.9	1.6	131.2	23.6	9.1	392.6	120.0	23.5	568.8
2026	6.5	1.8	184.9	49.7	6.2	249.1	1.5	0.3	89.6	17.3	1.1	109.8	26.7	9.6	399.3	121.3	26.1	583.0
2027	5.5	1.8	186.9	43.5	6.5	244.2	1.2	0.2	84.7	14.4	0.9	101.4	23.4	11.3	468.4	123.7	31.2	658.0

Notes:

*** Data underlying from 1971-1982 are more uncertain than the rest of the time-series.**

Table 3.3.4.3 Estimated number (in thousands) of 1SW spawning salmon by year for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model.

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	12.2	4.7	131.0*		8.1		7.6	3.3	82.3		4.8		19.7	6.8	190.0		13.5	
1972	47.6	4.3	152.6*	71.9	6.4	285.6	29.6	3.0	96.2	56.6	3.8	221.2	77.0	6.2	221.9	90.3	10.7	361.3
1973	22.2	5.2	150.6*	78.2	8.0	266.5	13.8	3.6	94.8	62.5	4.7	206.0	35.8	7.4	217.3	96.5	13.3	335.5
1974	30.4	5.2	143.7*	93.8	11.6	287.1	19.0	3.6	90.3	75.4	6.9	227.5	49.5	7.4	208.4	114.4	19.2	356.0
1975	36.7	6.3	142.7*	111.5	12.6	313.5	22.9	4.4	89.6	88.5	7.4	251.1	59.8	9.0	207.8	139.8	20.8	386.2
1976	33.6	6.3	135.4*	109.3	7.1	294.7	20.9	4.4	84.9	84.6	4.2	234.5	54.1	9.1	196.7	138.7	11.8	362.8
1977	18.8	8.7	139.4*	74.3	3.2	246.8	11.6	6.1	87.6	57.6	1.9	190.8	30.8	12.6	202.6	93.9	5.4	313.0
1978	17.8	8.9	113.5*	58.9	3.8	204.5	11.2	6.2	71.6	45.7	2.2	159.5	28.9	12.8	164.7	74.0	6.4	258.8
1979	16.1	8.6	206.0*	74.8	3.9	310.6	10.0	5.9	128.6	58.8	2.3	231.2	25.9	12.3	298.9	93.7	6.5	406.2
1980	12.7	1.3	143.7*	73.3	5.0	237.3	8.3	0.9	89.5	57.8	3.0	180.8	19.4	1.9	209.7	91.9	8.3	304.9
1981	11.3	6.7	141.3*	53.8	9.1	223.1	7.5	4.6	88.6	42.0	5.4	168.8	17.3	9.6	206.4	67.2	15.1	290.1
1982	6.8	3.1	110.6*	49.7	8.0	179.1	4.5	2.1	69.2	39.8	4.8	135.6	10.3	4.4	160.5	61.2	13.4	230.6
1983	16.6	4.5	161.0	64.7	10.7	259.4	10.9	3.2	108.7	52.6	6.4	204.9	25.0	6.5	222.8	79.4	17.9	323.5
1984	18.1	1.6	163.5	80.7	15.1	281.4	11.9	1.1	108.5	65.1	9.0	221.8	27.5	2.4	229.3	98.5	25.3	349.7
1985	24.0	11.3	171.8	92.9	17.8	320.8	15.8	7.9	117.2	73.2	10.6	260.5	36.8	16.3	236.3	116.1	30.1	390.6
1986	18.9	14.2	152.1	102.4	18.7	309.0	12.4	9.8	106.7	80.7	11.1	254.9	28.8	20.3	206.3	127.2	31.2	369.6
1987	22.9	8.3	127.5	95.8	15.0	271.4	15.0	5.8	90.1	75.0	8.9	226.7	34.9	12.0	171.1	118.8	24.9	321.3
1988	13.5	12.0	117.0	86.6	12.6	244.3	8.8	8.4	83.0	71.9	7.4	204.5	20.4	17.3	158.4	105.4	20.8	289.5
1989	23.4	6.5	183.7	96.3	3.6	315.4	15.1	4.5	137.1	86.0	2.2	265.5	35.5	9.3	245.4	107.3	6.1	378.0
1990	23.3	4.9	166.0	97.1	9.9	302.7	15.1	3.4	124.5	86.3	5.7	257.8	35.5	7.0	217.2	108.5	17.7	357.2
1991	23.1	7.1	143.9	83.1	12.3	271.6	14.8	4.9	107.4	73.3	7.1	231.0	35.0	10.1	189.7	94.0	22.3	319.9
1992	32.5	13.3	122.0	116.1	13.8	300.9	20.8	9.2	92.4	100.5	8.0	262.1	49.7	19.1	158.5	133.1	24.8	344.3
1993	21.8	10.8	121.5	114.0	13.7	284.1	14.1	7.6	91.3	97.4	7.8	247.0	33.2	15.7	155.6	132.6	24.6	325.4
1994	12.2	3.5	166.5	116.1	10.6	310.7	7.9	2.4	123.0	98.3	6.1	262.3	18.5	5.0	221.9	136.2	19.0	369.6
1995	12.2	9.1	107.7	121.3	17.5	270.3	7.9	6.3	81.5	103.3	10.9	235.2	18.4	13.1	139.2	142.1	29.7	308.9
1996	20.9	4.9	80.9	138.4	10.4	257.7	13.7	3.4	61.5	117.8	6.5	225.7	31.9	7.0	102.8	161.2	17.8	291.2
1997	19.1	6.7	105.3	158.4	4.7	296.3	12.5	4.6	81.5	133.6	2.9	259.7	29.0	9.6	132.6	187.4	8.0	336.2
1998	24.1	11.3	137.6	163.6	3.8	342.8	15.7	7.9	105.5	137.8	2.4	298.8	36.4	16.4	175.6	192.7	6.6	390.6
1999	31.5	6.0	128.1	162.5	6.0	336.5	20.2	4.2	97.5	137.4	3.7	293.4	48.0	8.7	163.6	192.4	10.2	383.5
2000	34.1	6.3	212.9	141.4	11.2	409.0	22.0	4.4	163.0	119.5	6.9	350.7	52.3	9.1	275.1	166.8	19.0	477.2
2001	24.7	5.8	185.7	198.0	6.8	425.6	15.9	4.1	142.7	159.4	4.3	362.6	37.4	8.4	238.6	249.2	11.8	496.7
2002	17.1	10.3	111.3	211.4	6.6	358.9	11.2	7.2	86.0	162.8	4.1	302.1	26.1	15.0	141.3	270.7	11.2	425.2
2003	17.0	5.5	156.8	199.4	3.6	386.0	11.1	3.8	119.5	153.7	2.2	322.2	25.7	7.9	203.4	256.2	6.1	456.7
2004	7.2	14.9	93.9	146.4	3.0	267.0	4.7	10.5	73.1	113.2	1.9	226.9	10.9	21.9	117.9	187.3	5.1	315.0
2005	15.7	13.7	140.4	133.2	3.0	308.3	10.4	9.5	109.1	102.0	1.8	260.4	24.1	19.9	177.3	170.3	5.0	359.5
2006	25.8	14.2	111.1	162.5	3.3	318.9	17.5	9.8	85.4	124.6	2.0	270.5	38.1	20.6	140.3	208.9	5.6	375.1

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2007	7.6	10.6	61.8	123.7	1.0	206.2	5.1	7.4	47.5	94.9	0.6	172.4	11.1	15.6	77.8	160.6	1.7	246.3
2008	8.2	10.1	88.0	93.4	1.8	202.9	5.6	7.0	68.1	72.5	1.1	173.8	12.0	14.8	110.7	118.8	3.6	236.3
2009	14.5	16.7	71.6	101.0	2.0	207.4	9.7	12.8	55.7	77.3	1.2	177.5	21.3	22.5	89.9	131.1	3.8	242.8
2010	11.5	13.5	116.2	92.5	3.4	239.1	7.8	10.2	90.9	72.6	2.0	204.6	17.0	18.0	146.4	117.5	6.5	278.1
2011	13.2	11.5	80.3	102.8	3.3	212.8	8.9	8.7	63.2	81.1	1.9	183.6	19.2	15.5	100.1	128.7	6.5	245.6
2012	22.9	5.8	90.0	109.9	4.0	234.4	15.5	4.4	71.2	87.2	2.4	202.1	33.5	7.8	111.0	138.0	7.8	270.4
2013	13.3	14.3	90.8	100.7	2.2	223.2	9.0	10.8	70.7	78.2	1.3	190.8	19.4	19.2	115.1	127.8	4.9	259.8
2014	18.8	6.7	138.0	90.7	6.7	263.6	12.7	5.1	106.4	70.7	4.1	222.5	27.5	9.1	179.5	116.5	12.5	311.6
2015	11.7	19.7	109.1	90.0	1.8	234.3	7.9	14.9	85.7	69.8	1.1	200.8	17.2	27.0	139.0	115.0	3.3	272.9
2016	9.2	8.6	82.5	76.5	1.7	180.3	6.2	6.4	64.7	59.7	1.1	153.8	13.4	11.8	104.4	99.1	3.0	210.6
2017	7.8	8.5	109.9	39.6	2.2	169.9	5.3	6.3	85.3	31.1	1.4	142.3	11.7	11.7	141.3	53.1	3.9	202.8
2018	19.8	9.1	121.1	51.5	6.2	211.1	13.4	6.7	94.8	40.3	3.8	178.4	29.7	12.5	152.2	69.7	12.7	247.1
2019	6.4	5.9	87.6	69.5	3.0	174.3	4.4	4.3	68.6	54.4	1.9	148.1	9.7	8.5	110.7	89.2	6.2	204.4
2020	5.6	6.9	110.1	45.6	3.5	173.3	3.8	5.1	85.9	36.0	2.3	145.8	8.5	9.7	139.6	58.2	6.1	205.4
2021	18.9	5.8	92.3	41.4	4.1	167.8	11.0	4.2	71.0	21.2	2.7	131.4	36.9	8.4	119.4	81.4	7.3	215.3
2022	10.0	7.4	124.3	59.2	3.4	208.4	5.8	5.2	94.8	25.0	2.2	159.2	19.6	11.4	161.1	115.7	6.0	272.9
2023	9.7	5.5	100.5	65.3	2.7	188.4	5.1	3.8	77.0	27.2	1.8	138.8	24.7	9.0	131.0	133.8	4.8	262.6
Previous five-year mean:																		
	12.2	7.0	107.1	53.4	4.0	187.0												
Change (recent year relative to previous five-year mean):																		
	-20 %	-22 %	-6 %	22 %	-33 %	1 %												
Rank of recent year (highest = 1 to lowest):																		
	45/53	42/53	42/53	43/53	46/53	46/53												

Notes:

*** Data underlying from 1971-1982 are more uncertain than the rest of the time-series.**

Table 3.3.4.4 Estimated number (in thousands) of MSW spawning salmon by year for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model.

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	10.2	2.9	83.4*		0.3		5.3	1.8	54.2		0.2		19.1	4.3	117.9		0.4	
1972	10.5	4.6	114.1*	58.8	0.2	189.4	5.6	2.8	74.4	45.7	0.1	147.1	19.8	6.8	160.8	73.8	0.4	238.9
1973	17.1	4.3	130.8*	66.0	0.9	221.2	8.9	2.6	85.3	52.9	0.6	171.3	32.0	6.3	186.7	81.6	1.6	279.2
1974	29.2	4.0	122.7*	98.9	0.6	258.8	15.1	2.5	79.9	76.3	0.3	205.0	54.1	6.0	174.8	126.3	1.0	320.4
1975	37.2	4.5	105.4*	87.0	0.2	237.2	19.2	2.7	68.7	67.1	0.1	188.8	69.6	6.6	149.5	110.0	0.3	294.1
1976	29.2	3.6	109.1*	86.6	0.5	232.4	15.3	2.3	70.9	66.7	0.3	184.3	55.6	5.4	155.1	109.6	0.8	287.6
1977	20.3	5.1	108.6*	71.8	0.2	207.9	10.5	3.2	70.7	54.3	0.1	164.1	38.2	7.6	155.0	91.6	0.4	259.5
1978	10.3	6.6	71.7*	50.6	0.3	140.5	5.4	4.1	47.0	38.8	0.2	112.0	19.4	9.8	101.7	64.0	0.5	174.4
1979	12.4	4.3	126.8*	44.5	0.7	190.1	6.7	2.7	82.3	33.0	0.4	143.3	24.3	6.5	180.1	58.8	1.2	246.5
1980	12.4	6.0	148.9*	47.7	1.4	217.9	6.9	3.7	96.7	37.3	0.8	163.9	22.6	9.0	211.7	60.4	2.3	282.4
1981	14.8	2.1	130.3*	65.9	0.3	215.2	8.1	1.3	84.7	47.7	0.2	164.0	26.7	3.2	184.0	88.3	0.5	274.3
1982	19.5	2.4	105.0*	40.8	1.5	171.3	11.0	1.5	68.4	31.3	0.9	131.2	35.4	3.6	150.0	52.0	2.4	219.2
1983	21.6	1.8	101.1	49.2	1.0	177.2	12.1	1.1	71.2	40.3	0.6	142.3	39.5	2.8	136.7	59.1	1.6	216.9
1984	18.0	2.4	104.0	62.1	1.3	190.0	10.1	1.5	73.4	50.7	0.8	154.9	32.9	3.6	140.0	74.8	2.2	229.3
1985	17.3	1.5	95.9	51.2	0.5	168.1	9.8	1.0	67.8	41.6	0.3	136.6	31.8	2.3	127.9	62.4	0.8	203.6
1986	14.2	4.2	114.7	52.5	0.3	187.8	8.0	2.6	80.3	39.5	0.1	149.5	26.2	6.2	155.1	68.3	0.4	231.0
1987	18.6	4.3	89.9	53.3	1.2	169.8	10.5	2.7	64.2	39.7	0.7	136.8	34.5	6.5	120.4	70.6	1.9	206.8
1988	13.2	2.8	73.0	45.0	1.2	136.8	7.4	1.7	52.2	35.2	0.7	112.0	24.3	4.2	97.4	56.7	2.1	165.3
1989	10.6	2.4	78.0	50.9	4.3	147.4	5.8	1.5	59.9	42.6	2.5	126.1	18.9	3.5	99.6	60.5	7.2	171.6
1990	11.7	2.5	91.4	48.1	2.6	157.7	6.4	1.5	69.9	41.1	1.5	133.5	21.0	3.7	118.0	56.6	4.6	186.8
1991	15.6	1.7	76.5	60.5	3.6	159.2	8.6	1.1	58.9	51.0	2.0	136.6	28.1	2.6	97.6	70.6	6.2	185.1
1992	15.3	2.6	84.1	58.5	5.0	167.0	8.3	1.6	64.6	49.1	2.8	143.3	27.3	3.9	107.1	68.5	8.7	194.2
1993	15.9	2.9	78.4	55.8	5.7	160.3	8.7	1.8	60.4	47.2	3.2	137.6	28.5	4.3	99.1	64.7	9.9	185.4
1994	15.2	2.5	77.0	65.3	4.3	165.6	8.2	1.5	59.0	54.3	2.4	142.1	27.2	3.7	97.5	76.5	7.5	191.7
1995	9.9	1.6	83.5	64.2	2.4	163.1	5.4	1.0	64.1	52.7	1.5	138.6	17.8	2.3	106.7	78.3	4.0	190.0
1996	10.1	2.1	82.8	63.3	4.0	163.3	5.6	1.3	63.9	50.4	2.5	139.6	18.0	3.1	104.4	77.3	6.6	189.7
1997	12.3	1.2	57.7	52.8	2.9	128.1	6.8	0.7	44.4	42.2	1.8	108.9	22.1	1.7	72.7	64.9	4.7	149.1
1998	11.7	1.7	69.7	41.9	1.6	127.7	6.5	1.0	53.5	33.4	1.0	107.7	20.9	2.5	88.1	51.3	2.6	149.5
1999	13.9	2.3	72.4	54.6	1.1	145.1	9.1	1.5	53.7	43.9	0.7	122.3	21.1	3.3	94.3	66.1	1.9	170.1
2000	26.5	1.4	102.7	58.9	4.1	195.1	17.5	0.9	78.4	48.6	2.5	166.3	39.9	2.0	131.2	71.3	6.7	228.4
2001	28.8	1.6	122.6	89.3	4.8	249.1	19.0	1.1	94.3	71.7	3.0	212.8	43.9	2.4	155.7	109.5	7.9	290.2
2002	25.4	1.6	106.8	74.3	3.3	213.6	16.7	1.1	81.4	61.3	2.1	181.7	38.5	2.4	137.1	90.9	5.4	249.1
2003	18.1	2.0	96.0	63.3	0.8	181.6	11.9	1.4	73.7	51.8	0.5	154.7	27.6	2.9	122.1	78.5	1.3	212.0
2004	8.4	1.9	87.5	48.1	2.4	149.6	5.5	1.3	66.9	39.2	1.5	125.9	12.6	2.7	113.1	60.3	4.0	177.7
2005	6.9	2.4	79.1	36.4	1.6	127.3	4.5	1.7	61.1	29.1	1.0	107.0	10.5	3.5	100.5	45.4	2.7	150.5
2006	10.1	2.8	101.2	46.7	1.7	163.2	6.8	1.9	78.5	37.4	1.1	137.9	14.8	4.0	127.3	58.1	2.8	191.8

Year	Finland median	Iceland(NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland(NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland(NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2007	14.7	3.1	83.8	40.0	1.6	144.0	9.9	2.3	64.2	32.4	1.0	122.0	21.5	4.2	105.8	49.0	2.6	168.0
2008	14.8	3.4	125.9	47.5	2.7	195.2	10.0	2.4	97.9	38.7	1.6	165.3	21.7	5.0	160.8	56.9	4.7	231.6
2009	6.4	3.2	99.9	70.0	2.3	184.0	4.3	2.4	77.6	56.6	1.4	155.6	9.3	4.4	128.7	88.3	4.2	216.2
2010	10.2	4.4	122.9	60.9	2.7	202.1	6.9	3.3	96.3	49.7	1.7	172.3	14.9	6.0	154.3	74.3	4.8	236.4
2011	7.9	5.3	178.8	72.8	5.6	272.0	5.3	3.9	140.6	59.1	3.2	230.7	11.5	7.2	223.9	89.6	10.4	319.0
2012	9.5	3.0	157.0	64.0	7.2	242.0	6.4	2.2	123.9	50.8	4.5	205.2	14.0	4.2	194.2	80.9	12.9	283.2
2013	9.2	3.5	112.0	33.6	2.9	161.9	6.2	2.6	88.9	27.2	1.7	137.5	13.4	5.0	139.4	40.7	5.8	190.4
2014	9.9	4.3	124.1	36.7	6.3	182.5	6.7	3.2	96.2	29.4	4.0	152.9	14.5	6.1	157.4	45.1	10.9	216.8
2015	9.5	4.0	147.9	34.0	4.1	200.5	6.4	3.0	116.4	26.7	2.5	167.3	14.0	5.6	187.5	42.1	7.7	241.2
2016	10.2	5.9	159.9	31.7	3.0	211.9	6.9	4.3	126.8	24.8	1.9	177.7	15.0	8.4	199.2	39.4	5.3	251.8
2017	9.0	3.6	162.4	25.1	4.0	205.2	6.2	2.5	128.1	19.6	2.6	169.5	13.4	5.7	202.9	30.9	7.1	246.8
2018	5.5	4.0	160.1	25.1	5.0	200.6	3.8	2.8	126.5	19.5	3.2	166.0	8.2	6.4	200.6	31.2	8.8	242.1
2019	7.8	3.0	130.8	31.7	8.6	183.8	5.3	2.1	103.0	24.2	5.2	154.1	11.6	4.8	164.7	41.2	17.4	219.8
2020	4.7	2.9	133.3	24.0	5.4	170.9	3.2	2.2	104.3	18.9	3.5	141.3	6.9	4.1	167.4	29.5	9.4	205.8
2021	8.7	2.2	115.2	20.2	4.7	152.6	5.0	1.6	87.4	15.0	3.1	122.9	17.1	3.3	151.6	25.9	8.2	189.3
2022	11.1	2.5	133.6	26.0	5.2	181.0	6.4	1.8	101.5	11.4	3.4	142.7	21.6	4.0	176.6	44.2	9.0	227.6
2023	10.0	3.1	120.7	29.8	5.2	172.1	5.8	1.9	89.9	13.0	3.4	134.1	19.5	7.4	168.7	51.9	9.1	224.4
Previous five-year mean:																		
	7.5	2.9	134.6	25.4	5.8	177.8												
Change (recent year relative to previous five-year mean):																		
	33 %	5 %	-10 %	17 %	-9 %	-3 %												
Rank of recent year (highest = 1 to lowest):																		
	39/53	23/53	19/53	47/52	7/53	29/52												

Notes:

*** Data underlying from 1971-1982 are more uncertain than the rest of the time-series.**

Table 3.3.4.5 Estimated number (in thousands) of returning 1SW salmon by year for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model. The last four years are forecasted from the Life-cycle Model under the zero catch scenario.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	82.6	49.7	62.2	1055	181.7	591.4	2038.8	66	35.9	52.9	853.2	162.7	514.5	1808.1	103.8	80.7	76.1	1332	204.1	705	2326.3
1972	79.6	99.1	50.8	1123	158.6	610.8	2143.4	62.8	71.8	43	909.7	142.3	515.6	1890.4	103	161.8	61.9	1418.4	178	752.2	2458.8
1973	94	61.1	54.4	1223.1	138.7	735.4	2327.6	74.5	44	46.1	992.2	124.3	623.8	2055.9	121.9	99.1	66.4	1542.6	155.8	905.9	2677.3
1974	117.1	28.3	38.7	1396.1	151.6	708.9	2456.4	92	20.4	32.8	1125.2	135	604.6	2152	151	46.1	47.2	1771.7	171.5	858.7	2845.1
1975	121	56.9	60.1	1534.1	124.6	591.9	2508.7	95.4	40.9	50.9	1246.2	111.6	498	2190.4	155.8	92	73.2	1938.6	139.6	732	2927.6
1976	80	51.8	47.5	1046.5	86.6	468.7	1796.4	63.9	37.6	40.2	847.7	77.6	395.2	1572	102.5	84.6	57.9	1324	97	575.3	2083.9
1977	91.9	39.9	48.7	902.7	85.4	565.4	1751.3	72.2	28.9	41.2	730.7	76.3	470.9	1538.1	118.4	65.2	59.1	1143.9	95.9	711.7	2023.4
1978	105.3	40.9	63.7	791.4	111.1	592.9	1721.7	82.7	29.6	53.9	639.4	99.7	493.8	1523.1	135.8	66.9	77.6	997.3	124.4	738.5	1968.2
1979	99.7	46.9	58.8	726.9	78	598.9	1622.4	78.2	33.9	49.7	585.8	69.8	490.5	1429.5	130.3	76.7	71.8	914.2	87.7	759.1	1861.2
1980	93.3	97.9	26.7	555.8	98.6	391.8	1280.5	72.8	70.7	22.6	448.6	88.2	324.4	1135.3	122.6	159.9	32.5	700.1	111.5	490.5	1455.6
1981	98.5	78.2	34.5	291.8	77.5	504.2	1096.3	77.3	56.2	29.2	243.8	69.2	414.7	978.6	128.2	126.4	42.1	353.2	86.9	638.9	1247.3
1982	83.4	48.2	35.4	604.3	111.8	578.6	1474.3	65.5	34.5	30	503.8	99.4	488.6	1324.7	109	78	43.2	730	127.1	711.3	1651.4
1983	121.9	51.3	44.7	1061.9	157	643.3	2097.5	96	37.2	37.9	887.8	139.8	540.5	1881.3	158.2	83.9	54.5	1286.4	178.4	793.4	2355.8
1984	107.3	84.8	27.5	559.8	61.8	611.9	1468.5	85	61	23.3	467.3	55.1	515.5	1318.3	138.1	137	33.5	678.8	69.4	748.8	1645.1
1985	107.5	31.1	44.5	927.4	80	557.1	1760	83.6	22.6	37.8	774.4	71.3	456.5	1570.8	140.1	51.3	54.4	1126.2	90.5	700.3	1994.7
1986	123.4	48.9	73.3	1038.3	90	651.6	2052.2	97.1	29.6	62.1	865.7	80.1	539.5	1822.7	160.6	135.2	89.3	1253.9	101.9	821.3	2323.1
1987	128.4	85.8	45.6	668.3	49.1	556.2	1563	100.7	52.3	38.6	549.9	43.4	448.2	1372.4	167.6	240.2	55.4	821	55.9	711.3	1801.8
1988	176.2	29.3	81.9	908.3	116.1	673.8	2006.3	136.3	17.9	69.2	747.2	101.6	535.6	1776.2	233.9	81.9	99.6	1116	133.1	872.5	2289
1989	118.4	16.1	45.5	651.3	111.4	752	1711.3	92.7	9.8	38.7	535.1	95.8	588.6	1496.4	155	45.2	55.7	798.9	131.5	996	1981.9
1990	84.6	27	42.1	407.3	92.2	487.9	1155	66.6	16.4	35.6	335	85.1	372.1	1004.6	111	76.1	51.3	501	100.2	656.4	1345.8
1991	84	19.5	46.4	290.6	51.5	417.3	921.6	65.6	11.9	39.3	239.2	47.6	321.4	800.9	110.4	54.9	56.5	357	56	563.1	1077.9
1992	87.9	35.5	53	421.7	104.3	544.7	1264.5	67.4	21.6	45	346.4	94.1	417.5	1103.6	116.6	100.7	64.7	517.8	116.2	736.3	1479
1993	122.1	51	52	344.2	122.3	584.6	1296	93.9	31.1	44.1	284.6	112.9	436.4	1123.5	163.6	142.5	63.4	419.8	133.1	800.5	1532.7
1994	134.8	40.1	42.8	439.5	83.8	593.3	1353.7	108.6	24.5	36.3	363.6	74.9	452.2	1177.1	175.5	110.7	52.2	537.5	94.3	805.1	1587.4
1995	103.7	13.5	52.7	491.3	77.8	579	1330.3	82.1	8.7	44.8	405.3	71.8	439.5	1154.8	137.2	29.2	64.5	599	84.7	787.5	1557.6
1996	77.1	16.5	45.7	456.2	80.3	447.7	1135.7	60.9	10.7	38.7	376.9	70.7	325.5	979.3	103.1	35.6	55.6	558.4	92.6	644.5	1346.2
1997	69.3	8.5	33.4	457.3	95.5	385.1	1059.5	53.9	5.5	28.2	377.4	84.1	282.5	921.1	94.5	18.5	40.7	558.3	110.1	538	1234.7
1998	75.6	16.4	45.6	479.3	207.9	429.4	1269.4	58.4	10.8	38.6	396.5	179.7	315.3	1113.4	106.2	35.6	55.7	586.2	246.2	602.1	1468.4
1999	60	5.6	37	445.7	54.2	287.1	898	45.6	3.6	31.3	367.5	50.5	210.7	780.3	86.6	11.9	45.5	543.4	58.2	400.3	1044.3
2000	91.7	14.3	32.9	621.1	79.6	444.4	1297.8	70.1	9.3	27.8	512.2	74.1	327.9	1125.3	130.9	31.2	40.4	755.4	85.6	620.8	1510.5
2001	79.3	12.4	29.6	493	63.3	469.8	1159.6	60	8	24.9	433.1	58.8	344.5	1007.9	117.5	26.7	36.3	570.2	68.5	663	1367.9
2002	74.8	27.8	36.9	431.6	112.4	346.9	1046.6	56.7	17.6	31	378.3	102.6	258.1	925.5	110.8	60.2	45.3	498.6	126.2	478.2	1194.9
2003	58.1	18.2	44	423.2	70.4	345.3	973.5	41	11.5	37.1	370.5	65.7	244.9	846.4	100.7	39.7	54	489.4	77	498.3	1139.6
2004	104.9	22.3	44	311.7	67.4	476.9	1042.7	74.4	13.9	37.1	273	62.6	342.1	889.6	176.4	48.2	54.3	360.1	74.2	666.8	1244.2
2005	86.3	14.6	64.8	309.5	84.7	479.1	1054.3	60.4	9.1	54.7	273	77.5	348	905.6	147	31.5	80.1	356.9	95.2	677.3	1257.6

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2006	84.3	20.2	46	236.9	57.4	430.6	890.3	57.4	12.7	38.7	210	52.4	307.5	752	152.7	44.1	56.5	271.4	64.6	612	1084.4
2007	80.6	15.7	52.7	238.8	84.9	441.9	948.1	55.1	9.9	44.8	172.5	75.2	319.5	777.2	146.4	34.4	63.5	432.4	99.1	617.1	1192.1
2008	79	15.6	63.8	252.8	53.3	355.4	855.2	54.3	9.8	53.5	181	47.1	256.7	693.7	143.8	34.1	79.1	465.6	60.9	500.1	1085.4
2009	48.8	4.5	71.8	205.4	33.2	276.1	661.8	34.1	2.8	60.6	150.3	29.5	200.1	542.6	89.2	9.7	88.5	365.2	38.5	385.3	838.1
2010	98.4	15.2	73.6	272.8	33.0	493.5	1025.8	67.5	9.5	62.0	198.3	29.4	357.4	830.2	179.2	33.0	91.3	492.0	38.2	696	1298.9
2011	65.5	10.4	51.9	235.6	23.8	277.7	688.4	45.9	6.5	43.6	171.6	20.3	204.4	564.9	116.1	22.6	64.3	420.4	30.4	381.8	885.7
2012	37.9	11.2	29.5	242.3	55.0	351.7	757.4	26.2	7.0	24.7	174.6	40.0	254.8	608.9	69.0	24.3	36.6	440.9	95	491.6	973
2013	52.6	15.7	87.6	204.5	61.5	278.6	731.9	36.5	9.9	73.7	150.1	45.4	202.3	605.9	96.3	34.6	108.6	363.4	102.8	392.1	910.3
2014	31.5	14.2	21.7	126.2	27.5	161.9	398.4	21.7	8.8	18.1	93.8	21.1	121.6	330.2	57.1	30.2	26.9	217.0	44.2	220.5	499.4
2015	39.0	13.0	60.3	179.2	29.5	254.6	599.1	26.7	8.1	50.4	131.1	23.2	183.8	491.1	70.6	28.1	75.4	319.2	46.1	360.5	756.1
2016	41.0	11.6	35.3	180.7	55.4	249.7	598.8	28.3	7.3	29.5	131.1	45.2	176.0	486.8	74.4	25.7	44.2	323.8	82	359.2	762.3
2017	29.8	14.9	36.7	195.5	46.9	220.3	567.4	20.5	9.3	30.7	140.8	35.9	157.7	458.3	53.4	32.2	46.1	354.1	75.4	316.6	738.2
2018	38.5	12.3	31.7	155.7	40.8	212.8	513.1	26.5	7.7	26.5	113.5	31.9	150.9	414.7	69.4	26.7	39.7	278.1	64.9	308.6	655.4
2019	25.8	12.8	21.1	132.9	22.7	215.0	446.6	13.9	8.0	17.5	94.8	18.2	151.2	354.3	37.9	27.7	26.5	243.0	34.5	309.9	579.6
2020	48.1	10.3	26.4	162.4	36.2	289.5	590.5	22.9	6.4	21.8	115.3	32.8	201.8	469.0	73.0	22.2	33.5	296.6	42.2	420.3	760.6
2021	25.7	6.1	21.4	168.1	27.6	210.1	473.9	12.3	3.9	17.2	119.4	25.0	143.9	373.6	39.1	13.5	27.9	307.5	31.6	310.4	627.4
2022	35.8	2.9	26.7	145.6	11.3	230.2	468.6	17.1	1.8	21.9	103.6	9.8	161.0	366.5	54.4	6.3	34.6	268.4	14.8	340.7	614.5
2023	21.6	3.5	19.0	108.8	9.9	180.6	355.0	10.3	2.2	15.6	78.8	8.4	123.2	276.4	32.8	7.7	24.6	196.7	13.8	270.4	468.4
Previous five-year mean:																					
	34.8	8.9	25.5	152.9	27.7	231.5	498.5														
Change (recent year relative to previous five-year mean):																					
	-38 %	-60 %	-26 %	-29 %	-64 %	-22 %	-29 %														
Rank of recent year (highest = 1 to lowest):																					
	53/53	52/53	53/53	53/53	53/53	52/53	53/53														
Fore-cast:																					
2024	34.3	3.8	18.5	128.5	16.6	185.9	387.6	10.5	0.9	6.4	42.6	6.2	85.1	151.7	108.0	16.2	50.0	380.3	46.2	432.5	1033.2
2025	30.6	3.6	18.2	131.8	11.4	190.6	386.2	7.5	0.7	5.2	36.5	3.2	77.1	130.2	124.3	16.6	57.3	416.0	38.6	502.7	1155.5
2026	31.3	2.9	17.4	112.1	6.9	168.1	338.7	6.5	0.5	3.8	30.0	1.5	61.1	103.4	125.6	18.4	56.2	430.6	28.7	487.9	1147.4
2027	31.7	3.5	17.9	101.9	8.3	160.7	324.0	4.6	0.4	3.3	18.8	1.2	49.4	77.7	189.3	32.1	74.2	539.5	61	481.5	1377.6

Table 3.3.4.6 Estimated number (in thousands) of returning MSW salmon by year for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model. The last four years are forecasted from the Life-cycle Model under the zero catch scenario.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	91.0	10.7	24.3	157.5	21.9	338.5	652.1	70.4	8.3	21.6	122.3	19.3	280.7	573.2	121.1	15.4	28.0	211.8	25.0	432.6	759.3
1972	149.4	21.7	37.5	169.5	19.1	448.4	856.5	112.8	16.6	33.3	130.9	16.9	370.7	751.5	204.6	30.8	43.0	227.5	21.7	573.1	994.2
1973	114.0	13.2	33.8	182.5	16.7	447.3	816.7	85.9	10.2	29.9	141.8	14.8	372.5	716.1	155.6	18.9	38.8	246.2	19.0	566.0	950.6
1974	85.0	6.2	29.1	207.3	18.3	324.5	678.4	64.3	4.7	25.9	160.6	16.0	273.7	598.8	117.5	8.8	33.5	277.3	21.0	406.3	782.4
1975	113.8	12.3	31.1	230.6	15.0	428.9	843.6	85.8	9.5	27.5	179.1	13.3	343.4	728.1	155.9	17.6	35.5	308.8	17.0	561.4	993.6
1976	61.4	9.0	26.8	160.2	10.4	240.6	515.6	46.7	6.9	23.8	124.1	9.2	187.9	441.5	83.8	12.8	30.8	215.7	11.9	328.8	614.7
1977	75.9	6.9	26.2	139.5	10.3	332.0	597.9	57.6	5.3	23.1	108.2	9.1	257.4	508.0	104.3	9.9	30.0	187.8	11.7	455.2	727.9
1978	63.9	7.1	33.7	120.8	13.4	451.9	698.2	48.2	5.5	29.9	94.0	11.9	336.2	573.7	89.0	10.2	38.8	161.7	15.3	634.8	883.5
1979	31.6	8.2	21.6	108.7	9.4	360.0	544.5	23.7	6.3	19.1	84.3	8.3	262.9	440.8	44.3	11.6	24.8	146.3	10.7	509.6	696.9
1980	103.7	17.0	30.4	119.9	11.9	472.9	763.6	77.6	13.1	26.9	93.4	10.5	359.6	635.4	145.1	24.2	34.9	161.0	13.7	653.6	950.7
1981	145.5	11.7	20.3	88.2	9.3	423.4	707.3	108.3	8.4	18.0	68.7	8.3	346.2	607.7	203.2	18.9	23.3	118.9	10.6	547.1	838.3
1982	56.1	7.2	14.3	51.5	13.5	283.9	430.5	42.0	5.2	12.7	40.9	11.8	225.5	367.5	78.1	11.7	16.4	66.6	15.6	373.0	522.5
1983	64.5	7.7	23.9	106.2	18.9	304.4	530.5	48.5	5.6	21.2	86.5	16.6	246.3	463.8	90.1	12.5	27.5	132.9	21.8	394.2	623.8
1984	51.2	12.7	20.3	76.5	7.5	267.4	438.9	38.5	9.2	18.0	64.0	6.6	206.9	374.5	71.1	20.6	23.3	92.8	8.5	362.0	535.6
1985	75.1	9.5	14.7	83.7	9.6	275.7	472.9	56.0	6.9	13.0	72.4	8.5	212.0	402.3	105.2	15.4	16.9	97.6	11.1	376.9	575.5
1986	103.7	9.7	12.3	94.7	10.8	345.5	582.5	77.4	7.0	10.9	76.7	9.5	272.7	498.0	146.1	15.7	14.1	119.1	12.5	457.8	702.8
1987	82.7	5.2	10.9	117.4	5.6	240.1	467.0	61.5	3.7	9.7	96.6	4.9	181.0	395.6	116.7	8.4	12.5	143.9	6.3	336.3	568.2
1988	108.1	14.2	12.4	84.9	15.6	239.6	480.7	79.8	10.2	11.0	69.8	13.6	179.7	407.4	153.9	23.2	14.3	104.8	18.0	334.5	584.1
1989	86.8	6.5	11.1	77.8	12.4	240.0	440.5	64.5	4.7	9.8	62.4	10.7	180.9	370.7	121.9	10.6	12.7	98.1	14.7	337.7	542.8
1990	107.0	6.7	11.0	37.2	11.3	250.3	428.8	79.8	4.8	9.8	31.6	10.4	186.4	354.5	152.3	10.8	12.6	44.3	12.4	355.1	537.4
1991	47.0	6.1	10.9	56.1	5.8	195.6	324.2	34.7	4.4	9.7	46.6	5.4	138.0	263.2	67.1	9.9	12.6	68.0	6.3	284.3	415.3
1992	35.7	7.7	12.4	42.9	13.3	184.9	299.3	26.0	5.5	10.9	37.1	12.1	133.8	246.0	51.8	12.4	14.2	50.3	14.7	263.0	378.3
1993	39.5	3.6	6.0	42.0	31.4	190.4	319.0	28.6	2.6	5.4	29.1	29.3	135.3	257.0	58.6	5.8	6.9	69.1	33.9	277.9	408.7
1994	55.6	7.6	9.8	67.6	11.0	231.6	386.6	42.0	5.9	8.7	59.1	9.9	167.5	317.7	79.9	10.9	11.3	78.1	12.4	330.4	488.7
1995	55.6	3.7	10.1	65.4	9.4	268.3	416.0	41.3	2.8	8.9	58.1	8.7	188.8	333.0	83.2	5.2	11.6	74.5	10.1	393.6	545.2
1996	57.4	6.5	6.5	43.6	10.2	220.8	349.6	42.2	5.0	5.8	38.3	8.3	150.8	273.8	88.1	9.3	7.4	50.3	13.0	336.3	468.4
1997	35.7	3.3	7.3	56.3	12.7	162.7	285.6	25.8	2.6	6.5	41.2	10.4	110.2	223.7	57.2	4.8	8.4	87.4	16.5	246.4	372.1
1998	23.2	2.8	4.5	32.8	17.5	133.4	216.8	16.5	2.2	4.0	31.0	13.8	91.7	173.2	39.0	4.0	5.2	34.8	23.6	199.3	283.6
1999	47.1	6.1	8.8	50.9	8.0	152.9	285.3	32.0	4.7	7.8	34.4	6.8	103.0	220.8	85.4	8.7	10.2	97.4	9.5	228.8	373.6
2000	48.6	4.2	2.4	64.1	9.8	156.3	291.1	33.3	3.3	2.1	55.6	8.3	106.5	232.9	88.4	6.1	2.8	74.6	11.8	232.6	372.2
2001	51.9	5.0	4.2	56.9	6.6	205.8	336.7	35.7	3.8	3.7	47.1	5.8	138.6	262.0	93.3	7.1	4.9	71.6	7.7	315.0	449.4
2002	46.4	4.6	4.6	65.6	8.3	144.5	281.6	32.2	3.4	4.0	52.7	7.6	98.7	224.4	84.0	6.6	5.3	87.2	9.4	219.7	362.4
2003	59.8	6.6	7.3	69.1	5.1	171.5	328.8	41.5	5.0	6.4	56.2	4.7	115.4	259.4	109.3	9.6	8.4	90.0	5.6	262.4	427.1
2004	51.3	12.5	5.9	38.0	5.3	234.4	355.0	35.4	9.3	5.2	31.5	5.0	155.7	268.9	93.3	18.0	6.8	47.9	5.9	361.1	482.7
2005	55.3	7.6	5.2	49.3	6.7	227.8	358.9	38.3	5.7	4.6	43.4	6.2	153.2	276.8	100.7	11.0	6.0	57.0	7.5	351.1	486.0

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2006	50.9	7.7	4.3	35.4	5.3	280.9	393.3	34.8	5.8	3.8	25.2	4.9	186.1	292.1	93.0	11.0	5.0	60.4	5.9	435.2	549.8
2007	48.0	7.3	2.7	25.1	5.5	227.7	323.3	33.2	5.5	2.3	18.9	4.9	152.7	243.1	87.4	10.5	3.1	37.5	6.4	343.0	441.9
2008	53.2	8.0	3.0	18.7	4.3	305.7	400.4	36.8	6.0	2.6	14.1	3.8	204.0	293.5	97.2	11.6	3.6	28.0	4.9	468.7	563.4
2009	40.8	3.7	4.7	23.5	4.3	253.3	335.6	28.1	2.8	4.1	18.2	3.9	171.0	249.7	74.2	5.4	5.5	34.4	4.9	380.5	465.8
2010	60.6	3.1	9.7	22.2	6.3	330.8	440.7	41.8	2.3	8.5	16.8	5.8	223.8	326.6	110.6	4.4	11.3	32.6	7	494.3	607.4
2011	101.3	8.6	4.9	23.8	8.1	417.7	576.6	70.0	6.5	4.3	18.1	6.9	286.2	433.2	184.2	12.4	5.8	35.3	10.3	621	789
2012	80.6	6.9	2.8	20.9	19.0	331.9	472.7	55.0	5.1	2.4	16.1	14.0	223.1	353.1	145.1	9.8	3.4	31.0	32.4	505.1	652.4
2013	78.6	7.0	7.8	23.9	6.1	302.8	436.6	53.9	5.3	6.7	18.3	4.6	204.5	328.2	143.2	10.2	9.3	35.3	10.3	454.5	595.6
2014	52.9	8.8	4.8	20.1	3.3	203.6	301.0	36.5	6.6	4.0	15.3	2.6	139.6	228.0	96.8	12.6	5.8	29.5	5.1	304.1	406.5
2015	86.3	9.8	4.3	20.9	4.2	246.2	383.1	59.0	7.4	3.7	15.8	3.4	166.4	287.5	159.7	14.2	5.2	30.9	6.3	370.8	518.5
2016	112.3	4.2	6.2	20.7	7.8	269.1	433.2	77.7	3.2	5.2	16.0	6.6	179.0	324.0	201.1	6.1	7.6	29.8	10.7	415.7	592.8
2017	89.5	4.8	5.3	19.0	6.3	235.2	371.0	61.9	3.6	4.4	14.6	5.2	158.0	280.0	162.3	6.9	6.5	27.8	9.2	358.2	507.2
2018	89.7	7.2	5.6	19.3	6.0	135.1	272.9	62.5	5.4	4.8	14.8	4.9	90.8	209.3	160.0	10.4	6.8	28.5	8.6	203.7	361.7
2019	71.3	11.4	4.6	17.6	3.7	171.5	282.6	37.1	8.6	3.9	13.8	3.2	112.7	212.7	104.7	16.5	5.6	25.4	5.2	261.6	377.8
2020	126.5	5.6	6.4	18.9	2.3	221.4	385.6	68.5	4.2	5.4	14.4	1.9	144.9	283.5	186.2	8.1	7.9	28.0	3	344.2	521.3
2021	79.8	5.4	2.7	21.9	2.2	151.3	266.6	43.2	4.0	2.3	16.9	2.0	99.5	200.1	117.5	7.7	3.4	32.0	2.6	232.6	355.1
2022	102.2	6.7	3.7	21.5	1.3	164.9	303.6	55.3	5.1	3.2	16.7	1.2	108.8	226.6	150.5	9.7	4.4	31.6	1.7	249.5	401.6
2023	83.3	4.7	4.8	13.4	1.3	112.7	223.8	45.1	3.5	4.2	10.7	1.1	73.3	164.0	122.6	6.7	5.6	18.9	1.7	176.6	295.3
Previous five-year mean:																					
	93.9	7.3	4.6	19.8	3.1	168.9	302.3														
Change (recent year relative to previous five-year mean):																					
	-11 %	-35 %	4 %	-33 %	-58 %	-33 %	-26 %														
Rank of recent year (highest = 1 to lowest):																					
	19/53	44/53	39/53	53/53	53/53	53/53	52/53														
Forecast:																					
2024	67.4	4.2	4.1	12.4	1.5	97.7	187.3	29.2	1.7	1.4	4.8	0.4	47.6	85.1	150.2	12.3	10.2	35.2	4.7	193.4	406
2025	76.0	4.2	3.4	14.0	2.0	104.3	203.9	27.4	1.2	0.8	4.0	0.4	41.2	75.0	218.9	16.6	12.0	48.5	8.9	262.7	567.6
2026	69.5	3.8	3.4	14.7	1.3	104.2	196.9	21.6	0.9	0.6	3.5	0.2	34.2	61.0	214.3	14.7	15.4	58.6	8.1	306.9	618
2027	70.8	3.1	3.1	12.8	0.7	92.2	182.7	17.6	0.6	0.4	2.4	0.1	27.9	49.0	241.0	16.8	15.5	58.7	6.2	289.1	627.3

Table 3.3.4.7 Estimated number (in thousands) of 1SW spawning salmon by year for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	35.2	47.9	31.0	394.7	36.2	230.5	789.5	23.1	34.1	21.7	232.2	27.9	160.9	595.6	52.0	79.0	44.9	637.7	46.0	334.5	1044.6
1972	38.4	95.6	25.5	419.6	31.8	274.2	906.4	25.8	68.3	17.6	247.4	24.6	188.5	687.2	57.9	158.3	36.5	673.4	40.2	400.4	1184.4
1973	46.2	59.0	27.2	454.7	27.7	330.2	966.7	31.0	41.9	18.9	269.1	21.6	229.4	728.8	69.4	96.9	39.2	733.4	35.3	483.9	1273.9
1974	58.4	27.3	19.3	525.1	30.3	308.0	983.2	38.9	19.4	13.5	307.3	23.2	214.7	725.0	86.7	45.1	27.9	843.2	39.0	444.0	1324.0
1975	60.5	55.0	30.1	573.2	25.0	273.6	1033.8	40.4	38.9	20.9	339.6	19.4	188.4	767.8	90.2	90.0	43.2	926.9	31.6	399.4	1401.5
1976	39.5	50.0	23.8	393.0	17.3	223.4	761.4	26.8	35.8	16.5	230.2	13.4	156.0	568.9	58.9	82.8	34.2	630.3	21.9	321.5	1011.1
1977	45.5	38.5	24.4	336.4	17.2	277.0	754.9	30.2	27.5	16.9	199.5	13.2	191.0	574.1	67.7	63.8	34.9	543.4	21.6	409.1	993.2
1978	53.4	39.5	31.9	294.7	22.2	288.5	747.1	35.7	28.2	22.1	174.1	17.2	199.5	574.7	79.6	65.5	45.8	475.0	28.1	422.1	966.5
1979	51.8	45.2	29.5	270.3	15.6	312.5	741.3	34.7	32.3	20.3	159.2	12.0	214.1	570.9	78.3	75.1	42.4	432.7	19.8	459.0	951.4
1980	48.4	94.5	13.4	208.7	19.8	203.2	606.0	32.5	67.3	9.3	122.3	15.2	141.9	474.5	73.3	156.5	19.2	333.3	25.4	293.3	760.7
1981	51.6	75.5	17.3	70.5	15.5	266.7	508.9	34.8	53.5	12.0	36.0	12.0	185.7	404.9	77.5	123.7	24.8	118.6	19.7	389.0	645.4
1982	43.7	46.5	17.7	170.2	22.5	276.5	589.4	29.3	32.8	12.3	97.0	17.0	194.9	461.9	65.8	76.3	25.5	267.1	29.1	397.0	742.8
1983	64.3	49.5	22.4	356.9	31.5	308.2	851.5	43.1	35.4	15.6	230.6	23.9	215.1	674.9	96.0	82.1	32.1	536.5	40.7	444.9	1068.9
1984	56.5	81.9	13.8	198.3	12.4	290.1	668.6	38.2	58.1	9.6	129.0	9.5	203.5	537.6	83.2	134.1	19.8	292.0	15.7	414.8	823.7
1985	56.3	30.0	22.2	235.2	16.0	304.1	677.7	37.4	21.5	15.5	124.8	12.2	212.6	515.2	84.1	50.2	32.1	387.5	20.6	433.5	873.7
1986	65.4	45.5	36.7	325.7	18.0	343.7	861.7	44.0	26.2	25.4	197.8	13.8	241.2	667.8	97.5	131.8	52.7	493.8	23.3	497.7	1087.1
1987	68.9	79.8	22.9	201.2	15.3	312.2	730.8	46.4	46.3	15.9	120.0	11.8	214.2	567.7	103.4	234.1	32.7	312.9	19.5	454.1	942.9
1988	95.5	27.2	41.0	344.4	41.3	424.8	995.6	63.9	15.9	28.4	231.0	32.3	298.5	803.4	145.4	79.9	58.8	504.3	52.3	604.7	1233.7
1989	64.6	15.0	22.7	221.5	12.4	479.3	833.3	43.4	8.7	15.9	141.8	4.5	330.9	646.8	96.9	44.0	32.8	334.4	22.1	701.7	1071.5
1990	45.9	25.1	21.1	159.4	35.0	334.1	635.4	31.2	14.5	14.6	107.8	28.7	228.7	502.5	69.4	74.2	30.2	230.9	42.4	487.1	804.1
1991	46.7	18.1	23.2	116.6	18.3	287.6	523.7	31.6	10.5	16.1	80.4	14.7	200.2	417.1	70.4	53.5	33.3	168.2	22.4	420.0	664.0
1992	49.3	33.0	26.4	158.6	45.9	378.3	710.2	32.9	19.1	18.5	105.9	37.7	262.2	567.3	74.7	98.2	38.1	232.6	55.7	551.9	899.3
1993	72.1	47.4	26.0	142.0	72.2	404.6	785.9	48.4	27.5	18.1	98.3	63.5	269.7	629.1	110.1	138.9	37.5	201.8	82.3	602.0	999.6
1994	80.0	37.3	21.4	124.7	25.1	408.0	716.6	55.5	21.7	14.8	72.4	19.2	280.0	559.9	119.0	107.9	30.8	199.3	32.5	600.5	924.6
1995	64.8	11.8	26.3	179.2	25.7	403.3	723.3	44.2	7.0	18.4	117.3	20.2	275.9	571.1	97.7	27.5	38.1	262.7	32.2	592.4	925.8
1996	49.5	14.4	22.9	181.9	34.6	330.2	645.6	33.9	8.7	15.8	124.4	25.5	219.0	508.0	75.2	33.6	32.8	262.3	46.5	509.9	834.3
1997	46.1	7.4	16.7	227.9	38.4	290.3	638.3	31.2	4.4	11.6	166.3	27.7	196.7	515.6	71.4	17.4	24.0	309.7	52.2	429.4	792.7
1998	51.8	14.3	22.8	221.5	156.0	324.0	805.3	35.0	8.7	15.8	159.5	128.4	220.0	668.0	82.4	33.6	32.9	307.3	193.6	482.2	981.6
1999	42.3	4.9	18.9	231.9	20.1	220.9	548.4	28.2	2.9	13.2	172.0	17.0	151.3	445.4	68.8	11.2	27.3	313.3	23.4	324.1	676.4
2000	64.5	12.5	16.8	351.1	34.0	332.7	825.8	43.1	7.5	11.7	266.3	29.5	227.0	675.7	103.9	29.4	24.2	465.8	39.1	493.5	1014.4
2001	57.1	10.9	15.5	256.6	32.2	363.5	748.3	37.9	6.5	10.7	197.4	28.3	248.9	605.6	95.2	25.2	22.2	333.1	37.0	539.4	939.0
2002	53.9	24.3	19.2	216.6	61.7	265.2	656.9	35.9	14.3	13.3	164.5	51.9	184.2	543.2	89.8	56.6	27.6	283.1	75.4	385.1	794.7
2003	45.6	15.9	22.9	248.8	33.1	278.8	660.3	28.6	9.4	16.0	197.2	28.4	187.5	540.0	88.2	37.5	32.9	314.4	39.7	418.1	812.3
2004	81.7	19.5	22.8	157.8	39.7	388.1	725.4	51.4	11.3	15.9	119.7	34.8	265.4	583.2	153.1	45.5	33.1	205.9	46.4	561.0	910.5
2005	67.6	12.7	33.7	171.6	50.8	389.9	741.3	41.9	7.4	23.5	136.0	43.6	270.5	603.8	128.4	29.7	48.9	218.7	61.3	569.8	928.7

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2006	67.9	17.6	23.9	126.9	38.9	348.6	639.2	41.2	10.3	16.6	100.4	33.8	237.1	510.7	136.4	41.4	34.4	160.9	46.1	513.9	818.1
2007	66.2	13.7	27.9	220.0	67.8	363.0	790.9	40.9	8.1	20.1	153.6	58.0	251.7	629.1	132.1	32.4	38.8	413.7	81.9	522.6	1026.7
2008	65.0	13.6	33.9	230.4	42.8	294.7	714.5	40.6	8.0	23.5	158.7	36.6	204.6	560.6	129.9	32.1	49.1	443.1	50.4	426.6	937.8
2009	40.3	3.9	37.3	189.1	26.4	228.7	546.6	25.5	2.3	26.1	133.8	22.7	159.7	433.4	80.5	9.2	53.9	348.8	31.8	328.2	719.3
2010	81.1	13.3	38.9	250.7	27.8	402.3	852.0	50.4	7.7	27.3	176.0	24.2	278.2	666.8	161.9	31.1	56.6	469.5	33	586.5	1112.2
2011	51.8	9.2	27.5	216.2	20.7	227.9	575.9	32.1	5.3	19.2	152.3	17.1	161.2	457.3	102.3	21.3	39.9	400.9	27.3	322.6	768.9
2012	31.5	9.8	15.6	220.4	50.1	296.6	652.1	19.8	5.7	10.9	152.7	35.1	208.3	511.9	62.6	22.9	22.7	418.6	90.2	423.7	863.1
2013	43.4	13.7	46.3	187.3	56.4	226.2	604.2	27.3	8.1	32.4	133.0	40.3	156.7	483.7	87.0	32.6	67.3	346.1	97.7	329.2	778.1
2014	26.5	12.4	11.8	116.4	25.5	130.5	337.8	16.7	7.1	8.1	84.1	19.1	93.6	272.6	52.2	28.4	16.9	207.2	42.2	183.8	436.4
2015	33.1	11.3	33.2	164.5	27.4	212.2	504.8	20.8	6.6	23.2	116.4	21.2	147.8	402.3	64.7	26.5	48.2	304.2	44.1	308.6	656.1
2016	34.9	10.1	19.4	166.6	52.2	217.3	524.9	22.2	6.0	13.6	117.2	42.0	150.1	418.0	68.3	24.2	28.3	309.7	78.8	317	683.4
2017	26.3	13.0	20.1	180.7	43.4	193.8	499.3	17.0	7.6	14.1	125.9	32.4	136.7	395.9	49.9	30.4	29.5	339.1	71.9	281.3	666.7
2018	34.9	10.7	17.4	145.3	37.9	186.3	453.1	22.9	6.3	12.2	103.1	29.0	130.2	359.7	65.8	25.1	25.4	267.6	62	273.6	590.6
2019	25.2	11.2	11.8	122.8	21.2	191.4	399.2	13.3	6.5	8.2	84.7	16.8	133.3	312.2	37.3	26.1	17.3	232.9	33	277.6	527.1
2020	47.7	9.0	15.0	150.9	35.5	259.5	534.3	22.6	5.2	10.5	103.6	32.0	179.7	419.9	72.6	20.9	22.1	284.9	41.5	378.6	698
2021	25.6	5.3	13.3	155.9	27.1	188.5	429.4	12.1	3.1	9.1	107.1	24.5	128.3	334.6	38.9	12.7	19.8	295.2	31.2	279.7	579.1
2022	35.7	2.5	16.0	135.7	10.9	206.6	422.3	16.9	1.5	11.2	93.7	9.4	143.7	325.9	54.2	5.9	23.9	258.4	14.4	307	561.3
2023	21.5	3.1	11.3	100.9	9.5	162.3	319.5	10.2	1.8	8.0	70.9	7.9	110.0	245.6	32.7	7.3	17.0	188.8	13.4	244	427.9
Previous five-year mean:																					
	33.8	7.8	14.7	142.1	26.5	206.5	447.7														
Change (recent year relative to previous five-year mean):																					
	-36 %	-60 %	-23 %	-29 %	-64 %	-21 %	-29 %														
Rank of recent year (highest = 1 to lowest):																					
	53/53	52/53	53/53	52/53	53/53	52/53	53/53														

Table 3.3.4.8 Estimated number (in thousands) of MSW spawning salmon by year for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles) as derived from the Run-Reconstruction Model.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	52.0	6.6	7.2	82.3	11.0	109.7	277.3	35.1	4.3	4.5	51.6	9.2	57.8	205.8	79.3	11.3	10.9	133.2	13.1	196.1	375.4
1972	92.6	13.5	11.3	88.9	9.6	148.7	376.4	61.3	8.5	7.0	55.4	8.0	78.9	279.7	143.8	22.7	16.8	143.3	11.4	262.4	502.6
1973	71.3	8.2	10.2	95.8	8.4	128.6	332.1	47.4	5.2	6.3	60.0	7.0	61.4	240.6	109.9	14.0	15.1	154.4	10.0	236.6	453.1
1974	53.5	3.9	8.7	108.6	9.2	81.3	273.8	35.4	2.4	5.4	68.1	7.6	35.2	199.6	83.2	6.5	13.0	174.2	11.1	154.8	368.3
1975	71.6	7.7	9.4	120.4	7.5	151.8	381.0	47.6	4.9	5.8	75.5	6.3	74.7	274.6	111.2	13.0	13.9	193.7	9.0	272.4	517.2
1976	38.6	5.6	8.0	83.8	5.2	95.6	244.6	25.8	3.6	5.0	52.3	4.4	48.1	176.0	59.4	9.4	12.0	135.3	6.3	176.2	334.3
1977	47.6	4.3	7.9	73.0	5.1	136.5	281.8	31.5	2.7	4.9	45.7	4.3	68.2	198.8	73.9	7.3	11.7	118.0	6.2	248.5	400.3
1978	40.7	4.5	10.1	63.4	6.7	226.9	359.0	27.0	2.8	6.3	39.8	5.6	121.5	244.7	64.0	7.5	15.1	101.6	8.0	393.5	527.6
1979	20.4	5.1	6.5	56.8	4.7	183.2	281.6	13.5	3.2	4.0	35.6	3.9	94.9	186.8	32.3	8.6	9.7	92.0	5.7	320.1	421.3
1980	66.9	10.6	9.2	62.7	6.0	231.0	394.6	44.2	6.7	5.6	39.4	5.0	127.4	278.0	105.5	17.8	13.6	101.0	7.2	394.1	564.8
1981	94.5	7.6	6.1	46.2	4.7	165.5	333.9	61.9	4.3	3.8	29.1	3.9	94.9	241.8	148.9	14.8	9.1	74.7	5.6	277.3	455.1
1982	36.5	4.7	4.3	32.5	6.7	109.3	197.8	24.1	2.7	2.7	23.2	5.6	55.9	140.2	57.1	9.2	6.4	46.6	8.3	190.3	281.9
1983	42.2	5.0	7.1	63.6	9.5	104.0	236.1	27.7	2.9	4.5	46.8	7.9	51.6	175.3	66.1	9.8	10.7	87.4	11.5	186.2	321.1
1984	33.3	8.2	6.1	43.3	3.7	116.9	215.3	22.1	4.7	3.8	33.0	3.1	62.2	156.4	52.1	16.1	9.1	57.2	4.5	202.2	302.9
1985	48.9	6.2	4.4	53.5	4.8	112.6	234.6	32.1	3.6	2.7	44.5	4.0	54.2	170.2	76.9	12.0	6.6	64.7	5.8	204.7	328.8
1986	67.8	6.3	3.7	50.9	5.4	137.4	277.7	44.7	3.6	2.3	35.9	4.5	71.1	200.7	107.6	12.3	5.5	72.7	6.6	238.8	387.7
1987	54.6	3.4	3.3	79.5	3.0	100.4	249.3	35.9	1.9	2.0	62.1	2.5	45.9	184.7	86.9	6.6	4.9	102.3	3.6	187.3	341.0
1988	71.6	9.2	3.7	53.2	10.0	87.2	241.7	46.9	5.3	2.3	41.0	8.4	33.0	174.7	114.7	18.2	5.6	69.9	11.9	174.2	336.4
1989	57.9	4.2	3.3	41.1	5.0	98.4	215.5	37.7	2.4	2.1	28.7	3.9	44.2	151.9	91.4	8.3	5.0	58.6	6.4	187.2	308.8
1990	71.2	4.3	3.3	14.9	7.0	113.2	219.7	47.0	2.5	2.1	11.3	6.2	55.1	151.4	114.2	8.5	4.9	19.6	8.0	207.9	318.8
1991	31.9	3.9	3.3	41.2	3.3	104.7	191.1	20.8	2.3	2.0	33.1	2.9	52.4	135.1	50.9	7.8	4.9	51.7	3.8	185.3	273.9
1992	24.2	5.0	3.7	20.9	8.9	80.2	145.0	15.7	2.8	2.3	17.1	7.9	33.5	96.6	39.5	9.8	5.5	25.6	10.1	150.9	216.8
1993	27.8	2.3	1.8	24.3	27.6	93.3	183.0	17.8	1.3	1.1	12.5	25.6	42.8	125.9	46.1	4.5	2.7	50.9	30.0	172.8	265.8
1994	39.2	5.3	3.0	40.3	6.6	114.7	212.2	26.0	3.6	1.8	34.2	5.7	56.3	149.8	63.4	8.6	4.4	47.6	7.7	205.2	305.7
1995	40.5	2.6	3.0	38.0	5.4	151.7	244.8	26.6	1.7	1.9	33.5	4.8	79.0	168.7	68.1	4.1	4.5	43.7	6.1	265.1	361.0
1996	42.6	4.5	1.9	19.6	6.8	136.3	216.1	27.6	3.0	1.2	16.4	4.9	72.6	147.3	73.3	7.3	2.9	23.5	9.6	241.6	325.6
1997	27.1	2.3	2.2	38.8	8.4	101.7	188.1	17.4	1.6	1.4	24.1	6.1	53.9	130.4	48.7	3.8	3.3	70.0	12.1	178.0	267.3
1998	18.0	2.0	1.4	12.5	13.6	79.0	129.0	11.4	1.3	0.8	11.5	10.0	40.9	88.8	33.8	3.2	2.0	13.5	19.6	139.2	190.1
1999	38.8	4.3	2.9	33.4	5.4	100.1	196.0	23.7	2.9	1.8	17.1	4.2	55.0	135.6	77.1	6.9	4.2	80.1	6.9	169.3	278.4
2000	41.4	3.0	0.8	44.2	6.3	97.0	197.9	26.1	2.0	0.5	36.3	4.9	51.3	144.1	81.1	4.8	1.2	54.3	8.4	166.2	273.7
2001	44.5	3.5	1.4	37.0	4.3	143.5	240.6	28.4	2.3	0.9	27.2	3.5	82.3	171.4	85.9	5.6	2.0	51.7	5.3	242.7	344.4
2002	39.8	3.2	1.6	47.6	4.5	97.5	202.0	25.6	2.1	1.0	34.7	3.8	56.1	148.0	77.3	5.2	2.3	69.1	5.5	166.2	277.0
2003	53.4	4.6	2.3	54.2	2.3	124.0	250.1	35.2	3.1	1.5	41.4	1.9	73.0	184.9	102.8	7.5	3.4	75.2	2.8	206.6	340.5
2004	45.9	8.7	1.9	24.8	3.3	171.5	263.3	30.0	5.8	1.2	18.3	2.9	99.7	184.1	87.9	14.1	2.9	34.7	3.8	286.9	379.9
2005	49.4	5.3	1.8	37.7	4.2	173.8	279.3	32.5	3.5	1.2	31.8	3.6	106.1	203.1	94.8	8.6	2.6	45.4	5.0	286.0	395.8

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2006	46.3	5.4	1.5	24.9	3.9	223.8	314.7	30.2	3.6	1.0	14.7	3.5	137.6	221.6	88.4	8.7	2.2	49.8	4.5	364.4	457.0
2007	43.9	5.1	0.9	21.7	4.4	178.5	262.2	29.2	3.4	0.6	15.5	3.8	110.3	187.5	83.3	8.2	1.3	34.1	5.3	284.2	370.7
2008	48.8	5.6	1.3	15.9	3.6	247.5	330.3	32.4	3.7	0.9	11.4	3.1	155.3	231.9	92.7	9.1	1.9	25.2	4.2	396.3	478.7
2009	37.5	2.6	1.7	20.1	3.6	206.9	277.8	24.7	1.7	1.1	14.7	3.2	132.1	199.2	70.8	4.2	2.5	31.0	4.2	322.5	396.9
2010	55.7	2.1	3.4	19.1	5.8	266.4	360.4	36.9	1.4	2.2	13.8	5.3	169.0	255.1	105.8	3.5	5.0	29.6	6.4	415.4	512.7
2011	91.0	6.0	1.9	20.2	7.0	340.8	478.9	59.7	4.0	1.2	14.5	5.8	221.4	346.5	173.8	9.8	2.7	31.7	9.2	526.3	672.6
2012	74.2	4.8	1.3	17.8	17.4	276.0	402.6	48.7	3.2	0.9	13.1	12.4	177.0	291.6	138.8	7.7	1.9	28.0	30.8	433.5	566.8
2013	71.9	4.9	3.5	20.5	5.6	250.9	367.7	47.3	3.3	2.4	14.9	4.1	161.5	267.4	136.5	8.0	5.0	32.0	9.8	388.8	513.5
2014	48.7	6.1	2.4	17.1	3.1	166.5	251.4	32.2	4.1	1.7	12.3	2.4	108.2	184.0	92.6	9.9	3.4	26.5	4.9	257.5	348
2015	79.6	6.9	2.0	17.8	4.0	207.4	329.3	52.4	4.6	1.4	12.8	3.2	135.0	240.4	153.1	11.2	2.9	27.8	6.1	321	454.9
2016	103.9	2.9	3.3	18.0	7.4	231.7	380.1	69.3	1.9	2.3	13.3	6.2	149.7	277.8	192.6	4.8	4.7	27.0	10.4	365.1	527.9
2017	84.3	3.4	2.8	16.5	6.0	203.8	327.5	56.7	2.2	2.0	12.1	4.8	133.6	242.2	157.1	5.4	4.1	25.3	8.9	315.8	454.1
2018	85.2	5.0	2.8	16.5	5.6	115.6	240.6	58.1	3.4	1.9	12.1	4.6	75.3	180.5	155.6	8.2	4.0	25.8	8.3	178	325.2
2019	70.6	8.0	2.4	15.4	3.6	151.5	254.0	36.4	5.3	1.7	11.6	3.0	97.8	188.3	104.0	13.0	3.4	23.2	5	233.5	341.9
2020	126.0	3.9	4.1	18.1	2.2	197.2	356.7	68.0	2.6	3.1	13.7	1.8	127.6	259.5	185.7	6.4	5.6	27.2	2.9	308.9	482.2
2021	79.6	3.8	1.8	20.2	2.2	134.5	245.3	43.0	2.5	1.3	15.2	2.0	87.4	182.2	117.3	6.1	2.4	30.2	2.5	208.6	327.3
2022	102.1	4.7	2.1	19.3	1.3	146.7	279.3	55.2	3.1	1.6	14.4	1.1	95.8	206.3	150.4	7.6	2.8	29.3	1.7	223.7	370.3
2023	83.1	3.3	2.5	12.0	1.3	99.9	205.6	44.9	2.2	1.9	9.3	1.1	64.1	148.5	122.4	5.3	3.2	17.5	1.7	158.1	272.6
Previous five-year mean:																					
	92.7	5.1	2.6	17.9	3.0	149.1	275.2														
Change (recent year relative to previous five-year mean):																					
	-10 %	-35 %	-7 %	-33 %	-58 %	-33 %	-25 %														
Rank of recent year (highest = 1 to lowest):																					
	sep.53	44/53	32/53	53/53	53/53	44/53	44/53														

Table 3.3.5.1 Estimated abundance (in thousands) at the PFA stage of maturing 1SW salmon (potential 1SW returns) for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles of the marginal posterior distributions) as derived from the Life-cycle Model. Years are PFA years. The last four years are forecasted under the zero catch scenario.

Year	Finland median	Iceland (NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland (NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland (NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	32.2	12.3	767.9	187.5	20.5	1021.8	23.6	10.2	679.1	158.3	15.9	927.8	44.7	14.9	879.9	221.6	26.5	1140.4
1972	123.9	11.3	884.0	147.2	16.6	1187.4	91.0	9.3	784.8	126.8	12.9	1077.0	169.2	13.6	1011.1	171.8	21.5	1320.9
1973	59.5	13.7	876.5	220.2	19.0	1192.1	43.4	11.4	775.8	188.9	14.7	1082.8	81.5	16.6	1005.5	257.4	24.6	1327.8
1974	80.8	13.3	843.5	216.0	27.1	1184.9	58.8	11.0	744.7	187.1	21.3	1076.3	110.9	15.9	974.9	250.3	34.9	1320.8
1975	98.2	15.8	835.1	315.8	30.7	1299.1	74.2	13.2	744.2	273.3	24.9	1191.5	129.9	18.8	943.7	365.9	38.6	1423.0
1976	79.8	16.7	783.4	229.0	15.9	1127.8	61.3	14.1	701.2	198.9	12.8	1034.4	103.9	19.7	886.2	263.8	20.2	1240.3
1977	49.8	22.3	776.9	151.4	11.1	1012.5	38.0	18.8	693.8	130.9	8.7	923.7	65.3	26.4	875.3	175.0	14.1	1117.8
1978	41.1	21.7	737.4	149.9	11.3	962.5	31.9	18.4	649.3	129.8	8.9	870.5	53.4	25.7	837.4	173.3	14.5	1067.2
1979	39.7	20.6	1129.5	195.8	14.4	1401.2	30.6	17.4	1016.3	169.2	11.1	1282.3	51.2	24.4	1265.9	226.9	18.6	1545.9
1980	32.5	4.2	859.3	148.6	13.9	1059.8	25.9	3.5	761.2	129.3	10.9	960.0	40.8	5.0	977.1	171.9	17.9	1180.2
1981	29.7	14.6	802.1	122.1	25.1	994.7	23.9	12.4	722.6	106.0	20.2	911.0	37.1	17.1	899.6	140.9	31.4	1095.0
1982	21.7	8.4	666.2	114.6	22.4	834.2	17.3	7.1	592.7	100.0	17.7	758.1	27.1	9.9	755.3	131.5	28.7	926.0
1983	39.3	11.0	898.6	171.0	30.7	1153.2	31.7	9.3	812.6	150.3	24.4	1061.5	49.0	13.0	998.9	195.3	39.1	1258.4
1984	45.7	5.0	938.8	193.2	37.8	1222.3	36.8	4.2	849.4	169.3	30.2	1125.6	57.0	6.0	1046.5	220.6	48.1	1333.5
1985	59.2	25.9	999.2	251.5	34.6	1373.4	47.8	21.9	897.6	218.8	28.9	1262.0	73.6	30.8	1114.8	290.3	43.0	1497.3
1986	50.9	35.3	867.4	211.3	49.1	1216.6	40.6	29.8	780.2	183.2	39.8	1118.9	64.0	42.0	967.3	243.9	61.4	1322.9
1987	53.4	22.0	710.3	230.5	41.8	1060.3	42.9	18.5	643.4	200.3	33.3	984.6	66.3	26.1	788.4	265.8	53.1	1149.1
1988	39.4	27.7	651.8	170.2	34.3	924.3	31.6	23.5	590.6	156.4	27.1	858.8	48.8	32.6	722.0	185.0	43.8	998.6
1989	69.1	17.7	706.1	248.9	12.3	1055.3	56.9	14.9	629.7	231.3	9.4	974.0	84.0	21.0	796.4	267.9	16.0	1149.6
1990	77.3	13.3	637.3	203.7	24.0	957.2	63.0	11.2	570.1	188.2	18.0	883.7	94.5	15.8	714.6	221.7	31.8	1038.5
1991	74.5	17.4	535.3	175.3	31.2	835.7	61.1	14.6	478.9	158.2	23.2	773.0	91.4	20.7	602.5	195.0	41.7	908.7
1992	95.5	34.0	473.1	209.2	30.4	844.5	79.1	28.8	423.8	184.1	23.1	782.6	116.0	40.1	528.9	238.3	40.0	911.8
1993	68.2	25.8	478.7	190.8	29.7	794.6	56.1	21.9	432.2	165.6	22.4	737.2	82.3	30.3	531.0	219.7	39.3	856.7
1994	43.0	10.3	583.5	208.4	23.1	869.5	35.2	8.7	525.5	180.9	17.5	803.0	52.3	12.2	649.3	241.3	30.5	944.8
1995	40.5	21.1	425.5	204.5	32.6	725.7	33.3	17.9	385.0	178.1	24.5	675.2	49.2	24.9	471.8	234.9	43.1	783.9
1996	57.9	12.8	318.6	247.3	21.8	660.1	47.0	10.8	288.8	214.5	16.4	611.5	71.0	15.1	352.5	285.7	28.9	714.3
1997	59.0	17.4	374.0	241.0	11.1	704.0	47.8	14.7	337.7	206.1	8.3	649.4	72.6	20.6	413.9	282.5	14.9	764.9
1998	65.4	27.4	459.8	269.7	8.3	833.0	53.3	23.2	414.0	232.3	6.1	768.8	80.2	32.4	511.5	315.7	11.0	902.7
1999	99.4	15.1	448.5	226.4	12.9	804.6	81.6	12.7	404.3	194.6	9.7	742.3	121.4	18.0	498.7	263.1	17.3	872.5
2000	106.8	16.2	693.5	245.4	20.2	1085.6	88.4	13.6	627.5	211.0	15.4	1001.9	130.4	19.2	770.0	285.9	26.8	1176.0
2001	80.6	15.1	590.6	293.7	14.8	998.5	66.3	12.6	534.5	238.5	11.1	913.1	98.4	18.0	657.2	361.9	19.8	1095.2
2002	51.5	20.5	402.5	275.5	10.6	762.3	41.8	17.2	363.3	222.7	8.0	692.4	63.5	24.7	446.0	340.7	14.1	843.3
2003	44.9	15.3	484.5	209.8	8.3	764.7	36.7	12.7	437.4	169.9	6.2	699.5	55.1	18.3	538.6	258.7	11.2	841.6
2004	23.1	31.8	338.4	183.5	6.5	585.0	18.8	26.7	306.6	149.4	4.9	535.7	28.4	38.1	374.1	225.4	8.7	640.8

Year	Finland median	Iceland (NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland (NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland (NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2005	44.8	30.9	454.0	190.1	6.2	727.4	36.8	25.8	412.5	154.9	4.6	670.1	54.9	37.1	500.6	232.9	8.3	792.8
2006	67.0	30.8	376.0	199.0	6.1	681.0	56.4	25.6	341.6	163.7	4.6	626.0	79.9	36.7	415.2	244.0	8.2	743.2
2007	25.2	26.3	226.3	155.4	2.4	437.0	20.9	21.8	204.1	125.7	1.8	396.5	30.4	31.8	251.2	192.6	3.3	481.8
2008	22.8	24.9	256.2	146.3	3.2	454.9	19.2	20.5	231.0	118.7	2.2	415.3	27.4	30.1	285.3	179.2	4.7	499.0
2009	39.4	31.1	226.1	132.3	3.5	433.7	32.9	26.6	203.5	108.0	2.4	397.5	47.2	36.5	252.1	161.5	5.2	473.4
2010	32.5	30.5	302.3	153.9	5.9	526.7	27.1	25.9	270.6	127.4	4.0	482.1	38.8	35.8	338.5	185.5	8.5	574.8
2011	37.6	22.9	231.8	137.7	6.0	437.2	31.3	19.4	208.0	114.4	4.2	401.6	44.8	27.1	259.6	165.4	8.6	477.3
2012	62.4	13.0	245.1	162.7	6.6	491.4	51.9	10.9	219.2	134.2	4.4	449.0	75.1	15.4	274.6	198.1	9.8	538.8
2013	39.6	27.6	231.3	149.1	5.0	453.5	33.1	23.4	206.4	122.7	3.3	414.0	47.4	32.8	259.7	181.4	7.5	498.8
2014	50.3	14.6	304.1	135.3	9.7	515.9	42.2	12.3	267.3	111.0	6.9	467.4	60.3	17.3	347.1	166.8	13.8	570.7
2015	36.0	34.1	272.8	120.6	3.4	468.5	30.0	28.6	243.0	100.1	2.4	428.9	43.2	40.8	305.7	146.8	4.8	512.1
2016	25.4	17.6	238.2	80.8	3.5	366.2	21.2	14.6	212.2	68.1	2.5	335.9	30.3	21.3	267.4	96.9	5.0	401.1
2017	16.9	16.5	275.6	54.0	3.3	367.3	13.5	13.6	244.7	44.5	2.3	333.9	21.2	20.0	311.2	66.2	4.7	405.2
2018	33.4	16.0	283.1	101.1	8.7	444.1	27.1	13.1	251.9	83.1	5.8	404.3	41.5	19.4	319.0	124.2	13.0	488.2
2019	15.1	10.5	244.6	72.9	6.4	350.3	12.1	8.4	218.1	61.0	4.2	319.5	18.8	13.0	275.8	88.1	9.5	386.0
2020	13.2	12.1	253.4	66.3	5.1	350.9	10.4	9.8	226.2	56.6	3.5	320.9	16.6	14.8	284.9	78.1	7.3	384.6
2021	14.9	10.8	212.4	60.6	5.9	306.4	10.1	8.6	185.5	45.4	4.0	272.3	21.9	13.5	244.0	81.8	8.5	345.6
2022	15.1	11.9	247.6	55.1	5.0	336.6	9.7	9.1	214.4	39.7	3.4	296.9	23.3	15.8	286.6	78.2	7.4	383.5
Forecast:																		
2023*	13.3	9.9	284.4	59.4	7.1	382.1	5.3	4.1	177.1	28.4	1.9	260.4	31.8	25.1	508.6	123.4	23.5	622.3
2024	12.6	8.7	277.7	64.4	5.2	384.4	4.1	2.4	143.5	27.3	0.9	234.7	41	32.8	574.9	167.3	22.7	717.5
2025	11.7	7.5	267.3	58.8	4.7	373.4	3.2	1.6	123.8	22.2	0.6	204.6	46.5	34.1	587.4	162.2	24.8	724
2026	10.5	7.3	268.2	51.4	4.7	364	2.3	1.1	114.3	16.7	0.5	186.7	47.1	35.6	650.7	170.2	33.7	805.9
2027	13	6.7	263.8	53.1	5.6	383.2	2.5	0.9	101.6	13.7	0.4	174.3	72.9	43.1	720.9	209.8	48.9	876.2

***PFA values are derived from incomplete input data (returns of 1SW maturing are not included) and therefore, 2023 PFA values should not b e compared to 2023 returns and spawners of 1SW fish (Tables 3.3.4.1 and 3.3.4.3). These values are included for completeness.**

Table 3.3.5.2 Estimated abundance (in thousands) at the PFA stage of non-maturing 1SW salmon (potential MSW returns) for N-NEAC countries and aggregated for the N-NEAC complex (median, 5% and 95% quantiles of the marginal posterior distributions) as derived from the Life-cycle Model. Years are PFA years. The last four years are forecasted under the zero catch scenario.

Year	Finland median	Iceland (NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland (NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland (NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
1971	43.8	30.2	914.7	227.7	1.1	1218.7	32.1	26.4	835.1	206.8	0.8	1136.6	60.2	34.5	1012.8	252.1	1.5	1319.7
1972	68.4	29.2	1076.4	383.5	4.4	1566.3	50.8	25.7	983.2	348.4	3.4	1460.4	93.8	33.3	1191.2	425.4	5.7	1689.2
1973	107.5	24.6	1014.4	339.3	2.8	1492.0	81.4	21.5	921.4	308.8	2.1	1388.9	144.7	28.0	1127.5	374.7	3.7	1613.0
1974	136.7	29.8	899.8	373.7	0.9	1445.2	105.6	26.1	818.8	341.2	0.7	1350.7	183.1	34.0	997.6	411.6	1.2	1556.9
1975	98.5	23.8	887.7	331.9	2.4	1347.1	77.5	20.9	809.6	303.5	1.9	1258.4	129.3	27.1	980.6	365.2	3.1	1449.4
1976	78.7	31.1	840.7	229.3	1.1	1182.2	61.8	27.6	768.9	208.8	0.9	1103.8	101.6	35.1	928.2	252.5	1.5	1278.0
1977	40.9	38.7	643.2	206.6	1.3	932.2	31.5	34.1	582.1	187.6	1.0	865.9	53.5	43.9	717.8	228.6	1.7	1010.4
1978	47.3	28.2	943.0	185.0	3.2	1208.3	35.9	24.9	869.4	166.9	2.5	1130.2	62.3	32.0	1033.0	205.6	4.2	1301.0
1979	44.2	42.6	1268.4	266.5	5.6	1629.7	34.0	37.9	1168.3	243.4	4.5	1524.3	57.6	48.0	1389.4	294.6	7.0	1754.7
1980	52.9	16.4	1252.6	185.8	1.9	1511.5	40.9	14.4	1157.6	167.6	1.5	1413.2	68.5	18.8	1363.5	206.6	2.5	1625.3
1981	57.6	21.1	1027.0	168.1	8.1	1282.8	45.5	18.4	950.1	152.2	6.4	1203.0	73.8	24.0	1116.4	186.3	10.4	1374.8
1982	59.8	15.0	948.3	228.2	5.3	1257.3	47.5	13.2	879.8	208.9	4.1	1184.2	75.9	17.1	1027.8	249.2	6.9	1339.5
1983	65.4	16.5	894.4	217.2	6.5	1201.2	51.2	14.6	827.3	199.5	5.0	1129.0	83.5	18.8	973.0	237.4	8.4	1283.6
1984	54.8	11.0	841.4	235.3	2.7	1146.6	43.0	9.7	778.7	213.7	2.1	1078.4	70.8	12.5	915.9	260.1	3.6	1225.6
1985	54.1	31.7	976.5	234.8	1.7	1300.3	42.1	27.8	908.6	212.5	1.3	1226.6	69.8	36.0	1056.9	260.6	2.2	1385.9
1986	58.2	32.6	770.1	181.1	6.1	1049.9	45.6	28.7	712.2	164.1	4.7	986.8	75.1	37.2	838.2	200.6	8.1	1121.8
1987	41.6	18.5	601.4	182.5	6.2	851.0	32.1	16.3	553.4	167.9	4.8	799.6	53.9	21.0	655.8	198.8	8.0	909.3
1988	38.7	17.9	488.1	174.1	21.6	741.6	31.1	15.7	445.9	163.1	17.4	696.2	48.5	20.3	535.2	186.6	27.2	791.1
1989	51.6	16.2	501.3	222.8	9.4	801.7	41.3	14.3	456.6	210.0	7.3	754.3	64.5	18.4	553.5	236.7	12.1	856.5
1990	58.2	11.2	400.5	210.0	14.4	695.2	46.4	9.9	365.7	197.0	11.1	654.6	73.6	12.7	442.0	224.1	18.8	741.8
1991	57.8	15.9	429.3	198.9	16.9	720.6	46.3	14.0	390.0	186.3	13.1	676.0	72.8	18.0	474.9	212.7	21.9	772.0
1992	68.5	17.6	406.6	238.1	18.5	750.3	54.8	15.6	372.5	223.1	14.5	708.7	86.0	19.9	445.0	254.3	23.9	796.2
1993	66.5	15.1	398.2	195.3	14.3	690.7	53.8	13.4	364.2	179.7	11.1	649.0	83.0	17.1	436.2	213.5	18.4	737.0
1994	39.3	9.4	465.5	229.5	8.1	753.2	31.6	8.3	426.0	213.3	6.2	708.2	49.0	10.7	511.2	247.7	10.5	802.9
1995	35.8	12.6	416.4	173.6	13.3	652.5	28.6	11.1	383.1	159.7	10.3	614.2	45.3	14.1	454.3	189.9	17.2	696.1
1996	41.7	6.8	275.5	145.3	8.6	478.9	33.1	6.0	251.1	133.0	6.6	448.0	52.5	7.7	302.6	160.0	11.2	512.5
1997	34.5	9.3	321.1	179.4	4.6	549.7	27.3	8.3	293.3	165.7	3.5	516.4	44.0	10.6	353.2	195.5	6.0	586.8
1998	45.8	11.5	342.4	149.8	3.7	554.0	37.2	10.1	310.5	135.9	2.8	516.9	56.4	13.2	378.9	166.1	4.8	595.6
1999	96.2	6.5	472.4	257.8	10.6	845.4	79.2	5.7	430.6	236.6	8.3	792.0	117.7	7.4	520.4	282.3	13.6	904.5
2000	102.2	7.3	555.1	182.7	13.2	862.4	85.1	6.4	505.3	164.5	10.3	804.3	123.8	8.5	612.2	204.9	17.0	926.9
2001	83.1	6.7	480.0	194.0	8.9	774.1	68.7	5.8	437.1	174.8	7.0	722.4	101.7	7.7	530.3	216.7	11.5	833.0
2002	63.9	8.1	413.1	146.3	2.9	635.6	53.8	6.9	377.1	131.5	2.2	592.9	76.9	9.6	455.1	164.0	3.8	683.3
2003	34.7	6.8	394.4	116.1	6.3	558.8	28.4	5.8	357.0	104.3	5.0	518.5	42.3	8.0	436.7	130.1	8.0	605.7
2004	26.0	9.3	364.4	124.2	5.1	529.5	21.5	7.9	332.4	113.2	3.9	494.8	31.6	10.9	400.7	137.5	6.5	569.0

Year	Finland median	Iceland (NE) median	Norway median	Russia median	Sweden median	N-NEAC median	Finland 5%	Iceland (NE) 5%	Norway 5%	Russia 5%	Sweden 5%	N-NEAC 5%	Finland 95%	Iceland (NE) 95%	Norway 95%	Russia 95%	Sweden 95%	N-NEAC 95%
2005	40.3	8.8	450.2	128.5	5.6	634.2	34.2	7.3	412.7	116.5	4.4	593.7	47.7	10.6	492.1	142.6	7.2	679.6
2006	55.9	8.3	392.0	142.2	5.6	604.9	47.2	6.9	358.6	130.9	4.4	567.1	66.5	9.8	431.0	155.5	7.1	649.0
2007	50.1	9.7	416.9	194.6	5.4	678.2	42.7	8.0	375.2	175.7	4.1	628.8	59.2	11.8	464.1	217.3	7.3	732.3
2008	27.5	8.5	357.8	173.0	6.5	574.2	23.1	7.1	320.3	157.6	4.9	532.0	32.7	10.1	399.1	191.7	8.8	619.6
2009	39.5	13.1	374.2	206.2	7.2	641.4	33.5	11.0	333.7	188.2	5.4	594.8	46.9	15.5	419.9	227.3	9.8	692.4
2010	30.0	12.5	500.7	197.6	13.0	754.4	25.1	10.4	446.8	181.1	9.9	696.3	35.8	15.1	559.4	216.2	17.5	818.2
2011	36.3	7.6	440.7	114.2	14.8	614.1	30.7	6.2	394.2	103.4	11.1	565.3	43.1	9.3	491.9	126.8	20.0	668.2
2012	34.9	8.7	331.6	121.9	8.5	506.4	29.0	7.1	294.3	111.2	6.2	466.9	41.9	10.8	372.2	134.2	11.9	550.1
2013	36.1	10.1	337.4	121.5	14.7	520.8	30.2	8.2	297.9	111.3	11.2	478.1	43.0	12.5	383.0	133.1	19.4	568.9
2014	36.5	9.9	416.3	113.4	9.9	587.2	30.7	8.1	371.1	104.6	7.2	538.6	43.1	12.1	469.5	123.4	13.8	641.6
2015	35.9	13.8	452.8	102.4	7.7	613.4	30.3	11.2	403.9	94.5	5.6	562.6	42.9	17.0	506.5	111.4	10.6	669.1
2016	27.0	8.2	425.7	96.4	8.7	566.5	22.2	6.3	380.5	88.6	6.4	519.2	32.7	10.7	478.7	105.2	11.9	620.3
2017	18.7	7.9	433.6	111.5	11.4	583.7	15.3	6.0	382.4	102.3	8.3	531.1	23.0	10.4	490.7	122.5	15.7	643.7
2018	25.1	6.9	380.9	92.4	16.2	522.4	20.5	5.3	337.8	85.6	11.0	477.6	30.8	9.0	429.8	100.2	23.9	573.9
2019	14.0	6.2	348.3	85.0	9.8	463.8	11.4	4.8	307.9	78.4	6.8	422.0	17.3	7.8	395.7	91.9	14.1	512.1
2020	13.1	4.2	307.5	84.7	9.3	420.6	9.2	3.2	266.5	68.6	6.5	374.3	19.0	5.5	356.2	107.5	13.3	473.1
2021	16.7	4.7	303.0	93.2	10.2	430.1	11.3	3.5	262.1	76.5	7.2	383.9	24.8	6.3	352.3	115.9	14.7	484.6
2022	13.7	5.1	290.6	95.1	11.1	418.3	8.8	3.3	246.1	77.1	7.7	366.9	21.4	8.0	347.4	120.7	16.1	481.7
Forecast:																		
2023	12	4.4	331	91.9	15.9	459.7	5.4	1.5	208.4	48.9	5	325.2	29.1	12.2	553.7	171.8	47	727.6
2024	11.3	3.7	326.8	92	11.1	463.1	3.4	0.9	176.2	38.7	2.6	283.4	40	15.3	663.6	202.9	39.7	822.3
2025	11	3.1	312.6	84	10.5	441	2.5	0.5	151.4	29.2	1.9	253.7	45.1	16.3	675	205	44.2	830.5
2026	9.3	3	315.9	73.5	10.9	440.2	1.9	0.4	143.2	24.4	1.5	234.4	39.5	19	791.8	209.2	52.7	948.6
2027	12.1	2.8	314.8	78.8	12.2	453.8	2.2	0.3	124.3	20.8	1.5	231.8	59.1	23.4	859.7	257.7	73.4	1021.2

Table 3.3.5.3 Estimated abundance (in thousands) at the PFA stage of maturing 1SW salmon (potential 1SW returns) for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles of the marginal posterior distributions) as derived from the Life-cycle Model. Years are PFA years. The last four years are forecasted under the zero catch scenario.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	106.5	57.1	78.8	1308.5	229.3	746	2534	86.4	38.1	65.9	1069.6	208.5	642.8	2264.2	132	84.8	94.7	1609.2	254.5	867.3	2859.9
1972	101.9	105.9	65.7	1411.3	199	779.8	2675.5	81.2	71.7	54.7	1160.1	181.6	652.5	2384.4	128.6	155.8	79	1717.8	219.5	929.1	3012.6
1973	121.6	67	71	1553.5	176.2	947.2	2951.7	96.9	45.4	59	1282.5	160.6	795.5	2628.3	153.2	98.1	85.7	1887.9	194.7	1130.9	3329.6
1974	149.6	39.1	50.9	1767.6	196.4	925.8	3140.3	118.8	26.2	42.4	1452.5	177.6	783.7	2787.2	190	58	61.3	2152.9	218.9	1090.6	3551.2
1975	153.8	74.3	75.7	1918.4	159	732.9	3119.9	123.8	53.4	63.5	1604.2	144.9	622.6	2783.2	190.8	102.5	89.7	2311.5	175.2	867.1	3540.7
1976	114.9	66.2	60.1	1304.2	115.1	627.9	2294.6	93.7	48.7	50.9	1095.5	104.9	537.5	2063.1	141.2	90.3	71	1562.5	127.2	736.5	2575.7
1977	116.1	47.6	64.2	1084.7	114.3	727.4	2162.6	94	34.3	54.2	910	103.9	614.1	1942.9	144	64.6	76.6	1311.2	126.1	866.1	2421.5
1978	116.1	52.8	80	1048.7	140.6	735.7	2182.5	94.4	39	67.5	880.6	128.7	623	1968.7	142.5	72.1	94.9	1262.6	154.7	867.2	2429
1979	142.8	74.8	73.1	993.1	110.2	753.8	2156.3	115.9	54.7	61.5	832.6	100.2	634.5	1943.8	176.2	101.3	86.3	1190.3	122.2	900.1	2399.2
1980	125.2	96.3	34.9	701.6	122.8	552.1	1641.6	100.9	69.6	29.2	587.4	112.5	463.4	1483.3	157	132.7	41.5	842.8	135.8	660.9	1819.3
1981	125.1	79.1	46	437.4	105.5	664.8	1463.9	101.5	58.4	38.8	375.8	95.6	565	1336.8	153.5	107.4	54.3	509.6	116.4	783	1603.8
1982	111	63.5	47.9	836.4	149	704.1	1918.3	89.4	46.4	40.4	724.6	134.9	604.4	1757.4	137.1	87.5	56.7	971.6	165.4	821.3	2101.3
1983	145.4	74	58.4	1193.6	186.2	827.6	2494.7	117.9	53.6	49.6	1045.3	171.7	711.1	2292.6	179.3	100.4	69	1382	205.2	965.4	2727.2
1984	136.8	84.9	36.4	791	84.6	745.8	1885.9	111.5	62	30.8	678.2	76.5	642.3	1723	168.2	116.1	43.2	921	93.6	868	2071.8
1985	145.1	45.4	54.9	1154.2	109.5	758	2276.1	116.7	32.5	46.4	1010.3	99.7	636.8	2079.2	180.4	63.5	65.1	1339.2	121.1	901.5	2505.2
1986	164	50.8	85.3	1252.4	118.9	797.9	2478.2	131.6	33.1	72.3	1085.9	108.2	672	2255.1	204	77.6	100.8	1459.2	131.6	950.7	2733.5
1987	160.2	85.7	62.6	840.6	66.5	697.5	1920.9	128.7	55.3	52.7	718.1	59.2	584.6	1742.8	199.8	129.3	74.3	984.4	74.7	837.2	2125.9
1988	211	37	99.8	1147	141.9	894.4	2539.4	169.7	24.1	85.3	980.4	126.7	743.8	2298.9	261.6	56.5	117.7	1344.7	159	1072.4	2807.6
1989	165.4	26.3	63.5	752.6	158	840.8	2015.1	132.3	16.7	53.9	650.2	141.5	689.6	1824.2	205.2	41.1	74.9	878.9	178.6	1021.7	2235
1990	114	38.3	54.2	568.5	116.2	658.1	1557.1	90.8	23.7	45.9	486.4	107.4	534.2	1397.6	142.9	60.6	63.6	669.3	125.6	814.4	1739.9
1991	99.9	28.5	60.9	407.7	68.2	510.6	1181.1	79.9	18.3	51.4	344.7	62.8	416.2	1060.9	124.5	44	71.7	482.8	73.9	635.7	1323.9
1992	117.8	24.6	63.9	545	130.3	645.5	1532.6	94.3	15.9	54.1	464.1	118.2	524.5	1379.5	147.5	37.7	75.5	640.8	144.1	792.6	1709.6
1993	151.7	43.7	70.3	470.3	152.5	707.8	1602.8	121.5	28.9	59.8	399.8	140.9	576.8	1444.8	189.6	65.9	82.3	553	165.3	872.1	1787.8
1994	156.3	22	54	585.4	113.6	705.5	1641.6	127	14.7	45.8	505.1	102.8	575	1474.7	193.7	32.6	63.4	680	126	862.4	1828.7
1995	132.2	20.1	62.2	609.7	99.6	661.9	1591.4	105.6	13.6	52.8	522.8	92	533.2	1427.6	166.2	29.4	73	709.4	108.1	821.5	1784.3
1996	98.3	16.9	61.2	600.1	104.6	520.6	1406.1	77.9	11.6	52.1	512.8	92.7	413.2	1260.3	124.1	24.6	72.5	704.3	118.6	658.5	1581.4
1997	83	10.9	42.5	536.9	128	446.6	1252.7	64.9	7.3	36	456.9	112.7	356.1	1122.3	105.9	16.2	49.9	630.5	145.2	564.1	1408
1998	100.1	19.7	64.3	616.5	208.8	497.3	1514.5	77.3	13.6	54.5	527.1	180.7	395.6	1364.9	129.9	28.3	75.4	725.3	242.1	626.8	1686.2
1999	86.4	12.9	41.8	615	70.4	413.8	1246.1	66	8.8	35.5	524.8	65.8	329.6	1112.2	113.5	19	49.2	724	75.4	524.7	1400.7
2000	113	17.5	43.8	695.9	100.3	556.2	1532.3	86.9	11.9	37.3	593.1	93.5	445.9	1372.1	146.5	25.6	51.6	816.4	107.9	698.3	1724.8
2001	96.5	15.6	38.5	624.3	84.4	497.7	1362.6	72.8	10.5	32.6	548.1	77.9	395.5	1227.2	128	22.7	45.6	713.6	91.5	628.8	1522.8
2002	95.5	24.3	49.3	548.3	136.7	444.3	1306.4	72.1	16.6	41.7	480.3	123.3	353	1180.2	127.5	35.3	58.4	627	151.1	563.6	1449
2003	81.8	25.4	54.9	512.2	89.2	440.1	1209	58.4	17.3	46.6	449.4	82.3	346.1	1085.9	114.5	36.9	64.9	585.7	96.6	559.7	1350.4
2004	109.9	20.8	63.6	422.4	88.8	525.3	1237	79.8	14.1	53.8	370.4	81.5	419.2	1107	149.9	30.3	75.3	482.9	97	656.4	1389.9

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2005	103.3	17.1	74.2	396	102	554.6	1251.7	75	11.8	63.1	347.6	92.3	439.2	1116.9	142.1	25.1	87.6	451.3	112.6	700.8	1412.1
2006	99.1	20.5	59.1	304.2	77.1	513.7	1078.2	69.7	14.2	50.2	268	69.3	408.6	956.6	139.3	29.4	69.6	344.6	85.8	649.4	1226.2
2007	96.7	19.4	64.9	279.5	95.7	469.5	1035.3	67.6	12.6	55.5	205.7	84.5	369.9	894.2	139.1	29.4	76	380.3	108.8	600.4	1202
2008	89.1	14.5	84.6	272.9	68.5	451.8	989.4	62	9.9	71.8	201.9	60.7	357.7	858.3	126.1	21.1	99.7	369.5	77.4	572	1146.1
2009	67.2	8.4	92.7	266.6	41.6	367.3	849.6	46.6	5.5	77.7	196.8	36.5	287.5	733.6	96.3	12.5	110.3	364.7	47.3	467	992.4
2010	107.7	19.7	89.8	275.4	42.9	499.9	1043.9	75.4	13.3	76.4	203.7	37.8	395.6	901.3	152.8	29.0	106.0	371.6	49.1	633.8	1212.4
2011	80.9	18.1	66.1	250.3	34.2	390.2	847.9	55.9	11.6	55.6	183.7	28.2	305.9	728.2	117.5	27.7	79.1	340.6	41.8	498.8	991.4
2012	56.0	10.3	43.0	309.2	54.9	363.7	845.9	37.7	6.6	36.0	223.8	40.6	282.4	716.1	83.0	16.2	51.4	430.6	74.1	468.7	1005.9
2013	57.1	16.4	90.8	253.8	58.4	323.9	806.5	40.9	11.2	77.1	187.9	45.0	255.9	700.3	80.5	24.2	107.6	340.0	77.2	407.4	931.6
2014	40.3	19.6	31.0	189.7	35.7	223.6	544.4	28.0	13.2	26.0	141.1	27.6	177.9	470.7	58.0	28.6	37.1	254.7	47.2	282.5	634.5
2015	53.0	11.3	70.8	219.4	39.7	302.6	702.5	36.8	7.7	59.4	163.4	31.0	238.9	607.4	75.5	16.5	85.0	298.2	51.6	384.6	819
2016	46.9	12.0	46.2	221.2	67.6	294.5	695.5	32.5	8.2	38.7	163.0	56.0	231.7	596.5	67.1	17.9	55.4	299.0	84	375.6	809.7
2017	40.4	18.0	47.3	212.2	49.0	254.4	628.4	27.4	12.1	39.6	155.9	38.7	196.4	535.6	59.4	26.9	56.6	290.4	63.6	331.1	739.3
2018	38.4	16.5	38.7	189.2	41.9	245.7	575.2	26.5	11.2	32.1	139.0	33.7	191.7	493.8	55.2	24.1	46.8	255.8	53.6	316.8	673.9
2019	33.9	10.9	30.0	170.7	26.4	254.5	532.3	22.9	7.3	24.7	122.3	21.4	197.5	448.8	49.8	16.3	36.3	238.2	33.2	331.1	633.5
2020	42.4	10.2	31.7	207.0	46.0	294.1	637.3	27.9	6.8	26.1	147.1	41.6	227.6	537.9	64.4	15.4	38.6	287.6	51.4	379.6	753.9
2021	37.4	9.0	28.6	200.7	35.6	276.3	593.8	24.2	5.8	23.2	143.6	32.3	211.2	499.6	57.2	13.8	35.6	280.3	39.8	363.5	711.4
2022	35.7	5.3	33.6	160.7	14.7	239.7	495.7	22.5	3.3	27.1	111.5	12.5	181.1	410.8	56.4	8.5	41.9	231.0	17.7	321.1	605.3
Forecast:																					
2023*	37.9	5.1	27.8	146.7	16.4	224.9	490.4	14.5	1.7	12.6	62.2	8.2	123.1	311.4	96.7	16	62.5	352.5	33.3	409.4	813.5
2024	43.6	4.8	23.5	163.4	21.1	236.3	551.0	13.3	1.2	8.1	54.2	7.9	108.1	305.5	137.3	20.6	63.5	483.5	58.7	549.9	1059.9
2025	38.9	4.5	23.1	167.5	14.5	242.3	548.2	9.6	0.9	6.6	46.4	4.1	98.0	287.0	158.0	21.1	72.8	528.8	49.1	639.1	1112.7
2026	39.8	3.7	22.1	142.5	8.7	213.7	511.3	8.2	0.6	4.9	38.1	1.9	77.7	240.2	159.6	23.4	71.5	547.4	36.5	620.3	1127.4
2027	40.3	4.5	22.8	129.6	10.6	204.2	517.9	5.8	0.6	4.2	24.0	1.5	62.8	212.7	240.7	40.9	94.4	685.9	77.6	612.1	1350

***PFA values are derived from incomplete input data (returns of 1SW maturing are not included) and therefore, 2023 PFA values should not be compared to 2023 returns and spawners of 1SW fish (Tables 3.3.4.5 and 3.3.4.7). These values are included for completeness.**

Table 3.3.5.4 Estimated abundance (in thousands) at the PFA stage of non-maturing 1SW salmon (potential MSW returns) for S-NEAC countries and aggregated for the S-NEAC complex (median, 5% and 95% quantiles of the marginal posterior distributions) as derived from the Life-cycle Model. Years are PFA years. The last four years are forecasted under the zero catch scenario.

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
1971	342.4	55.4	99.9	452	50.6	1151.1	2166	265.1	40.7	87	351.5	44.1	980.3	1977.8	444.4	76.2	115	575.8	58.2	1358.1	2375.6
1972	255.9	32.2	82.4	445.2	40.3	1078.7	1945.8	196.6	23.6	71.8	346.1	35.3	925	1773.6	333.3	43.6	94.8	570.1	46.1	1269.6	2146.8
1973	187.1	15.6	68.9	479.2	42.8	774.3	1579.2	142.6	11.3	60.3	377.6	37.1	664.4	1434.1	246.7	21.1	79.1	613.4	49.3	911.9	1743.1
1974	242.1	28.1	68.9	512.8	33.8	963	1861	186.4	20.5	60.3	400	29.7	797.2	1672.3	317	38.3	79.1	650.2	38.4	1171.1	2084.4
1975	177	24.2	71	423	28.2	691.2	1420.6	138.7	18.1	61.7	340.5	24.5	569	1282.3	226.6	32.3	81.8	521	32.5	832	1575.3
1976	155.7	17.9	60.6	306.4	23.4	692.6	1261.2	124.6	13.5	53.2	248	20.6	584.3	1140	196.8	23.7	69.2	377.1	26.7	828.5	1405.5
1977	140.2	16.2	72.7	262	27.8	886.5	1410.7	109.7	12.3	63.9	209.7	24.5	727.3	1246.3	178.4	21.4	82.9	327.1	31.7	1074.4	1601.8
1978	87.6	18.1	45.8	220.4	20.5	684.3	1080.6	68.3	13.7	40.1	176.8	17.9	564.1	952.8	112.7	23.7	52	273.6	23.4	840.7	1237.4
1979	192.8	30.3	66.5	251.8	25.6	967.3	1539.6	152.5	23.2	58.6	203.2	22.5	809	1378.7	244	40	75.5	313.5	29.3	1161.6	1736.6
1980	261.7	27.2	46.8	209.4	21.6	899.4	1473.1	207.4	19.2	40.9	167.8	18.9	769	1331.2	331.2	38	53.5	262.5	24.6	1054.8	1632.5
1981	145.9	20.3	35.7	124.5	32.4	691.8	1054.4	114.8	14.7	31.1	101.3	28	591	951.9	184.8	27.8	41.2	152.1	37.5	806.5	1169.1
1982	134.9	16.2	50.7	223.9	38.6	685.3	1153.8	105.4	11.7	44.8	187	33.7	587	1046.6	172.6	22.6	57.7	268.5	44.3	806.2	1277.1
1983	120.5	23.4	41	170.3	15.6	550.4	924.6	94.8	16.9	36.2	145.3	13.7	457.2	825.2	153.5	32.5	46.6	199.7	17.7	662.6	1038.5
1984	158.7	22.1	29.1	159.9	18.7	574.5	966.9	124.9	15.9	25.6	139.8	16.4	477.7	862.1	201.3	30.5	33	182.3	21.3	693.1	1086.7
1985	201.4	18.1	28	201.8	23.8	690.5	1168.9	158.4	13.1	24.5	167.2	20.8	580.7	1051.5	257.2	25.1	32	242.2	27.3	823.7	1305.4
1986	161.1	12.5	26.5	258.7	13.3	516.9	992.1	124.5	8.8	23	218	11.6	423.7	894.8	206.7	17.9	30.4	305.2	15.3	631.8	1111.6
1987	207.1	26.3	26	180.5	31.8	548.3	1025.3	162.1	18.7	22.8	151	27.6	445.4	911.7	265.6	37	29.7	216.3	36.8	674	1154.8
1988	188	15.9	26.1	162.7	28.8	518	943.3	147.2	11.3	22.8	134.6	24.7	429.9	849.2	240.8	22.3	29.9	195.2	33.8	631.5	1059.5
1989	175.9	13.1	20.9	79.1	22.1	494.6	809.4	137.8	9.1	18.4	67.9	20.1	400.9	708.9	224.3	18.7	23.7	92	24.2	614.4	933.2
1990	93.6	12.3	20.7	99.4	10.9	353	591.9	72.2	8.8	18.3	84.2	10.1	275.7	510.3	122.3	17.5	23.7	117.1	11.8	451.1	692.6
1991	84.3	14.3	24.5	84.2	26.3	353.9	589.3	63.8	10.2	21.4	72.9	23.8	286.2	519.3	109.4	19.9	27.9	97.5	29.1	441.8	677.2
1992	77.1	8	11.7	101.2	57.8	353.3	613	57.8	5.6	10.3	76.3	53.6	279.3	531.4	101.7	11.2	13.4	134.5	62.3	446.4	711.1
1993	88.9	11.3	16.8	114	19.8	352.7	606.8	68.2	8.6	14.9	99.9	17.8	279.8	528.2	115	14.8	19.1	129.9	22.2	450.4	704.9
1994	102	7.5	17.5	111.3	16.2	382.4	639.5	78.1	5.7	15.5	98.7	15.1	302.2	551.8	132.1	9.9	19.9	125.8	17.6	485.7	746.1
1995	85.1	10.4	12.1	79.7	17.5	372.1	579.5	64.4	8	10.6	70.2	14.2	289.4	492.3	112.5	13.7	13.8	91	21.6	479.9	690.6
1996	64.6	6.5	12.4	86.2	22.5	261.5	456.7	47.7	4.9	10.9	66.3	18.1	201.3	388.8	87.7	8.7	14.1	112	28.2	341.1	543.9
1997	52.7	5.3	8.1	57.6	25.7	229.5	379.7	37.7	4	7.1	53.1	20.1	175.8	323	73	6.9	9.2	62.3	32.7	299.8	453
1998	66.2	9.7	14.3	80	14.6	232.3	420.3	47.3	7.4	12.6	58.9	12.3	177	354.5	92.1	12.8	16.3	108.6	17.4	303.5	503.7
1999	65.8	6.8	4.5	101.5	16.2	237.6	434.8	46.5	5.1	3.9	88.1	13.6	182.8	372	91.9	9	5.1	116.8	19.3	311	512.7
2000	79	8.5	7.3	106.2	11.2	278.8	494.1	56.7	6.4	6.4	87.8	9.7	214.3	419.5	109.8	11.2	8.3	128.3	12.9	364.8	587.1
2001	72	8	7.8	108.2	13.9	248.3	460.7	51	6	6.8	87.5	12.4	189.4	391.7	102	10.6	9	134	15.5	323	545
2002	86	11.6	12.1	105.8	8.8	265.6	492.4	61.2	8.7	10.6	85.8	8.1	202.7	417.4	120.1	15.5	13.8	130	9.6	347	586.3
2003	78.3	18.2	10.4	70	9.2	298.6	487.5	55.1	13.8	9.1	57.7	8.5	228.1	408.8	111.5	24.1	12	84.8	10.1	390.5	586.3
2004	86.6	12.7	8.5	79.2	11.3	341.8	542.8	61.8	9.6	7.4	69.4	10.2	262.1	455.8	120.9	16.7	9.7	90.4	12.6	447.6	653.6

Year	UK (Eng&Wal) median	France median	Iceland (SW) median	Ireland median	UK (N Irel) median	UK (Scotl) median	S-NEAC median	UK (Eng&Wal) 5%	France 5%	Iceland (SW) 5%	Ireland 5%	UK (N Irel) 5%	UK (Scotl) 5%	S-NEAC 5%	UK (Eng&Wal) 95%	France 95%	Iceland (SW) 95%	Ireland 95%	UK (N Irel) 95%	UK (Scotl) 95%	S-NEAC 95%
2005	86.1	11.9	7.7	54.9	9.2	376.6	550.4	60.3	9.1	6.7	41.7	8.4	288.9	451.4	122.3	15.7	8.8	72.7	10.1	490.2	669.5
2006	81.4	12.3	4.6	43.1	9	351.2	504.2	56.7	9.3	4	33.1	7.9	267.2	414.1	115.7	16.3	5.3	55.8	10.4	459.8	618
2007	86.7	13.6	5.4	34.3	7.2	404.5	555.1	60.5	10.2	4.6	25.4	6.4	308.9	453.6	125.4	18.2	6.3	46.5	8.2	529.1	687.9
2008	76.9	7.2	8.1	41.1	7.3	362.7	506.4	54.7	5.4	7	31.2	6.5	277.2	414.1	110.4	9.6	9.3	54	8.2	471.6	619.2
2009	94.6	5.6	15.6	36.8	10.9	430.6	597.6	66.1	4.1	13.7	27.7	9.9	328.1	487.3	134.2	7.5	17.9	48.9	12	561.5	732.7
2010	149.8	14.4	8.9	39.3	13.3	582.3	813.5	106.6	10.8	7.7	29.5	11.2	449.9	667.6	211.2	19.1	10.2	52.4	16.1	754.9	995.1
2011	124.6	10.6	4.7	39.9	24.8	436.9	646.4	86.5	7.9	4.0	29.8	18.1	330.5	527.0	178.6	14.0	5.6	53.4	34.7	577.5	797.9
2012	105.9	11.8	12.6	36.3	8.4	383.9	564.2	72.9	8.9	10.7	26.8	6.1	291.4	460.5	152.9	15.7	14.9	49.1	12.2	507.4	694.8
2013	93.8	14.1	8.8	33.8	6.7	316.6	477.1	66.6	10.6	7.3	25.5	4.9	245.9	397.9	133.2	18.7	10.5	44.8	9.2	411.6	580.1
2014	127.7	16.5	7.6	33.0	7.0	327.6	523.7	90.5	12.6	6.5	24.9	5.6	254.0	435.0	178.2	21.8	9.0	43.3	9.2	426.3	633.1
2015	153.1	8.2	10.5	34.4	13.8	379.9	604.4	110.4	6.1	8.8	26.2	11.4	293.7	502.0	212.9	10.9	12.7	45.1	17.3	496.2	735.7
2016	131.2	8.9	8.9	33.6	9.7	310.0	505.9	93.8	6.7	7.4	25.4	8.0	238.4	420.1	182.7	11.7	10.8	44.3	12.3	402.6	612.1
2017	120.1	12.2	9.4	34.7	10.0	238.0	428.7	84.9	9.1	7.9	25.9	8.1	181.4	356.0	169.1	16.3	11.2	46.0	12.8	317.3	521.8
2018	114.7	16.3	8.5	29.1	6.3	239.6	417.5	80.3	12.4	7.0	22.2	5.2	181.7	344.3	163.6	21.5	10.1	37.9	7.9	315.7	507.5
2019	148.9	10.0	9.9	31.4	3.8	290.4	498.6	103.5	7.5	8.2	23.6	3.2	217.0	408.5	211.5	13.3	11.9	42.0	4.6	388.8	614.5
2020	123.5	9.5	5.0	34.9	4.0	230.4	410.7	85.8	7.1	4.1	26.2	3.6	174.0	338.0	178.4	12.8	6.0	46.4	4.5	305.1	504
2021	115.9	10.7	6.3	35.1	2.1	217.8	392.1	79.5	8.0	5.4	26.5	1.9	162.1	320.1	168.8	14.3	7.4	46.4	2.5	293.6	482.1
2022	110.6	7.7	8.2	23.5	2.1	175.5	331.1	74.0	5.7	7.1	17.9	1.8	126.7	263.1	163.7	10.3	9.4	30.9	2.6	245	419.6
Forecast:																					
2023	115.5	7.2	7	21.2	2.5	167.3	340.4	49.9	2.8	2.3	8.2	0.8	82.1	198.1	256.1	21.1	17.3	60	8	329.4	572.6
2024	128.4	7.0	5.8	23.7	3.3	176.3	380.4	46.3	2.1	1.4	6.8	0.7	69.6	201.0	370.0	28.1	20.3	81.9	15	444.1	782.4
2025	117.5	6.4	5.8	24.9	2.2	176.1	386.5	36.4	1.5	1.1	5.9	0.3	57.8	169.8	362.3	24.8	26.0	99.1	13.7	518.9	855.6
2026	119.8	5.2	5.2	21.6	1.2	155.9	367.6	29.8	1.0	0.7	4.1	0.1	47.2	146.3	407.4	28.4	26.3	99.2	10.5	488.7	902
2027	124.7	6.4	5.5	19.0	1.5	140.4	371.6	23.0	0.8	0.6	2.7	0.1	36.0	130.0	541.1	56.0	32.1	121.6	19.8	520.3	1110.4

Table 3.4.1.1 Probability of Northern and Southern NEAC - 1SW and MSW stock complexes achieving their CLs independently and simultaneously for different catch options for the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons. Shaded cells denote achievement of CLs with ≥95% probability.

Catch options seasons	TAC option (t)	N-NEAC-1SW	N-NEAC-MSW	S-NEAC-1SW	S-NEAC-MSW	All complexes simultaneously
2024/25	**0**	76%	100%	41%	57%	24%
	20	76%	100%	40%	51%	22%
	40	76%	98%	40%	45%	20%
	60	75%	93%	40%	41%	18%
	80	75%	85%	39%	37%	16%
	100	75%	78%	39%	32%	13%
	120	74%	72%	38%	27%	11%
	140	74%	66%	37%	24%	10%
	160	74%	60%	37%	21%	8%
	180	73%	57%	36%	18%	7%
	200	73%	54%	36%	16%	6%
2025/26	**0**	73%	100%	36%	57%	21%
	20	72%	98%	36%	52%	19%
	40	72%	93%	35%	47%	17%
	60	72%	84%	35%	43%	16%
	80	72%	74%	35%	38%	13%
	100	71%	65%	34%	34%	11%
	120	71%	56%	34%	29%	9%
	140	70%	50%	33%	25%	7%
	160	70%	43%	33%	22%	6%
	180	70%	38%	32%	19%	5%
	200	70%	34%	32%	17%	4%
2026/27	**0**	70%	98%	39%	53%	21%
	20	70%	95%	38%	47%	19%
	40	69%	88%	37%	42%	17%
	60	69%	80%	37%	37%	14%
	80	68%	70%	37%	33%	12%
	100	68%	61%	36%	30%	10%
	120	68%	51%	36%	26%	9%
	140	68%	44%	36%	24%	7%
	160	67%	38%	35%	22%	6%
	180	67%	34%	34%	20%	6%
	200	66%	30%	34%	18%	5%

Table 3.4.1.2 Forecast harvest rates (%) for 1SW and MSW salmon from Northern and Southern NEAC areas in all fisheries (assuming full catch allocations are taken) for different TAC options in the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons.

Catch options seasons	TAC option (t)	N-NEAC-1SW	N-NEAC-MSW	S-NEAC-1SW	S-NEAC-MSW
2024/25	**0**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	20	**0.2%**	**11.6%**	**0.5%**	**5.8%**
	40	**0.3%**	**23.2%**	**1.0%**	**11.6%**
	60	**0.5%**	**34.6%**	**1.4%**	**17.4%**
	80	**0.7%**	**45.0%**	**1.9%**	**23.3%**
	100	**0.9%**	**53.2%**	**2.4%**	**29.2%**
	120	**1.0%**	**59.1%**	**2.8%**	**35.1%**
	140	**1.2%**	**63.9%**	**3.3%**	**41.1%**
	160	**1.4%**	**67.6%**	**3.8%**	**47.0%**
	180	**1.5%**	**70.8%**	**4.3%**	**53.1%**
	200	**1.7%**	**73.4%**	**4.7%**	**59.1%**
2025/26	**0**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	20	**0.2%**	**11.5%**	**0.5%**	**6.1%**
	40	**0.3%**	**23.1%**	**1.0%**	**12.3%**
	60	**0.5%**	**34.3%**	**1.5%**	**18.5%**
	80	**0.7%**	**44.8%**	**2.1%**	**24.7%**
	100	**0.8%**	**54.6%**	**2.6%**	**31.0%**
	120	**1.0%**	**61.2%**	**3.1%**	**37.3%**
	140	**1.2%**	**66.6%**	**3.6%**	**43.7%**
	160	**1.4%**	**70.9%**	**4.1%**	**50.1%**
	180	**1.5%**	**74.2%**	**4.6%**	**56.5%**
	200	**1.7%**	**77.0%**	**5.1%**	**62.9%**
2026/27	**0**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
	20	**0.2%**	**11.2%**	**0.5%**	**6.1%**
	40	**0.3%**	**22.5%**	**1.0%**	**12.2%**
	60	**0.5%**	**33.4%**	**1.5%**	**18.3%**
	80	**0.7%**	**43.3%**	**2.0%**	**24.5%**
	100	**0.8%**	**52.8%**	**2.5%**	**30.8%**
	120	**1.0%**	**59.5%**	**3.0%**	**37.0%**
	140	**1.1%**	**64.7%**	**3.5%**	**43.3%**
	160	**1.3%**	**69.5%**	**4.0%**	**49.7%**
	180	**1.5%**	**72.8%**	**4.5%**	**56.1%**
	200	**1.6%**	**75.6%**	**5.0%**	**62.5%**

Table 3.4.1.3 Probability (%) of National NEAC - 1SW stock complexes achieving their CLs individually and simultaneously for different catch options for the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons. Shaded cells denote achievement of CLs with ≥95% probability.

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	Ireland	UK (England & Wales)	France	All 1SW MUs simultaneously
2024/25	**0**	8%	33%	99%	73%	61%	62%	74%	5%	25%	35%	3%	0%
	20	8%	33%	99%	73%	61%	62%	74%	5%	25%	35%	3%	0%
	40	8%	33%	99%	73%	61%	61%	74%	5%	25%	34%	3%	0%
	60	8%	33%	99%	73%	61%	61%	73%	5%	25%	34%	3%	0%
	80	8%	33%	99%	73%	60%	60%	73%	5%	24%	34%	3%	0%
	100	8%	33%	99%	73%	60%	59%	72%	5%	24%	34%	3%	0%
	120	8%	33%	99%	72%	60%	58%	72%	5%	24%	34%	3%	0%
	140	8%	33%	99%	72%	60%	58%	71%	5%	24%	33%	3%	0%
	160	8%	33%	99%	72%	60%	57%	71%	5%	24%	33%	3%	0%
	180	7%	33%	99%	72%	60%	57%	70%	5%	24%	33%	3%	0%
	200	7%	33%	99%	71%	59%	57%	69%	5%	24%	32%	3%	0%
2025/26	**0**	5%	27%	98%	69%	59%	56%	66%	3%	21%	37%	4%	0%
	20	5%	27%	98%	69%	59%	56%	66%	3%	21%	37%	4%	0%
	40	5%	27%	98%	69%	58%	55%	65%	3%	21%	37%	4%	0%
	60	5%	27%	98%	69%	58%	55%	65%	3%	21%	36%	4%	0%
	80	5%	27%	98%	69%	58%	55%	64%	3%	21%	36%	4%	0%
	100	5%	27%	98%	69%	58%	54%	64%	3%	20%	36%	4%	0%
	120	5%	26%	98%	69%	57%	54%	63%	3%	20%	36%	4%	0%
	140	5%	26%	98%	69%	57%	53%	62%	3%	20%	36%	4%	0%
	160	5%	26%	98%	68%	57%	53%	62%	3%	19%	35%	4%	0%
	180	5%	26%	98%	68%	56%	53%	61%	3%	19%	35%	4%	0%
	200	5%	26%	98%	68%	56%	52%	61%	3%	19%	34%	4%	0%
2026/27	**0**	5%	40%	97%	72%	54%	58%	60%	10%	24%	40%	9%	0%
	20	5%	40%	97%	71%	54%	58%	60%	10%	24%	40%	9%	0%
	40	5%	40%	97%	71%	54%	58%	59%	10%	24%	40%	9%	0%
	60	5%	40%	97%	71%	54%	57%	59%	10%	24%	40%	9%	0%
	80	5%	40%	97%	71%	54%	57%	59%	10%	24%	39%	9%	0%
	100	5%	40%	96%	71%	54%	57%	59%	10%	23%	39%	9%	0%

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	Ireland	UK (England & Wales)	France	All 1SW MUs simulta-neously
	120	5%	40%	96%	71%	54%	56%	58%	9%	23%	39%	9%	0%
	140	5%	39%	96%	71%	54%	56%	57%	9%	23%	39%	9%	0%
	160	5%	39%	96%	71%	54%	56%	57%	9%	22%	39%	9%	0%
	180	5%	39%	96%	71%	53%	55%	56%	9%	22%	39%	9%	0%
	200	5%	39%	96%	70%	53%	55%	56%	9%	22%	38%	9%	0%

Table 3.4.1.4 Probability (%) of National NEAC - MSW stock complexes achieving their CLs individually and simultaneously for different catch options for the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons. Shaded cells denote achievement of CL with ≥95% probability.

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	Ireland	UK (England & Wales)	France	All MSW MUs simultaneously
2024/25	**0**	97%	31%	99%	87%	54%	68%	55%	19%	6%	88%	14%	0%
	20	97%	29%	97%	81%	46%	65%	50%	17%	5%	85%	12%	0%
	40	97%	28%	91%	68%	36%	61%	47%	16%	4%	81%	10%	0%
	60	96%	26%	79%	54%	25%	58%	42%	14%	4%	76%	9%	0%
	80	96%	24%	65%	38%	16%	52%	37%	12%	3%	71%	8%	0%
	100	96%	22%	52%	27%	10%	49%	33%	10%	3%	66%	7%	0%
	120	96%	21%	39%	17%	6%	45%	30%	9%	3%	60%	6%	0%
	140	95%	19%	31%	11%	4%	40%	27%	8%	2%	55%	4%	0%
	160	95%	17%	25%	7%	2%	37%	24%	6%	2%	50%	4%	0%
	180	94%	17%	20%	5%	2%	32%	21%	6%	2%	45%	4%	0%
	200	94%	16%	17%	3%	1%	29%	18%	5%	2%	41%	3%	0%
2025/26	**0**	92%	31%	98%	82%	47%	65%	53%	14%	8%	79%	11%	0%
	20	91%	29%	93%	74%	40%	62%	50%	13%	8%	77%	10%	0%
	40	89%	28%	83%	62%	31%	58%	46%	12%	7%	73%	9%	0%
	60	87%	26%	72%	50%	21%	56%	43%	9%	6%	69%	8%	0%
	80	84%	24%	58%	36%	14%	52%	40%	8%	5%	63%	7%	0%
	100	82%	23%	46%	26%	10%	48%	37%	8%	4%	60%	6%	0%
	120	79%	21%	37%	20%	7%	44%	33%	7%	4%	55%	5%	0%
	140	76%	20%	29%	13%	5%	40%	29%	6%	4%	50%	5%	0%
	160	74%	19%	23%	9%	3%	38%	27%	5%	3%	47%	4%	0%
	180	71%	17%	18%	6%	2%	34%	25%	4%	2%	42%	4%	0%
	200	66%	16%	16%	5%	2%	29%	22%	4%	2%	37%	3%	0%
2026/27	**0**	84%	25%	97%	80%	46%	60%	47%	8%	8%	79%	10%	0%
	20	82%	23%	91%	74%	40%	57%	43%	7%	8%	74%	9%	0%
	40	80%	22%	81%	63%	31%	54%	40%	6%	6%	71%	8%	0%
	60	78%	21%	69%	52%	24%	52%	37%	6%	6%	68%	8%	0%
	80	75%	20%	56%	41%	17%	48%	34%	5%	5%	62%	7%	0%
	100	72%	18%	46%	31%	13%	45%	30%	5%	4%	57%	6%	0%
	120	69%	16%	37%	23%	9%	41%	28%	4%	4%	53%	5%	0%

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	Ireland	UK (England & Wales)	France	All MSW MUs simulta-neously
	140	66%	16%	29%	17%	6%	36%	25%	4%	4%	48%	5%	0%
	160	61%	14%	24%	13%	5%	33%	22%	3%	3%	44%	5%	0%
	180	57%	12%	20%	10%	4%	30%	20%	3%	3%	41%	4%	0%
	200	55%	11%	16%	8%	3%	26%	18%	3%	3%	36%	4%	0%

Table 3.4.1.5. Forecast harvest rates (%) for 1SW salmon from Northern and Southern NEAC countries in all fisheries (assuming full catch allocations are taken) for different TAC options in the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons.

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	UK (England & Wales)	Ireland	France
2024	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/25	**20**	0.1%	0.1%	0.2%	0.2%	0.3%	0.6%	0.5%	0.6%	0.4%	0.6%	0.4%
	40	0.1%	0.1%	0.4%	0.4%	0.7%	1.1%	0.9%	1.2%	0.7%	1.2%	0.9%
	60	0.2%	0.2%	0.6%	0.6%	1.0%	1.7%	1.4%	1.7%	1.1%	1.8%	1.3%
	80	0.2%	0.3%	0.8%	0.8%	1.3%	2.2%	1.9%	2.3%	1.4%	2.4%	1.7%
	100	0.3%	0.3%	1.0%	1.0%	1.7%	2.8%	2.3%	2.9%	1.8%	3.0%	2.2%
	120	0.3%	0.4%	1.2%	1.2%	2.0%	3.3%	2.8%	3.5%	2.1%	3.6%	2.6%
	140	0.4%	0.5%	1.4%	1.4%	2.3%	3.9%	3.3%	4.0%	2.5%	4.2%	3.0%
	160	0.4%	0.5%	1.6%	1.6%	2.7%	4.5%	3.7%	4.6%	2.8%	4.8%	3.4%
	180	0.5%	0.6%	1.8%	1.8%	3.0%	5.0%	4.2%	5.2%	3.2%	5.4%	3.9%
	200	0.6%	0.7%	2.0%	2.0%	3.3%	5.6%	4.7%	5.8%	3.6%	6.0%	4.3%
2025	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/26	**20**	0.1%	0.1%	0.2%	0.2%	0.3%	0.6%	0.5%	0.6%	0.4%	0.6%	0.5%
	40	0.1%	0.2%	0.4%	0.4%	0.6%	1.2%	1.0%	1.2%	0.8%	1.3%	0.9%
	60	0.2%	0.2%	0.6%	0.6%	0.9%	1.8%	1.5%	1.9%	1.2%	1.9%	1.4%
	80	0.3%	0.3%	0.8%	0.8%	1.2%	2.4%	2.0%	2.5%	1.5%	2.5%	1.9%
	100	0.3%	0.4%	1.0%	1.0%	1.5%	3.0%	2.6%	3.1%	1.9%	3.2%	2.3%
	120	0.4%	0.5%	1.2%	1.2%	1.8%	3.5%	3.1%	3.7%	2.3%	3.8%	2.8%
	140	0.4%	0.5%	1.4%	1.3%	2.1%	4.1%	3.6%	4.3%	2.7%	4.5%	3.3%
	160	0.5%	0.6%	1.6%	1.5%	2.4%	4.7%	4.1%	4.9%	3.1%	5.1%	3.7%
	180	0.6%	0.7%	1.8%	1.7%	2.7%	5.3%	4.6%	5.6%	3.5%	5.7%	4.2%
	200	0.6%	0.8%	2.0%	1.9%	3.1%	5.9%	5.1%	6.2%	3.8%	6.4%	4.7%
2026	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/27	**20**	0.1%	0.1%	0.2%	0.2%	0.3%	0.6%	0.5%	0.6%	0.4%	0.6%	0.5%
	40	0.1%	0.2%	0.4%	0.4%	0.6%	1.2%	1.0%	1.2%	0.8%	1.3%	0.9%
	60	0.2%	0.2%	0.6%	0.6%	0.9%	1.8%	1.5%	1.8%	1.2%	1.9%	1.4%
	80	0.2%	0.3%	0.8%	0.7%	1.2%	2.3%	2.0%	2.4%	1.6%	2.5%	1.9%
	100	0.3%	0.4%	1.0%	0.9%	1.5%	2.9%	2.5%	3.0%	1.9%	3.1%	2.3%

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	UK (England & Wales)	Ireland	France
	120	0.4%	0.4%	1.1%	1.1%	1.8%	3.5%	3.0%	3.7%	2.3%	3.8%	2.8%
	140	0.4%	0.5%	1.3%	1.3%	2.1%	4.1%	3.5%	4.3%	2.7%	4.4%	3.3%
	160	0.5%	0.6%	1.5%	1.5%	2.4%	4.7%	4.0%	4.9%	3.1%	5.0%	3.8%
	180	0.5%	0.7%	1.7%	1.7%	2.7%	5.3%	4.5%	5.5%	3.5%	5.6%	4.2%
	200	0.6%	0.7%	1.9%	1.9%	3.0%	5.8%	5.0%	6.1%	3.9%	6.3%	4.7%

Table 3.4.1.6. Forecast harvest rates (%) for MSW salmon from Northern and Southern NEAC countries in all fisheries (assuming full catch allocations are taken) for different TAC options in the Faroes fishery in the 2024/2025 to 2026/2027 fishing seasons.

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	UK (England & Wales)	Ireland	France
2024	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/25	**20**	3.7%	3.7%	13.9%	17.3%	17.3%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
	40	7.4%	7.4%	27.8%	34.6%	34.6%	11.6%	11.6%	11.6%	11.6%	11.6%	11.6%
	60	11.2%	11.2%	41.7%	51.9%	51.9%	17.4%	17.4%	17.4%	17.4%	17.4%	17.4%
	80	14.9%	14.9%	54.9%	69.3%	69.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
	100	18.6%	18.6%	65.8%	86.7%	86.7%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
	120	22.3%	22.3%	72.5%	99.0%	99.0%	35.1%	35.1%	35.1%	35.1%	35.1%	35.1%
	140	26.1%	26.1%	77.8%	99.0%	99.0%	41.1%	41.1%	41.1%	41.1%	41.1%	41.1%
	160	29.8%	29.8%	81.5%	99.0%	99.0%	47.0%	47.0%	47.0%	47.0%	47.0%	47.0%
	180	33.5%	33.5%	84.1%	99.0%	99.0%	53.1%	53.1%	53.1%	53.1%	53.1%	53.1%
	200	37.3%	37.3%	85.8%	99.0%	99.0%	59.1%	59.1%	59.1%	59.1%	59.1%	59.1%
2025	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/26	**20**	4.3%	4.3%	13.7%	15.8%	15.8%	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
	40	8.5%	8.5%	27.5%	31.6%	31.6%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
	60	12.8%	12.8%	41.3%	47.4%	47.4%	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%
	80	17.0%	17.0%	54.2%	63.3%	63.3%	24.7%	24.7%	24.7%	24.7%	24.7%	24.7%
	100	21.3%	21.3%	66.0%	79.2%	79.2%	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%
	120	25.5%	25.5%	73.8%	95.1%	95.1%	37.3%	37.3%	37.3%	37.3%	37.3%	37.3%
	140	29.8%	29.8%	80.0%	99.0%	99.0%	43.7%	43.7%	43.7%	43.7%	43.7%	43.7%
	160	34.1%	34.1%	83.6%	99.0%	99.0%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%
	180	38.3%	38.3%	85.8%	99.0%	99.0%	56.5%	56.5%	56.5%	56.5%	56.5%	56.5%
	200	42.6%	42.6%	88.1%	99.0%	99.0%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
2026	**0**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
/27	**20**	4.3%	4.3%	13.6%	15.4%	15.4%	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
	40	8.6%	8.6%	27.3%	30.8%	30.8%	12.2%	12.2%	12.2%	12.2%	12.2%	12.2%
	60	12.9%	12.9%	40.9%	46.3%	46.3%	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%
	80	17.3%	17.3%	54.1%	61.8%	61.8%	24.5%	24.5%	24.5%	24.5%	24.5%	24.5%
	100	21.6%	21.6%	65.8%	77.3%	77.3%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%

Catch options seasons	TAC option (t)	Russia	Tana/Teno (Norway & Finland)	Norway	Sweden	Iceland (northeast)	Iceland (southwest)	UK (Scotland)	UK (Northern Ireland)	UK (England & Wales)	Ireland	France
	120	25.9%	25.9%	74.7%	92.8%	92.8%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%
	140	30.2%	30.2%	80.4%	99.0%	99.0%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
	160	34.5%	34.5%	84.7%	99.0%	99.0%	49.7%	49.7%	49.7%	49.7%	49.7%	49.7%
	180	38.9%	38.9%	87.2%	99.0%	99.0%	56.1%	56.1%	56.1%	56.1%	56.1%	56.1%
	200	43.2%	43.2%	89.0%	99.0%	99.0%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%

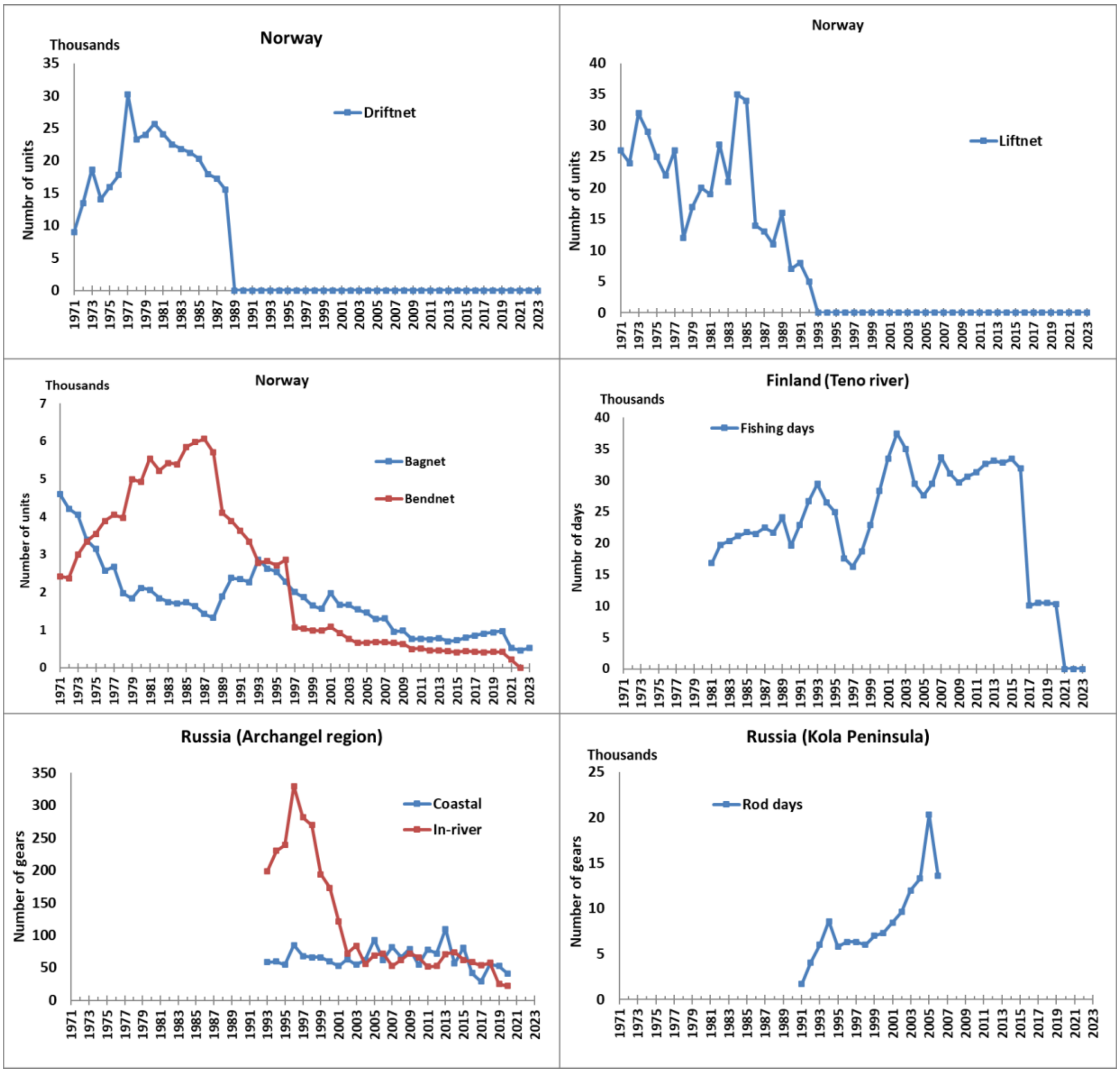


Figure 3.1.3.1. Overview of effort as reported for various fisheries and countries in the Northern NEAC area. 1971 - 2023. Notice that some of the y-axes are given in thousands. No data are available from Russia (Archangel region) since 2020.

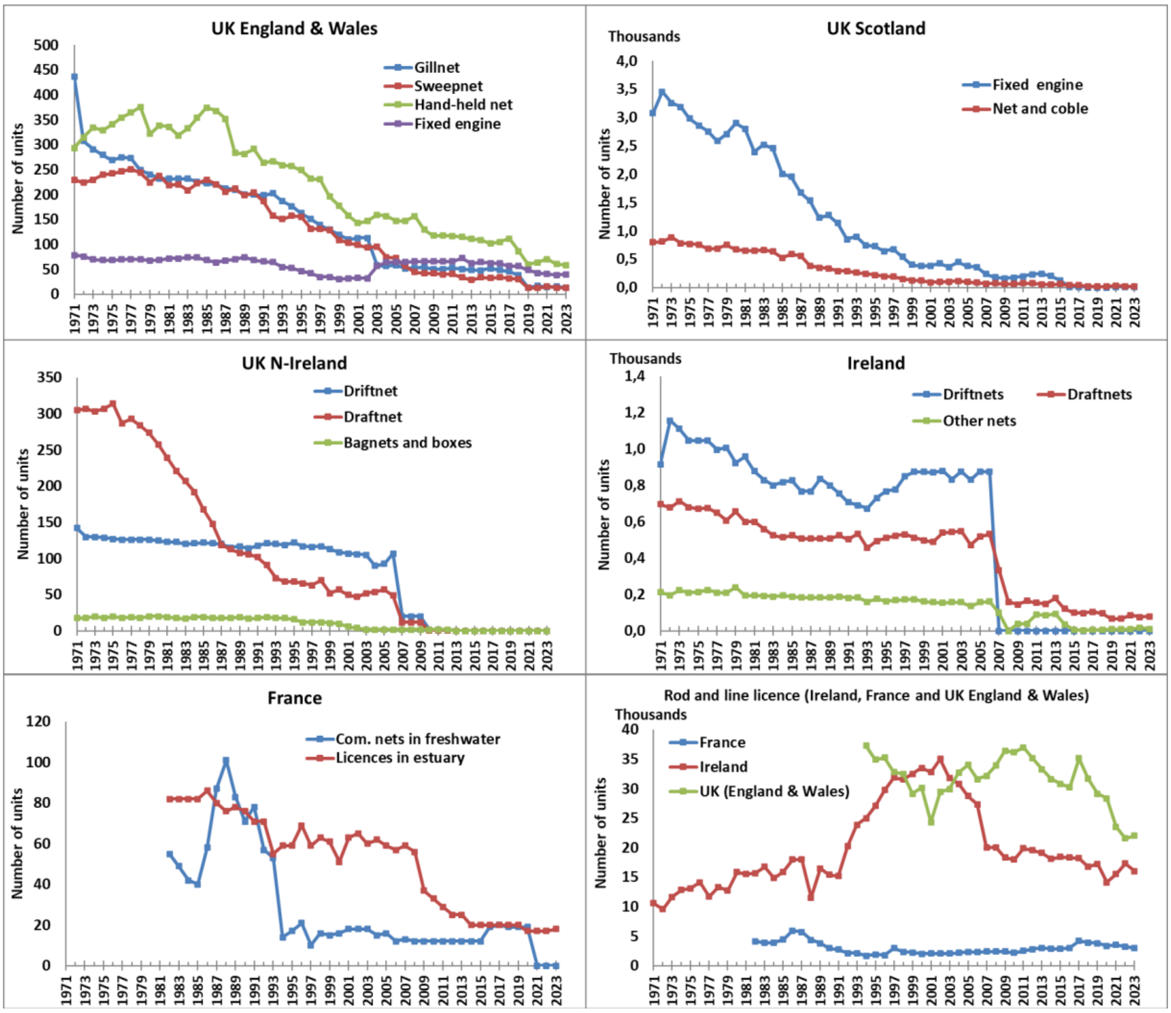


Figure 3.1.3.2. Overview of effort as reported for various fisheries and countries in the Southern NEAC area. 1971 - 2023. Notice all the y-axes on the right panel are given in thousands.

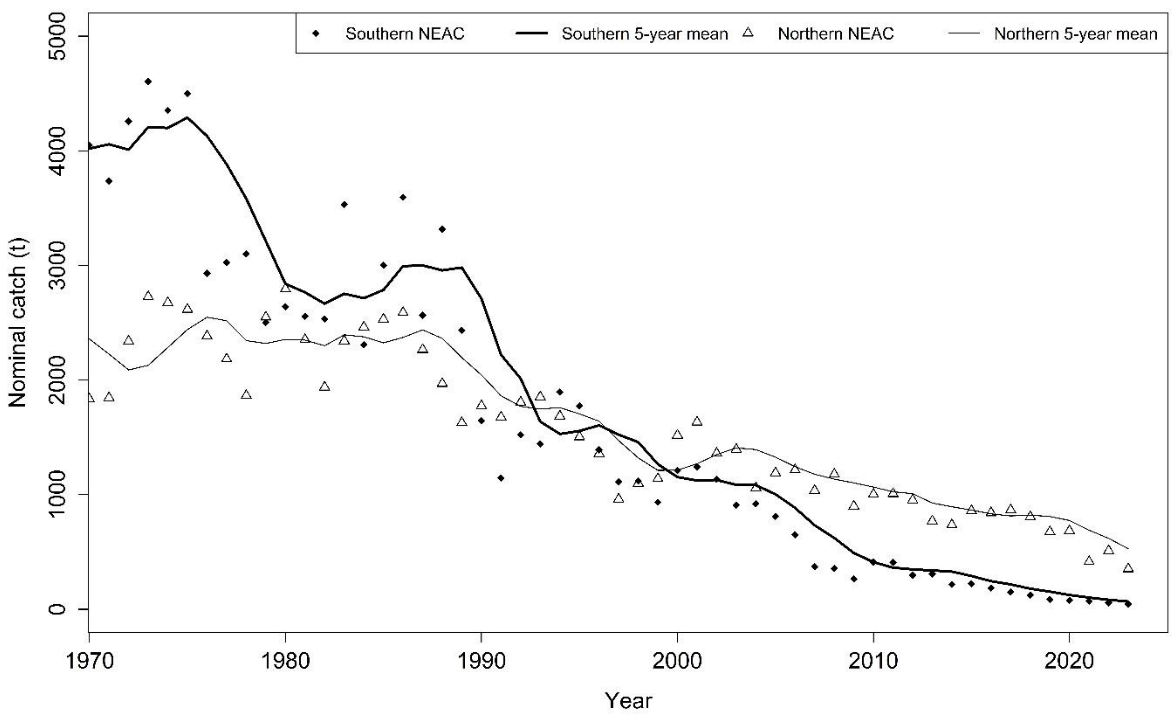


Figure 3.1.4.1. Nominal catches of salmon and five-year running means in the Southern and Northern NEAC areas. 1971–2023. All Icelandic catches included in Northern NEAC. No catch data available from Russia in 2023.

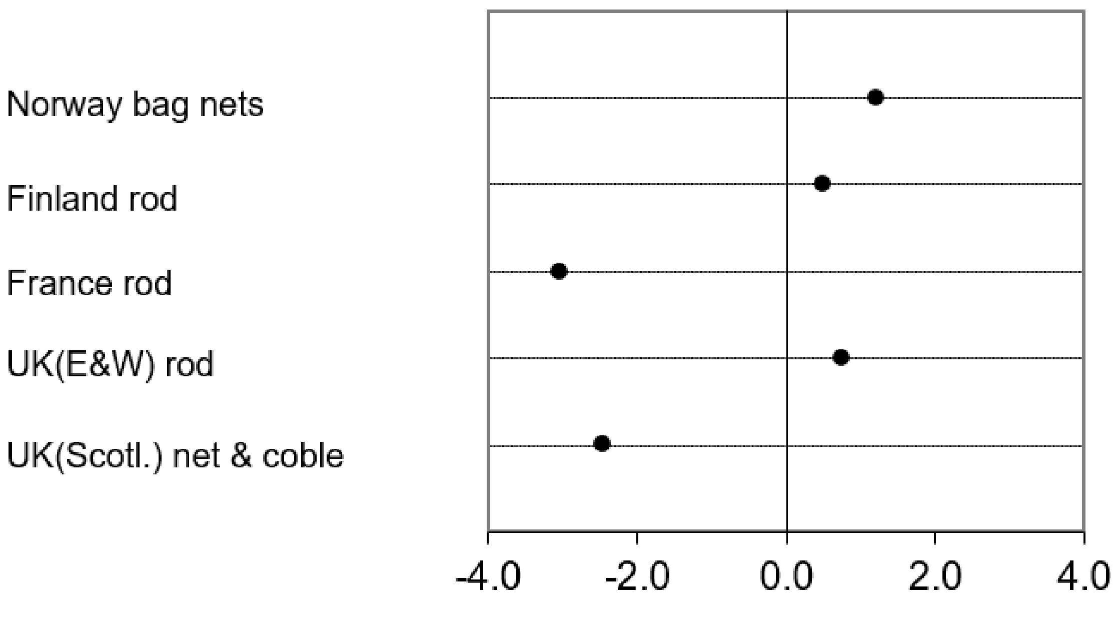


Figure 3.1.5.1. Percentage rate of change over yearly time-series in CPUE estimates for various rod and net fisheries in Northern and Southern NEAC area.

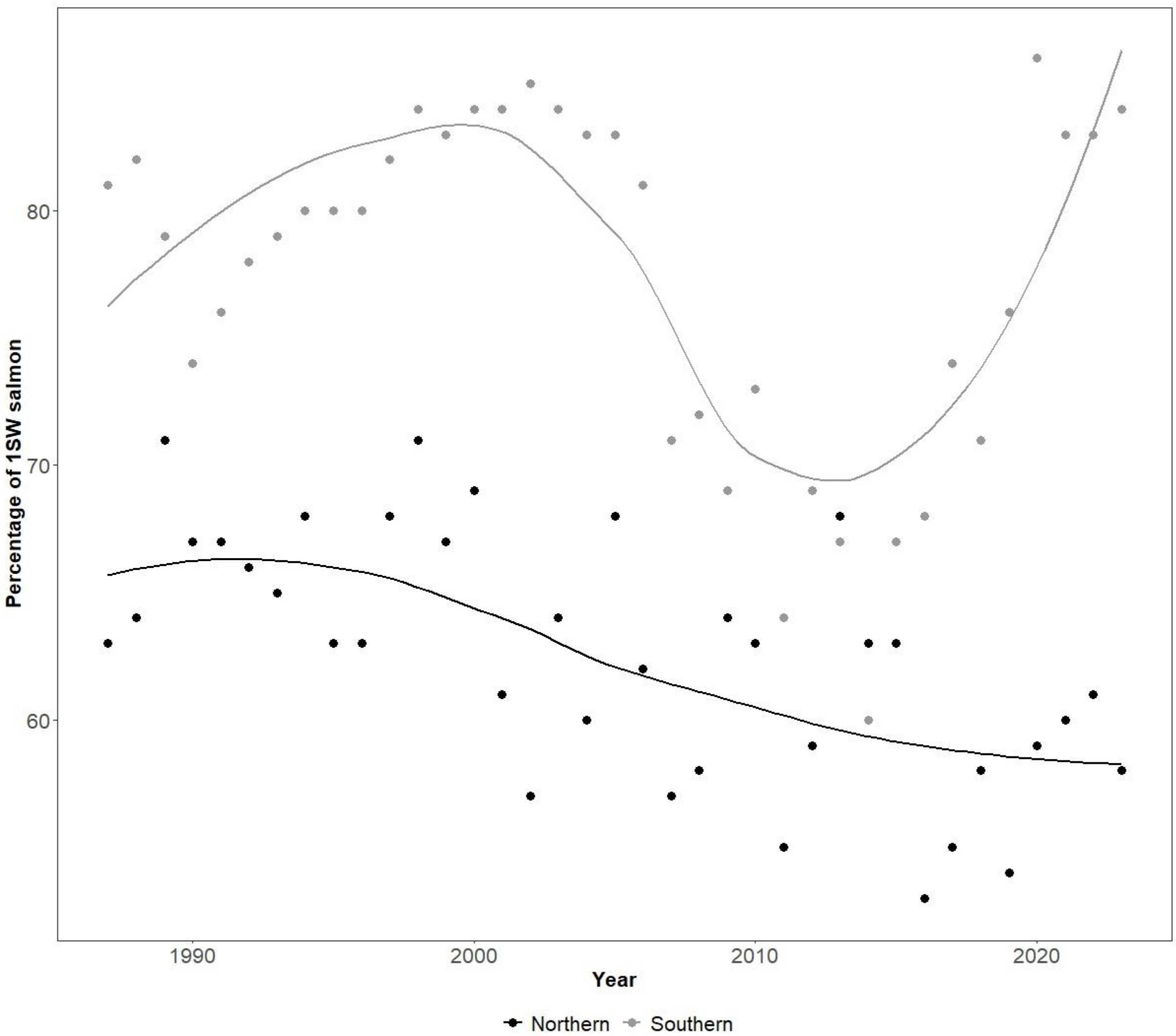


Figure 3.1.6.1. Percentage of 1SW salmon in the reported catch for the Northern (black dots) and Southern (grey dots) stock complexes. 1987–2023. Curves represent Northern (black line) and Southern (grey line) stock complexes with a Loess smoother (span = 85%) applied to the data. For 2021, 2022 and 2023 values for Russia contributing to this figure are the mean from the period 2016-2020.

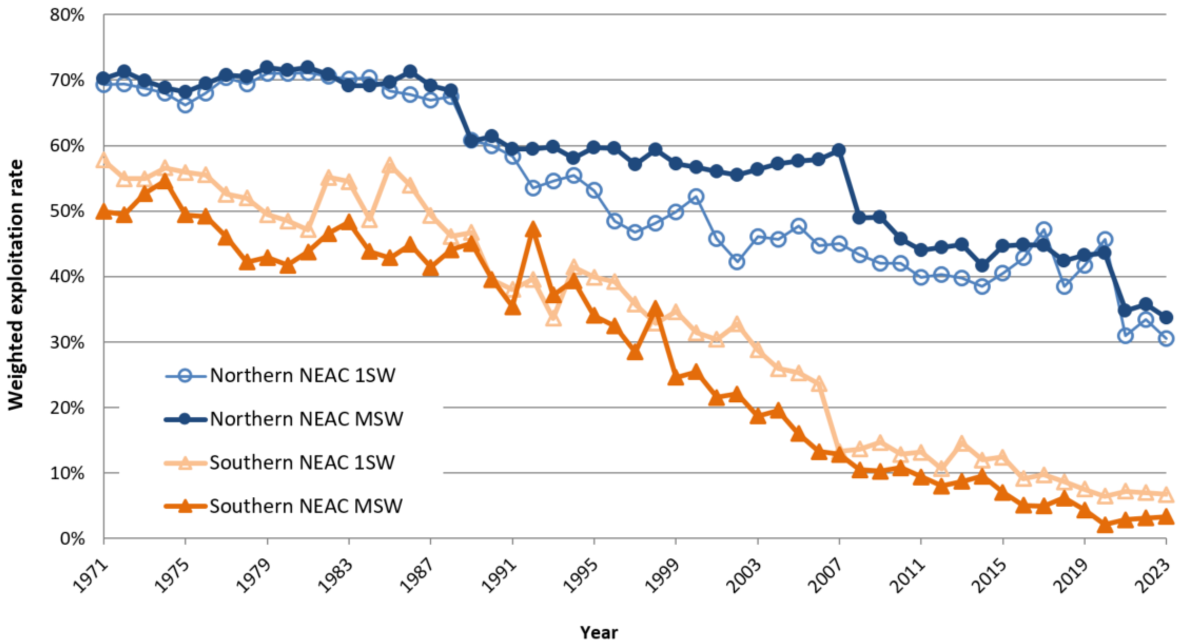


Figure 3.1.9.1. Mean annual exploitation rate of wild 1SW and MSW salmon by fisheries in Northern and Southern NEAC countries. Values for Russia since 2021 are based on the preceding five-year mean.

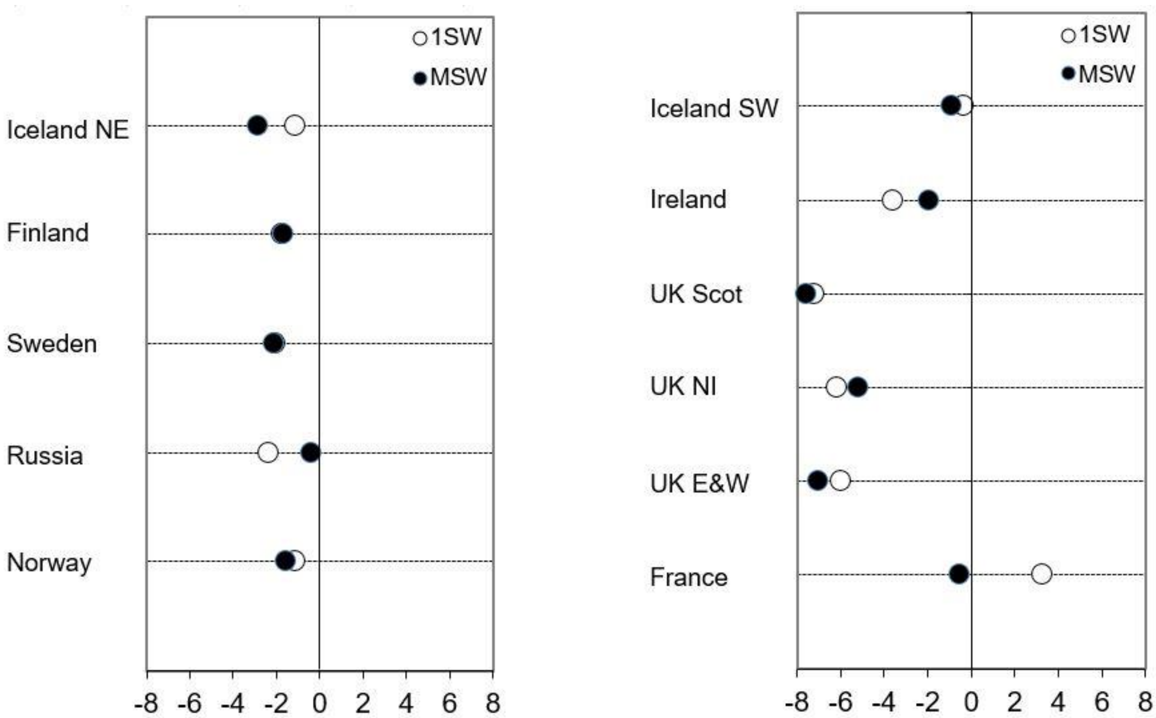


Figure 3.1.9.2. The rate of change (%) of exploitation of 1SW and MSW salmon in Northern NEAC (left) and Southern NEAC (right) countries. Values for Russia since 2021 are based on the preceding five-year mean.

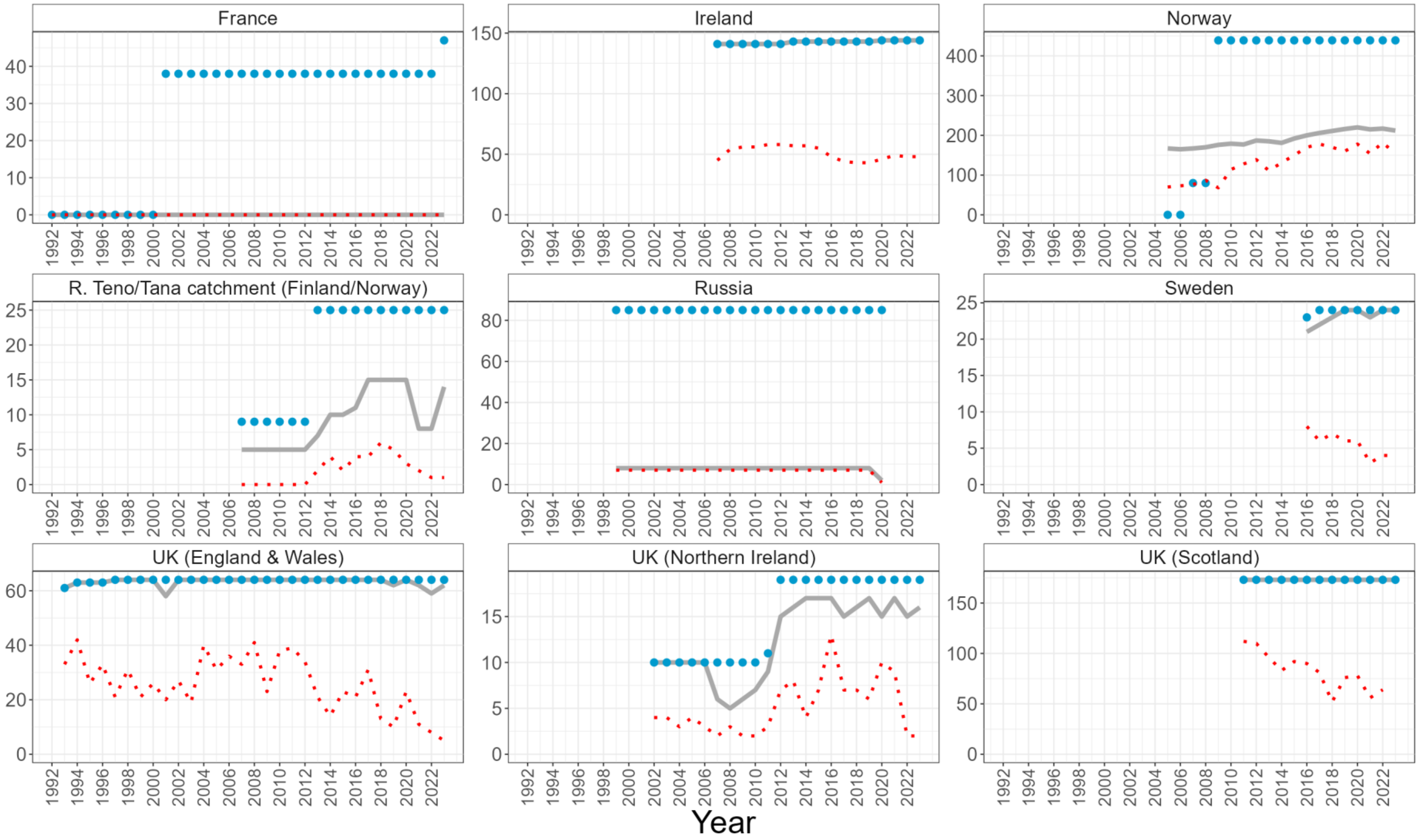


Figure 3.3.1.1 Time-series showing the number of rivers with established CLs (blue dotted lines), the number of rivers assessed annually (grey solid lines), and the number of rivers meeting CLs annually (red dotted lines) for jurisdictions in the NEAC area. The Teno/Tana reports on separate CLs for tributaries.

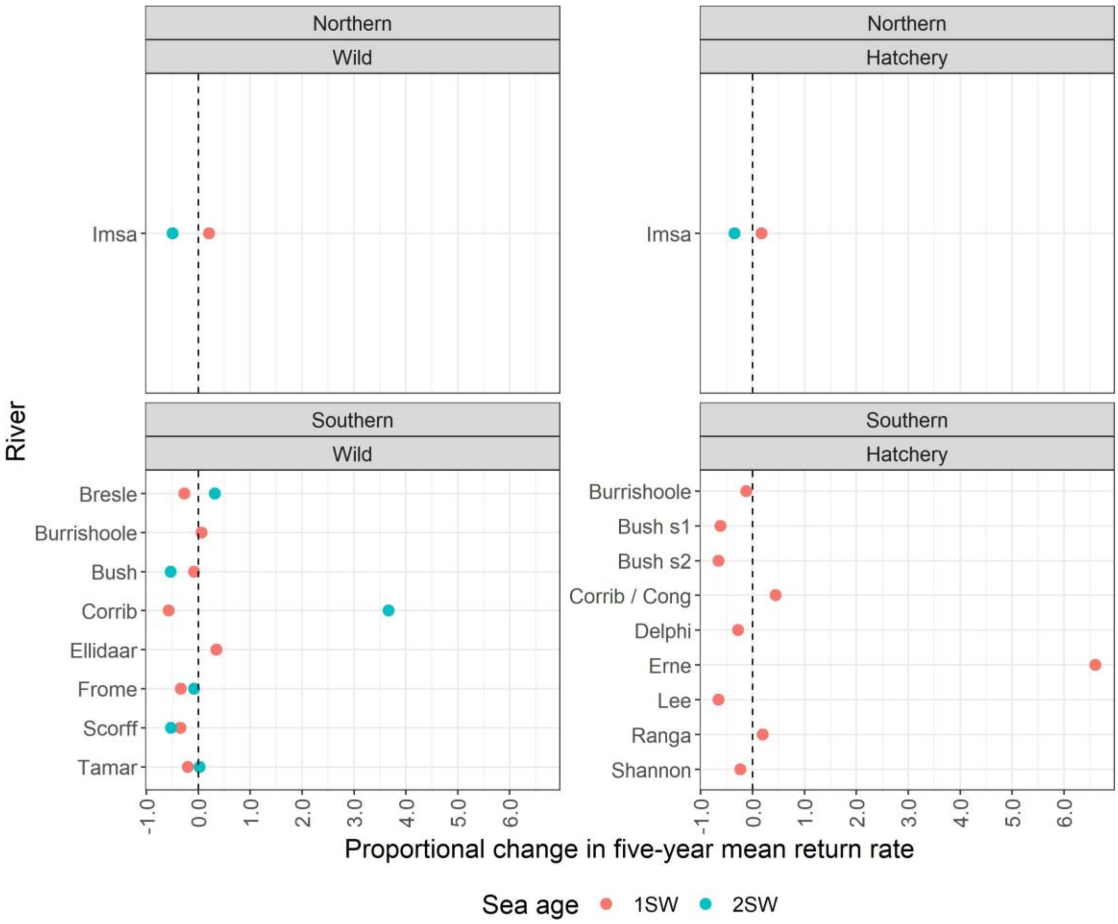


Figure 3.3.2.1. Comparison of the proportional change in the most recent five-year mean return rates compared to the previous five-year mean return rates for 1SW and 2SW wild (left hand panels) and hatchery (right hand panels) smolts to rivers of Northern (upper panels) and Southern NEAC (lower panels) areas. Populations with at least three data-points in each of the two time periods are included in the analysis. The scale of change in some rivers is influenced by low return numbers creating high uncertainty. which may have a large consequence on the proportional change.

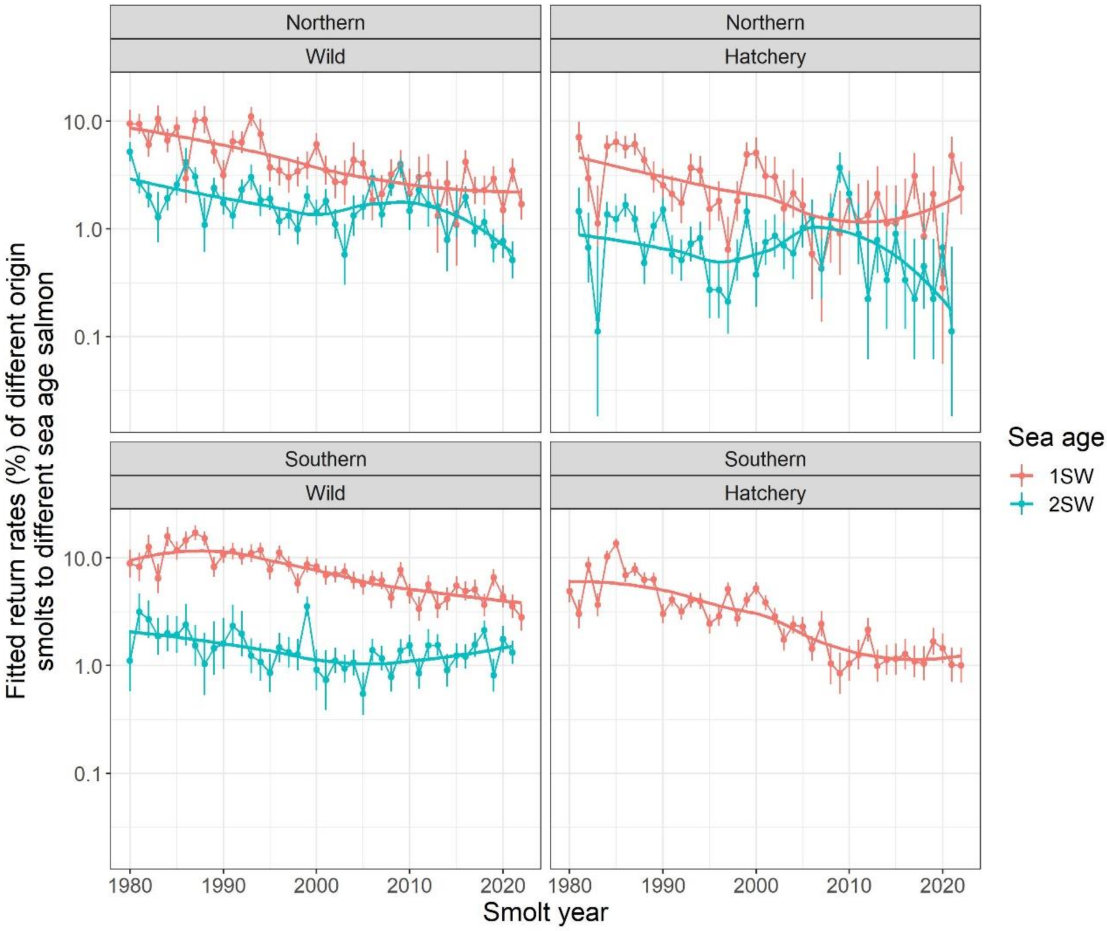


Figure 3.3.2.2. Least squared (marginal mean) average annual return rates (%) of wild (left hand panels) and hatchery origin smolts (right hand panels) of 1SW and 2SW salmon to Northern (top panels) and Southern NEAC areas (bottom panels). For most rivers in Southern NEAC. the values are returns to the coast prior to the homewater coastal fisheries. Mean annual return rates for each origin and area were estimated from a general linear model assuming quasi-Poisson errors (log-link function). Error bars represent standard errors. Trend lines are from locally weighted polynomial regression (LOESS) and are meant to be a visual interpretation aid. Following details in Tables 3.3.2.1 and 3.3.2.2 the analyses included estimated return rates (%) for 1SW and 2SW returns by smolt year. Note that the y-axis is on the log 10 scale.

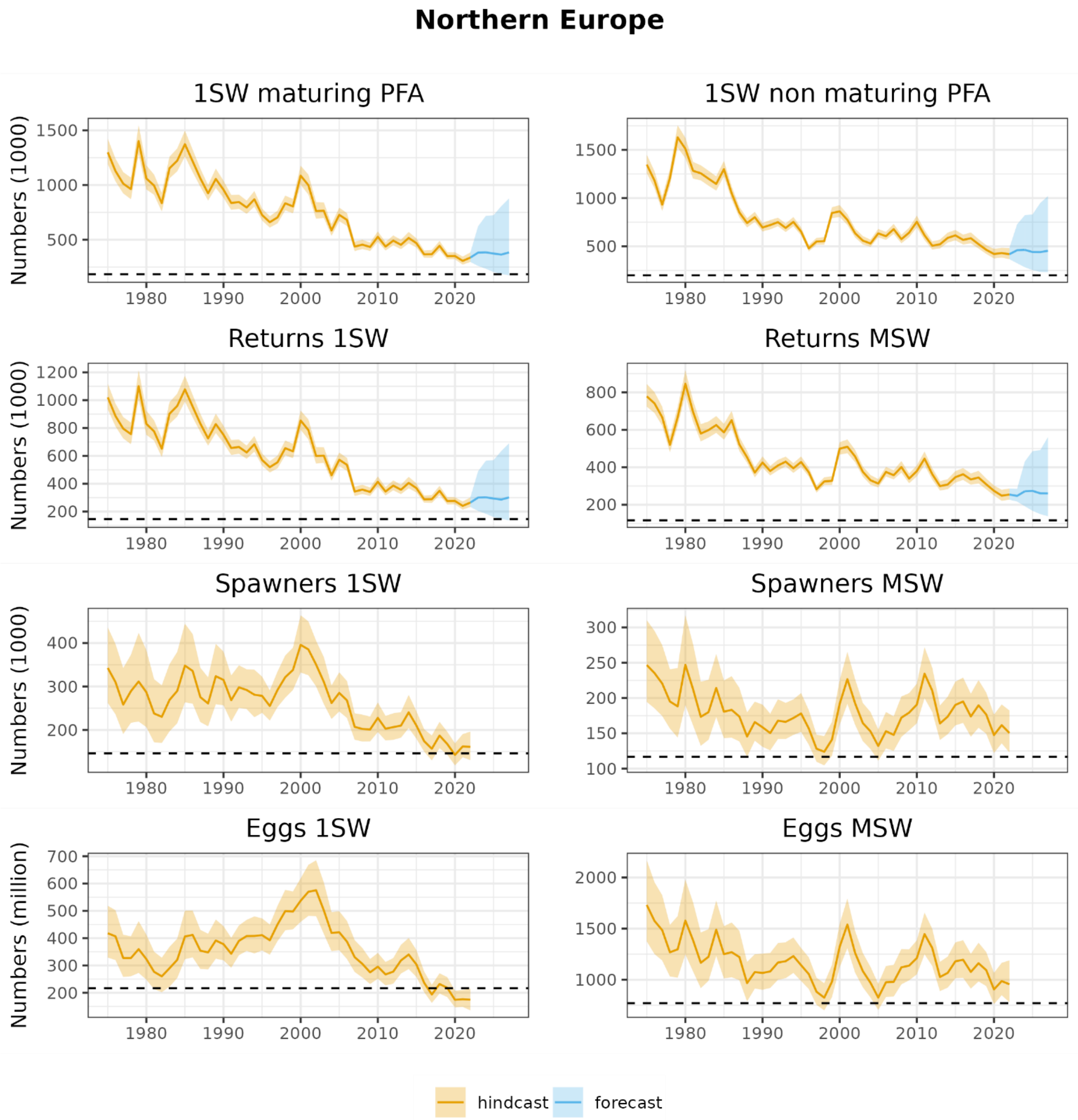


Figure 3.3.4.1 Northern NEAC (aggregate). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting on the historical time-series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with zero catches in all fisheries. The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

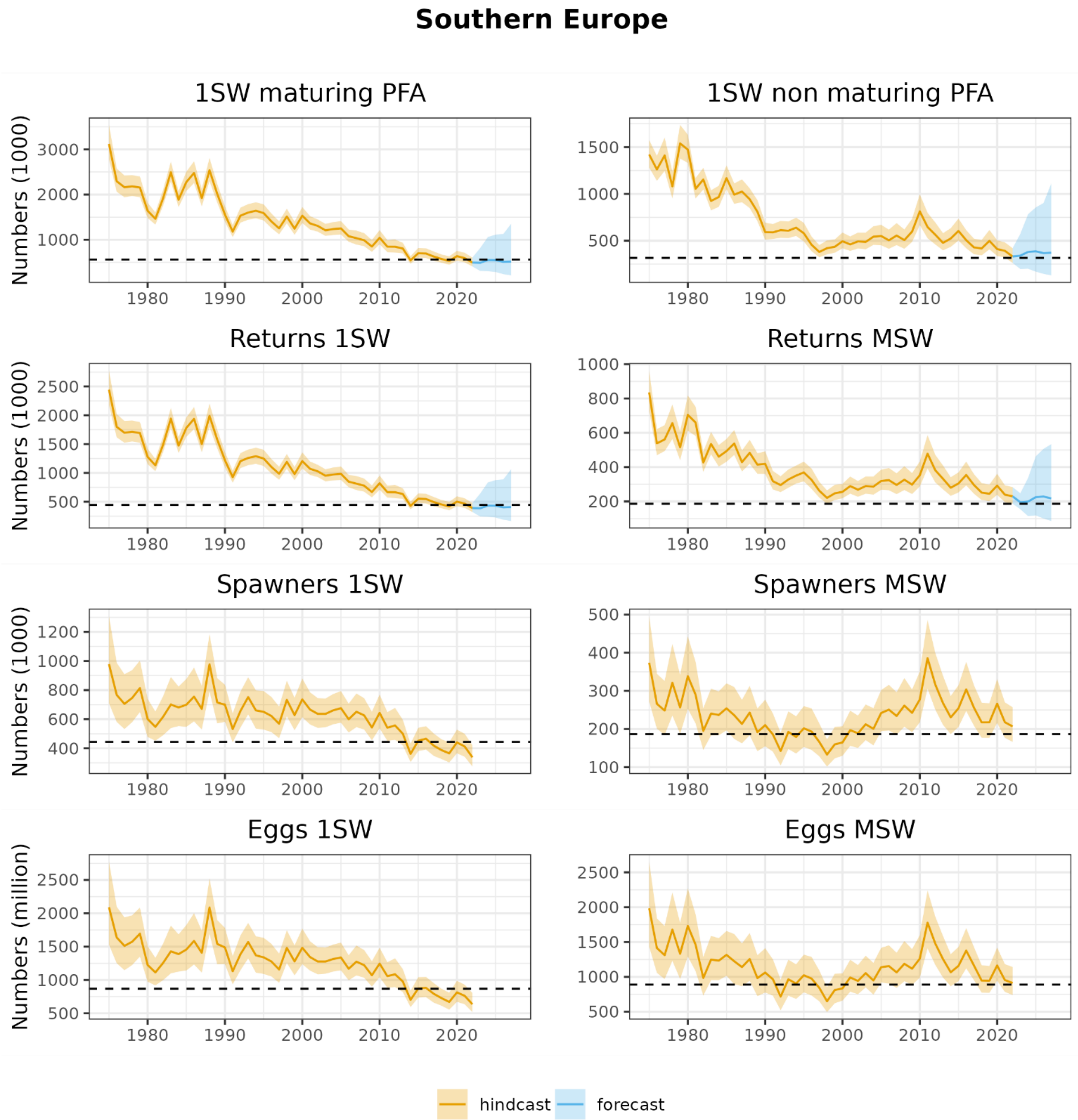


Figure 3.3.4.2 Southern NEAC (aggregate). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting on the historical time-series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with zero catches in all fisheries. The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

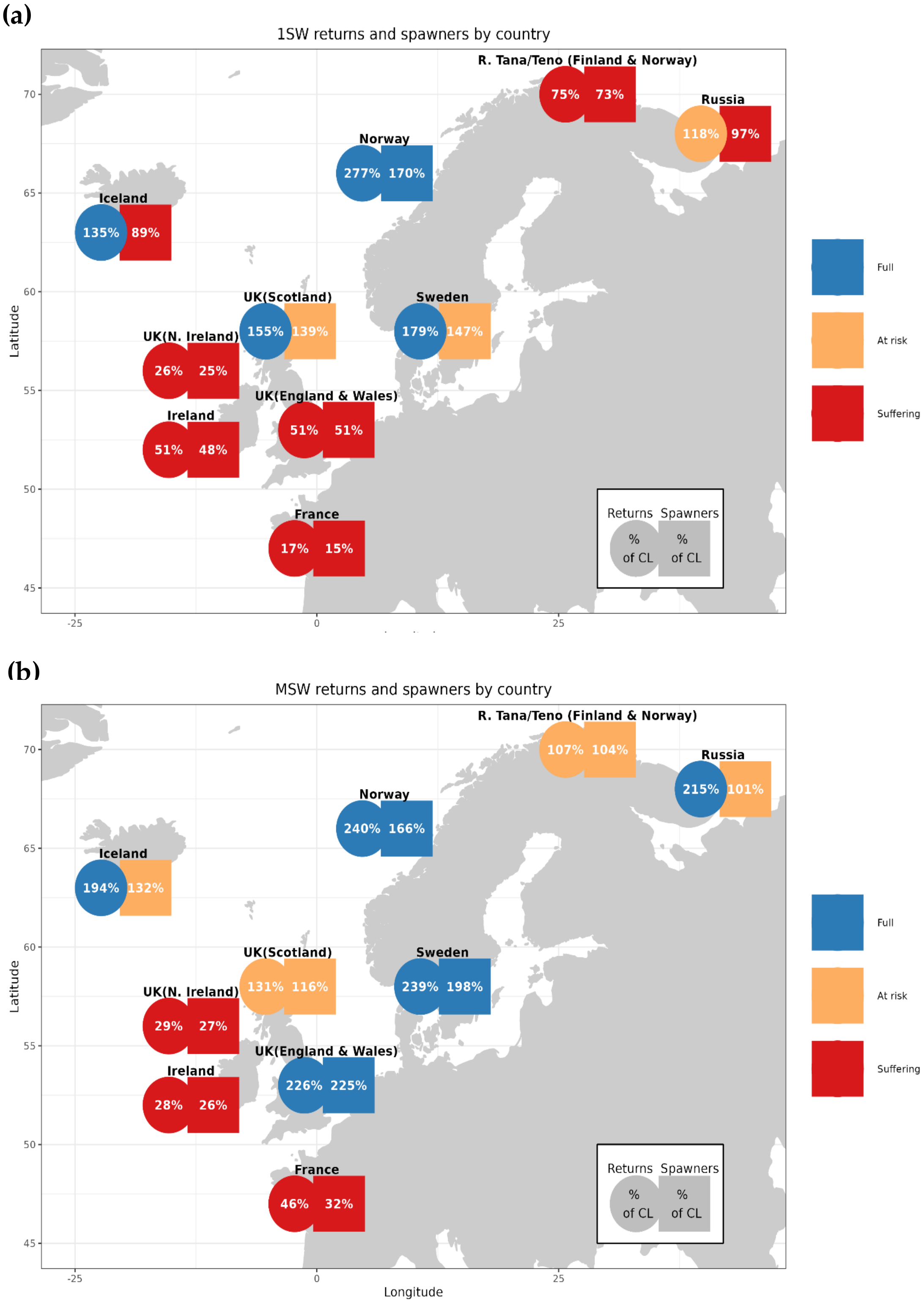


Figure 3.3.4.3 (a) 1SW and (b) MSW returns and spawners in percent of Conservation Limit (% of CL) for 2023. The percent of CL is based on the median of the Monte Carlo distribution as derived from the Run-Reconstruction Model. The colour shading represents the three ICES stock status designations: Full (at full reproductive capacity: the 5th percentile of the spawner estimate is above the CL); At Risk (at risk of suffering reduced reproductive capacity: median spawner estimate is above the CL. but the 5th percentile is below); and Suffering (suffering reduced reproductive capacity: median spawner estimate is below the CL).

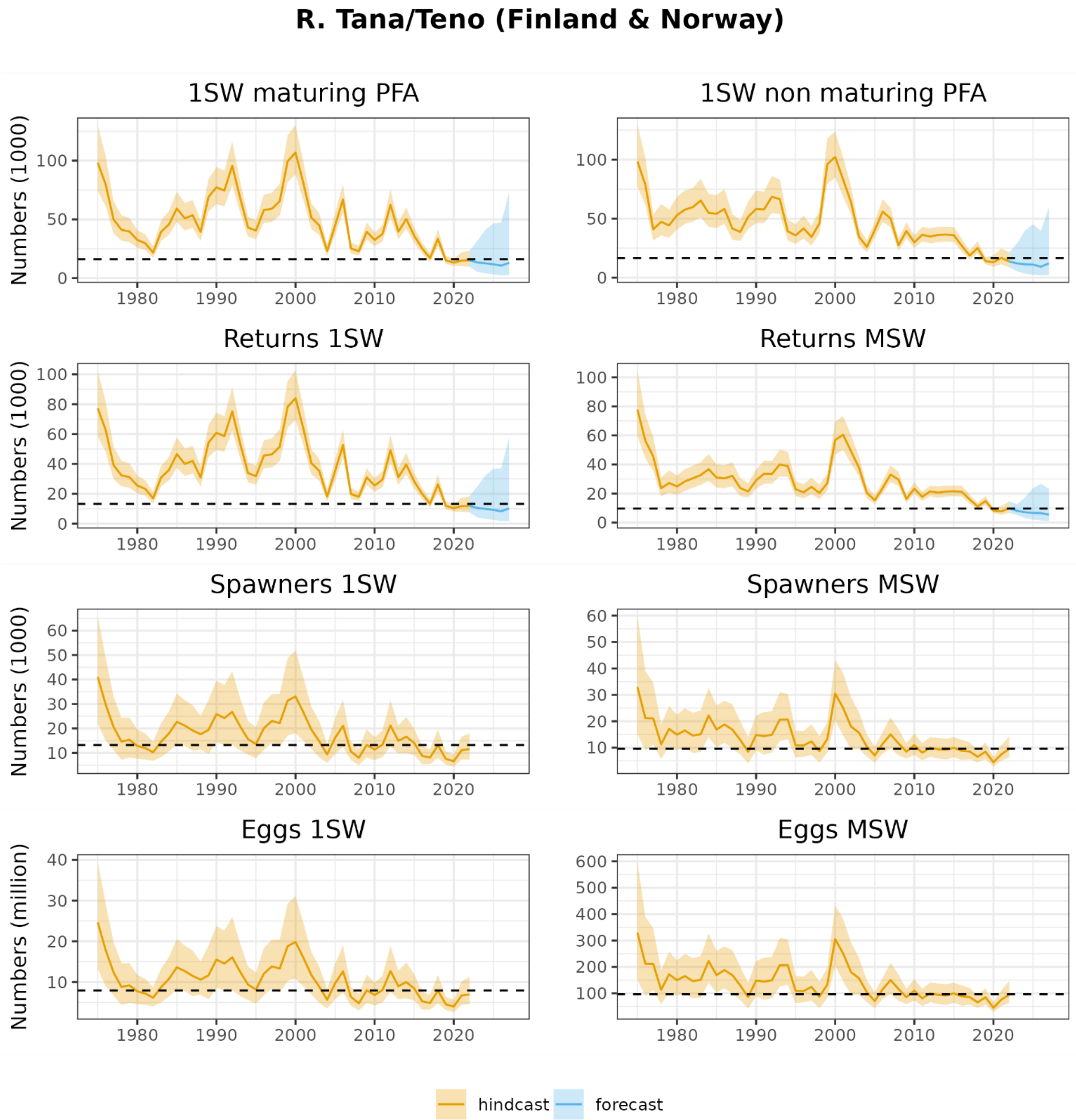


Figure 3.3.4.4a River Tana/Teno (Norway & Finland). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

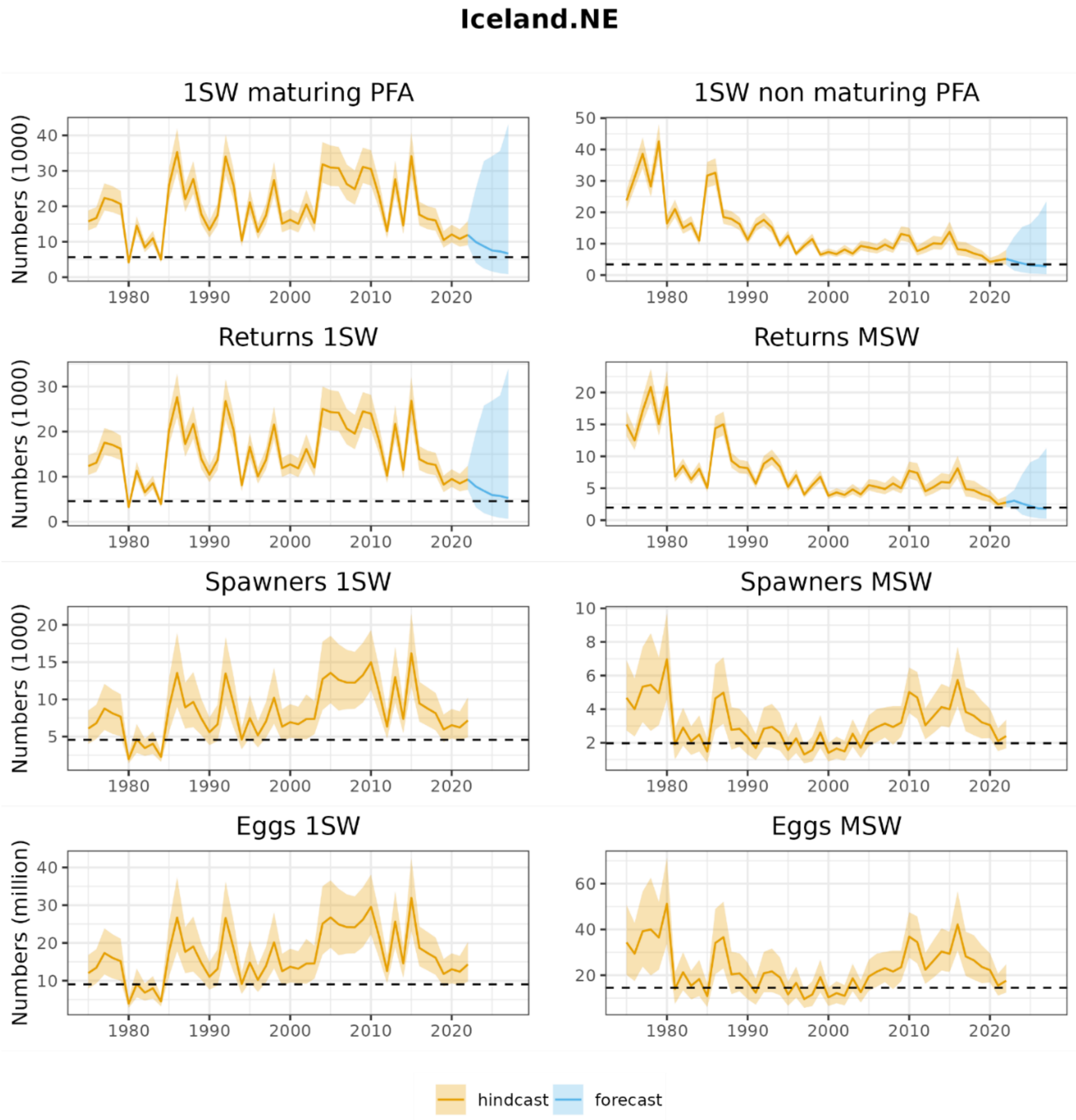


Figure 3.3.4.4b Iceland(Northeast). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

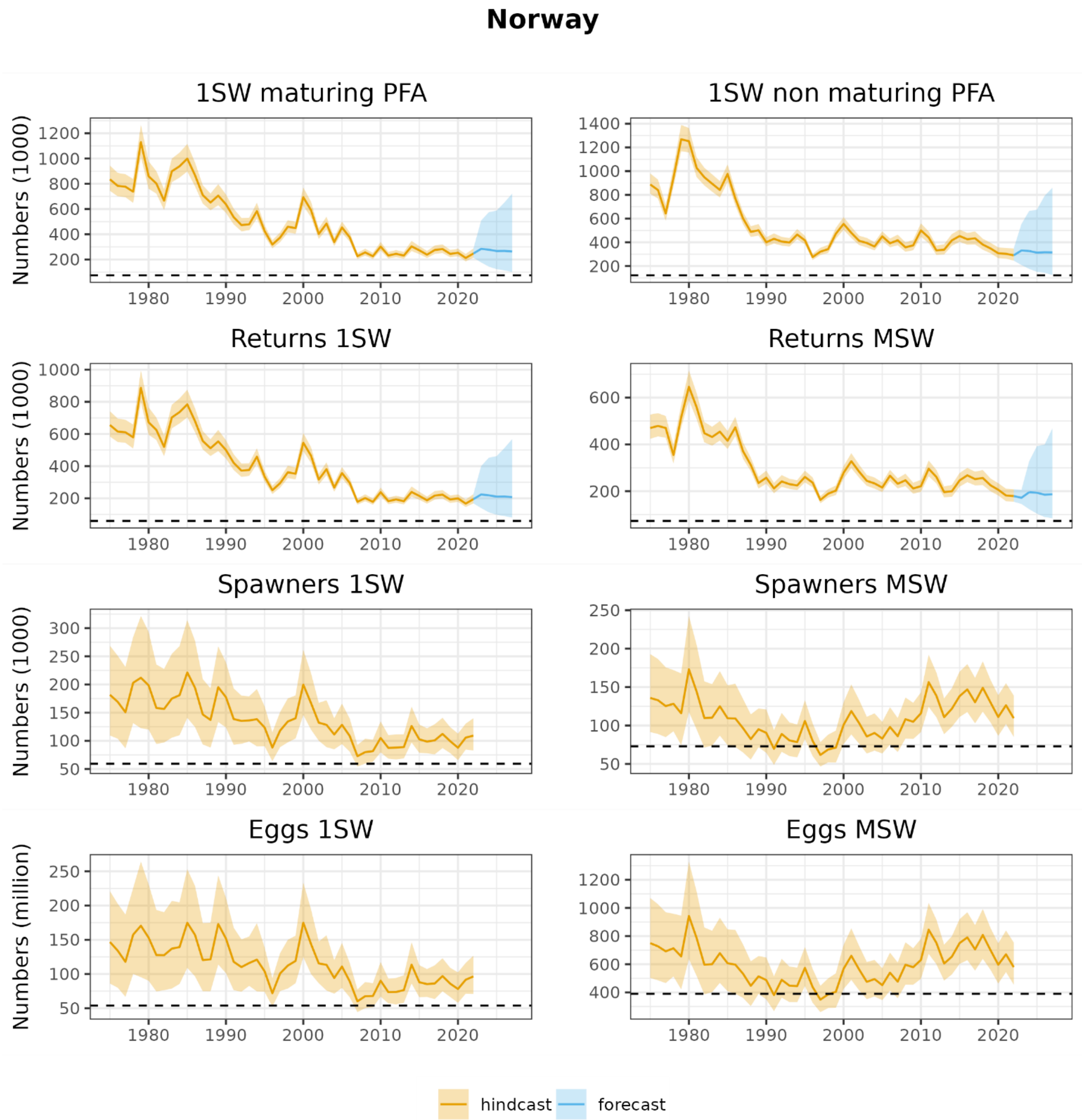


Figure 3.3.4.4c Norway. 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

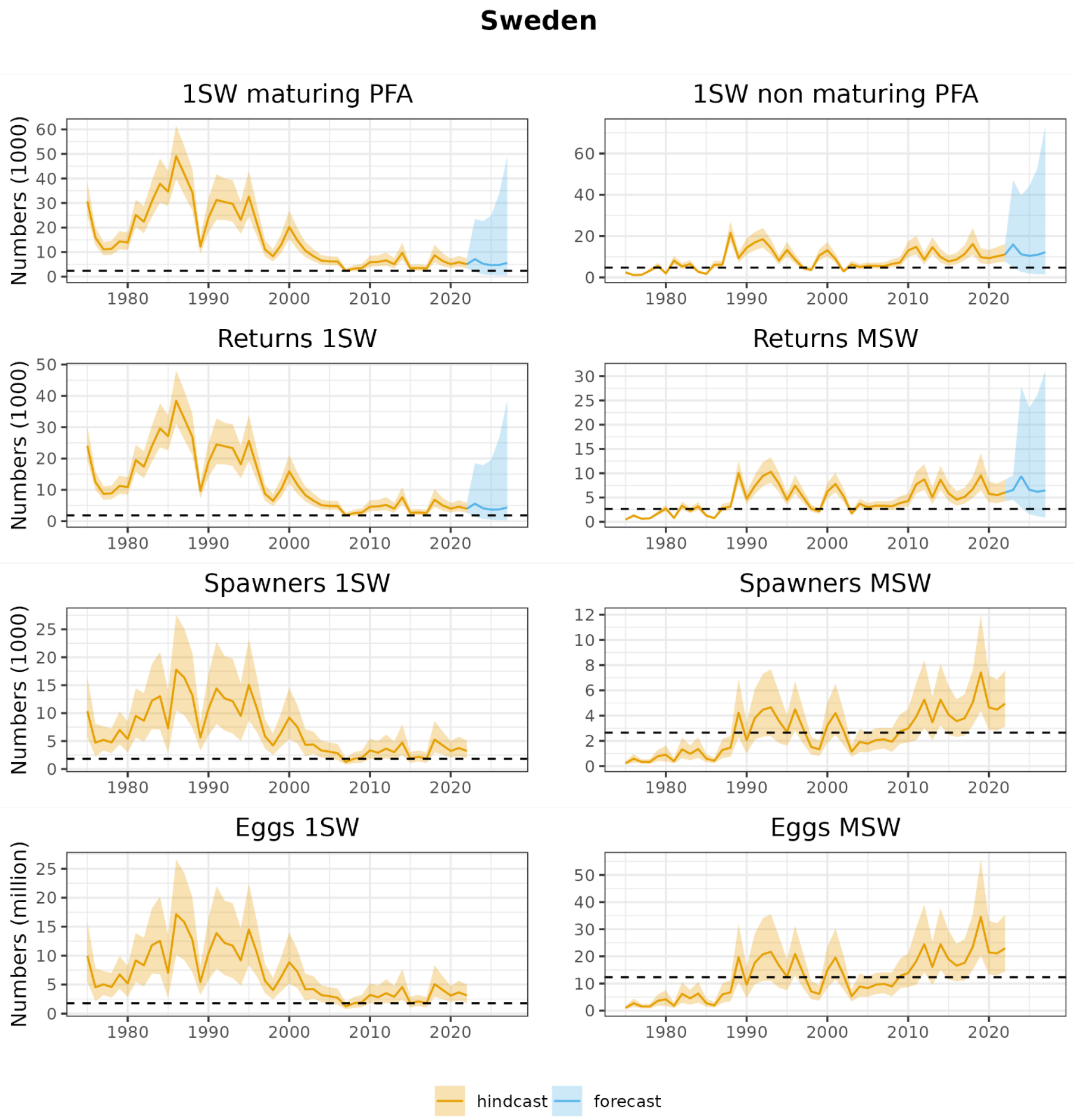


Figure 3.3.4.4d Sweden. 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

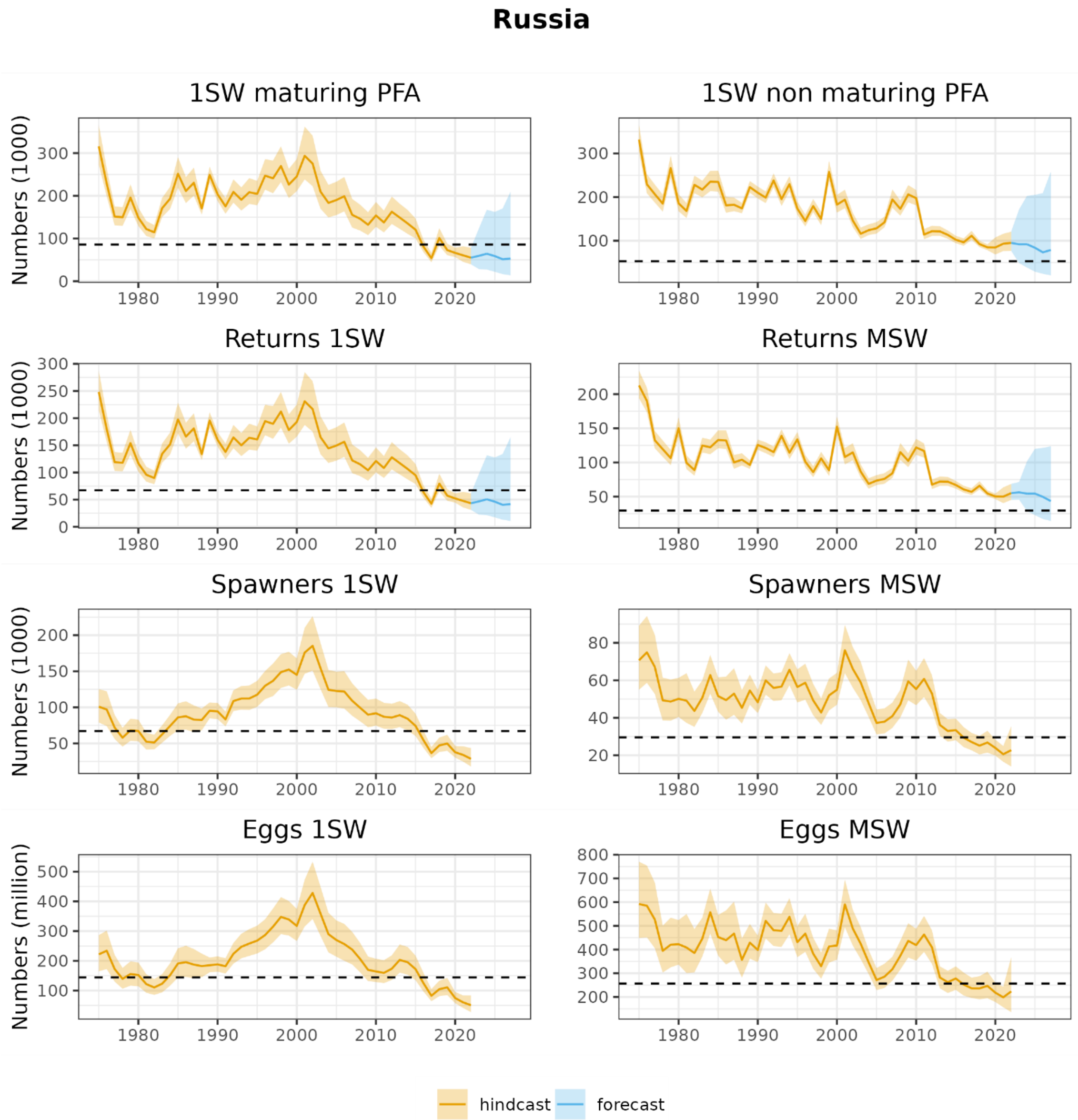


Figure 3.3.4.4e Russia. 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

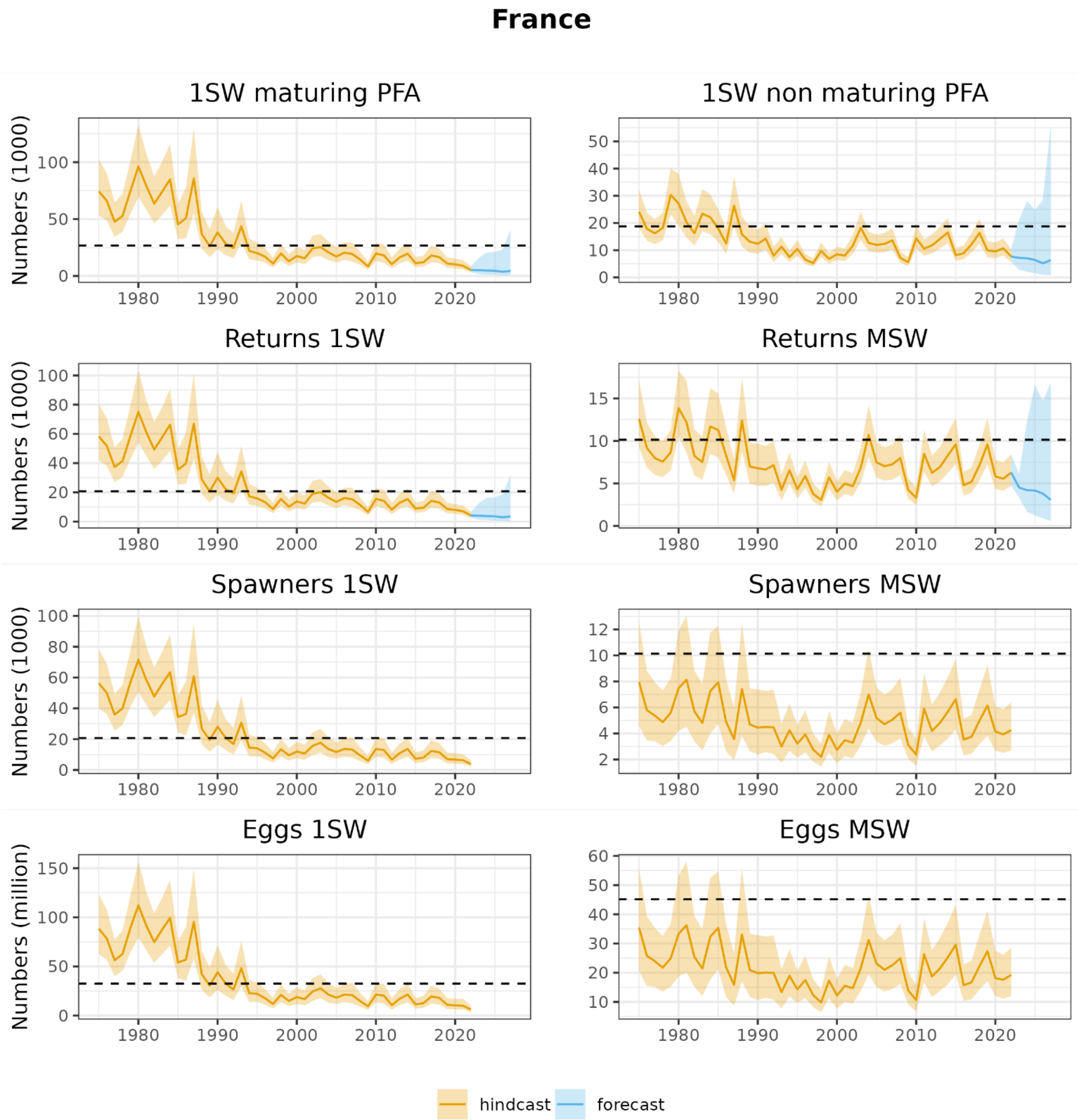


Figure 3.3.4.4f France. 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

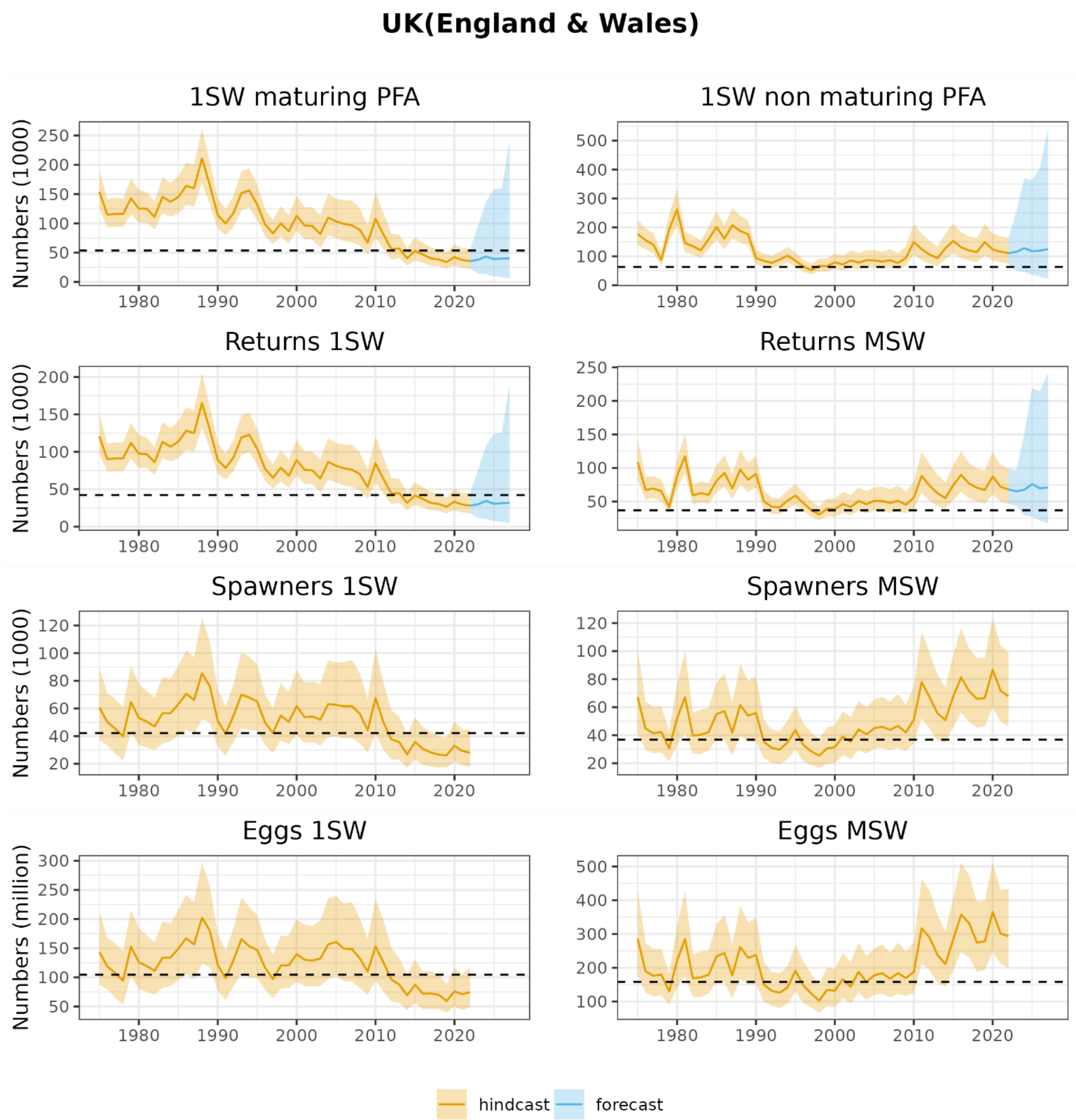


Figure 3.3.4.4g UK (England & Wales). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

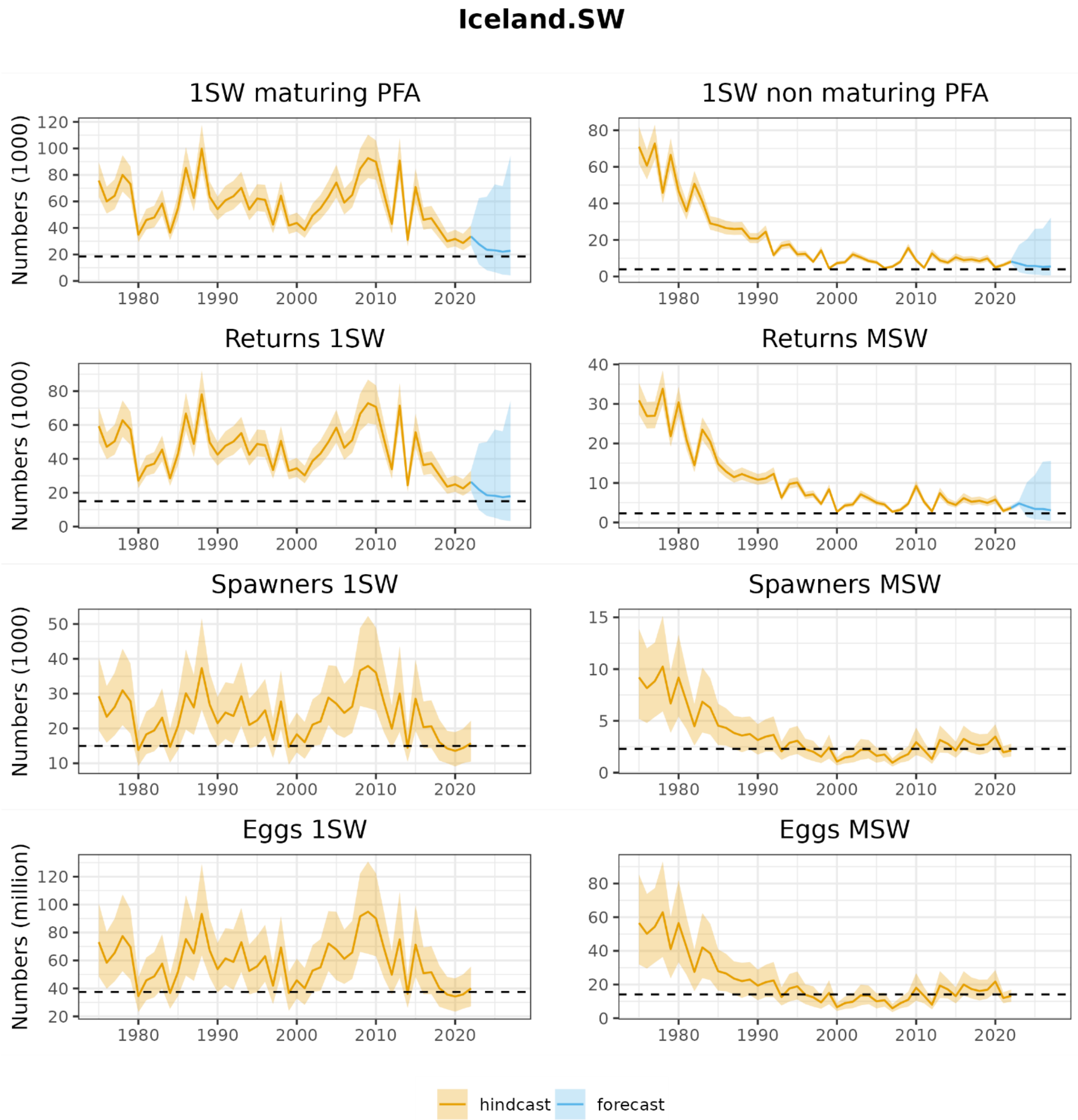


Figure 3.3.4.4h Iceland (southwest). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

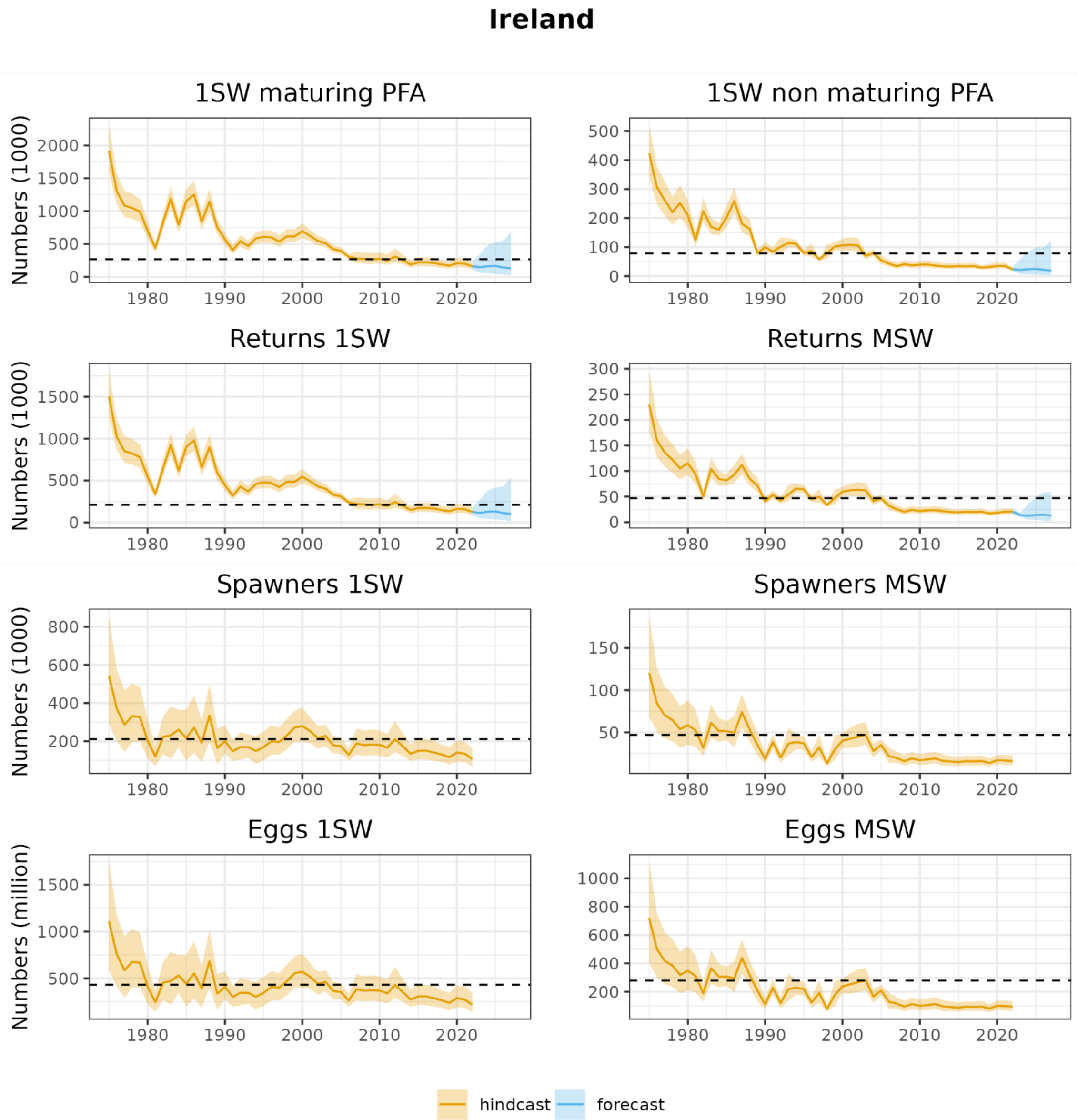


Figure 3.3.4.4i Ireland. 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

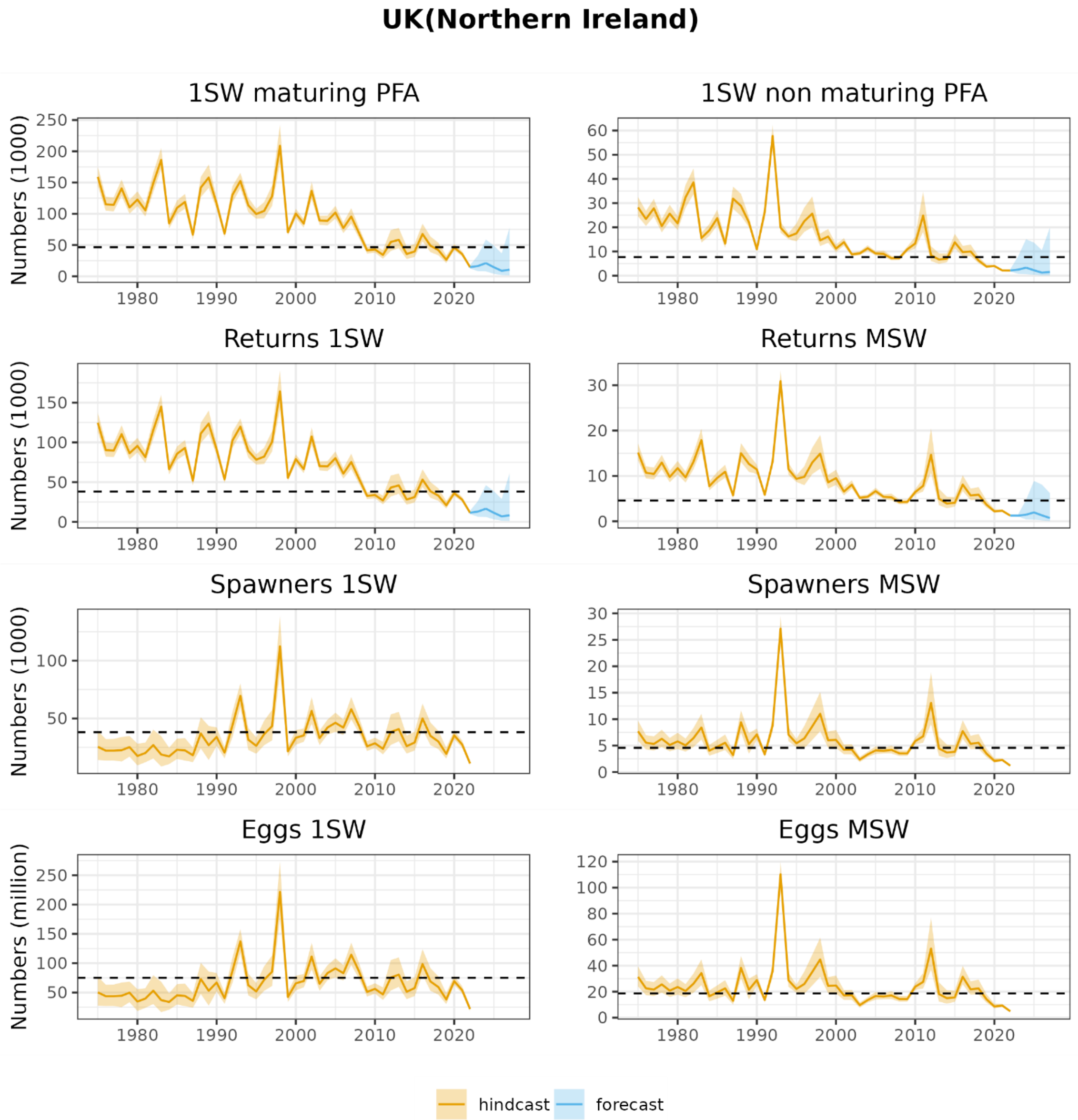


Figure 3.3.4.4j UK (Northern Ireland). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

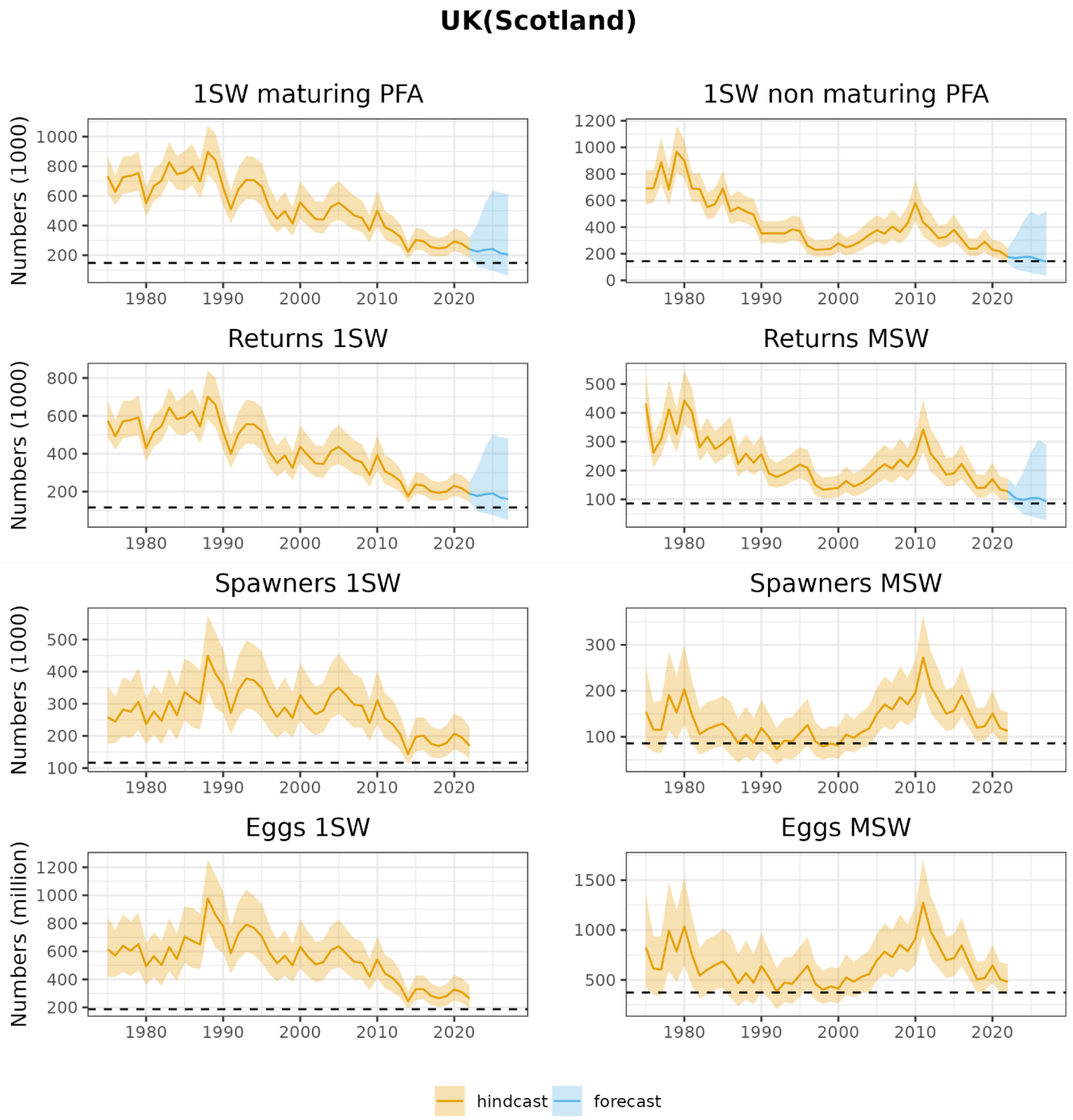


Figure 3.3.4.4k UK (Scotland). 1SW maturing and 1SW non-maturing PFA, returns of 1SW and MSW fish, 1SW and MSW spawners, and egg deposition from 1SW and MSW spawners, derived from the LCM. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Orange shaded area: hindcasting of the historical time-series. Blue shaded area: forecasting obtained under a scenario with zero catches in all fisheries (for PFA and returns). The horizontal dotted black lines are the age-specific SER values (in number of fish; PFA panels), the age-specific Conservation Limits (in number of fish; spawner and return panels) and the age-specific Conservation Limits (in eggs; eggs panels). Year refers to year of return with the exception of PFA non-maturing which is year of return minus one.

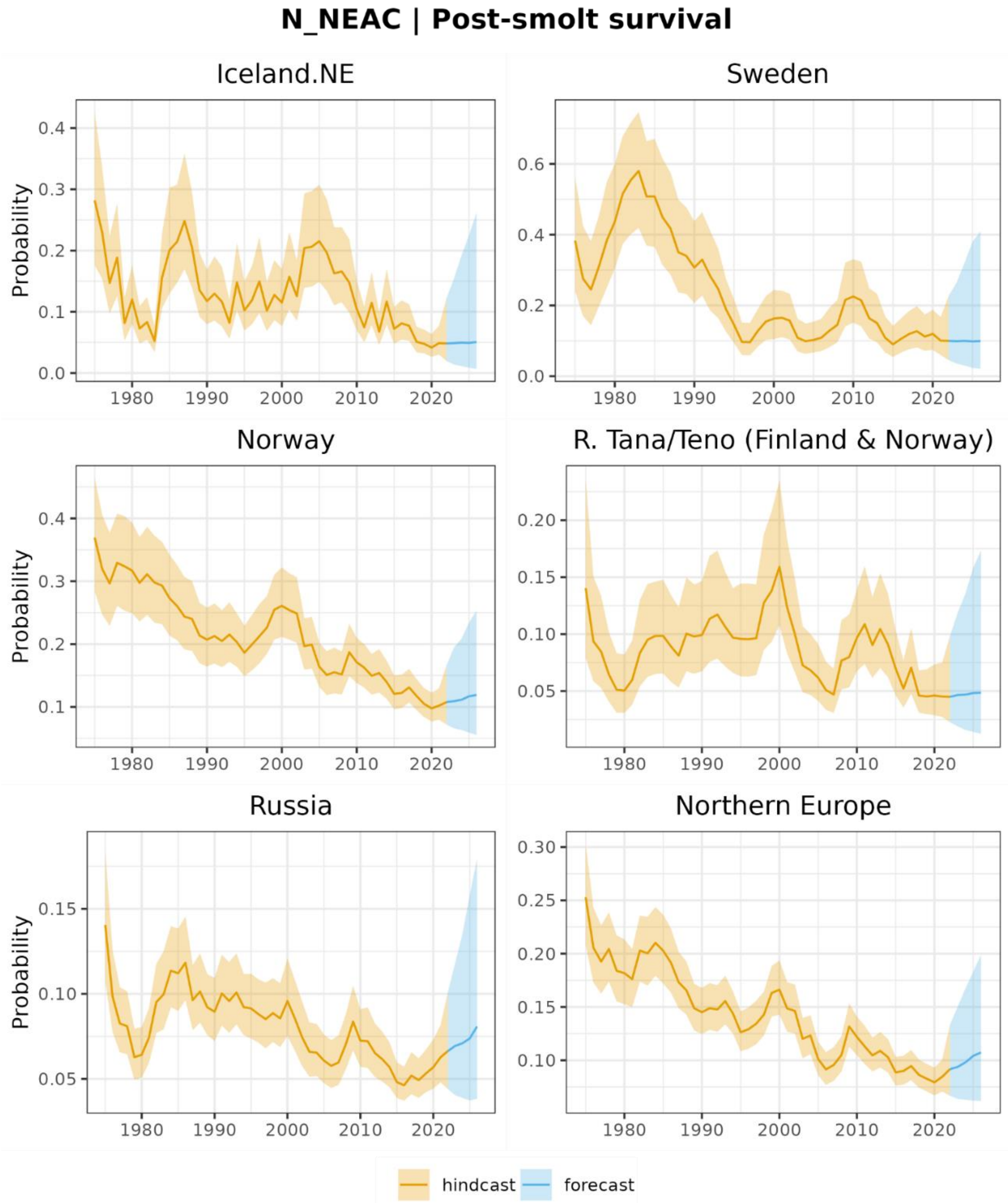


Figure 3.3.5.1. Post-smolt survival for all countries in Northern NEAC and for the Northern NEAC complex, derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval.

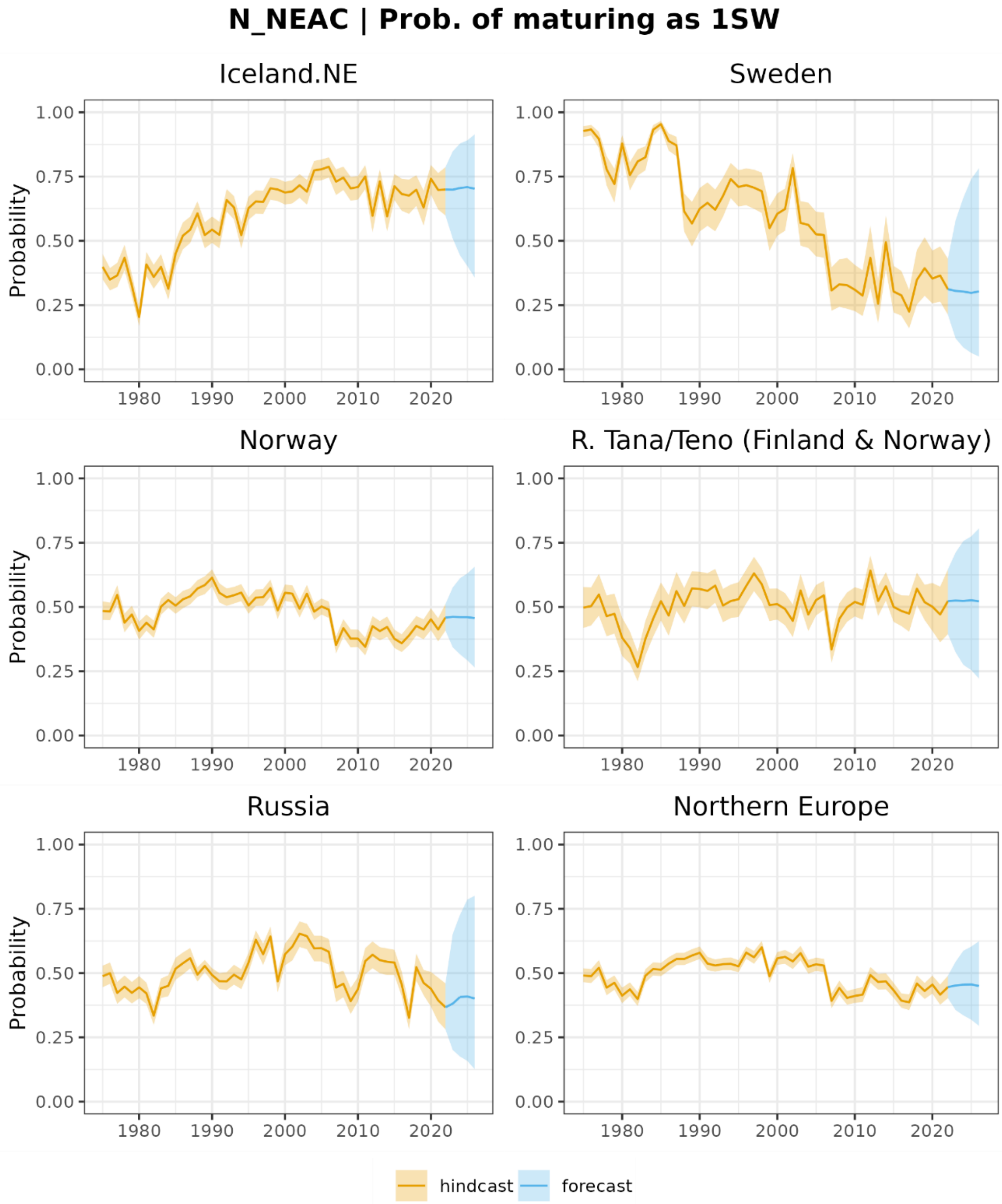


Figure 3.3.5.2. Probability to mature as 1SW for all countries in Northern NEAC and for the Northern NEAC complex, derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval.

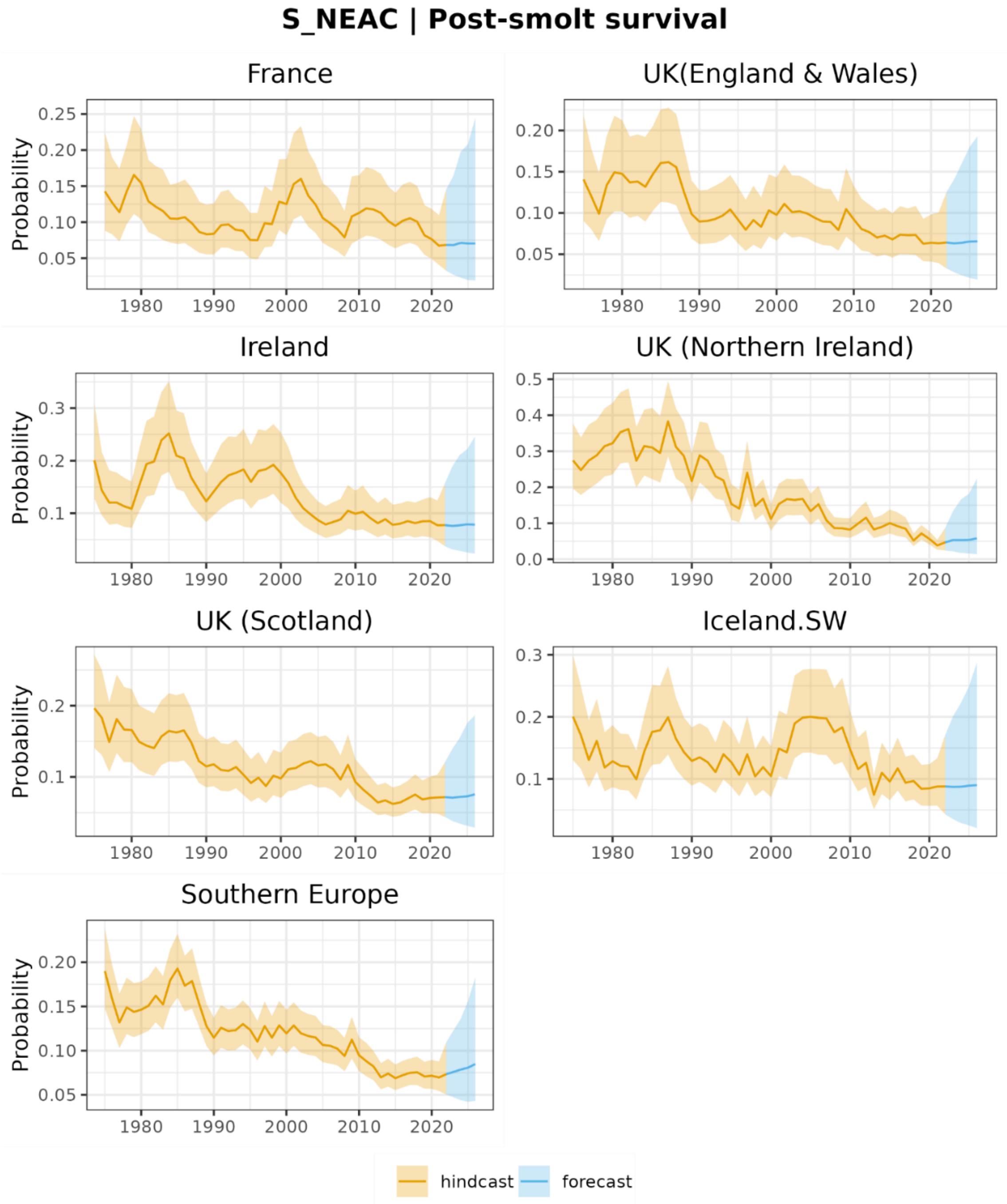


Figure 3.3.5.3. Post-smolt survival for all countries in Southern NEAC and for the Southern NEAC complex, derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval.

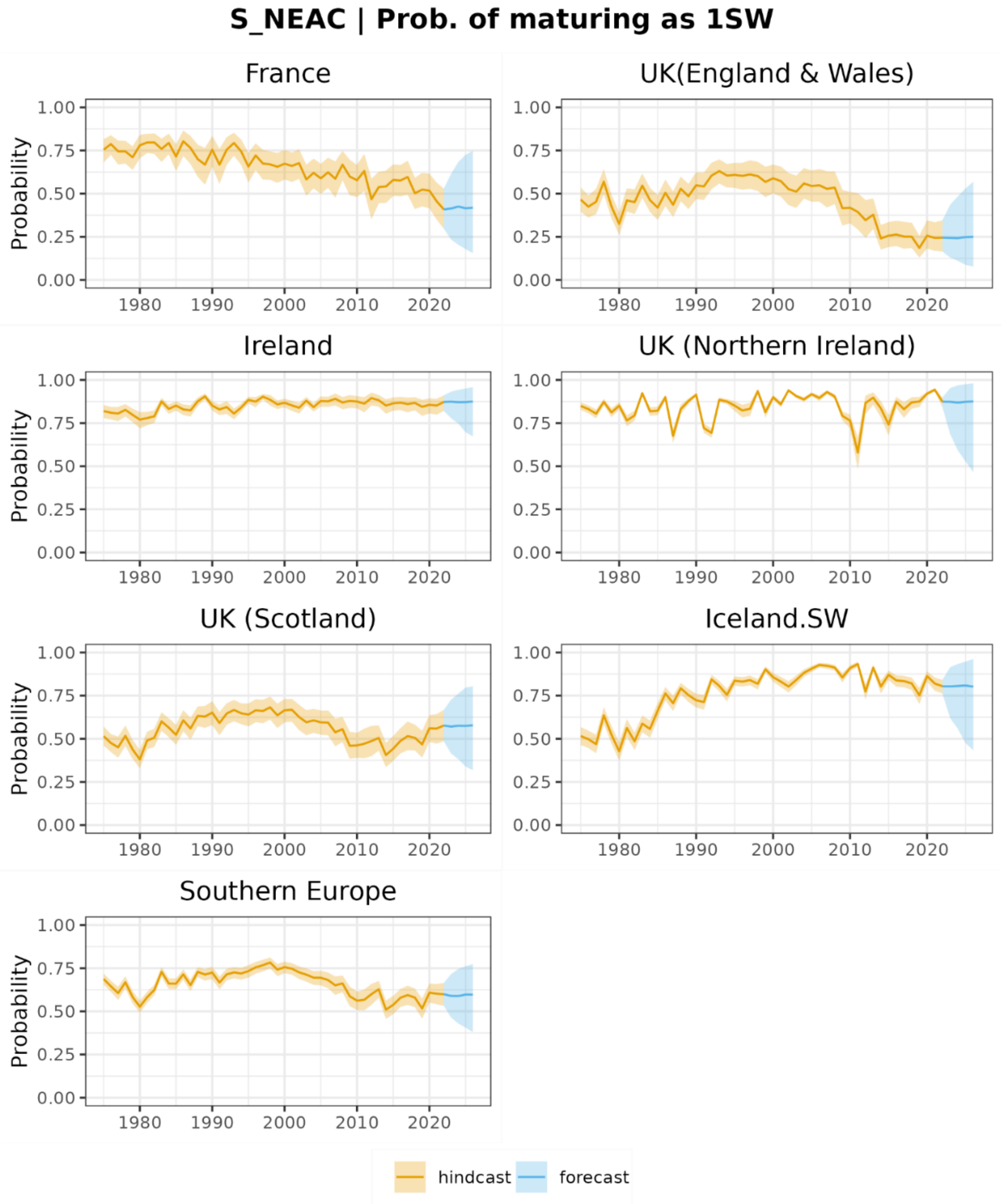


Figure 3.3.5.4. Probability to mature as 1SW for all countries in Southern NEAC and for the Southern NEAC complex, derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval.

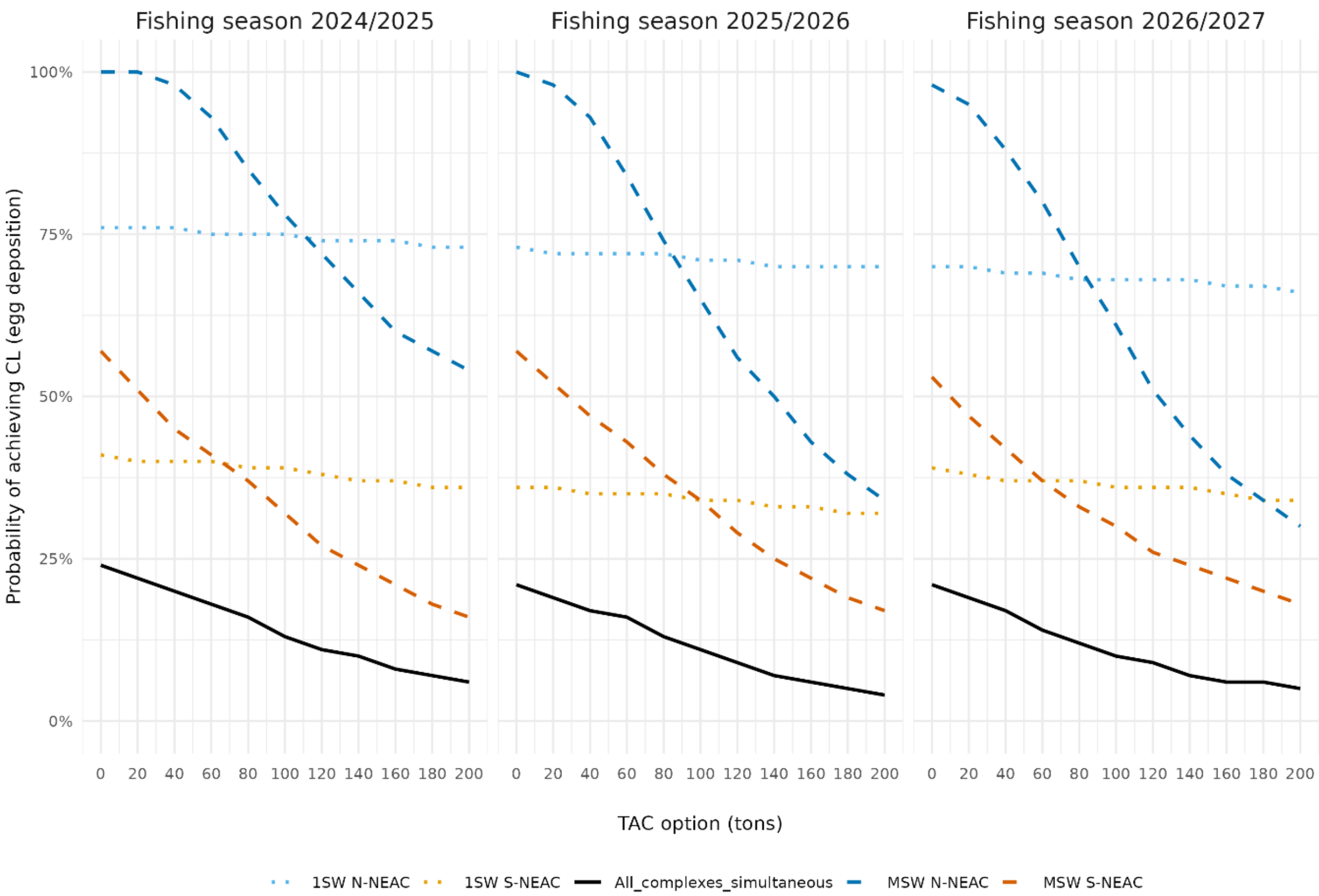


Figure 3.4.1.1 Probability (%) of Northern and Southern NEAC 1SW and MSW stock complexes, individually and simultaneously, achieving their Conservation Limits (CLs) for different catch options for the Faroes fishery. Probability of achieving CL is based on expected egg deposition of the returns to homewaters after the end of each fishing season. For example. egg deposition by 1SW fish year 2026 is affected by the fishery season 2025/2026 (as 1SW maturing fish). Returns and egg deposition by MSW fish year 2026 is affected by the fishery seasons 2024/2025 (as 1SW non-maturing fish) and 2025/2026 (as MSW fish).

4 North American Commission

4.1 NASCO has requested ICES to describe the key events of the 2023 fisheries

4.1.1 Key events of the 2023 fisheries

There were no significant changes in the 2023 fisheries.

4.1.2 Gear and effort

Canada

The 23 areas for which Fisheries and Oceans Canada (DFO) manages the salmon fisheries are called Salmon Fishing Areas (SFAs). Inner Bay of Fundy Atlantic salmon, SFA 22 and part of SFA 23, have been federally listed as endangered under the Canadian Species at Risk Act and information for these stocks are not included in the information and advice provided to NASCO - these stocks, with the exception of one, have a localized migration strategy while at sea and a high incidence of maturity after one winter at sea. In Quebec, the management of Atlantic salmon is delegated to the province (*Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs*) and the fishing areas are designated by Q1 through Q11 (Figure 4.1.2.1). Catches (retained fish) as well as caught and released fish are categorized in two size groups: small and large. Small salmon, generally 1SW, in the recreational, Indigenous and subsistence fisheries refer to salmon less than 63 cm fork length. In historic commercial fisheries, small salmon refer to fish less than 2.7 kg whole weight. Large salmon, generally maiden MSW and repeat spawners, in recreational, Indigenous and subsistence fisheries are greater than or equal to 63 cm fork length. In historic commercial fisheries large salmon refer to fish greater than or equal to 2.7 kg whole weight.

Three groups exploited salmon in Canada in 2023: Indigenous peoples, Labrador residents, and recreational fishers. There are no commercial salmon fisheries in Canada and retaining bycatch of salmon in commercial fisheries targeting other species is not permitted. Salmon discards from these fisheries are not estimated, however, previous analyses by ICES indicated the extent was low (ICES, 2004). The sale of Atlantic salmon caught in any Canadian fishery is prohibited.

Most catches (92% in 2023, Figure 2.1.1.2) in Canada take place in rivers or estuaries. Fisheries are principally managed on a river-by-river basis and in areas where retention of large salmon in recreational fisheries is allowed, the fisheries are closely controlled. In other areas, fisheries are managed on larger management units that encompass a collection of geographically neighbouring stocks. The commercial fisheries have remained closed since 2000 and the Labrador coastal Indigenous and subsistence fisheries are mainly located in bays generally inside headlands. Sampling of the Labrador Indigenous and subsistence fisheries continued in 2023.

The following management measures were in effect in 2023:

Indigenous food, social, and ceremonial (FSC) fisheries

In Quebec, Indigenous fisheries took place subject to agreements, conventions or through permits issued to the communities. There are approximately 10 communities with subsistence fisheries in addition to the fishing activities of the Inuit in Ungava (Q11), who fished in estuaries or within rivers. The permits generally stipulate gear, season, and catch limits. Catches with permits have to be reported collectively by each Indigenous group. However, catches under a convention, such as for Inuit in Ungava, do not have to be reported. In the Maritimes (SFAs 15 to 23), FSC agreements were signed with several Indigenous groups in 2023. The signed agreements often included allocations of small and large salmon and the area of fishing was usually in-river or estuaries. Catches that occurred both within and outside agreements were obtained from the Indigenous groups. In Labrador (SFAs 1 and 2), FSC agreements with the Nunatsiavut Government, Innu Nation, and NunatuKavut Community Council resulted in fisheries in estuaries and coastal areas. The management of these fisheries includes a number of conditions related to gear, seasons, weekly fishery closures, limits on total catch using carcass tags and logbook catch reporting. By agreement with First Nations, there were no FSC fisheries for salmon in Newfoundland (SFAs 3-14B) in 2023. When fisher reports are not available, catches are estimated based on the most reliable information available (i.e. observer reports or historical data). Catches by Indigenous recreational fishers were reported under recreational fisheries.

Labrador resident subsistence fisheries

DFO is responsible for regulating the Labrador resident subsistence fishery. A licensed gillnet subsistence trout and charr fishery for Labrador residents takes place in estuaries and coastal areas of Labrador. A total of 232 licences were issued in 2023. Conditions restrict a seasonal catch of three salmon of any size while fishing for trout and charr; three salmon tags accompanied each licence. Resident fishers were required to remove their nets from the water once their catch of salmon was taken. Catches exceeding three salmon must be discarded. All licensed resident fishers were requested to complete and return logbooks to DFO.

Recreational fisheries

Licences are required to fish recreationally for Atlantic salmon in Canada. Gear is restricted to fly fishing and there are daily and seasonal bag limits. Recreational fisheries management in 2023 varied by area and large portions of the southern areas remained closed to all directed salmon fisheries (Figure 4.1.2.2). Retention of large salmon was only permitted in Quebec.

Within the province of Quebec, there are 114 salmon rivers. Fishing for salmon was prohibited on 34 rivers. Large salmon could be retained throughout the season on eight rivers and for part of the season on an additional four rivers in 2023. Small salmon could be retained during the entire season on 44 rivers, and only during a part of the season on 12 rivers. Catch and release only fishing was permitted on 12 rivers in 2023. Since 2018, a seasonal permit allows a total retention of four salmon for the season, of which only one could be a large salmon. The only exception is for the four rivers located in the Ungava Bay region, where anglers could retain four salmon of any size under the seasonal permit. A three-day permit allows for the retention of one salmon of any size. Under these permits, retention of large salmon is allowed only from rivers which are open to retention of large salmon. A catch and release permit allows fishing for catch and release only.

Mandatory catch and release measures including a daily limit of two salmon were in effect in the Maritime provinces of Canada in 2023. Newfoundland and Labrador had retention fisheries for small salmon in 2023 with a seasonal limit of one or two salmon depending on river classification and a daily catch and release limit of three salmon.

USA

There were no recreational or commercial fisheries for anadromous Atlantic salmon in the USA in 2023.

France (Islands of Saint Pierre and Miquelon)

Six professional and 80 recreational gillnet licences were issued in 2023 (Table 4.1.2.1). Professional licences had a maximum authorization of three nets of 360 metres maximum length each whereas recreational licences were restricted to one net of 180 metres. The selling of Atlantic salmon was only allowed by professional licence holders and was restricted to within Saint Pierre and Miquelon.

4.1.3 Catches

Canada

The provisional nominal catch of salmon in 2023 by all users is 88.0 t, approximately 8% lower than the previous five-year mean of 96.0 t (2018-2022) and 31% lower than the previous 20-year mean of 127.6 t (2003-2022) (Tables 2.1.1.1, 2.1.1.2; Figure 4.1.3.1). The nominal catch prior to the closure of all commercial fisheries in 2000 averaged 1557 t from 1960−1999 (range: 152 t to 2863 t).

Indigenous FSC fisheries

The provisional nominal catch by Indigenous groups in 2023 was 63.9 t, similar to the previous five-year and 20-year means of 56.5 t and 58.1 t, respectively (Table 4.1.3.1).

DFO estimates the nominal catch from Indigenous fisheries in Labrador by raising the reported carcass tag use from logbooks to the total number of carcass tags allocated (59% of the carcass tags had a known reporting fate in 2023). For Quebec, Gulf and Maritimes regions, catches from Indigenous fisheries were to be reported by each community or group. Reports in most years were incomplete or missing, therefore the most recent or best data available were used.

Labrador resident subsistence fisheries

The provisional nominal catch by Labrador resident fishers was 1.2 t in 2023 (92% of the carcass tags had a known reporting fate in 2023), approximately 25% lower than the previous five-year mean of 1.6 t and 47% less than the previous 20-year mean of 2.2 t (Table 4.1.3.2).

Recreational fisheries

The recreational fisheries nominal catch in 2023 was 22.9 t (12 145 fish and 93% small salmon by number). This catch, by number, decreased 39% from the previous five-year mean, and is the lowest in the time-series since 1974 (Table 4.1.3.3; Figure 4.1.3.2).

The estimated number of salmon caught and released in the recreational fisheries of Canada was 42 595 salmon (21 845 small and 20 750 large) in 2023, representing 78% of the total catch released and retained (Table 4.1.3.4, Figure 4.1.3.3).

Recreational catch statistics for Atlantic salmon are not collected regularly in all areas of Canada and there is no enforceable mechanism in place that requires anglers to report their catch, except in Quebec where reporting of retained salmon is an enforced legal requirement.

Commercial fisheries

All commercial fisheries for Atlantic salmon have remained closed since 2000 and the catch in 2023 therefore was zero.

Unreported catches

The unreported catch for Canada was 16.4 t in 2023 and represents an estimated catch from illegal fisheries directed at salmon (Tables 2.1.3.1, 2.1.3.2). Unreported catch for Canada was not received from all regions in 2023 and therefore was considered incomplete.

USA

There are no commercial or recreational fisheries for anadromous Atlantic salmon in the USA and the catch therefore was zero. Unreported catches in the USA were estimated to be 0 t.

France (Islands of Saint Pierre and Miquelon)

The nominal catch in Saint Pierre and Miquelon was 1.4 t (558 fish) in 2023, similar to the previous five-year mean (2018-2022) but 50% less than the previous 20-year mean (2003-2022) of 2.8 t (Tables 2.1.1.1, 4.1.2.1). There are no unreported catch estimates for the time-series.

4.1.4 Catch of North American salmon, expressed as 2SW salmon equivalents

Catch histories (1972 to 2023) of salmon, expressed as 2SW salmon equivalents in the 2SW return year are provided in Table 4.1.4.1. The Newfoundland and Labrador commercial fishery was historically a mixed-stock fishery and caught both maturing and non-maturing 1SW salmon as well as 2SW maturing salmon. The catch of repeat spawners and older sea ages was not considered in this reconstruction.

Catches of 1SW non-maturing salmon in Newfoundland and Labrador commercial fisheries have been adjusted by natural mortalities of 3% per month for 13 months, and 2SW catches in these same fisheries have been adjusted by one month to express all catches as 2SW equivalents in the year and time they would reach rivers of origin. The Labrador commercial fishery has been closed since 1998. Catches from Indigenous (since 1998) and resident (since 2000) fisheries in Labrador are included. Mortalities in mixed-stock fisheries and losses in terminal locations (including catches, losses from catch and release mortality and other removals including broodstock) in Canada were summed with those of the USA to estimate total 2SW equivalent losses in North America. The terminal fisheries included coastal, estuarine and river catches of all areas, except Newfoundland and Labrador where only river catches were included, and excluding SPM. Data inputs were updated to 2023.

Total 2SW catch equivalents of North American origin salmon in all North Atlantic fisheries peaked at 562 600 fish in 1976 and were above 200 000 fish in most years until 1993 (Table 4.1.4.1; Figure 4.1.4.1). The 2SW catch equivalents within North America peaked at about 368 000 in 1976 and have remained below 12 000 2SW salmon equivalents for most years between 2000 and 2023 (Table 4.1.4.1; Figure 4.1.4.1). The percentage of the 2SW catch equivalents taken in North America has varied from 47% to 64% of the total removals in all fisheries during 2008 to 2023 (Figure 4.1.4.1).

In 2023, the losses of 2SW salmon in terminal areas of North America were estimated at 10 100 fish (median), 34% of the total North American catch of 2SW salmon. The percentage of catches occurring in terminal fisheries ranged from 19% to 45% during 1973 to 1992 and 34% to 88% during 1993 to 2023 (Table 4.1.4.1). Terminal fisheries percentages increased significantly since 1992 with the reduction and closures of the Newfoundland and Labrador commercial mixed-stock fisheries. The percentage of 2SW salmon caught in North American fisheries in 2023 is 34% (Table 4.1.4.1). The percentage of the 2SW catches by fishery and fishing area are summarized in Figure 4.1.4.1. The percent of the 2SW catch equivalents taken at Greenland was as high as 56% in 1992 and 2002 but as low as 5% in 1994 when the internal use fishery at Greenland was suspended (Figure 4.1.4.1). For 2019-2022, the Greenland share of the 2SW catch equivalents has been 36% to 49%. For the same years, the catches in the Labrador FSC and subsistence fisheries have been 26% to 34% of the total catches and 16% to 26% in terminal fisheries of Quebec (Figure 4.1.4.1).

4.1.5 Origin and composition of catches

In the past, salmon from both Canada and the USA were taken in the commercial fisheries of eastern Canada. Sampling programs of current marine fisheries (Labrador; Saint Pierre and Miquelon) are used to determine region of origin of caught salmon.

Labrador FSC and subsistence fisheries sampling programme

Salmon caught in the Labrador FSC and subsistence fisheries (SFAs 1 and 2, Figure 4.1.2.1) were sampled opportunistically for length, weight, sex, scales (for age analysis) and tissue (genetic analysis). Fish were also examined for the presence of external tags or marks.

In 2023, a total of 739 samples were collected from the Labrador FSC and subsistence fisheries: 137 from northern Labrador (SFA 1A), 111 from Lake Melville (SFA 1B), and 491 from southern Labrador (SFA 2). The samples represent 7.9% of the catch by number (8.7% of small salmon, 5.4% of large salmon) (18 samples did not have size information).

Size group	Statistics	2023
Small salmon (< 63 cm)	Samples (#)	477
	Catch (#)	7677
	Percent of catch	6.2%
Large salmon (≥ 63 cm)	Samples (#)	244
	Catch (#)	7726
	Percent of catch	3.2%
Total	Samples (#)	721
	Catch (#)	15 403
	Percent of catch	4.7%

Not all scales can be interpreted for age. In 2023, the percent sea age composition was 70% 1SW, 24% 2SW, <1% 3SW (one sample) and 5% previously spawned salmon. All salmon samples interpreted for river age were two to seven years (modal age four). There was no river age one, and few river age two salmon sampled suggesting that very few salmon from southern stocks of North America (USA, Scotia-Fundy) are exploited in these fisheries.

Labrador: Sample summary 2023								
Area	Number of scale samples	River Age (%)						
		1	2	3	4	5	6	7
Northern Labrador (SFA	133	0.0	0.0	3.8	36.1	48.1	10.5	1.5
Lake Melville (SFA 1B)	98	0.0	0.0	8.2	39.8	48.0	4.1	0.0
Southern Labrador (SFA	476	0.0	0.2	9.7	48.5	35.1	6.5	0.0
Total	707	0.0	0.1	8.3	45.0	39.3	6.9	0.3

The majority of tissue samples collected from the 2023 fisheries were analysed for genetic origin (99.2%) (Figure 4.1.5.3). A total of 733 tissue samples were analysed using the SNP panel with 31 range-wide reporting groups (Table 4.1.5.1; Figures 4.1.5.1, 4.1.5.2). The estimated percent contributions (and associated 95% credible interval) to each reporting group are shown in Table 4.1.5.2 and summarized in Figure 4.1.5.3. As in previous years, the estimated origin of the samples was dominated (>95%) by the Labrador reporting groups. The dominance of the Labrador reporting groups is consistent with previous analyses conducted since 2006 which estimated >95% of the catch was attributable to Labrador stocks (ICES, 2019a, 2021, 2023a). Furthermore, assignment of catch within the Labrador genetic reporting groups suggest largely local catch within salmon fishing areas.

Saint Pierre and Miquelon fisheries sampling programme

The number of samples collected in the Saint Pierre and Miquelon fishery was 39 in 2023 (7% of the catch). Based on the interpretation of the scale samples, 100% of the small salmon samples were 1SW and the majority of large salmon samples were 2SW (93%). River ages ranged from two to five years (modal age three).

Saint Pierre and Miquelon: Sample summary 2023									
Size group	Number of Samples (#)	Percent of Samples (%)	Virgin Sea Age (%)		River Age (%)				
			1SW	2SW	1	2	3	4	5
2023									
Small salmon (< 63 cm)	23	59.0	100.0	0.0	0.0	13.6	45.5	36.4	4.5
Large salmon (≥ 63 cm)	16	41.0	8.2	92.9	0.0	35.7	57.1	7.1	0.0
Total	39	100.0	63.9	36.1	0.0	22.2	50.0	25.0	2.8

All of the tissue samples collected in the 2023 Saint Pierre and Miquelon fishery were analysed for genetic origin using the SNP panel with 31 range-wide reporting groups (Table 4.1.5.1; Figures 4.1.5.1, 4.1.5.2). The estimated percent contributions (and associated 95% credible interval) to each reporting group are shown in Table 4.1.5.3 and summarized in Figure 4.1.5.5. The estimated origin of the samples was dominated (94.7%) by the reporting groups in Quebec (30.8%), Gulf (32.6%) and Newfoundland (31.3%). Large salmon were mainly from the Gulf of St Lawrence group (82%) and small salmon were from groups in Newfoundland (52%) and Quebec (38%).

4.1.6 Exploitation rates

Canada

The mean exploitation rate of small salmon in the 2023 Newfoundland recreational fishery, based on data from 10 rivers, was 7% (range: 0% to 14.7%), a decrease from the previous five-year mean of 13%. There was no estimate for Labrador. In Quebec, the total exploitation rate in 2023 was 14.0% for all fisheries, similar to the previous five-year mean (13.9%). The total recreational angling exploitation rate in Quebec was 6% (3% for large and 12% for small) and 8% (mostly large) for the Indigenous fishery. Retention of salmon was not permitted in the 2023 recreational fisheries of Nova Scotia, New Brunswick and Prince Edward Island. Overall for Canada, the 2023 exploitation rate of salmon in recreational fisheries was 5.6% (lowest since 1984 and mainly attributed to an increasing trend in the number of released fish) and 8.3% for Indigenous and subsistence fisheries.

USA

There was no exploitation of anadromous salmon in homewaters.

Exploitation trends for North American salmon fisheries

Annual exploitation rates of small salmon (mostly 1SW) and large salmon (mostly MSW) in North America for the 1971 to 2023 time period were calculated by dividing annual estimated losses (catches, estimated mortality from catch and release (ICES, 2010) and broodstock removals) in all areas of North America by annual estimates of the returns to North America prior to any homewater fisheries. These fisheries included coastal, estuarine and river fisheries in all areas, as well as the commercial fisheries of Newfoundland and Labrador, which caught salmon from all regions in North America.

Exploitation rates of both small and large salmon fluctuated annually but remained relatively steady until 1984 when exploitation of large salmon declined sharply with the introduction of the non-retention of large salmon in angling fisheries and reductions in commercial fisheries (Figure 4.1.6.1). Exploitation of small salmon declined steeply in North America with the closure of the Newfoundland commercial fishery in 1992. Declines continued in the 1990s with continuing management controls in all fisheries to reduce exploitation. In the most recent 10 years, exploitation rates on small salmon and large salmon have remained at the lowest in the time-series, averaging 9% for large salmon and 7% for small salmon. However, exploitation rates across regions within North America are highly variable.

4.2 Management objectives and reference points

Management objectives (MOs) are described in Section 1.4. Limit reference points (LRPs) and the application of precaution are described in Section 1.5.

Fisheries and Oceans Canada (DFO) undertook a revision of reference points for Atlantic salmon in Canada that conform to the Precautionary Approach (ICES, 2016). LRPs in all cases are defined in terms of total eggs from all sizes and sea ages of salmon. DFO Newfoundland Region retained the current conservation requirement based on 240 eggs per 100 m^2 of fluvial rearing habitat, and in addition for insular Newfoundland 368 eggs per ha of lacustrine habitat (or 150 eggs per ha for stocks on the northern peninsula of Newfoundland), as equivalent to their LRP, and have defined the upper stock reference (USR) as 150% of the LRP (DFO, 2017). DFO Maritimes Region (Scotia-Fundy) has retained the current conservation requirement based on 240 eggs per 100 m^2 as the LRP (DFO, 2012; Gibson and Claytor, 2013). DFO Gulf Region revised and defined the LRP using the proportion of eggs from MSW salmon as a covariate in the Bayesian Hierarchical Model (DFO, 2018) and defined the USR as 3.78 times the LRP (DFO, 2022). The Province of Quebec revised the LRP and USR using a Bayesian hierarchical analysis of stock–recruitment data (Dionne *et al.*, 2015; MFFP, 2016; ICES, 2017). For Quebec, the management plan for recreational fishery provides river-specific LRPs, expressed in number of eggs, to regulate salmon retention (MFFP, 2016). These LRPs are also used to establish the 2SW CLs for advice on the management of the 1SW non-maturing fisheries at Greenland.

The CLs in eggs are collated for the six stock-units based on defined stock-unit CLs in eggs or converted from fish to eggs (Newfoundland) using biological characteristics by sea age / size group (Table 4.2.1.1). The biological characteristics by stock-unit are used by the Life-cycle Model to convert spawners in numbers to eggs.

Country and Commission Area	Region	2SW spawner requirement (number of fish)	2SW management objective (number of fish)	Total egg requirement (million of eggs)
Canada	Labrador (LAB)	34 746		239.14
	Newfoundland (NFLD)	4022		417.78
	Quebec (QC)	17 364		124.60
	Southern Gulf of St Lawrence (GULF)	18 737		171.82
	Scotia-Fundy (SF)	24 705	10 976	253.53
Canada Total		99 574		1206.87
USA Total		29 199	4549	105.08
North America Total		128 773	15 525	1311.95

4.3 Status of stocks

Based on information provided in the update (2018) of the NASCO Database of Salmon Rivers, a total of 857 rivers have been identified in eastern Canada. CLs have been defined for 498 (58%) of these rivers in eastern Canada and all 33 rivers in USA. Assessments of adult spawners and egg depositions relative to CLs were reported for 79 rivers in eastern North America in 2023.

4.3.1 Smolt abundance

Canada

Wild smolt production was estimated in seven rivers in 2023 (Table 4.3.1.1). In 2023, the relative smolt production, standardized to the size of the river using the CL egg requirements, was highest in St Jean River (Quebec) and lowest in Rocky River (Newfoundland) (Figure 4.3.1.1). Trends in smolt production over the time-series declined ($p < 0.05$) in the Nashwaak River (Scotia-Fundy, 1998–2023), St Jean River (Quebec 1989–2023), de la Trinité River (Quebec, 1984–2022), Conne River (Newfoundland, 1987–2023) and Rocky Brook (Newfoundland, 1987–2023) whereas production significantly increased ($p < 0.05$) in Western Arm Brook (Newfoundland, 1971–2023). No other rivers showed statistically significant long-term trends (Figure 4.3.1.1).

USA

Wild smolt production was estimated on the Narraguagus River in 2023 (Table 4.3.1.1; Figure 4.3.1.1). Smolt production has declined over time ($p < 0.05$) on this river (1997–2023).

4.3.2 Estimates of total adult abundance

4.3.2.1 North American run–reconstruction model

The Run-Reconstruction Model developed by Rago *et al.* (1993) and described in previous WGNAS reports (ICES, 2008; 2009) and the primary literature (Chaput *et al.*, 2005) was used to estimate returns and spawners of small (1SW), large (MSW), and 2SW salmon (a subset of large) to the six geographic regions of NAC for the time-series to 2023. The input data were similar in structure to the data used previously by WGNAS (ICES, 2012; Stock Annex).

4.3.2.2 The Life-cycle Model

The Life-cycle Model (LCM) for wild Atlantic salmon was used for the first time by WGNAS 2024 to forecast stock status (see Section 2 of this report and the Stock Annex). Outputs of the LCM are in line with the run-reconstruction estimates of returns and spawners, and provide for S-NEAC, N-NEAC and NAC, by country and stock-unit, time-series and forecasts of total PFA, PFA 1SW maturing, PFA 1SW non-maturing, productivity (post-smolt survival), proportion maturing as 1SW, returns of 1SW, returns of MSW and eggs in returns/spawners of 1SW and MSW age groups.

4.3.2.3 Estimates of returns

Returns of small (1SW) and large (MSW) salmon to individual river systems and management areas were derived from a variety of methods. These methods included counts of salmon at monitoring facilities, population estimates from mark–recapture studies, and applying angling and commercial catch statistics, angling exploitation rates, and measurements of freshwater habitat. The 2SW component of the large returns was determined using the sea age composition of one or more indicator stocks.

Returns are the number of salmon that returned to the geographic region, including fish caught by homewater commercial fisheries, except in the case of the Newfoundland and Labrador regions where returns do not include landings in mixed-stock commercial and subsistence fisheries. This avoided double counting fish because commercial catches in Newfoundland and Labrador and subsistence fisheries in Labrador were added to the sum of regional returns to create the pre-fishery abundance estimates (PFA) of North American salmon.

Total returns of salmon to USA rivers are the sum of trap catches and redd-based estimates.

In 2020, some regions were affected by the COVID-19 global pandemic and had to either modify the way returns estimates were produced (e.g. SFA15 using snorkel counts of spawners instead of angling data) or could not provide returns estimates (e.g. SFA 16, 17, 18, 19–21 and 23). When no data were available, the previous five-year mean was used for all SFAs, except for Newfoundland where the previous six-year mean was used.

Small, large and 2SW salmon returns to the six stock-units and overall for NAC (1971-2023) from the Run-Reconstruction Model and forecasts (2024-2027) from the LCM are reported in Tables 4.3.2.1 to 4.3.2.3. Outputs from the LCM are shown in Figures 4.3.2.1 to 4.3.2.7.

Small salmon returns

- Small salmon returns for North America in 2023 (499 900);
- Small salmon returns in 2023 increased from the previous five-year mean in Labrador (58%) but decreased in all other regions (-45% to -73%);
- Small salmon returns in 2023 were the highest of the time-series for Labrador but lowest for Gulf and Quebec;
- In 2023, small salmon returns for Labrador and Newfoundland combined represented 95% of the total small salmon returns for North America.

Large salmon returns

- Large salmon returns for North America in 2023 (168 700);
- Large salmon returns in 2023 were the highest of the time-series for Labrador and increased from the previous five-year mean in Labrador (92%) and USA (81%), but decreased in all other regions (-9% to -54%);
- In 2023, large salmon returns for Labrador and Quebec combined represented 65% of the total large salmon returns for North America.

2SW salmon returns

- 2SW salmon returns for North America in 2023 were 112 100;
- 2SW salmon returns in 2023 increased from the previous five-year mean for Labrador (14%) and USA (55%), but decreased in all other regions (-16% to -52%);
- On average (2018-2022), the majority of 2SW salmon returns (93%) for NAC were from Labrador (36%), Quebec (30%), and Gulf (27%). There are few 2SW salmon returns to Newfoundland (5%), as the majority of the large salmon returns to that region are comprised of previously spawned 1SW salmon. Scotia-Fundy and USA each represent less than 1% of NAC 2SW returns.

4.3.3 Estimates of spawning escapements and eggs contribution

Small, large and 2SW salmon spawners to the six stock-units and overall for NAC (1971-2023) from the Run-Reconstruction Model are reported in Tables 4.3.3.1 to 4.3.3.3. Outputs from the LCM, including eggs, are shown in Figures 4.3.2.1 to 4.3.2.7.

Small salmon spawners

- Small salmon spawners for North America in 2023 (485 200) ranks sixth highest of the 54-year time-series;
- Small salmon spawners in 2023 increased from the previous five-year mean for Labrador (59%) but decreased in all other regions (-46% to -73%);
- Small salmon spawners in 2023 were the highest in the time-series for Labrador, lowest for Gulf, and second lowest for Quebec and Scotia-Fundy;
- On average (2018-2022), small salmon spawners for Labrador and Newfoundland combined represented 91% of the total small salmon spawners for North America.

Large salmon spawners

- Large salmon spawners for North America in 2023 (165 400) ranks the sixth highest of the 54-year time-series;
- Large salmon spawners in 2023 increased from previous five-year mean in Labrador (14%) and USA (147%), but decreased and all other regions (-18% to -55%);
- Large salmon spawners in 2023 were the highest in the time-series for Labrador.

2SW salmon spawners

- 2SW salmon spawners for North America in 2023 (110 600) ranks the eighth highest of the 54-year time-series and were below the combined 2SW CL for NAC;
- 2SW salmon spawners in 2023 increased from the previous five-year mean for Labrador (14%) and USA (147%), but decreased in all other regions (-17% to -52%);
- 2SW salmon spawners were below the region-specific 2SW CLs for Newfoundland (63% of CL), Gulf (98% of CL), Scotia-Fundy (9% of CL) and USA (81% of CL). The 2SW CLs have never been exceeded for Scotia-Fundy and USA over the time-series;
- The 2SW management objectives for Scotia-Fundy and USA have not been met since 1991 and 2013, respectively. For USA, 2SW returns are assessed relative to the management objective as adult stocking programmes for restoration efforts contribute to the number of spawners.

Eggs from spawners

- The mean total eggs from spawners for North America for the most recent five years (2019-2023) was 1247 million, below the total egg requirement of 1311 million eggs;
- Eggs in spawners from Labrador and Newfoundland combined represented 70%, on average over the most recent five years (2019-2023), of the total eggs for North America;

- Eggs in 2SW spawners (427 million) represented 33%, on average over the most recent five years (2019-2023), of the total eggs for North America.

4.3.4 River Specific Egg depositions

Egg depositions by all sea ages combined in 2023 exceeded or equalled the river-specific CLs in 33 of the 79 assessed rivers (42%) but were less than 50% of CLs in 33 rivers (42%) (Figure 4.3.4.1). Large deficiencies in egg depositions (<10% CLs) were noted in 14 assessed rivers (18%) in 2023.

- In 2023, CLs on assessed rivers were met or exceeded in one of four (25%) for Labrador, four of 13 (31%) for Newfoundland, 26 of 30 (87%) for Quebec, two of 13 (15%) for Gulf and zero of six for Scotia-Fundy;
- Large deficiencies in egg depositions were noted for USA. All 13 assessed rivers were below 25% of their CLs.

The time-series of attained CLs for assessed rivers is presented in Table 4.3.4.1 and Figure 4.3.4.2. The time-series includes all assessed small rivers on Prince Edward Island (SFA 17) individually.

- In Canada, CLs were first established in 1991 for 74 rivers. Since then, the number of rivers with defined CLs increased to 266 in 1997 and to 498 since 2018. The number of rivers assessed annually has ranged from 57 to 91 and the annual percentages of these rivers achieving CL has ranged from 26% to 70% with no temporal trend.

4.3.5 Return rates in monitored rivers

Return rates are the ratio of adult returns relative to out-migrating smolts of previous years. In 2023, return rate estimates were available from five wild and one hatchery populations from rivers distributed among Newfoundland, Quebec and USA (Tables 4.3.5.1 to 4.3.5.4). Three of the five smolt monitoring programs in Newfoundland, that generally have higher 1SW return rates (5% to 11%), were impacted by high water levels in 2022 and 2023.

In 2023, the return rates of wild smolts as 2SW salmon to the Saint Jean and de la Trinité River (Quebec) were 2.2% and 0.3%, respectively (Table 4.3.5.2; Figure 4.3.5.1). The return rates of wild smolts as small (1SW) salmon in four monitored rivers in 2023 ranged from 0.1% to 2.6% (Table 4.3.5.1; Figure 4.3.5.1).

In 2023, the return rate of hatchery-origin smolts as 2SW salmon to the Penobscot River (USA) was 0.26% (Table 4.3.5.4; Figure 4.3.5.2). The return rate of hatchery-origin smolts as small (1SW) salmon to this river was 0.02% in 2023 (Table 4.3.5.3; Figure 4.3.5.2).

Return rates were highly variable among rivers and years (Figures 4.3.5.1 and 4.3.5.2) and factors contributing to the variation were discussed in ICES (2023a).

4.3.6 Pre-fisheries abundance (PFA)

The LCM provides estimates of the PFA for maturing 1SW, non-maturing 1SW and maturity groups combined as of 01 January of the first winter at sea for the time series 1971 to 2022, and forecasts abundance for the 2023 to 2026 PFA years.

4.3.6.1 Non-maturing 1SW salmon

PFA estimates for the six stock-units and NAC overall are shown in Figures 4.3.2.1. to 4.3.2.7. The NAC median estimate of non-maturing 1SW salmon in 2022 was 302 000 salmon (95% C.I.

range 267 700 to 343 500) (Table 4.3.6.1). This value is 8% higher than the previous five-year mean (279 000). The estimated non-maturing 1SW salmon in 2022 was within the mid-range of the 52-year time-series, but remains well below the high values of the 1970s (Figure 4.3.2.1).

4.3.6.2 Maturing 1SW salmon

Maturing 1SW salmon are in some areas (particularly Newfoundland) a major component of salmon stocks, and their abundance when combined with the non-maturing 1SW salmon group provides an index of the smolt cohort.

The PFA of the 1SW maturing cohort of North American origin is shown in Table 4.3.6.1. PFA estimates for each of six stock-units are shown in Figures 4.3.2.1. to 4.3.2.7. The estimated PFA of the maturing component in 2022 was 551 000 fish, approximately half of the maximum abundance of 1 053 000 fish in 1981 (Table 4.3.6.1, Figure 4.3.2.1).

4.3.6.3 Total 1SW recruits (maturing and non-maturing)

The total PFA for 2022 was 854 500 fish. The total PFA abundance has declined from a peak of 2 212 000 fish in 1975 (Table 4.3.6.1, Figure 4.3.2.1).

4.3.6.4 PFA by stock-units

On average over the most recent five years (2018-2022), the maturing PFA for Labrador and Newfoundland represented 43% and 46% of the maturing PFA in eastern North America, respectively. The non-maturing PFA was comprised 39% for Labrador, 22% for Quebec, 19% for Gulf, and 18% for Newfoundland. The maturing and non-maturing PFAs were lowest for Scotia-Fundy and USA. The majority (78%) of the total PFA abundance is now represented by production from Labrador and Newfoundland. This is a change from the 1970s, when the stock-units with the largest proportion of total PFA were Quebec (25%), Labrador (22%), Newfoundland (21%) and Gulf (21%).

Stock-unit	Percent of NAC maturing PFA 2018-2022	Percent of NAC non-maturing PFA 2018-2022	Percent of NAC total PFA 2018-2022
Labrador (LB)	43	39	42
Newfoundland (NF)	46	18	36
Quebec (QC)	6	22	11
Southern Gulf of St Lawrence (GF)	4.7	19	9
Scotia-Fundy (SF)	0.6	0.9	0.7
USA (US)	0.1	0.8	0.3

4.3.7 Population dynamics

4.3.7.1 Post-smolt survival

Post-smolt survival is a measure of marine productivity in the first year at sea. Prior to the 1980s, the probability of post-smolt survival was as high as 0.4 while in recent years, values have declined to around 0.1 for all regions and for NAC overall (Figure 4.3.7.1).

4.3.7.2 Probability of maturing as a 1SW salmon

There are region-specific differences in the probability of maturing as a 1SW salmon (Figure 4.3.7.2). This is highest for Newfoundland, followed by Labrador and Scotia-Fundy, and is lower for Quebec, Gulf and the USA. In NAC overall, the probability of maturing as a 1SW salmon has increased from less than 0.5 prior to the 1980s to a peak of 0.75 in the early 2000s.

4.3.8 Summary on status of stocks

There has been a slight increasing trend in the number of small (1SW) salmon returns to North America (Figure 4.3.2.1). This trend was mainly driven by the closure of commercial fisheries in 1992 and 1998, and the substantial increasing trend over the time-series in returns to the Labrador region that include record highs in 2022 and 2023. The 2023 estimates of small (1SW) salmon returns declined relative to the previous five-year mean for all NAC regions other than Labrador (Table 4.3.2.1). Important variations in annual abundances of small salmon continue to be observed, such as the low returns of 2009 and 2013 and the high returns of 2011 and 2021 (Figure 4.3.2.1).

The 2023 estimates of large (MSW salmon including maiden and repeat spawners) salmon returns, as well as the 2SW maiden component, declined relative to the previous five-year mean in all NAC regions other than Labrador and USA (Tables 4.3.2.2 and 4.3.2.3).

In 2023, the median estimates of 2SW salmon returns and spawners to rivers were above the respective 2SW CLs (i.e. at full reproductive capacity) in two stock-units of NAC (Labrador and Quebec). All other regions were at risk of suffering or suffering reduced reproductive capacity (Figure 4.3.8.1). The percent (based on medians) of CLs attained from 2SW spawners in 2023 ranged from 9% in Scotia-Fundy to 182% in Labrador. For the USA, 2SW spawners exceed 2SW returns as salmon stocked as part of restoration efforts are included in the number of 2SW spawners. In the two southernmost regions of NAC, the percent management objective attained for 2SW returns were 10% for Scotia-Fundy and 38% for USA.

Estimates of PFA indicate continued low abundance of North American adult Atlantic salmon. The total PFA in the Northwest Atlantic has shown an overall declining trend since the 1970s with a period of persistent low abundance since the early 1990s. During 1992 to 2022, the total PFA was 815 000 fish, less than half the mean abundance (1 634 400 fish) during 1971 to 1991.

Overall, 95% of 1SW (small) salmon returns to NAC in 2023 were from two stock-units (Labrador and Newfoundland). Over the previous five years, 92% of 2SW salmon returns to NAC were from three stock-units (Gulf, Labrador and Quebec).

Returns to rivers (after commercial fisheries in Newfoundland and Labrador) of 1SW salmon have generally increased over the time-series for the NAC, mainly as a result of the commercial fishery closures in 1992 and in 1998. Important variations in annual abundances continue to be observed, such as the low returns of 2009 and 2013 and the high returns of 2011 and 2021 (Figure 4.3.2.1). Increased returns in recent years were estimated for Labrador and Newfoundland, which have contributed to this increasing trend for NAC. The estimated 1SW salmon returns in Labrador have increased substantially over the time-series, the estimated returns in 2023 were the highest of the 54-year time-series. The estimated returns of 1SW salmon to Newfoundland were the second lowest of the last ten years.

The abundances of large salmon (MSW salmon including maiden and repeat spawners) returns in 2023 relative to 2022 declined in all areas except Labrador.

Total eggs in the returns and spawners exceeded the CLs in two stock-units (Labrador and Quebec) (Figure 4.3.8.2). River-specific egg depositions by all sea ages combined in 2023 exceeded or equalled the river-specific CLs in 33 of the 79 assessed rivers (42%) but were less than 50% of CLs in 33 rivers (42%) (Figure 4.3.4.1). Large deficiencies in the 2023 egg depositions (< 10% CLs) were noted in 14 assessed rivers (18%) in the Scotia-Fundy and USA regions (Table 4.3.4.1).

Wild smolt-to-adult return rates to monitored rivers in eastern North America remain low, with 2023 smolt return rates ranging from 0.3% for 2SW stocks to 2.6% for 1SW stocks (Tables 4.3.5.1 and 4.3.5.2). Three of the five smolt monitoring programs in Newfoundland, that generally have higher 1SW return rates (5% to 11%), are not included in 2023 because monitoring was impacted by high water levels in 2022 and 2023.

Despite major changes in fisheries, returns to the southern regions of NAC (Scotia-Fundy and USA) remain near historical lows and many populations are currently at risk of extirpation. All salmon stocks within the USA and the Scotia-Fundy regions have been or are being considered for listing under country-specific species-at-risk legislation. Recovery Potential Assessments for the three Designable Units of salmon in Scotia-Fundy as well as for one Designable Unit in Quebec and one in Newfoundland occurred in 2012 and 2013 to inform the requirements under the Species at Risk Act listing process in Canada (ICES, 2014).

Based on the previous five years, regional return estimates are reflective of the overall return estimates for NAC, as Labrador and Newfoundland collectively comprised 95% of the small salmon returns, whereas Labrador, Quebec, and Gulf collectively comprised 77% of the large salmon returns and 94% of the 2SW salmon returns to NAC.

The continued low and declining abundance of salmon stocks across North America, despite significant fishery reductions, strengthens the conclusions that factors acting on survival in the first and second years at sea, at both local and broad ocean scales, are constraining abundance of Atlantic salmon. Declines in smolt production in some rivers of eastern North America are now being observed and are also contributing to lower adult abundance.

4.4 NASCO has asked ICES to provide catch options or alternative management advice for 2024-2027 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding

Assessment of risks from exploitation in the mixed-stock fisheries for NAC for 2024-2027 is based on the application of the LCM (see Section 2 of this report and the Stock Annex). Catch options are only considered for the non-maturing 1SW and maturing 2SW components as the maturing 1SW component is not fished outside homewaters, and in the absence of significant marine interceptory fisheries, is managed in homewaters.

As the predicted number of 2SW salmon returning to North America in 2024 to 2027, even with no fishing mortality in the North Atlantic, is substantially lower than the 2SW CL/MO, there are no catch options for the composite stock in the North American fisheries. Where river-specific spawning requirements are being achieved, there are no biological reasons to restrict the catch.

Wild salmon populations are now critically low in the southern regions (Scotia-Fundy, USA) of North America and the remnant populations require alternative conservation actions including habitat restoration, captive rearing strategies, and very restrictive fisheries regulation in some areas to maintain the genetic integrity of the stocks and improve their chances of persistence.

Advice regarding management of this stock complex in the fishery at West Greenland is provided in Section 5.

4.4.1 Relevant factors to be considered in management

The management for all fisheries should be based upon assessments of the status of individual stocks. Fisheries on mixed-stocks, particularly in coastal waters or on the high seas, pose particular difficulties for management as they target all stocks present, whether or not they are meeting their individual CLs. Conservation would be best achieved if fisheries target stocks that have been shown to be meeting CL. Fisheries in estuaries and especially rivers are more likely to meet this requirement.

Sampling of the Labrador FSC and subsistence fisheries has shown that the majority of salmon caught (> 95%) are from rivers in Labrador although there are occasional contributions from other areas, including the USA.

The salmon caught in the Saint Pierre and Miquelon mixed-stock fisheries originate in all areas of North America. All sea age groups, including previous spawners, contribute to the fisheries in varying proportions.

4.4.2 Forecast/catch options for 2024 fisheries on 2SW salmon

It is possible to provide catch options on 2SW salmon for the NAC area for 2024. The forecast for 2024 for 2SW maturing fish is based on a forecast of the 2023 PFA, and accounting for fish which were already removed from the cohort by fisheries in Greenland and Labrador as 1SW non-maturing fish in 2023. The forecast of the 2SW salmon returns in 2024 by stock-unit and overall for NAC are presented in Table 4.3.2.3.

As the 5th percentiles of the predicted numbers of 2SW salmon returning to the stock-units in North America in 2024 are lower than the 2SW management objectives for all areas and overall for North America, there are no catch options on 2SW salmon in mixed-stock fisheries in North America in 2024 that would allow the attainment of region-specific management objectives (see section 4.2). A limited catch option may be available on individual rivers where CLs are being achieved; in these circumstances, there are no biological reasons to further restrict the catch.

4.4.3 Forecast/catch options for 2025-2027 fisheries on 2SW salmon

The LCM provides forecasts of 2SW returns to regions of NAC for 2025 to 2027 return years in the absence of fishing.

Catch options for 2SW salmon returns to NAC in 2025 to 2027 are presented relative to the probability of meeting or exceeding 2SW CLs/MOs for the regions, in the absence of any mixed-stock fisheries exploitation at sea (Table 4.4.2.1). For the six stock-units in NAC, the probabilities of 2SW returns meeting or exceeding CL/MO in 2025 to 2027 range from a high of 0.76 for Quebec to a low of 0.01 for Scotia-Fundy.

There are, therefore, no mixed-stock fishery options on 1SW non-maturing salmon in 2024 to 2026 or on 2SW salmon in 2025 to 2027 which would provide a greater than 95% chance of meeting the individual management objectives (Table 4.4.2.1).

The previous advice provided by ICES (2021) indicated that there were no mixed-stock fishery catch options on the 1SW non-maturing salmon or 2SW maturing component for the 2021 to 2024 return years. This year’s assessment confirms and continues the advice.

Table 4.1.2.1. The number of professional and recreational gillnet licences issued and reported landings in Saint Pierre and Miquelon, 1990 to 2023. The data for 2023 are provisional.

Year	Number of licences		Reported landings (t)		
	Professional	Recreational	Professional	Recreational	Total
1990			1.15	0.734	1.88
1991			0.63	0.530	1.16
1992			1.30	1.024	2.32
1993			1.90	1.041	2.94
1994			2.63	0.790	3.42
1995	12	42	0.39	0.445	0.84
1996	12	42	0.95	0.617	1.57
1997	6	36	0.76	0.729	1.49
1998	9	42	1.04	1.268	2.31
1999	7	40	1.18	1.140	2.32
2000	8	35	1.13	1.133	2.27
2001	10	42	1.54	0.611	2.16
2002	12	42	1.22	0.729	1.95
2003	12	42	1.62	1.272	2.89
2004	13	42	1.50	1.285	2.78
2005	14	52	2.24	1.044	3.29
2006	13	52	1.73	1.825	3.56
2007	13	53	0.97	1.062	2.03
2008	9	55	1.60	1.85	3.45
2009	8	50	1.87	1.60	3.46
2010	9	57	1.00	1.78	2.78
2011	9	58	1.76	1.99	3.76
2012	9	60	0.28	1.17	1.45
2013	9	64	2.29	3.01	5.30
2014	12	70	2.25	1.56	3.81
2015	8	70	1.21	2.30	3.51
2016	8	70	0.98	3.75	4.73

Year	Number of licences		Reported landings (t)		
	Professional	Recreational	Professional	Recreational	Total
2017	8	80	0.59	2.22	2.82
2018	9	80	0.16	1.13	1.29
2019	7	80	0.07	1.21	1.29
2020	5	81	0.09	1.65	1.74
2021	4	80	0.22	1.38	1.60
2022	4	80	0.10	1.14	1.24
2023	6	80	0.03	1.42	1.45

Table 4.1.3.1. Catches (by weight, t), and the percent large by weight and by number, in the Indigenous food, social, and ceremonial (FSC) fisheries in Canada, 1990 to 2023. The data for 2023 are provisional.

Indigenous FSC fisheries			
Year	Catch (t)	% Large	
		by Weight	by Number
1990	31.9	78	
1991	29.1	87	
1992	34.2	83	
1993	42.6	83	
1994	41.7	83	58
1995	32.8	82	56
1996	47.9	87	65
1997	39.4	91	74
1998	47.9	83	63
1999	45.9	73	49
2000	45.7	68	41
2001	42.1	72	47
2002	46.3	68	43
2003	44.3	72	49
2004	60.8	66	44
2005	56.7	57	34
2006	61.4	61	39
2007	48.0	62	40
2008	62.5	66	43
2009	51.2	65	45
2010	59.1	59	38
2011	70.4	63	41
2012	59.6	62	40
2013	64.0	71	51
2014	52.9	61	41
2015	62.9	67	46

Indigenous FSC fisheries			
Year	Catch (t)	% Large	
		by Weight	by Number
2016	64.0	72	50
2017	61.3	72	51
2018	52.5	64	44
2019	54.7	72	50
2020	60.7	73	52
2021	56.6	62	42
2022	57.8	68	48
2023	63.9	73	55

Table 4.1.3.2. Catches (by weight, t), and the percent large by weight and number, in the Labrador resident subsistence fishery, Canada, for the period 2000 to 2023. The data for 2023 are provisional.

Labrador resident subsistence fishery			
Year	Catch (t)	% Large	
		by Weight	by Number
2000	3.5	30	18
2001	4.6	33	23
2002	6.2	27	15
2003	6.7	32	21
2004	2.2	40	26
2005	2.7	32	20
2006	2.6	39	27
2007	1.7	23	13
2008	2.3	46	25
2009	2.9	42	28
2010	2.3	37	25
2011	2.1	51	37
2012	1.7	49	32
2013	2.1	65	51
2014	1.6	46	41
2015	2.0	54	38
2016	1.6	57	39
2017	1.4	58	40
2018	1.5	43	26
2019	1.6	67	47
2020	1.7	56	38
2021	1.8	46	32
2022	1.4	51	35
2023	1.2	60	42

Table 4.1.3.3. Catches of small and large salmon by number, and the percent large by number, in the recreational fisheries of Canada for the period 1974 to 2023. The data for 2023 are provisional.

Year	Small	Large	Both size groups	% Large
1974	53 887	31 720	85 607	37
1975	50 463	22 714	73 177	31
1976	66 478	27 686	94 164	29
1977	61 727	45 495	107 222	42
1978	45 240	28 138	73 378	38
1979	60 105	13 826	73 931	19
1980	67 314	36 943	104 257	35
1981	84 177	24 204	108 381	22
1982	72 893	24 640	97 533	25
1983	53 385	15 950	69 335	23
1984	66 676	9982	76 658	13
1985	72 389	10 084	82 473	12
1986	94 046	11 797	105 843	11
1987	66 475	10 069	76 544	13
1988	91 897	13 295	105 192	13
1989	65 466	11 196	76 662	15
1990	74 541	12 788	87 329	15
1991	46 410	11 219	57 629	19
1992	77 577	12 826	90 403	14
1993	68 282	9919	78 201	13
1994	60 118	11 198	71 316	16
1995	46 273	8295	54 568	15
1996	66 104	9513	75 617	13
1997	42 891	6756	49 647	14
1998	45 810	4717	50 527	9
1999	43 667	4811	48 478	10
2000	45 811	4627	50 438	9
2001	43 353	5571	48 924	11

Year	Small	Large	Both size groups	% Large
2002	43 904	2627	46 531	6
2003	38 367	4694	43 061	11
2004	43 124	4578	47 702	10
2005	33 922	4132	38 054	11
2006	33 668	3014	36 682	8
2007	26 279	3499	29 778	12
2008	46 458	2839	49 297	6
2009	32 944	3373	36 317	9
2010	45 407	3209	48 616	7
2011	49 931	4141	54 072	8
2012	30 453	2680	33 133	8
2013	31 404	3472	34 876	10
2014	33 339	1343	34 682	4
2015	37 642	1971	39 613	5
2016	35 303	1823	37 126	5
2017	22 015	1886	23 901	8
2018	11 757	979	12 736	8
2019	22 171	1226	23 397	5
2020	20 760	916	21 676	4
2021	21 222	736	21 958	3
2022	21 370	1016	22 344	4
2023	11 246	899	12 145	7
Previous five-year mean	18 307	975	19 282	5

Table 4.1.3.4. Numbers of salmon caught and released in Eastern Canadian salmon angling fisheries, for the period 1984 to 202 3. Blank cells indicate no data. Released fish in the kelt fishery of New Brunswick are not included in the totals for New Brunswick nor Canada. Totals for all years prior to 1997 are incomplete and are considered minimal estimates. Values for 2023 are provisional.

	Newfoundland and Labrador			Nova Scotia			New Brunswick			Prince Edward Island			Quebec			Canada		
Year	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total
1984				939	1655	2594	851	14 479	15 330							1790	16 134	17 924
1985		315	315	1323	6346	7669	3963	17 815	21 778			67				5286	24 476	29 762
1986		798	798	1463	10 750	12 213	9333	25 316	34 649							10 796	36 864	47 660
1987		410	410	1311	6339	7650	10 597	20 295	30 892							11 908	27 044	38 952
1988		600	600	1146	6795	7941	10 503	19 442	29 945	767	256	1023				12 416	27 093	39 509
1989		183	183	1562	6960	8522	8518	22 127	30 645							10 080	29 270	39 350
1990		503	503	1782	5504	7286	7346	16 231	23 577			1066				9128	22 238	31 366
1991		336	336	908	5482	6390	3501	10 650	14 151	1103	187	1290				5512	16 655	22 167
1992	5893	1423	7316	737	5093	5830	8349	16 308	24 657			1250				14 979	22 824	37 803
1993	18 196	1731	19 927	1076	3998	5074	7276	12 526	19 802							26 548	18 255	44 803
1994	24 442	5032	29 474	796	2894	3690	7443	11 556	18 999	577	147	724				33 258	19 629	52 887
1995	26 273	5166	31 439	979	2861	3840	4260	5220	9480	209	139	348		922	922	31 721	14 308	46 029
1996	34 342	6209	40 551	3526	5661	9187				472	238	710		1718	1718	38 340	13 826	52 166
1997	25 316	4720	30 036	713	3363	4076	4870	8874	13744	210	118	328	182	1643	1825	31 291	18 718	50 009
1998	31 368	4375	35 743	688	2476	3164	5760	8298	14058	233	114	347	297	2680	2977	38 346	17 943	56 289
1999	24 567	4153	28 720	562	2186	2748	5631	8281	13912	192	157	349	298	2693	2991	31 250	17 470	48 720
2000	29 705	6479	36 184	407	1303	1710	6689	8690	15379	101	46	147	44e	4008	4453	37 347	20 526	64 482
2001	22 348	5184	27 532	527	1199	1726	6166	11252	17418	202	103	305	809	4674	5483	30 052	22 412	59 387
2002	23 071	3992	27 063	829	1100	1929	7351	5349	12700	207	31	238	852	4918	5770	32 310	15 390	50 924
2003	21 379	4965	26 344	626	2106	2732	5375	7981	13356	240	123	363	1238	7015	8253	28 858	22 190	53 645

	Newfoundland and Labrador			Nova Scotia			New Brunswick			Prince Edward Island			Quebec			Canada		
Year	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total
2004	23 430	5168	28 598	828	2339	3167	7517	8100	15617	135	68	203	1291	7455	8746	33 201	23 130	62 316
2005	33 129	6598	39 727	933	2617	3550	2695	5584	8279	83	83	166	1116	6445	7561	37 956	21 327	63 005
2006	30 491	5694	36 185	1014	2408	3422	4186	5538	9724	128	42	170	1091	6185	7276	36 910	19 867	60 486
2007	17 719	4607	22 326	896	1520	2416	2963	7040	10 003	63	41	104	951	5392	6343	22 592	18 600	41 192
2008	25 226	5007	30 233	1016	2061	3077	6361	6130	12 491	3	9	12	1361	7713	9074	33 967	20 920	54 887
2009	26 681	4272	30 953	670	2665	3335	2387	8174	10 561	6	25	31	1091	6180	7271	30 835	21 316	52 151
2010	27 256	5458	32 714	717	1966	2683	5730	5660	11 390	42	27	69	1356	7683	9039	35 101	20 794	55 895
2011	26 240	8119	34 359	1157	4320	5477	6537	12 466	19 003	46	46	92	3100	9327	12 427	37 080	34 278	71 358
2012	20 940	4089	25 029	339	1693	2032	2504	5330	7834	46	46	92	2126	6174	8300	25 955	17 332	43 287
2013	19 962	6770	26 732	480	2657	3137	2646	8049	10 695	12	23	35	2238	7793	10 031	25 338	25 292	50 630
2014	20 553	4410	24 963	185	1127	1312	2806	5884	8690	68	68	136	1580	4932	6512	25 192	16 421	41 613
2015	24 861	6943	31 804	548	1260	1808	11 552	7489	19 041	68	68	136	3078	9573	12 651	40 107	25 333	65 440
2016	26 145	10 206	36 351	362	1550	1912	7130	7958	15 088	68	68	136	3905	11 533	15 438	37 610	31 315	68 925
2017	22 544	8137	30 681	330	732	1062	5935	6179	12 114	68	68	136	3191	10 173	13 364	32 068	25 289	57 357
2018	26 403	3562	29 965	526	2180	2706	4703	6978	11 681	68	68	136	2747	8776	11 523	34 447	21 564	56 011
2019	30 784	6937	37 721	508	1564	2072	4506	3507	8013	68	68	136	2845	9849	12 694	38 711	21 925	60 636
2020	25 964	8359	34 323	346	1446	1792	5401	5197	10 598	68	68	136	1620	8149	9769	33 399	23 219	56 618
2021	39 465	6183	45 648	844	1222	2066	5551	3271	8822	68	68	136	2041	8343	10 384	47 969	19 087	67 056
2022	23 577	5344	28 921	743	2242	2985	1647	2242	3889	68	68	136	3048	11 682	14 730	29 083	21 578	50 661
2023	17 488	4597	22 085	449	2311	2760	1647	3708	5355	68	68	136	2194	10 065	12 259	21 845	20 750	42 595

Table 4.1.4.1. Reported catches and losses expressed as 2SW salmon equivalents (number of fish X 1000) in North American salmon fisheries for the period 1972 to 2023, year of 2SW catches in North America. Only midpoints of the run-reconstruction Monte Carlo simulated values are shown. Geographic locations are: SPM = Saint-Pierre and Miquelon, LAB = Labrador, NF = Newfoundland, QC = Quebec, GF = Gulf, SF = Scotia-Fundy.

	Mixed-stock fisheries in North America					Canada – losses from all sources (terminal fisheries, catch and release mortality, by-catch mortality) in year i													
Year (i)	NF-LAB comm / subs 1SW (Year i-1) (a)	% 1SW of total 2SW equiva-lents (Year i)	NF-LAB Comm / subs 2SW (Year i) (a)	NF-LAB Comm / subs total (Year i)	SPM (Year i)	LAB	NF	QC	GF	SF	To-tal	USA	North America Total Losses	Termi-nal losses as % of NA To-tal	Green-land Total (Year i - 1)	NW Atlan-tic To-tal	Catch in home-waters as % of total NW At-lantic	Esti-mated abun-dance in North America (2SW)	Exploita-tion rate in North America
1972	21.9	13	144.2	166.2	0	0.4	0.6	27.4	20.2	5.6	54.3	0.3	220.8	25	197.8	418.6	53	292.4	0.76
1973	18.7	8	205.8	224.6	0	1.0	0.8	32.8	15.6	6.2	56.4	0.3	281.3	20	148.0	429.4	66	363.3	0.77
1974	23.7	9	236.0	259.7	0	0.8	0.5	47.9	18.1	13.1	80.3	0.2	340.3	24	186.7	527.0	65	449.6	0.76
1975	23.4	9	237.7	261.1	0	0.3	0.5	41.1	14.2	12.5	68.6	0.4	330.1	21	154.6	484.7	68	417.0	0.79
1976	34.9	12	256.7	291.6	0.3	0.8	0.4	41.9	16.1	11.1	70.3	0.2	362.5	19	194.7	557.2	65	431.3	0.84
1977	26.6	10	241.4	268.0	0	1.3	0.8	42.1	28.9	13.5	86.5	1.4	355.8	25	113.0	468.9	76	473.4	0.75
1978	26.9	15	157.4	184.3	0	0.8	0.5	37.6	20.4	9.4	68.7	0.9	253.9	27	142.9	396.8	64	317.5	0.80
1979	13.5	13	92.1	105.6	0	0.6	0.1	25.2	6.3	3.9	36.1	0.4	142.1	26	103.7	245.7	58	172.1	0.83
1980	20.6	9	217.3	237.9	0	0.9	0.6	53.6	25.4	17.4	97.9	1.5	337.3	29	141.9	479.2	70	451.9	0.75
1981	33.6	14	201.5	235.1	0	0.5	0.4	44.2	14.5	12.8	72.5	1.3	308.9	24	120.9	429.7	72	365.5	0.85
1982	33.5	20	134.5	168	0	0.6	0.4	35.1	20.6	8.9	65.6	1.4	235.0	29	161.2	396.2	59	291.2	0.81
1983	25.2	18	111.6	136.8	0.3	0.4	0.4	34.5	17.3	12.3	64.9	0.4	202.5	32	145.9	348.3	58	237.5	0.85
1984	19.0	19	82.9	101.9	0.3	0.5	0.2	19.2	3.6	3.9	27.4	0.7	130.3	22	26.8	157.2	83	199.5	0.65
1985	14.3	15	78.8	93.1	0.3	0.3	0	22.1	0.8	5.1	28.3	0.6	122.3	24	32.4	154.8	79	213.1	0.57
1986	19.5	16	105.0	124.5	0.3	0.5	0	27.1	1.9	3.0	32.5	0.6	157.9	21	99.0	256.9	61	266.9	0.59
1987	24.7	16	132.3	157.0	0.2	0.6	0	27.1	1.9	1.4	31.1	0.3	188.6	17	123.7	312.3	60	260.0	0.73
1988	31.5	28	81.2	112.7	0.2	0.7	0	27.4	1.4	1.4	30.9	0.2	144.1	22	123.8	267.8	54	215.2	0.67
1989	21.9	21	81.4	103.3	0.2	0.5	0	23.6	1.2	0.3	25.5	0.4	129.4	20	84.9	214.2	60	195.8	0.66
1990	19.2	25	57.4	76.6	0.2	0.4	0	22.8	1.3	0.6	25.1	0.7	102.6	25	43.6	146.2	70	176.0	0.58
1991	11.8	23	40.5	52.3	0.1	0.1	0	23.4	1.1	1.4	26.0	0.2	78.7	33	52.2	130.9	60	148.4	0.53

	Mixed-stock fisheries in North America					Canada – losses from all sources (terminal fisheries, catch and release mortality, by-catch mortality) in year i													
Year (i)	NF-LAB comm / subs 1SW (Year i-1) (a)	% 1SW of total 2SW equiva-lents (Year i)	NF-LAB Comm / subs 2SW (Year i) (a)	NF-LAB Comm / subs total (Year i)	SPM (Year i)	LAB	NF	QC	GF	SF	To-tal	USA	North America Total Losses	Termi-nal losses as % of NA To-tal	Green-land Total (Year i - 1)	NW Atlan-tic To-tal	Catch in home-waters as % of total NW At-lantic	Esti-mated abun-dance in North America (2SW)	Exploita-tion rate in North America
1992	9.8	28	25.1	34.9	0.3	0.8	0.1	23.9	1.1	1.1	27.1	0.2	62.5	44	79.5	142.0	44	145.9	0.43
1993	3.1	19	13.3	16.4	0.3	0.4	0	18.4	0.7	1.2	20.7	0.2	37.6	56	29.8	67.4	56	122.1	0.31
1994	2.1	15	11.9	14.0	0.4	0.5	0.1	19.1	0.7	0.8	21.2	0	35.6	60	1.9	37.5	95	107.2	0.33
1995	1.2	12	8.7	9.9	0.1	0.5	0.1	17.8	0.5	0.4	19.3	0	29.2	66	1.9	31.1	94	134.3	0.22
1996	1.0	15	5.6	6.7	0.2	0.4	0.2	17.1	0.9	0.8	19.4	0	26.2	74	19.2	45.4	58	113.8	0.23
1997	0.9	14	5.6	6.5	0.2	0.2	0.2	14.1	0.8	0.6	15.9	0	22.6	70	19.3	41.9	54	93.9	0.24
1998	1.2	40	1.8	2.9	0.3	0.2	0.1	7.9	0.5	0.3	9.0	0	12.2	74	13	25.2	48	64.5	0.19
1999	0.2	17	0.8	1.0	0.3	0.3	0.1	6.6	0.7	0.5	8.2	0	9.4	86	4.3	13.8	69	68.3	0.14
2000	0.1	12	1.1	1.2	0.3	0.3	0.2	6.3	0.6	0.2	7.6	0	9.0	84	6.4	15.5	58	70.1	0.13
2001	0.3	17	1.3	1.6	0.2	0.3	0.1	6.8	0.9	0.3	8.4	0	10.2	82	5.9	16.2	63	80.9	0.13
2002	0.3	19	1.1	1.3	0.2	0.2	0	4.2	0.5	0.2	5.2	0	6.7	77	8.6	15.3	44	51.0	0.13
2003	0.3	15	1.7	2.0	0.3	0.2	0.1	6.1	0.7	0.2	7.3	0	9.6	76	3.2	12.9	75	78.3	0.12
2004	0.3	11	2.9	3.2	0.2	0.3	0.1	6.0	0.9	0.1	7.3	0	10.7	68	3.5	14.2	76	76.0	0.14
2005	0.5	17	2.2	2.7	0.3	0.3	0.1	5.3	1.0	0.1	6.7	0	9.7	69	4.3	14.1	69	78.2	0.12
2006	0.6	19	2.4	3.0	0.5	0.2	0.1	4.9	0.8	0.2	6.1	0	9.5	64	4.2	13.7	69	74.7	0.13
2007	0.6	21	2.1	2.6	0.2	0.2	0.1	4.7	0.9	0.1	6.0	0	8.9	68	4.9	13.8	64	69.7	0.13
2008	0.5	14	3.0	3.5	0.4	0.2	0.1	4.5	0.8	0.1	5.7	0	9.7	59	6.6	16.3	59	76.8	0.13
2009	0.5	17	2.6	3.1	0.4	0.2	0.1	4.6	0.9	0.1	6.0	0	9.5	63	7.5	17.0	56	90.4	0.11
2010	0.4	13	2.9	3.3	0.5	0.2	0.1	4.2	0.8	0.1	5.4	0	9.2	59	6.7	15.9	58	73.3	0.13
2011	0.5	13	3.5	4.0	1.0	0.1	0.1	5.9	1.5	0.1	7.7	0	12.7	61	8.8	21.5	59	146.1	0.09
2012	0.6	16	3.3	3.9	0.2	0.1	0	4.5	0.7	0.1	5.3	0	9.4	57	6.9	16.2	58	76.0	0.12
2013	0.5	10	5.0	5.6	1.2	0.2	0.1	4.9	1.0	0	6.1	0	12.9	47	7.1	20.0	65	113.3	0.11
2014	0.4	12	3.1	3.5	0.6	0.1	0	3.5	0.6	0	4.3	0	8.4	51	9.6	18.0	47	83.9	0.10

Year (i)	Mixed-stock fisheries in North America					Canada – losses from all sources (terminal fisheries, catch and release mortality, by-catch mortality) in year i													
	NF-LAB comm / subs 1SW (Year i-1) (a)	% 1SW of total 2SW equiva-lents (Year i)	NF-LAB Comm / subs 2SW (Year i) (a)	NF-LAB Comm / subs total (Year i)	SPM (Year i)	LAB	NF	QC	GF	SF	To-tal	USA	North America Total Losses	Termi-nal losses as % of NA To-tal	Green-land Total (Year i - 1)	NW Atlan-tic To-tal	Catch in home-waters as % of total NW At-lantic	Esti-mated abun-dance in North America (2SW)	Exploita-tion rate in North America
2015	0.5	9	4.8	5.3	0.4	0.1	0.1	4.1	0.8	0	5.1	0	10.8	47	11.4	22.2	49	121.6	0.09
2016	0.5	11	4.3	4.9	0.3	0.2	0.1	4.3	0.7	0	5.3	0	10.5	51	11.7	22.2	47	116.2	0.09
2017	0.4	9	4.5	5.0	0.1	0.2	0.1	3.8	0.7	0	4.8	0	9.8	49	5.6	15.4	63	115.1	0.09
2018	0.4	11	3.2	3.6	0.2	0.1	0	3.1	0.7	0	3.9	0	7.7	51	5.4	13.1	59	92.2	0.08
2019	0.5	10	4.5	5.0	0.2	0.2	0.1	3.1	0.3	0	3.7	0	8.9	42	9.6	18.5	48	70.5	0.13
2020	0.4	8	4.9	5.3	0.2	0.2	0.1	3.2	0.7	0	4.2	0	9.7	43	6.4	16.1	60	105.6	0.09
2021	0.4	12	3.3	3.7	0.2	0.1	0.1	3.0	0.5	0	3.6	0	7.6	48	4.3	11.9	64	87.3	0.09
2022	0.5	10	4.5	5.0	0.1	0.1	0.1	3.0	0.6	0	3.7	0	8.9	42	8.6	17.4	51	125.5	0.07
2023	0.5	8	6.0	6.5	0.2	0.1	0.1	2.8	0.4	0	3.5	0	10.1	34	7.4	17.5	58	121.8	0.08

Variations in numbers from previous assessments are due to updates to data inputs and to stochastic variation from Monte Carlo simulation.

NF-LAB comm / subs 1SW (Year i-1) = catch of 1SW non-maturing * 0.677057 (M of 0.03 per month for 13 months to July for Canadian terminal fisheries).

NF-LAB comm / subs 2SW (Year i) = catch of 2SW salmon * 0.970446 (M of 0.03 per month for 1 month to July of Canadian terminal fisheries).

Canada: Losses from all sources = 2SW returns - 2SW spawners (includes losses from catches from catch and release mortality and other in-river losses such as bycatch mortality but excludes the fisheries at St-Pierre and Miquelon and NF-LAB comm / subs fisheries).

a - starting in 1998 there was no commercial fishery in Labrador; numbers reflect catches of the Indigenous and resident subsistence fisheries.

Greenland total catch = estimated catch in year *i-1* of 1SW non-maturing salmon of North American origin at Greenland * 0.719 which is the discounted catch for 11 months of mortality at sea as returning 2SW salmon to eastern North America (M of 0.03 per month for 11 months).

Table 4.1.5.1. Correspondence between the stock-unit used by ICES for assessing the status of North American salmon stocks and the genetic reporting groups (Figure 4.1.5.1 and Figure 4.1.5.2) defined using the SNP range-wide baseline (Jeffery *et al.*, 2018).

Stock-unit	Genetic reporting group	Group acronym
Labrador	Labrador Central	LAC
	Lake Melville	MEL
	Labrador South	LAS
Quebec	Ungava	UNG
	St Lawrence North Shore Lower	QLS
	Anticosti	ANT
	Gaspe Peninsula	GAS
	Quebec City Region	QUE
Gulf	Gulf of St Lawrence	GUL
Scotia–Fundy	Inner Bay of Fundy	IBF
	Eastern Nova Scotia	ENS
	Western Nova Scotia	WNS
	Saint John River & Aquaculture	SJR
Newfoundland	Northern Newfoundland	NNF
	Western Newfoundland	WNF
	Newfoundland 1	NF1
	Newfoundland 2	NF2
	Fortune Bay	FTB
	Burin Peninsula	BPN
	Avalon Peninsula	AVA
USA	Maine, United States	USA
Europe	Spain	SPN
	France	FRN
	European Broodstock	EUB
	United Kingdom and Ireland	BRI
	Barents-White Seas	BAR
	Baltic Sea	BAL
	Southern Norway	SNO
	Northern Norway	NNO
	Iceland	ICE
	Greenland	GL

Table 4.1.5.2. Genetic mixture analysis of Labrador FSC and subsistence fisheries for 2023 using the SNP range wide baseline (Jeffery *et al.*, 2018). Mean percent values (and 95% credible interval) by range-wide reporting groups (Figure 4.1.5.1 and Figure 4.1.5.2) by size (Small < 63 cm, Large >= 63 cm; 29 samples did not have size data) and SFA. Reporting groups with zero support have been excluded from the table. Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value.

Reporting group	Total	Small	Large	SFA 1A	SFA 2	SFA 1B
Maine, United States	0.1 (0.0, 0.4)	0.3 (0.0, 1.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0.3 (0.0, 1.0)	0 (0.0, 0.0)
Gulf of St Lawrence	0 (0.0, 0.0)	0.3 (0.0, 1.0)	1 (0.1, 2.8)	0 (0.0, 0.0)	0.7 (0.1, 1.6)	0 (0.0, 0.0)
Québec City Region	0.4 (0.0, 1.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	2.1 (0.0, 5.9)	0 (0.0, 0.0)	0 (0.0, 0.0)
Gaspe Peninsula	0.3 (0.0, 0.9)	0 (0.0, 0.0)	0.6 (0, 2.1)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)
St Lawrence North Shore Lower	1.1 (0.5, 2.0)	1.2 (0.4, 2.4)	0.4 (0, 1.6)	0 (0.0, 0.0)	1.3 (0.4, 2.6)	0 (0.0, 0.0)
Newfoundland 2	1.1 (0.4, 2.0)	0.5 (0.1, 1.4)	0 (0.0, 0.0)	0 (0.0, 0.0)	0.7 (0.1, 1.6)	0 (0.0, 0.0)
Avalon Peninsula	0 (0.0, 0.0)	0.2 (0.0, 0.8)	0 (0.0, 0.0)	0 (0.0, 0.0)	0.2 (0.0, 0.8)	0 (0.0, 0.0)
Newfoundland 1	1.2 (0.5, 2.1)	1 (0.3, 2.2)	0.4 (0, 1.5)	0 (0.0, 0.0)	1.1 (0.3, 2.3)	0 (0.0, 0.0)
Northern Newfoundland	0.5 (0.0, 1.1)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)	0 (0.0, 0.0)
Labrador South	**69.7** **(66.2, 73.2)**	**53.1** **(48, 58.3)**	**41.9** **(35.0, 49.0)**	**0** **(0.0, 0.0)**	**77.8** **(73.4, 82.1)**	**3.3** **(0.5, 7.9)**
Lake Melville	**12.3** **(9.9, 15.0)**	**20.8** **(16.9, 25.0)**	**29.0** **(22.7, 35.5)**	**14.0** **(7.4, 21.7)**	**7.4** **(5.1, 10.0)**	**94.4** **(89.1, 98.0)**
Labrador Central	**12.9** **(10.1, 15.8)**	**21.9** **(17.4, 26.7)**	**23.9** **(17.4, 31.0)**	**82.8** **(74.6, 90.0)**	**9.3** **(6.0, 12.9)**	**0.0** **(0.0, 0.0)**
Ungava	0 (0.0, 0.0)	0 (0.0, 0.0)	1.3 (0.3, 3.0)	1.5 (0.2, 4.0)	0.2 (0.0, 0.8)	0 (0.0, 0.0)
Total samples	**726**	**472**	**236**	**136**	**479**	**111**

Table 4.1.5.3. Genetic mixture analysis of Saint Pierre and Miquelon for 2023 using the SNP range wide baseline (Jeffery et al., 2018). Mean percent values (and 95% credible interval) by range-wide reporting groups (Figure 4.1.5.1 and Figure 4.1.5.2) by size (Small < 63 cm, Large >= 63 cm). Reporting groups with zero support have been excluded from the table. Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value.

Reporting group	Total	Small	Large
Maine, USA	0 (0.0, 0.0)	0.1 (0.0, 0.5)	0 (0.0, 0.0)
Gulf of St Lawrence	**32.6** **(17.6, 49.3)**	**0** **(0.0, 0.0)**	**82.0** **(56.2, 97.7)**
Gaspe Peninsula	**18.1** **(6.6, 33.2)**	**20.8** **(7.4, 38.8)**	**0** **(0.0, 0.0)**
Anticosti	5.7 (0.7, 15.1)	4.7 (0.1, 16.5)	6.4 (0.1, 22.3)
St Lawrence North Shore Lower	7.0 (0.6, 18.1)	12.6 (2.3, 28.7)	0 (0.0, 0.0)
Fortune Bay	3.1 (0.1, 11.0)	5.2 (0.1, 19.1)	0 (0.0, 0.0)
Burin Peninsula	**19.9** **(8.3, 34.5)**	**33.1** **(13.6, 54.6)**	**0** **(0.0, 0.0)**
Avalon Peninsula	2.6 (0.1, 9.1)	4.4 (0.1, 15.4)	0 (0.0, 0.0)
Western Newfoundland	5.7 (0.3, 15.2)	9.6 (0.7, 25.1)	0 (0.0, 0.0)
Total samples	**39**	**23**	**16**

Table 4.2.1.1. Summary of biological characteristics (proportion female, eggs per female) of Atlantic salmon by sea age (size group) for regions (when applicable) within the six stock-units of NAC. Details on derivation are provided in the Stock Annex.

		Proportion female		Eggs per female	
Stock-unit	Region	1SW (small)	MSW (large)	1SW (small)	MSW (large)
US	US	0.014	0.640	3165	7912
SF	SFA23	0.292	0.824	3479	6955
	SFA19-21	0.384	0.927	3029	6133
GF	SFA18	0.099	0.654	2947	9372
	SFA17	0.214	0.811	3143	4963
	SFA16	0.144	0.804	3635	7492
	SFA15	0.061	0.656	3017	8558
QC	1	0.070	0.620	3682	9455
	2	0.020	0.660	3682	9455
	3	0.060	0.630	3682	9455
	5	0.060	0.790	4111	8796
	6	0.050	0.620	4111	8796
	7	0.090	0.730	3563	8687
	8	0.210	0.590	3563	8687
	9	0.310	0.820	3436	6806
	10	0.130	0.700	3019	6020
	11	0.330	0.640	3682	7672
NF	NF	0.713	0.836	2500	5000
LB	LB	0.505	0.859	2500	5000

Table 4.3.1.1. Estimated smolt production by smolt migration year in monitored rivers of eastern North America 1991 to 2023.

Smolt Migration Year	USA	Scotia-Fundy				Gulf				
	Narraguagus	Nashwaak	LaHave	St Mary's (West)	Middle	Margaree	NW Miramichi	SW Miramichi	Restigouche	Kedgwick
1991										
1992										
1993										
1994										
1995										
1996			20 510							
1997	2869		16 550							
1998	2845	22 750	15 600							
1999	4247	28 500	10 420				390 500			
2000	1843	15 800	16 300				162 000			
2001	2562	11 000	15 700				220 000	306 300		
2002	1774	15 000	11 860			63 200	241 000	711 400	1 066 584	172 325
2003	1201	9000	14 034			83 100	286 000	48 500	799 021	69 295
2004	1284	13 600	21 613			105 800	368 000	1 167 000	608 750	85 675
2005	1287	5200	5270	7350		94 200	151 200		805 667	78 297
2006	2339	25 400	22 971	25 100		113 700	435 000	1 330 000	591 776	125 446
2007	1177	21 550	24 430	16 110		112 400		1 344 000	1 129 024	116 300
2008	962	7310	14 450	15 217		128 800		901 500	547 733	52 055
2009	1176	15 900	8643	14 820		96 800		1 035 000	621 321	142 908
2010	2149	12 500	16 215					2 165 000	726 058	101 233
2011	404	8750		8066			768 000		795 124	254 577
2012	969	11 060							883 417	167 911
2013	1237	10 120	7159		11 103				1 008 650	121 250
2014	1615	11 100	29 175		11 907				302 987	58 008
2015	1201	7900	6664		24 110				1 065 469	236 891
2016		7150	25 849	4394	14 848				597 926	74 996
2017				15 190					536 615	56 586
2018	604			4171	9554				315 037	64 338

Smolt Migration Year	USA	Scotia-Fundy				Gulf				
	Narraguagus	Nashwaak	LaHave	St Mary's (West)	Middle	Margaree	NW Miramichi	SW Miramichi	Restigouche	Kedgwick
2019	829	8710		1742					379 137	57 707
2020									834 414	103 445
2021	1426		5293	3289						
2022	1031	15 400							385 945	108 118
2023	1421	5205								

Table 4.3.1.1 Cont`d. Estimated smolt production by smolt migration year in monitored rivers of eastern North America 1991 to 2023.

Smolt Migration Year	Quebec			Newfoundland				
	St Jean	De la Trinité	Vieux-Fort	Conne	Rocky	Campbellton	Western Arm Brook	Garnish
1991	113 927	40 863		74 645	7732		13 453	
1992	154 980	50 869		68 208	7813		15 405	
1993	142 972	86 226		55 765	5115	31 577	13 435	
1994	74 285	55 913		60 762	9781	41 663	9283	
1995	60 227	71 899		62 749	7577	39 715	15 144	
1996	104 973	61 092		94 088	14 261	58 369	14 502	
1997		31 892		100 983	16 900	62 050	23 845	
1998	95 843	28 962		69 841	12 163	50 449	17 139	
1999	114 255	56 557		63 658	8625	47 256	13 500	
2000	50 993	39 744		60 777	7616	35 596	12 706	
2001	109 845	70 318		86 898	9392	37 170	16 013	
2002	71 839	44 264		81 806	10 144	32 630	14 999	
2003	60 259	53 030		71 479	4440	35 089	12 086	
2004	54 821	27 051		79 667	13 047	32 780	17 323	
2005	96 002	34 867		66 196	15 847	30 123	8607	
2006	102 939			35 146	13 200	33 304	20 826	
2007	135 360	42 923		63 738	12 355	35 742	16621	
2008	45 978	35 036		68 242	18 338	40 390	17 444	
2009	37 297	32 680		63 512	14 041	36 705	18 492	
2010	47 187	37500		54 392	15 098	41 069	19 044	

Smolt Migration Year	Quebec			Newfoundland				
	St Jean	De la Trinité	Vieux-Fort	Conne	Rocky	Campbellton	Western Arm Brook	Garnish
2011	45 050	44 400		50 701	9311	37 033	20 544	
2012	40 787	45 108		51 220	5673	44 193	13 573	
2013	36 849	42 378		66 261	6989	44 928	19 710	
2014	56 456	30 741	30 873	56 224	9901	45 634	19 771	
2015		47 566	25 096	32 557	6454	32 747	14 278	
2016	58 307	42 269	28 234		4542	44 785	14 255	
2017	34 261	27 433	34 447	58 803	5233	36 005	15 439	11 903
2018	38 356	35 519	16 046		3600	38 485	13 317	10 425
2019	36 988	28 230		25 241	1149	40 848	12 732	16 405
2020	38 110	38 892						
2021	60 655	42 679		22 163	5267	20 412	11 285	8494
2022	43 634	28 991		22 695	5880	50 024	11 926	20 368
2023	35 742			22 540	2243	16 587	12 167	13 353

Table 4.3.2.1. Estimated small salmon returns (medians, 5th percentile, 95th percentile; X 1000) from run reconstruction to the six geographic areas and overall, for NAC 1970 to 2023. Returns for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23. The last four years (2024 to 2027) are forecast values from the LCM under the 0-catch scenario.

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	49.1	135.7	23.7	62.8	26.5	NA	298.8	34.1	119.7	19.4	53.9	22.8	NA	272.8	72.6	150.7	27.9	71.9	30.3	NA	328.6
1971	64.4	118.5	18.7	49.9	18.9	0	271.2	44.6	105.5	15.3	42.7	16.1	0	244.2	95.4	131.9	22.1	57.0	21.7	0	305.2
1972	48.5	110.6	15.6	62.7	17.0	0	255.4	33.7	97.6	12.8	53.6	14.1	0	231.4	71.6	123.4	18.4	72.0	19.8	0	283.2
1973	13.9	159.9	20.7	63.3	24.4	0	282.4	9.4	142.0	17.0	54.2	20.8	0	260.8	19.8	177.7	24.4	72.2	28.1	0	304
1974	54.0	120.6	21.0	98.5	43.7	0.1	338.7	37.5	106.9	17.2	83.8	37.2	0.1	309.1	79.4	134.2	24.8	112.9	50.0	0.1	372
1975	103.4	151.1	22.5	88.4	33.9	0.1	400.9	71.4	133.2	18.6	75.6	30.5	0.1	358.3	153.7	169.0	26.7	101.2	37.3	0.1	454.9
1976	73.6	158.8	25.0	128.9	53.0	0.2	440.7	51.1	138.9	20.5	110.9	46.7	0.2	401.8	109.1	178.5	29.4	146.7	59.2	0.2	485.8
1977	65.7	159.4	22.7	46.3	46.2	0.1	341.6	45.8	140.1	18.6	39.9	40.2	0.1	310.2	97.1	179.4	26.8	52.6	52.1	0.1	379
1978	32.7	139.4	21.3	41.2	15.8	0.2	251.5	23.0	121.9	17.4	36.2	14.5	0.2	228.9	48.1	157.1	25.0	46.1	17.1	0.2	275
1979	42.2	152.1	27.0	72.5	48.9	0.2	344.0	29.2	133.0	22.2	62.4	42.3	0.2	315.8	63.1	170.7	32.0	82.1	55.4	0.3	374.4
1980	96.1	172.5	37.2	63.3	70.6	0.8	441.9	66.2	152.6	30.5	54.5	62.7	0.8	401.1	143.1	192.7	43.9	71.9	78.5	0.8	493.6
1981	105.6	225.4	51.9	106.1	59.3	1.1	551.7	72.6	197.2	42.7	85.4	50.9	1.1	497.9	157.8	253.3	61.5	127.2	67.7	1.1	614.8
1982	73.8	200.4	29.5	120.6	36.1	0.3	463.2	50.9	177.1	24.3	95.9	31.4	0.3	416.8	108.9	223.9	34.9	145.8	40.7	0.3	511.8
1983	45.7	156.6	22.5	37.2	22.6	0.3	286.2	31.8	137.5	18.4	29.6	19.9	0.3	259	68.1	175.4	26.6	44.7	25.3	0.3	316.1
1984	24.4	206.8	25.5	54	42.8	0.6	354.8	16.8	179.4	24.5	44.5	36.6	0.6	323.6	35.8	233.7	26.5	63.5	48.8	0.6	385.7
1985	43.1	195.6	27.5	85.9	47.5	0.4	401.7	29.9	168.8	26.4	68.1	40.2	0.4	363	63.9	222.7	28.7	103.9	54.8	0.4	440.8
1986	66.1	200.1	38.5	160.3	49.1	0.8	516.9	45.2	174.8	37.1	125.7	41.7	0.8	463.7	97.6	225.7	40.0	194.1	56.8	0.8	569.8
1987	82.7	135.5	44.1	122	51.4	1.1	438.6	56.6	118.5	42.3	97.2	43.4	1.1	393.6	122.7	152.5	45.9	147.5	59.2	1.1	488.7
1988	75.7	217.5	50.6	172.2	51.8	1.0	571.3	51.7	190.5	48.8	136.3	44.1	1.0	515.1	112.9	244.4	52.5	207.5	59.6	1.0	629.1
1989	52.0	107.7	40.1	103.6	54.6	1.3	360.8	35.9	95.0	38.6	81.7	46.6	1.2	326.4	77.2	120.5	41.5	125.3	62.8	1.3	397.1
1990	30.4	152.3	45.4	117.2	55.3	0.7	402.4	21.0	138.3	43.9	92.9	46.3	0.7	369.1	45.0	166.3	47.1	141.7	64.1	0.7	435.9
1991	24.4	105.6	36.4	85.7	28.2	0.3	281.4	16.6	96.4	35.3	68.1	24.6	0.3	258.1	36.3	114.7	37.7	103.4	31.9	0.3	305.2
1992	33.9	229.0	40.0	193.2	34.0	1.2	532.2	24.1	199.4	38.6	164.2	29.3	1.2	487.9	50.9	257.5	41.5	221.5	38.6	1.2	577.1
1993	45.6	265.6	34.5	137.2	25.7	0.5	511	33.3	235.4	33.4	89.4	21.9	0.5	450.3	66.7	296.0	35.7	184.7	29.5	0.5	570.9
1994	33.9	161.0	33.0	67.2	10.5	0.4	307.3	25.1	138.6	32.0	57.2	9.3	0.4	279.9	48.3	183.1	34.0	77.2	11.6	0.4	334.7

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1995	47.7	204.0	26.6	60.9	20.0	0.2	360.8	36.1	173.3	25.7	52.1	17.5	0.2	325.5	66.8	234.8	27.4	69.8	22.5	0.2	397.6
1996	90.2	313.1	35.2	57.2	31.8	0.7	530.6	67.8	269.0	34.2	47.9	27.5	0.6	477.1	127.2	357.4	36.1	66.4	36.1	0.7	586.8
1997	95.6	176.8	27.6	30.6	9.4	0.4	341.7	73.7	159.1	26.7	24.9	8.2	0.4	310.0	130.6	194.6	28.5	36.3	10.5	0.4	380.1
1998	150.4	183.6	28.7	39.9	20.4	0.4	423.7	102.7	171.3	27.6	34.2	18.7	0.4	373.5	199.6	196.4	29.7	45.6	2.02	0.4	474.8
1999	147.9	201.2	30.0	35.5	10.6	0.4	425.4	100.2	185.7	28.9	31.0	9.8	0.4	374.9	194.6	216.9	31.1	40.0	11.4	0.4	475.5
2000	182.3	228.9	27.9	50.9	12.4	0.3	502.8	123.9	216.9	26.1	44.7	11.3	0.3	442.9	240.1	240.8	29.8	57.1	13.4	0.3	562.1
2001	144.4	156.2	18.9	43.0	5.4	0.3	368.5	99.0	148.3	18.2	37.7	5.0	0.3	321.5	192.1	164.3	19.6	48.5	5.8	0.3	416.6
2002	102.7	155.7	30.3	69.2	9.9	0.5	368.2	66.4	143.4	29.4	60.3	9.0	0.4	328.3	139.0	168.0	31.2	78.1	10.7	0.5	407.9
2003	86.0	242.4	25.2	41.7	5.8	0.2	401.5	52.4	232.9	24.5	36.1	5.3	0.2	365.9	119.1	252.0	26.1	47.4	6.3	0.2	436.1
2004	95.2	210.4	34.2	76.5	8.4	0.3	424.7	72.2	192.3	32.4	65.9	7.6	0.3	393.0	117.6	228.2	35.9	87.3	9.2	0.3	456.8
2005	220.7	221.8	23.0	47.4	7.5	0.3	521.2	166.1	176.9	21.9	39.4	6.8	0.3	447.3	275.4	266.6	24.1	55.6	8.2	0.3	595.1
2006	213.6	212.8	28.1	59.7	10.3	0.4	524.6	140.5	194.3	27.0	49.3	9.3	0.4	449.0	285.9	231.7	29.3	69.7	11.3	0.5	599.5
2007	194.8	183.8	21.4	41.1	7.7	0.3	448.9	138.4	158.5	20.3	33.0	7.0	0.3	386.0	250.6	208.7	22.4	49.1	8.5	0.3	511.1
2008	203.9	247.7	35.7	61.9	15.4	0.8	565.9	149.0	222.6	34.3	49.9	13.9	0.8	503.0	258.7	272.9	37.2	74.0	16.9	0.8	628.6
2009	102.1	223.3	20.8	25.8	4.2	0.2	376.0	60.0	194.3	19.8	20.7	3.8	0.2	323.3	144.4	251.1	21.9	30.9	4.6	0.2	430
2010	122.0	267.8	27.5	73.3	14.9	0.5	505.8	83.1	256.1	26.1	64.0	13.4	0.5	463.5	160.8	279.2	28.8	82.4	16.4	0.5	547.8
2011	247.6	242.9	36.9	74.6	9.5	1.1	613.5	147.3	216.1	35.4	61.0	8.5	1.1	509.0	345.9	270.1	38.4	89.0	10.4	1.1	715.3
2012	174.3	270.9	23.1	18.8	0.6	0	487.3	112.2	250.8	22.1	15.1	0.5	0	422.6	235	290.6	24.2	22.5	0.7	0	551.6
2013	156.5	187.6	18.8	24.8	2.1	0.1	389.8	90.5	172.3	17.8	19.3	1.9	0.1	321.5	220.5	203.3	19.7	30.1	2.3	0.1	455.3
2014	267.1	170.1	22.0	12.5	1.4	0.1	473.2	185.4	155.2	21.0	10.3	1.3	0.1	390.7	350.6	184.8	23.0	14.9	1.6	0.1	557.9
2015	257.4	283.2	36.8	39.6	4.2	0.1	621.4	183.4	253	35.4	35.0	3.8	0.1	540.1	331.9	313.4	38.2	44.4	4.6	0.2	702.5
2016	206.5	208.8	33.2	24.0	2.6	0.2	474.9	118.3	184.2	31.7	19.7	2.3	0.2	383.6	294.4	233.2	34.7	28.3	2.8	0.2	565.7
2017	164.9	175.3	24.4	22.4	3.9	0.4	391.1	90.4	148.3	23.2	18.7	3.5	0.4	311.7	238.2	201.9	25.5	26.1	4.3	0.4	470.0
2018	275.1	94.3	23.7	17.6	1.3	0.3	412.7	176.4	77.7	22.7	14.8	1.3	0.3	312.8	377.4	110.8	24.8	20.4	1.4	0.3	516.1
2019	118.5	257.9	20.9	15.8	3.5	0.4	416.5	67.1	199.0	19.9	12.9	3.2	0.4	336.7	168.5	316.2	21.8	18.7	3.8	0.4	496.2
2020	198.2	202.9†	26.1	26.7†	3.1†	0.2	457.1†	139.5	154.4	24.9	22.8	2.8	0.2	378.5	258.6	252.1	27.2	30.7	3.4	0.2	538.1
2021	190.7	422.4	34.0	29.1	3.6	0.2	679	114.1	317.2	32.6	21.3	3.3	0.2	545.4	268.2	524.9	35.3	36.6	4.0	0.2	815.1
2022	335.5	160.4	25.4	18.0	1.5	0.4	540.7	171.1	138.6	24.4	13.7	1.3	0.4	377.2	505.7	182.8	26.4	22.6	1.6	0.4	712.1

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2023	354.0	121.9	14.2	8.4	0.7	0.1	499.9	159.3	98.9	13.6	6.4	0.6	0.1	305.2	551.4	144.6	14.9	10.3	0.7	0.1	697.5
Prev. 5-year																					
	223.8	227.9	25.9	20.9	2.6	0.3	501.3														
%Change (recent year relative to previous 5-year mean)																					
	58%	-47%	-45%	-60%	-73%	-67%	0%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	48	54	54	53	44	16														
Forecast:																					
2024	173.2	142.9	22.6	15.4	1.1	0.3	386.1	57.5	56.5	9.0	3.6	0.1	0	198.1	478.1	356.4	57.6	62.0	5.9	2.0	789.5
2025	160.7	196.8	26.0	15.5	1.1	0.3	437.2	49.4	65.0	8.6	3.0	0.1	0	213.8	492.0	537.4	74.0	76.5	7.7	3.0	939.9
2026	180.9	237.4	26.3	13.5	1.4	0.7	512.7	43.3	67.0	6.8	1.6	0.1	0	221.5	587.9	708.9	81.0	75.2	11.7	7.8	1223.7
2027	196.6	188.6	26.7	13.7	1.5	0.7	496.2	40.7	48.0	5.2	1.3	0.1	0	187	704.5	640.1	92.4	95.1	15.1	11.4	1279.5

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.2.2. Estimated large salmon returns (medians, 5th percentile, 95th percentile; X 1000) from run reconstruction to the six geographic areas and overall, for NAC 1970 to 2023. Returns for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23. The last four years (2024 to 2027) are forecast values from the LCM under the 0-catch scenario.

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	10.0	14.9	103.5	69.5	20.3	NA	218.6	5.0	11.8	84.9	67.1	18.0	NA	198.3	17.0	17.9	122.1	71.9	22.6	NA	238.8
1971	14.3	12.6	59.2	40.0	15.9	0.7	143.1	7.1	10.0	48.5	37.6	14.1	0.6	128.5	24.3	15.1	69.8	42.5	17.6	0.7	158.4
1972	12.4	12.6	77.3	57.0	19.0	1.4	180.2	6.1	10.0	63.3	48.9	17.1	1.4	161.4	20.9	15.2	91.1	65.0	20.9	1.4	198.8
1973	17.2	17.3	85.4	53.4	14.8	1.4	190.1	8.5	13.8	70.0	45.6	13.4	1.4	169.1	29.1	20.9	100.6	61.3	16.1	1.4	211.6
1974	17.0	14.3	114.0	77.7	28.6	1.4	253.7	8.3	12.7	93.9	66.0	26.3	1.4	227.0	28.8	15.8	134.9	89.4	30.9	1.4	281.3
1975	15.7	18.4	97.3	50.5	30.6	2.3	215.5	7.8	16.1	79.6	43.1	28.0	2.3	192.7	26.7	20.7	114.6	57.8	33.2	2.4	237.8
1976	18.2	16.6	96.3	48.7	28.8	1.3	210.7	9.0	14.6	79.0	41.4	25.9	1.3	188.3	30.8	18.6	114.0	56.1	31.6	1.3	234.1
1977	16.2	14.6	113.5	87.8	38.1	2.0	273.1	8.0	13.0	93.3	75.3	34.6	2.0	245.9	27.3	16.3	134.2	100.5	41.5	2.0	300.2
1978	12.6	11.4	102.5	43.9	22.2	4.2	197.3	6.2	10.4	84.0	39.0	20.6	4.2	176.3	21.4	12.3	120.9	48.9	23.9	4.2	218.6
1979	7.3	7.2	56.5	17.4	12.8	1.9	103.3	3.6	6.3	46.4	15.2	11.6	1.9	91.7	12.3	8.1	66.7	19.6	14.0	2.0	115.2
1980	17.4	12.1	134.1	62.4	43.7	5.8	276.1	8.5	11.1	110.0	54.7	39.5	5.7	247.6	29.2	13.0	158.5	70.2	47.8	5.8	304.8
1981	15.6	28.9	105.5	39.3	28.2	5.6	223.9	7.7	25.3	86.5	33.0	25.4	5.6	200.5	26.4	32.4	124.5	45.7	31.0	5.7	246.8
1982	11.5	11.6	93.4	54.0	23.7	6.1	200.9	5.6	10.1	76.7	42.7	21.5	6.0	177.8	19.5	13.1	110.6	65.4	25.8	6.1	223.5
1983	8.4	12.4	77.0	40.9	20.6	2.2	161.6	4.1	11.3	63.0	34.0	18.4	2.1	144.6	14.1	13.6	90.7	47.8	22.8	2.2	178.5
1984	6.0	12.4	64.0	32.7	24.6	3.2	143.0	2.9	9.2	62.2	23.4	21.2	3.2	131.5	10.1	15.7	65.8	42.0	27.8	3.3	154.7
1985	4.7	10.9	66.7	44.4	34.1	5.5	166.7	2.3	7.6	64.6	32.0	29.3	5.5	152.4	8.0	14.2	68.9	57.0	39.0	5.6	181.2
1986	8.2	12.3	78.3	68.1	28.2	6.2	201.7	4.0	9.5	76.4	49.1	23.8	6.1	180.8	13.7	15.1	80.2	87.5	32.7	6.2	222.7
1987	11.0	8.4	73.7	46.1	17.7	3.1	160.4	5.4	6.4	71.8	33.6	15.0	3.1	145.6	18.7	10.4	75.6	58.4	20.3	3.1	175.4
1988	6.9	13.0	81.3	53.1	16.4	3.3	174.2	3.4	9.9	78.9	38.8	13.7	3.3	158.5	11.7	16.0	83.6	67.0	19.1	3.3	189.4
1989	6.7	6.9	74.0	42.1	18.5	3.2	151.7	3.3	5.4	72.0	31.2	15.7	3.2	139.2	11.2	8.5	75.9	53.3	21.4	3.2	164.3
1990	3.8	10.3	72.7	56.4	16.1	5.1	164.4	1.9	8.4	70.1	39.3	13.5	5.0	146.7	6.5	12.2	75.4	73.2	18.5	5.1	182.1
1991	1.9	7.5	65.7	56.9	15.7	2.6	150.5	0.9	6.1	63.3	39.4	13.4	2.6	132.4	3.2	9.0	68.1	74.5	17.9	2.7	168.7
1992	7.6	31.5	65.9	59.6	14.3	2.5	181.5	4.0	22.1	63.5	50.9	12.3	2.4	167.7	12.8	41.0	68.2	68.4	16.2	2.5	195.7
1993	9.5	17.1	50.6	63.4	10.1	2.2	153.3	6.0	13.8	49.6	34.4	8.9	2.2	123.6	15.1	20.4	51.7	93.1	11.2	2.3	183.3
1994	13.1	17.3	51.2	40.9	6.3	1.3	130.8	8.6	13.8	50.3	32.9	5.7	1.3	120.1	20.6	21.0	52.1	49.2	7.0	1.4	142.4

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1995	25.9	19.0	59.3	48.1	7.5	1.7	162.0	18.3	14.7	58.2	41.2	6.6	1.7	149.9	37.8	23.4	60.3	55.1	8.4	1.8	176.1
1996	18.6	28.9	53.7	40.7	10.9	2.4	155.7	13.2	23.7	52.6	32.5	9.6	2.4	144.0	26.8	34.2	54.8	48.8	12.2	2.4	167.9
1997	16.1	28.0	44.4	35.6	5.6	1.6	131.8	11.6	22.9	43.6	28.1	5.0	1.6	121.4	23.6	33.1	45.3	43.1	6.2	1.6	143.1
1998	13.4	35.2	34.0	30.7	3.8	1.5	118.7	8.0	27.4	33.2	25.2	3.5	1.5	107.6	18.8	43.3	34.8	36.3	4.2	1.5	129.9
1999	16.1	32.1	37.2	27.6	4.9	1.2	119.0	9.6	25.0	36.0	23.3	4.6	1.2	108.0	22.6	39.2	38.4	32.0	5.3	1.2	130.3
2000	21.7	27.0	35.5	30.1	2.9	0.5	117.7	13.1	23.0	34.0	25.5	2.6	0.5	106.8	30.8	31.0	37.0	34.6	3.1	0.5	128.9
2001	23.2	17.8	37.3	40.1	4.7	0.8	123.8	13.8	15.2	36.0	35.0	4.3	0.8	112.6	32.6	20.6	38.6	45.1	5.1	0.8	135.1
2002	16.9	16.8	26.4	23.6	1.6	0.5	85.8	9.8	13.7	25.5	19.9	1.4	0.5	77.1	24.0	19.9	27.4	27.4	1.7	0.5	94.8
2003	14.1	24.5	42.1	40.1	3.5	1.2	125.4	7.4	19.4	40.5	33.7	3.2	1.2	114.5	21.0	29.5	43.8	46.3	3.9	1.2	136.3
2004	17.1	22.3	36.6	39.8	3.1	1.3	120.2	11.6	17.0	35.3	32.6	2.8	1.3	109.6	22.5	27.5	37.8	46.8	3.4	1.3	130.8
2005	21.0	28.3	35.5	38.6	2.0	1.0	126.5	12.1	20.4	34.3	31.7	1.8	1.0	112.2	29.8	36.2	36.6	45.5	2.2	1.0	140.4
2006	21.2	35.7	32.9	37.3	3.0	1.0	131.1	13.3	30.0	31.9	30.8	2.7	1.0	119.2	29.0	41.4	33.9	43.8	3.3	1.0	143.2
2007	21.8	29.6	30.2	35.0	1.6	1.0	119.0	12.8	23.4	29.2	29.5	1.5	0.9	106.9	31.0	35.7	31.1	40.4	1.7	1.0	131.7
2008	26.2	28.9	36.3	29.1	3.3	1.8	125.7	15.9	22.5	34.8	23.2	2.9	1.8	111.4	36.5	35.2	37.7	34.8	3.6	1.8	139.6
2009	38.9	34.3	35.1	36.3	3.1	2.1	150.0	20.7	23.9	33.9	30.7	2.8	2.1	127.5	57.8	45.0	36.3	41.9	3.4	2.1	173.3
2010	18.9	35.3	37.8	33.2	2.5	1.1	128.6	11.6	28.8	36.7	27.8	2.3	1.1	117.4	26.1	42.1	38.9	38.5	2.7	1.1	140.4
2011	57.2	43.5	47.8	64.8	4.8	3.1	221.0	33.1	31.5	46.4	52.4	4.3	3.1	190.5	82.0	55.4	49.1	76.9	5.3	3.1	252.0
2012	33.5	28.8	33.6	27.1	1.3	0.9	125.2	20.5	23.3	32.5	22.3	1.2	0.9	109.9	47.0	34.4	34.7	32.0	1.4	0.9	141.0
2013	64.3	37.7	38.5	35.9	3.2	0.5	180.1	39.7	25.9	37.4	28.8	2.8	0.5	150.7	88.7	49.7	39.7	43.1	3.6	0.5	208.9
2014	62.0	20.2	22.1	22.9	0.8	0.3	128.4	38.7	16.4	21.5	18.3	0.7	0.3	104.1	85.5	23.9	22.8	27.5	0.8	0.3	152.7
2015	88.5	36.9	36.4	33.3	0.7	0.8	197.0	53.8	29.1	35.4	27.5	0.7	0.8	160.4	124.2	44.7	37.5	39.2	0.8	0.8	233.0
2016	72.0	35.0	39.3	38.2	1.6	0.4	186.4	39.2	27.8	38.0	30.2	1.4	0.4	151.6	103.8	42.5	40.6	46.3	1.7	0.4	220.1
2017	75.2	19.9	38.1	35.6	1.2	0.7	170.8	35.3	15.3	36.8	30.4	1.1	0.7	130.2	116.4	24.4	39.5	41.1	1.3	0.7	212.1
2018	46.4	8.8	28.6	39.5	1.6	0.5	125.2	25.3	6.3	27.7	31.0	1.4	0.5	101.9	67.2	11.3	29.5	47.9	1.7	0.5	148.5
2019	27.5	36.9	30.6	23.2	0.7	1.1	120.0	14.4	25.4	29.7	17.9	0.7	1.1	101.0	40.5	48.3	31.5	28.3	0.8	1.1	138.8
2020	45.9	29.6†	38.8	44.6†	1.2†	1.5	161.6†	44.4	19.5	37.7	36.3	1.0	1.5	148.3	47.3	39.2	39.8	53.1	1.3	1.5	174.3
2021	49.3	53.6	32.7	20.3	0.8	0.4	157.2	46.2	34.9	31.8	14.5	0.7	0.4	137.7	52.4	72.2	33.6	26.1	0.9	0.4	176.9
2022	84.7	30.4	36.0	34.3	2.3	1.2	188.8	46.5	20.0	35.0	27.5	2.0	1.1	148.6	123.5	41.0	36.9	41.1	2.6	1.2	230.0

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2023	97.2	14.7	29.7	24.1	1.1	1.7	168.7	74.0	10.6	28.9	17.8	1.0	1.7	144.2	121.5	18.8	30.6	30.6	1.3	1.7	194.2
Prev. 5-year																					
	50.7	31.9	32.8	32.1	1.3	0.9	149.8														
%Change (recent year relative to previous 5-year mean)																					
	92%	-54%	-9%	-25%	-17%	81%	13%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	36	50	49	50	24	21														
Forecast:																					
2024	80.9	9.8	26.0	20.7	1.5	1.9	147.4	33.7	3.6	14.1	7.9	0.4	0.6	85.6	171.1	23.8	47.9	50.9	4.7	6.0	255.8
2025	73.9	13.8	28.2	23.5	1.7	1.1	157.6	22.7	3.4	11.7	6.0	0.3	0.2	77.6	217.1	50.9	64.4	78.0	6.9	4.3	340.5
2026	71.4	18.3	31.5	24.4	1.5	1.2	173.4	19.4	3.3	10.9	4.9	0.2	0.2	73.9	227.7	83.3	87.4	96.9	8.6	6.1	393.9
2027	78.5	22.8	30.9	21.0	1.9	2.5	191.0	17.5	3.1	8.7	3.1	0.2	0.3	74.9	294.1	119.1	93.7	94.1	12.8	16.0	493.6

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.2.3. Estimated 2SW salmon returns (medians, 5th percentile, 95th percentile; X 1000) from run reconstruction to the six geographic areas and overall, for NAC 1970 to 2023. Returns for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23. The last four years (2024 to 2027) are forecast values from the LCM under the 0-catch scenario.

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	10.0	4.1	75.6	59.5	17.1	NA	166.7	5.0	3.1	62.0	57.5	15	NA	151.4	17.0	5.2	89.1	61.6	19.2	NA	182.4
1971	14.3	3.6	43.2	34.8	13.5	0.7	110.6	7.1	2.6	35.4	32.6	11.9	0.6	98.1	24.3	4.6	51.0	37.0	15.2	0.7	123.7
1972	12.4	3.7	56.4	49.4	16.0	1.4	139.7	6.1	2.7	46.2	42.4	14.3	1.4	124.6	20.9	4.8	66.5	56.5	17.7	1.4	155.1
1973	17.2	4.6	62.3	47.6	12.9	1.4	146.6	8.5	3.5	51.1	40.6	11.7	1.4	129.6	29.1	5.8	73.5	54.7	14.1	1.4	164.9
1974	17.0	3.7	83.2	67.4	27.1	1.4	200.3	8.3	2.9	68.5	56.9	24.9	1.4	178.9	28.8	4.4	98.4	77.3	29.4	1.4	222.6
1975	15.7	5.2	71.0	43.0	28.9	2.3	166.5	7.8	3.9	58.1	36.6	26.3	2.3	148.5	26.7	6.5	83.7	49.3	31.5	2.4	185.1
1976	18.2	4.4	70.3	40.4	26.6	1.3	161.8	9.0	3.3	57.7	34.3	23.8	1.3	143.4	30.8	5.4	83.2	46.2	29.4	1.3	181.0
1977	16.2	3.5	82.9	80.6	32.3	2.0	218.0	8.0	2.9	68.1	69.0	28.9	2.0	196.0	27.3	4.2	98.0	92.3	35.7	2.0	241.2
1978	12.6	3.6	74.8	36.3	18.8	4.2	150.9	6.2	2.9	61.3	32.2	17.2	4.2	134.2	21.4	4.2	88.2	40.5	20.4	4.2	167.7
1979	7.3	1.7	41.2	11.6	10.5	1.9	74.5	3.6	1.3	33.8	10.1	9.4	1.9	65.4	12.3	2.1	48.7	13.0	11.6	2.0	83.8
1980	17.4	3.9	97.9	56.9	38.7	5.8	221.0	8.5	3.2	80.3	49.7	34.7	5.7	198.6	29.2	4.6	115.7	64.0	42.6	5.8	243.9
1981	15.6	7.0	77.0	24.4	23.2	5.6	153.5	7.7	5.5	63.2	20.4	20.8	5.6	135.4	26.4	8.6	90.9	28.4	25.6	5.7	171.8
1982	11.5	3.2	68.2	41.9	16.7	6.1	148.2	5.6	2.5	56.0	32.7	14.8	6.0	130.0	19.5	3.8	80.7	51.0	18.6	6.1	166.0
1983	8.4	3.7	56.2	31.4	16.5	2.2	118.6	4.1	3.0	46.0	25.9	14.5	2.1	105.1	14.1	4.4	66.2	36.9	18.5	2.2	131.9
1984	6.0	3.4	46.7	29.5	21.5	3.2	110.6	2.9	2.5	45.4	20.8	18.3	3.2	100.2	10.1	4.3	48.1	38.2	24.6	3.3	120.9
1985	4.7	2.7	48.7	35.9	29.7	5.5	127.5	2.3	1.9	47.1	25.1	25.4	5.5	115.0	8.0	3.6	50.3	46.7	34.0	5.6	139.5
1986	8.2	3.3	57.2	56.7	21.4	6.2	153.3	4.0	2.4	55.8	40.4	18.2	6.1	135.8	13.7	4.1	58.6	73.3	24.7	6.2	171.1
1987	11.0	2.3	53.8	35.6	13.7	3.1	119.9	5.4	1.7	52.4	25.5	11.6	3.1	107.0	18.7	3.0	55.2	45.6	15.7	3.1	132.8
1988	6.9	3.4	59.3	42.0	11.8	3.3	127.0	3.4	2.4	57.6	30.6	9.9	3.3	114.5	11.7	4.4	61	53.4	13.6	3.3	139.5
1989	6.7	1.7	54.0	27.9	14.6	3.2	108.3	3.3	1.2	52.6	20.4	12.4	3.2	99.2	11.2	2.1	55.4	35.5	16.9	3.2	117.3
1990	3.8	2.7	53.1	36.6	11.7	5.1	113.1	1.9	2.0	51.2	26.0	9.9	5.0	101.7	6.5	3.4	55.1	47.3	13.4	5.1	124.4
1991	1.9	2.1	48.0	35.7	13.0	2.6	103.4	0.9	1.6	46.2	24.5	11.1	2.6	91.7	3.2	2.5	49.7	46.9	14.9	2.7	114.9
1992	7.6	8.1	48.1	37.6	12.0	2.5	116.1	4.0	5.5	46.4	31.9	10.3	2.4	108.1	12.8	10.9	49.8	43.5	13.7	2.5	124.6
1993	9.5	4.4	37.0	43.3	8.1	2.2	104.9	6.0	3.2	36.2	23.1	7.2	2.2	83.7	15.1	5.5	37.7	63.4	9.0	2.3	125.7
1994	13.1	4.0	37.4	30.1	5.2	1.3	91.5	8.6	2.9	36.7	23.9	4.7	1.3	83.1	20.6	5.2	38.0	36.3	5.7	1.4	100.9

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1995	25.9	3.8	43.3	39.4	6.8	1.7	121.3	18.3	2.6	42.5	33.5	6.0	1.7	110.6	37.8	5.1	44.0	45.3	7.6	1.8	134.5
1996	18.6	5.7	39.2	29.2	9.2	2.4	104.7	13.2	4.1	38.4	23.0	8.1	2.4	95.6	26.8	7.3	40.0	35.4	10.3	2.4	114.7
1997	16.1	6.0	32.4	23.9	4.6	1.6	85.2	11.6	4.3	31.8	18.2	4.1	1.6	76.9	23.6	7.8	33.1	29.7	5.0	1.6	94.3
1998	8.7	6.5	24.8	16.5	2.6	1.5	60.7	5.2	4.5	24.3	12.9	2.4	1.5	55.2	12.5	8.4	25.4	20.1	2.8	1.5	66.3
1999	10.5	6.3	27.1	16.0	4.2	1.2	65.3	6.3	4.4	26.3	13.1	3.9	1.2	59.5	15.0	8.2	28.0	19.0	4.5	1.2	71.2
2000	14.2	6.3	25.9	17.0	2.4	0.5	66.4	8.5	4.5	24.8	14.0	2.2	0.5	59.4	20.4	8.2	27.0	19.9	2.6	0.5	73.6
2001	15.1	2.5	27.2	27.1	4.3	0.8	77.0	9.0	1.7	26.3	23.4	3.9	0.8	69.6	21.5	3.3	28.2	30.8	4.6	0.8	84.6
2002	11.0	2.4	19.3	14.1	1.0	0.5	48.4	6.5	1.6	18.6	11.6	0.9	0.5	42.9	15.9	3.3	20.0	16.6	1.0	0.5	54.1
2003	9.2	3.4	30.8	26.1	3.3	1.2	73.9	4.9	2.2	29.6	21.4	3.0	1.2	67.1	13.8	4.5	31.9	30.7	3.6	1.2	80.9
2004	11.1	3.3	26.7	25.7	2.7	1.3	70.9	7.6	2.1	25.8	20.5	2.5	1.3	64.2	14.9	4.6	27.6	30.9	2.9	1.3	77.6
2005	13.7	4.4	25.9	26.9	1.7	1.0	73.7	7.9	2.6	25.0	21.7	1.5	1.0	65.2	19.7	6.3	26.7	32.1	1.8	1.0	82.1
2006	13.8	5.4	24.0	22.5	2.5	1.0	69.3	8.7	3.5	23.3	18.1	2.3	1.0	62.1	19.3	7.2	24.8	26.9	2.8	1.0	76.7
2007	14.2	4.2	22.0	22.5	1.4	1.0	65.3	8.4	2.6	21.3	18.8	1.3	0.9	58.0	20.5	5.7	22.7	26.3	1.5	1.0	72.8
2008	17.2	3.9	26.5	19.1	3.1	1.8	71.4	10.4	2.4	25.4	14.8	2.7	1.7	62.8	24.3	5.3	27.6	23.3	3.4	1.8	80.0
2009	25.3	4.6	25.7	24.1	2.7	2.1	84.5	13.4	2.8	24.8	20.1	2.4	2.1	71.6	37.7	6.4	26.5	28.2	2.9	2.1	97.8
2010	12.2	4.7	27.6	20.4	2.0	1.1	68.0	7.5	3.2	26.8	16.4	1.8	1.1	61.3	17.1	6.2	28.4	24.4	2.2	1.1	74.7
2011	37.1	3.7	34.9	51.9	4.6	3.0	135.1	21.5	2.4	33.9	41.5	4.2	3.0	116.1	53.7	4.9	35.8	61.8	5.1	3.1	155.1
2012	21.7	2.3	24.5	19.3	1.1	0.9	69.8	13.3	1.6	23.7	15.9	1.0	0.9	60.6	30.9	3.0	25.3	22.8	1.2	0.9	79.9
2013	41.7	4.8	28.1	25.6	2.9	0.5	103.5	25.7	3.1	27.3	20.4	2.6	0.5	86.5	58.3	6.6	29.0	30.9	3.3	0.5	121.2
2014	40.2	2.9	16.1	16.9	0.7	0.3	77.1	25.0	1.9	15.7	13.3	0.6	0.3	61.4	56.1	3.8	16.6	20.5	0.8	0.3	93.4
2015	57.4	4.9	26.6	22.0	0.7	0.8	112.3	34.9	3.3	25.8	17.7	0.6	0.8	89.4	81.6	6.6	27.3	26.1	0.7	0.8	136.9
2016	46.8	3.1	28.7	27.7	1.5	0.4	108.2	25.5	2.3	27.7	21.6	1.4	0.4	85.8	68.0	4.0	29.7	33.8	1.7	0.4	130.7
2017	48.8	2.1	27.8	26.6	1.1	0.7	107.1	22.9	1.4	26.8	22.3	1.0	0.7	80.7	75.8	2.7	28.8	31.0	1.3	0.7	134.6
2018	30.1	1.5	20.9	31.6	1.4	0.5	86.1	16.4	0.8	20.2	24.5	1.3	0.5	70.1	44.0	2.1	21.6	38.8	1.6	0.5	102.0
2019	17.9	4.7	22.3	17.1	0.7	1.1	63.8	9.4	2.8	21.7	12.9	0.7	1.1	53.9	26.5	6.7	23.0	21.4	0.8	1.1	74.0
2020	29.8	3.9†	28.3	32.7†	1.1†	1.5	97.3†	27.5	2.3	27.5	25.8	1.0	1.4	89.7	32.2	5.6	29.1	39.6	1.2	1.5	104.8
2021	32.0	8.1	23.9	16.0	0.8	0.4	81.2	28.9	4.4	23.2	11.1	0.7	0.4	74.3	35.3	11.8	24.5	20.8	0.8	0.4	88.2
2022	54.9	3.8	26.3	25.8	2.1	1.1	114.0	30.1	2.3	25.6	20.0	1.8	1.1	88.4	80.9	5.2	27.0	31.5	2.3	1.2	140.7

Year	Median of estimated returns (X 1000)							5th percentile of estimated returns (X 1000)							95th percentile of estimated returns (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2023	63.2	2.6	24.5	18.8	1.0	1.7	112.1	47.7	1.4	23.8	13.4	0.9	1.7	95.2	80.3	3.8	25.2	24.4	1.2	1.7	129.9
Prev. 5-year																					
	32.9	4.4	27.1	24.3	1.2	0.9	90.9														
%Change (recent year relative to previous 5-year mean)																					
	92%	-41%	-10%	-23%	-18%	85%	23%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	45	50	46	49	24	26														
Forecast:																					
2024	52.5	1.5	21.8	15.8	1.4	1.9	98.8	21.9	0.5	11.8	6.0	0.4	0.6	56.8	111.2	3.6	40.2	38.9	4.4	5.9	173.8
2025	48.1	2.1	23.7	17.9	1.6	1.1	103.5	14.7	0.5	9.8	4.6	0.3	0.2	50.1	141.1	7.6	54.1	59.7	6.4	4.2	227.2
2026	46.4	2.7	26.4	18.7	1.4	1.2	109.8	12.6	0.5	9.2	3.8	0.2	0.2	46.5	148.0	12.4	73.4	74.1	8.0	6.0	255.3
2027	51.0	3.4	25.9	16.0	1.8	2.5	120	11.4	0.5	7.3	2.4	0.1	0.3	44.8	191.1	17.8	78.6	72	11.9	15.8	316.9

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.3.1. Estimated small salmon spawners (medians, 5th percentile, 95th percentile; X 1000) from run reconstruction to the six geographic areas and overall, for NAC 1970 to 2023. Spawners for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23.

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	45.1	105.2	13.8	39.3	18.4	NA	222.5	30.1	89.9	11.3	30.3	14.6	NA	197.4	68.5	120.6	16.3	48.3	22.2	NA	252.1
1971	60.5	92.2	11.7	32.6	12.2	0	209.9	40.7	79.0	9.6	25.6	9.3	0	182.9	91.5	105.4	13.8	39.7	15.0	0	243.8
1972	45.5	86.3	10.3	40.1	10.8	0	194.0	30.7	73.2	8.4	31.1	8.0	0	169.8	68.7	99.1	12.1	49.4	13.7	0	222.3
1973	6.5	124.3	13.7	45.9	18.3	0	208.8	1.9	106.7	11.3	36.7	14.6	0	187.6	12.3	142.0	16.2	54.5	22.0	0	230.2
1974	51.5	94.2	12.6	76.4	33.0	0	268.5	35.0	80.7	10.3	61.6	26.7	0	239.9	76.9	107.9	14.8	90.7	39.5	0	301.1
1975	99.5	117.5	14.5	67.5	26.2	0.1	326.3	67.4	99.5	11.9	54.5	22.7	0.1	283.8	149.7	135.7	17.1	80.2	29.6	0.1	381.1
1976	67.8	124.3	16.2	90.0	40.7	0.2	341.0	45.4	104.6	13.3	72.0	34.5	0.1	301.3	103.4	144.0	19.2	107.9	47.0	0.2	385.8
1977	61.1	125.3	15.0	24.8	32.2	0.1	259.7	41.2	106.2	12.3	18.6	26.3	0.1	228.0	92.5	144.9	17.7	30.9	38.0	0.1	296.6
1978	30.0	110.8	14.4	22.8	9.0	0.1	188.1	20.3	93.0	11.7	18.0	7.7	0.1	166.0	45.4	128.5	16.9	27.6	10.4	0.1	211.8
1979	38.0	120.8	19.8	49.6	36.5	0.2	266.5	25.1	102.0	16.3	40.0	30.1	0.2	238.3	59.0	139.7	23.4	59.1	43.1	0.2	296.4
1980	92.3	136.4	26.1	43.5	49.6	0.7	349.9	62.4	116.5	21.3	35	41.8	0.7	308.9	139.3	156.4	30.7	51.9	57.6	0.7	402.0
1981	100.4	178.8	38.7	69.8	40.4	1.0	430.7	67.4	151.2	31.7	49.5	32.0	1.0	377.2	152.6	206.4	45.7	90.7	48.6	1.0	493.3
1982	69.7	158.7	21.1	88.8	24.4	0.3	364.8	46.8	135.8	17.3	63.8	19.7	0.3	319.2	104.8	181.8	24.9	113.8	29.2	0.3	413.4
1983	41.3	124.4	15.0	23.6	14.8	0.3	220.7	27.4	105.6	12.3	16.1	12.1	0.3	194.0	63.7	143.2	17.8	31.3	17.6	0.3	250.1
1984	21.4	167.0	20.8	21.6	32.8	0.5	264.9	13.9	140.3	19.8	12.0	26.6	0.5	233.5	32.9	193.4	21.8	31.0	38.8	0.5	296.1
1985	40.0	159.2	21.1	59.4	36.1	0.4	317.3	26.8	132.2	20.0	41.9	28.9	0.4	279.4	60.8	186.7	22.3	77.5	43.4	0.4	357.0
1986	62.6	162.8	28.2	121.8	39.5	0.7	416.7	41.8	137.2	26.7	86.6	31.9	0.7	364.8	94.2	188.5	29.6	154.9	47.1	0.7	470.5
1987	77.3	111.0	33.2	89.2	41.1	1.1	354.4	51.2	93.7	31.4	64.5	33.2	1.1	310.2	117.4	127.7	35.0	113.9	49.0	1.1	404.0
1988	70.2	177.3	36.8	126	42.3	0.9	456.1	46.2	151.1	35.0	91.1	34.4	0.9	400.3	107.3	204.6	38.7	161.4	50.0	0.9	514.6
1989	47.3	89.2	31.2	69.5	43.7	1.1	283.6	31.2	76.3	29.8	47.7	35.5	1.1	248.9	72.5	101.9	32.6	91.2	51.7	1.1	319.4
1990	27.1	122.3	33.3	84.3	44.0	0.6	312.7	17.6	108.2	31.8	60.3	35.2	0.6	280.4	41.7	136.6	34.9	108.3	52.9	0.6	345.5
1991	22.1	85.1	26.6	66.2	22.3	0.2	223.3	14.3	75.7	25.4	48.8	18.6	0.2	200.4	34.0	94.4	27.8	83.9	26.0	0.2	246.9
1992	31.1	205.4	27.8	159.8	26.4	1.1	453.0	21.3	176.4	26.4	131.7	21.7	1.1	408.9	48.1	234.4	29.2	187.7	31.0	1.1	497.3
1993	42.9	239.1	22.6	112.8	20.5	0.4	440.2	30.6	209.0	21.4	65.9	16.7	0.4	379.3	64.0	268.9	23.7	160.2	24.3	0.4	501.1
1994	31.0	130.1	21.2	44.8	9.1	0.4	237.6	22.2	107.8	20.3	35.1	8.0	0.4	210.6	45.4	152.0	22.2	54.4	10.2	0.4	265.4

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1995	44.9	171.1	18.0	48.2	17.9	0.2	301.8	33.2	140.3	17.2	39.4	15.3	0.2	266.2	63.9	201.7	18.9	56.9	20.4	0.2	338.2
1996	87.3	274.3	23.2	35.2	28.2	0.7	451.3	64.9	230.7	22.3	28.6	24.0	0.6	398.0	124.2	318.1	24.2	41.6	32.5	0.7	506.8
1997	93.0	151.7	18.9	19.0	8.3	0.4	292.3	71.2	133.8	18.0	14.6	7.2	0.4	261.5	128.1	169.4	19.7	23.5	9.5	0.4	331.3
1998	147.9	158.4	21.6	25.5	19.9	0.4	373.9	100.2	145.9	20.6	21.2	18.3	0.4	324.0	197.1	170.6	22.7	29.9	21.5	0.4	424.7
1999	145.4	176.4	23.8	21.4	10.2	0.4	377.9	97.7	161.0	22.7	17.9	9.4	0.4	327.0	192.1	191.8	24.9	24.8	.0	0.4	427.4
2000	179.0	204.7	21.4	31.2	12.0	0.3	448.5	120.6	192.7	19.6	26.4	11.0	0.3	388.7	236.9	216.7	23.3	36.0	13.0	0.3	507.7
2001	141.8	133.5	13.9	26.6	5.1	0.3	321.2	96.4	125.4	13.2	22.5	4.7	0.3	275.1	189.6	141.8	14.6	30.6	5.5	0.3	369.2
2002	100.1	133.1	21.4	44.3	9.6	0.5	308.8	63.8	120.6	20.5	37.2	8.7	0.4	269.0	136.4	145.3	22.3	51.4	10.4	0.5	347.8
2003	83.4	219.6	19.4	25.9	5.6	0.2	353.8	49.8	210.0	18.6	21.7	5.1	0.2	318.5	116.5	229.4	20.2	30.0	6.1	0.2	389.0
2004	92.8	188.4	26.3	49.4	8.1	0.3	365.5	69.8	170.2	24.6	41.1	7.4	0.3	334.5	115.2	206.5	28.1	57.4	8.9	0.3	395.6
2005	218.0	197.3	18.3	29.6	7.3	0.3	471.7	163.4	151.9	17.2	23.8	6.6	0.3	395.3	272.7	241.8	19.4	35.4	8.0	0.3	543.9
2006	211.4	191.3	21.6	38.7	10.0	0.4	473.8	138.3	172.7	20.5	31.0	9.1	0.4	397.1	283.6	209.8	22.7	46.5	11.0	0.5	548.6
2007	192.6	167.9	16.7	26.4	7.5	0.3	411.2	136.2	142.7	15.6	20.7	6.8	0.3	348.7	248.3	193	17.8	32.2	8.3	0.3	473.2
2008	201.3	217.4	26.9	39.5	15.1	0.8	500.9	146.5	192.0	25.5	30.3	13.7	0.8	439.3	256.2	242.7	28.3	48.8	16.6	0.8	563.1
2009	100.4	197.2	16.2	15.8	4.1	0.2	334.1	58.3	169.0	15.2	11.9	3.7	0.2	281.6	142.8	225.5	17.2	19.7	4.5	0.2	386.9
2010	120.1	235.1	21.5	47.0	14.8	0.5	439.3	81.1	223.7	20.1	40.0	13.3	0.5	397.2	158.8	246.8	22.8	53.9	16.2	0.5	480.3
2011	245.5	214.2	28.2	48.8	9.4	1.1	546.8	145.1	187.8	26.7	38.5	8.4	1.1	442.2	343.7	241.2	29.7	59	10.3	1.1	650.1
2012	172.6	246.9	17.8	11.5	0.6	0	449.4	110.5	226.8	16.7	8.6	0.5	0	383.8	233.3	266.9	18.8	14.4	0.6	0	514.6
2013	154.7	163.4	14.6	15.1	2.1	0.1	349.0	88.7	148.0	13.6	11.1	1.9	0.1	282.0	218.7	178.7	15.5	19.1	2.3	0.1	415.4
2014	265.1	146.1	16.8	8.8	1.4	0.1	438.4	183.4	131.2	15.8	7.1	1.3	0.1	355.9	348.6	160.8	17.8	10.5	1.5	0.1	523.2
2015	255.6	251.8	28.1	37.7	4.2	0.1	577.3	181.6	222.1	26.7	33.2	3.8	0.1	495.9	330.1	281.8	29.5	42.1	4.6	0.2	658.0
2016	204.6	178.8	26.3	23.0	2.5	0.2	435.6	116.4	154.6	24.7	18.7	2.3	0.2	344.6	292.6	203.3	27.7	27.2	2.8	0.2	526.6
2017	162.9	156.2	19.1	21.3	3.9	0.4	363.3	88.4	129	17.9	17.7	3.5	0.4	283.6	236.3	183.3	20.2	25.0	4.3	0.4	442.5
2018	274.2	91.8	18.1	17.1	1.3	0.3	403.3	175.5	74.2	17.1	14.3	1.2	0.3	302.9	376.5	109.3	19.2	19.9	1.4	0.3	506.0
2019	117.1	238.2	16.5	15.4	3.5	0.4	390.6	65.7	180.2	15.5	12.5	3.2	0.4	310.2	167.1	297.3	17.4	18.3	3.8	0.4	470.7
2020	197.2	183.9†	21.1	25.8†	3.1†	0.2	431.6†	138.5	135.3	20.0	21.9	2.8	0.2	351.4	257.6	231.8	22.2	29.8	3.4	0.2	512.6
2021	189.2	402.4	28.0	28.5	3.6	0.2	652.1	112.6	297.5	26.5	20.9	3.3	0.2	515.0	266.7	505.2	29.3	36.2	4.0	0.2	788.8

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2022	334.2	141.4	20.5	17.5	1.5	0.4	515.4	169.8	119.9	19.6	13.1	1.3	0.4	351.2	504.4	163.8	21.5	21.9	1.6	0.4	687.3
2023	353.2	111.5	11.1	8.0	0.7	0.1	485.2	158.5	88.5	10.5	6.0	0.6	0.1	290.5	550.6	134.2	11.8	9.9	0.7	0.1	682.8
Prev. 5-year																					
	222.7	211.3	20.7	20.4	2.6	0.3	477.8														
%Change (recent year relative to previous 5-year mean)																					
	6%	-24%	-46%	-53%	-55%	-65%	-6%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	45	53	54	53	43	6														

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.3.2. Estimated large salmon spawners (medians, 5th percentile, 95th percentile; X1000) from run reconstruction to the six geographic areas and overall, for NAC 1970 to 2023. Spawners for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23.

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	9.5	12.7	39.1	11.8	7.9	NA	81.4	4.4	9.7	32.1	9.6	5.5	NA	70.9	16.5	15.7	46.2	14.1	10.2	NA	92.3
1971	13.9	11.0	20.3	11.8	8.2	0.5	65.8	6.6	8.4	16.6	9.4	6.4	0.5	56.1	23.8	13.6	23.9	14.2	10.0	0.5	77.3
1972	12.0	11.3	39.8	33.3	11.9	1.0	109.6	5.7	8.7	32.6	25.5	10.1	1.0	96.3	20.5	13.9	46.8	41.1	13.9	1.0	123.5
1973	16.1	15.4	40.4	35.4	7.6	1.1	116.4	7.5	11.8	33.0	27.8	6.3	1.1	101.2	28.1	18.9	47.5	43.0	8.9	1.1	132.9
1974	16.2	13.0	49.1	55.8	15.2	1.1	150.9	7.5	11.4	40.2	44.5	13.0	1.1	132.7	28.0	14.6	57.9	67.4	17.5	1.2	169.9
1975	15.4	17.1	40.9	33.7	17.8	1.9	127.3	7.4	14.9	33.4	26.5	15.2	1.9	112.6	26.4	19.5	48.0	41.0	20.5	2.0	142.6
1976	17.4	15.6	38.9	29.2	17.0	1.1	119.5	8.1	13.6	31.8	22.0	14.1	1.1	104.3	30.0	17.6	45.8	36.3	19.8	1.1	135.8
1977	14.9	11.8	55.9	55.4	21.6	0.6	160.9	6.7	10.2	45.8	43.3	18.1	0.6	141.2	26.0	13.5	65.8	67.8	25.0	0.6	180.5
1978	11.9	9.8	51.2	19.3	10.9	3.3	106.8	5.5	8.8	42.0	14.5	9.2	3.3	93.2	20.7	10.8	60.4	24.1	12.5	3.3	120.4
1979	6.7	6.6	22.0	8.8	7.9	1.5	53.7	2.9	5.7	18.0	6.7	6.7	1.5	47.0	11.6	7.5	25.9	10.9	9.2	1.5	60.7
1980	16.5	10.1	60.9	34.5	24.0	4.3	150.6	7.6	9.2	50.0	26.9	19.8	4.2	132.9	28.3	11.1	71.9	42.0	28.0	4.3	169.2
1981	15.1	27.5	44.8	16.0	12.7	4.3	120.9	7.2	23.9	36.7	9.9	9.9	4.3	106.1	25.9	31.1	52.8	22.3	15.5	4.4	136.3
1982	10.9	10.4	45.5	26.8	10.4	4.6	109.0	5.0	8.8	37.2	15.8	8.3	4.6	92.5	18.8	11.9	53.6	38.3	12.5	4.7	125.6
1983	8.0	11.1	29.6	18.2	5.7	1.8	74.7	3.7	9.9	24.3	11.4	3.5	1.8	63.7	13.7	12.3	34.9	25.2	7.9	1.8	85.5
1984	5.5	11.9	37.6	28.7	20.0	2.5	106.3	2.4	8.6	35.9	19.3	16.7	2.5	94.9	9.6	15.1	39.5	37.8	23.4	2.6	117.7
1985	4.4	10.9	36.5	43.1	28.6	4.9	128.7	2.0	7.6	34.4	30.6	23.7	4.8	114.3	7.7	14.2	38.7	55.9	33.4	4.9	143.3
1986	7.8	12.2	41.2	65.9	24.9	5.6	157.7	3.6	9.4	39.2	46.8	20.5	5.5	136.8	13.2	15.1	43.1	85.5	29.3	5.6	178.9
1987	10.4	8.4	36.5	43.5	16.0	2.8	117.9	4.7	6.4	34.6	30.9	13.4	2.8	103.3	18.0	10.4	38.5	55.8	18.7	2.8	132.9
1988	6.2	13.0	43.7	51.1	14.8	3.0	132.2	2.7	9.8	41.3	37.3	12.1	3.0	116.6	11.0	16.1	46.0	65.0	17.5	3.1	147.5
1989	6.2	6.9	41.7	40.2	18.2	2.8	116.1	2.8	5.4	39.8	29.1	15.2	2.8	103.4	10.7	8.4	43.6	51.2	21.0	2.8	128.7
1990	3.5	10.2	41.5	54.5	15.2	4.4	129.5	1.5	8.3	38.8	37.8	12.8	4.3	111.8	6.1	12.1	44.2	71.4	17.8	4.4	147.1
1991	1.8	7.5	33.6	55.5	14.1	2.4	115.0	0.8	6.1	31.2	38.2	11.9	2.4	97.2	3.1	8.9	35.9	73.2	16.3	2.4	133.4
1992	6.8	31.2	33.0	57.6	13.0	2.3	144.4	3.2	21.9	30.6	49.1	11.0	2.3	130.3	12.0	40.5	35.3	66.2	15.0	2.3	158.2
1993	9.1	17.0	25.4	62.7	8.8	2.1	125.6	5.6	13.6	24.5	33.6	7.6	2.0	95.7	14.7	20.2	26.4	91.9	9.9	2.1	155.1
1994	12.6	16.9	25.0	40.0	5.4	1.3	101.9	8.1	13.4	24.1	31.9	4.8	1.3	91.0	20.2	20.4	26.0	48.0	6.1	1.4	113.1

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1995	25.4	18.6	34.9	47.3	7.1	1.7	135.4	17.8	14.0	33.8	40.4	6.2	1.7	123.3	37.4	23.0	35.9	54.3	8.0	1.8	149.7
1996	18.2	28.4	30.2	39.4	10.0	2.4	129	12.9	23.3	29.2	31.5	8.7	2.4	117.6	26.5	33.6	31.3	47.4	11.3	2.4	141.4
1997	15.9	27.6	25.1	34.3	4.9	1.6	109.8	11.4	22.5	24.2	26.9	4.3	1.6	99.2	23.4	32.6	26.0	41.8	5.5	1.6	121.1
1998	13.1	34.8	23.2	29.8	3.5	1.5	105.9	7.7	27.0	22.4	24.3	3.2	1.5	94.6	18.5	42.8	24.0	35.2	3.8	1.5	117.1
1999	15.7	31.8	28.1	26.2	4.4	1.2	107.4	9.1	24.6	26.9	21.9	4.1	1.2	96.4	22.2	38.9	29.3	30.5	4.8	1.2	118.0
2000	21.3	26.5	26.8	28.9	2.7	1.6	108.0	12.6	22.5	25.3	24.3	2.4	1.6	97.0	30.4	30.6	28.4	33.6	2.9	1.6	119.2
2001	22.7	17.5	28	38.5	4.4	1.5	112.7	13.3	14.8	26.7	33.6	4.0	1.5	101.3	32.1	20.2	29.3	43.5	4.8	1.5	123.8
2002	16.6	16.5	20.7	22.7	1.4	0.5	78.4	9.5	13.5	19.8	19.0	1.2	0.5	69.6	23.7	19.7	21.6	26.4	1.5	0.5	87.2
2003	13.7	24.2	33.8	38.8	3.3	1.2	115.0	7.0	19.0	32.2	32.5	3.0	1.2	104.1	20.6	29.1	35.4	45.1	3.6	1.2	125.8
2004	16.7	21.8	28.4	38.5	3.0	1.3	109.6	11.2	16.7	27.1	31.4	2.7	1.3	99.0	22.0	26.9	29.6	45.6	3.2	1.3	120.1
2005	20.6	27.8	28.2	37.1	1.9	1.1	116.6	11.7	20.0	27.0	30.3	1.7	1.1	102.4	29.4	35.8	29.3	44.1	2.1	1.1	131.0
2006	20.9	35.2	26.2	35.9	2.8	1.4	122.4	12.9	29.5	25.2	29.4	2.5	1.4	110.4	28.6	40.9	27.2	42.3	3.1	1.4	134.5
2007	21.4	29.2	23.7	33.5	1.5	1.2	110.6	12.5	23.2	22.7	28.2	1.3	1.2	98.0	30.6	35.5	24.6	38.9	1.6	1.2	123.2
2008	25.9	28.2	30.1	27.7	3.2	2.2	117.5	15.6	22.0	28.7	21.9	2.8	2.2	103.4	36.2	34.5	31.6	33.5	3.5	2.3	131.1
2009	38.6	34.0	28.8	34.9	3.0	2.3	141.9	20.3	23.5	27.6	29.3	2.7	2.3	119.2	57.5	44.7	30.0	40.7	3.3	2.3	165.0
2010	18.6	34.8	32.0	31.6	2.4	1.5	120.7	11.3	28.1	30.9	26.3	2.1	1.5	109.3	25.8	41.5	33.1	37.0	2.6	1.5	132.1
2011	56.9	42.8	39.7	62.9	4.7	3.9	210.9	32.9	30.7	38.3	50.9	4.2	3.9	180.9	81.8	54.7	41.0	74.9	5.2	3.9	242.0
2012	33.4	28.6	27.5	26.1	1.2	2.1	118.9	20.4	23.0	26.4	21.4	1.1	2.0	103.7	46.9	34.2	28.6	30.9	1.4	2.1	134.7
2013	64.1	37.4	31.8	34.4	3.1	5.3	175.9	39.5	25.5	30.7	27.3	2.8	5.2	147.0	88.4	49.0	33.0	41.5	3.5	5.3	205.1
2014	61.9	19.9	17.4	22.4	0.7	0.6	122.9	38.5	16.2	16.7	17.8	0.7	0.6	98.9	85.3	23.7	18.0	26.9	0.8	0.6	147.0
2015	88.4	36.3	30.9	32.6	0.7	1.5	190.2	53.7	28.5	29.8	26.7	0.7	1.5	154.7	124.1	44.0	31.9	38.3	0.8	1.5	227.3
2016	71.7	34.4	33.3	37.2	1.5	0.9	179.4	38.9	27.0	32.0	29.3	1.4	0.9	144.4	103.5	41.9	34.7	45.1	1.7	0.9	213.0
2017	74.8	20.4	32.9	34.8	1.2	1.5	165.5	35.0	15.4	31.6	29.5	1.1	1.4	125.4	116.1	25.5	34.2	40.1	1.3	1.5	207.4
2018	46.3	8.4	24.4	38.7	1.5	0.9	120.1	25.2	6.2	23.5	30.2	1.3	0.9	97.0	67.1	10.5	25.3	47.1	1.7	0.9	143.2
2019	27.3	36.2	26.3	22.5	0.7	1.2	114.3	14.1	24.8	25.4	17.3	0.7	1.2	95.8	40.3	47.9	27.3	27.7	0.8	1.2	133.2
2020	45.6	30.7†	34.4	43.6†	1.1†	1.5	157.0†	44.1	20.1	33.4	35.1	1.0	1.5	143.6	47.1	41.0	35.5	51.9	1.3	1.5	170.2
2021	49.2	52.9	28.6	19.7	0.8	0.4	151.7	46.1	34.6	27.6	14.0	0.7	0.4	132.0	52.3	71.7	29.5	25.4	0.9	0.4	171.6

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2022	84.5	30.4	31.7	33.3	2.3	1.5	183.7	46.4	19.9	30.7	26.7	2.0	1.5	143.5	123.4	40.9	32.6	40.2	2.6	1.5	225.0
2023	97.0	14.4	25.6	23.5	1.1	3.7	165.4	73.8	10.3	24.7	17.2	1.0	3.6	141.0	121.4	18.5	26.4	29.9	1.3	3.7	190.9
Prev. 5-year																					
	50.5	31.5	28.6	31.3	1.3	1.1	144.3														
%Change (recent year relative to previous 5-year mean)																					
	92%	-54%	-10%	-25%	-14%	236%	15%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	35	43	44	50	9	6														

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.3.3. Estimated 2SW salmon spawners (medians, 5th percentile, 95th percentile; X 1000) from run reconstruction to the six geographi c areas and overall, for NAC 1970 to 2023. Spawners for Scotia-Fundy (SF) do not include those from SFA 22 and a portion of SFA 23.

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1970	9.5	3.2	28.6	9.9	6.5	NA	58	4.4	2.3	23.4	8.2	4.7	NA	49.5	16.5	4.2	33.7	11.7	8.3	NA	67.2
1971	13.9	3.0	14.8	10.4	7.1	0.5	49.8	6.6	2.1	12.1	8.3	5.6	0.5	40.9	23.8	3.9	17.5	12.5	8.5	0.5	60.3
1972	12.0	3.1	29.1	29.1	10.4	1.0	84.9	5.7	2.2	23.8	22.3	8.7	1.0	73.4	20.5	4.1	34.2	36.0	12.0	1.0	97.2
1973	16.1	3.8	29.5	32.2	6.7	1.1	89.9	7.5	2.8	24.1	25.2	5.5	1.1	76.3	28.1	4.9	34.7	39.1	7.8	1.1	104.6
1974	16.2	3.1	35.8	49.0	14.1	1.1	119.9	7.5	2.4	29.3	38.9	11.9	1.1	103.8	28.0	3.8	42.3	58.9	16.2	1.2	136.8
1975	15.4	4.7	29.8	28.9	16.3	1.9	97.3	7.4	3.4	24.4	22.7	13.9	1.9	84.6	26.4	6.0	35.1	35.1	18.8	2.0	111.4
1976	17.4	4.0	28.4	24.1	15.5	1.1	90.7	8.1	3.0	23.2	18.3	12.9	1.1	77.6	30.0	5.0	33.4	29.9	18.1	1.1	105.6
1977	14.9	2.8	40.8	51.5	18.8	0.6	129.8	6.7	2.2	33.4	40	15.7	0.6	112.4	26.0	3.4	48.1	62.9	21.9	0.6	148.0
1978	11.9	3.1	37.3	16.0	9.4	3.3	81.4	5.5	2.5	30.7	12.1	7.9	3.3	70.0	20.7	3.6	44.1	19.9	10.9	3.3	93.1
1979	6.7	1.6	16.0	5.8	6.7	1.5	38.4	2.9	1.2	13.1	4.4	5.6	1.5	32.9	11.6	2.0	18.9	7.2	7.7	1.5	44.5
1980	16.5	3.3	44.5	31.5	21.3	4.3	121.7	7.6	2.6	36.5	24.7	17.6	4.2	106.1	28.3	3.9	52.5	38.3	24.9	4.3	137.7
1981	15.1	6.6	32.7	9.8	10.4	4.3	79.0	7.2	5.1	26.8	5.9	8.3	4.3	67.3	25.9	8.1	38.5	13.7	12.5	4.4	92.4
1982	10.9	2.8	33.2	21.2	7.8	4.6	80.8	5.0	2.2	27.1	12.2	6.2	4.6	67.3	18.8	3.4	39.1	30.2	9.4	4.7	94.7
1983	8.0	3.3	21.6	14.0	4.2	1.8	53.1	3.7	2.7	17.8	8.6	2.7	1.8	44.2	13.7	3.9	25.5	19.6	5.7	1.8	62.3
1984	5.5	3.2	27.5	25.9	17.5	2.5	82.4	2.4	2.3	26.2	17.3	14.5	2.5	72.1	9.6	4.1	28.8	34.7	20.5	2.6	92.9
1985	4.4	2.7	26.7	35.1	24.6	4.9	98.6	2.0	1.9	25.1	24.2	20.6	4.8	86.3	7.7	3.5	28.3	45.8	28.8	4.9	110.7
1986	7.8	3.2	30.0	55.1	18.4	5.6	120.4	3.6	2.4	28.6	38.9	15.3	5.5	102.8	13.2	4.1	31.4	71.6	21.6	5.6	138.2
1987	10.4	2.3	26.7	33.5	12.2	2.8	88.3	4.7	1.6	25.3	23.5	10.2	2.8	75.7	18.0	3.0	28.1	43.2	14.2	2.8	100.9
1988	6.2	3.4	31.9	40.7	10.3	3.0	95.9	2.7	2.4	30.2	29.4	8.5	3.0	83.4	11.0	4.4	33.6	52.0	12.1	3.1	108.4
1989	6.2	1.7	30.4	26.6	14.3	2.8	82.3	2.8	1.2	29.1	19.1	12.1	2.8	73.2	10.7	2.1	31.8	34.1	16.6	2.8	91.4
1990	3.5	2.7	30.3	35.5	11.0	4.4	87.5	1.5	2.0	28.4	24.8	9.2	4.3	76.0	6.1	3.3	32.3	46.0	12.8	4.4	98.8
1991	1.8	2.0	24.5	34.8	11.6	2.4	77.3	0.8	1.6	22.8	23.7	9.8	2.4	65.8	3.1	2.5	26.2	45.8	13.5	2.4	88.6
1992	6.8	8.1	24.1	36.5	10.8	2.3	88.7	3.2	5.4	22.3	30.7	9.2	2.3	80.8	12	10.8	25.8	42.3	12.5	2.3	97.3

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
1993	9.1	4.3	18.6	42.7	6.9	2.1	83.9	5.6	3.2	17.9	22.3	6.0	2.0	63	14.7	5.4	19.3	62.5	7.8	2.1	104.8
1994	12.6	3.9	18.3	29.4	4.4	1.3	70.4	8.1	2.8	17.6	23.2	3.9	1.3	61.9	20.2	5.0	18.9	35.7	4.9	1.4	79.9
1995	25.4	3.7	25.5	38.9	6.5	1.7	101.9	17.8	2.4	24.7	33.0	5.6	1.7	91.5	37.4	5.0	26.2	44.8	7.3	1.8	115.2
1996	18.2	5.5	22.1	28.3	8.4	2.4	85.2	12.9	3.9	21.3	22.0	7.3	2.4	76.1	26.5	7.1	22.9	34.5	9.4	2.4	95.5
1997	15.9	5.9	18.3	23.1	4.0	1.6	69.3	11.4	4.1	17.7	17.4	3.5	1.6	61.0	23.4	7.6	18.9	28.9	4.4	1.6	78.4
1998	8.5	6.3	16.9	15.9	2.3	1.5	51.6	5.0	4.4	16.3	12.5	2.1	1.5	46.1	12.3	8.3	17.5	19.5	2.5	1.5	57.2
1999	10.2	6.2	20.5	15.2	3.7	1.2	57.1	6.0	4.3	19.7	12.3	3.5	1.2	51.4	14.7	8.1	21.4	18.1	4.0	1.2	62.8
2000	13.9	6.2	19.6	16.3	2.2	1.6	59.9	8.3	4.4	18.5	13.4	2.0	1.6	53.0	20.1	8.0	20.7	19.3	2.4	1.6	67.2
2001	14.8	2.4	20.5	26.2	4.0	1.5	69.4	8.7	1.7	19.5	22.5	3.7	1.5	62.0	21.1	3.2	21.4	29.8	4.4	1.5	77.0
2002	10.8	2.4	15.1	13.6	0.8	0.5	43.2	6.3	1.6	14.4	11.1	0.7	0.5	37.7	15.7	3.2	15.8	16.1	0.9	0.5	48.8
2003	9.0	3.3	24.7	25.3	3.1	1.2	66.7	4.6	2.2	23.5	20.7	2.8	1.2	59.8	13.6	4.5	25.9	29.9	3.4	1.2	73.4
2004	10.8	3.2	20.7	24.9	2.6	1.3	63.6	7.3	2.0	19.8	19.7	2.4	1.3	56.9	14.6	4.5	21.6	29.9	2.8	1.3	70.1
2005	13.4	4.3	20.6	25.9	1.6	1.1	66.9	7.6	2.5	19.7	20.8	1.4	1.1	58.7	19.5	6.2	21.4	30.9	1.7	1.1	75.2
2006	13.6	5.3	19.1	21.7	2.4	1.4	63.5	8.4	3.5	18.4	17.4	2.1	1.4	56.2	19.0	7.1	19.9	26	2.6	1.4	71.0
2007	14.0	4.1	17.3	21.7	1.3	1.2	59.5	8.1	2.6	16.6	18.0	1.2	1.2	52.1	20.2	5.6	18.0	25.3	1.4	1.2	67.1
2008	16.9	3.8	22.0	18.2	3.0	2.8	66.8	10.1	2.4	20.9	14.0	2.6	2.8	58.1	24.0	5.2	23.0	22.4	3.3	2.8	75.4
2009	25.0	4.5	21.0	23.2	2.5	2.3	78.7	13.2	2.7	20.1	19.1	2.3	2.3	65.7	37.5	6.4	21.9	27.3	2.8	2.3	92.1
2010	12.0	4.6	23.3	19.5	1.9	1.5	62.9	7.3	3.1	22.5	15.6	1.7	1.5	56.2	16.9	6.1	24.1	23.5	2.1	1.5	69.6
2011	37.0	3.6	28.9	50.4	4.6	3.9	128.4	21.3	2.4	27.9	40.3	4.1	3.8	109.2	53.5	4.9	29.9	60.3	5.0	3.9	148.1
2012	21.6	2.3	20.0	18.6	1.0	2.0	65.7	13.2	1.6	19.2	15.2	0.9	2.0	56.3	30.8	3.0	20.9	22.1	1.1	2.0	75.6
2013	41.5	4.8	23.2	24.5	2.9	5.2	102.1	25.5	3.0	22.4	19.2	2.6	5.2	85.0	58.2	6.5	24.1	29.6	3.3	5.3	119.9
2014	40.1	2.8	12.7	16.4	0.7	0.6	73.3	24.9	1.9	12.2	12.8	0.6	0.6	57.5	56	3.8	13.1	20.1	0.7	0.6	89.6
2015	57.3	4.8	22.5	21.4	0.7	1.5	108.4	34.8	3.2	21.8	17.2	0.6	1.5	85.3	81.5	6.4	23.3	25.6	0.7	1.5	132.7
2016	46.6	3.1	24.3	27.0	1.5	0.9	103.3	25.3	2.2	23.4	21.1	1.3	0.9	81.1	67.8	3.9	25.3	33.0	1.6	0.9	125.7
2017	48.6	2.0	24.0	26.0	1.1	1.4	103.2	22.7	1.4	23.0	21.7	1.0	1.4	76.8	75.6	2.7	25.0	30.3	1.2	1.5	130.7

Year	Median of estimated spawners (X 1000)							5th percentile of estimated spawners (X 1000)							95th percentile of estimated spawners (X 1000)						
	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC	LAB	NF	QC	GF	SF	US	NAC
2018	30.0	1.4	17.8	31.0	1.4	0.9	82.5	16.4	0.8	17.1	23.9	1.2	0.9	66.8	44.0	2.1	18.5	38.2	1.6	0.9	98.7
2019	17.7	4.6	19.2	16.8	0.7	1.2	60.1	9.2	2.7	18.5	12.6	0.6	1.2	50.3	26.3	6.5	19.9	21.0	0.7	1.2	70.1
2020	29.7	3.8†	25.1	32†	1.1†	1.5	93.2†	27.3	2.2	24.4	25.2	1.0	1.4	85.8	32.0	5.5	25.9	38.8	1.2	1.5	100.5
2021	32.0	8.0	20.8	15.5	0.8	0.4	77.6	28.9	4.3	20.2	10.7	0.7	0.4	70.7	35.2	11.7	21.5	20.4	0.8	0.4	84.5
2022	54.8	3.7	23.1	25.2	2.1	1.5	110.4	30.0	2.3	22.4	19.5	1.8	1.5	84.9	80.8	5.2	23.8	30.8	2.3	1.5	137.3
2023	63.1	2.5	21.7	18.4	1.0	3.7	110.6	47.6	1.4	21.0	13.0	0.9	3.6	93.6	80.1	3.7	22.4	23.9	1.2	3.7	128.4
Prev. 5-year																					
	32.8	4.3	24.0	23.7	1.2	1.1	87.2														
%Change (recent year relative to previous 5-year mean)																					
	92%	-42%	-10%	-22%	-18%	236%	27%														
Rank (highest = 1 to lowest) over 54 years (1971 to 2023)																					
	1	45	41	40	48	9	8														
2SW CL																					
	34.7	4.0	17.4	18.7	24.7	29.2															
% 2SW CL attained in most recent year (2023)																					
	182%	63%	125%	98%	4%	13%															
2SW management objective																					
					11.0	4.5															
% 2SW management objective attained in most recent year (2023)																					
					9%	81%															

†: In 2020, some regions were affected by the COVID-19 global pandemic and monitoring programs could not operate. For these areas previous 5-year averages were used.

Table 4.3.4.1. Time-series of stocks in Canada and the USA with established CLs, the number of rivers assessed, and the number and percentage of assessed rivers meeting CLs 1991 to 2023. In 2016, Quebec implemented a new Atlantic salmon management plan which changed their river-specific LRP values (Dionne *et al.*, 2015) and DFO Gulf Region revised the river-specific reference points in 2018 (DFO 2018).

Year	Canada				USA			
	No. CLs	No. assessed	No. met	% met	No. CLs	No. assessed	No. met	% met
1991	74	64	34	53				
1992	74	64	38	59				
1993	74	69	30	43				
1994	74	72	28	39				
1995	74	74	36	49	33	16	0	0
1996	74	76	44	58	33	16	0	0
1997	266	91	38	42	33	16	0	0
1998	266	83	38	46	33	16	0	0
1999	269	82	40	49	33	16	0	0
2000	269	81	31	38	33	16	0	0
2001	269	78	29	37	33	16	0	0
2002	269	80	21	26	33	16	0	0
2003	269	79	33	42	33	16	0	0
2004	269	75	39	52	33	16	0	0
2005	269	70	31	44	33	16	0	0
2006	269	65	29	45	33	16	0	0
2007	269	61	23	38	33	16	0	0
2008	269	68	29	43	33	16	0	0
2009	375	70	32	46	33	16	0	0
2010	375	68	31	46	33	16	0	0
2011	458	75	50	67	33	16	0	0
2012	472	74	32	43	33	16	0	0
2013	473	75	46	61	33	16	0	0
2014	476	69	20	29	33	16	0	0
2015	476	74	43	58	33	16	0	0
2016	476	62	41	66	33	16	0	0
2017	476	68	42	62	33	16	0	0
2018	498	70	38	54	33	16	0	0
2019	498	71	41	58	33	16	0	0
2020	498	57	40	70	33	16	0	0
2021	498	73	39	53	33	14	0	0
2022	498	69	45	65	33	14	0	0
2023	498	66	33	50	33	13	0	0

Table 4.3.5.1. Return rates (%) by year of smolt migration of wild Atlantic salmon as 1SW (or small) salmon to North American rivers 1991 to 2022 smolt migration years. The year 1991 was selected as the start of the time series for illustration as it is the first year of the commercial fishery moratorium for the island of Newfoundland.

	USA	Scotia-Fundy				Gulf				Quebec				Newfoundland						
Smolt year	Narraguagus	Nashwaak	La Have	St Mary's	Middle	Margaree	NW Miramichi	SW Miramcihi	Miramichi	À la Barbe	Saint Jean	Bec scie	de la Trinité	Highlands	Conne	Rocky	NE Trepassey	Campbellton	Garnish	WAB
1991										0.6	0.5	1.2	1.6		3.4	3.1	2.6			3.6
1992										0.5	0.4	1.3	0.8		4.0	3.7	4.7			6.1
1993										0.4	0.3	0.9	0.7	1.5	2.7	3.1	5.4	9.0		7.1
1994											0.3	1.2	0.6	1.6	5.8	3.9	8.5	7.3		8.9
1995											0.6	1.4	0.9	1.6	7.2	4.7	9.2	8.1		8.1
1996			1.5								0.3		0.6	3.2	3.4	3.1	2.9	3.4		3.5
1997	0.04		4.3										1.7	1.4	2.9	2.5	5.0	5.3		7.2
1998	0.21	2.9	2.0								0.3		1.4	2.5	3.4	2.7	4.9	6.1		6.1
1999	0.31	1.8	4.8				3.0				0.3		0.4	0.6	8.1	3.2	5.9	3.8		11.1
2000	0.28	1.5	1.2				4.9				0.5		0.3	0.6	2.5	3.1	3.2	6.0		4.4
2001	0.16	3.1	2.7				6.6	8.6	7.9		0.5		0.6		3.0	2.9	7.1	5.3		9.2
2002	0.00	1.9	2.0			1.5	2.4	3.0	3.0		0.6		0.9		2.4	4.0	5.5	6.8		9.4
2003	0.08	6.4	1.8			1.6	4.1	6.8	5.9		0.6		0.6		5.3	3.8	6.6	7.8		9.5
2004	0.08	5.1	1.1			0.9	2.6	1.8	2.0		0.7		1.0		2.5	3.3	4.4	11.4		5.9
2005	0.24	12.7	8.0	3.0		1.1	3.6				0.4		1.5		4.0	2.2	5.5	9.2		15.1
2006	0.09	1.8	1.5	0.7		0.7	1.4	1.5	1.5		0.3				3.3	1.3	2.7	5.6		3.8
2007	0.35	5.6	2.3	2.2		1.3		1.6			0.4		1.5		4.4	5.6	5.5	11.2		11.6
2008	0.22	3.9	1.2	0.6		0.3		1.0			0.6		0.7		2.4	2.7	2.6	8.8		6.1
2009	0.26	12.4	3.5			1.0		3.3			0.8		1.9		2.5	6.8	4.9	9.5		9.6

	USA	Scotia-Fundy				Gulf				Quebec				Newfoundland						
Smolt year	Narraguagus	Nashwaak	La Have	St Mary's	Middle	Margaree	NW Miramichi	SW Miramichi	Miramichi	À la Barbe	Saint Jean	Bec scie	de la Trinité	Highlands	Conne	Rocky	NE Trepassey	Campbellton	Garnish	WAB
2010	0.95	7.9	1.8					1.5			0.7		2.5		2.7	5.1	5.6	11.0		7.1
2011	0.32	0.3									0.4		0.6		3.9	4.6	3.0	9.7		5.7
2012	0.00	1.6									0.4		0.4		5.3	3.7	4.0	9.3		5.2
2013	0.26	1.6	0.6		0.2						0.9		0.6		1.9	5.3		10.0		7.2
2014	0.32	2.9	0.6		0.4						0.9		1.9		4.1			8.8		8.2
2015	0.09	5.0	0.4		0.2								1.2		3.6			8.4		9.4
2016		2.8	0.7		1.1						0.2		0.5			7.7		3.7		5.7
2017											0.8		0.7		0.8	6.2		8.5	2.8	9.3
2018	1.99				0.4						0.5		0.4			14.7		7.0	2.5	3.4
2019	0.27										1.4		0.8		0.6	17.0		7.3	0.9	5.6
2020											1.2		2.0							
2021	0.49		1.1								0.7		0.5		1.2	5.4		7.5	3.9	10.7
2022	0.39										0.5		0.1			2.6			1.1	

Table 4.3.5.2. Return rates (%) by year of smolt migration of wild Atlantic salmon as 2SW salmon to North American rivers 1991 to 2021 smolt migration years. The year 1991 was selected as the start of the time series for illustration as it is the first year of the commercial fishery moratorium for the island of Newfoundland.

	USA	Scotia-Fundy				Gulf				Quebec				Nfld
Smolt year	Narraguagus	Nashwaak	LaHave	St Mary's	Middle	Margaree	NW Miramichi	SW Miramcihi	Miramichi	À la Barbe	Saint Jean	Bec scie	de la Trinité	Highlands
1991										0.6	0.9	0.4	0.6	
1992										0.5	0.7	0.4	0.5	
1993										0.4	0.8	0.9	0.7	1.2
1994											0.9	1.5	0.7	1.4
1995											0.9	0.4	0.5	1.3
1996			0.2								0.4		0.5	0.9
1997	0.87		0.4										1.1	1.2
1998	0.28	0.7	0.3								0.4		0.7	1.1
1999	0.53	0.8	0.9				1.2				0.7		0.2	0.7
2000	0.17	0.3	0.1				0.5				1.2		0.1	0.7
2001	0.85	0.9	0.6				0.6	3.3	2.3		0.9		0.3	
2002	0.58	1.3	0.5			6.2	0.7	1.4	1.3		0.9		0.5	
2003	1.01	1.6	0.2			3.9	0.9	2.0	1.6		1.4		0.2	
2004	0.98	1.3	0.3			3.0	0.5	0.8	0.7		1.1		0.7	
2005	0.73	1.5	0.5	0.3		2.3	1.1				0.6		0.5	
2006	0.74	0.6	0.4	0.1		3.0	0.2	0.5	0.4		0.5			
2007	2.07	1.3	0.2	0.1		2.1		0.8			0.5		0.3	
2008	0.65	2.1	0.3			2.4		0.7			1.8		0.5	
2009	1.80	3.3	0.9			5.7		2.2			1.9		0.8	

	USA	Scotia-Fundy				Gulf				Quebec				Nfld
Smolt year	Narraguagus	Nashwaak	LaHave	St Mary's	Middle	Margaree	NW Miramichi	SW Miramcihi	Miramichi	À la Barbe	Saint Jean	Bec scie	de la Trinité	Highlands
2010	0.24	0.4	0.2								1.0		0.6	
2011	0.56	1.0									1.7		0.3	
2012	1.02	0.3									0.6		0.1	
2013	1.91	0.5	0.2		1.7						1.9		0.3	
2014	0.51	0.6	0.2		1.5						1.2		0.6	
2015	0.62	1.2	0.4		2.0								0.4	
2016		0.4	0.2		2.2						0.7		0.2	
2017											1.9		0.3	
2018	3.31				3.8						2.0		0.3	
2019	0.40	0.5									1.9		0.3	
2020											3.1		0.6	
2021											2.2		0.3	

Table 4.3.5.3. Return rates (%) by year of smolt migration of hatchery Atlantic salmon as 1SW salmon to North American rivers 1991 to 2022 smolt migration years. The year 1991 was selected as the start of the time series for illustration as it is the first year of the commercial fishery moratorium for Newfoundland.

	USA			Scotia-Fundy				Gulf	Quebec			
Smolt year	Connecticut	Penobscot	Merrimack	Saint John	La Have	East Sheet	Liscomb	Morell	Mill	West	Valleyfield	Aux Rochers
1991	0.00	0.14	0.01	0.69	4.51	0.15	0.50	3.16			0.48	0.43
1992	0.00	0.04	0.00	0.41	1.26	0.21	0.42	1.43	0.44	2.16	0.70	0.07
1993	0.00	0.05	0.00	0.39	0.62	0.32	0.56	0.14	0.37		0.02	0.10
1994	0.00	0.03	0.00	0.66	1.44	0.36	0.35	5.20	0.11		0.08	0.02
1995		0.08	0.02	1.14	2.26	0.37	0.64					0.07
1996		0.04	0.02	0.56	0.47	0.07	0.17					0.31
1997		0.04	0.02	0.75	0.87	0.03	0.15					0.46
1998		0.04	0.09	0.47	0.34	0.05	0.10					1.04
1999		0.03	0.05	0.46	0.79	0.23						0.32
2000	0.00	0.04	0.01	0.27	0.43	0.03						1.15
2001		0.07	0.06	0.45	0.87							0.02
2002		0.04	0.02	0.34	0.63							0.07
2003	0.00	0.05	0.03	0.32	0.72							
2004	0.00	0.05	0.02	0.39	0.53							
2005	0.02	0.06	0.02	0.56								
2006	0.00	0.04	0.02	0.24								
2007	0.01	0.13	0.01	0.83								
2008	0.00	0.03	0.00	0.13								
2009	0.00	0.07	0.03	1.44								

Smolt year	USA			Scotia-Fundy				Gulf	Quebec			
	Connecticut	Penobscot	Merrimack	Saint John	La Have	East Sheet	Liscomb	Morell	Mill	West	Valleyfield	Aux Rochers
2010	0.01	0.12	0.18	0.12								
2011	0.00	0.00	0.00	0.02								
2012		0.01	0.00	0.67								
2013		0.02	0.01	0.11								
2014		0.02		0.24								
2015		0.06		0.11								
2016		0.05		0.54								
2017		0.05		0.25								
2018		0.05		0.15								
2019		0.04		0.67								
2020		0.04										
2021		0.06										
2022		0.02										

Table 4.3.5.4. Return rates (%) by year of smolt migration of hatchery Atlantic salmon as 2SW salmon to North American rivers 1991 to 2021 smolt migration years. The year 1991 was selected as the start of the time series for illustration as it is the first year of the commercial fishery moratorium for Newfoundland.

	USA			Scotia Fundy				Gulf				Quebec
SMOLT YEAR	Connecticut	Penobscot	Merrimack	Saint John	La Have	East Sheet	Liscomb	Morell	Mill	West	Valleyfield	Aux Rochers
1991	0.04	0.19	0.02	0.15	0.48	0.00	0.05	0.04			0.00	0.13
1992	0.08	0.08	0.00	0.22	0.24	0.01	0.03	0.07	0.00	0.05	0.06	0.06
1993	0.04	0.19	0.03	0.19	0.21	0.02	0.03	0.31	0.91		0.01	0.19
1994	0.04	0.22	0.05	0.27	0.23	0.06	0.02					0.05
1995		0.16	0.06	0.19	0.23	0.00	0.03					0.04
1996		0.14	0.09	0.08	0.13	0.01						0.07
1997		0.10	0.11	0.20	0.17	0.01						0.08
1998		0.05	0.06	0.06	0.11	0.00						0.09
1999		0.08	0.13	0.16	0.21	0.00						0.02
2000	0.01	0.06	0.03	0.05	0.07							0.01
2001		0.16	0.26	0.15	0.13							0.02
2002		0.17	0.18	0.11	0.17							
2003	0.00	0.12	0.05	0.06	0.09							
2004	0.03	0.12	0.13	0.09	0.11							
2005	0.02	0.10	0.10	0.12								
2006	0.02	0.23	0.15	0.06								
2007	0.02	0.30	0.08	0.17								
2008	0.01	0.15	0.05	0.16								
2009	0.04	0.39	0.17	0.13								
2010	0.00	0.09	0.11	0.07								
2011	0.01	0.05	0.02	0.02								
2012		0.03	0.08	0.10								
2013		0.10	0.02	0.02								
2014		0.04		0.09								
2015		0.12		0.04								
2016		0.08		0.00								
2017		0.16		0.00								
2018		0.22		0.06								
2019		0.06										
2020		0.17										
2021		0.26										

Table 4.3.6.1. Estimates (medians, 5th percentiles, 95th percentiles; X 1000) of Pre-fishery Abundance (PFA) for 1SW maturing salmon (PFA1SWmat), 1SW non-maturing salmon (PFA1SWnmat) and the total cohort of 1SW salmon (PFA1SWcohort), as of 1 January of the second summer at sea for NAC, as derived from the LCM. Years are PFA years. Predicted abundances are provided for four years under a 0-catch scenario.

Year	Median of estimated PFA (X 1000)			5th percentile of estimated PFA (X 1000)			95th percentile of estimated PFA (X 1000)		
	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort
1971	623.0	980.9	1605.8	573.6	892.6	1502.6	684.2	1075.2	1716.6
1972	634.6	1043.6	1681.2	577.8	970.0	1583.8	708.7	1124.3	1787.7
1973	785.1	1278.2	2064.3	711.8	1197.2	1954.6	877.9	1363.0	2189.5
1974	830.6	1161.7	1994.0	754.5	1090.6	1888.0	926.7	1236.9	2115.5
1975	941.5	1274.2	2218.0	873.0	1194.7	2105.3	1025.3	1358.5	2340.2
1976	927.4	1177.7	2106.5	863.9	1118.1	2013.2	1000.5	1240.6	2206.0
1977	698.0	962.0	1660.9	654.2	904.0	1585.0	747.5	1022.4	1738.7
1978	477.6	585.2	1063.4	444.9	547.3	1012.0	514.0	626.4	1120.0
1979	728.1	1171.5	1900.3	682.6	1109.5	1820.4	779.8	1237.2	1985.8
1980	954.5	1093.7	2049.6	892.5	1034.9	1960.2	1027.6	1156.6	2146.0
1981	1057.8	974.2	2031.9	991.5	915.3	1940.0	1131.5	1037.7	2134.4
1982	890.9	818.7	1710.9	832.3	772.0	1631.5	957.0	868.2	1795.6
1983	608.0	495.0	1103.1	567.6	471.1	1055.4	652.5	521.7	1156.9
1984	631.4	528.0	1160.2	590.9	502.1	1110.6	676.8	556.5	1215.6
1985	778.4	768.2	1547.1	725.4	722.9	1475.0	839.8	814.1	1626.1
1986	984.9	804.3	1790.6	915.7	758.3	1704.0	1062.6	853.3	1883.8
1987	967.7	737.3	1705.4	902.3	691.6	1623.1	1042.4	786.2	1795.7
1988	955.7	629.3	1585.1	891.7	591.3	1507.7	1024.6	670.3	1667.4
1989	707.5	505.8	1213.7	661.3	476.3	1155.8	760.1	538.5	1278.4
1990	671.2	441.5	1113.1	629.4	415.8	1062.3	717.4	471.1	1170.4

Year	Median of estimated PFA (X 1000)			5th percentile of estimated PFA (X 1000)			95th percentile of estimated PFA (X 1000)		
	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort
1991	519.3	497.3	1016.8	484.6	468.0	970.2	557.7	528.5	1066.7
1992	677.1	338.4	1016.5	628.7	309.8	957.4	730.8	373.8	1084.4
1993	613.2	265.3	879.2	563.0	247.6	822.2	670.1	285.5	942.2
1994	407.7	290.0	698.0	376.8	272.1	660.4	441.1	310.0	738.5
1995	454.6	321.2	775.7	416.1	300.9	729.7	496.0	343.3	825.8
1996	617.8	296.5	914.5	568.5	281.4	861.9	672.4	312.8	972.6
1997	422.0	226.2	648.7	398.1	210.2	618.2	447.1	244.3	680.5
1998	488.3	210.5	699.4	451.0	195.3	656.3	532.8	227.8	749.5
1999	515.0	204.7	720.1	471.8	190.7	671.6	566.1	221.1	776.7
2000	593.5	217.3	810.9	545.0	203.4	758.2	651.6	233.8	874.7
2001	438.1	161.2	599.7	399.7	149.1	556.9	484.6	175.1	650.1
2002	475.0	216.4	691.9	437.9	201.2	649.7	520.1	232.8	741.8
2003	508.3	216.3	725.0	471.5	200.6	682.7	551.1	233.3	772.5
2004	550.0	217.8	768.3	514.2	200.5	725.6	588.5	237.7	814.0
2005	616.8	232.9	850.3	551.7	216.3	779.9	690.4	251.9	928.3
2006	644.7	210.1	855.1	583.0	193.9	787.4	719.0	228.7	935.7
2007	558.3	228.7	788.2	499.7	209.0	722.8	628.5	251.5	864.0
2008	698.7	243.9	943.4	639.7	222.8	875.7	768.4	268.3	1019.9
2009	480.9	237.9	719.2	432.6	220.0	665.3	537.8	257.8	781.1
2010	654.9	347.5	1003.2	606.2	318.5	941.4	710.0	381.3	1073.1
2011	671.8	235.7	908.1	605.3	213.5	835.0	749.4	262.4	994.1
2012	577.5	311.2	889.9	522.8	277.1	822.3	643.4	352.3	970.1
2013	517.5	211.5	729.6	457.5	189.3	660.4	595.6	240.7	820.0

Year	Median of estimated PFA (X 1000)			5th percentile of estimated PFA (X 1000)			95th percentile of estimated PFA (X 1000)		
	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort	PFA1SWmat	PFA1SWnmat	PFA1SWcohort
2014	558.4	316.7	877.0	491.0	280.7	791.1	642.6	361.7	982.9
2015	739.6	325.4	1066.4	668.2	291.7	980.2	822.8	369.0	1166.2
2016	559.6	250.5	811.1	494.9	224.8	734.0	641.3	284.3	908.2
2017	459.7	210.1	671.5	399.6	185.0	598.8	537.4	242.5	761.0
2018	407.0	219.8	628.1	351.0	197.3	560.7	476.5	247.9	708.6
2019	504.7	292.5	797.9	430.5	273.7	718.9	592.3	314.9	889.8
2020	607.5	255.7	863.4	526.8	236.4	778.5	700.4	279.3	963.5
2021	734.3	324.8	1060.8	631.3	283.6	939.3	858.1	378.6	1205.6
2022	551.0	302.0	854.5	453.8	267.7	744.8	681.2	343.5	993.6
Prev. 5-year									
	560.9	279.0	840.9						
Change (recent year relative to previous 5-year mean)									
	1.5%	15.9%	6.3%						
Rank (highest = 1 to lowest) over time-series (1971 to most recent year)									
	36 / 52	29 / 52	34 / 52						
Forecast:									
2023*	450.8	267.4	728.6	270.1	161.4	465.9	784.5	452.7	1151.7
2024	490.9	270.5	777.9	251.9	133.2	438.5	1003.6	584.2	1486.2
2025	555.7	297.5	870.7	271.8	126.8	458.6	1194.9	676.0	1788.2
2026	651.8	327.8	1021.2	281.6	128.6	476.6	1555.7	847.0	2236.2
2027	630.7	351.0	1038.8	237.7	121.8	440.9	1626.6	955.0	2410.4

***PFA values are derived from incomplete input data (returns of 1SW maturing are not included) and therefore 2023 PFA values should not be compared to 2023 returns and spawners of 1SW fish (Tables 4.3.2.1 to 4.3.2.3 and 4.3.3.1 to 4.3.3.3). These values are included for completeness.**

Table 4.4.2.1. Probabilities that the returns of 2SW salmon to the six regions of NAC will meet or exceed the 2SW CL/MO in the absence of fishing on the 1SW non-maturing and 2SW age groups for the 2SW salmon return years 2025 to 2027.

Region	2SW CL/MO	Probability of meeting 2SW CL/MO in the absence of fisheries (2SW return year)		
		2025	2026	2027
Labrador	34 746	0.69	0.65	0.69
Newfoundland	4022	0.18	0.34	0.43
Quebec	17 364	0.74	0.76	0.72
Gulf	18 737	0.48	0.50	0.44
Scotia-Fundy	10 976	0.01	0.02	0.06
USA	4549	0.04	0.08	0.30

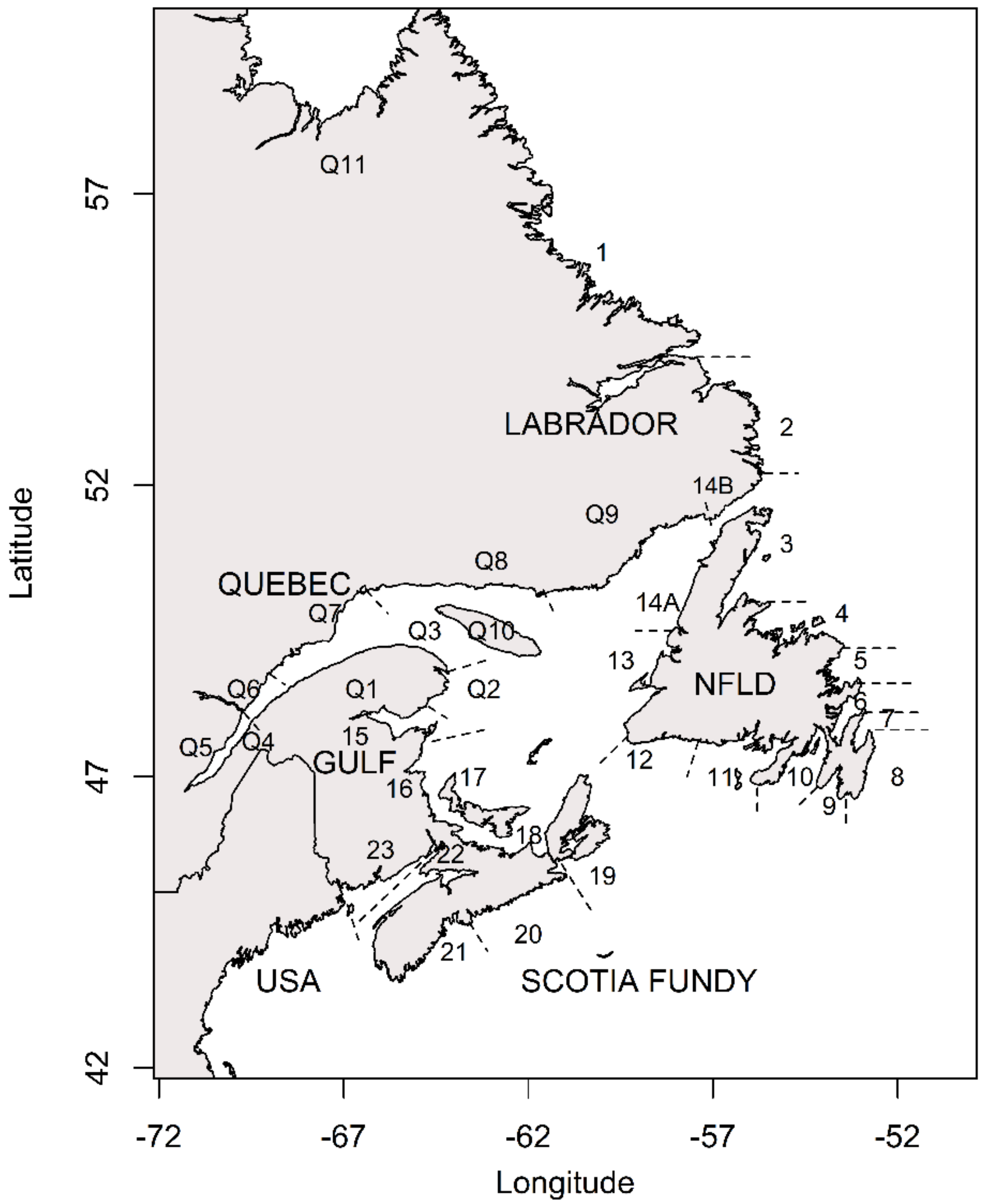


Figure 4.1.2.1. Map of Salmon Fishing Areas (SFAs) and Quebec Management Zones (Qs) in Canada.

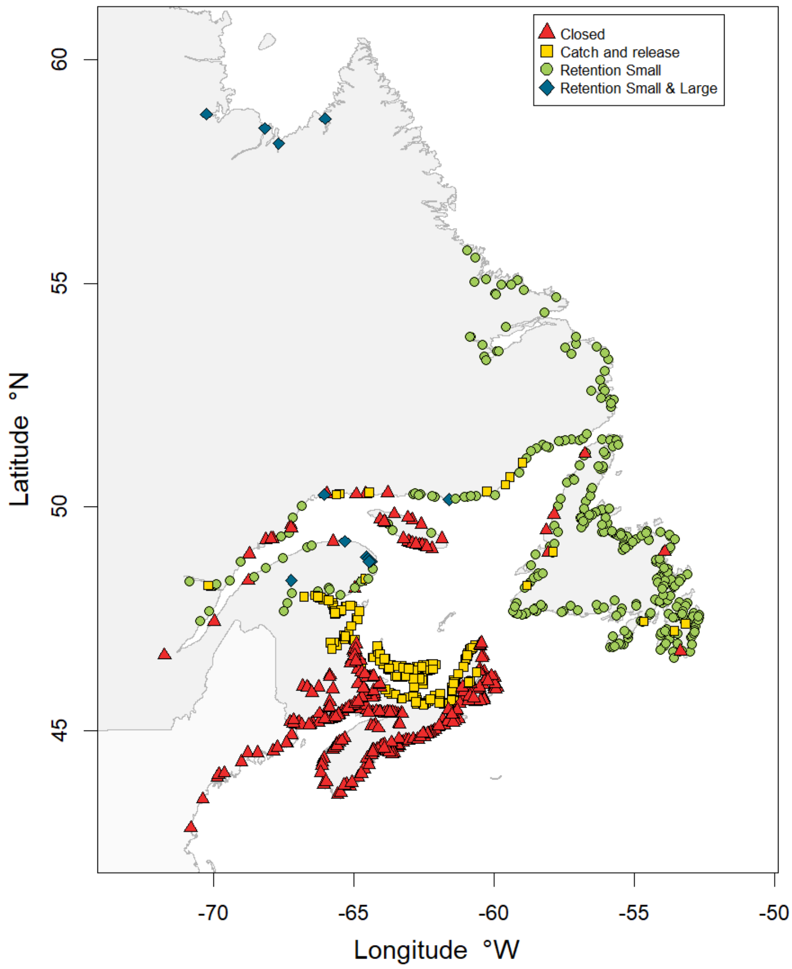


Figure 4.1.2.2. Summary of recreational fisheries management measures in Canada in 2023. Note: details on specific regions are available in the text and may not appear on the figure.

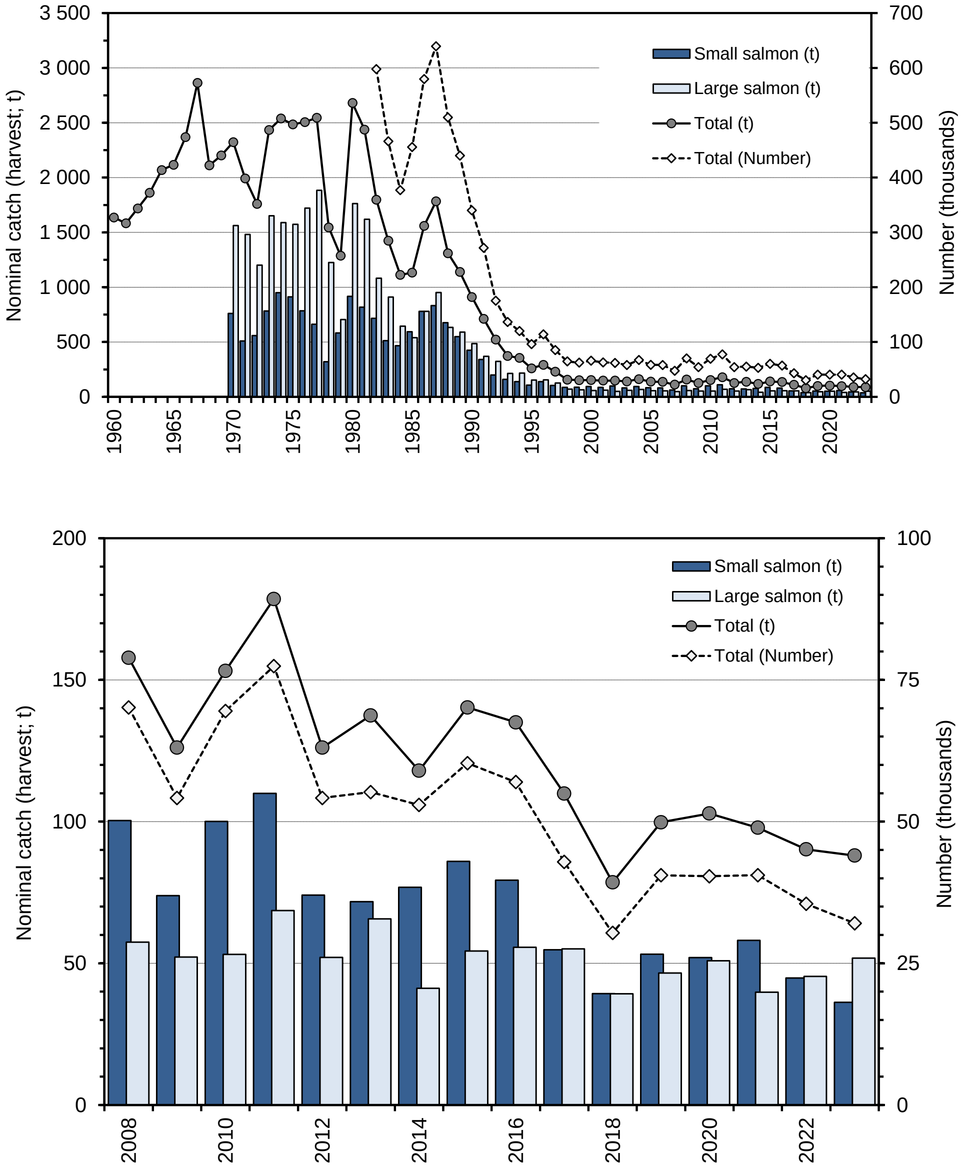
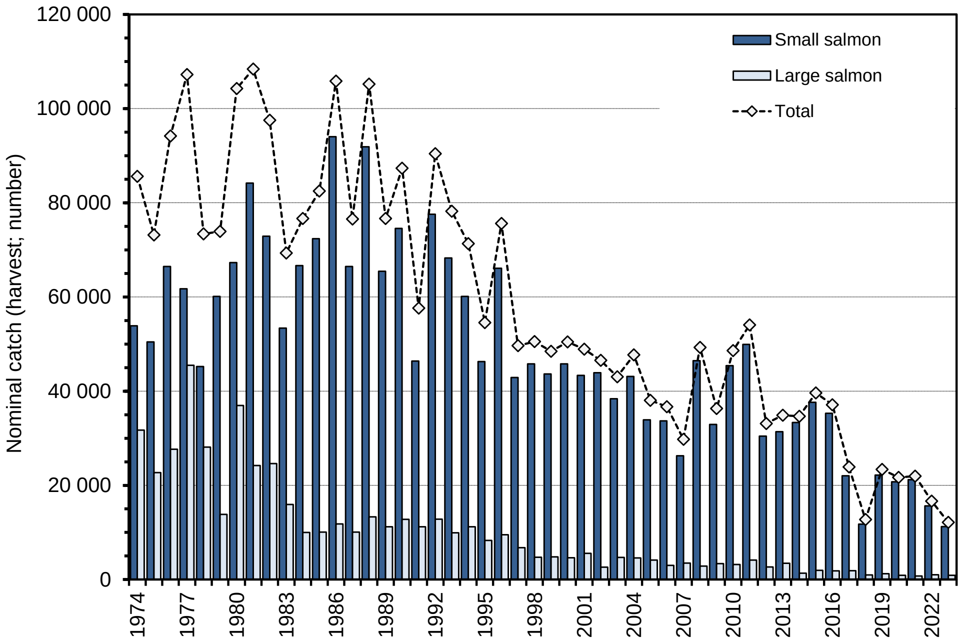


Figure 4.1.3.1. Nominal catch (t) of small salmon, large salmon and both sizes combined (weight and number) for Canada, 1960 to 2023 (top panel) and 2008 to 2023 (bottom panel) by all users.



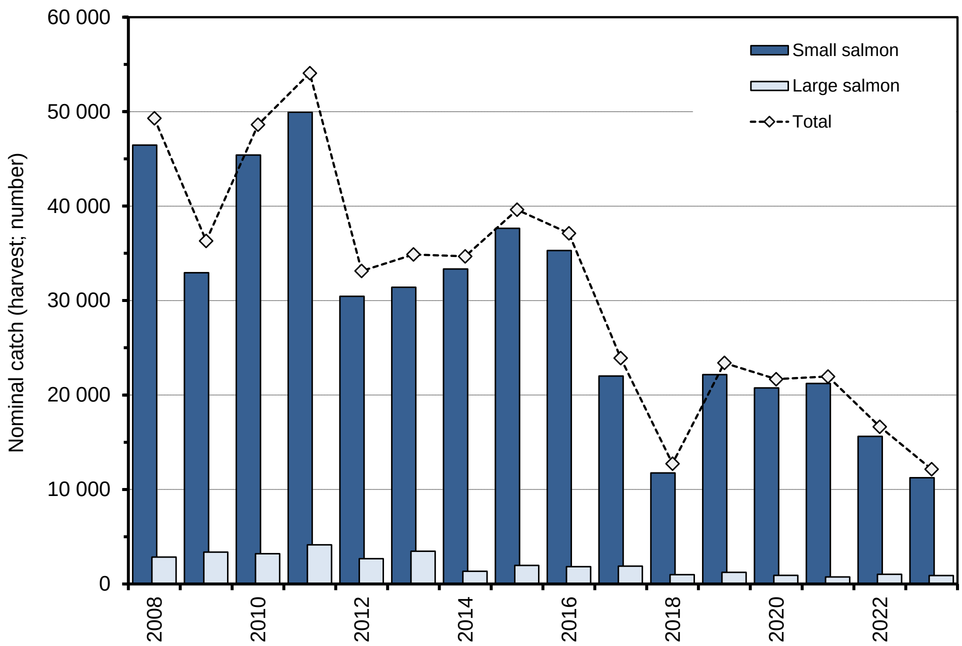


Figure 4.1.3.2. Nominal catch (number) of small salmon, large salmon, and both sizes combined, in the recreational fisheries in Canada, 1974 to 2023 (top panel) and 2008 to 2023 (bottom panel).

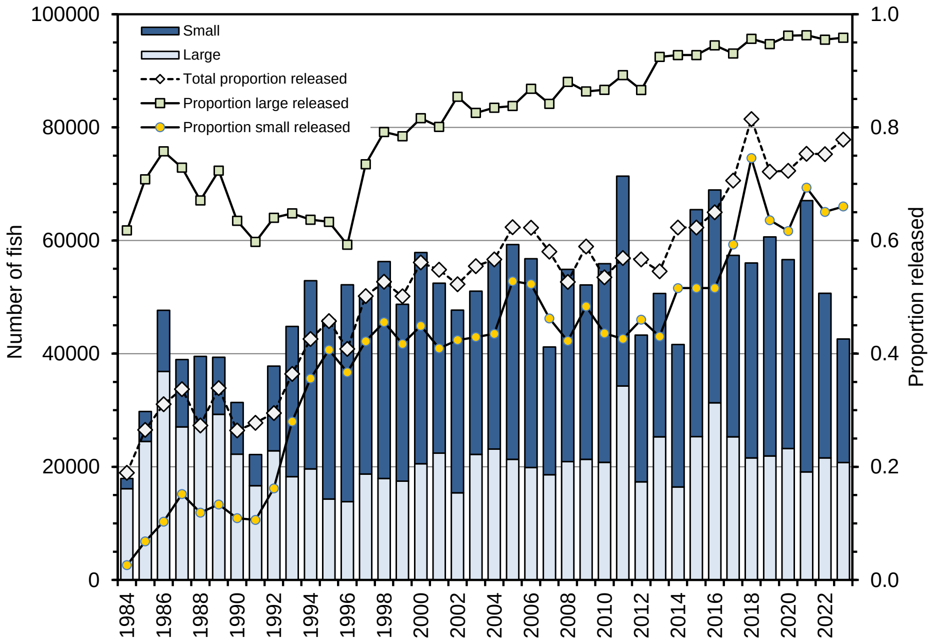


Figure 4.1.3.3. The number (bars) of caught and released small salmon and large salmon in the recreational fisheries of Canada, 1984 to 2023. Black lines represent the proportion released of the total catch (released and retained) (grey diamond); small salmon (yellow circle) and large salmon (grey square).

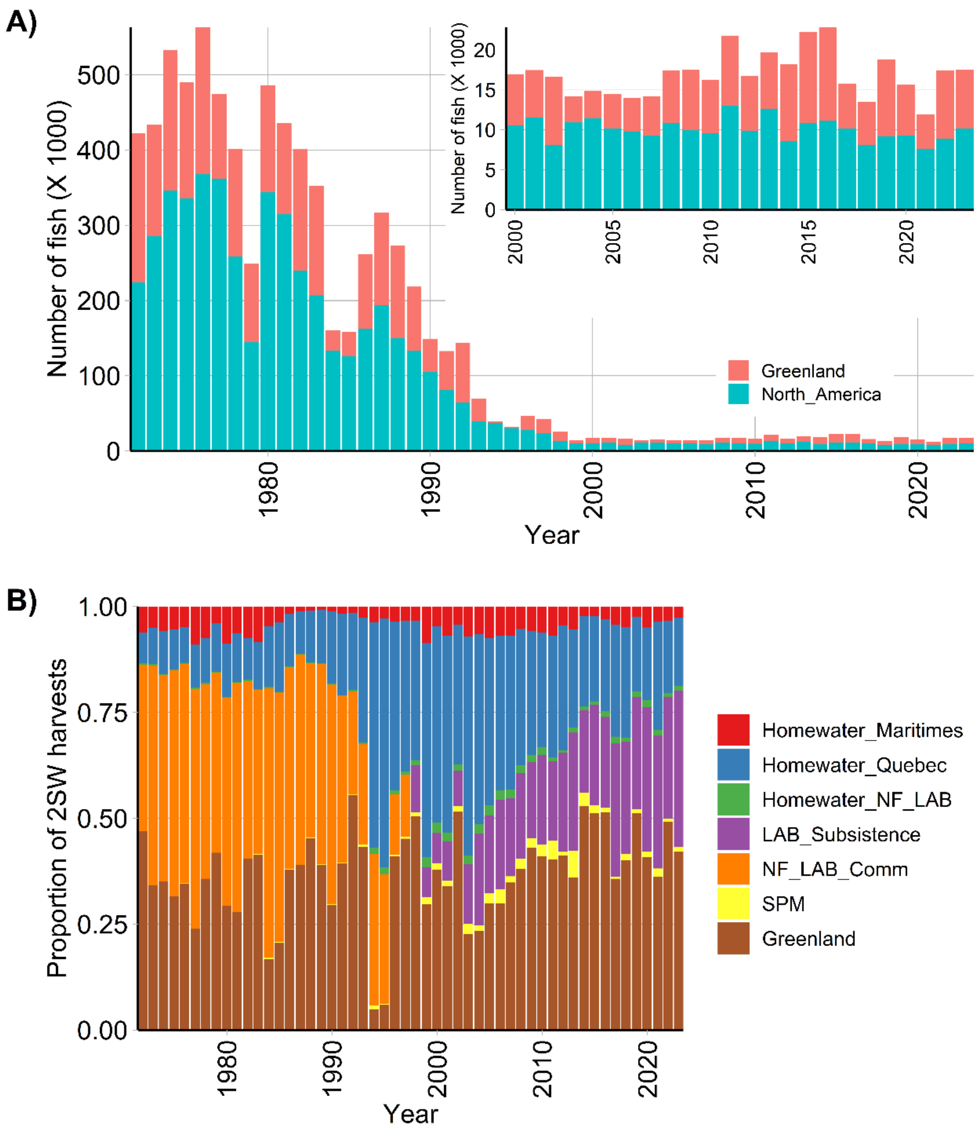


Figure 4.1.4.1. Estimates of the 2SW salmon catch (number of fish; year of 2SW catch) taken at Greenland (year – 1) and in North America (upper panel A), and the percentages of the catch from North American origin 2SW salmon equivalents taken in various fishing areas of the North Atlantic (lower panel B) 1972 to 2023.

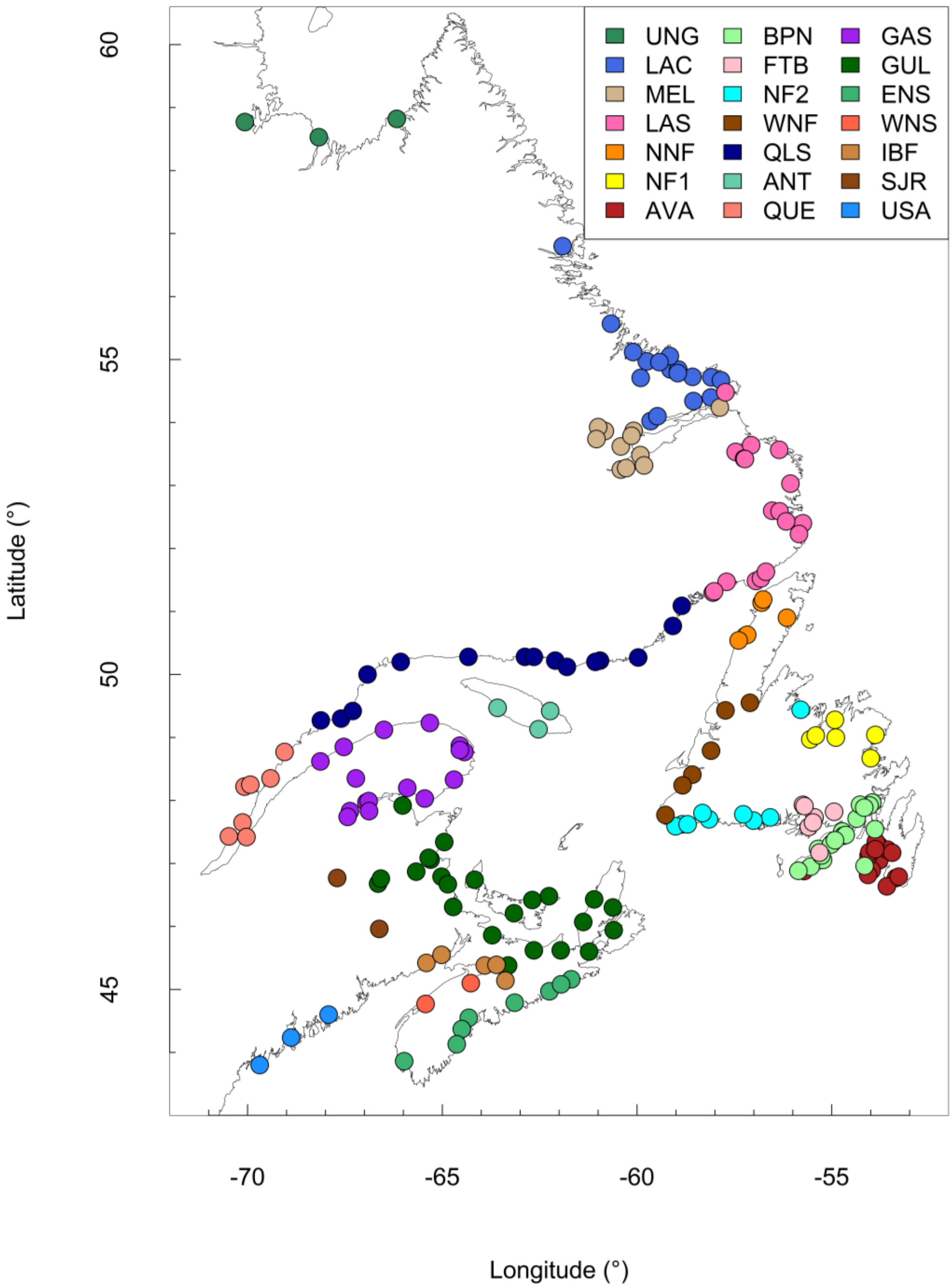


Figure 4.1.5.1 Map of North American sample locations used in the development of the SNP range wide baseline for Atlantic salmon (Jeffery *et al.*, 2018). The 21 North American reporting groups are labelled and identified by colour). See Figure 4.1.5.2 for full range wide baseline sampling locations.

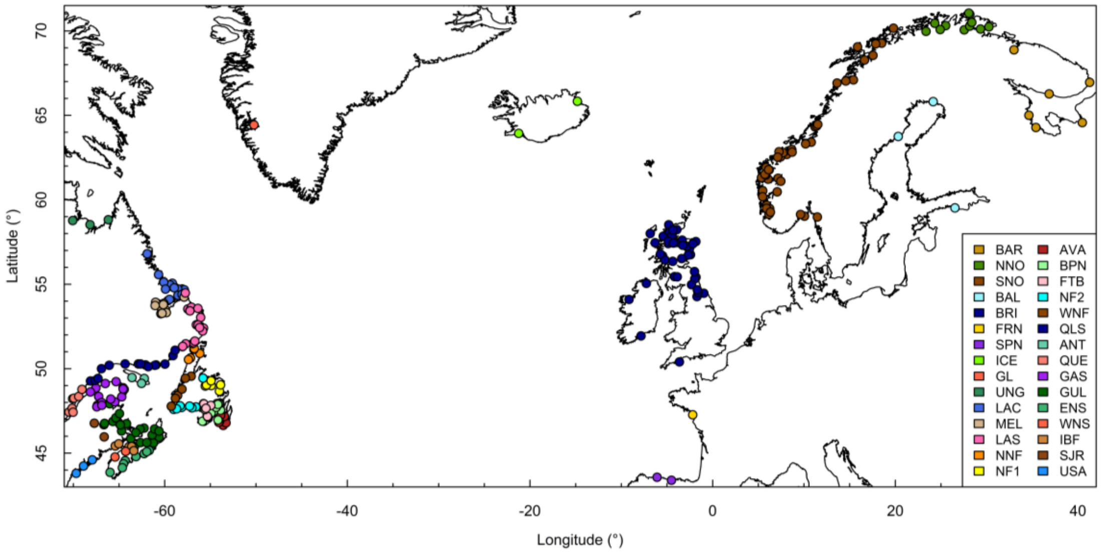


Figure 4.1.5.2. Map of range-wide sample locations used in the development SNP baseline for Atlantic salmon and the 31 defined reporting groups (labelled and identified by colour) (Jeffery *et al.*, 2018). See Figure 4.1.5.1 for finer resolution of North American locations.

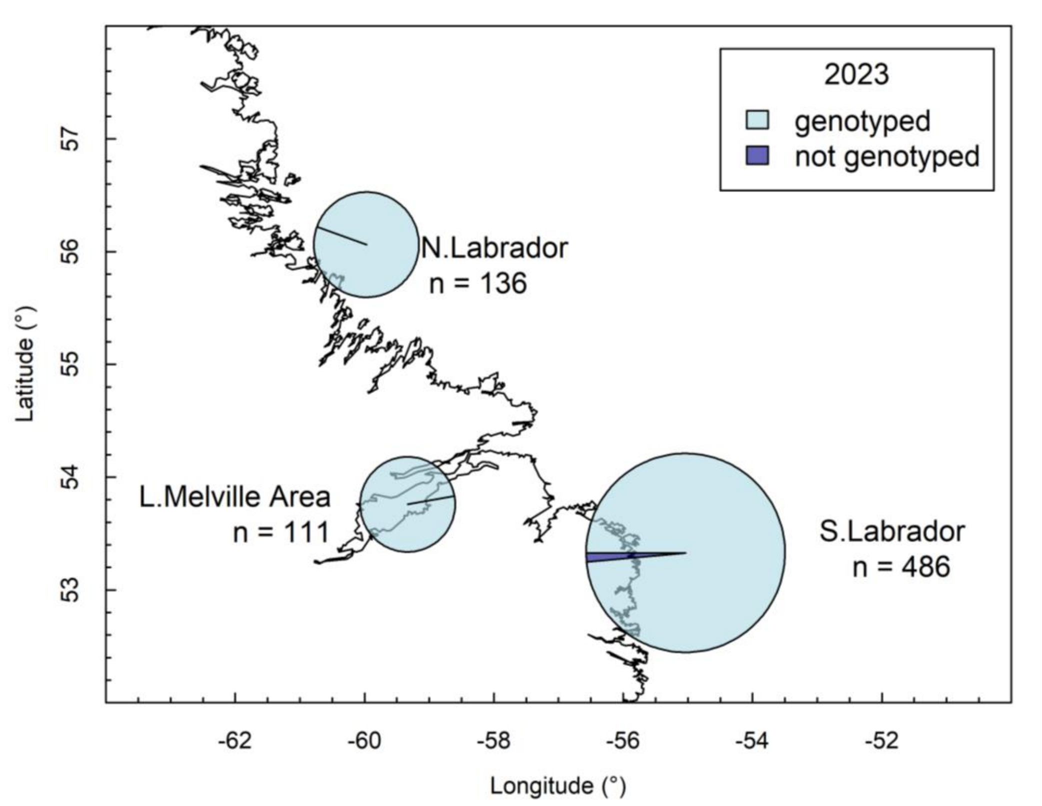


Figure 4.1.5.3. Total tissue samples available, and proportions of samples genotyped, by Salmon Fishing Area in the Labrador Atlantic salmon subsistence fisheries in 2023.

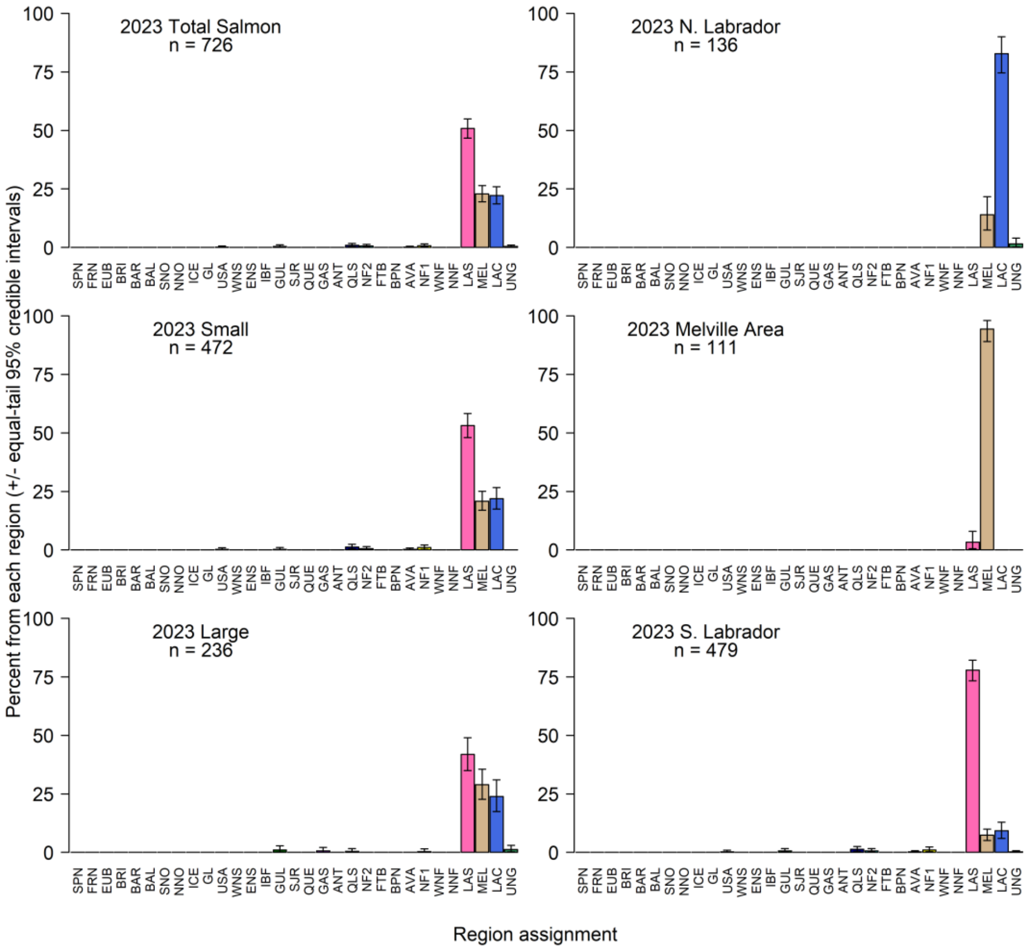


Figure 4.1.5.4. Bayesian estimate of mixture composition of samples from the Labrador Atlantic salmon subsistence fisheries for 2023 by size group (small < 63 cm, large ≥ 63 cm) and region (Figure 4.1.2.1: SFA 1A – N. Labrador, SFA 1B – Lake Melville, and SFA 2 –S. Labrador) using the SNP range wide baseline for Atlantic salmon (Jeffery *et al.* 2018). Baseline locations refer to regional reporting groups identified in Figure 4.1.5.1 and Figure 4.1.5.2. Regional assignment acronyms are explained in Table 4.1.5.1. Data are summarized in Table 4.1.5.2. Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value.

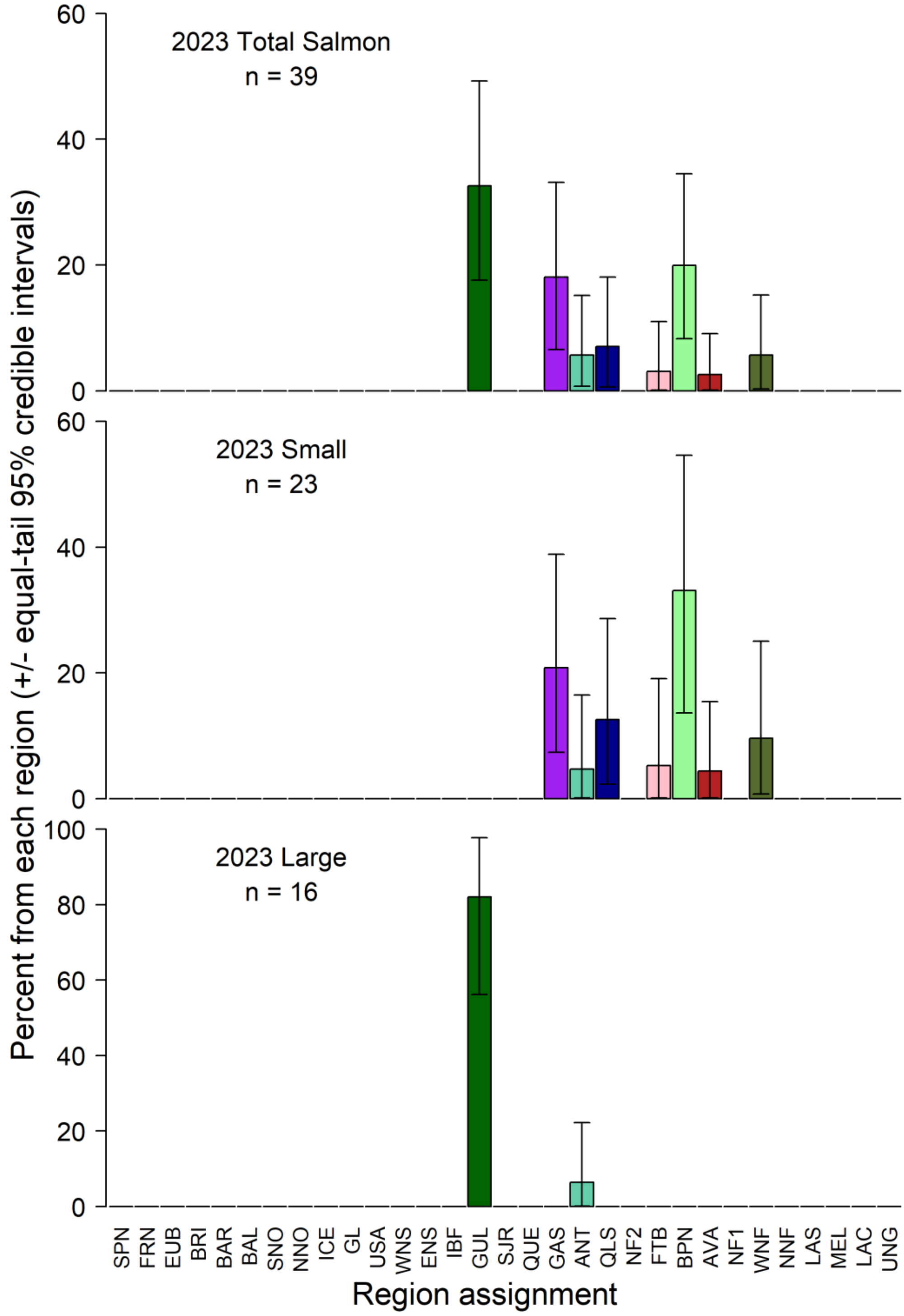


Figure 4.1.5.5. Bayesian estimate of mixture composition of samples from the Saint Pierre and Miquelon Atlantic salmon fishery for 2023 by size group (small < 63 cm, large ≥ 63 cm) using the SNP range wide baseline for Atlantic salmon (Jeffery *et al.* 2018). Baseline locations refer to regional reporting groups identified in Figure 4.1.5.1 and Figure 4.1.5.2. Regional assignment acronyms are explained in Table 4.1.5.1. Data are summarized in Table 4.1.5.3. Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value.

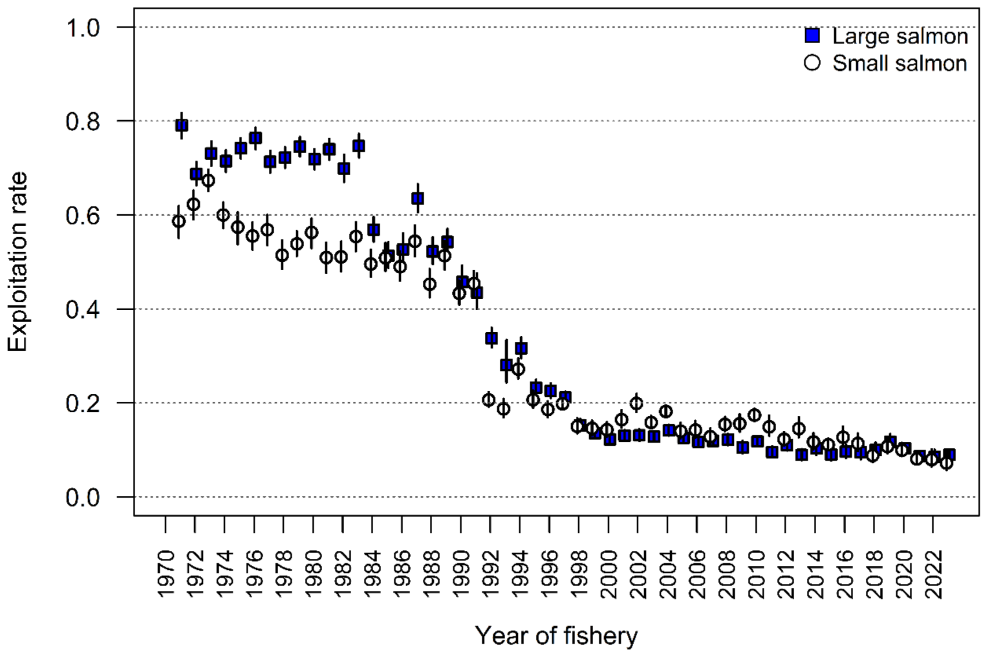


Figure 4.1.6.1. Exploitation rates in North America on the North American stock complex of small and large salmon 1971 to 2023. The symbols are the median and the error bars are the 5th to 95th percentiles of the distributions from Monte Carlo simulation.

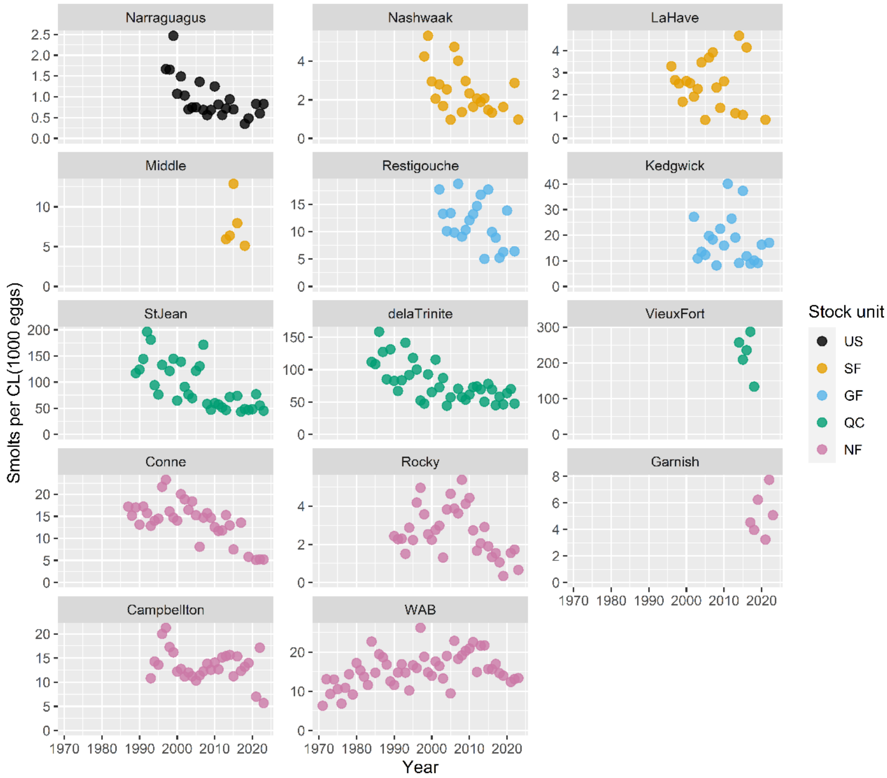


Figure 4.3.1.1. Time-series of wild smolt production from 13 monitored rivers in eastern Canada and one river in eastern USA, 1970 to 2023. Smolt production is expressed as a proportion of the conservation egg requirements for the river. Note y-axis range change for the St Jean River, de la Trinité River and Vieux-Fort River relative to other rivers.

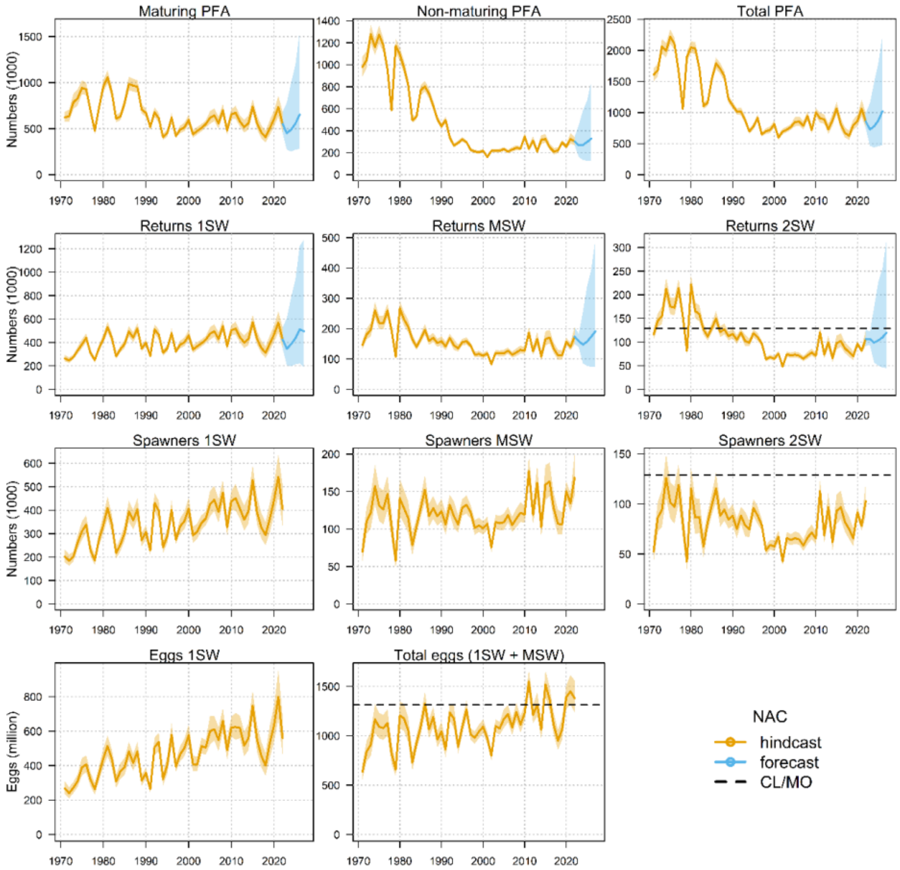


Figure 4.3.2.1. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for NAC as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the CL for NAC. Forecasts of PFA and returns are provided for years 2023 to 2027.

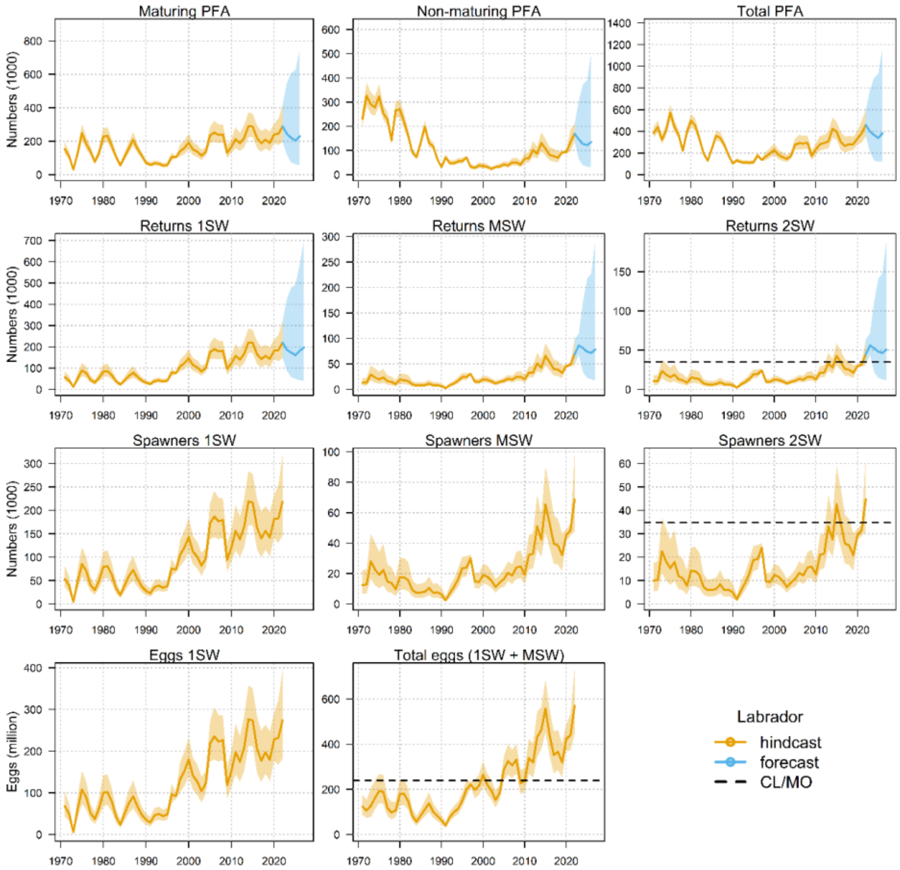


Figure 4.3.2.2. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for Labrador as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the CL for Labrador. Forecasts of PFA and returns are provided for years 2023 to 2027.

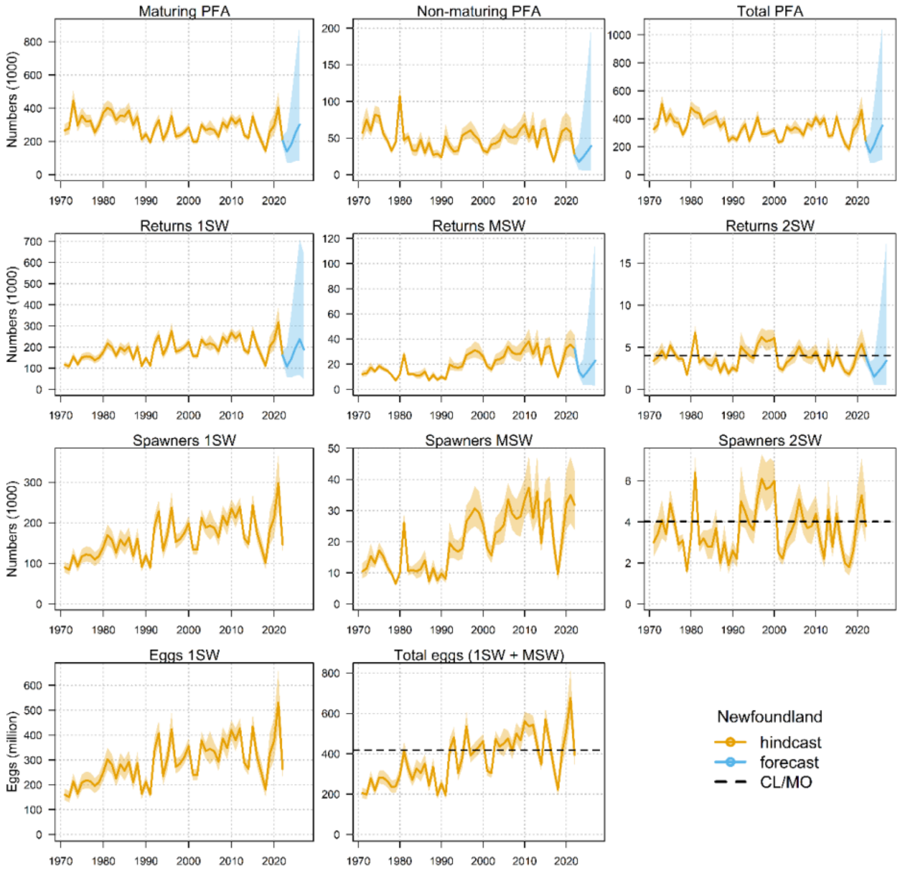


Figure 4.3.2.3. Estimated (median 5th to 95th percentile range) Pre-fishery Abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for Newfoundland as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the CL for Newfoundland. Forecasts of PFA and returns are provided for years 2023 to 2027.

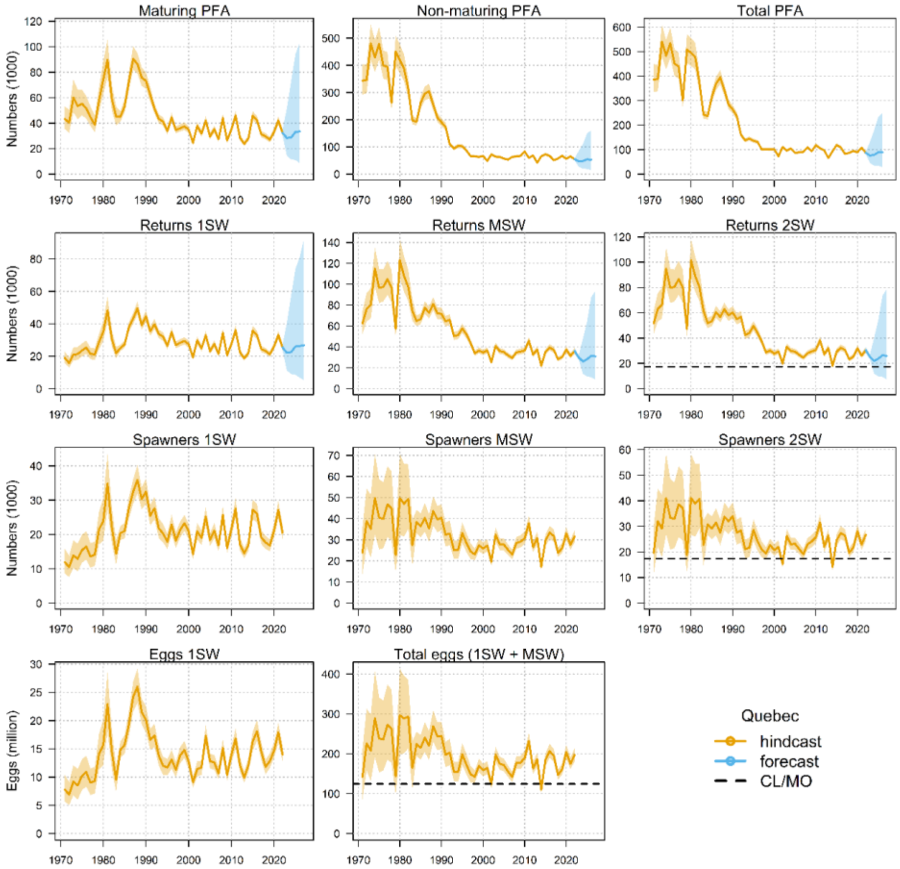


Figure 4.3.2.4. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for Quebec as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the CL for Quebec. Forecasts of PFA and returns are provided for years 2023 to 2027.

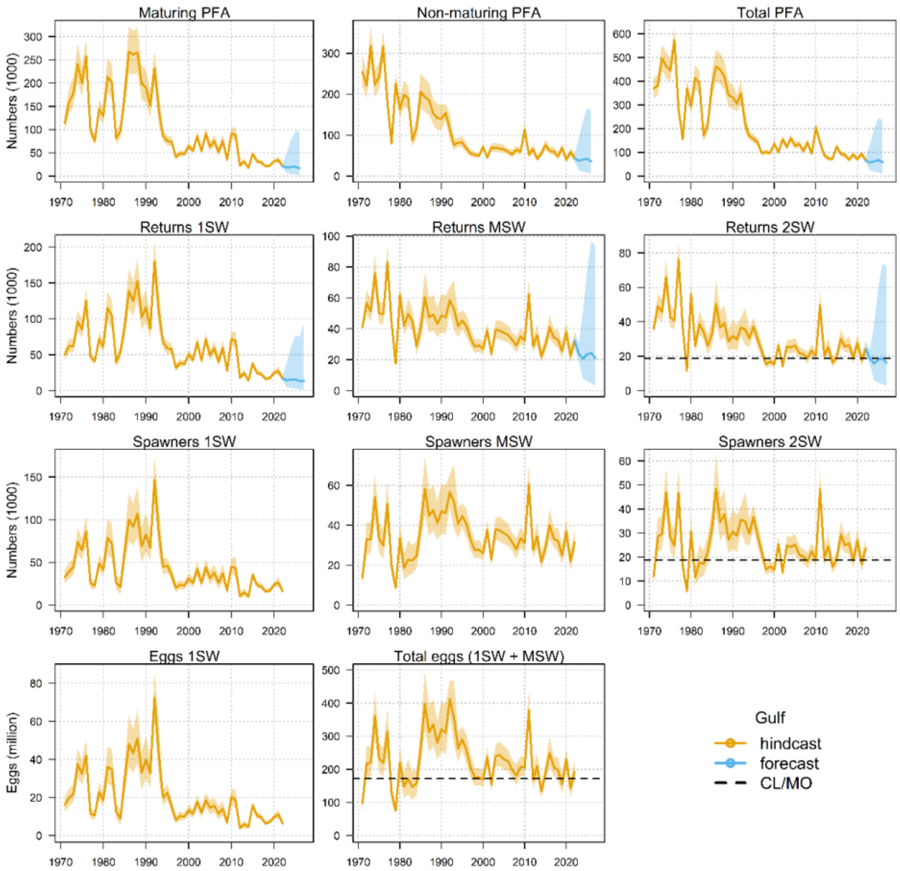


Figure 4.3.2.5. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for Gulf as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the CL for Gulf. Forecasts of PFA and returns are provided for years 2023 to 2027.

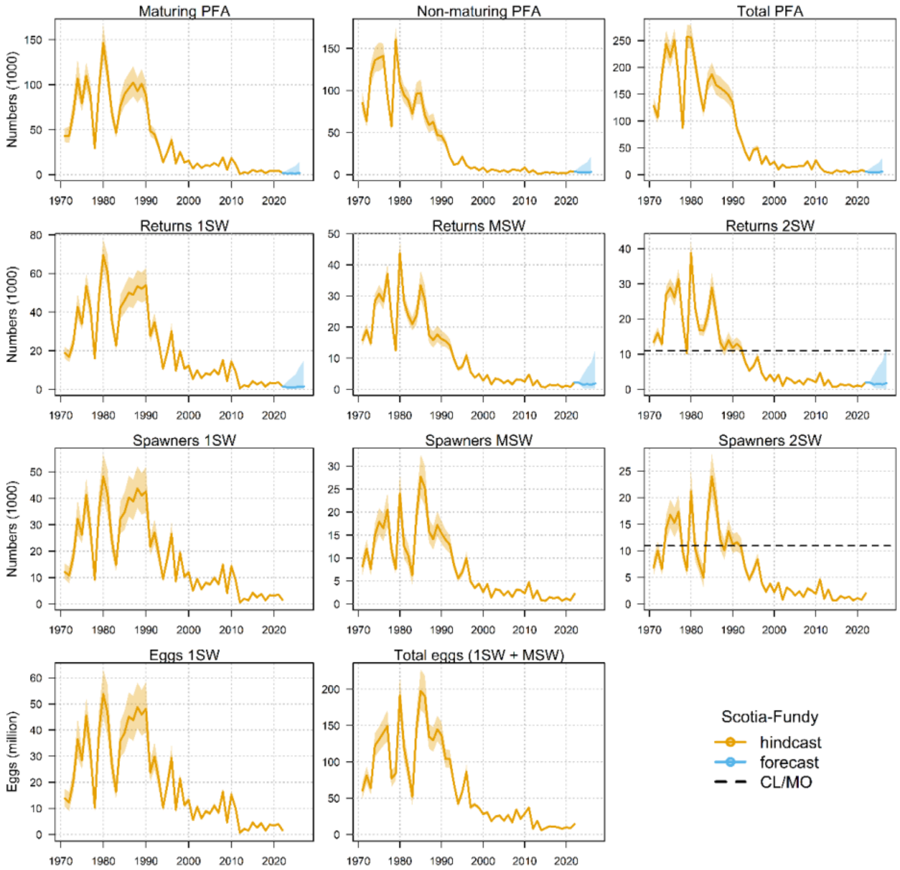


Figure 4.3.2.6. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for Scotia-Fundy as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the MO for Scotia-Fundy. Forecasts of PFA and returns are provided for years 2023 to 2027.

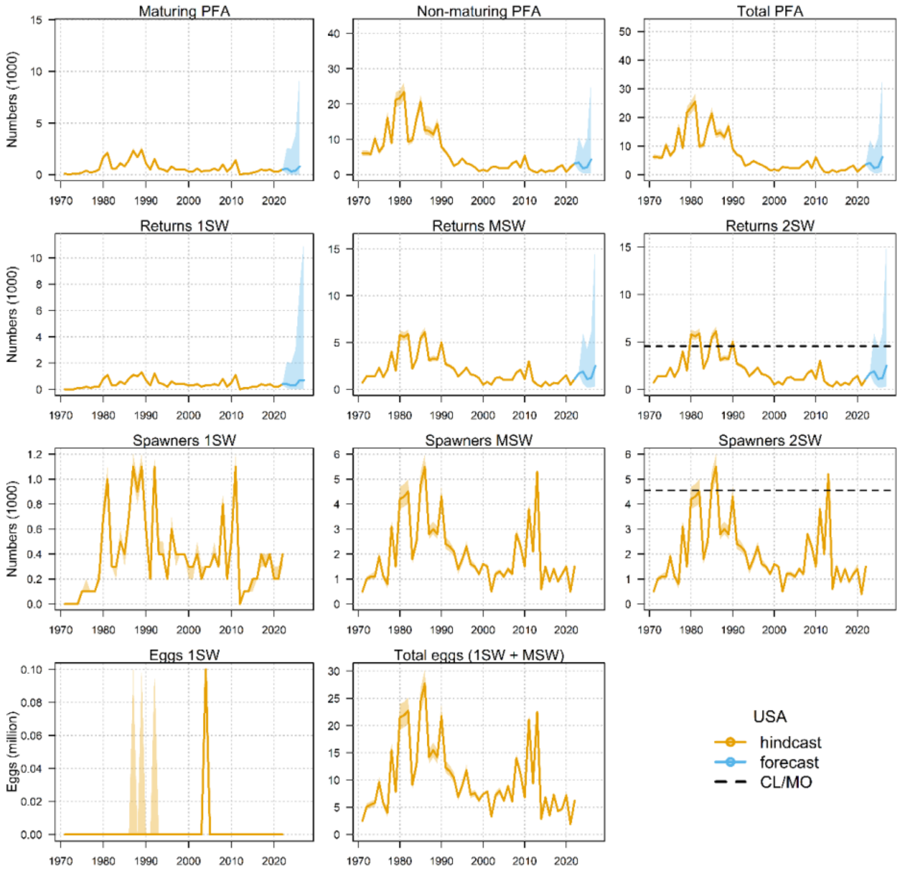


Figure 4.3.2.7. Estimated (median 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing and 1SW non-maturing salmon, returns of 1SW, MSW and 2SW, spawners of 1SW, MSW and 2SW and egg contribution from 1SW and total (1SW/MSW) for US as derived from the LCM. Solid line: median of the marginal posterior distributions. Yellow shaded area: hindcasting on the historical time series. Blue shaded area (for PFA and returns): forecasting obtained under a scenario with 0 catches in all fisheries. The dashed line corresponds to the MO for US. Forecasts of PFA and returns are provided for years 2023 to 2027. The 2SW CL for USA (29 990 fish) is off the scale in the plot. For USA, estimated spawners exceed the estimated returns in the later years due to adult stocking restoration efforts; therefore, 2SW returns are assessed relative to the management objective for USA.

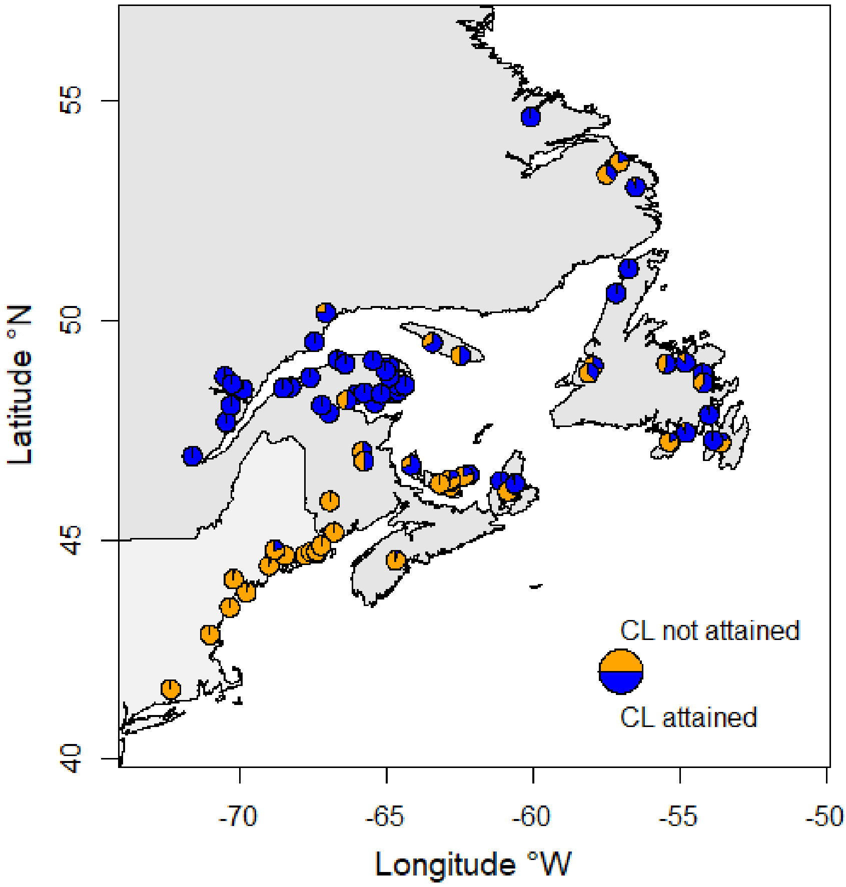


Figure 4.3.4.1. Proportion of the conservation requirement attained in the 79 assessed rivers in 2023 of the North American Commission area.

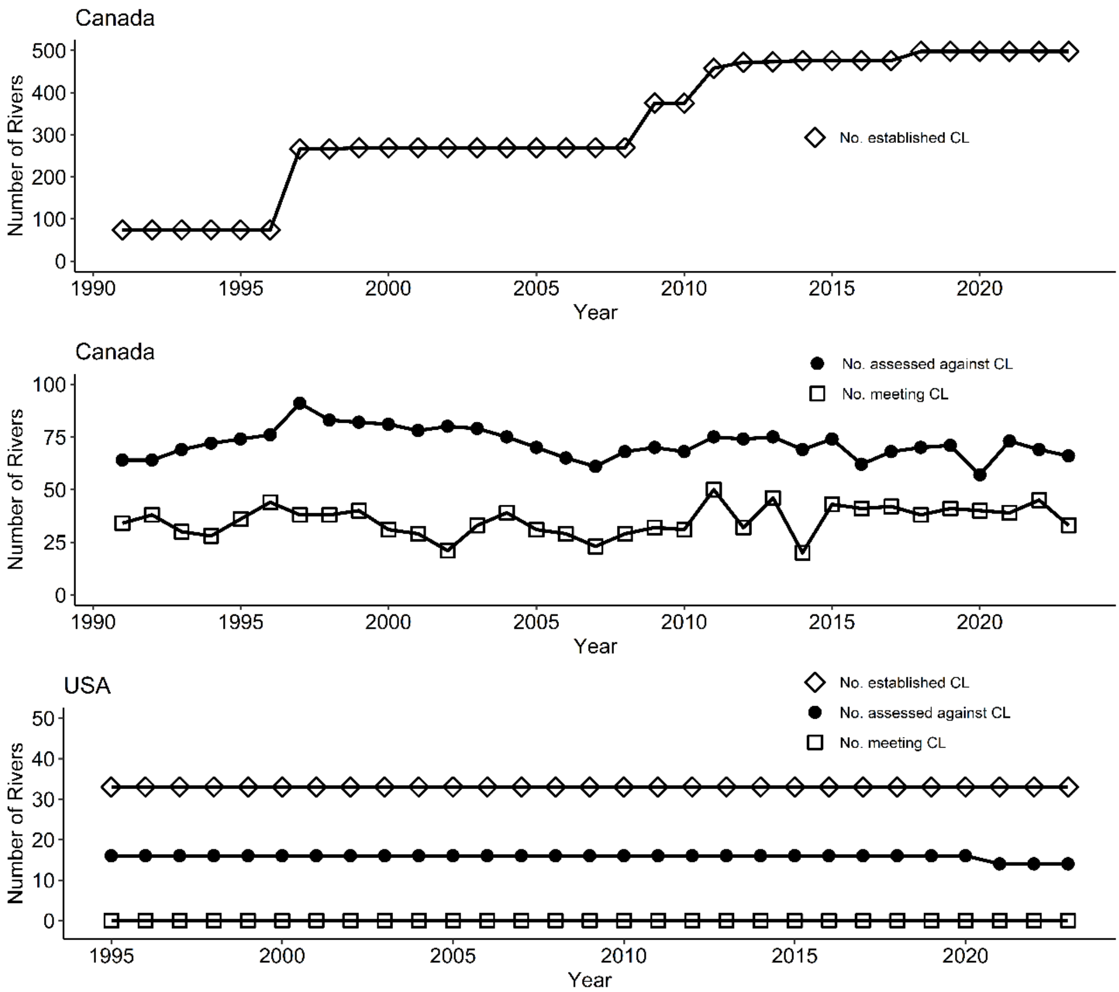


Figure 4.3.4.2. Time-series for Canada and the USA showing the number of rivers with established CLs, the number rivers assessed, and the number of assessed rivers meeting CLs for the period 1991 to 2023.

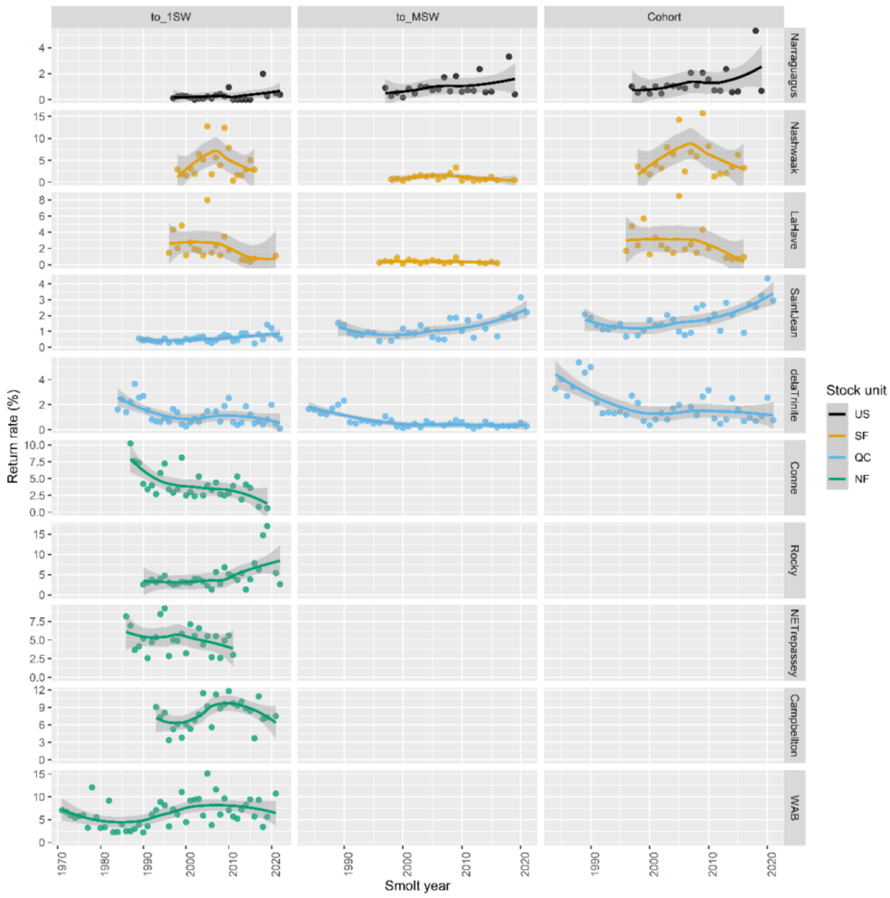


Figure 4.3.5.1. Estimated annual return rates (left and third column of panels; individual rivers are shown with different symbols and colours) and least squared (or marginal mean) mean annual return rates (with one standard error bars) (second and right column of panels) of wild origin smolts as 1SW and 2SW salmon to the geographic areas of North America. The standardised values are annual means derived from a general linear model analysis of rivers in a region. Note y-scale differences among panels. Standardized rates are not shown for regions with a single population.

Figure 4.3.5.2. Estimated annual return rates (left and third column of panels; individual rivers are shown with different symbols and colours) and least squared (or marginal mean) mean annual return rates (with one standard error bars) of hatchery origin smolts as 1SW and 2SW salmon to the geographic areas of North America. The standardized values are annual means derived from a general linear model analysis of rivers in a region. Note y-scale differences among panels. Standardised rates are not shown for regions with a single population.

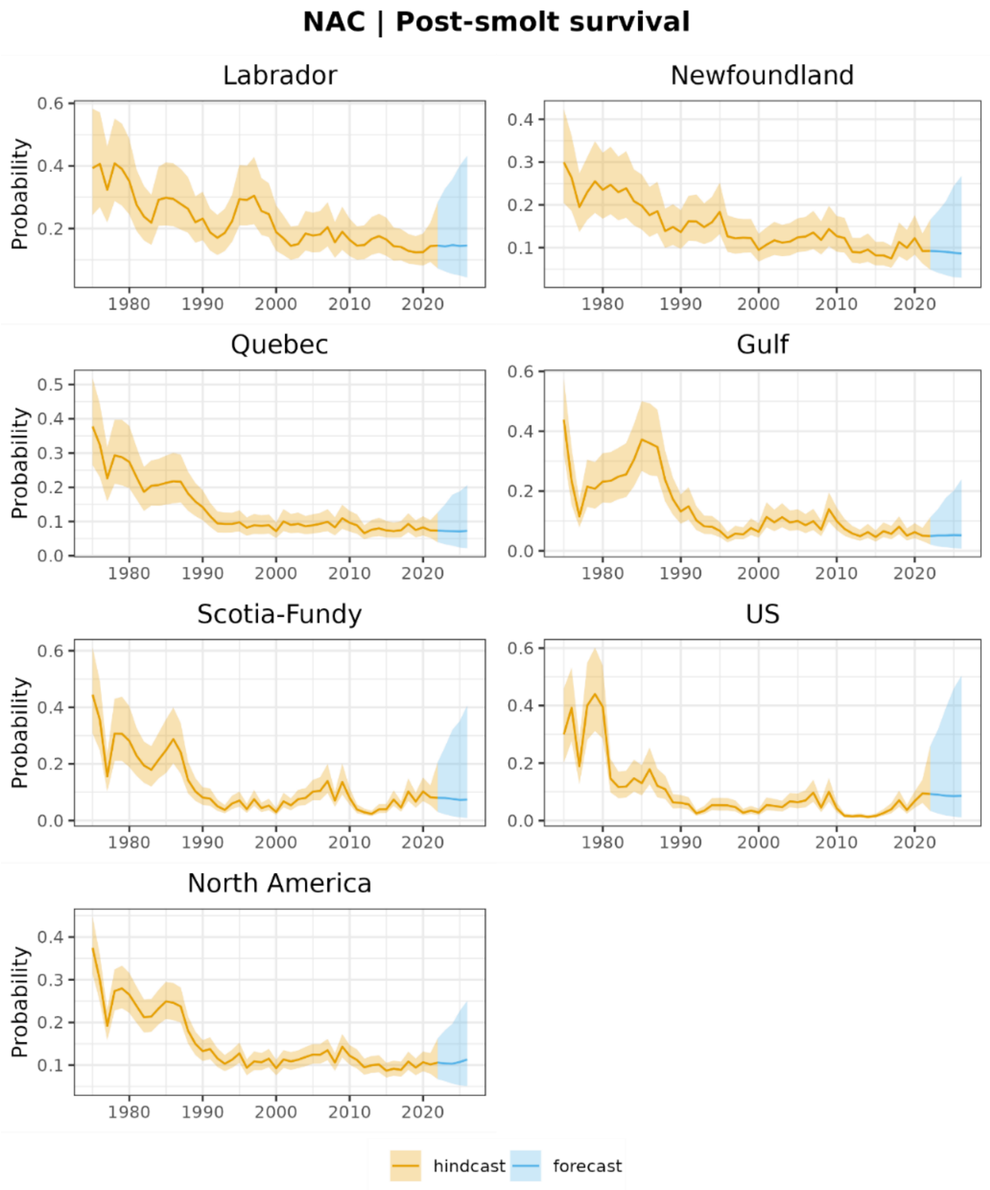


Figure 4.3.7.1. Post-smolt survival for the six stock-units in NAC (upper panels) and NAC overall (lower panel), derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Yellow shaded area: hindcasting on the historical time series. Blue shaded area: forecasting obtained under a scenario with 0 catches in all fisheries.

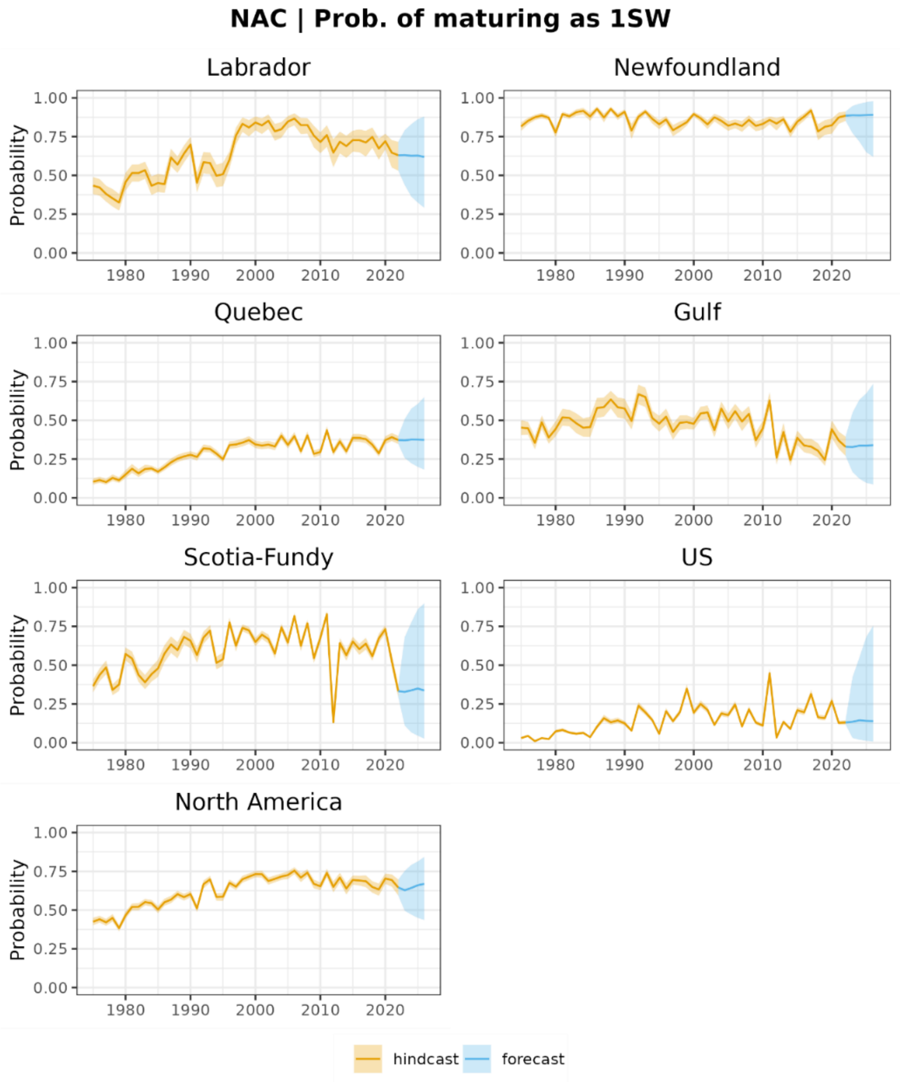


Figure 4.3.7.2. Probability to mature as 1SW for the six stock-units in NAC (upper panels) and NAC overall (lower panel), derived from the LCM. Years are smolt migration years. Solid line: median of the marginal posterior distributions. Shaded area: 90% Bayesian credibility interval. Yellow shaded area: hindcasting on the historical time series. Blue shaded area: forecasting obtained under a scenario with 0 catches in all fisheries.

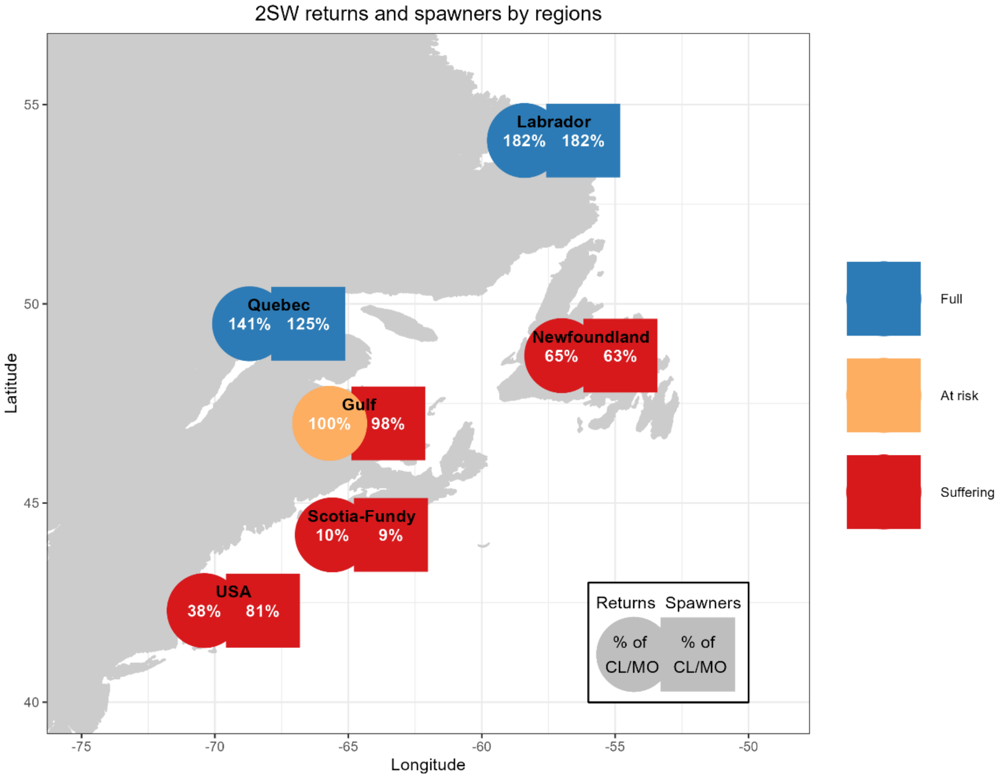


Figure 4.3.8.1. Estimated returns (circle symbol) and spawners (square symbol) of 2SW salmon in 2023 to six stock-units of North America relative to ICES stock status categories. The percentage of the 2SW CLs for the four northern regions and to the rebuilding management objectives (MO) for the two southern areas are shown based on the median of the Monte Carlo distribution. The colour shading is interpreted as follows: blue refers to the stock being at full reproductive capacity (median and 5th percentile of the Monte Carlo distributions are above the CL), orange refers to the stock being at risk of suffering reduced reproductive capacity (median is above but the 5th percentile is below the CL), and red refers to the stock suffering reduced reproductive capacity (the median is below the CL).

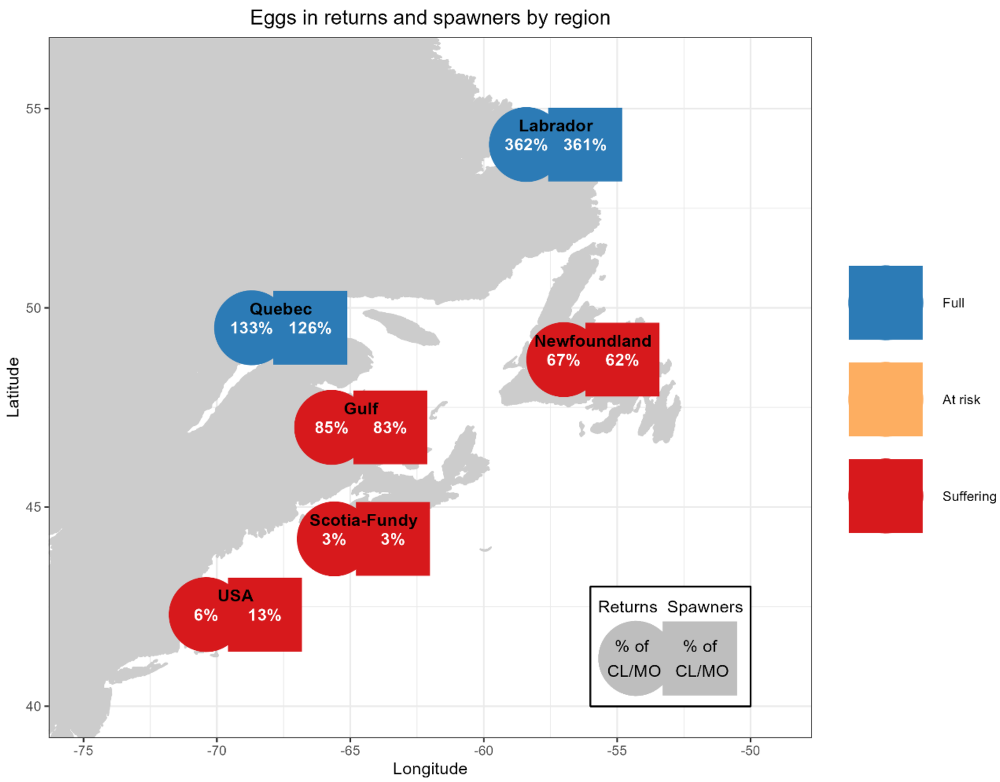


Figure 4.3.8.2. Estimated total eggs in the returns (circle symbol) and spawners (square symbol) of salmon in 2023 to six stock-units of North America relative to ICES stock status categories. The percentage of the CLs for the four northern regions and to the rebuilding management objectives (MO) for the two southern areas are shown based on the median of the Monte Carlo distribution. The colour shading is interpreted as follows: blue refers to the stock being at full reproductive capacity (median and 5th percentile of the Monte Carlo distributions are above the CL), orange refers to the stock being at risk of suffering reduced reproductive capacity (median is above but the 5th percentile is below the CL), and red refers to the stock suffering reduced reproductive capacity (the median is below the CL).

5 Atlantic salmon in the West Greenland Commission

5.1 NASCO has requested ICES to describe the key events of the 2023 fishery

The Atlantic salmon fishery is currently regulated according to the Government of Greenland's Executive Order no. 29 of 28 July 2022. Since 1998, with the exception of 2001, the export of Atlantic salmon has been banned. There are two landing categories reported for the fishery: commercial landings where professional fishers can sell salmon to hotels, institutions and local markets, and recreational landings where both professional fishers and non-professional fishers fish for private consumption. Since 2018, all fishers are required to have a license to fish for Atlantic salmon.

In 2021, the Government of Greenland published a “Management Plan for Atlantic Salmon in Greenland” (GoG 2021), which is to remain in force from 01 July 2021 through 31 December 2025. The management plan recognizes three separate management areas and specifies fishing seasons for each. The plan also outlines two different user groups and outlines how established total allowable catches (TAC) will be distributed according to historical catch data. The purpose of the management plan is to ensure access for the Greenlandic population to the utilization of Atlantic salmon while taking into account the international agreements that Greenland has negotiated. Information on the different management areas, fishing seasons, user groups and quota allotment are provided below:

Management Areas	Fishing season	User Group	% of TAC by area	% of TAC by user group
Northwest	01 Sep – 31 Oct		40%	
		Commercial		28%
		Recreational		12%
Southwest	01 Aug – 30 Sep		60%	
		Commercial		42%
		Recreational		18%
East Greenland	15 Aug – 15 Oct		3 t annually	
		Commercial		50%
		Recreational		50%

In 2022, parties of the West Greenland Commission (WGC) of NASCO were able to agree to a “Multi-Annual Regulatory Measure for Fishing for Atlantic Salmon at West Greenland” to cover the time period of 2022-2025 (NASCO 2022; see WGC(22)10). The agreement maintained many of the provisions that were in the preceding measures while also outlining a new measure to minimize the likelihood of overharvest. At least for the first year of the agreement, it was agreed that the fishery would be closed when the registered catch had reached no more than 49% of the overall TAC to help ensure that the TAC would not be exceeded. In subsequent years, the percentage could be adjusted, in consultation with the WGC, based on previous experiences and the expected effect of new management measures. As outlined in the measure, the Government of Greenland set a total quota for all components of the 2023 fishery at 30 t, with 27 t for the fishery at West Greenland and 3 t for the fishery at East Greenland.

The total catch reported to ICES was 34.3 t (33.0 t at West Greenland and 1.3 t at East Greenland) for the 2023 fishery. Detailed statistics on the quotas and quota uptake by each region and user group for the 2023 fishery are provided below:

Management Areas	Opening Dates	User Groups	Quotas (t)	2023 Closing Dates	Catch (t)
Northwest	01 Sep				
		Commercial	7.56	02 Oct	12.13
		Recreational	3.24	09 Oct	2.31
Southwest	01 Aug				
		Commercial	11.34	15 Sep	12.54
		Recreational	4.86	15 Sep	5.98
East Greenland	15 Aug				
		Commercial	1.5	15 Oct	0.52
		Recreational	1.5	15 Oct	0.79

Given the dynamic nature of the management of the fishery with differing opening dates for each region and differing closing dates and quotas for each user group within a region, the length of the fishing season for each region-user group can vary. Detailed statistics on the opening and closing dates and length of each regional user group are provided below:

Management Areas	Opening Dates	User Groups	2021 Closing Dates (length in days)	2022 Closing Dates (length in days)	2023 Closing Dates (length in days)
Northwest	01 Sep				
		Commercial	22 Sep (22)	19 Oct (49)	02 Oct (32)
		Recreational	01 Oct (31)	31 Oct (61)	09 Oct (39)
Southwest	01 Aug				
		Commercial	15 Sep (46)	22 Aug (22)	15 Sep (46)
		Recreational	22 Sep (53)	11 Sep (42)	15 Sep (46)
East Greenland	15 Aug				
		Commercial	15 Oct (62)	15 Oct (62)	15 Oct (62)
		Recreational	15 Oct (62)	15 Oct (62)	15 Oct (62)

5.1.1 Catch and effort in 2023

Only hooks and fixed gillnets are allowed to target salmon directly and the minimum mesh size has been 140 mm (stretched mesh) since 1985. Commercial fishers are allowed to use up to 20 gillnets at a time as single gillnets fixed to the shore. The use of up to 20 sections (~70 m per section) connected and used as a driftnet was historically allowed, but since 2020 the use of driftnets has been banned. Recreational licensed fishers can only use one gillnet fixed to the shore or rod and reel. All nets must be tended regularly and marked with name and contact information. Gillnets are only allowed in the inshore areas.

Nets are the preferred gear in Greenland and very little rod and reel fishing in seawater takes place. However, a small recreational fishery directly targeting salmon via rod and reel has been noted in the Nuuk and Qaqortoq regions. Reports from recreational fishers fishing with rod and reel are received annually and are included in the reported landings. Landings from this gear type are considered insignificant at this time.

As in past years, Officers from the Greenland Fisheries License Control Authority (GFLK) have patrolled areas with known salmon fishing activity during and after the season to remove gill-nets if they are not set in accordance with regulations. Officers also continue to visit local markets and public institutions to maintain a presence at these locations and to encourage adherence to the fishing regulations.

Catch data were collated from fisher reports. The reports were screened for errors and missing values. Catches were assigned to a NAFO/ICES Sub-area based on the reporting community. Reports which contained only the total number of salmon caught or the total catch weight without the number of salmon, were corrected using 3.25 kg gutted weight per salmon. Since 2005, it has been mandatory to report gutted weights, and these have been converted to whole weight using a conversion multiplier of 1.11. It was noted that errors in reported catch data have been decreasing given improved catch reporting since 2018 following the mandatory requirement for all fishers to report catches.

The total reported landings for 2023 are 34.3 t (33.0 t for West Greenland and 1.3 t for East Greenland; Tables 5.1.1.1 and 5.1.1.2). Reported catch was distributed among the six NAFO Divisions on the west coast of Greenland and in ICES Sub-area 14b on the east coast of Greenland (Table 5.1.1.2; Figure 5.1.1.1). Harvest reported for East Greenland is not included in assessments of the contributing stock complexes, owing to a lack of information on the stock composition of that fishery. Reported landings of Atlantic salmon increased from 60 t in 1960 to a peak of 2689 t reported in 1971 and generally decreased until the closure of the export commercial fishery in 1998. Reported landings for the internal use-only fishery peaked at 57.9 t in 2014 and have averaged 39.1 t over the previous ten years (2013–2022; Table 5.1.1.1). The majority of the catch in 2023 was reported by commercial fishers, as in previous years (Figure 5.1.1.2). Detailed statistics on the reported landings for the 2021-2023 fisheries are provided below:

Reported Landings					
	Reported Landings (t (%))			Landings Type (t (%))	
	West Greenland only	East Greenland only	Total	Commercial	Recreational
2021	41.8 (96.8%)	1.4 (3.2%)	43.2	32.2 (74.6%)	11.0 (25.4%)
2022	29.0 (97.3%)	0.8 (2.7%)	31.7	20.6 (69.3%)	9.2 (30.7%)
2023	33.0 (96.2%)	1.3 (3.8%)	34.3	25.2 (73.5%)	9.1 (26.5%)

There is currently no quantitative approach for estimating the unreported catch for the fishery, but the 2023 value is likely to have been at the same level as previously reported by the Greenlandic authorities (10 t). The 10 t estimate was historically meant to account for recreational fishers in smaller communities fishing for recreational use, but not reporting landings. This estimate was not meant to represent non-reporting by commercial fishers.

WGNAS has employed two different approaches to estimate unreported catch from commercial fishers: comparisons of the sampling programme statistics to reported landings and utilizing results from the previously implemented phone surveys. The need for an adjustment for some unreported catch, primarily for commercial landings, has been assessed annually since 2002 by comparing the weight of salmon seen by the sampling teams with the corresponding community-specific reported landings for the entire fishing season (see Section 5.2). However, sampling only occurs during a portion of the fishing season and therefore these adjustments are considered minimum unreported catch adjustments.

The seasonal distribution of catches has previously been reported to WGNAS (ICES, 2002), but since 2002 this has generally not been possible although fishers are required to record daily catches. The seasonal distribution for factory landings, when allowed, is assumed to be accurate given the reporting structure in place between the factories and the GFLK.

Greenland Authorities issued 793 licences (285 for commercial fishers and 508 for recreational fishers) and received 1625 reports from 652 fishers in 2023 (Tables 5.1.1.3 and 5.1.1.4; Figure 5.1.1.3). The number of licences issued, the number of fishers who reported, and the number of reports received have increased greatly since 2017 as a result of the 2018 regulations requiring all fishers to receive a licence and mandatory reporting requirements. The current levels are among the highest in the time-series and the number of fishers reporting landings matches the levels recorded during the commercial export fishery from 1987 to 1991. The percentage of fishers that reported in 2023 (82% overall: 87% for commercial and 80% for recreational) increased from the 2022 values and is greater than the mean for the 2018-2022 time period (78% overall: 80% for commercial and 77% for recreational). A summary of the number of licenses issued and number and percentage of fishers reporting for 2021-2023 is provided below:

Licenses and Reporting						
	Licenses Issued			Number of Fishers Reporting (%)		
	Commercial	Recreational	Total	Commercial	Recreational	Total
2021	360	579	939	281 (78%)	424 (73%)	705 (75%)
2022	291	466	757	199 (68%)	312 (67%)	511 (68%)
2023	285	508	793	247 (87%)	405 (80%)	652 (82%)

WGNAS previously reported on the procedures for reporting salmon harvested in Greenland (ICES, 2014; ICES, 2016) and modifications to these procedures were made by the Government of Greenland in 2018. In summary, all fishers are required to have a licence to fish for Atlantic salmon and all licence holders are required to report catches. Reports can be made to GFLK by email, phone, fax, or return logbook on a daily basis. Factory landings, when allowed, are submitted to GFLK either on a daily or weekly basis, depending on the likelihood of exceeding a quota. No factory landings have been allowed since 2015.

5.1.2 Phone surveys

Phone surveys were conducted in 2015, 2016, and 2017 to assess the 2014, 2015, and 2016 fisheries, respectively. The number of fishers contacted, the questions asked, and the method to estimate unreported catch differed from year to year. Based on the results from these surveys, estimated adjusted landings (survey) were added to the adjusted landings (sampling) as described in Section 5.2, and 'reported landings' to estimate the landings for assessment. A phone survey was initiated for the 2017 fishery, but only nine fishers were contacted and no landings adjustment were estimated. Phone surveys have not been conducted since the 2017 fishery and therefore no landing adjustments have been estimated since that time. A summary of the reported landings, adjusted landings (sampling), and adjusted landings (survey) is presented in Table 5.1.2.1. Adjusted 'landings for assessment' do not replace the official reported statistics.

5.1.3 Exploitation

Previously, an extant exploitation rate for NAC and Southern NEAC non-maturing 1SW fish at West Greenland was calculated by dividing the estimated continent of origin reported harvest of 1SW salmon at West Greenland by the PFA estimate for the corresponding year for each stock complex (ICES 2023a). In 2024, exploitation rates for NAC and Southern MSW fish at West Greenland were calculated by dividing the estimated continent of origin reported harvest of MSW salmon at West Greenland by the MSW PFA estimates for the corresponding year for each stock complex. The reason for this change was the adoption of the Life-cycle Model (LCM) as the model estimates MSW PFA for NAC and Southern NEAC.

MSW exploitation rates for NAC and Southern NAC are available for the 1971 to 2022 PFA years. The most recent estimate of exploitation available is for the 2022 fishery as the 2023 exploitation rate estimates are dependent on the 2023 PFA estimates derived from 2024 MSW returns. NAC and Southern NEAC PFA estimates (Tables 4.3.6.1 and Table 3.3.5.4) are provided for January of the PFA year and adjusted by seven months (01 January to 01 August) of natural mortality at 0.03 per month. The 2022 NAC exploitation rate was 4.4% (Figure 5.1.3.1). This value is in line with the mean estimate (4.8%) for the 2002-2022 time period and remains among the lowest in the time-series. NAC exploitation rate peaked in 1971 at approximately 37%. The 2022 Southern NEAC exploitation rate was 0.3%. The 2022 estimate is among the lowest of the time-series and below the mean estimate (0.7%) for the 2002-2022 time period. Southern NEAC exploitation rate at Greenland peaked in 1975 at approximately 31%. It should be noted that annual estimates of exploitation vary slightly from year to year as they are dependent on the model outputs, which vary slightly from assessment to assessment (see Sections 4.3 and 3.3.5).

5.2 International Sampling Programme

The International Sampling Programme for the fishery at West Greenland agreed by the parties at NASCO continued in 2023 (NASCO 2023; see WGC(23)07). The sampling was undertaken by participants from Ireland, UK (England & Wales), UK (Scotland) and USA. Denmark (in respect of the Faroe Islands and Greenland), in co-operation with the Greenland Institute of Natural Resources (GINR), agreed to sample Atlantic salmon from the city of Nuuk over the course of the fishing season and to implement a Citizen Science sampling program similar to what was conducted in 2021 (ICES 2023a). The Citizen Science Program involved mailing all license holders who had recently reported catches of five or more salmon. The mailing contained a letter requesting the fishers help to collect biological characteristics data and scale/tissue samples from their catch, an instruction sheet and five scale envelopes. It was requested that any collected samples and associated data be returned to the GINR at the conclusion of the fishing season.

Samplers were stationed in three communities (Figure 5.1.1.1) representing three NAFO Divisions: Sisimiut (NAFO Division 1B), Maniitsoq (1C), and Qaqortoq (1F). Samples were also collected in Nuuk (1D) by GINR. Samples were also received from five NAFO Divisions and a single sample was returned from ICES Sub-area 14b via the Citizen Science Program.

In 2023, a total of 1281 salmon were sampled, approximately 10% by weight of the reported landings. A total of 1240 fork lengths, 1225 weights, 1215 scale samples for age determination and 1280 tissue samples were collected (Table 5.2.1). Detailed statistics on the number of samples collected by each sampling type across the NAFO Divisions and ICES Sub-area14b are provided below:

Salmon Sampled (2023)									
	NAFO Division/ICES Sub-area								
	1A	1B	1C	1D	1E	1F	14b	Unk.	Grand Total
Citizen Science	5	13	7	6	-	1	1	7	40
Sampling Program	-	174	862	-	-	170	-	-	1206
GINR	-	-	-	35	-	-	-	-	35
Total	5	187	869	41	0	171	1	7	1281

The International Sampling Programme has been successful at annually sampling the harvest of Atlantic salmon at Greenland and the data collected have contributed valuable inputs to the assessment models used by WGNAS. Prior to any sampling, the sampler always obtains permission from the market manager or fisher before sampling the catch. This arrangement has generally been successful for all samplers, although there have been a small number of issues in some years in some communities. In 2022 access to landed salmon was denied to the sampler in Qaqortoq after only a few days of sampling. Intervention by the Government of Greenland was initiated, but the situation was not remedied during the fishing season. Intervention continued after the fishing season and no issues occurred in 2023.

In 2023, seven adipose fin-clipped fish were recorded, but no internal or external tags were identified by the samplers. A small number of tags were returned to the GINR directly, but the information associated with those tags has not yet been compiled. Data on the tag returns in 2023 will be reported by WGNAS in 2025.

Starting in 2002, non-reporting of harvest was evident based on a comparison of reported landings and sample data. When there is this type of discrepancy, the reported landings are adjusted (Adjusted landings (sampling)) according to the estimated total weight of the fish identified as being landed during the sampling effort and these adjusted landings are carried forward for assessments. Adjusted landings do not replace the official reported statistics (Tables 5.1.1.1 and 5.1.1.2). Landings for assessment are presented in Table 5.1.2.1. No adjustments have been made since 2017 and details of all adjustments made to date have been reported previously (ICES 2021a).

5.2.1 Biological characteristics of the catches

In 2023, the mean length and whole weight of North American non-maturing 1SW salmon were 63.1 cm and 2.64 kg, and the means for European non-maturing 1SW salmon were 61.1 cm and 2.59 kg (Table 5.2.1.1). All figures represent a decrease from the previous year's values (63.9 and 62.4 cm mean fork length and 2.79 and 2.73 kg mean whole weight for North American and European salmon, respectively) and from the previous 10-year mean values (65.4 and 64.1 cm mean fork length and 3.17 and 3.07 kg mean whole weight for North American and European salmon, respectively, from 2013-2022). The mean length and weight data reported in Table 5.2.1.1

have not been adjusted for the period of sampling and it is known that salmon grow quickly during the period of feeding at West Greenland. Preliminary analyses to adjust for period of sampling have been previously reported (ICES 2011; ICES 2015) and therefore caution is urged when interpreting the uncorrected data.

North American salmon sampled from the 2023 fishery at West Greenland were predominantly river age three (26.4%), four (29.9%) and five (23.1%) year old fish (Table 5.2.1.2). European salmon were predominantly river age two (49.8%) and three (17.6%) year old fish (Table 5.2.1.3). As expected, the 1SW age group dominated the sample collection for both the North American (92.8%) and European (98.9%) origin fish in 2023 (Table 5.2.1.4).

5.2.2 Continent and region of origin of catches at West Greenland

In 2023, 1266 of 1280 tissue samples collected from five NAFO Divisions and ICES Sub-area 14b were successfully genetically analysed and summarized: 1A (n=5), 1B (n = 186), 1C (n=866), 1D (n=37), 1F (n = 171) and 14b (n = 1; Figure 5.2.2.1). Excluded samples were due to poor preservation, low assignment probability (P>0.8) or no associated location information.

Since 2017, a Single Nucleotide Polymorphism (SNP) rangewide baseline (Jeffery *et al.*, 2018) providing 21 North American and 9 European reporting groups has been used for continent and region of origin analysis. The baseline has been revised, resulting in 21 North American and 10 European reporting groups (Table 5.2.2.1 and Figure 5.2.2.2; ICES 2019a). A Bayesian approach is used to estimate mixture composition or assign individuals to continent and region of origin. The approach uses the R package '*rubias*' (Anderson *et al.*, 2008).

In 2023, 62.5% of the salmon sampled were of North American origin and 37.5% were of European origin (Table 5.2.2.2). The single sample collected from ICES Sub-area 14b was assigned to be from North America. These findings show that large proportions of fish from the North American stock complex continue to contribute to the fishery (Table 5.2.2.3 and Figure 5.2.2.3). The proportion of North American fish was lower in 2023, compared to the 2021 and 2022 estimates, which were among the highest estimates in the time series. The NAFO division-specific continent of origin assignments for 2001-2023 are presented in Figure 5.2.2.4. The annual variation in the continental representation among divisions within the recent time-series underscores the need to sample multiple NAFO Divisions to achieve the most accurate estimate of the contribution of fish from each continent to the mixed-stock fishery.

The estimated weighted proportions of North American and European salmon since 1982 and the weighted numbers of North American and European salmon caught at West Greenland (excluding unreported catch and reported harvest from ICES Sub-area 14b) are provided in Table 5.2.2.3 and Figure 5.2.2.5. Approximately 7000 (20.6 t) North American origin fish and 3900 (12.3 t) European origin fish were harvested in 2023.

WGNAS has previously reported on the region of origin of catches at West Greenland, both for North American and European origin salmon (ICES, 2019a). Region of origin estimates for the 2023 fishery, based on the updated rangewide SNP baseline, are provided in Table 5.2.2.1 and Figure 5.2.2.2.

As in previous years, the 2023 North American contributions to the West Greenland fishery were dominated by the Gaspé Peninsula, the Gulf of St. Lawrence, and the Labrador South reporting groups (Table 5.2.2.4 and Figure 5.2.2.6). These three groups accounted for approximately 49% of the North American contributions in 2023. Of particular note is the 14% overall contribution by the Ungava Bay reporting group (23% of the overall North American contribution), which is double the 2021 and 2022 estimated contributions (ICES 2023a). The balance of the North American contribution (approximately 28%) was from the Eastern Nova Scotia, Labrador Central, Lake Melville, St. Lawrence North Shore-Lower, Maine (U.S.), and Newfoundland reporting groups. The Northeast Atlantic contribution was dominated by the United Kingdom/Ireland reporting group, accounting for 94% of the European contributions in 2023. No Greenland reporting group fish, which represents the Kapisillit river, Greenland's only self-sustaining Atlantic salmon population, were identified in 2023. Since 2018, only two Greenlandic fish have been identified (2018 and 2022).

5.3 NASCO has requested ICES to describe the status of the stocks

The stocks contributing to the Greenland fishery are the NAC 2SW and Southern NEAC MSW complexes. The midpoints of the spawner abundance estimates for four of the seven stock complexes exploited at West Greenland were below Conservation Limits (CLs) in 2023 (Figure 5.3.1). A more detailed overview of status of stocks in the NEAC and NAC areas is presented in the relevant Commission sections (Sections 3 and 4).

5.3.1 North American stock complex

The estimate of 2SW salmon spawners in North America for 2023 increased in Labrador (92%) and USA (236%) and decreased in Newfoundland (-42%), Quebec (-10%), Gulf (-22%) and Scotia-Fundy (-18%) compared to the previous five-year means (Table 4.3.3.3). The midpoints of the spawner abundance estimates were 182% of the 2SW CL for Labrador, 63% for Newfoundland, 125% for Quebec and 98% for Gulf, and 9% and 81% of the Management Objectives (MOs) associated with Scotia-Fundy and USA, respectively (Figure 4.3.8.1). Labrador and Quebec are considered to be at full reproductive capacity but Newfoundland and Gulf are considered to be suffering reproductive capacity. Scotia-Fundy and USA are also considered to be suffering reproductive capacity according to their MOs, which are far below their respective CLs. Within each of the geographic areas, there are individual river stocks which are failing to meet CLs (Table 4.3.4.1; Figures 4.3.4.1 and 4.3.4.2). In the southern areas of NAC (Scotia-Fundy and USA) there are numerous populations at high risk of extinction and these are under consideration or receiving special protections under federal legislation. The estimated exploitation rate of salmon in North American fisheries has declined (Figure 4.1.6.1) from a peak of approximately 80% in 1971 for large salmon to a mean of 9% over the past ten years. The PFA MSW forecasts for 2024 to 2026 increase from 270 500 in 2024 to 327 800 in 2026, but remains well below the high values of the 1970s (Table 4.3.6.1; Figure 4.3.2.1). No significant increases in the regional PFA forecasts during 2024 to 2026 are expected for any of the NAC region (Figures 4.3.2.2 - 4.3.2.7).

5.3.2 MSW Southern European stock complex

The midpoint of the spawner abundance estimate for the Southern NEAC MSW stock complex was above the CL, but is considered to be at risk of suffering reduced reproductive capacity (Figure 3.3.4.2). The midpoint of the spawner abundance estimate was 110% of the MSW CL for the Southern NEAC MSW stock complex. Individual countries stock status within the Southern NEAC MSW stock complex varied across all three stock status designations (Figure 3.3.4.3). Note that rivers in the south and west of Iceland are included in the assessment of the Southern NEAC stock complex. Within individual jurisdictions, there are large numbers of rivers not meeting CLs after homewater fisheries (Table 3.3.1.1 and Figure 3.3.1.1). Homewater exploitation rates on the MSW Southern NEAC stock complex are shown in Figure 3.1.9.1. Exploitation on MSW fish in Southern NEAC was 3% in 2023, which is at the same level as the previous five-year (4%) but lower than the previous ten-year (5%) means. The PFA MSW are forecast to remain relatively stable for the years 2024 to 2026, though they remain amongst the lowest estimates in the time series (Figure 3.3.4.2; Table 3.3.5.4). No significant increases in the regional PFA forecasts during 2024 to 2026 are expected for any of the S-NEAC regions (Figures 3.3.4.4g-3.3.4.4k).

5.4 NASCO has requested ICES to provide catch options or alternative management advice for 2024–2026 with an assessment of risk relative to the objective of exceeding stock conservation limits, or predefined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding

Catch options for the West Greenland fishery for 2024 to 2026 are based on application of the LCM (see Section 2 of this report and the Stock Annex) in a risk analysis framework that considers CLs or alternate MOs of the NAC and NEAC areas (Table 5.4.1). The risk analysis framework makes full use of the outputs from the LCM (ICES 2023d). The risks of the Greenland fishery to NAC and NEAC stock complexes are developed in parallel and combined into a single catch options table (Table 5.4.2 and Figure 5.4.1).

5.4.1 Catch options for West Greenland

None of the stated management objectives would allow a mixed-stock fishery at West Greenland to take place in 2024, 2025, or 2026.

- In the absence of any marine mixed-stock fishing mortality at Greenland and North America, the lowest probabilities that the returns of 2SW salmon to North America will be sufficient to meet the conservation requirements of any one of the four northern regions (Labrador, Newfoundland, Québec, and Gulf) were estimated to be 0.18, 0.34, and 0.43 for the years 2024, 2025, and 2026, respectively (Table 5.4.2);
- In the absence of any marine mixed-stock fishing mortality at Greenland and North America, there is a low probability (from 0.01 to 0.06) that the returns in the southern region of Scotia-Fundy will be sufficient to meet the stock rebuilding objective during the period 2024 to 2026 (Table 5.4.2). The probability of meeting or exceeding the stock rebuilding objective of the USA region is estimated at 0.04 to 0.30 over the three years;
- In the absence of any marine mixed-stock fishing mortality at Greenland and in NEAC, the probabilities of meeting or exceeding the CL for the Southern NEAC MSW complex are 0.57, 0.57, and 0.53 in 2024 to 2026, respectively (Table 5.4.2);
- In the absence of any marine mixed-stock fishing mortality on these stocks, there is a near zero probability (0.0 to 0.02) of meeting or exceeding the seven management objectives simultaneously in 2024 to 2026 (Table 5.4.2).

The previous advice provided by ICES (2021b) indicated that there were no mixed-stock fishery catch options on the 1SW non-maturing salmon component for the 2021 to 2023 PFA years. This year’s assessment confirms and continues that advice.

5.5 Relevant factors to be considered in management

The management of all fisheries should be based upon assessments of the status of individual stocks. Fisheries on mixed-stocks, particularly in coastal waters or on the high seas, pose particular difficulties for management as they target all stocks present, whether or not they are meeting their individual CLs. Conservation would be best achieved if fisheries target stocks that have been shown to be meeting CLs. Fisheries in estuaries and especially rivers are more likely to meet this requirement.

The salmon caught in the West Greenland fishery are mostly (> 90%) non-maturing 1SW salmon, most of which are destined to return to homewaters in Europe or North America as 2SW fish. The primary European stocks contributing to the fishery in West Greenland are thought to originate in the southern MSW stock complex, although small numbers may also originate in northern Europe. Most MSW stocks in North America are thought to contribute to the fishery at West Greenland. Previous spawners, including salmon that spawned first as 1SW and 2SW salmon also contribute to the fishery, but in generally low (< 5%) proportions (Table 5.2.1.4).

Table 5.1.1.1. Nominal catches of salmon at West Greenland since 1960 (t, round fresh weight) by participating nations. For Greenlandic vessels specifically, all catches up to 1968 were taken with set gillnets only whereas catches after 1968 were taken with set gillnets and driftnets. All non-Greenlandic vessel catches from 1969–1975 were taken with driftnets. The quota figures applied to Greenlandic vessels only and parenthetical entries identify when quotas did not apply to all sectors of the fishery.

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
1960	-	-	-	-	60	60		
1961	-	-	-	-	127	127		
1962	-	-	-	-	244	244		
1963	-	-	-	-	466	466		
1964	-	-	-	-	1539	1539		
1965	-	36	-	-	825	858		Norwegian harvest figures not available, but known to be less than Faroese catch
1966	32	87	-	-	1251	1370		
1967	78	155	-	85	1283	1601		
1968	138	134	43	272	579	1127		
1969	250	215	30	355	1360	2210		
1970	270	259	8	358	1244	2139		Greenlandic total includes 7 t caught by longlines in the Labrador Sea
1971	340	255	-	645	1449	2689	-	
1972	158	144	-	401	1410	2113	1100	
1973	200	171	-	385	1585	2341	1100	
1974	140	110	-	505	1162	1917	1191	
1975	217	260	-	382	1171	2030	1191	
1976	-	-	-	-	1175	1175	1191	
1977	-	-	-	-	1420	1420	1191	
1978	-	-	-	-	984	984	1191	
1979	-	-	-	-	1395	1395	1191	
1980	-	-	-	-	1194	1194	1191	
1981	-	-	-	-	1264	1264	1265	Quota set to a specific opening date for the fishery
1982	-	-	-	-	1077	1077	1253	Quota set to a specific opening date for the fishery

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
1983	-	-	-	-	310	310	1191	
1984	-	-	-	-	297	297	870	
1985	-	-	-	-	864	864	852	
1986	-	-	-	-	960	960	909	
1987	-	-	-	-	966	966	935	
1988	-	-	-	-	893	893	840	Quota for 1988–1990 was 2520 t with an opening date of 01 August. Annual catches were not to exceed an annual average (840 t) by more than 10%. Quota adjusted to 900 t in 1989 and 924 t in 1990 for later opening dates.
1989	-	-	-	-	337	337	900	
1990	-	-	-	-	274	274	924	
1991	-	-	-	-	472	472	840	
1992	-	-	-	-	237	237	258	Quota set by Greenland authorities
1993	-	-	-	-			89	The fishery was suspended. NASCO adopt a new quota allocation model.
1994	-	-	-	-			137	The fishery was suspended and the quotas were bought out.
1995	-	-	-	-	83	83	77	Quota advised by NASCO
1996	-	-	-	-	92	92	174	Quota set by Greenland authorities
1997	-	-	-	-	58	58	57	Private (non-commercial) catches to be reported after 1997
1998	-	-	-	-	11	11	20	Fishery restricted to catches used for internal consumption in Greenland
1999	-	-	-	-	19	19	20	
2000	-	-	-	-	21	21	20	
2001	-	-	-	-	43	43	114	Final quota calculated according to the ad hoc management system

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
2002	-	-	-	-	9	9	55	Quota bought out, quota represented the maximum allowable catch (no factory landing allowed), and higher catch figures based on sampling programme information are used for the assessments
2003	-	-	-	-	9	9		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments
2004	-	-	-	-	15	15		Same as previous year
2005	-	-	-	-	15	15		Same as previous year
2006	-	-	-	-	22	22		Quota set to nil (no factory landing allowed) and fishery restricted to catches used for internal consumption in Greenland
2007	-	-	-	-	25	25		Quota set to nil (no factory landing allowed), fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments
2008	-	-	-	-	26	26		Same as previous year
2009	-	-	-	-	26	26		Same as previous year
2010	-	-	-	-	40	40		No factory landing allowed and fishery restricted to catches used for internal consumption in Greenland
2011	-	-	-	-	28	28		Same as previous
2012	-	-	-	-	33	33	(35)	Unilateral decision made by Greenland to allow factory landing with a 35 t quota for factory landings only, 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	-	-	-	-	47	47	(35)	Same as previous year

Year	Norway	Faroes	Sweden	Denmark	Greenland	Total	Quota	Comments
2014	-	-	-	-	58	58	(30)	Unilateral decision made by Greenland to allow factory landing with a 30 t quota for factory landings only, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments
2015	-	-	-	-	57	57	45	Unilateral decision made by Greenland to set a 45 t quota for all sectors of the fishery, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments
2016	-	-	-	-	27	27	32	Unilateral decision made by Greenland to reduce the previously set 45 t quota for all sectors of the fishery to 32 t based on overharvest of 2015 fishery, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information and phone surveys are used for the assessments
2017	-	-	-	-	28	28	45	Unilateral decision made by Greenland to set a 45 t quota for all sectors of the fishery, fishery restricted to catches used for internal consumption in Greenland, and higher catch figures based on sampling programme information are used for the assessments
2018	-	-	-	-	40	40	30	No factory landing allowed and fishery restricted to catches used for internal consumption in Greenland
2019	-	-	-	-	30	30	20	Same as previous year
2020	-	-	-	-	32	32	21	Same as previous year
2021	-	-	-	-	43	43	30	Overall quota segregated across three management areas and two user groups with 27 t allocated for the fishery at West Greenland
2022	-	-	-	-	30	30	30	Same as previous year
2023	-	-	-	-	34	34	30	Same as previous year

Table 5.1.1.2. Distribution of nominal catches (t) by Greenland fishers since 1960. NAFO Division is represented by 1A–1F. Since 2005, gutted weights have been reported and converted to total weight by a factor of 1.11. Rounding issues are evident for some totals. No landings are reported for 1993 and 1994 as the fishery was suspended. Entries of '+' represent catches of < 0.5 t and '-' indicate no catch.

Year	1A	1B	1C	1D	1E	1F	Unk.	West Greenland	East Greenland	Total
1960	-	-	-	-	-	-	60	60	-	60
1961	-	-	-	-	-	-	127	127	-	127
1962	-	-	-	-	-	-	244	244	-	244
1963	1	172	180	68	45	-	-	466	-	466
1964	21	326	564	182	339	107	-	1539	-	1539
1965	19	234	274	86	202	10	36	861	-	861
1966	17	223	321	207	353	130	87	1338	-	1338
1967	2	205	382	228	336	125	236	1514	-	1514
1968	1	90	241	125	70	34	272	833	-	833
1969	41	396	245	234	370	-	867	2153	-	2153
1970	58	239	122	123	496	207	862	2107	-	2107
1971	144	355	724	302	410	159	560	2654	-	2654
1972	117	136	190	374	385	118	703	2023	-	2023
1973	220	271	262	440	619	329	200	2341	-	2341
1974	44	175	272	298	395	88	645	1917	-	1917
1975	147	468	212	224	352	185	442	2030	-	2030
1976	166	302	262	225	182	38	-	1175	-	1175
1977	201	393	336	207	237	46	-	1 420	6	1426
1978	81	349	245	186	113	10	-	984	8	992
1979	120	343	524	213	164	31	-	1395	+	1395
1980	52	275	404	231	158	74	-	1194	+	1194
1981	105	403	348	203	153	32	20	1264	+	1264
1982	111	330	239	136	167	76	18	1077	+	1077
1983	14	77	93	41	55	30	-	310	+	310
1984	33	116	64	4	43	32	5	297	+	297
1985	85	124	198	207	147	103	-	864	7	871
1986	46	73	128	203	233	277	-	960	19	979

Year	1A	1B	1C	1D	1E	1F	Unk.	West Greenland	East Greenland	Total
1987	48	114	229	205	261	109	-	966	+	966
1988	24	100	213	191	198	167	-	893	4	897
1989	9	28	81	73	75	71	-	337	-	337
1990	4	20	132	54	16	48	-	274	-	274
1991	12	36	120	38	108	158	-	472	4	476
1992	-	4	23	5	75	130	-	237	5	242
1993	-	-	-	-	-	-	-	-	-	-
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	10.0	1.6	2.5	5.0	0	26.2	0	26.2
2009	0.2	6.2	7.1	3.0	4.3	4.8	0	25.6	0.8	26.3
2010	17.3	4.6	2.4	2.7	6.8	4.3	0	38.1	1.7	39.6
2011	1.8	3.7	5.3	8.0	4.0	4.6	0	27.4	0.1	27.5
2012	5.4	0.8	15.0	4.6	4.0	3.0	0	32.6	0.5	33.1
2013	3.1	2.4	17.9	13.4	6.4	3.8	0	47.0	0.0	47.0
2014	3.6	2.8	13.8	19.1	15.0	3.4	0	57.8	0.1	57.9
2015	0.8	8.8	10.0	18.0	4.2	14.1	0	55.9	1.0	56.8

Year	1A	1B	1C	1D	1E	1F	Unk.	West Greenland	East Greenland	Total
2016	0.8	1.2	7.3	4.6	4.5	7.3	0	25.7	1.5	27.1
2017	1.1	1.7	9.3	6.9	3.2	5.6	0	27.8	0.3	28.0
2018	2.4	5.7	13.7	8.2	4.2	4.8	0	39.0	0.8	39.9
2019	0.8	3.0	4.4	8.0	4.8	7.3	0	28.3	1.4	29.8
2020	0.9	3.6	6.6	9.7	3.0	7.1	0	30.9	0.8	31.7
2021	1.3	5.1	13.8	10.5	3.4	7.4	0.3	41.8	1.4	43.2
2022	1.4	3.0	5.3	8.2	4.1	7.0	0.8	29.0	0.8	29.8
2023	1.4	5.0	8.0	4.8	7.3	6.3	0.2	33.0	1.3	34.3

Table 5.1.1.3. Total number of licences issued and number of fishers reporting catches of Atlantic salmon in the Greenland fishery by NAFO (1A-1F)/ICES Divisions. Reports received by fish factories prior to 1997 and to the Licence Office from 1998 to present. Blanks cells indicate that the data were not reported or available. Starting in 2018, a new regulation was enacted which required all fishers to have a licence to fish for Atlantic salmon. Prior to 2018, only commercial fishers were required to have a licence.

Year	Licences	1A	1B	1C	1D	1E	1F	ICES	Unk.	Number of fishers reporting	Number of reports received
1987		78	67	74		99	233		0	579	
1988		63	46	43	53	78	227		0	516	
1989		30	41	98	46	46	131		0	393	
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	452	2	7	13	15	6	37		0	76	
2002	479	1	1	9	13	9	8		0	41	
2003	150	11	1	4	4	12	10		0	42	
2004	155	20	2	8	4	20	12		0	66	
2005	185	11	7	17	5	17	18		0	75	
2006	159	43	14	17	20	17	30		0	141	
2007	260	29	12	26	10	33	22		0	132	
2008	260	44	8	41	10	16	24		0	143	
2009	294	19	11	35	15	25	31	9	0	145	
2010	309	86	17	19	16	30	27	13	0	208	389
2011	234	25	9	20	15	20	23	5	0	117	394
2012	279	35	9	32	8	16	16	6	0	122	553

Year	Licences	1A	1B	1C	1D	1E	1F	ICES	Unk.	Number of fishers reporting	Number of reports received
2013	228	28	8	21	19	7	11	1	0	95	553
2014	321	21	8	40	20	10	14	1	0	114	669
2015	310	18	18	58	31	14	41	9	0	189	938
2016	263	9	11	31	16	23	40	10	3	143	503
2017	282	17	9	40	24	23	28	2	0	143	631
2018	786	98	78	81	143	44	105	8	0	557	1536
2019	717	96	70	117	169	54	108	24	0	638	1531
2020	757	100	89	103	151	47	118	10	0	618	1321
2021	939	97	91	117	197	51	103	12	3	671	1840
2022	757	77	67	70	147	35	99	9	0	504	1266
2023	793	96	97	92	203	52	93	14	5	652	1625

Table 5.1.1.4. Total number of licences issued, number and percent of people reporting, and reported catch by fisher type in the Greenland Atlantic salmon fishery 1987-present. Mean values for different time periods are also provided for comparison. Prior to 2018, only commercial fishers were required to have a licence.

	Commercial Fishers				Recreational Fishers				Total			
Year	No. Licenses	No. reporting	%	Catch (kg)	No. Licenses	No. reporting	%	Catch (kg)	No. Licenses	No. reporting	%	Catch (kg)
1987										579		
1988										516		
1989										393		
1990										362		
1991										410		
1992										212		
1993												
1994												
1995										145		
1996										163		
1997		185								185		59 333
1998	405	46	11%	7463		24				70		11 059
1999	424	110	26%	15 551						110		19 464
2000	179	45	25%	19 900		1				46		20 504
2001	451	57	13%	34 184		30				87		42 514
2002	480	24	5%	5753		19				43		8119
2003	150	23	15%	6008		19				42		8694
2004	157	32	20%	11 342		32				64		15 945
2005	185	55	30%	7133		20				75		13 788
2006	166	69	42%	12 023		67				136		20 836
2007	261	102	39%	14 919		28				130		22 204
2008	262	78	30%	11 303		173				251		26 000
2009	293	100	34%	21 955		45				145		26 278
2010	309	110	36%	27 332		98				208		39 696
2011	242	61	25%	21 397		56				117		27 524

	Commercial Fishers				Recreational Fishers				Total			
Year	No. Li-censes	No. re-porting	%	Catch (kg)	No. Li-censes	No. re-porting	%	Catch (kg)	No. Li-censes	No. re-porting	%	Catch (kg)
2012	276	79	29%	29 056		43				122		33 178
2013	328	66	20%	45 600		29				95		46 961
2014	320	98	31%	56 246		16				114		57 836
2015	310	114	37%	50 841		75				189		56 847
2016	263	71	27%	19 395		69				140		27 120
2017	282	93	33%	24 919		50				143		28 042
2018	329	235	71%	32 597	457	322	70%	7268	786	557	71%	39 865
2019	302	276	91%	21 869	415	361	87%	7879	717	638	89%	29 769
2020	339	277	82%	22 000	418	341	82%	9669	757	618	82%	31 670
2021	360	281	78%	32 245	579	424	73%	10 972	939	705	75%	43 216
2022	291	199	68%	20 640	466	312	67%	9154	757	511	68%	29 794
2023	285	247	87%	25 182	508	405	80%	9083	793	652	82%	34 266
1998-2008 mean	**284**	**58**	**22%**	**13 234**		**41**		**5475**		**85**		**19 012**
2009-2017 mean	**291**	**88**	**30%**	**32 971**		**53**		**5193**		**142**		**38 165**
2018-2023 mean	**318**	**253**	**80%**	**25 756**	**474**	**361**	**77%**	**9004**	**792**	**614**	**78%**	**34 763**

Table 5.1.2.1. Adjusted landings estimated from comparing the weight of salmon seen by the sampling teams and the corresponding community-specific reported landings (Adjusted landings (sampling)) and from phone surveys (Adjusted landings (survey)). Dashes '-' indicate that no adjustment was necessary or that a phone surveys was not conducted. Adjusted landings (sampling and surveys) are added to the reported landings for assessment purposes. Adjusted landings do not replace official reported statistics. Rounding issues are evident for some totals.

Year	Reported Landings (West Greenland only)	Adjusted Landings (Sampling)	Adjusted Landings (Survey)	Landings for Assessment
2002	9.0	0.7		9.8
2003	8.7	3.6		12.3
2004	14.7	2.5		17.2
2005	15.3	2.0		17.3
2006	23.0			23.0
2007	24.6	0.2		24.8
2008	26.1	2.5		28.6
2009	25.5	2.5		28.0
2010	37.9	5.1		43.1
2011	27.4			27.4
2012	32.6	2.0		34.6
2013	46.9	0.7		47.7
2014	57.7	0.6	12.2	70.5
2015	55.9		5.0	60.9
2016	25.7	0.3	4.2	30.2
2017	27.8	0.3		28.0
2018	39.0			39.0
2019	28.3			28.3
2020	30.9			30.9
2021	41.8			41.8
2022	29.0			29.0
2023	33.0			33.0

Table 5.2.1. Size of biological samples and percentage (by number) of North American and European salmon in research vessel catches at West Greenland (1969 to 1982), from commercial samples (1978 to 1992, 1995 to 1997, and 2001) and from local consumption samples (1998 to 2000, and 2002 to present). Parenthetical sample numbers represent the number of samples available. The 95% confidence intervals for continent of origin were calculated according ot the methods of Pella and Robertson (1979) for 1984–1986 and binomial distribution for the years. Genetic-based continent of origin assignments are considered to be 100% accurate. The 606 research samples collected in 1978 were collected during the fishery and the 49 samples were collected after the fishery closed.

Source	Year	Sample Size			Continent of Origin (%)			
		Length	Scales	Genetics	North American	(95% CI)	European	(95% CI)
Research	1969	212	212		51	(57, 44)	49	(56, 43)
	1970	127	127		35	(43, 26)	65	(75, 57)
	1971	247	247		34	(40, 28)	66	(72, 50)
	1972	3488	3488		36	(37, 34)	64	(66, 63)
	1973	102	102		49	(59, 39)	51	(61, 41)
	1974	834	834		43	(46, 39)	57	(61, 54)
	1975	528	528		44	(48, 40)	56	(60, 52)
	1976	420	420		43	(48, 38)	57	(62, 52)
	1978	606	606		38	(41, 38)	62	(66, 59)
	1978	49	49		55	(69, 41)	45	(59, 31)
	1979	328	328		47	(52, 41)	53	(59, 48)
	1980	617	617		58	(62, 54)	42	(46, 38)
	1982	443	443		47	(52, 43)	53	(58, 48)
Commercial	1978	392	392		52	(57, 47)	48	(53, 43)
	1979	1653	1653		50	(52, 48)	50	(52, 48)
	1980	978	978		48	(51, 45)	52	(55, 49)
	1981	4570	1930		59	(61, 58)	41	(42, 39)
	1982	1949	414		62	(64, 60)	38	(40, 36)
	1983	4896	1815		40	(41, 38)	60	(62, 59)
	1984	7282	2720		50	(53, 47)	50	(53, 47)
	1985	13 272	2917		50	(53, 46)	50	(52, 34)
	1986	20 394	3509		57	(66, 48)	43	(52, 34)
	1987	13 425	2960		59	(63, 54)	41	(46, 37)

Source	Year	Sample Size			Continent of Origin (%)			
		Length	Scales	Genetics	North American	(95% CI)	European	(95% CI)
	1988	11 047	2562		43	(49, 38)	57	(62, 51)
	1989	9366	2227		56	(60, 52)	44	(48, 40)
	1990	4897	1208		75	(79, 70)	25	(30, 21)
	1991	5005	1347		65	(69, 61)	35	(39, 31)
	1992	6348	1648		54	(57, 50)	46	(50, 43)
	1995	2045	2045		68	(75, 65)	32	(35, 28)
	1996	3341	1397		73	(76, 71)	27	(29, 24)
	1997	794	282		80	(84, 75)	20	(25, 16)
	2001	4721	2655		69	(71, 67)	31	(33, 29)
Local Consumption	1998	540	406		79	(84, 73)	21	(27, 16)
	1999	532	532		90	(97, 84)	10	(16, 3)
	2000	491	491	490	70		30	
	2002	501	501	501 (1001)	68		32	
	2003	1743	1743	1779	68		32	
	2004	1639	1639	1688	73		27	
	2005	767	767	767	76		24	
	2006	1209	1209	1193	72		28	
	2007	1116	1110	1123	82		18	
	2008	1854	1866	1853	86		14	
	2009	1662	1683	1671	91		9	
	2010	1261	1265	1240	80		20	
	2011	967	965	964	92		8	
	2012	1372	1371	1373	82		18	
	2013	1155	1156	1149	82		18	
	2014	892	775	920	72		28	
	2015	1708	1704	1674	80		20	
	2016	1300	1240	1302	66		34	
	2017	1369	1328	986 (1367)	74		26	

Source	Year	Sample Size			Continent of Origin (%)			
		Length	Scales	Genetics	North American	(95% CI)	European	(95% CI)
	2018	1064	1048	979 (1111)	83		17	
	2019	1117	1049	1071 (1119)	72		28	
	2020	140	76	197	56		44	
	2021	1293	882 (1308)	1532	82		18	
	2022	672	623	669	94		6	
	2023	1240	1215	1266	62		38	

[1] **CI - confidence interval calculated by method of Pella and Robertson (1979) for 1984–1986 and binomial distribution for the others.**

[2] **During 1978 Fishery.**

[3] **Research samples after 1978 fishery closed.**

Table 5.2.1.1. Annual mean whole weights (kg) and fork lengths (cm) by sea age and continent of origin of Atlantic salmon caught at West Greenland 1969 to the present (NA = North America and E = Europe). Sampling did not occur in 1977, 1993, and 1994. These data have not been adjusted for the period of sampling and it is known that salmon grow quickly during the period of feeding at West Greenland. Caution is urged when interpreting these uncorrected data. In addition, some estimates, especially with the older sea age fish are based on a small number of samples.

	Whole Weight (kg)									Fork Length (cm)					
	1SW		2SW		PS		All Sea Ages		Total	1SW		2SW		PS	
Year	NA	E	NA	E	NA	E	NA	E		NA	E	NA	E	NA	E
1969	3.12	3.76	5.48	5.80	-	5.13	3.25	3.86	3.58	65.0	68.7	77.0	80.3	-	75.3
1970	2.85	3.46	5.65	5.50	4.85	3.80	3.06	3.53	3.28	64.7	68.6	81.5	82.0	78.0	75.0
1971	2.65	3.38	4.30	-	-	-	2.68	3.38	3.14	62.8	67.7	72.0	-	-	-
1972	2.96	3.46	5.85	6.13	2.65	4.00	3.25	3.55	3.44	64.2	67.9	80.7	82.4	61.5	69.0
1973	3.28	4.54	9.47	10.00	-	-	3.83	4.66	4.18	64.5	70.4	88.0	96.0	61.5	-
1974	3.12	3.81	7.06	8.06	3.42	-	3.22	3.86	3.58	64.1	68.1	82.8	87.4	66.0	-
1975	2.58	3.42	6.12	6.23	2.60	4.80	2.65	3.48	3.12	61.7	67.5	80.6	82.2	66.0	75.0
1976	2.55	3.21	6.16	7.20	3.55	3.57	2.75	3.24	3.04	61.3	65.9	80.7	87.5	72.0	70.7
1977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1978	2.96	3.50	7.00	7.90	2.45	6.60	3.04	3.53	3.35	63.7	67.3	83.6	-	60.8	85.0
1979	2.98	3.50	7.06	7.60	3.92	6.33	3.12	3.56	3.34	63.4	66.7	81.6	85.3	61.9	82.0
1980	2.98	3.33	6.82	6.73	3.55	3.90	3.07	3.38	3.22	64.0	66.3	82.9	83.0	67.0	70.9
1981	2.77	3.48	6.93	7.42	4.12	3.65	2.89	3.58	3.17	62.3	66.7	82.8	84.5	72.5	-
1982	2.79	3.21	5.59	5.59	3.96	5.66	2.92	3.43	3.11	62.7	66.2	78.4	77.8	71.4	80.9
1983	2.54	3.01	5.79	5.86	3.37	3.55	3.02	3.14	3.10	61.5	65.4	81.1	81.5	68.2	70.5
1984	2.64	2.84	5.84	5.77	3.62	5.78	3.20	3.03	3.11	62.3	63.9	80.7	80.0	69.8	79.5
1985	2.50	2.89	5.42	5.45	5.20	4.97	2.72	3.01	2.87	61.2	64.3	78.9	78.6	79.1	77.0
1986	2.75	3.13	6.44	6.08	3.32	4.37	2.89	3.19	3.03	62.8	65.1	80.7	79.8	66.5	73.4
1987	3.00	3.20	6.36	5.96	4.69	4.70	3.10	3.26	3.16	64.2	65.6	81.2	79.6	74.8	74.8
1988	2.83	3.36	6.77	6.78	4.75	4.64	2.93	3.41	3.18	63.0	66.6	82.1	82.4	74.7	73.8
1989	2.56	2.86	5.87	5.77	4.23	5.83	2.77	2.99	2.87	62.3	64.5	80.8	81.0	73.8	82.2
1990	2.53	2.61	6.47	5.78	3.90	5.09	2.67	2.72	2.69	62.3	62.7	83.4	81.1	72.6	78.6
1991	2.42	2.54	5.82	6.23	5.15	5.09	2.57	2.79	2.65	61.6	62.7	80.6	82.2	81.7	80.0
1992	2.54	2.66	6.49	6.01	4.09	5.28	2.86	2.74	2.81	62.3	63.2	83.4	81.1	77.4	82.7
1993	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	2.37	2.67	6.09	5.88	3.71	4.98	2.45	2.75	2.56	61.0	63.2	81.3	81.0	70.9	81.3
1996	2.63	2.86	6.50	6.30	4.98	5.44	2.83	2.90	2.88	62.8	64.0	81.4	81.1	77.1	79.4
1997	2.57	2.82	7.95	6.11	4.82	6.9	2.63	2.84	2.71	62.3	63.6	85.7	84.0	79.4	87.0
1998	2.72	2.83	6.44	-	3.28	4.77	2.76	2.84	2.78	62.0	62.7	84.0	-	66.3	76.0

	Whole Weight (kg)									Fork Length (cm)					
	1SW		2SW		PS		All Sea Ages		Total	1SW		2SW		PS	
Year	NA	E	NA	E	NA	E	NA	E		NA	E	NA	E	NA	E
1999	3.02	3.03	7.59	-	4.20	-	3.09	3.03	3.08	63.8	63.5	86.6	-	70.9	-
2000	2.47	2.81	-	-	2.58	-	2.47	2.81	2.57	60.7	63.2	-	-	64.7	-
2001	2.89	3.03	6.76	5.96	4.41	4.06	2.95	3.09	3.00	63.1	63.7	81.7	79.1	75.3	72.1
2002	2.84	2.92	7.12	-	5.00	-	2.89	2.92	2.90	62.6	62.1	83.0	-	75.8	-
2003	2.94	3.08	8.82	5.58	4.04	-	3.02	3.10	3.04	63	64.4	86.1	78.3	71.4	-
2004	3.11	2.95	7.33	5.22	4.71	6.48	3.17	3.22	3.18	64.7	65.0	86.2	76.4	77.6	88.0
2005	3.19	3.33	7.05	4.19	4.31	2.89	3.31	3.33	3.31	65.9	66.4	83.3	75.5	73.7	62.3
2006	3.10	3.25	9.72	-	5.05	3.67	3.25	3.26	3.24	65.3	65.3	90.0	-	76.8	69.5
2007	2.89	2.87	6.19	6.47	4.94	3.57	2.98	2.99	2.98	63.5	63.3	80.9	80.6	76.7	71.3
2008	3.04	3.03	6.35	7.47	3.82	3.39	3.08	3.07	3.08	64.6	63.9	80.1	85.5	71.1	73.0
2009	3.28	3.40	7.59	6.54	5.25	4.28	3.48	3.67	3.50	64.9	65.5	84.6	81.7	75.9	73.5
2010	3.44	3.24	6.40	5.45	4.17	3.92	3.47	3.28	3.42	66.7	65.2	80.0	75.0	72.4	70.0
2011	3.30	3.18	5.69	4.94	4.46	5.11	3.39	3.49	3.40	65.8	64.7	78.6	75.0	73.7	76.3
2012	3.34	3.38	6.00	4.51	4.65	3.65	3.44	3.40	3.44	65.4	64.9	75.9	70.4	72.8	68.9
2013	3.33	3.16	6.43	4.51	3.64	5.38	3.39	3.20	3.35	66.2	64.6	81.0	72.8	69.9	73.6
2014	3.25	3.02	7.60	6.00	4.47	5.42	3.39	3.13	3.32	65.6	64.7	86.0	78.7	73.6	83.5
2015	3.36	3.13	7.52	7.1	4.53	3.81	3.42	3.18	3.37	65.6	64.4	84.1	82.5	74.2	67.2
2016	3.18	2.79	7.77	5.18	4.03	4.12	3.32	2.89	3.18	65.2	62.6	85.1	76.0	72.2	70.9
2017	3.42	3.31	6.50	3.69	4.94	8.00	3.50	3.36	3.26	66.6	64.8	85.1	72.4	76.7	81.9
2018	2.91	2.93	9.27	5.59	4.53	-	2.97	3.00	2.97	63.8	63.9	87.5	76.3	77.1	-
2019	2.93	2.89	6.62	6.27	4.01	2.76	3.01	2.83	2.96	63.9	63.4	78.4	76.8	72.1	62.1
2020	3.20	3.38	-	-	7.90	-	3.59	3.38	3.50	66.6	65.6	-	-	85.0	-
2021	3.34	3.34	7.92	4.02	4.72	-	3.44	3.35	3.42	66.2	65.9	86.9	70.1	74.7	-
2022	2.79	2.73	6.51	6.05	3.25	-	2.83	3.05	2.85	63.9	62.4	80.9	81.5	69.0	-
2023	2.64	2.59	7.55	5.25	3.65	3.87	2.83	2.61	2.75	63.1	61.1	83.7	75.6	70.9	72.0
Prev. 10-yr mean	**3.17**	**3.07**	**7.35**	**5.38**	**4.60**	**4.92**	**3.29**	**3.14**	**3.24**	**65.4**	**64.1**	**83.9**	**76.3**	**74.5**	**73.2**
Overall mean	**2.91**	**3.14**	**6.76**	**6.05**	**4.19**	**4.71**	**3.05**	**3.22**	**3.14**	**63.7**	**65.0**	**82.3**	**80.0**	**72.3**	**75.4**

Table 5.2.1.2. River age distribution (%) and mean river age for all North American origin salmon caught at West Greenland from 1968 to the present. Sampling did not occur in 1977, 1993 and 1994.

Year	1	2	3	4	5	6	7	8
1968	0.3	19.6	40.4	21.3	16.2	2.2	0	0
1969	0	27.1	45.8	19.6	6.5	0.9	0	0
1970	0	58.1	25.6	11.6	2.3	2.3	0	0
1971	1.2	32.9	36.5	16.5	9.4	3.5	0	0
1972	0.8	31.9	51.4	10.6	3.9	1.2	0.4	0
1973	2.0	40.8	34.7	18.4	2.0	2.0	0	0
1974	0.9	36	36.6	12.0	11.7	2.6	0.3	0
1975	0.4	17.3	47.6	24.4	6.2	4.0	0	0
1976	0.7	42.6	30.6	14.6	10.9	0.4	0.4	0
1977	-	-	-	-	-	-	-	-
1978	2.7	31.9	43.0	13.6	6.0	2.0	0.9	0
1979	4.2	39.9	40.6	11.3	2.8	1.1	0.1	0
1980	5.9	36.3	32.9	16.3	7.9	0.7	0.1	0
1981	3.5	31.6	37.5	19.0	6.6	1.6	0.2	0
1982	1.4	37.7	38.3	15.9	5.8	0.7	0	0.2
1983	3.1	47.0	32.6	12.7	3.7	0.8	0.1	0
1984	4.8	51.7	28.9	9.0	4.6	0.9	0.2	0
1985	5.1	41.0	35.7	12.1	4.9	1.1	0.1	0
1986	2.0	39.9	33.4	20.0	4.0	0.7	0	0
1987	3.9	41.4	31.8	16.7	5.8	0.4	0	0
1988	5.2	31.3	30.8	20.9	10.7	1.0	0.1	0
1989	7.9	39.0	30.1	15.9	5.9	1.3	0	0
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

Year	1	2	3	4	5	6	7	8
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
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
2014	0.4	26.0	44.5	21.9	6.9	0.4	0	0
2015	0.1	31.6	40.6	21.6	6.0	0.2	0	0
2016	0.1	21.3	43.3	26.8	7.3	1.1	0	0
2017	0.3	31.0	41.6	19.6	7.2	0.3	0	0
2018	0.5	29.8	38.4	24.1	6.5	0.7	0	0
2019	0.6	26.9	32.5	25.4	13.7	0.8	0	0
2020	2.6	28.2	23.1	28.2	17.9	0	0	0
2021	0.4	27.3	38.3	21.7	10.1	2.0	0.1	0
2022	0.4	24.9	38.7	24.1	10.3	1.6	0	0
2023	1.0	15.8	26.4	29.9	23.1	3.8	0	0

Year	1	2	3	4	5	6	7	8
Previous 10-yr Mean	0.5	28.0	37.8	23.4	9.5	0.8	0.0	0.0
Overall Mean	2.2	30.6	39.0	19.4	7.5	1.1	0.1	0.0

Table 5.2.1.3. River age distribution (%) and mean river age for all European origin salmon caught in West Greenland 1968 to the present. Sampling did not occur in 1977, 1993 and 1994.

Year	1	2	3	4	5	6	7	8
1968	21.6	60.3	15.2	2.7	0.3	0	0	0
1969	0	83.8	16.2	0	0	0	0	0
1970	0	90.4	9.6	0	0	0	0	0
1971	9.3	66.5	19.9	3.1	1.2	0	0	0
1972	11.0	71.2	16.7	1.0	0.1	0	0	0
1973	26.0	58.0	14.0	2.0	0	0	0	0
1974	22.9	68.2	8.5	0.4	0	0	0	0
1975	26.0	53.4	18.2	2.5	0	0	0	0
1976	23.5	67.2	8.4	0.6	0.3	0	0	0
1977	-	-	-	-	-	-	-	-
1978	26.2	65.4	8.2	0.2	0	0	0	0
1979	23.6	64.8	11.0	0.6	0	0	0	0
1980	25.8	56.9	14.7	2.5	0.2	0	0	0
1981	15.4	67.3	15.7	1.6	0	0	0	0
1982	15.6	56.1	23.5	4.2	0.7	0	0	0
1983	34.7	50.2	12.3	2.4	0.3	0.1	0.1	0
1984	22.7	56.9	15.2	4.2	0.9	0.2	0	0
1985	20.2	61.6	14.9	2.7	0.6	0	0	0
1986	19.5	62.5	15.1	2.7	0.2	0	0	0
1987	19.2	62.5	14.8	3.3	0.3	0	0	0
1988	18.4	61.6	17.3	2.3	0.5	0	0	0
1989	18.0	61.7	17.4	2.7	0.3	0	0	0
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

Year	1	2	3	4	5	6	7	8
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	0.0	1.0	0	0
1999	27.7	65.1	7.2	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
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
2012	9.3	63.0	24.0	3.7	0	0	0	0
2013	4.5	68.2	24.4	2.5	0	0	0	0
2014	4.5	60.7	30.8	4.0	0	0	0	0
2015	9.2	54.9	28.8	5.8	1.2	0	0	0
2016	2.5	63.3	29.6	4.3	0.3	0	0	0
2017	10.0	73.0	15.4	1.7	0	0	0	0
2018	13.7	62.1	19.0	5.2	0	0	0	0
2019	7.5	60.5	24.2	7.5	0.4	0	0	0
2020	9.7	74.2	9.7	3.2	3.2	0	0	0
2021	15.6	58.2	19.1	5.7	1.4	0	0	0
2022	17.9	53.8	17.9	5.1	5.1	0	0	0
2023	27.1	49.8	17.6	4.5	0.5	0.5	0	0

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Previous 10-yr Mean	**9.5**	**62.9**	**21.9**	**4.5**	**1.2**	**0.0**	**0.0**	**0.0**
Overall Mean	**16.3**	**61.0**	**19.1**	**3.1**	**0.5**	**0.0**	**0.0**	**0.0**

Table 5.2.1.4. Sea age composition (%) of samples from fishery landings in West Greenland by continent of origin from 1985 to present. Sampling did not occur in 1993 and 1994.

Year	North American			European		
	1SW	2SW	Previous Spawners	1SW	2SW	Previous Spawners
1985	92.5	7.2	0.3	95.0	4.7	0.4
1986	95.1	3.9	1.0	97.5	1.9	0.6
1987	96.3	2.3	1.4	98.0	1.7	0.3
1988	96.7	2.0	1.2	98.1	1.3	0.5
1989	92.3	5.2	2.4	95.5	3.8	0.6
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	0.6
1999	96.8	1.2	2.0	100.0	0.0	0.0
2000	97.4	0.0	2.6	100.0	0.0	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	0.0
2003	96.7	1.0	2.3	98.9	1.1	0.0
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	0.0	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

Year	North American			European		
	1SW	2SW	Previous Spawners	1SW	2SW	Previous Spawners
2012	93.2	0.7	6.0	98.0	1.6	0.4
2013	94.9	1.4	3.7	96.6	2.4	1.0
2014	91.3	1.1	7.6	96.1	2.4	1.5
2015	97.0	0.7	2.3	98.2	1.2	0.6
2016	93.5	2.5	4.0	95.5	3.5	1.0
2017	92.5	1.5	6.0	93.1	5.7	1.2
2018	97.4	0.4	2.2	97.4	2.6	0
2019	95.9	1.4	2.7	97.9	1.7	0.3
2020	92.3	0	7.7	97.1	0	2.9
2021	95.5	1.2	3.3	97.9	2.1	0
2022	94.7	0.7	4.6	90.0	10.0	0
2023	92.8	3.1	4.1	98.9	0.9	0.2
Previous 10-yr mean	**94.5**	**1.1**	**4.4**	**96.0**	**3.2**	**0.9**
Overall mean	**95.2**	**1.9**	**2.9**	**96.6**	**2.6**	**0.8**

Table 5.2.2.1. SNP baseline reporting groups and codes used for continent and region of origin assignments. See Figure 5.2.2.2 for location details.

ICES region	Reporting group	Group acro-	ICES re-gion	Reporting group	Group acronym
Quebec (North)	Ungava	UNG	Europe	Spain	SPN
Labrador	Labrador Central	LAC		France	FRN
	Lake Melville	MEL		European Broodstock	EUB
	Labrador South	LAS		United Kingdom / Ireland	BRI
Quebec	St Lawrence North Shore Lower	QLS		Barents-White Seas	BAR
	Anticosti	ANT		Baltic Sea	BAL
	Gaspe Peninsula	GAS		Southern Norway	SNO
	Quebec City Region	QUE		Northern Norway	NNO
Gulf	Gulf of St Lawrence	GUL		Iceland	ICE
Scotia-Fundy	Inner Bay of Fundy	IBF		Greenland	GL
	Eastern Nova Scotia	ENS			
	Western Nova Scotia	WNS			
	Saint John River & Aquaculture	SJR			
Newfoundland	Northern Newfoundland	NNF			
	Western Newfoundland	WNF			
	Newfoundland 1	NF1			
	Newfoundland 2	NF2			
	Fortune Bay	FTB			
	Burin Peninsula	BPN			
	Avalon Peninsula	AVA			
USA	Maine, United States	USA			

Table 5.2.2.2. The number of samples and continent of origin of Atlantic salmon by NAFO Division sampled in West Greenland in 2023. A single sample from ICES Sub-area 14b is provided below, but not included in the total.

NAFO Division	Sample dates	Numbers			Percentages	
		North American	European	Total	North American	European
1A	30 Sep	3	2	5	60.0	40.0
1B	05 Sep – 15 Oct	111	75	186	59.7	40.3
1C	01 Sep – 08 Oct	515	351	866	59.5	40.5
1D	14 Sep – 15 Sep	24	13	37	64.9	35.1
1F	03 Aug – 14 Sep	137	34	171	80.1	19.9
TOTAL		**790**	**475**	**1265**	**62.5**	**37.5**
14b	19 Sep	1	0	1	100.0	0.0

Table 5.2.2.3. The estimated percentage and numbers of North American (NA) and European (E) Atlantic salmon caught in the West Greenland fishery based on NAFO Division continent of origin estimates weighted by catch weight (1982 to the present). Numbers are rounded to the nearest 100 fish. Unreported catch is not included in this assessment and sampling did not occur in 1993 and 1994.

	Percentage by continent weighted by catch		Numbers of salmon by continent	
Year	N	E	NA	E
1982	57	43	192 200	143 800
1983	40	60	39 500	60 500
1984	54	46	48 800	41 200
1985	47	53	143 500	161 500
1986	59	41	188 300	131 900
1987	59	41	171 900	126 400
1988	43	57	125 500	168 800
1989	55	45	65 000	52 700
1990	74	26	62 400	21 700
1991	63	37	111 700	65 400
1992	45	55	46 900	38 500
1995	67	33	21 400	10 700
1996	70	30	22 400	9700
1997	85	15	18 000	3300
1998	79	21	3100	900
1999	91	9	5700	600
2000	65	35	5100	2700
2001	67	33	9400	4700
2002	69	31	2300	1000
2003	64	36	2600	1400
2004	72	28	3900	1500
2005	74	26	3500	1200
2006	69	31	4000	1800
2007	76	24	6100	1900
2008	86	14	8000	1300
2009	89	11	7000	800

Year	Percentage by continent weighted by catch		Numbers of salmon by continent	
	N	E	NA	E
2010	80	20	10 000	2600
2011	93	7	6800	600
2012	79	21	7800	2100
2013	82	18	11 500	2700
2014	72	28	12 800	5400
2015	79	21	13 500	3900
2016	64	36	5100	3300
2017	74	26	6100	2200
2018	80	20	10 600	2600
2019	72	28	6800	2600
2020	59	41	5200	3600
2021	83	17	10 300	2000
2022	91	9	9200	900
2023	64	36	7000	3900
Previous 10-yr mean	**76**	**24**	**9110**	**2920**
Overall mean	**70**	**30**	**36 023**	**27 358**

Table 5.2.2.4. Bayesian estimates of mixture composition for West Greenland Atlantic Salmon fishery by region and overall for 2023. Baseline locations refer to regional reporting groups identified in Table 5.2.2.1 and Figure 5.2.2.2. Sample locations are identified by NAFO Divisions. Mean estimates provided with 95% credible interval in parentheses. Estimates of mixture contributions not supported by significant individual assignments (P>0.8) are represented as zero and therefore all columns may not add up to 100. Credible intervals with a lower bound of zero, or close to zero, may indicate little support for the mean assignment value. Overall credible intervals with a lower bound of zero and have been greyed out for visualization.

Reporting Group	COO	NAFO 1A	NAFO 1B	NAFO 1C	NAFO 1D	NAFO 1F	Overall
Baltic Sea	EUR	0 (0, 0)	0.0	0.0	0.0	0.0	0.0
Barents-White Seas	EUR	0 (0, 0)	0.0	0.0	0.0	0.0	0.0
European Broodstock	EUR	0 (0, 0)	0.0	0.0	0.0	0.0	0.0
UK/Ireland	EUR	51.3 (8.8, 91.6)	37.2 (30.4, 44.3)	38.2 (35, 41.4)	25.9 (13.2, 40.9)	19.5 (13.9, 25.8)	35.1 (32.5, 37.8)
France	EUR	0.1 (0, 0)	0.5 (0, 2)	0.2 (0, 0.7)	0 (0, 0)	0 (0, 0)	0.2 (0.1, 0.6)
Greenland	EUR	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Iceland	EUR	0.2 (0, 0.3)	0.5 (0, 2)	1.0 (0.5, 1.8)	0 (0, 0)	0 (0, 0)	0.8 (0.4, 1.3)
Northern Norway	EUR	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.0
Southern Norway	EUR	3.5 (0, 30.7)	0.1 (0, 0.7)	0.2 (0, 0.7)	7.3 (1.1, 17.9)	0.1 (0, 1)	0.4 (0.1, 0.8)
Spain	EUR	1.9 (0, 30)	1.6 (0.3, 3.9)	0.9 (0.4, 1.6)	0 (0, 0.1)	0 (0, 0)	0.9 (0.4, 1.4)
Anticosti	NA	0.2 (0, 1.2)	0.4 (0, 1.8)	1.3 (0.6, 2.2)	0 (0, 0.1)	0.3 (0, 2.1)	1 (0.5, 1.7)
Avalon Peninsula	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.0
Burin Peninsula	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.1)
Eastern Nova Scotia	NA	0.6 (0, 7.6)	1.3 (0.2, 3.5)	0.1 (0, 0.4)	2.7 (0, 9.7)	0 (0, 0.3)	0.4 (0.1, 0.9)
Fortune Bay	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Gaspé Peninnsula	NA	1.7 (0, 19.8)	14.1 (9.1, 19.8)	10.7 (8.5, 12.9)	9 (0.9, 21.2)	15.8 (10, 22.7)	12.2 (10.2, 14.1)
Gulf of St Lawrence	NA	1.8 (0, 19.7)	10 (5.7, 15.1)	5.7 (4.1, 7.5)	8.2 (0.3, 22.6)	18.7 (12.1, 26)	8.3 (6.7, 10.1)
Inner Bay of Fundy	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.2)
Labrador Central	NA	8.4 (0, 57.5)	7.9 (3.9, 13)	7.7 (5.8, 9.9)	6.6 (0, 19.1)	5.9 (2.3, 10.9)	7.7 (6, 9.5)
Labrador South	NA	13.4 (0, 63.6)	9.9 (5.5, 15.4)	8.5 (6.5, 10.7)	11.1 (1.8, 25.3)	16.6 (11, 22.9)	9.9 (8.1, 11.8)
Lake Melville	NA	6.7 (0, 54.2)	3.8 (1.2, 7.4)	3.5 (2.2, 5.1)	5.3 (0, 19.1)	1.6 (0, 4.5)	3.1 (2.1, 4.3)

Reporting Group	COO	NAFO 1A	NAFO 1B	NAFO 1C	NAFO 1D	NAFO 1F	Overall
Newfoundland 1	NA	0.4 (0, 4.5)	0.4 (0, 1.9)	0.5 (0.1, 1.1)	0.1 (0, 0.5)	0 (0, 0.1)	0.4 (0.1, 0.8)
Newfoundland 2	NA	0.7 (0, 8.6)	0 (0, 0.4)	0.2 (0, 0.7)	0.1 (0, 0.9)	3.1 (1, 6.4)	0.5 (0.1, 1)
Northern Newfoundland	NA	0.4 (0, 3.7)	0.5 (0, 1.9)	0.3 (0, 0.8)	0 (0, 0.4)	0.4 (0, 2.1)	0.4 (0.1, 0.9)
St. Lawrence North Shore-Lower	NA	1.2 (0, 14.7)	2.2 (0.6, 4.9)	1.8 (1, 2.8)	2.8 (0.1, 10)	2.8 (0.7, 6.1)	2.1 (1.4, 3)
Québec City Region	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.1)
Saint John River & Aquaculture	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.3)
Ungava Bay	NA	0.2 (0, 1.2)	7.0 (3.8, 11)	16.8 (14.3, 19.4)	17.9 (7, 32.1)	10.1 (6.1, 15.1)	14.4 (12.5, 16.4)
Maine, United States	NA	0.2 (0, 1.1)	1.1 (0.1, 3.1)	1.3 (0.6, 2.1)	0 (0, 0.1)	2.2 (0.5, 4.9)	1.3 (0.8, 2.1)
Western Newfoundland	NA	0.5 (0, 5)	1.1 (0.1, 3)	1.0 (0.4, 1.8)	0.1 (0, 0.7)	0 (0, 0.5)	0.8 (0.4, 1.4)
Western Nova Scotia	NA	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)

Table 5.4.1. CL/MOs relevant to the development of catch options at West Greenland for the six geographic areas in NAC and the S-NEAC non-maturing complex.

Area	Objective	Number of fish
US	2SW proportion of recovery criteria	4549
Scotia-Fundy	25% increase from 2SW returns during 1992 to 1997	10 976
Gulf	2SW Conservation Limit	18 737
Québec	2SW Conservation Limit	17 364
Newfoundland	2SW Conservation Limit	4022
Labrador	2SW Conservation Limit	34 746
S-NEAC non-maturing complex	MSW Conservation Limit	174 735

Table 5.4.2. Catch options tables for the mixed-stock fishery at West Greenland by year of fishery/PFA. Catch options for the 2024-2026 fisheries will impact 2SW returns in 2025-2027 respectively. For the simultaneous achievement, 0% refers to null attainment out of 5000 draws.

	Probability of meeting or exceeding region-specific CL/MOs							
	Labrador	Newfoundland	Québec	Gulf	Scotia-Fundy	US	S NEAC (aggregated)	NAC and S NEAC (simultaneously)
2024 Catch options								
0	69%	18%	74%	48%	1%	4%	57%	0%
10	68%	18%	71%	47%	1%	3%	56%	0%
20	65%	17%	69%	44%	1%	3%	56%	0%
30	63%	16%	67%	42%	1%	3%	55%	0%
40	61%	15%	64%	40%	1%	2%	55%	0%
50	58%	14%	61%	38%	1%	2%	54%	0%
60	56%	14%	58%	36%	1%	2%	53%	0%
70	53%	12%	56%	34%	1%	2%	53%	0%
80	52%	12%	53%	32%	1%	2%	52%	0%
90	51%	11%	50%	30%	0%	2%	52%	0%
100	48%	11%	47%	29%	0%	1%	51%	0%
2025 Catch options								
0	65%	34%	76%	50%	2%	8%	57%	0%
10	64%	32%	74%	49%	2%	7%	57%	0%
20	62%	31%	73%	47%	2%	7%	56%	0%
30	60%	30%	70%	46%	2%	7%	55%	0%
40	58%	29%	68%	45%	2%	6%	55%	0%
50	56%	28%	67%	44%	2%	6%	55%	0%
60	55%	27%	65%	43%	2%	6%	54%	0%
70	53%	26%	63%	41%	2%	5%	54%	0%
80	52%	25%	60%	40%	1%	5%	53%	0%
90	50%	24%	57%	38%	1%	5%	53%	0%
100	48%	24%	56%	36%	1%	4%	52%	0%
2026 Catch options								
0	69%	43%	72%	44%	6%	30%	53%	2%
10	68%	42%	70%	43%	6%	30%	52%	2%
20	66%	41%	68%	42%	6%	28%	51%	2%
30	65%	40%	66%	40%	5%	27%	51%	2%
40	63%	39%	64%	40%	5%	26%	51%	2%
50	62%	37%	62%	39%	5%	25%	50%	2%
60	60%	37%	61%	38%	5%	24%	49%	1%
70	59%	35%	60%	37%	4%	24%	49%	1%
80	57%	34%	58%	36%	4%	23%	48%	1%
90	55%	33%	57%	34%	4%	22%	47%	1%
100	54%	32%	56%	33%	4%	21%	47%	1%

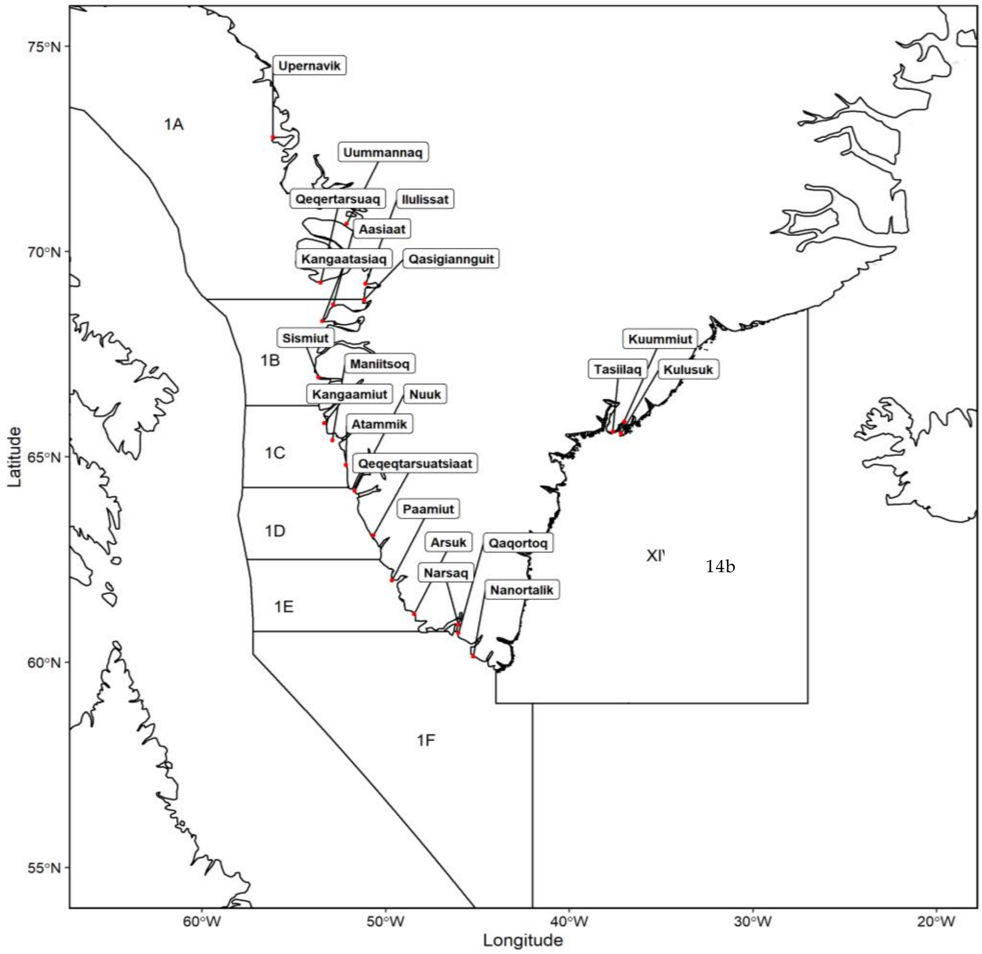


Figure 5.1.1.1. Map of south Greenland showing communities to which Atlantic salmon have historically been landed and corresponding NAFO divisions and ICES Statistical Areas.

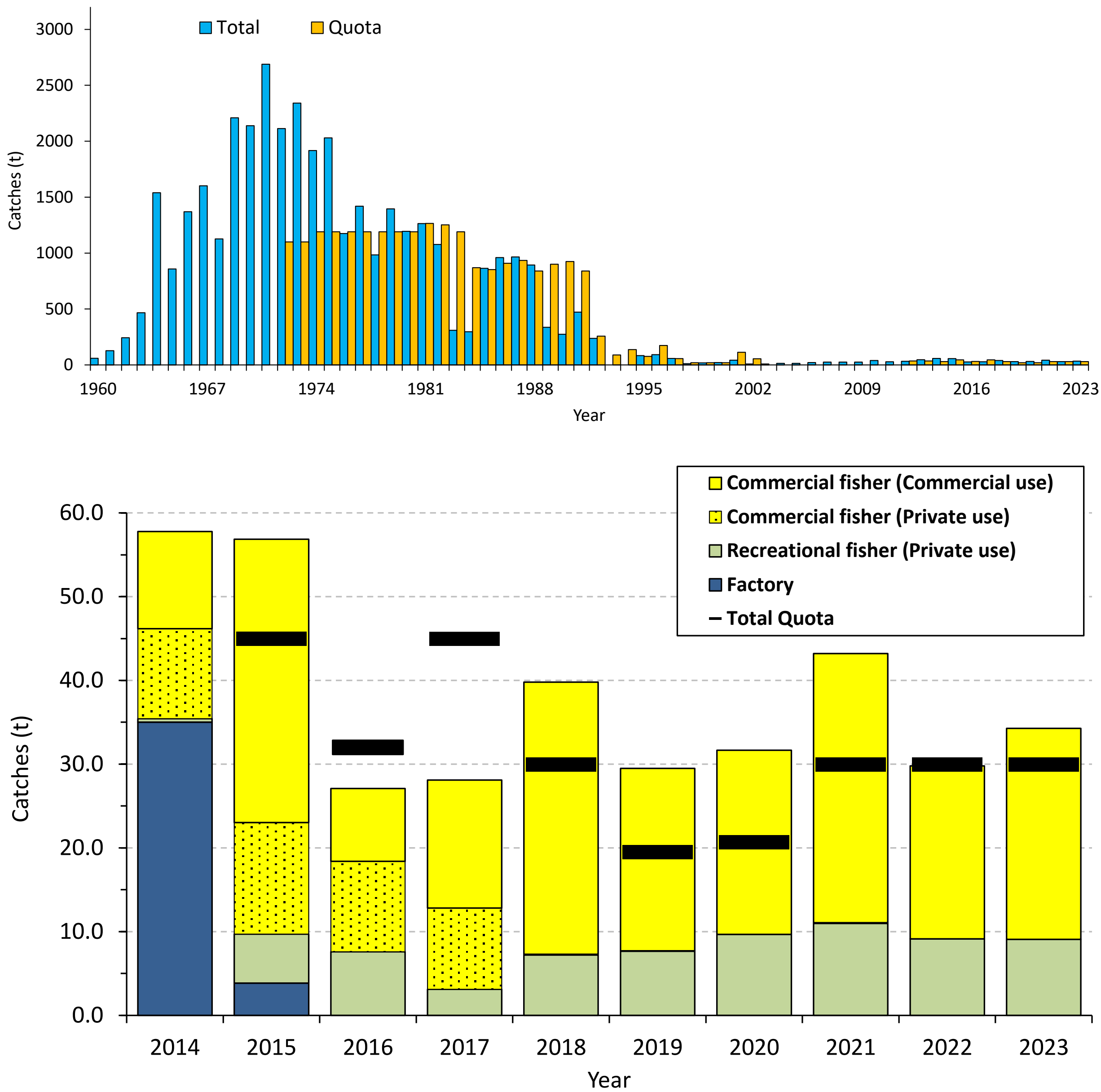


Figure 5.1.1.2. Nominal catches and commercial quotas (t, round fresh weight) of salmon at Greenland for 1960–2023 (top panel) and 2014–2023 (bottom panel). Total reported landings from 2014–2023 are displayed by landings type. A factory-only quota was set from 2012–2014 and a single quota for all components of the fishery was applied starting in 2015. From 2016-2020 the overall quota was adjusted annually to account for overharvest the previous year. All fishers are required to have a licence to fish for Atlantic salmon starting in 2018.

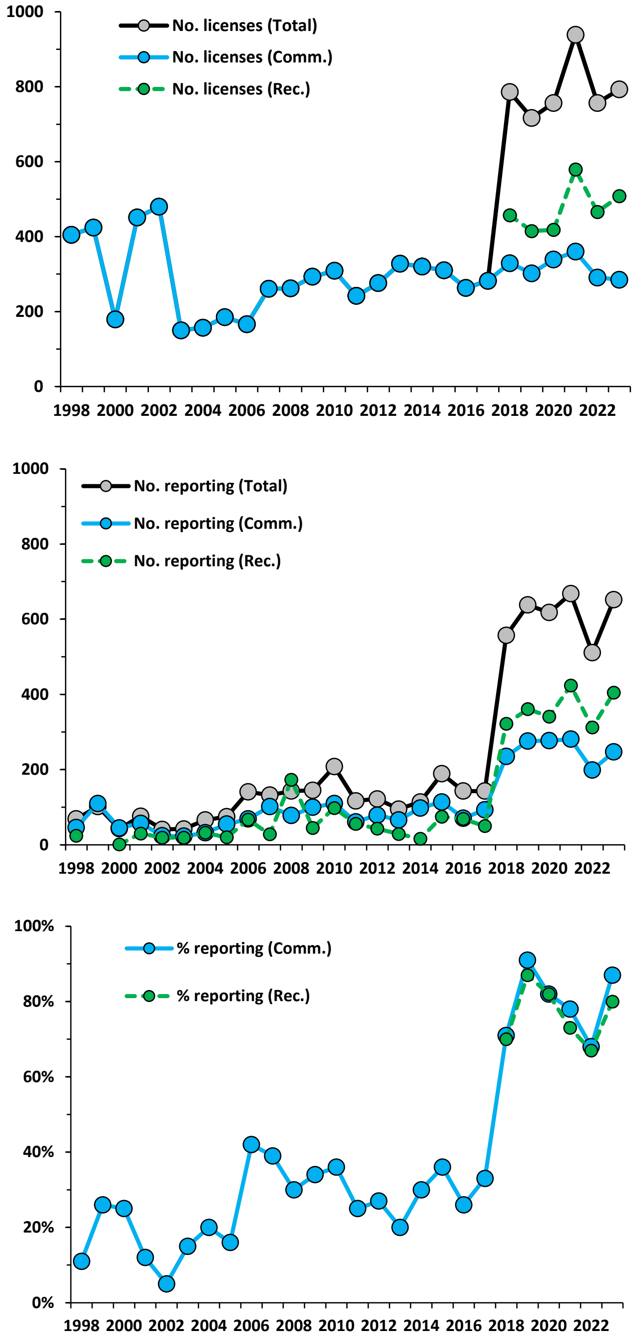


Figure 5.1.1.3. Number of licences issued by license type (top), number of fishers reporting by license type (middle) and percent of licensed fishers reporting by license type (bottom). Detailed statistics are available from 1998 to the present. Starting in 2018 all fishers were required to have a license.

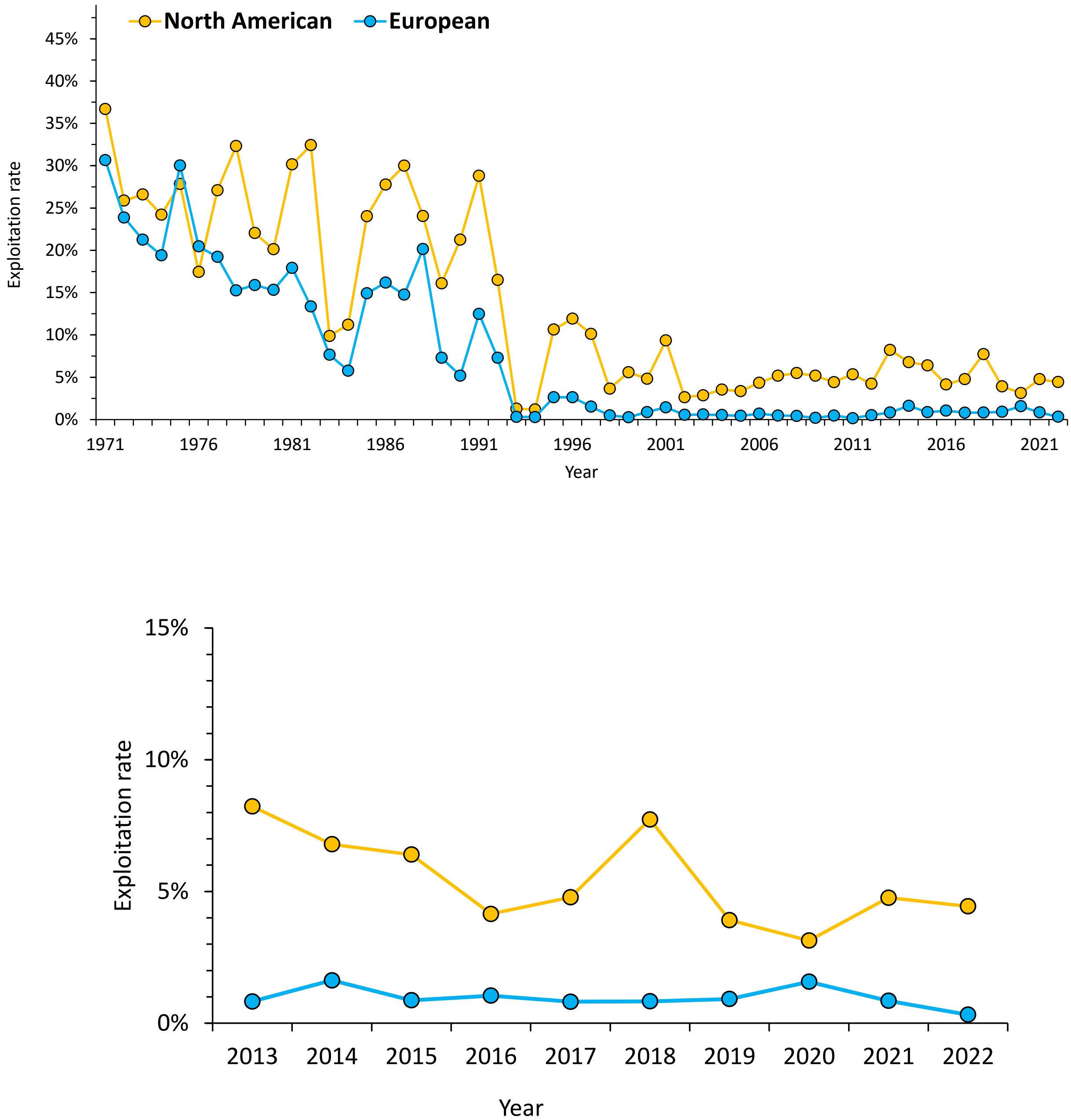


Figure 5.1.3.1. Exploitation rate (%) for NAC and Southern NEAC MSW Atlantic salmon at West Greenland, 1971–2022 (top) and 2013–2022 (bottom). Exploitation rate estimates are only available to 2022, as 2023 exploitation rates are dependent on 2024 returns. Unreported catch is included.

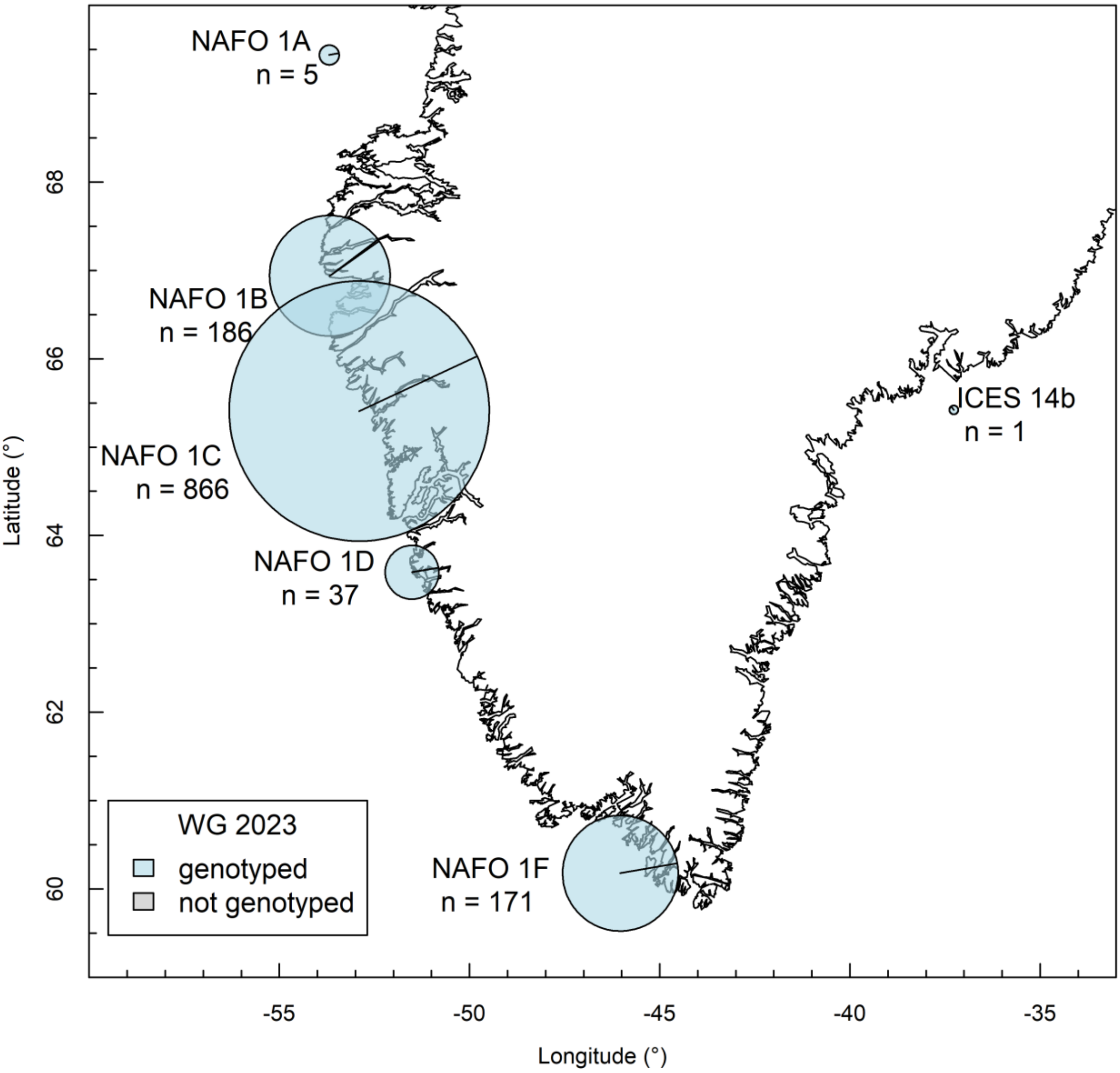
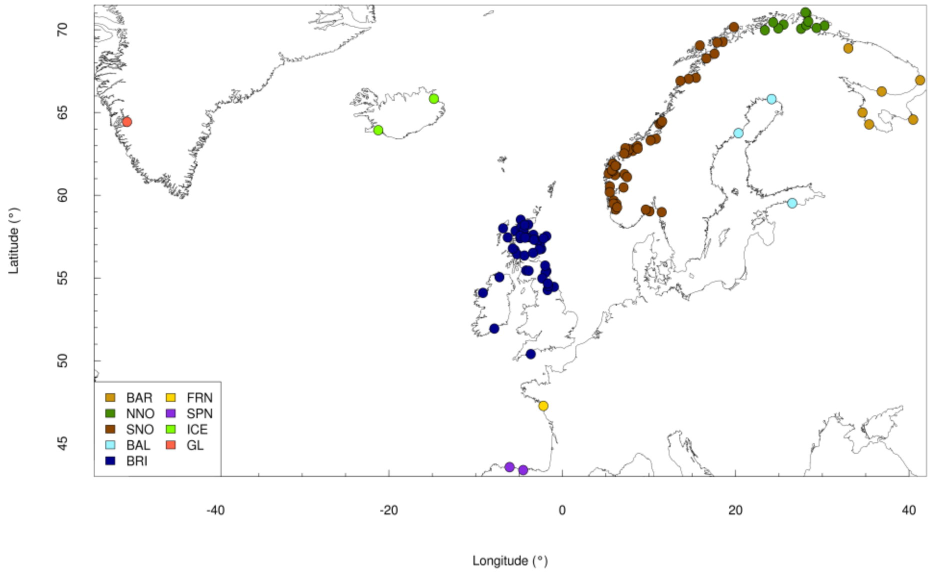


Figure 5.2.2.1. Map showing total samples and subsamples for West Greenland Atlantic Salmon fishery 2023 SNP-based analyses to estimate continent and region of origin. Pie charts are scaled to sample size and blue and grey areas represent the proportions genotyped and not genotyped.



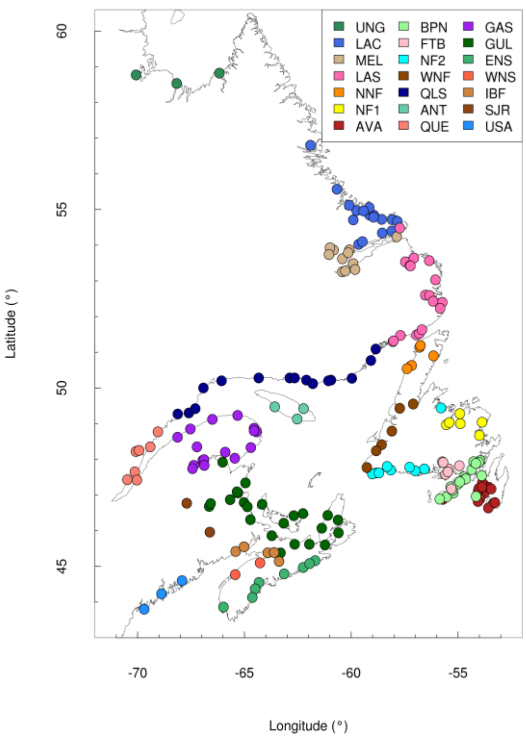


Figure 5.2.2.2. Map of sample locations for the SNP-based genetic baseline for European (top) and North American (bottom) reporting groups. The EUB (European Broodstock) reporting group does not have a geographic location and is therefore not represented on the top map. See Table 5.2.2.1 for location abbreviations.

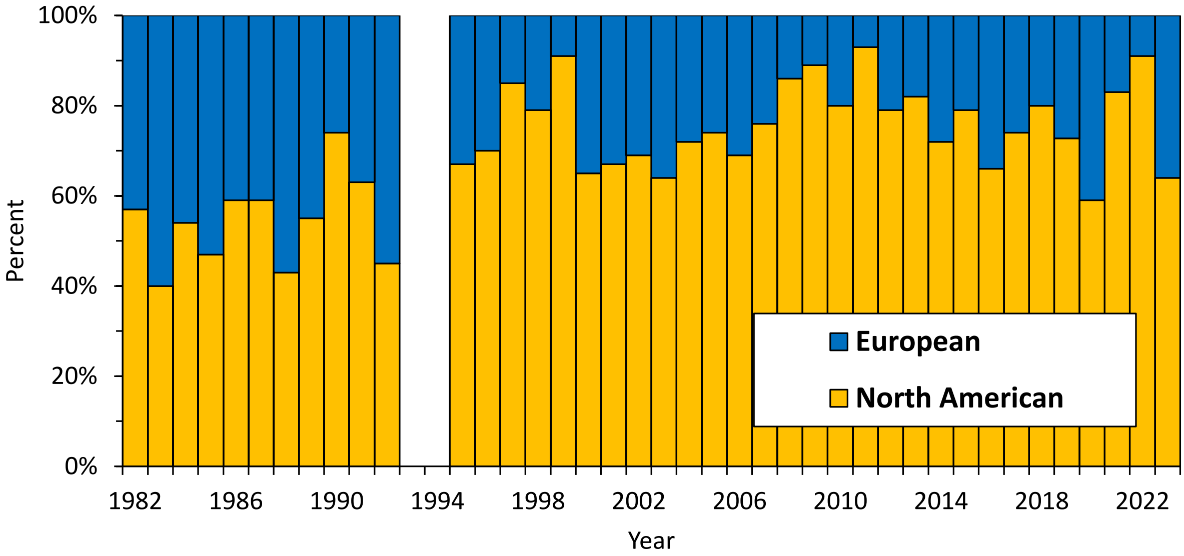


Figure 5.2.2.3. Percent of the sampled catch by continent of origin for 1982 to the present. Sampling did not occur in 1993 and 1994.

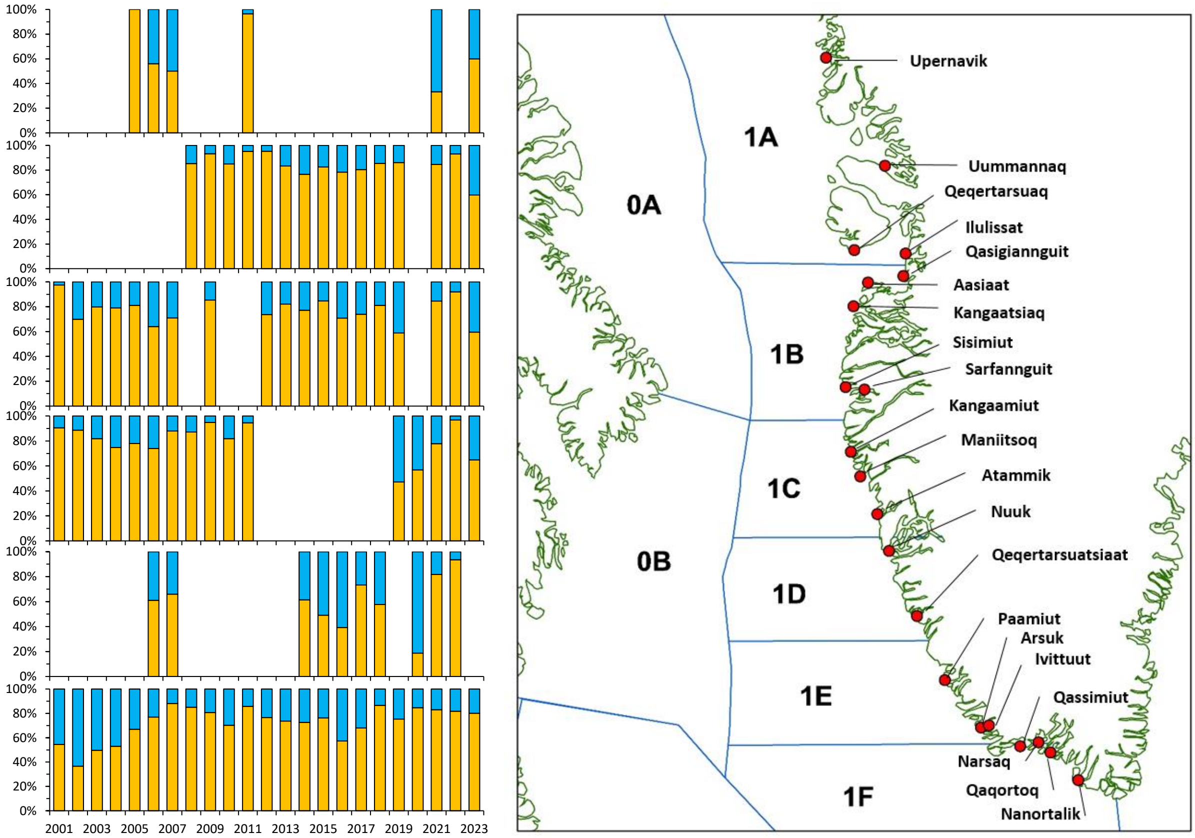


Figure 5.2.2.4. Percentage of North American (orange) and European (blue) origin Atlantic salmon sampled from Greenland fisheries by year (2001–2023) and NAFO Division. The northernmost NAFO Division (1A) is the top graph and southernmost (1F) is the bottom graph. Where data are presented, samples were collected during that year and within that NAFO Division.

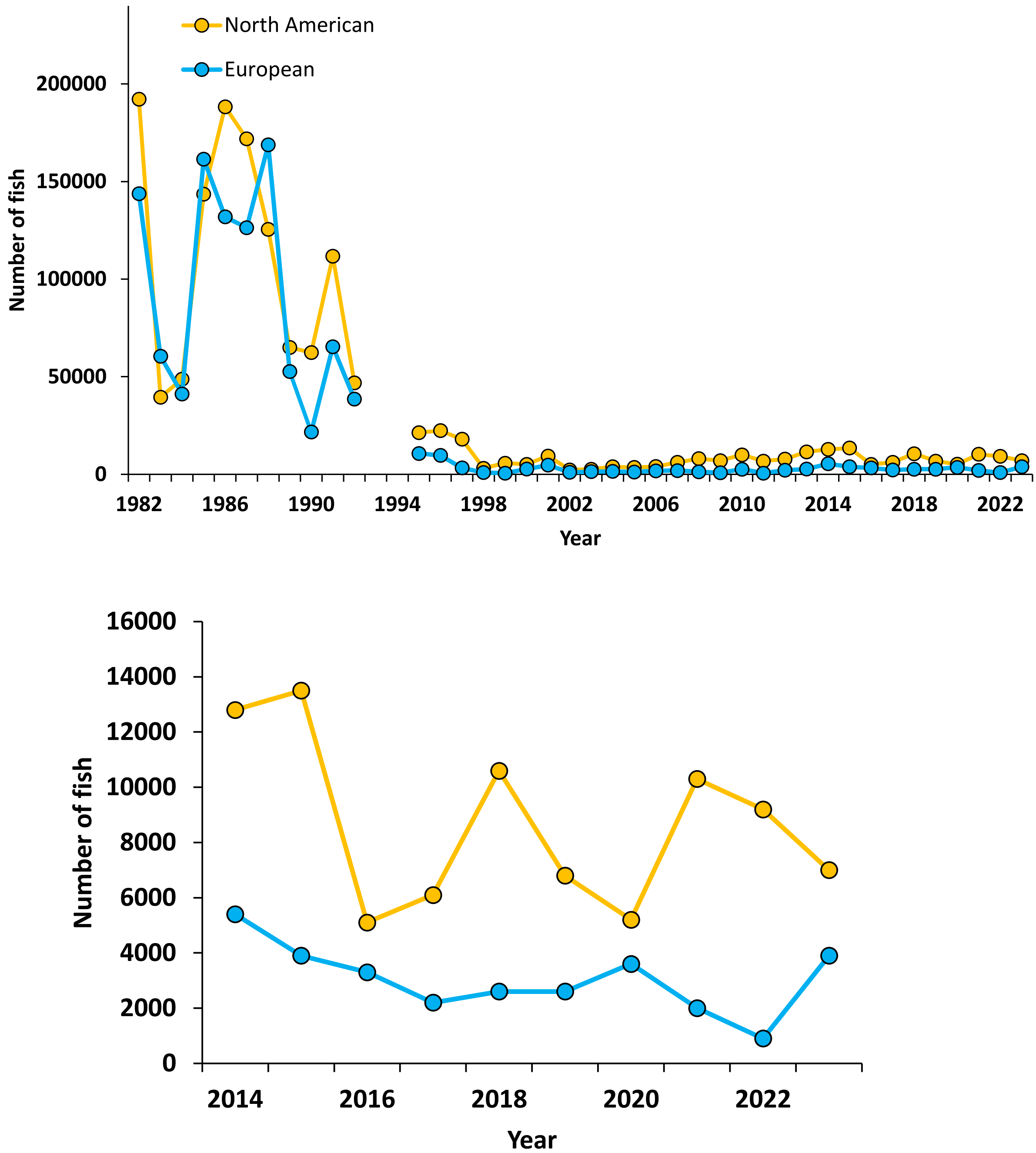


Figure 5.2.2.5. Number of North American and European Atlantic salmon caught at West Greenland from 1982–2023 (top) and 2014–2023 (bottom). Estimates are based on continent of origin by NAFO division, weighted by catch (weight) in each division. Numbers are rounded to the nearest 100 fish. Unreported catch not included.

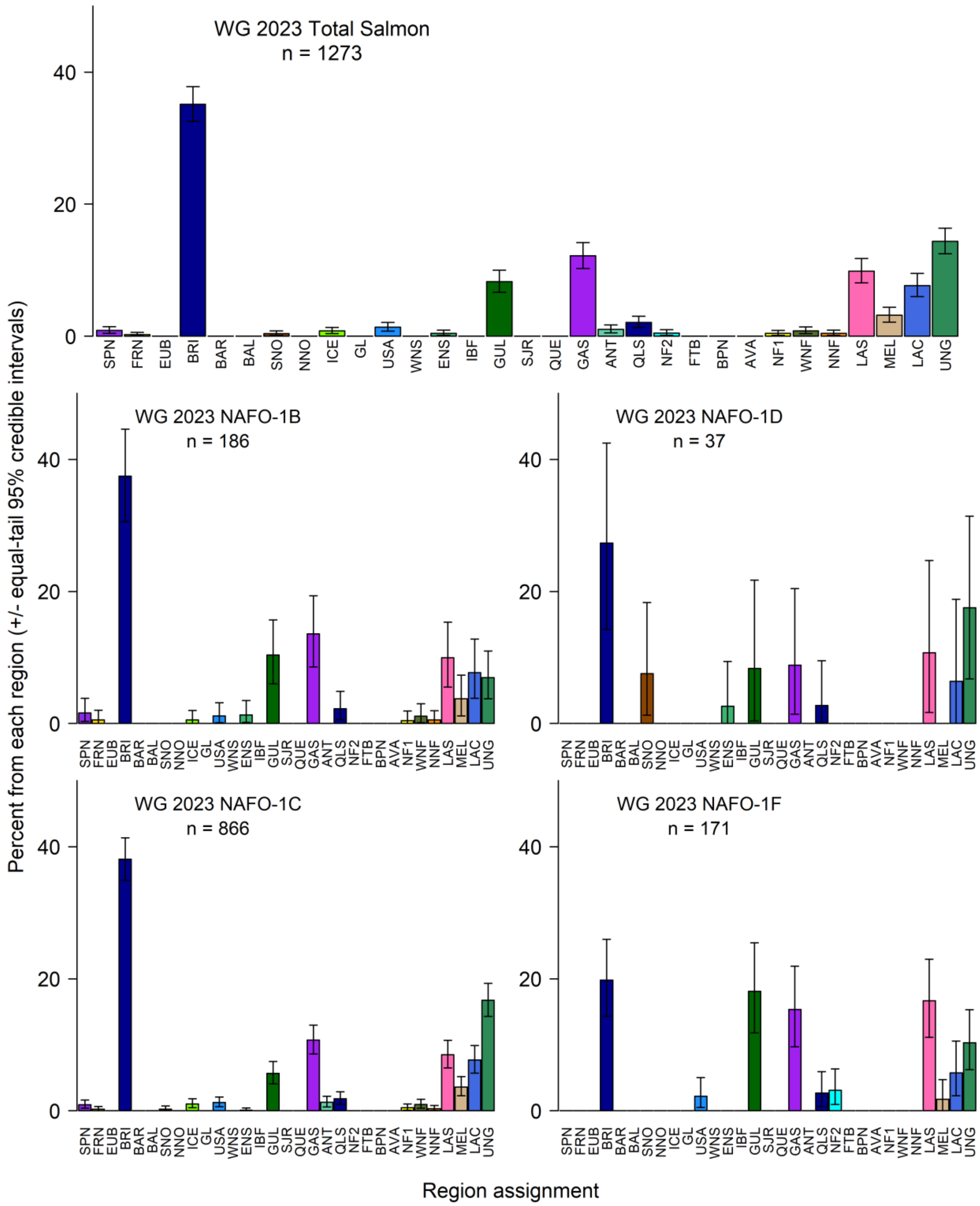


Figure 5.2.2.6. Bayesian estimates of mixture composition of samples from the West Greenland Atlantic salmon fishery for 2023 by region and overall using the SNP baseline. Baseline locations refer to genetic reporting groups identified in Table 5.2.2.1 and Figure 5.2.2.2. See Table 5.2.2.4 for detailed results. Estimates of mixture contributions not supported by significant individual assignments (P > 0.8) are not included.

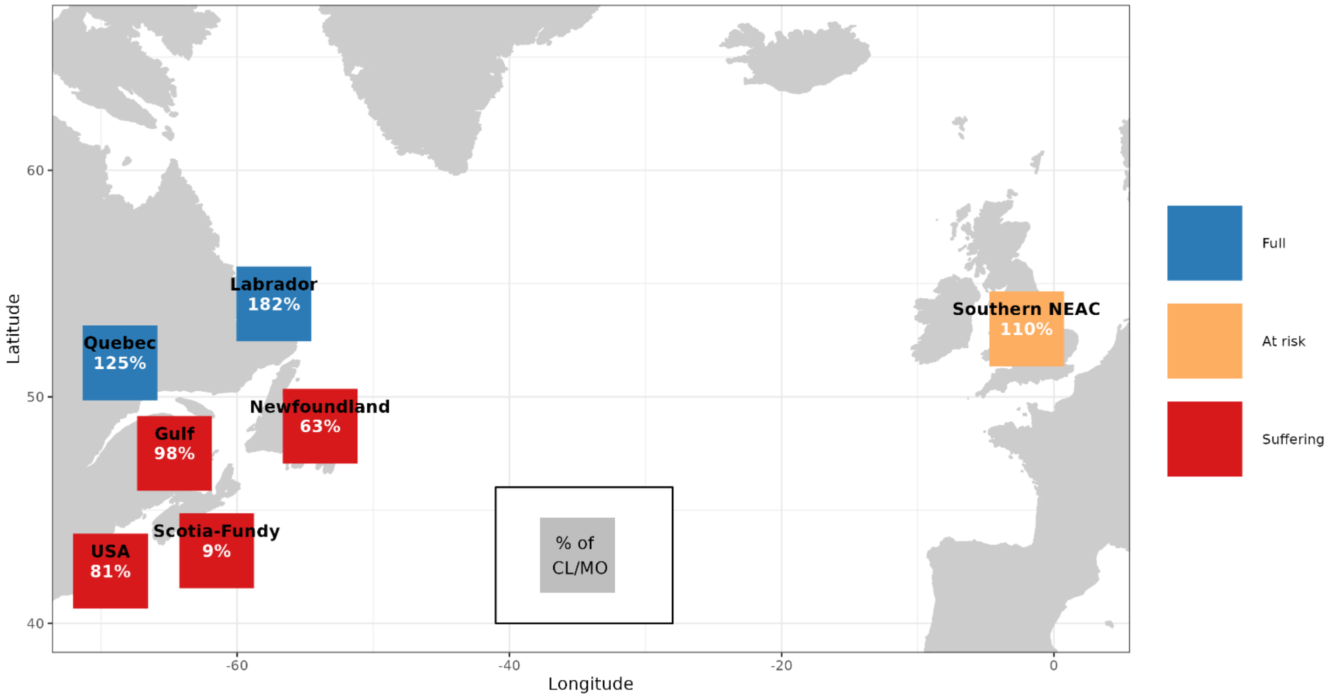


Figure 5.3.1. Summary 2SW (NAC regions) and MSW (Southern NEAC) 2023 median (from the Monte Carlo posterior distributions) spawner estimates in relation to Conservation Limits/Management Objectives (CL/MO). The colour shading represents the three ICES stock status designations: Full (at full reproductive capacity: the 5th percentile of the spawner estimate is above the CL); At Risk (at risk of suffering reduced reproductive capacity: median spawner estimate is above the CL, but the 5th percentile is below); and, Suffering (suffering reduced reproductive capacity: median spawner estimate is below the CL).

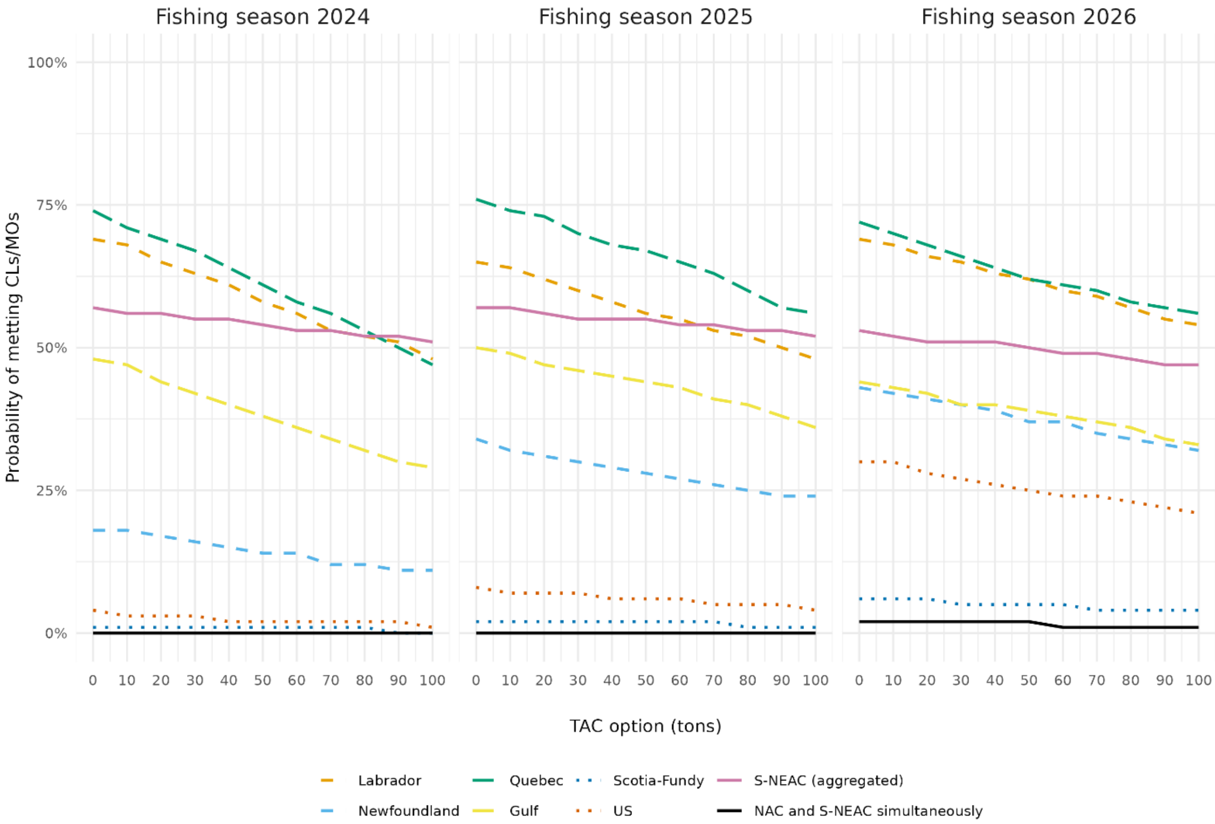


Figure 5.4.1. Probability of six NAC regions and S-NEAC 2SW returns, and all stock complexes simultaneously, achieving their 2SW CL/MOs for different catch options for the 2024, 2025 and 2026 West Greenland fisheries. Catch options for the 2024-2026 fisheries will affect 2SW returns in 2025-2027 respectively.

6 Considering future advice

ToR 5 was to "Provide input to and feedback on the development of draft formats and materials for providing advice."

ICES formed a sub-group to consider this topic. The group met prior to the annual meeting of the WG to consider the task and plan delivery. This work is not reported here, but will be reported in due course.

7 WGNAS response to generic ToRs

ToR 6 was to "Address relevant points in the Generic ToRs for Regional and Species Working Groups for each salmon stock complex".

The Working Group considered each of these requests in turn. Table 7.1 summarizes the responses, including reference to report sections where requests have been addressed.

Table 7.1. Summary of the WGNAS considerations of the Generic ToRs.

ToR	WGNAS response
a) Conduct an assessment on the stock(s) to be addressed in 2024 using the method (assessment, forecast or trends indicators) as described in the stock annex and documented in TAF; - complete and document an audit of the calculations and results; and produce a brief report of the work carried out regarding the stock, providing summaries of the following where relevant: **Quality control and quality assurance of input data. In the event of late, missing or inconsistent data document issues and deviations from the stock annex.**	
i) Where misreporting of catches is significant, provide qualitative and where possible quantitative information and describe the methods used to obtain the information;	See Sections 2.1.3, 2.5
ii) For relevant stocks (i.e., all stocks for NEAFC request advice), estimate the percentage of the total catch that has been taken in the NEAFC Regulatory Area in the most recent years.	N/A
iii) For category 2 and 3 stocks requiring new advice in 2024, implement the methods in guidance for harvest control rules and stock assessments for stocks in categories 2 and 3 . Replace the former 2 over 3 advice rule (2 over 5 for elasmobranchs) which is no longer considered precautionary.	N/A
iv) Evaluate spawning stock biomass, total stock biomass, fishing mortality, catches (projected landings and discards) using the method described in the stock annex;	See Sections 3, 4, 5
1) for category 1 and 2 stocks, in addition to the other relevant model diagnostics, the recommendations and decision tree formulated by WKFORBIAS (see Annex 2 of https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2020/WKFORBIAS_2019.pdf) should be considered as guidance to determine whether an assessment remains sufficiently robust for providing advice.	N/A, not requested by NASCO
2) If the assessment is deemed no longer suitable as basis for advice, provide advice using an appropriate Category 2-5 approach as described in ICES technical guidance for harvest control rules and stock assessments for stocks in categories 2 and 3 or in Advice on fishing opportunities (for Cat 5 & 6).	N/A, cat 1 stocks
3) If the assessment has been moved to a Category 2-5 approach in the past year, consider what is necessary to move back to a Category 1 and develop proposal for the appropriate benchmark process.	N/A, cat 1 stocks
v) Provide all requested catch scenarios for the year(s) beyond the terminal year of the data (These are listed in ICES Guidance for completing single-stock advice)	See sections 3.4, 4.4, 5.4
vi) Historical and analytical performance of the assessment and catch options with a succinct description of associated quality issues. For the analytical performance of category 1 and 2 age-structured assessments, report the mean Mohn's rho (assessment retrospective bias analysis) values for time series of recruitment, spawning stock biomass, and fishing mortality rate. The WG report should include a plot of this retrospective analysis. The values should be calculated in accordance with the "Guidance for completing ToR viii) of the Generic ToRs for Regional and Species Working Groups - Retrospective bias in assessment" and reported using the ICES application for this purpose.	See sections 1.6. and 2.3

ToR	WGNAS response
b) Produce and quality assure a first draft of the advice for each stock according to ACOM guidelines.	Completed
c) Include non-fisheries conservation considerations in accordance with the “ICES Guidelines on Non-Fisheries Conservation Considerations”.	Completed
d) Review progress on benchmark issues and processes of relevance to the Expert Group.	
i) update the benchmark issues lists for the individual stocks in SID;	Presumably, Benchmark 2023 did this
ii) review progress on benchmark issues and identify potential benchmarks to be initiated in 2025 for conclusion in 2026;	See Annex 6 for response to Benchmark Reviewers’ Recommendations
iii) determine the prioritization score for benchmarks proposed for 2025–2026;	N/A
iv) as necessary, document generic issues to be addressed by the Benchmark Oversight Group (BOG)	None
e) Prepare the data calls for the next year’s update assessment and for planned data evaluation workshops;	ToRs will be developed in response to questions from NASCO meetings in June ’24, and datacall developed thereafter
f) Identify research needs of relevance to the work of the Expert Group.	See section 2.5
g) Review and update information regarding operational issues and research priorities on the Fisheries Resources Steering Group SharePoint site.	TBD after the Advice is published
h) Update TAF, SAG, ASD (Advice and Scenarios database) and SID with final assessment input and output and advice information.	TBD, after the Advice is published
i) Consider and comment on Ecosystem and Fisheries Overviews with a focus on:	
i) identifying and correcting mistakes and errors (both in the text, tables and figures), and	WG has not examined the EOs or FOs
ii) proposing concrete evidence-based input that is considered essential for the advice but is currently under-developed or missing (with references and Data Profiling Tool entries, as appropriate).	WG has not examined the EOs or FOs

Annex 1: List of Working Papers submitted to WGNAS 2024

The table below lists the working documents presented to WGNAS 2024 and are inserted in full in this annex in the following pages.

WP No.	Authors	Title
01	Nygaard, R.	The salmon fishery in Greenland 2023
02	Sheehan, T. F., Coyne, J., Davies, G., Deschamps, D., Haas-Castro, R., Quinn, P., Vaughn, L., Nygaard, R., Bradbury, I. R., Robertson, M. J., Ó Maoiléidigh, N. and Carr, J.	The International Sampling Program: Continent of Origin and Biological Characteristics of Atlantic Salmon Collected at West Greenland in 2023
03	Bardarson, H., Gudbergsson, G., Jonsson, I.R., and Sturlaugs-son, J.	National Report for Iceland: The 2023 Salmon Season
05	Erkinaro, J., Orell, P., Falkegård, M., Kylmäaho, M., Johan-sen, N., Haantie, J., Pohjola, J.-P. and Kuusela, J.	Status of Atlantic salmon stocks in the rivers Teno/Tana and Näätämöjoki/Neidenelva, Finland/Norway
06	Fiske, P., Wennevik, V., Jensen, A.J., Utne, K.R., and Bolstad, G.	Atlantic salmon; National Report for Norway 2023
07	Ahlbeck Bergendahl, I. and Jones, D.	Fisheries, Status and Management of Atlantic Salmon stocks in Sweden: National Report for 2022
09	Jacobsen, J.A.	Status of the fisheries for Atlantic salmon and produc-tion of farmed salmon in 2023 for the Faroe Islands
10	Kelly, S., Millane, M., Maxwell, H., Ó Maoiléidigh, N., Gar-gan, P., White, J., O'Higgins, K., Fitzgerald, C., Dillane, M., McGrory, T., Bond, N. McLaughlin, D., Rogan, G., Cotter, D. & Poole, R..	National Report for Ireland - The 2023 Salmon Season
11	Marine Scotland Science, Salmon and Freshwater Fisheries	National Report for UK (Scotland): 2023 season
12	Cefas, Environment Agency and Natural Resources Wales	Salmon stocks and fisheries in UK (England and Wales), 2023
13	Ensing, D., and Kennedy, R.	Summary of Salmon Fisheries and Status of Stocks in Northern Ireland for 2023
14	Buoro, M.	National report France including Saint Pierre and Mi-quelon 2023
16	de la Hoz, J.	Salmon Fisheries and Status of Stocks in Spain (Astu-rias-2022)
17	April, J. and Cauchon, V.	Status of Atlantic salmon Stocks in Québec in 2023
18	Cauchon, V., Giacomazzo, M. and April, J..	Evolution of freshwater and marine survival for the two index populations in Québec

WP No.	Authors	Title
19	Kelly, N.I., Robertson, M.J., Burke, C., Duffy, S., Poole, R., Bradbury, I., Van Leeuwen, T., Dempson, J.B., Lehnert, S., Lancaster, D. and Loughlin, K.	Status of Atlantic Salmon (*Salmo salar*) Stocks within the Newfoundland and Labrador Region (Salmon Fishing Areas 1–14B), Canada in 2023
20	G. Dauphin, C. Breau, A. Daigle, S. Douglas, G. Goguen, M. Horsman, S. Roloson	Status of Atlantic salmon in Gulf Region (Canada) Salmon Fishing Areas 15 to 18 to 2023
21	Taylor, A.D. and D. Hogan	Status of Atlantic salmon in Canada's Maritimes Region (Salmon Fishing Areas 19 to 21, and 23).
22	Hawkes, J., Kocik, J., Atkinson, E., Sweka, J. and Sheehan, T.F.	National Report for the United States, 2023
23		
24		
25		
26	Rivot et al.	WGNAS 2024 Life-cycle Model description
27	Rivot et al.	WGNAS 2024 User Guide for the Life-cycle Model
28	Rivot et al.	WGNAS 2024 WebAp SalmoGlob Toolbox
29	Rivot et al.	WGNAS 2024 Comparison of LCM vs PFA models
30	Sheehan, T.F., Carr, J., Chafe, G., Perry, H., Robertson M.J. and Bradbury, I.R.	Update on Pop-off Satellite Tagging Atlantic Salmon at Greenland (2018-2022)
31		

Annex 2: References cited

Anderson E.C., Waples R.S., Kalinowski S.T. 2008. An improved method for predicting the accuracy of genetic stock identification. Can J Fish Aquat Sci. 65(7):1475-1486.

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Annex 3: List of Participants

Member	Country
Ida Ahlbeck Bergendahl	Sweden
Julien April	Canada
Jan Arge Jacobsen	Faroe Islands
Hlynur Bárðarson	Iceland
Geir Bolstad	Norway
Ian Bradbury	Canada
Cindy Breau	Canada
Colin Bull	UK
Gérald Chaput	Canada
Anne Cooper	Denmark (ICES)
Gaspard Dubost	France
Dennis Ensing	UK (Northern Ireland)
Jaakko Erkinaro	Finland
Peder Fiske	Norway
Marko Freese	Germany
Jonathan Gillson	UK (England & Wales)
Stephen Gregory	UK (England & Wales)
Nora Hanson	UK (Scotland)
David Hardie	Canada
Derek Hogan	Canada
Niels Jepsen	Denmark
Nicholas Kelly	Canada
Seán Kelly	Ireland
Richard Kennedy	UK (Northern Ireland)
Clément Lebot	France
Hugo Maxwell	Ireland
Michael Millane	Ireland

Member	Country
Rasmus Nygaard	Greenland
James Ounsley	UK (Scotland)
Rémi Patin	France
Stig Pedersen	Denmark
Etienne Rivot	France
Martha Robertson	Canada
Kjell Rong Utne	Norway
Timothy Sheehan	USA
Tom Staveley	Sweden
Alan Walker (Chair)	UK (England & Wales)
Vidar Wennevik	Norway
Jonathan White	Ireland

Annex 4: Reported nominal catch of salmon in numbers and weight (tonnes round fresh weight) by sea-age class. Catches reported for 2023 may be provisional. Methods used for estimating age composition given in footnote

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
Canada (6)																	
	1982	358000	716									240000	1082			598000	1798
	1983	265000	513									201000	911			466000	1424
	1984	234000	467									143000	645			377000	1112
	1985	333084	593									122621	540			455705	1133
	1986	417269	780									162305	779			579574	1559
	1987	435799	833									203731	951			639530	1784
	1988	372178	677									137637	633			509815	1310
	1989	304620	549									135484	590			440104	1139
	1990	233690	425									106379	486			340069	911
	1991	189324	341									82532	370			271856	711
	1992	108901	199									66357	323			175258	522
	1993	91239	159									45416	214			136655	373
	1994	76973	139									42946	216			119919	355
	1995	61940	107									34263	153			96203	260

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	Year	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	1996	82490	138									31590	154			114080	292
	1997	58988	103									26270	126			85258	229
	1998	51251	87									13274	70			64525	157
	1999	50901	88									11368	64			62269	152
	2000	55263	95									10571	58			65834	153
	2001	51225	86									11575	61			62800	147
	2002	53464	99									8439	49			61903	148
	2003	46768	81									11218	60			57986	141
	2004	54253	94									12933	68			67186	162
	2005	47368	83									10937	56			58305	139
	2006	46747	82									11248	55			57995	137
	2007	37075	63									10311	49			47386	112
	2008	58386	100									11736	57			70122	157
	2009	42943	74									11226	52			54169	126
	2010	58531	100									10972	53			69503	153
	2011	63756	110									13668	69			77424	179
	2012	43192	74									10980	52			54172	126
	2013	41311	72									13887	66			55198	138
	2014	44171	77									8756	41			52927	118
	2015	48838	86									11473	54			60311	140
	2016	45265	79									11716	56			56981	135

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2017	31314	55									11563	55			42877	110
	2018	21802	39									8548	39			30350	78
	2019	30759	53									9774	47			40533	100
	2020	29757	52									10606	51			40363	103
	2021	32159	58									8385	40			40544	98
	2022	25544	45									9939	45			35483	90
	2023	20302	36									11763	52			32065	88
Denmark																	
	2020															1946	9
	2021	626										732				1758	
	2022	524										660				1591	
	2023	398										695				1358	
Faroes																	
	1983	9086		101227		21663		448		29						132453	625
	1984	4791		107199		12469		49								124508	651
	1985	324		123510		9690								1653		135177	598
	1986	1672		141740		4779		76						6287		154554	545
	1987	76		133078		7070		80								140304	539
	1988	5833		55728		3450		0								65011	208
	1989	1351		86417		5728		0								93496	309
	1990	1560		103407		6463		6								111436	364

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1991	631		52420		4390		8								57449	202
	1992	16		7611		837										8464	31
	1993			4212		1203										5415	22
	1994			1866		206										2072	7
	1995			1807		156										1963	6
	1996			268		14										282	1
	1997																
	1998	339		1315		109										1763	6
	1999																
	2000	225		1560		205										1990	8
	2001	0		0		0										0	
	2002	0		0		0										0	
	2003	0		0		0										0	
	2004	0		0		0										0	
	2005	0		0		0										0	
	2006	0		0		0										0	
	2007	0		0		0										0	
	2008	0		0		0										0	
	2009	0		0		0										0	
	2010	0		0		0										0	
	2011	0		0		0										0	

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2012	0		0		0										0	
	2013	0		0		0										0	
	2014	0		0		0										0	
	2015	0		0		0										0	
	2016	0		0		0										0	
	2017	0		0		0										0	
	2018	0		0		0										0	
	2019	0		0		0										0	
	2020		0		0		0										0
	2021		0		0		0										0
	2022		0		0		0										0
Finland																	
	1982	2598	5									5408	49			8006	54
	1983	3916	7									6050	51			9966	58
	1984	4899	9									4726	37			9625	46
	1985	6201	11									4912	38			11113	49
	1986	6131	12									3244	25			9375	37
	1987	8696	15									4520	34			13216	49
	1988	5926	9									3495	27			9421	36
	1989	10395	19									5332	33			15727	52
	1990	10084	19									5600	41			15684	60

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	Year	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	1991	9213	17									6298	53			15511	70
	1992	15017	28									6284	49			21301	77
	1993	11157	17									8180	53			19337	70
	1994	7493	11									6230	38			13723	49
	1995	7786	11									5344	38			13130	49
	1996	12230	20	1275	5	1424	12	234	4	19	1			354	3	15536	45
	1997	10341	15	2419	10	1674	15	141	2	22	1			418	3	15015	46
	1998	11792	19	1608	7	1660	16	147	3					460	3	15667	48
	1999	17929	31	2055	8	1643	17	120	2	6	0			592	3	22345	63
	2000	20199	37	5247	25	2502	25	101	2	0	0			1090	7	29139	96
	2001	14979	25	6091	28	5451	59	101	2	0	0			2137	12	28759	126
	2002	8095	15	5550	20	3845	41	135	2	10	0			2466	15	20101	93
	2003	8375	15	2332	8	3551	33	145	2	5	0			2424	15	16832	75
	2004	4177	7	1480	6	1077	10	246	4	6	0			1430	11	8416	38
	2005	10412	19	1287	5	1420	14	56	1	40	1			804	7	14019	47
	2006	17359	30	4217	18	1350	13	62	1	0	0			764	5	23752	67
	2007	4861	7	5368	20	2287	22	17	0	6	0			1195	8	13734	59
	2008	5194	8	2518	8	4161	40	227	4	0	0			1928	11	14028	71
	2009	9960	13	1585	5	1252	11	223	3	0	0			899	5	13919	37
	2010	7260	13	3270	13	1244	11	282	4	5	0			996	8	13057	49
	2011	9043	15	1859	8	1434	13	173	3	10	0			789	5	13308	44

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2012	15904	30	2997	13	1234	11	197	3	5	0			967	7	21304	64
	2013	9408	14	3044	15	1186	11	63	1	7	0			806	5	14514	46
	2014	13031	26	3323	13	928	9	96	2	0	0			1284	7	18662	57
	2015	8255	13	3562	16	1069	9	79	1	0	0			903	6	13868	45
	2016	6763	14	3028	10	1997	20	91	1	0	0			959	5	12838	50
	2017	2533	5	1642	7	1349	14	116	2	3	0			530	3	28973	31
	2018	6699	11	849	4	393	4	43	1	0	0			719	5	8703	25
	2019	2628	4	2205	8	310	3	27	1	4	0			727	5	5901	21
	2020	2064	3	477	2	746	7	30	0							3805	16
	2021	156	0									83	1			239	1
	2022	189	0									127	1			316	1
	2023	181	0									130	1			311	1
France (4,7)																	
	1987	6013	18									1806	9			7819	27
	1988	2063	7									4964	25			7027	32
	1989	1124	3	1971	9	311	2									3406	14
	1990	1886	5	2186	9	146	1									4218	15
	1991	1362	3	1935	9	190	1									3487	13
	1992	2490	7	2450	12	221	2									5161	21
	1993	3581	10	987	4	267	2									4835	16
	1994	2810	7	2250	10	40	1									5100	18

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	Year	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	1995	1669	4	1073	5	22	0									2764	9
	1996	2063	5	1891	9	52	0									4006	14
	1997	1060	3	964	5	37	0									2061	8
	1998	2065	5	824	4	22	0									2911	9
	1999	690	2	1799	9	32	0									2521	11
	2000	1792	4	1253	6	24	0									3069	10
	2001	1544	4	1489	7	25	0									3058	11
	2002	2423	6	1065	5	41	0									3529	11
	2003	1598	5									1540	8			3138	13
	2004	1927	5									2880	14			4807	19
	2005	1236	3									1771	8			3007	11
	2006	1763	3									1785	9			3548	12
	2007	1378	3									1685	9			3063	12
	2008	1471	3									1931	9			3402	12
	2009	487	1									975	4			1462	5
	2010	1658	4									821	4			2479	8
	2011	1145	3									2126	9			3271	12
	2012	1010	2									1669	7			2679	9
	2013	1457	3									1679	7			3136	10
	2014	1469	3									2159	9			3628	12
	2015	1239	3									2435	9			3674	12

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2016	1017	2									972	4			1989	6
	2017	1524	4									986	5			2510	9
	2018	1071	4									1678	7			2749	11
	2019	472	2	1094	4	42	0					4	0			3810	14
	2020	469	2	451	2	33	0					1	0			2150	8
	2021	437	2	286	1	20	0					3	0			1550	6
	2022	246	1	524	2	6	0					993	4			1805	7
	2023	304	1									1001	4			1384	5
Germany																	
	2023															43	0
Greenland																	
	1982	315532		17810										2688		336030	1077
	1983	90500		8100										1400		100000	310
	1984	78942		10442										630		90014	297
	1985	292181		18378										934		311493	864
	1986	307800		9700										2600		320100	960
	1987	297128		6287										2898		306313	966
	1988	281356		4602										2296		288254	893
	1989	110359		5379										1875		117613	337
	1990	97271		3346										860		101477	274
	1991	167551	415	8809	53									743	4	177103	472

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1992	82354	217	2822	18									364	2	85540	237
	1993																
	1994																
	1995	31241		558										478		32277	83
	1996	30613		884										568		32065	92
	1997	20980		134										124		21238	58
	1998	3901		17										88		4006	11
	1999	6124	18	50	0									84	1	6258	19
	2000	7715	21	0	0									140	0	7855	21
	2001	14795	40	324	2									293	1	15412	43
	2002	3344	10	34	0									27	0	3405	10
	2003	3933	12	38	0									73	0	4044	12
	2004	4488	14	51	0									88	0	4627	14
	2005	3120	13	40	0									180	1	3340	14
	2006	5746	20	183	1									224	1	6153	22
	2007	6037	24	82	0	6	0							144	1	6263	25
	2008	9311	26	47	0	0	0							177	1	9535	27
	2009	7442	27	268	1	0	0							328	1	8038	29
	2010															11579	40
	2011															8088	28
	2012															9622	33

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2013															14030	47
	2014															17440	58
	2015															16855	57
	2016															8522	27
	2017															8023	28
	2018															12864	40
	2019																30
	2020															10138	32
	2021															14136	43
	2022															9712	31
	2023	10542	34													10542	34
Iceland (3)																	
	1991	29601		11892												41493	130
	1992	38538		15312												53850	175
	1993	36640		11541												48181	160
	1994	24224	59	14088	76											38312	135
	1995	32767	90	13136	56											45903	146
	1996	26927	66	9785	52											36712	118
	1997	21684	56	8178	41											29862	97
	1998	32224	81	7272	37											39496	118
	1999	22620	59	9883	52											32503	111

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2000	20270	49	4319	24											24589	73
	2001	18538	46	5289	28											23827	74
	2002	25277	64	5194	26											30471	90
	2003	24738	61	8119	37											32857	98
	2004	32600	84	6128	28											38728	112
	2005	39980	101	5941	28											45921	129
	2006	29857	71	5635	23											35492	94
	2007	31899	74	3262	15											35161	89
	2008	44391	106	5129	26											49520	132
	2009	43981	103	4561	24											48542	127
	2010	43457	105	9251	43											52708	148
	2011	28550	74	4854	24											33404	98
	2012	17011	39	2848	12											19859	51
	2013	40412	97	4274	19											44686	116
	2014	13593	29	3317	22											16910	51
	2015	33713	78	3201	16											36914	94
	2016	19528	49	5082	23											24610	72
	2017	20229	51	3726	15											23955	66
	2018	18753	48	2661	12											21414	60
	2019	11102	267	2932	10											14034	37
	2020	18378	46	2368	9							2431	11			23177	66

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	Year	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	2021	14978	38									1241	6			20639	56
	2022	20341	47									2262	10			22603	57
	2023	12711	31									2820	14			15531	45
Ireland																	
	1980	248333	745									39608	202			287941	947
	1981	173667	521									32159	164			205826	685
	1982	310000	930									12353	63			322353	993
	1983	502000	1506									29411	150			531411	1656
	1984	242666	728									19804	101			262470	829
	1985	498333	1495									19608	100			517941	1595
	1986	498125	1594									28335	136			526460	1730
	1987	358842	1112									27609	127			386451	1239
	1988	559297	1733									30599	141			589896	1874
	1989															330558	1079
	1990															188890	567
	1991															135474	404
	1992															235435	631
	1993															200120	541
	1994															286266	804
	1995															288225	790
	1996															249623	685

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1997															209214	570
	1998															237663	624
	1999															180477	515
	2000															228220	621
	2001															270963	730
	2002															256808	682
	2003															204145	551
	2004															180953	489
	2005															156308	422
	2006															120834	326
	2007															30946	84
	2008															33200	89
	2009															25170	68
	2010															36508	99
	2011															32308	87
	2012															32599	88
	2013															32303	87
	2014															20883	56
	2015															23416	63
	2016															21504	58
	2017															26714	72

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2018															17866	58
	2019															16521	44
	2020	15794	43									1212	3			40152	108
	2021	16914	46									1794	5			18708	51
	2022	12273	33									2372	6			14645	40
	2023	10631	29									1703	5			12334	33
Norway (6)																	
	1981	221566	467									213943	1189			435509	1656
	1982	163120	363									174229	985			337349	1348
	1983	278061	593									171361	957			449422	1550
	1984	294365	628									176716	995			471081	1623
	1985	299037	638									162403	923			461440	1561
	1986	264849	556									191524	1042			456373	1598
	1987	235703	491									153554	894			389257	1385
	1988	217617	420									120367	656			337984	1076
	1989	220170	436									80880	469			301050	905
	1990	192500	385									91437	545			283937	930
	1991	171041	342									92214	535			263255	877
	1992	151291	301									92717	566			244008	867
	1993	153407	312	62403	284	35147	327									250957	923
	1994		415		319		262										996

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1995	134341	249	71552	341	27104	249									232997	839
	1996	110085	215	69389	322	27627	249									207101	786
	1997	124387	241	52842	238	16448	151									193677	630
	1998	162185	296	66767	306	15568	139									244520	741
	1999	164905	318	70825	326	18669	167									254399	811
	2000	250468	504	99934	454	24319	219									374721	1177
	2001	207934	417	117759	554	33047	295									358740	1266
	2002	127039	249	98055	471	33013	299									258107	1019
	2003	185574	363	87993	410	31099	298									304666	1071
	2004	108645	207	77343	371	23173	206									209161	784
	2005	165900	307	69488	320	27507	261									262895	888
	2006	142218	261	99401	453	23529	218									265148	932
	2007	78165	140	79146	363	28896	264									186207	767
	2008	89228	170	69027	314	34124	322									192379	806
	2009	73045	135	53725	241	23663	219									150433	595
	2010	98490	184	56260	250	22310	208									177060	642
	2011	71597	140	81351	374	20270	183									173218	697
	2012	81638	162	63985	289	26689	245									172312	696
	2013	70059	117	49264	227	14367	131									133690	475
	2014	85419	171	47347	203	12415	116									145181	490
	2015	83196	153	64069	296	15407	134									162672	583

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2016	65470	117	69167	321	19406	174									154043	612
	2017	83032	164	67761	307	20913	196									171706	667
	2018	84348	167	62447	289	15247	138									162042	594
	2019	67097	122	53239	244	15889	147									136225	513
	2020	79612	143	52344	239	15868	145									147824	527
	2021	42963	81									38658	214			81621	295
	2022	59863	118									48680	272			108543	389
	2023	44143	83	29181	136	8680	78									82004	297
Russia (5)																	
	1987	97242		27135		9539		556		18				2521		137011	564
	1988	53158		33395		10256		294		25				2937		100065	420
	1989	78023		23123		4118		26		0				2187		107477	364
	1990	70595		20633		2919		101		0				2010		96258	313
	1991	40603		12458		3060		650		0				1375		58146	215
	1992	34021		8880		3547		180		0				824		47452	167
	1993	28100		11780		4280		377		0				1470		46007	139
	1994	30877		10879		2183		51		0				555		44545	141
	1995	27775	62	9642	50	1803	15	6	0	0	0			385	2	39611	129
	1996	33878	79	7395	42	1084	9	40	1	0	0			41	1	42438	132
	1997	31857	72	5837	28	672	6	38	1	0	0			559	3	38963	110
	1998	34870	92	6815	33	181	2	28	0	0	0			638	3	42532	130

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1999	24016	66	5317	25	499	5	0	0	0	0			1131	6	30963	102
	2000	27702	75	7027	34	500	5	3	0	0	0			1853	9	37085	123
	2001	26472	61	7505	39	1036	10	30	0	0	0			922	5	35965	115
	2002	24588	60	8720	43	1284	12	3	0	0	0			480	3	35075	118
	2003	22014	50	8905	42	1206	12	20	0	0	0			634	4	32779	108
	2004	17105	39	6786	33	880	7	0	0	0	0			529	3	25300	82
	2005	16591	39	7179	33	989	8	1	0	0	0			439	3	25199	83
	2006	22412	54	5392	28	759	6	0	0	0	0			449	3	29012	91
	2007	12474	30	4377	23	929	7	0	0	0	0			277	2	18057	62
	2008	13404	28	8674	39	669	4	8	0	0	0			312	2	23067	73
	2009	13580	30	7215	35	720	5	36	0	0	0			173	1	21724	71
	2010	14834	33	9821	48	844	6	49	0	0	0			186	1	25734	88
	2011	13779	31	9030	44	747	5	51	0	0	0			171	1	23778	81
	2012	17484	42	6560	34	738	5	53	0	0	0			173	1	25008	82
	2013	14576	35	6938	36	857	6	27	0	0	0			93	1	22491	78
	2014	15129	35	7936	38	1015	7	34	0	0	0			106	1	24220	81
	2015	15011	38	7082	36	723	5	19	0	0	0			277	1	23112	80
	2016	11064	28	4716	22	621	4	23	0	0	0			289	2	16713	56
	2017	5592	14	5930	28	644	4	7	0	0	9			90	0	12263	55
	2018	12626	30	9355	43	820	5	13	0	0	0			232	1	23046	79
	2019	8720	21	6145	30	588	4	15	0	0	0			136	1	15604	113

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2020	8870	20	4399	23	605	5	13	0	0	0			71	0	13958	97
	2021																49
	2022																55
Spain (2)																	
	1993	1589		827		75										2491	8
	1994	1658	5									735	4			2393	9
	1995	389	1									1118	6			1507	7
	1996	349	1									676	3			1025	4
	1997	169	0									425	2			594	2
	1998	481	1									403	2			884	3
	1999	157	0									986	5			1143	5
	2000	1227	3									433	3			1660	6
	2001	1129	3									1677	9			2806	12
	2002	651	2									1085	6			1736	8
	2003	210	1									1116	6			1326	7
	2004	1053	3									731	4			1784	7
	2005	412	1									2336	11			2748	12
	2006	350	1									1864	9			2214	10
	2007	481	1									1468	7			1949	8
	2008	162	0									1371	7			1533	7
	2009	106	0									250	1			356	1

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2010	81	0									166	1			247	1
	2011	18	0									1027	5			1045	5
	2012	237	1									1064	6			1301	7
	2013	111	0									725	4			836	4
	2014	48	0									1160	6			1208	6
	2015	46	0									1048	5			1094	5
	2016	332	1									806	4			1138	5
	2017	140	0									358	2			498	2
	2018	123	0									477	3			600	3
	2019	125	0									866	4			991	4
	2020	244	1									816	4			1060	5
	2021	21	0	492	3							74	0			649	4
	2022	34	0	52	0	3	0					382	2			488	3
	2023	26	0	27	0	2	0					352	1			407	1
SPM																	
	2019															506	1
	2020															616	2
	2021															690	2
	2022															478	1
	2023															558	1
Sweden																	

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	Year	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
	1990	7430	18									3135	15			10565	33
	1991	8990	20									3620	18			12610	38
	1992	9850	23									4655	26			14505	49
	1993	10540	23									6370	33			16910	56
	1994	8035	18									4660	26			12695	44
	1995	9761	22									2770	14			12531	36
	1996	6008	14									3542	19			9550	33
	1997	2747	7									2307	12			5054	19
	1998	2421	6									1702	9			4123	15
	1999	3573	8									1460	8			5033	16
	2000	7103	18									3196	15			10299	33
	2001	4634	12									3853	21			8487	33
	2002	4733	12									2826	16			7559	28
	2003	2891	7									3214	18			6105	25
	2004	2494	6									2330	13			4824	19
	2005	2122	5									1770	10			3892	15
	2006	2585	4									1772	10			4357	14
	2007	1228	3									2442	13			3670	16
	2008	1197	3									2752	16			3949	19
	2009	1269	3									2495	14			3764	17
	2010	2109	5									3066	17			5175	22

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2011	2726	7									5759	32			8485	39
	2012	1900	5									4826	25			6726	30
	2013	1052	3									1996	12			3048	15
	2014	2887	8									3657	22			6544	30
	2015	1028	2									2569	15			3597	17
	2016	742	2									1389	7			2131	9
	2017	1093	3									2674	15			3767	18
	2018	1712	4									2027	12			3739	17
	2019	981	2									3168	18			4149	20
	2020	976	2									2082	12			3058	14
	2021	1130	3									1452	8			2582	11
	2022	681	2									1229	7			1910	8
	2023	764	2									1541	9			2305	10
UK (E&W)																	
	1985	62815										32716				95531	361
	1986	68759										42035				110794	430
	1987	56739										26700				83439	302
	1988	76012										34151				110163	395
	1989	54384										29284				83668	296
	1990	45072										41604				86676	338
	1991	36671										14978				51649	200

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1992	34331										10255				44586	171
	1993	56033										13144				69177	248
	1994	67853										20268				88121	324
	1995	57944										22534				80478	295
	1996	30352										16344				46696	183
	1997	30203										11171				41374	142
	1998	30272										6645				36917	123
	1999	27953										13154				41107	150
	2000	48153										12800				60953	219
	2001	38480										12827				51307	184
	2002	34708										10961				45669	161
	2003	14656										7550				22206	89
	2004	24753										5806				30559	111
	2005	19883										6279				26162	97
	2006	17204										4852				22056	80
	2007	15540										4383				19923	67
	2008	14467										4569				19036	64
	2009	10015										3895				13910	54
	2010	25502										7193				32695	109
	2011	19708										14867				34575	136
	2012	7493										7433				14926	58

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2013	13113										9495				22608	84
	2014	7678										6541				14219	54
	2015	9053										10209				19262	68
	2016	9447										13047				22494	86
	2017	4866										7298				12164	49
	2018	5052										6174				11226	42
	2019	497										642				1139	5
	2020	329	1									425	2			754	6
	2021	108	0									172	1			280	1
	2022	114	0									163	1			277	1
	2023	91	0									176	1			267	1
UK (NI)																	
	2020															888	2
	2021															624	2
	2022															566	1
	2023															553	2
UK (Scot)																	
	1982	208061	496									128242	596			336303	1092
	1983	209617	549									145961	672			355578	1221
	1984	213079	509									107213	504			320292	1013
	1985	158012	399									114648	514			272660	913

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1986	202838	525									148197	744			351035	1269
	1987	164785	419									103994	503			268779	922
	1988	149098	381									112162	501			261260	882
	1989	174941	431									103886	464			278827	895
	1990	81094	201									87924	423			169018	624
	1991	73608	177									65193	285			138801	462
	1992	101676	238									82841	361			184517	599
	1993	94517	227									71726	320			166243	547
	1994	99479	248									85404	400			184883	648
	1995	89971	224									78511	364			168482	588
	1996	66465	160									57998	267			124463	427
	1997	46866	114									40459	182			87325	296
	1998	53503	121									39264	162			92767	283
	1999	25255	57									30694	143			55949	200
	2000	44033	114									36767	161			80800	275
	2001	42586	101									34926	150			77512	251
	2002	31385	73									26403	118			57788	191
	2003	29598	71									27588	122			57091	193
	2004	37631	88									36856	159			74033	245
	2005	39093	91									28666	126			67117	215
	2006	36668	75									27620	118			63848	193

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2007	32335	71									24098	100			56433	171
	2008	23431	51									25745	110			49176	161
	2009	18189	37									19185	83			37374	120
	2010	33426	69									26988	111			60414	180
	2011	15706	33									28496	126			44202	159
	2012	19371	40									19785	84			39156	124
	2013	20747	45									17223	74			37970	119
	2014	12581	26									13329	58			25910	84
	2015	13659	29									9165	39			22824	68
	2016	4220	8									4163	19			8383	27
	2017	3727	8									4419	19			8146	27
	2018	3834	8									2578	12			6412	20
	2019	2480	5									1890	8			4370	13
	2020	2218	5									2113	9			4331	14
	2021	1280	3									996	4			2276	7
	2022	1075	2									916	4			1991	6
	2023	763	2									722	3			1485	5
USA																	
	1982	33		1206		5								21		1265	6
	1983	26		314	1	2								6		348	1
	1984	50		545	2	2								12		609	2

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	1985	23		528	2	2								13		566	2
	1986	76		482	2	2								3		563	2
	1987	33		229	1	10								10		282	1
	1988	49		203	1	3								4		259	1
	1989	157	0	325	1	2								3		487	1
	1990	52	0	562	2	12								16		642	2
	1991	48	0	185	1	1								4		238	1
	1992	54	0	138	1	1										193	1
	1993	17		133	1	0	0							2		152	1
	1994	12		0	0	0	0									12	0
	1995	0	0	0	0	0	0									0	0
	1996	0	0	0	0	0	0									0	0
	1997	0	0	0	0	0	0									0	0
	1998	0	0	0	0	0	0									0	0
	1999	0	0	0	0	0	0									0	0
	2000	0	0	0	0	0	0									0	0
	2001	0	0	0	0	0	0									0	0
	2002	0	0	0	0	0	0									0	0
	2003	0	0	0	0	0	0									0	0
	2004	0	0	0	0	0	0									0	0
	2005	0	0	0	0	0	0									0	0

		1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total	
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**
	2006	0	0	0	0	0	0									0	0
	2007	0	0	0	0	0	0									0	0
	2008	0	0	0	0	0	0									0	0
	2009																
	2010																
	2011																
	2012																
	2013																
	2014																
	2015																
	2016																
	2017																
	2018																
	2019																
	2020																
	2021																
	2022																

			1SW		2SW		3SW		4SW		5SW		MSW(1)		PS		Total
Country	**Year**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**	**No.**	**Wt**

1. MSW includes all sea ages >1, when this cannot be broken down.
Different methods are used to separate 1SW and MSW salmon in different countries:
- Scale reading: Faroe Islands, Finland (1996 onwards), France, Russia, USA and West Greenland.
- Size (split weight/length): Canada (2.7 kg for nets; 63 cm for rods), Finland up until 1995 (3 kg),
Iceland (various splits used at different times and places), Norway (3 kg), UK Scotland (3 kg in some places and 3.7 kg in others),
All countries except Scotland report no problems with using weight to catergorise catches into sea age classes; mis-classification may be very high in some years.
In Norway, catches shown as 3SW refer to salmon of 3SW or greater.

2. Based on catches in Asturias (80-90% of total catch) 1993-2018, and on catches for all Spain in 2019-2020 with 2SW, MSW and Not-Specified assigned to MSW.

3. Iceland catches of wild fish only, i.e. excluding ranched fish.

4. France data for 2019 and 2020 show catch number only, as reported by the recreational fishery that doesn't report catch weight.

5. Russian data extracted from NASCO website at https://nasco.int/conservation/third-reporting-cycle-2/

6. For Norway and Canada, fish reported as Small are assigned to 1SW whereas those reported as Large are assigned to MSW

7. For France, fish reported as Small are assigned to 1SW whereas those reported as Large are assigned to NS

8. N.B. Totals include NS values which are not shown.

Annex 5: Glossary of terms and acronyms used in this report

Note that this list does not contain SI units or terms used in formulae or some of the tables and figures.

1SW (One-Sea-Winter) – Maiden adult salmon that has spent one winter at sea; also called a grilse.

2SW (Two-Sea-Winter) – Maiden adult salmon that has spent two winters at sea.

ACOM (Advisory Committee) of ICES – The Committee works on the basis of scientific assessment prepared in the ICES expert groups. The advisory process includes peer review of the assessment before it can be used as the basis for advice. The Advisory Committee has one member from each member country under the direction of an independent chair appointed by the Council.

ASC – Annual Science Conference of ICES.

ASF – Atlantic Salmon Federation.

ASRJV – Atlantic Salmon Research Joint Venture of Canada.

BEAM – Bycatch Evaluation and Assessment Matrix, developed by WGBYC.

B_{pa} – Biomass for precautionary approach.

Catch – removing fish from water. Note this term can have several definitions depending on the fate of the fish after it is removed from the water (i.e. retained or released) and whether the information is reported or not.

CL (Conservation Limit) – Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that undesirable levels are avoided, i.e. that stock levels exceed the undesirable levels.

CoASal "Conserving our Atlantic salmon as a sustainable resource for people of the North; fisheries and conservation in the context of growing threats and a changing environment" – A project under the EU's Kolarctic project.

CPUE (Catch per Unit of Effort) – A derived quantity obtained from the independent values of catch and effort.

C&R (Catch and Release) – Catch and release is a practice within recreational fishing intended as a technique of conservation. After capture, the fish are unhooked and returned to the water before experiencing serious exhaustion or injury. Using barbless hooks, it is often possible to release the fish without removing it from the water (a slack line is frequently sufficient).

COVID-19 – Coronavirus pandemic.

CWT (Coded Wire Tag) – The CWT is a length of magnetized stainless steel wire 0.25 mm in diameter. The tag is marked with rows of numbers denoting specific batch or individual codes. Tags are cut from rolls of wire by an injector that hypodermically implants them into suitable tissue. The standard length of a tag is 1.1 mm.

DCF (Data Collection Framework) – Framework under which EU Member States collect, manage and make available a wide range of fisheries data needed for scientific advice.

DC-MAP (Data Collection Multi-Annual Programme) – European Union multiannual programme which includes the Data Collection Framework.

DFO (Department of Fisheries and Oceans) – DFO and its Special Operating Agency, the Canadian Coast Guard, deliver programs and services that support sustainable use and development of Canada's waterways and aquatic resources.

Distant water fisheries – Fisheries undertaken by a Party that take salmon originating in another Party's rivers; primarily used with reference to the fisheries in waters off Greenland and the Faroes.

DNA (Deoxyribonucleic Acid) – DNA is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms (with the exception of RNA- Ribonucleic Acid viruses). The main role of DNA molecules is the long-term storage of information. DNA is often compared to a set of blueprints, like a recipe or a code, since it contains the instructions needed to construct other components of cells, such as proteins and RNA molecules.

DSG (diadromous subgroup) – Pan-regional subgroup within the Regional Coordination Groups to coordinate and identify data collection needs for diadromous species in relation to the EU data collection regulation Data Collection Framework/Data Collection-Multi-Annual Programme.

DST (Data Storage Tag) – A miniature data logger with sensors including salinity, temperature, and depth that is attached to fish and other marine animals.

eDNA - Environmental DNA.

EG - Expert Group of ICES.

ESRF - Canada's Environmental Studies Research Fund.

EU - European Union.

EUB – European baseline for genetics.

Extant exploitation rate – Note that the term 'exploitation rate' may have several definitions and uses in the report. Specifically however, extant exploitation rates for NAC and Southern MSW fish at West Greenland were calculated by dividing the estimated continent of origin reported harvest of MSW salmon at West Greenland by the MSW PFA estimates for the corresponding year for each stock complex (see Section 5 of the WGNAS report for more details).

FAO - Food and Agriculture Organization of the United Nations.

FSC (Food, Social and Ceremonial fishery) – Indigenous fishery in Canada for food, social or ceremonial purposes.

GFLK – Greenland Fisheries Licence Control Authority.

GINR – Greenland Institute of Natural Resources.

GLM (Generalised Linear Model) – A conventional linear regression model for a continuous response variable given continuous and/or categorical predictors.

GoSL or GoStL – Gulf of St. Lawrence, Canada.

Harvest – The catch and retention of fish.

Homewaters – Riverine, estuarine and marine waters out to 12 nautical miles of countries producing salmon.

ICES (International Council for the Exploration of the Sea) – A global organisation that develops science and advice to support the sustainable use of the oceans through the coordination of oceanic and coastal monitoring and research, and advising international commissions and governments on marine policy and management issues.

IMR – Institute of Marine Research, Norway.

Interreg – European Union research funding scheme.

ISA – Infectious Salmon Anaemia.

ISSG Diad – The Intersessional Sub Group Diadromous Fish of the Regional Coordination Groups (RCG's).

IYS – The International Year of the Salmon.

KNAPK - Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat, the Organization of Fishermen and Hunters in Greenland.

LAB / Lab (Labrador) – Labrador, Canada.

LCM – The North Atlantic wide Life Cycle Model or Bayesean Life Cycle Model.

MO – Management Objective.

MSA – Missing Salmon Alliance, UK.

MSW (Multi-Sea-Winter) – A MSW salmon is an adult salmon which has spent two or more winters at sea. These include 'maiden' fish that have yet to spawn for the first time, and repeat spawners.

MSY – Maximum Sustainable Yield.

MSY.$B_{escapement}$ – A target based on the amount of biomass left to spawn.

NAC (North American Commission) – The North American Atlantic Commission of NASCO or the North American Commission area of NASCO.

NAFO (Northwest Atlantic Fisheries Organisation) – NAFO is an intergovernmental fisheries science and management organization that ensures the long-term conservation and sustainable use of the fishery resources in the Northwest Atlantic.

NASCO (North Atlantic Salmon Conservation Organisation) – An international organisation, established by an inter-governmental convention in 1984. The objective of NASCO is to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation taking account of the best available scientific information.

NCC (NunatuKavut Community Council) – NCC is one of four subsistence fisheries harvesting salmonids in Labrador.

NEAC (North East Atlantic Commission) – North-East Atlantic Commission of NASCO or the North-East Atlantic Commission area of NASCO.

N-NEAC or NEAC–N (North East Atlantic Commission- northern area) – The northern portion of the North-East Atlantic Commission area of NASCO. Also described as 'Northern or northern NEAC'.

S-NEAC or NEAC–S (North East Atlantic Commission – southern area) – The southern portion of the North-East Atlantic Commission area of NASCO. Also described as 'Southern or southern NEAC'.

NF (Newfoundland) – Newfoundland, Canada.

NG (Nunatsiavut Government) – NG is one of four subsistence fisheries harvesting salmonids in Labrador. NG members are fishing in the northern Labrador communities.

NOAA – The National Ocean and Atmospheric Administration of the USA.

Nominal catch – The catch of a fishery, defined as the round, fresh weight of fish, that are caught and retained, and reported.

NPAFC – The North Pacific Anadromous Fish Commission.

PICES – The North Pacific Marine Science Organization.

PFA (Pre-Fishery Abundance) – The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time. In the previous version of the stock complex Bayesian PFA forecast model two productivity parameters are calculated, for the maturing (PFAm) and non-maturing (PFAnm) components of the PFA. In the updated version only one productivity parameter is calculated, and used to calculate total PFA, which is then split into PFAm and PFAnm based upon the proportion of PFAm (p.PFAm).

PFANAC1SW (PFA NAC 1SW) – The non-maturing component of 1SW salmon, destined to be 2SW returns (excluding 3SW and previous spawners) is represented by the PFA estimate for year i.

PIT (Passive Integrated Transponder) – PIT tags use radio frequency identification technology. PIT tags lack an internal power source. They are energized on encountering an electromagnetic field emitted from a transceiver. The tag's unique identity code is programmed into the microchip's non-volatile memory.

Precautionary Approach – NASCO's Agreement on the Adoption of a Precautionary Approach states that an objective for the management of salmon fisheries is to maintain the diversity and abundance of salmon stocks, and NASCO's Standing Committee on the Precautionary Approach interpreted this as being "to maintain both the productive capacity and diversity of salmon stocks" (NASCO, 1998).

PSAT – pop-off satellite tag.

R – A computer programming language.

RCG (Regional Coordination Group) – Group(s) that coordinate and identify data collection needs in relation to the EU data collection regulations.

RDB – A Regional Database.

RDBES - Regional Database and Estimation System.

RENOSAUM (Rénovation de la stratégie de gestion du saumon en Bretagne) – A French management-orientated research project.

RRM – Run-Reconstruction Model.

RSD – Red skin disease.

SER (Spawner Escapement Reserve) – The CL increased to take account of natural mortality between the recruitment date (assumed to be 1st January after first entering the sea) and the date of return to homewaters.

SEUPB – Special EU Programmes Body.

SFA (Salmon Fishing Areas) – Areas for which the Department of Fisheries and Oceans (DFO) Canada manages the salmon fisheries.

S_{lim} – Limit reference point.

SLU – Swedish University of Agricultural Sciences.

SNP (Single Nucleotide Polymorphism) – Type of genetic marker used in stock identification and population genetic studies.

S_{pa} – ICES Precautionary target reference point.

St P & M or SPM – St Pierre and Miquelon, Islands of France south of Newfoundland.

SoBI – Strait of Belle Isle, Canada.

SU – Stock-units.

TAC – Total Allowable Catch.

ToR – Terms of reference.

UK (United Kingdom of Great Britain and Northern Ireland) – Salmon stocks are grouped and managed according to three UK jurisdictions: Scotland, England and Wales; Northern Ireland.

URMS – Urban runoff mortality syndrome.

USA – United States of America.

VNIRO (PINRO) – Russian Federal Research Institute of Fisheries and Oceanography.

WGBAST – ICES Working Group for Baltic Salmon and Trout.

WGC (West Greenland Commission) – The West Greenland Commission of NASCO or the West Greenland Commission area of NASCO.

WGDIAD (Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species) – A Working Group of ICES.

WGNAS (Working Group on North Atlantic Salmon) – ICES working group responsible for the annual assessment of the status of salmon stocks across the North Atlantic and formulating catch advice for NASCO.

WKBaltSalMP I and II – ICES Workshop on Evaluating Draft Baltic Salmon Management Plan.

WKBSALMON – Workshop for the benchmark of the salmon assessment approach.

WKSALMODEL – ICES Salmon Life Cycle Modelling Workshop.

WKSALMON II – ICES/NASCO Workshop 2 for North Atlantic Salmon At-Sea Mortality.

YOY – Young of the year.

Annex 6: WGNAS consideration of recommendations by the Benchmark reviewers

Introduction

The Benchmark reviewers recommended further additions to the LCM in terms of diagnostics, analytical approaches and management to improve both the modelling approach and outputs provided by the WGNAS. They suggested a prioritisation based on their perceived level of importance and ease of incorporation (High, Medium, Low). These recommendations are reproduced here below, with notes inserted to indicate those that have been addressed by WGNAS already, or when the WGNAS plans to address them in the future. The prioritisation presented is that which the reviewers suggested.

High priority

1. We recommend the authors use the nimbleHMC algorithm for estimation rather than the default Metropolis-Hastings/Gibbs MCMC algorithm used currently. The HMC algorithm will improve the speed in which the MCMC algorithm reaches a sufficient effective number of sample sizes and the ability to efficiently explore the posterior distribution of the model. The implementation of the HMC MCMC algorithm is relatively straightforward, as demonstrated in the benchmark and will allow the WGNAS to run models quickly during meetings. In the 2_compile_model.R script the "configureMCMC" function can be exchanged for "configureHMC" on line 84 and "buildDerivs = TRUE" added to the "nimbleModel" function call on line 49. Having 1100 iterations, with 10 thin and 500 burnin across 10 parallel chains ran in ~16 hours on a personal computer with greater level of convergence than illustrated in the benchmark (all Rhat < 1.01 and Neff > 10,000). The number of iterations could easily be reduced to ~300 to have the model run quicker and achieve >3,000 effective samples. In the long term, we recommend that authors transition the model to Stan because of the ability to optimize the model for sampling efficiency/speed and improved convergence diagnostics, but recognize that would take substantial effort and is not a priority.

In response: WGNAS plans to address this recommendation in the next two years (e.g., through the EU funded DIASPARA project). Implementing the HMC within Nimble will be tested for WGNAS 2025 or WGNAS 2026. Moving the model to Stan would require recoding the model and therefore, given the high resource requirement for this, it is an option will be explored in the future.

2. We recommend the authors include figures of the prior predictive distributions of management quantities provided to NASCO (e.g. number of eggs/fish relative to conservation limits). While posterior distributions are currently included, adding the prior predictive distributions will allow managers and the working group to better understand how assumptions of the model impact management recommendations. Also, including figures of the prior and posterior distributions as density/histograms will better illustrate the distributions.

In response: WGNAS will explore this issue in the next two years. However, the prior distributions on the key parameters of the model (post-smolt survival and probability to mature as 1SW) are uninformative. As a consequence, WGNAS does not believe the prior predictive will be informative.

3. Similar to #2, we recommend the authors include the number of effective samples for the posterior distributions of management quantities provided to NASCO. All the diagnostics currently included are

for quantities that are not necessarily used for decision making and, ideally, the working group should ensure that the posterior distribution of management quantities is well described by the MCMC sampler.

In response: WGNAS will explore this issue in the following two years. A low effective sample size for the management quantities will require to increase the number of samples that are drawn (and/or to improve the computational efficiency of the MCMC sampling for the hindcasting phase).

4. We recommend including sensitivity analyses with the final model demonstrating robustness of the model recommendations to assumed values in the model (e.g. MM). While the Bayesian and management framework allows uncertainty in parameters to be integrated into management advice, some fixed parameters and structural assumptions will impact management advice. These are standard in most stock assessments and will better allow the working group and managers to understand the sensitivities of model output to the different assumptions used. This will also help the working group prioritize research efforts to better address where model assumptions produce the least robust advice.

In response: A sensitivity analysis to the mortality during the second year at sea (M) and to the average value of the egg-to-smolt survival has already been conducted on a previous version of the model (see Benchmark report). WGNAS has already investigated the possibility to improve estimates of M and no easy option emerged. Further investigating this issue would require additional resources (fundings and human forces) which are not identified yet.

5. We recommend that the authors conduct within-model retrospective analysis on final models for each assessment/benchmark year. Retrospective analysis is a standard assessment diagnostic (see Carvahlo et al., 2021) to evaluate the consistency of model-based management advice to new data and identify if the model is producing poor management advice. Years of data are sequentially removed, and the model is refit and mean relative error of key model outputs (i.e. median #eggs/fish relative to conservation limits) is calculated relative to the model with the full set of data. While it is unlikely feasible given the long convergence times, the significance of retrospective patterns could be evaluated using a simulation or bootstrap approach (see Breivik et al., 2023).

In response: WGNAS addressed this recommendation during the benchmark. Results revealed that model estimates are highly stable. Going forwards, WGNAS plans to investigate the retrospective diagnostics for each full assessment year (e.g., every three years).

6. We recommend that the working group stop using the approach inflating the SD of the sampling error associated with mean fish weight in the West Greenland catch for increasing the uncertainty in the numbers of fish caught. This is less intuitive and will be harder for subsequent researchers to reproduce. The working group should use SE of the mean instead. However, because the resulting uncertainty associated with catches is lower than desired using the SE, we recommend the working group use the mean weight and apply a default 5% CV for catch in numbers until better information is available.

In response: WGNAS already addressed this recommendation. The relative observation error around the number of fish caught at West Greenland is now fixed at CV = 5%.

Medium priority

7. Similar to #3 above, the current assumption of constant marine mortality rate of 3% per month is almost certainly wrong but needed to allow the model to converge. We recommend the working group explore constraints on both smolt to PFA survival and probability of maturing along with marine mortality to see if this allows estimation of marine mortality.

In response: WGNAS has already investigated the possibility to improve estimates of M. No easy option emerges. Further investigating this issue would require additional resources (fundings and human forces) which are not identified yet.

8. We recommend that the working group include catch and return data from run reconstruction models assuming a multivariate distribution when incorporating the data into the LCM. The returns and catch data from the run reconstruction models have correlated errors because they are derived from the same model/parameters and the assumption of IID errors is not met. This will lead to under-estimation of uncertainty in management quantities. Catch and return data could be input as vectors with the variance covariance matrix input as a matrix and the distributions altered from univariate lognormal to multivariate lognormal.

In response: The methods to address this issue are well identified. WGNAS will address this issue in the medium term, depending on the available resources.

9. We recommend the authors conduct retrospective skill determination for alternative forecast parameterizations of the LCM. Currently there are a number of model assumptions used in the forecast model (e.g. random walk for survival, maturity and five-year average of the proportion of NAC vs NEAC fish) that could potentially be outperformed by alternatives parameterizations (e.g. AR). Ultimately, conducting a retrospective forecast skill assessment could evaluate what forecast parameterization performs the best. We recognize the long run times of the model make this recommendation challenging, it would require work intersessional to complete.

In response: WGNAS plans to address this recommendation in the next two or three years (e.g., through the EU funded DIASPARA project).

10. We recommend the authors' simulation test (self test) the model to ensure that all management quantities can be reliably estimated from the model and that there are sufficient data to estimate the model parameters.

In response: The methods to address this issue are well identified. However, investigating this issue would require additional resources (fundings and human forces) which are not identified yet.

11. We recommend the working group examine genetic data of West Greenland catch to see if the current assumption of constant harvest rate by stock-unit is justified or needs to be changed. These comparisons will need to recognize both the uncertainty in the current model estimates as well as the uncertainty in the genetic data.

In response: Genetic samples are not available for all years. WNASG identified that recoding the model in terms of relative harvest rate would be a priority to facilitate the transportation of the genetic information from year for which genetic data are available to years without any data. Such a model development would also make easier the examination of the constant harvest rate hypothesis. WGNAS will address this issue on the medium term depending on the available resources.

12. We recommend that the working group continues labelling the results of LCM as 2SW despite data being provided as MSW and recommend the working group explore the implications of alternative life histories and the impact on management advice in the LCM. This caveat should be described in the assessment document.

In response: To make communication easier (especially to NASCO), the WGNAS 2024 decided to keep the labelling of MSW which is aligned with the data stream. For NAC stock-units, the 2SW component of MSW is calculated in the model and some of the results are labelled as 2SW. Future development of the model would explicitly represent the different sea-age components (1SW, 2SW, 3SW, multi-spawners …). This would require additional resources (fundings and human forces) which are not identified yet.

13. We recommend the working group include sensitivities that have density dependence in the LCM to allow internal calculation of reference points if NASCO is interested and explore the consequences of density dependence for achieving conservation limits. Having a model-based estimation of conservation limits would be a large change from current practice and would need the agreement from NASCO before use in catch advice.

In response: WGNAS acknowledges the importance of this recommendation. Parameterizing density dependence (e.g., in the freshwater phase) requires further research that would require additional resources (fundings and human forces) which are not identified yet.

14. We recommend that the working group include Denmark, Portugal and other stock-units in LCM when data are available.

In response: WGNAS acknowledge the importance of this recommendation. WGNAS has no visibility on the possibility to get the data for these stock-units in the short-medium term, but will continue to work with experts from these countries to source/generate data where possible.

15. We recommend that the author's account for the proportion of NAC fish caught in Faroes fishery in LCM hind- and forecast. Currently, the probability of achieving conservation limits for NAC stock-units is independent of catch in the Faroes. However, a small proportion of NAC fish are present in the fishery and not accounting for the extraction of NAC fish may overestimate the status of NAC stock-units relative to conservation limits under alternative catch scenarios.

In response: The method and the data to address this issue are well identified. However, investigating this issue would require additional resources (fundings and human forces) which are not identified yet.

16. We recommend that NASCO and the working group clarify the management scenarios used for the forecast in the assessment. Currently it is not clear if forecasts include scenarios where there are both catches at Faroes and West Greenland at the same time. The forecasts also do not account for home water fisheries where fish are easily allocated to stock-unit, which limits potential management advice. Recommend clarification from NASCO on allocation of TAC to homewater and Faroes fisheries and forecast under multiple allocation scenarios.

In response: Following the WGNAS practices and previous decisions on the sharing agreement rule, no joint scenarios for W. Greenland and Faroes fishery are explored, and the scenarios do not explicitly consider homewater fisheries (those are implicitly included through the sharing agreement rule). Other options/scenarios could easily be explored when/if they are judged more appropriate by managers.

17. We recommend the working group improve the model diagnostic figures so that breaks do not appear. For example, the number of effective samples plots suggest an error in the code.

In response: WGNAS plans to address this recommendation in the next two or three years (e.g., through the EU funded DIASPARA project).

18. We recommend that the working group coordinates with NASCO to ensure consistency between conservation limits and how eggs or fish are derived in the LCM. In addition, we recommend that the working group output the median and 95% CI of Conservation Limits in both eggs and fish.

In response: The benchmark has reviewed CLs and proposed a method to ensure consistency between the CL in number of eggs and in number of fish (CL in number of fish are derived from the CL in number of eggs based on the biological characteristics that are used in the model).

Low priority:

19. We recommend the authors move the prior distributions of variance-covariance matrices used in multivariate normal distributions to the LKJ distribution via "dlkj_corr_cholesky" as it will likely increase sampling efficiency and speed over the inverse Wishart (sensu Nimble and Stan guides).

In response: WGNAS plans to address this recommendation in the next two or three years (e.g., through the EU funded DIASPARA project).

20. We recommend the authors modify the LCM to allow a single value of Russian catch to be used in LCM instead of estimating stock-specific values. Alternatively, the working group can account for the correlation of Russian data post 2021 in the likelihood function of the LCM when doing the variance inflation because an increase in catch in one river would be associated with a decrease in the catch in other rivers. As is currently specified, the variance inflation in the model will include catches beyond those observed (i.e. draws will invariably include catches from the upper end of the IID distributions across all Russian stock-units).

In response: WGNAS plans to address this recommendation in the next two or three years.

21. We recommend the working group continue to explore how catch and release fishing can best be accommodated within the LCM.

In response: WGNAS will continue to explore this matter. One option could be to account for additional natural mortality between the returns and the spawners, based on national estimates.