Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2026/074

Gulf Region

NAFO Division 4TVn Fall Spawning Atlantic Herring (*Clupea harengus*) Assessment Framework Review: Fisheries and Surveys Data

François Turcotte, Lysandre Landry, Jenni L. McDermid, Laurie D. Maynard, Jacob Burbank

Fisheries and Oceans Canada
Gulf Fisheries Centre
343 Université Avenue, P.O. Box 5030
Moncton, NB, E1C 9B6

October 2026

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
DFO.CSAS-SCAS.MPO@dfo-mpo.gc.ca



© His Majesty the King in Right of Canada, as represented by the Minister of the Department of Fisheries and Oceans, 2026

This report is published under the Open Government Licence - Canada

ISSN 1919-5044
ISBN 978-1-100-00766-3 Cat. No. Fs70-5/2026-074E-PDF

Correct citation for this publication:

Turcotte, F., Landry, L., McDermid, J.L., Maynard, L.D., and Burbank, J. 2026. NAFO Division 4TVn Fall Spawning Atlantic Herring (*Clupea harengus*) Assessment Framework Review: Fisheries and Surveys Data. DFO Can. Sci. Advis. Sec. Res. Doc. 2026/074. v + 130 p.

Aussi disponible en français :

*Turcotte, F., Landry, L., McDermid, J.L., Maynard, L.D., et Burbank, J. 2026. Examen du cadre de référence pour le hareng de l'Atlantique (*Clupea harengus*) frayant à l'automne de la division 4TVn de l'OPANO: Données sur les pêches et les relevés. Secr. can. des avis sci. du MPO. Doc. de rech. 2026/074. v + 139 p.*

TABLE OF CONTENTS

ABSTRACT v
INTRODUCTION 1
STOCK STRUCTURE 2
COMMERCIAL FISHERY LANDINGS 4
METHODS 5
RESULTS 7
Sample selection 7
Mobile gear fisheries 9
Fixed gear fisheries 19
Landings 25
CPUE 27
RESEARCH VESSEL SURVEY 27
METHODS 27
RESULTS 30
Catches 30
Growth 31
Maturity 33
Biomass and proportion-at-age 34
CHALEUR BAY/MISCOU ACOUSTIC SURVEY 39
METHODS 41
RESULTS 42
EXPERIMENTAL GILLNETS 46
SELECTIVITY-AT-AGE 47
Methods 47
Results 48
AGE COMPOSITION 53
Methods 53
Results 53
SPAWNING GROUND ACOUSTIC SURVEY 56
AGE-AT-MATURITY 57
METHODS 57
RESULTS 58
DISCUSSION 59
COMMERCIAL FISHERY LANDINGS 59
RESEARCH VESSEL SURVEY 60
CHALEUR BAY/MISCOU ACOUSTIC SURVEY 61
SELECTIVITY AT AGE 62

EXPERIMENTAL GILLNETS AGE COMPOSITIION 62
AGE AT MATURITY 62
ECOSYSTEM INFORMATION 63
Recruitment drivers 63
Predators abundance 63
REFERENCES CITED 65
APPENDIX 1: EDGE AND WINTER CATCH AT AGE RESULTS 70
EDGE 70
WINTER 71
APPENDIX 2: CATCH AT AGE COMPARISON 73
MOBILE GEAR FISHERIES 73
Edge 73
Winter 75
Inshore North 77
Inshore Middle 79
Inshore South 81
FIXED GEAR FISHERIES 83
Fixed North 83
Fixed Middle 85
Fixed South 87
APPENDIX 3: SAMPLE SELECTION ALGORITHM SUMMARY 89

ABSTRACT

This document reviews the assessment framework for fall spawning Atlantic herring (*Clupea harengus*) in NAFO Division 4TVn, focusing on data inputs and methods to address recent concerns in stock assessments. The southern Gulf of St. Lawrence (sGSL) fall spawning herring stock has been assessed as three subpopulation: North, Middle, and South regions. Previous models showed unrealistic trends in natural mortality of young herring which led to inflated cohort strength, prompting a review to improve biological realism and model performance.

Key updates include transitioning toward state-space stock dynamics modeling, disaggregating catches and survey results into gear- and region-specific indices, and incorporating predator effects on older ages. Revised catch-at-age calculations use objective sample selection and Gompertz growth modeling to produce region- and fleet-specific matrices. Fishery-independent surveys provide important indices. We reassessed how to proportion catch in the acoustic and bottom-trawl surveys, as well as experimental gillnet data. Instead of a knife-edge maturity where all herring were considered mature at age 4, we investigated maturity ogives which showed that age-at-maturity rose from ~2.75 years in the 1970s to 3.43 years in 2024, improving spawning stock biomass estimates.

Ecosystem drivers, including zooplankton and temperature, strongly influence recruitment, while predator abundance (bluefin tuna and grey seals) correlates with mortality in older herring. Recommendations include adopting region-specific indices, modeling selectivity as random effects, and incorporating time-varying maturity schedules and ecosystem interactions in future assessments.

INTRODUCTION

Atlantic herring (*Clupea harengus*) are distributed throughout the southern Gulf of St. Lawrence (sGSL), from the north shore of the Gaspé Peninsula to the northern tip of Cape Breton Island, including the Magdalen Islands. This range encompasses Northwest Atlantic Fisheries Organization (NAFO) Division 4T, with overwintering occurring in NAFO Division 4Vn. Two spawning components occur in the sGSL: spring spawners and fall spawners. Spring spawning occurs primarily in April-May in shallow waters (< 5 m). Fall spawning occurs from mid-August to mid-October at depths of 5 to 20 m, but can occur as early as July 1.These spawning components are considered distinct stocks and are thus assessed separately. Fall spawning herring are further separated into three regions (North, Middle, and South regions) which are treated as subpopulations.

The most recent stock assessment of fall spawning Atlantic Herring in NAFO Division 4TVn raised important concerns that triggered a review of the assessment framework. Key issues included unrealistic declines in time-varying natural mortality of young fish (ages2 to 6) and inflated cohort strength in population forecasts (Maynard et al. 2024). The last complete framework review occurred in 2015 (Benoît et al. 2016, Surette 2016; Surette et al. 2016, Swain 2016), followed by model revisions in 2019 (Turcotte et al. 2021a).

Since these concerns primarily relate to population modeling, this review focuses on addressing modeling needs rather than conducting a comprehensive reassessment of all data sources. Major anticipated changes include:

1. potentially transitioning from traditional statistical catch-at-age models to a state-space framework;
2. developing separate models for each subpopulation (hereafter North, Middle, South regions) instead of a single aggregated model,
3. disaggregating catch into fixed and mobile gear fleets with independently estimated selectivity; and
4. incorporating predator abundance effects on natural mortality for older ages.

These structural changes aim to improve biological realism, reduce parameter confounding, and improve diagnostic performance. Accordingly, data treatment will focus on generating region-specific data sets, selectivity-at-age, and predator abundance indicators.

This document specifically reviews the following components:

- **Fishery catch-at-age calculations** to produce distinct matrices of total catch, catch-at-age, and weight-at-age by fishing fleet (gillnets: fixed gear; seiners: mobile gear);
- **Catch-per-unit-effort (CPUE) calculations for the gillnet fishery** to improve the data quality, refine the spatial information, and enhance predictive modeling;
- **Fisheries and Oceans Canada (DFO) multispecies bottom-trawl research vessel survey (RV survey)** to generate region-specific biomass indices, catch-at-age and weight-at-age matrices;

- **DFO Chaleur Bay/Miscou acoustic survey (BDCM survey)** to generate region-specific biomass indices, catch-at-age and weight-at-age matrices and re-examine its potential use beyond a juvenile (ages 2 and 3) indicator;
- **Experimental gillnets program** to inform selectivity-at-age in the gillnet fishery and to generate region specific biomass indices, catch-at-age and weight-at-age matrices;
- **Age-at-maturity ogives** to transition away from an assumed static knife-edge maturity schedule.

The spawning grounds acoustic survey was recently developed (Turcotte et al. 2022) and deemed appropriate with no additional work required for this framework review. The relevant ecosystem information will also be discussed but no additional analysis of environmental drivers was performed for this framework review. The following section provides biological and fishery background information relevant to the review.

STOCK STRUCTURE

Both spring and fall spawning components are harvested in commercial fishing fleets using gillnets (fixed gear) and seines (mobile gear), however their relative contributions to catches varies in time and space. Consequently, landings must be separated into spring and fall spawning groups to accurately assess and manage the stocks.

Herring exhibit strong spawning site fidelity (Wheeler and Winters 1984; McQuinn 1997; Brophy et al. 2006; Moll et al. 2025), suggesting the presence of localized stocks within the sGSL. Natal homing rates range from 56 to 73%, while limited straying among spawning groups maintains gene flow and supports a “metapopulation” structure in Atlantic herring in general (Moll et al. 2025). The sGSL gillnet fishery primarily targets these local spawning aggregations. Even if stock dynamics may not be entirely localized, regional differences in stock dynamics, fishing patterns and survey catchability justify treating regions separately to improve stock assessment accuracy.

Atlantic herring are pelagic and form schools during feeding, spawning, and migration periods. Knowledge of herring movement within and among spawning, feeding, and overwintering areas in the sGSL is derived from historical studies or inferences from fishery catches. Contemporary research on movement ecology, scale of migration, and drivers of movement (including homing behaviour) is lacking (Jac et al. 2025).

In the sGSL, the most significant spring spawning areas are along the New Brunswick shores of the Northumberland Strait and in the Chaleur Bay, while the largest fall spawning grounds occur off Miscou and Escuminac (New Brunswick), North Cape and Cape Bear (Prince Edward Island), and Pictou (Nova Scotia) (Messieh 1987; Turcotte et al. 2022). Both spawning components mix in shared feeding areas during summer and fall. Unlike spawning sites, which remain relatively stable through time, feeding areas vary with prey availability. Herring feed primarily on zooplankton, krill, and fish larvae, with large copepods (*Calanus finmarchicus*, *C. hyperboreus*, and *C. glacialis*) being preferred prey (Darbyson et al. 2003). In the sGSL, fishery catches, acoustic surveys, and trawl data indicate that both spring and fall spawners mix and forage near their spawning areas during summer and fall, particularly in Chaleur Bay, American Bank, Shediac Valley, St. Georges Bay, Northumberland Strait, and other areas of the southern Gulf where prey concentrations are highest (McQuinn et al. 2012).

Overwintering distributions of herring in the Gulf of St. Lawrence and adjacent regions have primarily been inferred from capture–mark–recapture studies and winter surveys. Adults overwinter off the north and east coasts of Cape Breton and in the Laurentian Channel within NAFO divisions 4T and 4Vn (Claytor 2001; Simon and Stobo 1983). Although studies from the

early 1970s (Winters and Beckett 1978) found that sGSL herring also overwintered off the south coast of Newfoundland, exploratory fishing in 2006 found no such concentrations, and it is suggested that historic migration pattern no longer occurs (McQuinn 1997; Wheeler et al. 2006). The available biological data shows that herring from both spawning components mix in the overwintering areas. Overwintering of juvenile herring was studied using bottom trawl surveys in December of 1991 to 1994 (LeBlanc et al. 1995). This study found that where juvenile fall-spawning herring were found differed through the years, but overall larger numbers were captured in the North and Middle regions (NAFO 4Tlmn) compared to the South region (NAFO 4Tgh).

Two general sets of assessment models were evaluated for the fall spawning herring stock as part of the 2015 assessment framework review: whole area models (NAFO 4T) and regionally-disaggregated models covering sub-regions of NAFO 4T. The three subpopulations that encompass the traditional herring spawning beds and fishing areas were: North region (Gaspé and Miscou; Herring Fishing Areas (HFA) 16A and 16B; NAFO subdivisions 4Tmnopq), Middle region (Escuminac-Richibucto and west Prince Edward Island; HFA 16C and 16E; NAFO 4Tkl), and South region (Fisherman's Bank and Pictou; HFA 16DFG; NAFO 4Tfghj) (Figure 1). These regions were defined because of the geographic proximity of spawning beds as well as similarity of population dynamics; and is the finest level of disaggregation that can be supported by the available data. The greatest improvement in model fit and reduction in residual patterns occurred using a three-population model with process error in q, allowing q to vary independently among populations. The spatial disaggregation matches the management units used for Total Allowable Catch (TAC) attribution and management of the stock. This model was chosen as the preferred model for the provision of advice (Swain 2016). This current assessment framework review uses the same regional definition for the stock.

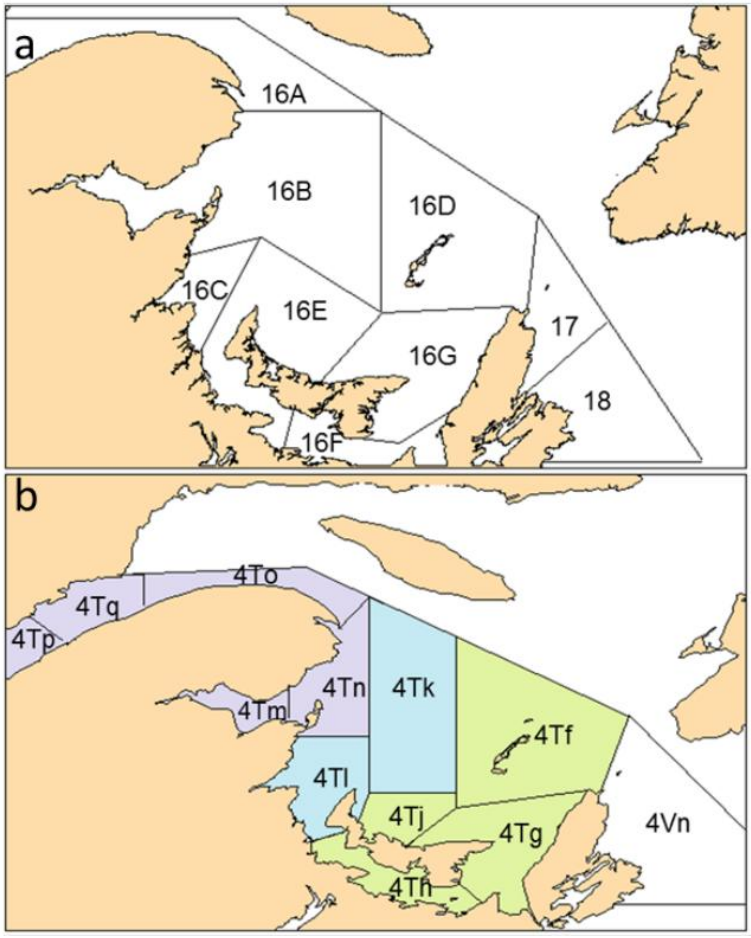


Figure 1: Upper panel a) Southern Gulf of St. Lawrence Herring fishery management zones, lower panel b) Northwest Atlantic Fisheries Organization (NAFO) Divisions 4T and 4Vn, where NAFO subdivisions are colored boxes. Purple boxes represents the North region, blue boxes represents the Middle region, and green boxes represents the South region.

COMMERCIAL FISHERY LANDINGS

The sGSL herring fishery operates within NAFO Divisions 4T and 4Vn. The fall spawning herring Total Allowable Catch (TAC) is established for the entire sGSL and subsequently distributed among fleets and regions according to relative biomass estimates from stock assessments. Allocation is further divided among HFA 16A–16G, 17, and 18 (Chadwick et al. 1989; Claytor et al. 1991) based on historical sharing agreements.

The fishery consists of two main fleets: a Fixed gear fishery that consists of a coastal gillnet fleet that targets spawning aggregations and a Mobile gear fishery that consists of small and large purse seine fleets. The Fixed gear fishery operates primarily in NAFO Division 4T, while the Mobile gear fishery is active in 4T and, historically, 4Vn. During the spring and fall fishing seasons, the Mobile gear fishery is currently prohibited from fishing in areas designated exclusively for the Fixed gear fishery. In spring, the Mobile gear fishery operates along the northern boundary of NAFO Division 4Tf in the Laurentian Channel, this is known as the Edge fishery. Meanwhile in the fall, the Mobile gear fishery has primarily targeted herring in Chaleur Bay over the last decade.

Before 1967, the sGSL herring fishery was dominated by the Fixed gear fishery, with average landings of approximately 34,000 tonnes (t) between 1935 and 1966. The introduction of the Mobile gear fishery in the mid-1960s led to a rapid expansion of catches, with combined landings averaging 166,000 t between 1967 and 1972. Since 1981, the Mobile gear fishery has declined and the Fixed gear fishery has accounted for most of the catch from both spring and fall spawning components (Maynard et al. 2024).

A global TAC was first introduced in 1972 at 166,000 t, but was reduced to 40,000 t in the following year. Separate TACs for spring and fall spawner components were implemented in 1985. Initially, the TAC was allocated by fishing season (spring and fall), but was later assigned directly to spawning components based on biological sampling from the fishery.

The large purse seines fleet targets fish from both spawning populations during their fall migrations out of the Gulf and into overwintering areas (LeBlanc et al. 2012). Catches from the Edge fishery represented predominately fall spawners and their catch was historically attributed to the South region based on geographic proximity (Benoît et al. 2016). However, there is no evidence that these fish originate from the South region. It is more plausible that fish in this area are a mixture of sGSL subpopulations, consisting of migrating or overwintering fish. Prior to 1999, a Winter fishery in NAFO Division 4Vn also targeted herring on their overwintering grounds, when fish from both spawning components and three subpopulations were presumably aggregated. In assessments prior to 2019, the Winter fishery catches were redistributed based on seiner landings in each region. This approach resulted in regions without seiner landings not receiving any catch redistribution. Beginning with the 2019 assessment, catches from the Winter and Edge fisheries were redistributed among the North, Middle, and South regions in proportion to each region's Fixed fishery landings. Ideally, the catch from these fisheries where subpopulations fish are mixed in unknown proportions would be attributed proportionally to their relative population biomass. This would assume proportional mixing in the overwintering areas, and resulting proportional catch. However, this approach is unattainable until a population model can estimate the subpopulation relative biomass and jointly attribute the catch from this fisheries proportionally. Consequently, in the current framework review, catches from the Winter and Edge fisheries were redistributed among the North, Middle, and South regions in proportion to each region's Fixed fishery landings, as performed in earlier assessments. This assumes gillnet catches are proportional to the relative biomass of each subpopulation and a reliable indicator of the proportion of each subpopulation in the overwintering areas and associated catch.

The following sections describe a comprehensive review of the catch-at-age calculations for the sGSL herring fishery. Separate catch-at-age matrices are developed for the Fixed and Mobile fisheries.

METHODS

Catch data come from purchase slips and ZIFF (Zonal Interchange File Format) files collected by the Statistics Branch of DFO. Catch data from 1978 to 1984 are available by fishery and by NAFO subdivisions. Beginning in 1985, the catch data are further reported by vessel and trip. The ZIFF files are based on information collected by the Dockside Monitoring Program (DMP). This program provides accurate, timely, and independent third-party verification of fish landings. Contracted companies are hired by the fishing industry to observe the offloading of fish and to record and report the landings information to DFO. The level of DMP coverage for the NAFO 4TVn herring fisheries landings is 100%.

Mobile gear catches were split into four main fisheries: the three regional fall inshore mobile fisheries (i.e., Inshore North, Inshore Middle and Inshore South), and the Overwinter fishery,

which combines the Winter fishery catches in 4Vn and the Edge fishery catches in the spring season. Fixed gear catches were split into the three main regional fisheries: Fixed North, Fixed Middle and Fixed South.

Commercial catches from Fixed and Mobile gear fisheries were sampled dockside by DFO scientific personnel and at sea by fisheries observers in the Mobile gear fishery. Sampling procedures are designed to obtain samples that are spatially and temporally representative of landings. Random samples of fish with length stratification are used with 200 fish lengths recorded for length frequency samples and 2 fish saved by 0.5 cm length bin for biological sampling in the laboratory. The biological samples are used to determine the size, age, and spawning component composition of the catch. Yearly age reading consistency tests are performed in order to evaluate and ensure the consistency of age reading over time. Three methods are used to identify either spring or fall spawners based on gonad maturity stages (Cleary et al. 1982):

1. For immature Herring of maturity stages 1 and 2 (juveniles), the season of hatching is based on the size at capture and visual examination of otolith characteristics (Messieh 1972). The spawning component assignment for juvenile Herring is its hatching season (Cleary et al. 1982).
2. Adult Herring with ripe or spent gonads are assigned their maturity stage by macroscopic laboratory examination of the gonads. The fish are assumed to belong to the spawning component of the season in which they were caught.
3. Adult Herring with unripe gonads are assigned their maturity stage by using a gonadosomatic index (GSI) based on a discriminant function model. The GSI is based on the length of the fish and its gonad weight (McQuinn 1989). Once the maturity stage is determined by GSI, the spawning component is assigned by using a maturity schedule decision rule (a table cross-referencing maturity stage assigned by GSI and the date of capture to assign a spawning component) (Cleary et al. 1982).

Prior to this framework, the selection of samples used in the catch-at-age calculation was based on annual criteria and expert judgement by the DFO biologist in charge of the Herring program. Here, we implemented a decision rule that selects samples to characterize the annual fishery catch used for the catch-at-age calculation. The decision rule established a hierarchical matching process to identify relevant length frequency and biological samples based on specific criteria. The decision rule first attempts to find exact matches using the most specific conditions (year, region, season, gear, and fishery). If no match is found, it progressively relaxes the conditions by removing constraints in a stepwise manner. If no match can be found within the same year, the search is expanded to include samples from the previous and following years, following the same stepwise relaxation of criteria. For fisheries not operating in the North, Middle or South regions (Edge and Winter mobile fisheries), the region level is not used.

$$S_c = \begin{cases} 1 = \text{year} + \text{season} + \text{region} + \text{gear} + \text{fishery}, & \text{if match found, else} \downarrow \\ 2 = \text{year} + \text{season} + \text{region} + \text{gear}, & \text{if match found, else} \downarrow \\ 3 = \text{year} + \text{season} + \text{gear}, & \text{if match found, else} \downarrow \\ 4 = \text{year} + \text{season}, & \text{if match found, else} \downarrow \\ 5 = \text{adjacent years} + \text{season} + \text{region} + \text{gear} + \text{fishery}, & \text{if match found, else} \downarrow \\ 6 = \text{adjacent years} + \text{season} + \text{region} + \text{gear}, & \text{if match found, else} \downarrow \\ 7 = \text{adjacent years} + \text{season} + \text{gear}, & \text{if match found, else} \downarrow \\ 8 = \text{adjacent years} + \text{season}, & \text{if match found, else} \downarrow \\ 9 = \text{adjacent years (+/- 2)} + \text{season}, & \text{if match found, else} \downarrow \\ 10 = \text{adjacent years}, & \end{cases}$$

For each fishery-year, after each criterion was evaluated, the number of sampled fish matching the criteria was added to the cumulative total and recorded. The loop continued until the minimum required total number of fish was reached: 125 fish for biological data and 500 fish for length-frequency data. If the first criterion evaluation resulted in more fish than required, all selected fish were kept. For subsequent criteria, if the number of available fish exceeded the remaining number needed, individuals were randomly selected among available fish. The number of fish retained from each available sample was proportional to the sample size. Finally, the criterion levels used for each catch component was recorded and summarized by fishery.

The following calculations were performed for each fishery and year combination. First, a Gompertz growth model was fit to weight and age data from the selected samples. The Gompertz growth function was as follows:

$$W_t = W_0\left[e^{G(1-e^{-}kt)}\right]$$

where W_t is weight at year t and W_0, G and k are model parameters. Weight was predicted over ages 0 to 15 to obtain a stratum-specific weight-at-age matrix. Age-length keys were derived for fish of ages between 0 and 15 and lengths between 10 and 45 cm, using ages and lengths that appeared more than once in the selected samples. The length frequencies of selected samples were then scaled by the proportion of fall spawners in each 0.5 cm length bin from the biological samples. Using annual length-weight relationships, the total weight of the sampled fish was calculated (sample weight). The sampling ratio was calculated as the sample weight divided by the landings weight. The length frequencies were scaled to the landings by multiplying them by the sampling ratio. Lastly, the age-length key was applied the scaled length frequency to obtain the numbers-at-age in the catch. The fall spawners landings were then calculated as the product of the numbers-at-age and the weight-at-age.

Here, the catches from the Edge and Winter fisheries were combined to generate a single data set of total landings, proportions at age and weight at age. This catch data is referred to as the Overwinter fishery. These catches consist of an unknown mix of spawners from each region and are all from mobile gear catches. The biological and length frequency characteristics from the two sources of catch were deemed to be similar enough to be combined in one catch-at-age (see Appendix 1 or distinct matrices).

RESULTS

Detailed differences in catch and weight at age results between the method used in former assessment and the current method are presented in Appendix 2. The following section describes the results of the current method.

Sample selection

Across fixed-gear fisheries and years, biological samples meeting the highest quality criteria were generally available to characterize the catch. Exceptions occurred in 1978 for the Middle and South fixed-gear fisheries, where level-3 samples were used, and in a few early years of the time series where level-4 samples were required (Figure 2). The Fixed North fishery consistently had the highest-quality biological data across all years.

For the inshore mobile fisheries, the Inshore North fleet had high-quality data, with all years except 2022 meeting the top criterion (Figure 2). Inshore Middle and Inshore South showed greater variation, with samples spanning criteria 1, 3, and 4. The Overwinter fishery also had largely good-quality samples, with many years at criterion 1 and a few level-3 samples in the late 1980s and early 1990s. Only two years relied on level-4 samples.

The number of fish sampled for the catch-at-age was highest early in the time series, particularly for the Fixed North and Fixed South fisheries (Figure 3). Inshore North and the Overwinter fishery also had many years with large sample sizes.

The length frequency sample selection showed highly similar results to the biological sample selection (Figure 4). Years where criteria lower than 1 were used for length frequency samples selection were also years where criteria lower than 1 were used for biological samples selection. However a few years of length frequency sample selection used better criteria than the biological sample selection, as more length frequency samples are available than biological samples.

The detailed biological and length frequency samples selection algorithm results are available in Appendix 3.

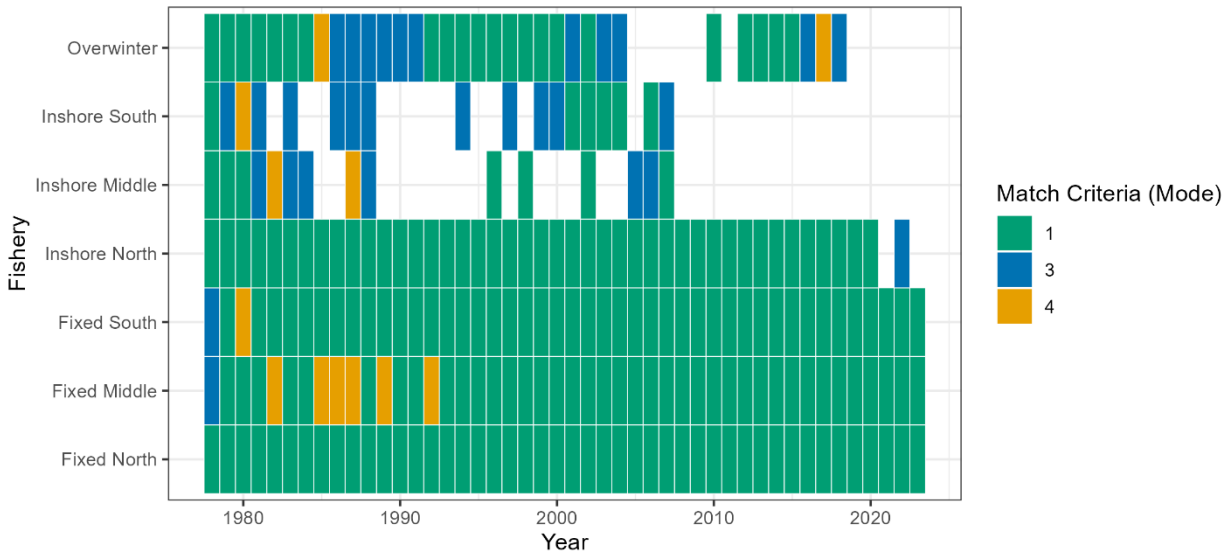


Figure 2: Biological sample selection modal criteria used by fishery and years for the catch at age.

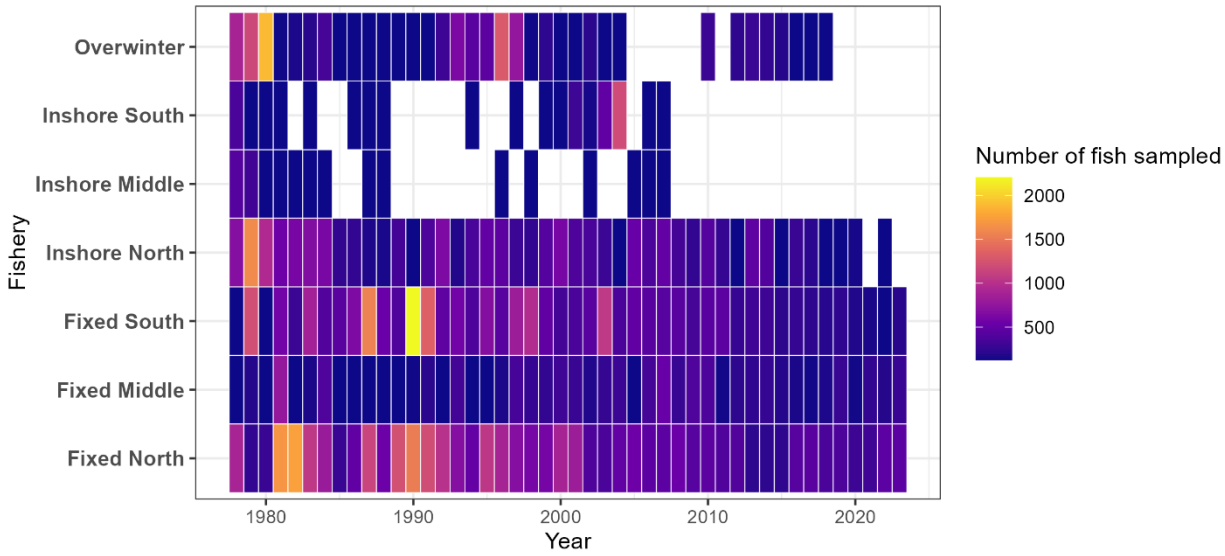


Figure 3: Number of sampled fish used in the biological sample selection modal criteria used by fishery and years for the catch at age.

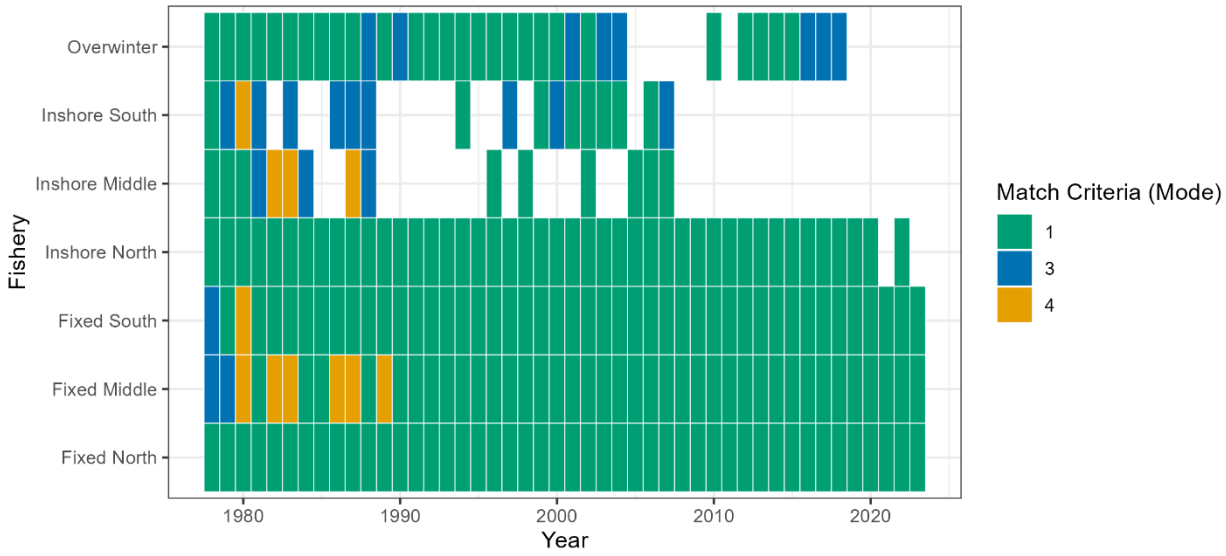


Figure 4: Length frequency sample selection modal criteria used by fishery and years for the catch at age.

Mobile gear fisheries

Overwinter fishery from Edge and Winter catches

The Edge fishery catches consists of mobile gear catches in the spring season (April to June), from seiners fishing on the slope of the Laurentian Channel, northeast of the Magdalen Islands and down to the deep waters of the Cape Breton Through (Figure 5). The Edge fishery occurred in most years between 1978 and 2018. Catches consisted of 83% fall spawners across all years where samples were available. The gonads of sampled fall spawners from this fishery were predominantly in the resting or in mid-maturation stages.

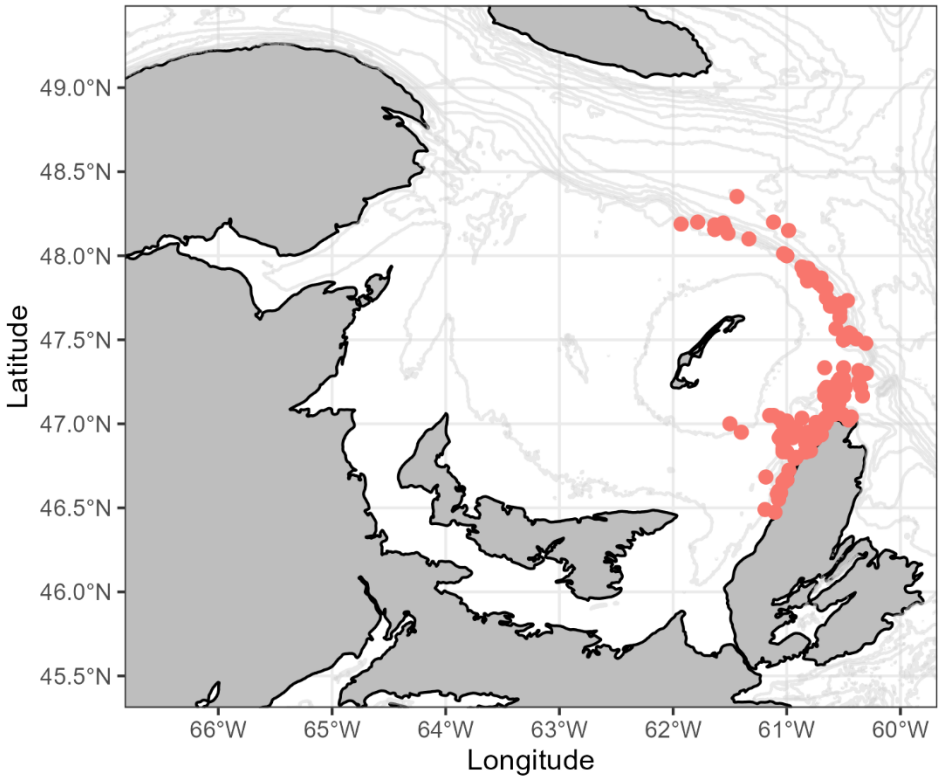


Figure 5: Location of fall spawning Atlantic Herring mobile gear catches in the Edge fishery between 1978 and 2023 for catches where biological samples were obtained (red points), contour lines are 50 meters increment in bathymetry.

The Winter fishery catches consists of mobile gear catches occurring in the NAFO Division 4Vn in late fall and winter seasons (Figure 6). The Winter fishery occurred in most years between 1978 and 1998. The Winter fishery catches were 83% fall spawners across all years were samples were available. The gonads of sampled fall spawners from this fishery were predominantly in the recovering maturity stage.

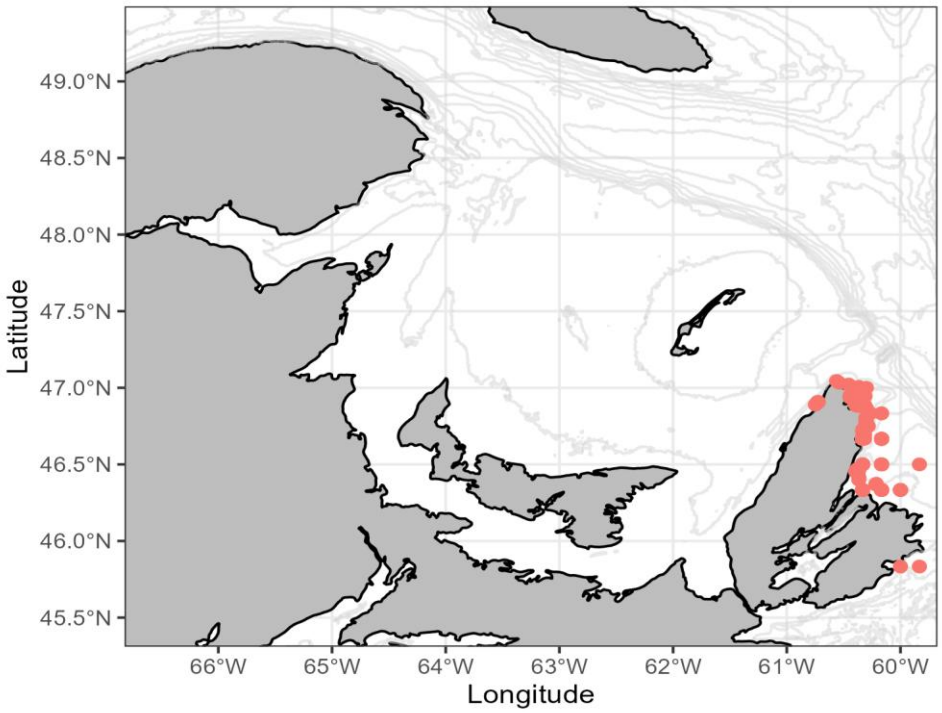


Figure 6: Locations of fall spawning Atlantic Herring mobile gear catches in the Winter fishery between 1978 and 2023 for catches where biological samples were obtained (red points), contour lines are 50 meters increment in bathymetry.

The Edge and Winter catch-at-age matrices were combined (in proportion to annual landings) to generate the Overwinter fishery catch-at-age (Figure 7). Catch-at-age in the Overwinter fishery showed important catches of ages 2 to 5 from 1978 to the late-1980s and associated catches of older fish following these cohorts in subsequent years (Figure 7 and 8). Proportions-at-age in years 2010 and later were higher for fish age 6 and older (Figure 8). Weight-at-age increased between 1978 and the late-1980s before generally decreasing until the mid-2010s. Between 2015 and 2018, weight-at-age has mostly remained stable for younger fish and increased slightly for older fish (Figure 9). The disaggregated catch and weight at age results for the Edge and Winter fisheries are available in Appendix 1.

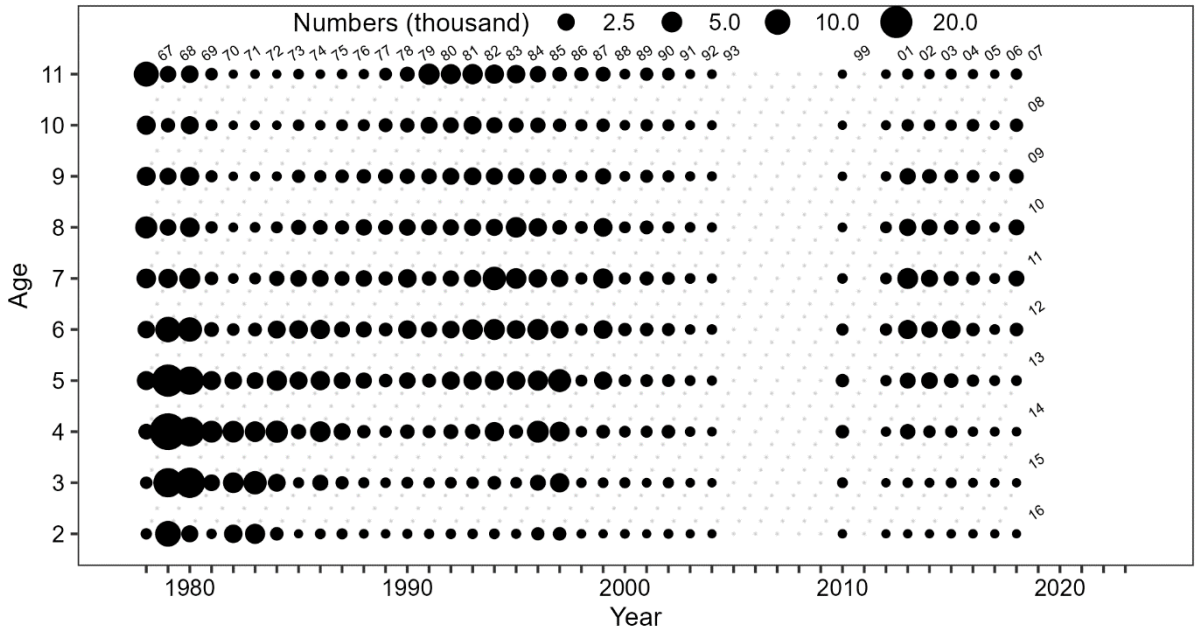


Figure 7: Overwinter fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2024.

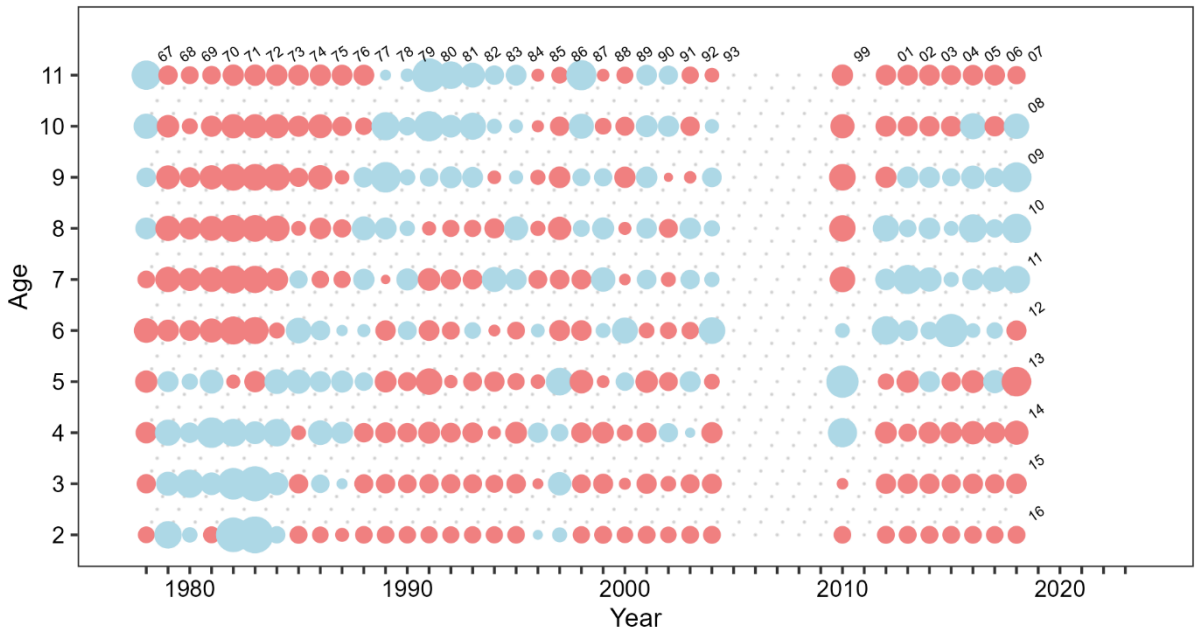


Figure 8: Overwinter fishery standardized proportions at age of fall spawning Atlantic Herring between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

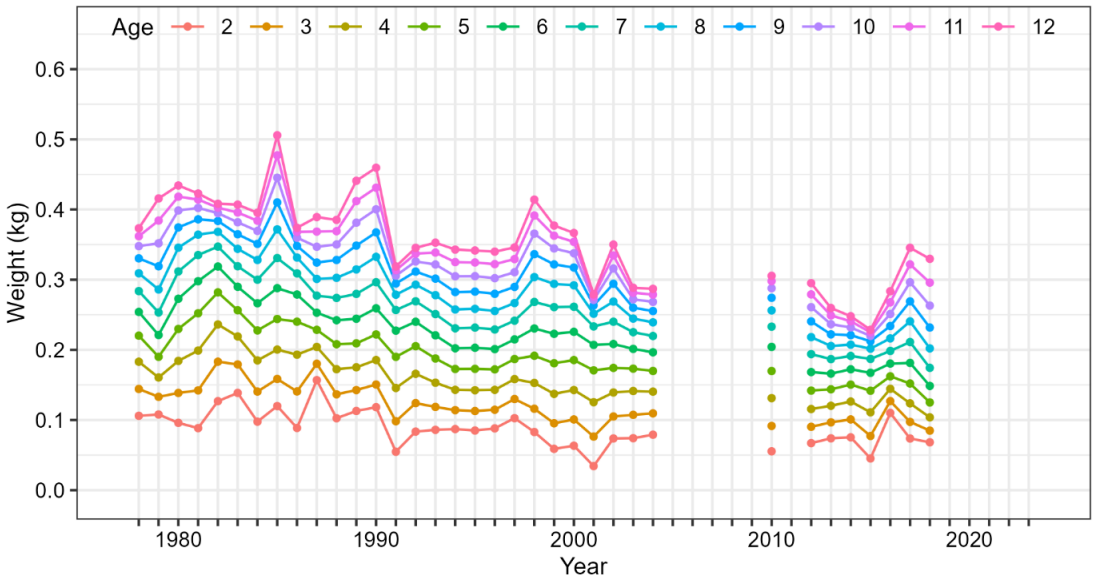


Figure 9: Overwinter fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Inshore Mobile fisheries

The Inshore mobile fishery consists of mobile gear catches in the fall to early winter season (July to December), from seiners fishing in shallower, inshore waters of the sGSL (Figure 10). Over all regions and years, the fall spawners represented 64% of the inshore mobile fishery catch.

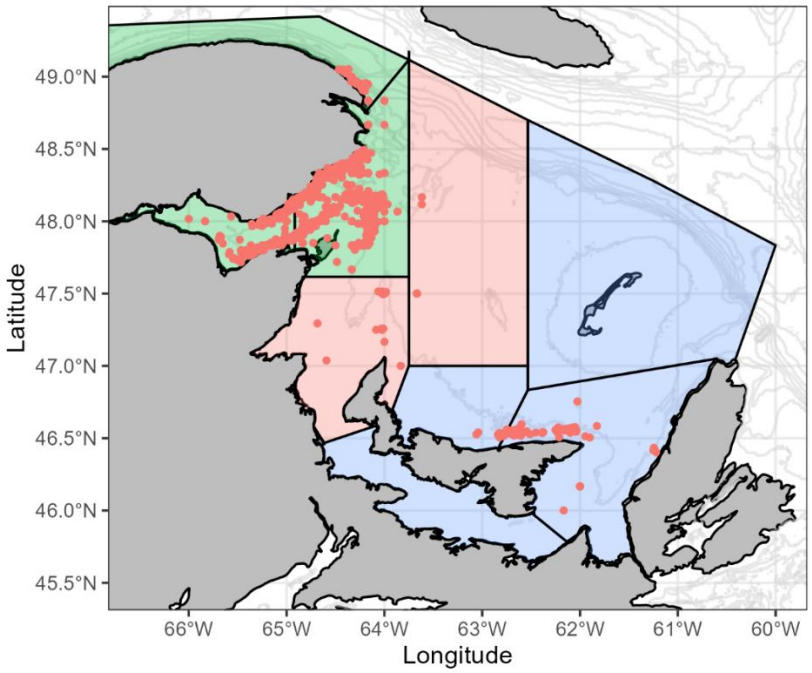


Figure 10: Location of Inshore mobile gear fishery catches of fall spawning Atlantic Herring between 1978 and 2023 for catches where biological samples were obtained (red points), contour lines are 50 meters increment in bathymetry. Colored polygons are assessment regions North (green), Middle (red) and South (blue).

Inshore Mobile North fishery

Inshore mobile catches in the North region occurred primarily from 1978 and 2020, and in 2022. This fishery catch was 63% fall spawners across all years where samples were available. The fall spawners caught in the fishery were predominantly in post-spawning maturity stages (recovering or resting). Numbers-at-age in the catch (Figure 11) show important catches at all ages from 1978 to 1980, ages 5 to 10 dominated catches in years 1986 to 1989, and then catches became increasingly composed of younger fish thereafter. By 2009, catches mostly consisted of fish aged 3 to 6. Catches were overall smaller afterwards and were distributed relatively evenly across ages. Strong cohorts occurred in the late-1970s, late-1980s and early-1990s (Figure 12). However, the 1980s and 1990s cohorts were not well represented in the catch at young ages. From 2000 onwards, cohorts appeared, but their relative proportions rapidly decreased at older ages. From 2010 and onwards, the catch was mostly composed of ages 6+ but without clear cohort signals. Weight-at-age generally declined for all ages between 1978 and the late 2000s, with large variations for older fish (Figure 13). Weight-at-age has since declined slightly across ages.

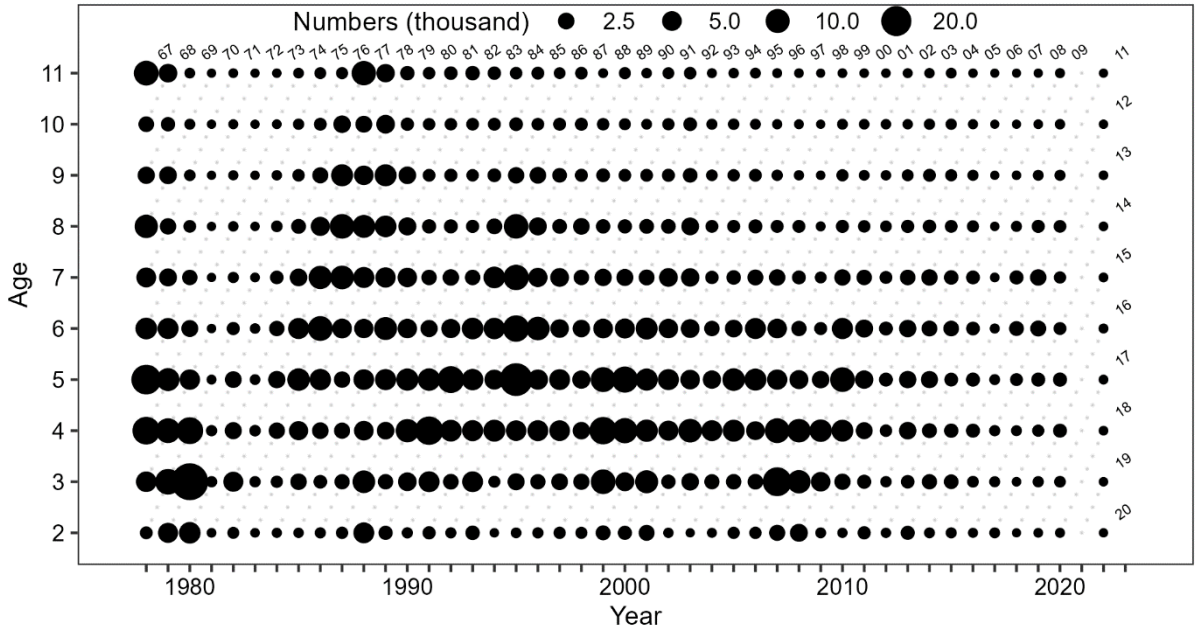


Figure 11: Inshore mobile north fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

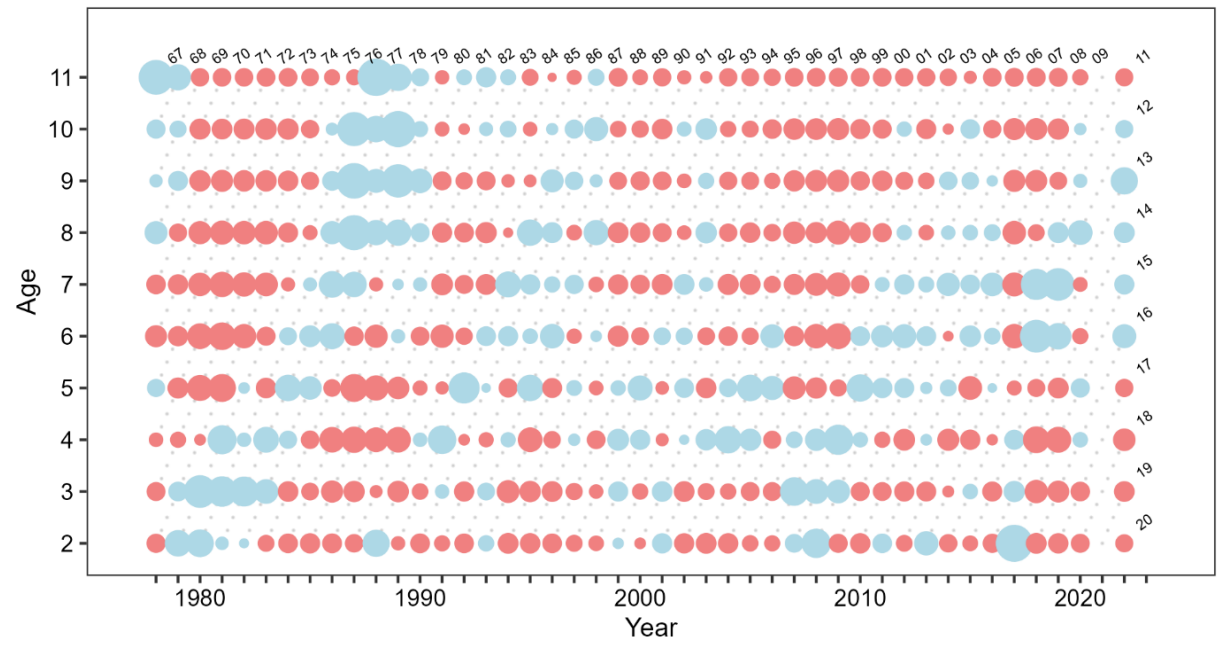


Figure 12: Inshore mobile north fishery standardized proportions at age of fall spawning Atlantic Herring between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

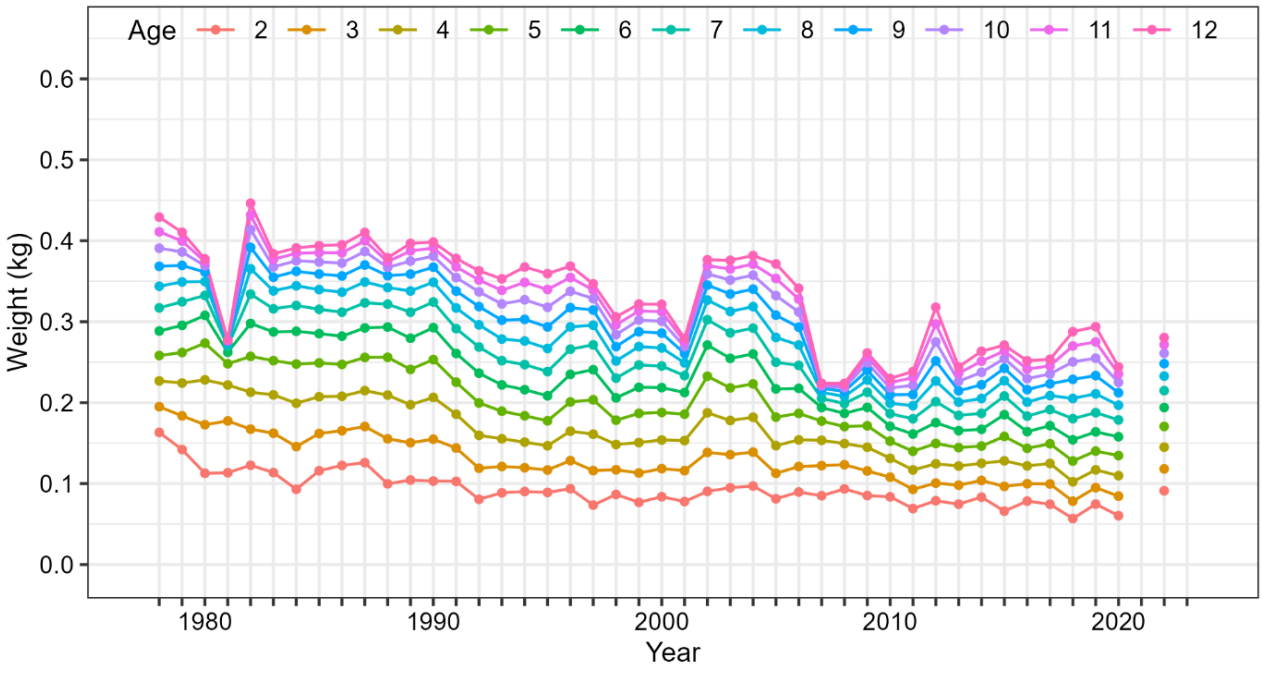


Figure 13: Inshore mobile north fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Inshore mobile Middle fishery

In the Middle region catches in the inshore mobile fishery occurred every year between 1978 and 1984, but only sporadically afterwards. The Inshore mobile middle fishery caught 89% fall spawners across all years where samples were available. The fall spawners caught in the fishery were mostly in the recovering gonad maturity stage. Numbers-at-age in the catch (Figure 14) shows important catches for all ages from 1978 to 1980. From 1983 to 2007, ages 4 to 6 were predominantly caught. Cohorts can be tracked for a few years around 1980 but the sporadic activity of the fishery and small landings makes cohort tracking difficult (Figure 15). Although only a few years of fishery activity occurred, weight-at- age appears to have generally declined for all ages between 1978 and 2007 (Figure 16).

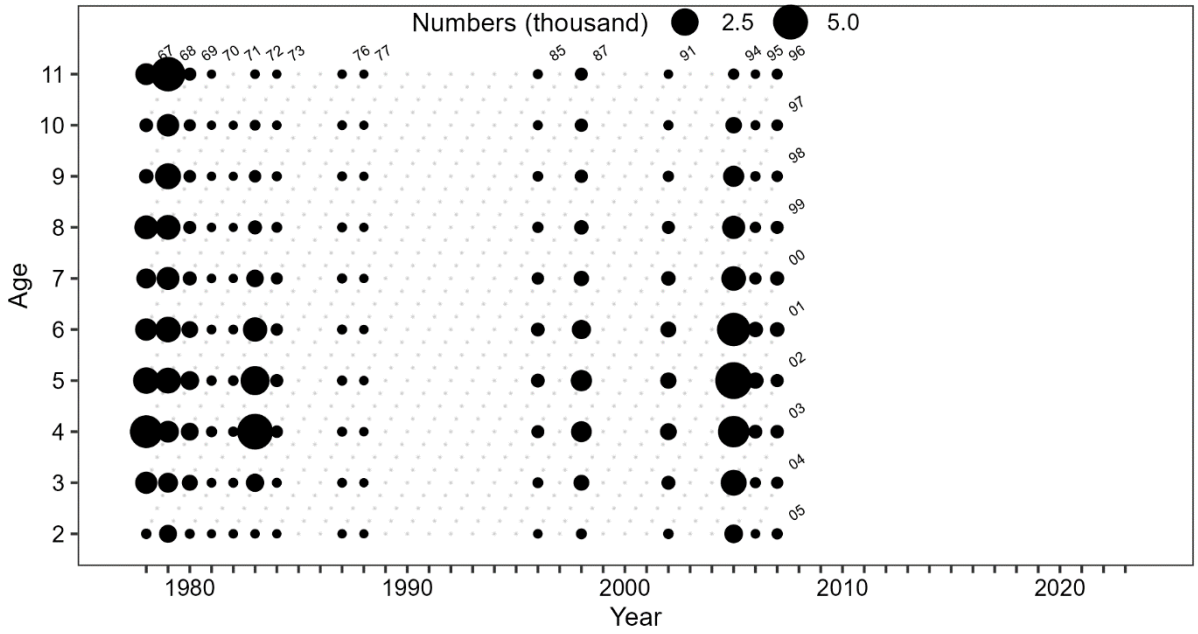


Figure 14: Inshore mobile middle fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

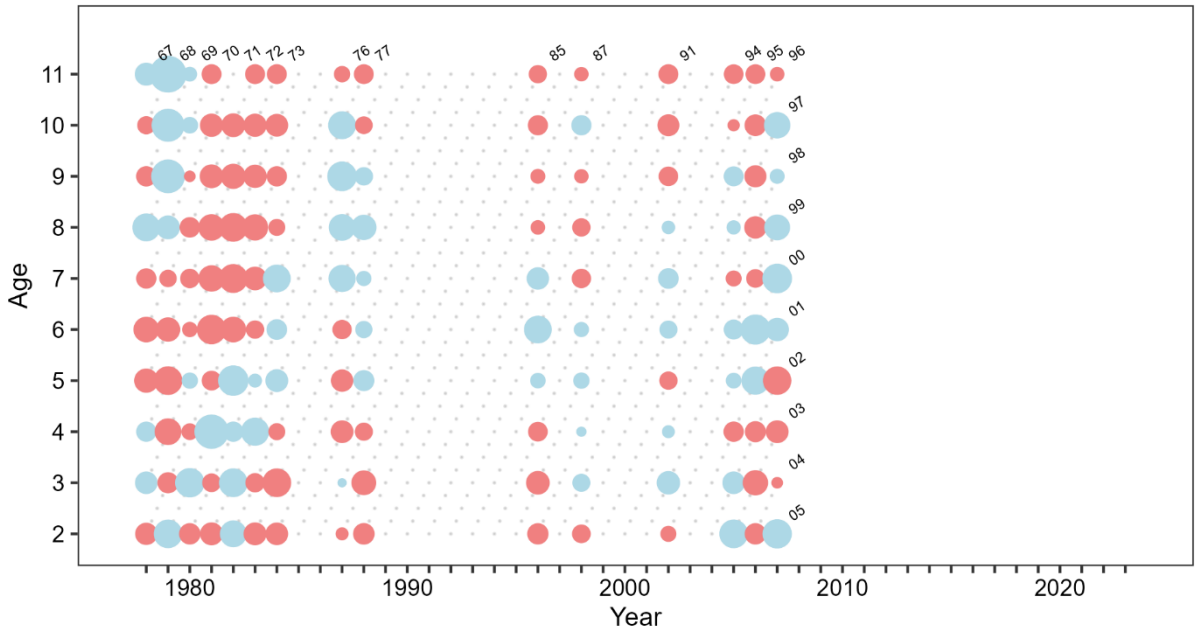


Figure 15: Inshore mobile middle fishery standardized proportions at age of fall spawning Atlantic Herring between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

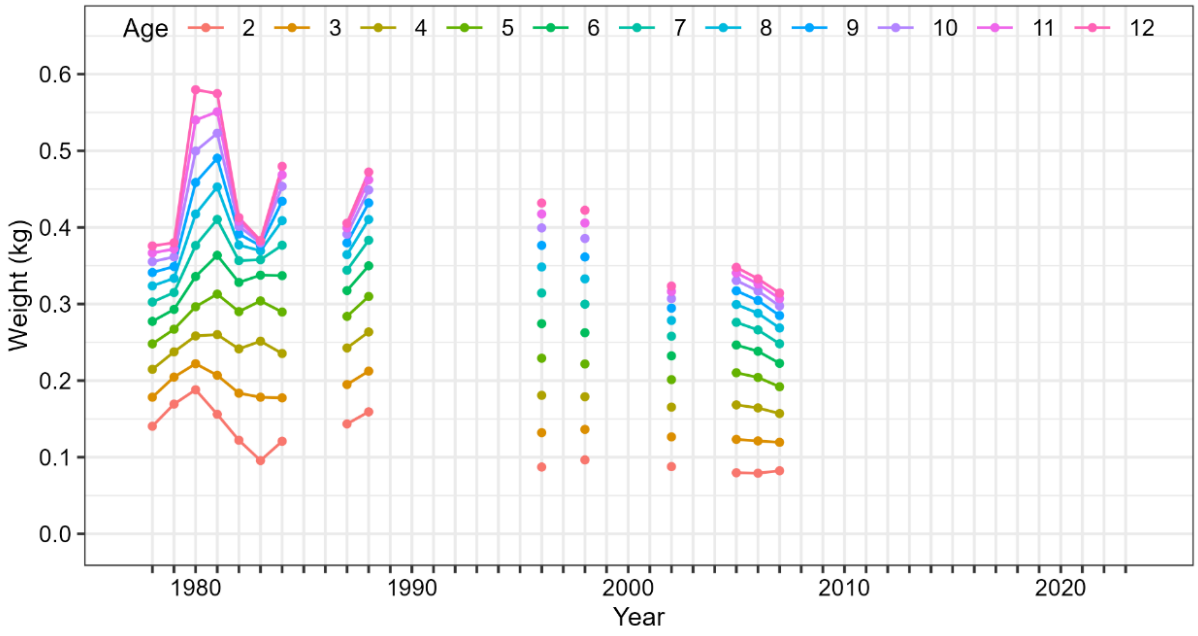


Figure 16: Inshore mobile Middle fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Inshore mobile South fishery

In the South region, catches in the inshore mobile fishery occurred every year between 1978 and 1981, but only sporadically afterwards and did not operate after 2007. The Inshore mobile

south fishery caught 87% fall spawners across all years where samples were available. The fall spawners caught in the fishery were predominantly in the recovering and ripe gonad maturity stage. The numbers-at-age in the catch showed important catches at ages 3 and 4 in 1978, ages 4 and 5 in 1981, and evenly across all ages from 1999 to 2007 (Figure 17). Strong cohorts occurred in the late-1970s and can be tracked through the years where data is available. The cohorts of the early-1980s and those of the late-1990s are difficult to track due to sporadic fishing activity (Figure 18). Weight-at-age increased across all ages from 1978 to 1981, generally declined until the late 2000s, and remained mostly stable since (Figure 19).

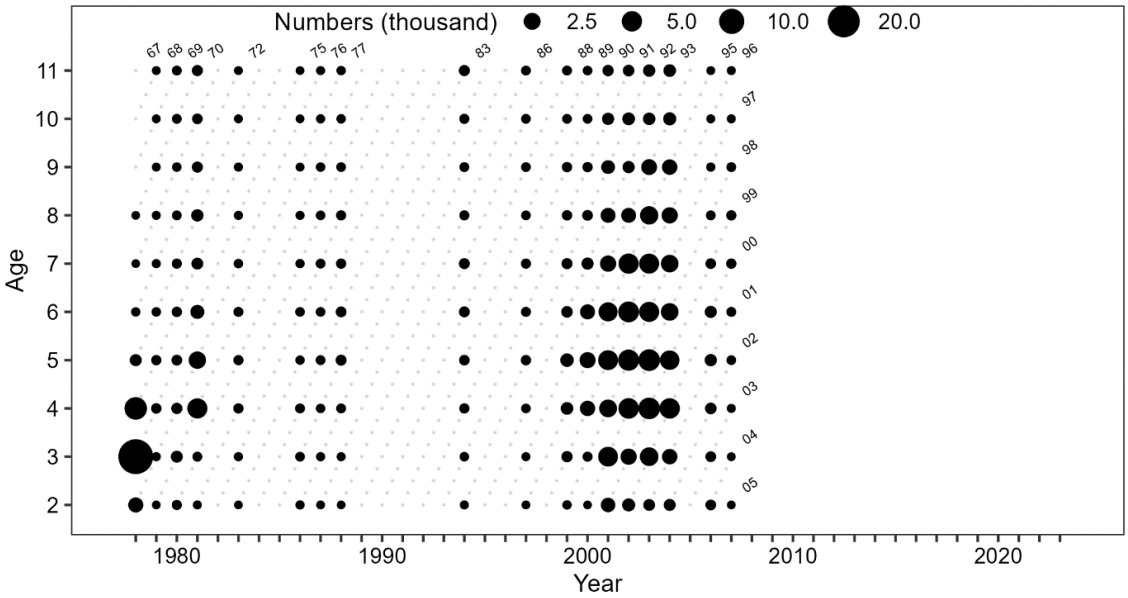


Figure 17: Inshore mobile South fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

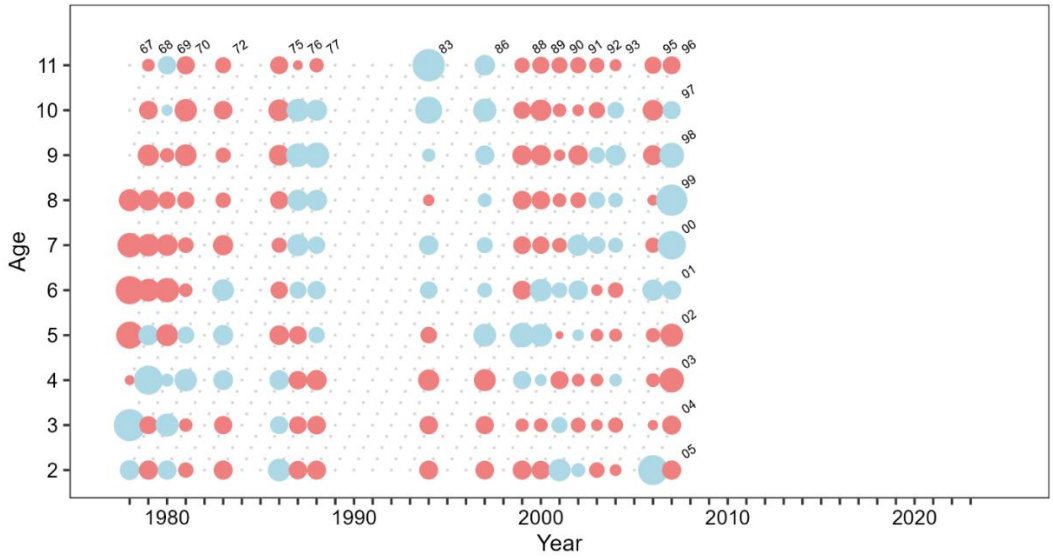


Figure 18: Standardized proportions at age of fall spawning Atlantic Herring in the Inshore mobile South fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

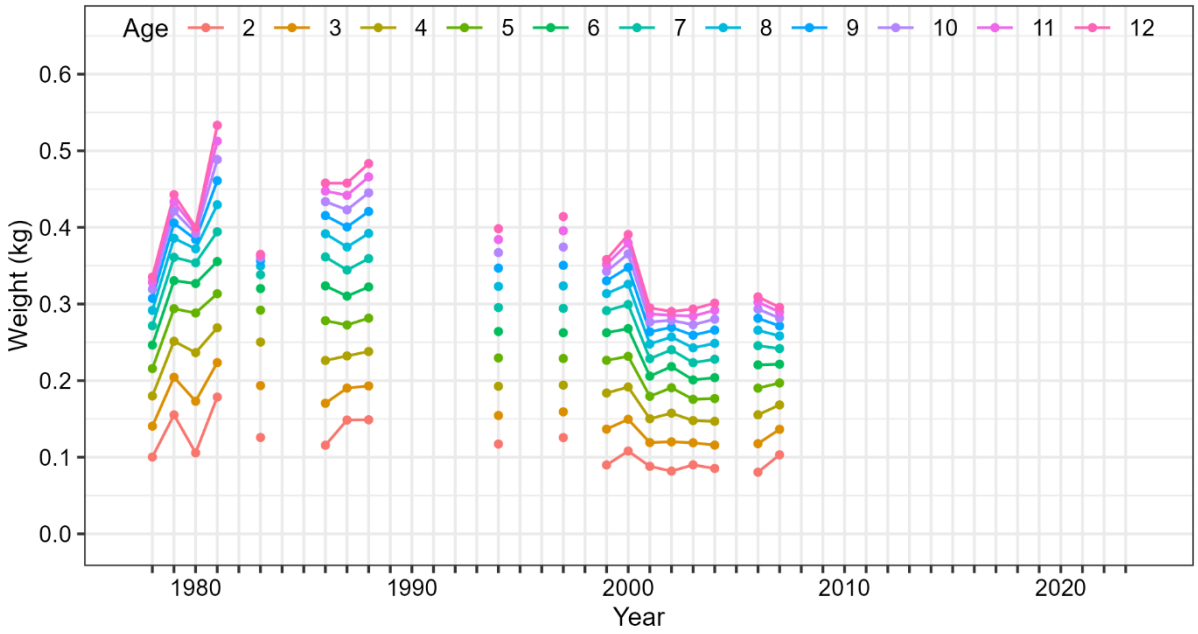


Figure 19: Inshore mobile South fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Fixed gear fisheries

Fixed North

The Fixed north fishery caught 98% fall spawners across all years where samples were available. These fish were predominantly in the ripe stage of gonadal maturation. The numbers-at-age in the catch showed important catches of ages 4 to 8 over most years. From 2010 and onwards, that catch was mostly of ages 6+ (Figure 20). Strong cohorts occurred in the late-1970s to late-1980s which could be tracked in the catch to older ages (Figure 21). However, cohorts form the 1990s to mid-2000 were not well represented in the catch at young ages nor older ages. From 2004 onwards, cohorts appeared at ages 4 to 7. From 2015 and onwards, cohorts to remained represented at older ages. Weight-at-age was mostly stable from 1978 to 1988, then declined slowly until 2013 for all ages. Since 2013, weight-at-age has slightly increased for younger ages while simultaneously decreasing slightly for older ages (Figure 22).

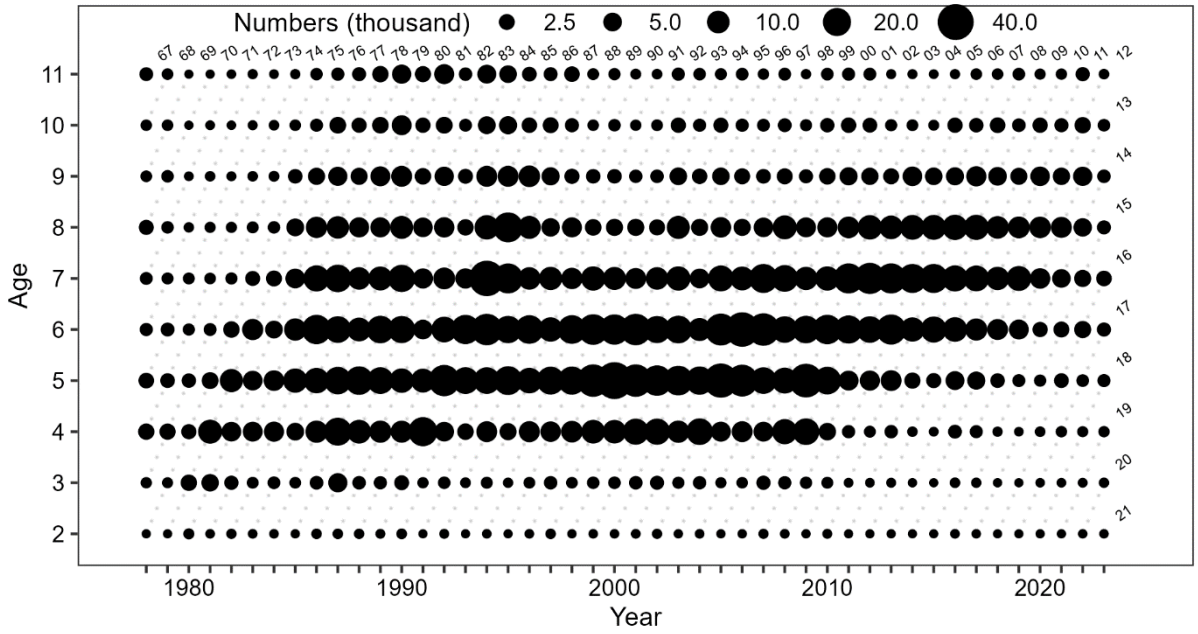


Figure 20: Fixed North fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

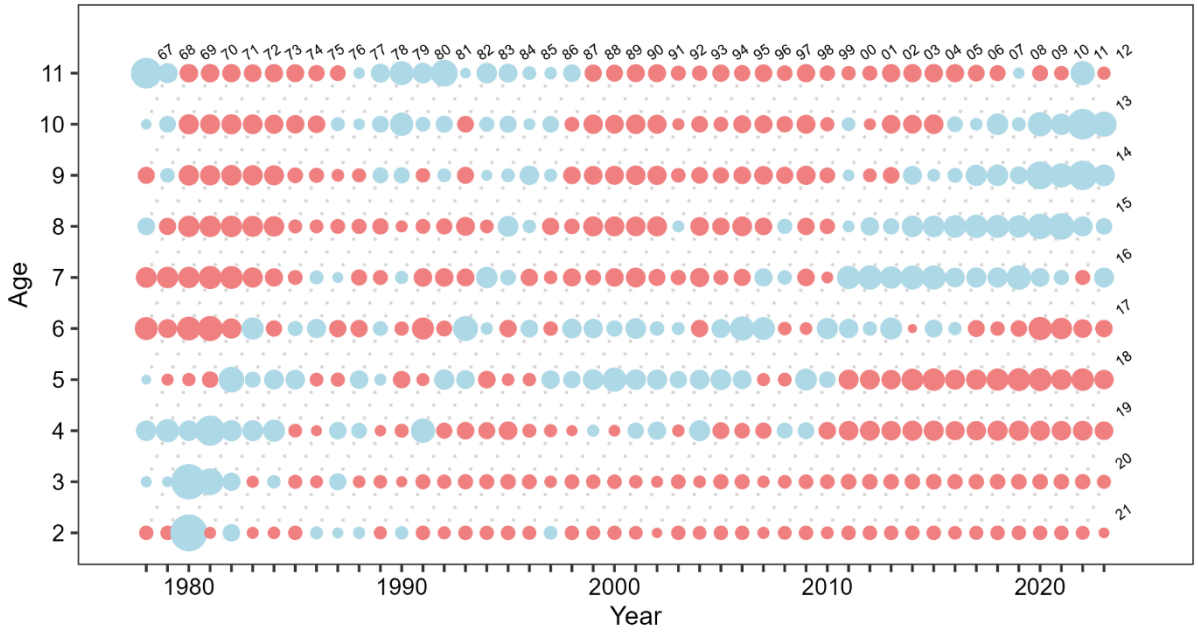


Figure 21: Standardized proportions at age of fall spawning Atlantic Herring in the Fixed North fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

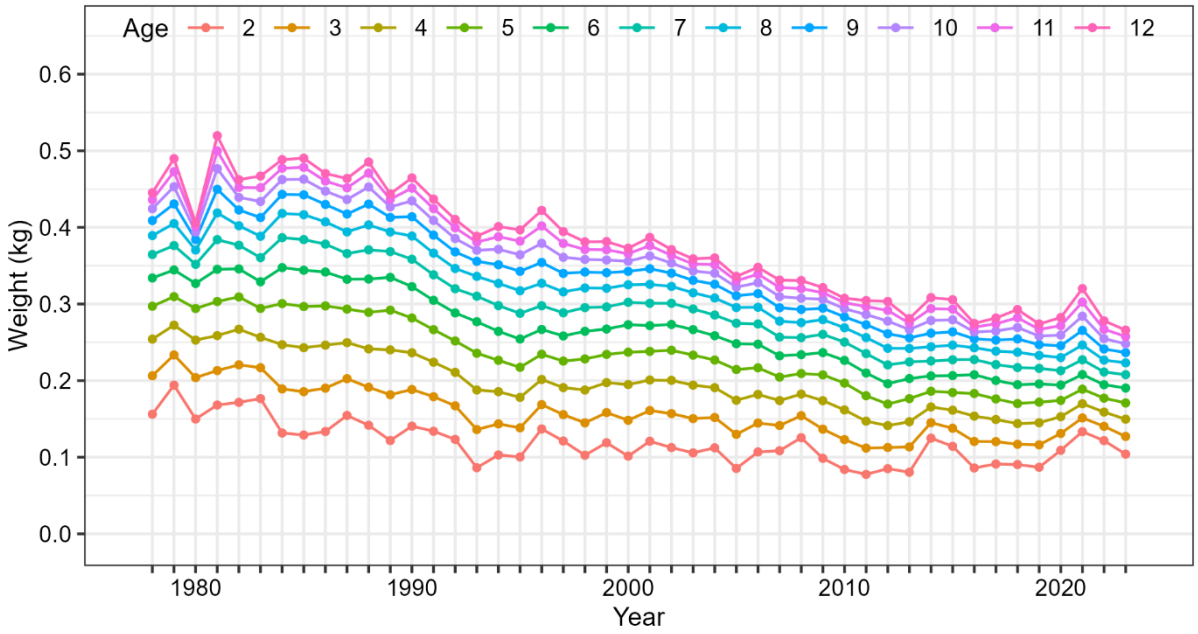


Figure 22: Fixed North fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Fixed Middle

The Fixed middle fishery caught 99% fall spawners across all years when samples were available. These fish were predominantly in the ripe stage of gonadal maturation. The numbers-at-age in the catch show important catches at ages 3 and 4 in 1980 and 1981. Larger catches occurred between 1990 and 2018 for ages 4 to 8. After 2010, catches were mostly of ages 6+ (Figure 23). Strong cohorts occurred from 1977 to 1980 and from 1985 to 1990, which can be tracked through time. Cohorts from 2006 to 2011 appear at ages 2 to 6 and remained at older ages. Since 2011, cohorts have not been well represented at young ages in the catch (Figure 24). Weight-at-ages 4 to 12 increased from 1978 to 1981, then decreased slowly until 2010 and remained stable afterward. For the younger ages, weight-at-age decreased slightly until 2010 and has remained stable since.

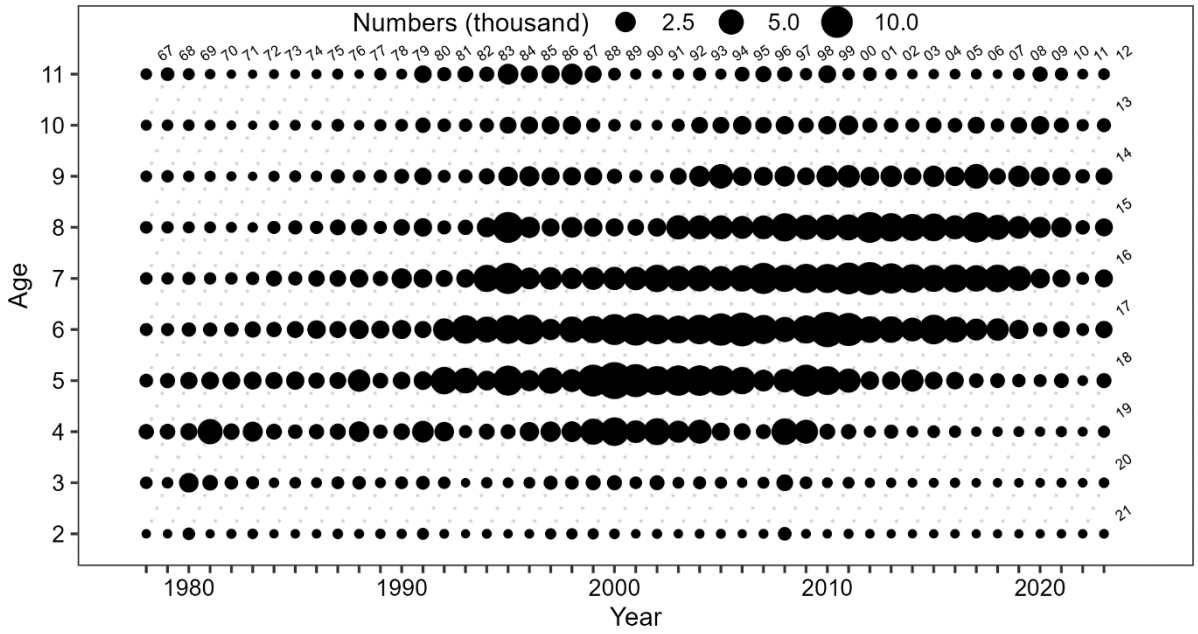


Figure 23: Fixed Middle fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

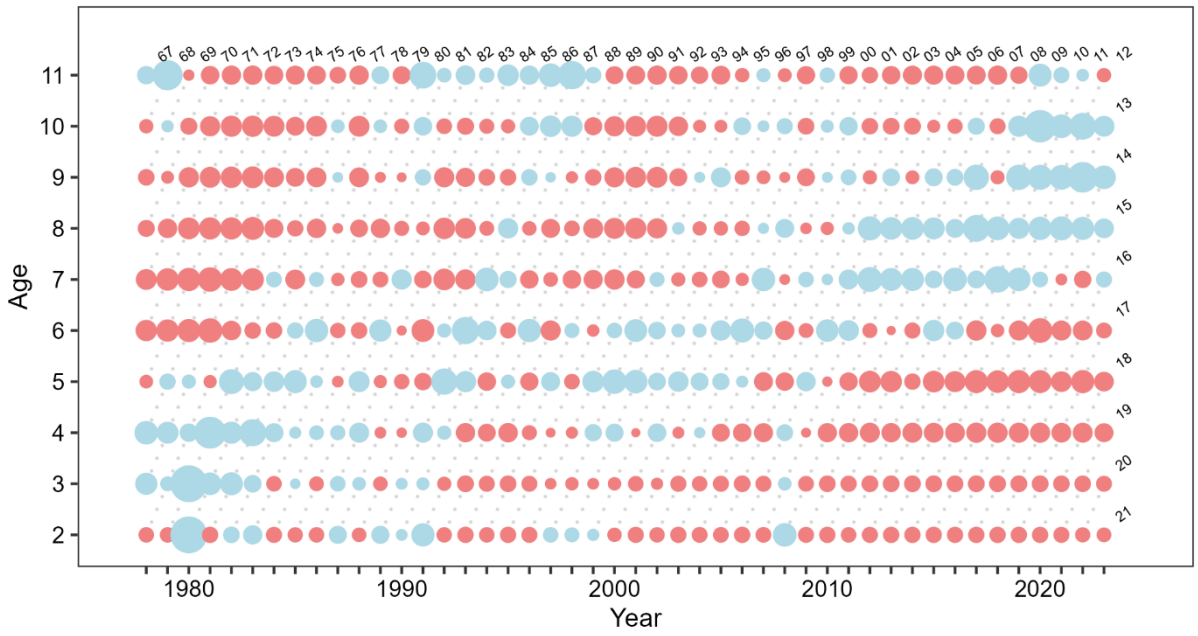


Figure 24: Standardized proportions at age of fall spawning Atlantic Herring in the Fixed Middle fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

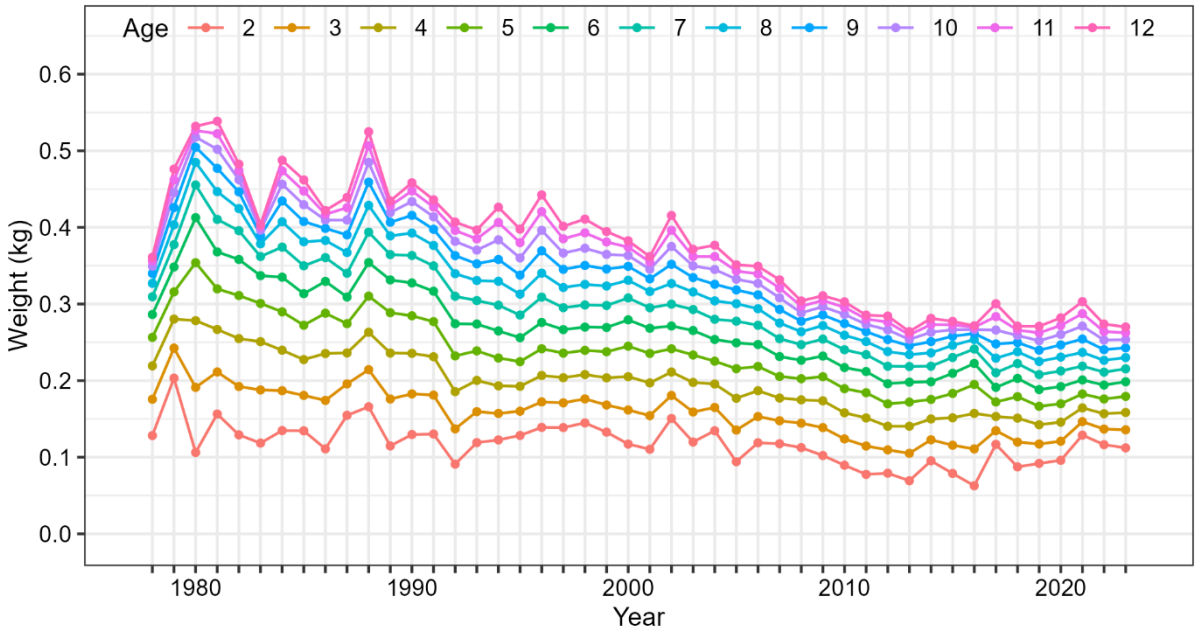


Figure 25: Fixed Middle fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Fixed South

The Fixed south fishery caught 99% fall spawners across all years when samples were available. These fish were predominantly in the ripe stage of gonadal maturation. The numbers-at-age in the catch showed important catches at ages 3 to 4 in 1978 to 1980. Larger catches then occurred at ages 4 to 8 between 1981 and 2010. From 2010 and onwards, catches were mostly of fish ages 6+ (Figure 26). Strong cohorts occurred from 1976 to 1986, and were still highly represented in the population at ages 11+. Between 1986 and 2012, cohorts appeared at age 5 and persist into older ages. Since then, younger cohorts have not been well represented in the catch (Figure 27). Weight-at-age increased at all ages from 1978 to 1981, then decreased gradually until 2018 and have since remained stable (Figure 28).

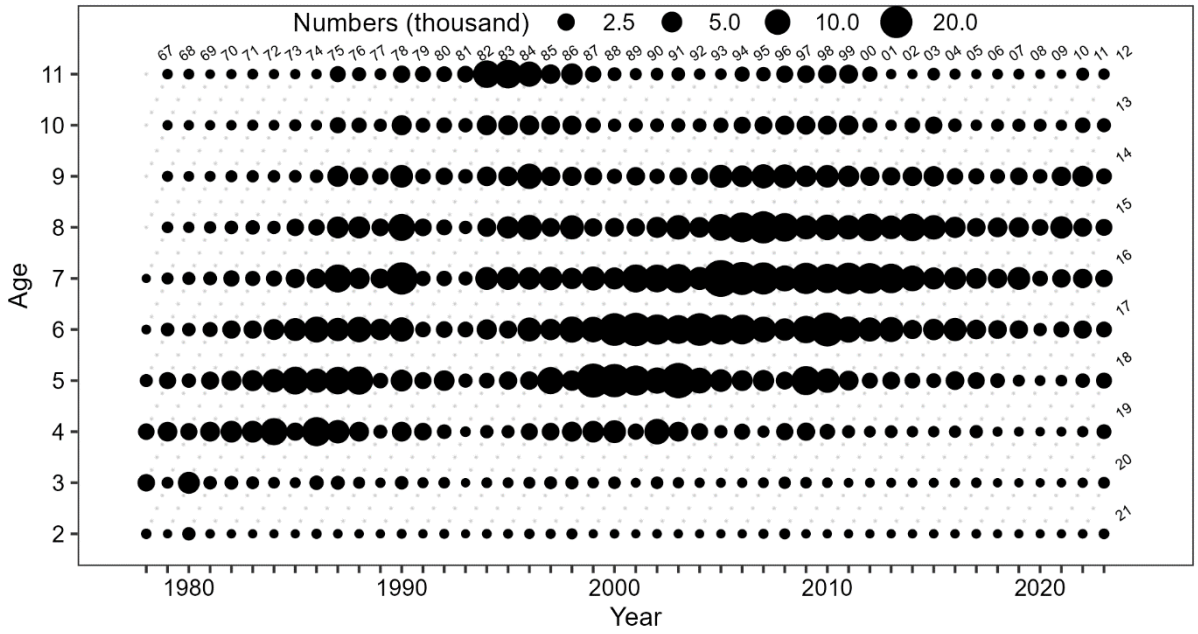


Figure 26: Fixed South fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

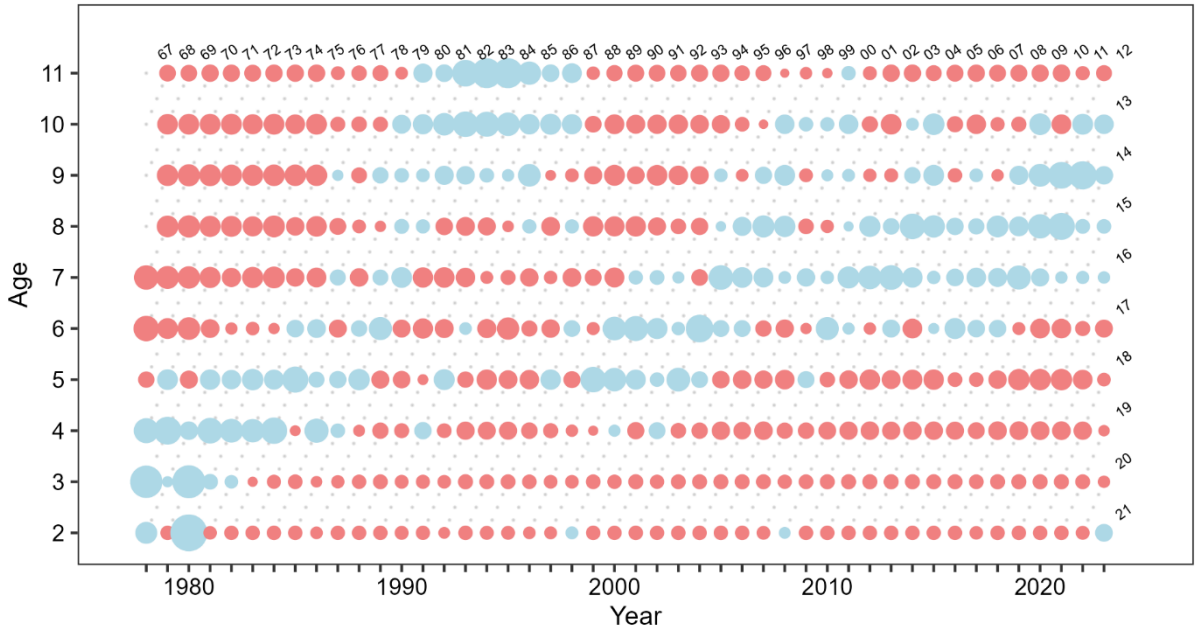


Figure 27: Standardized proportions at age of fall spawning Atlantic Herring in the Fixed South fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

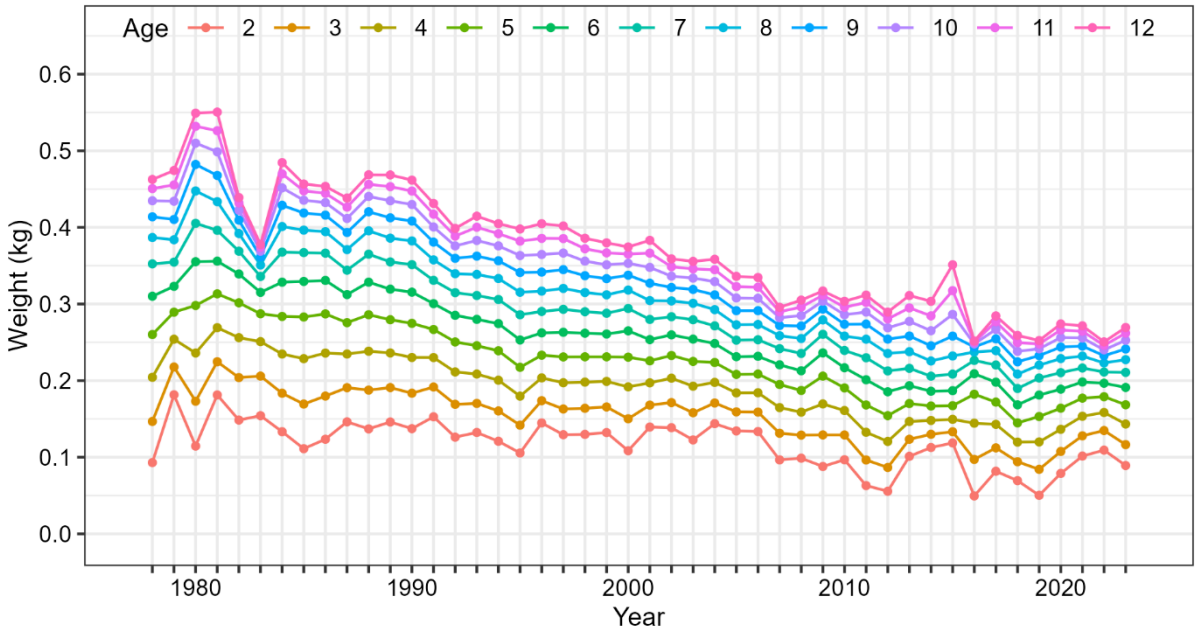


Figure 28: Fixed South fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

Landings

Fall spawning Atlantic herring landings were around 50,000 t annually between 1978 and 1980 (Figure 29). Landings decreased to 20,000 t in 1981 and gradually increased to over 60,000 t in the late-1980s. Landings then fluctuated at high levels until they gradually declined between 2005 (67,627 t) and 2023 (6,486 t). Estimated landings of fall herring from the Mobile gear fisheries between 1978 and 1980 were higher than in previous assessments. This is likely the result of a combination of methodological changes between former and present catch at age calculations, attribution of catch to spring versus fall spawners, and scarcity of samples to characterize these large catches. Post 1980, the trends and scale in fall herring landings are very similar to previous assessments. Mobile gear landings were proportionally more important in 1978 to 1980, whereas Fixed gear landings dominated the annual landings in all subsequent years until 2023 (Figure 30).

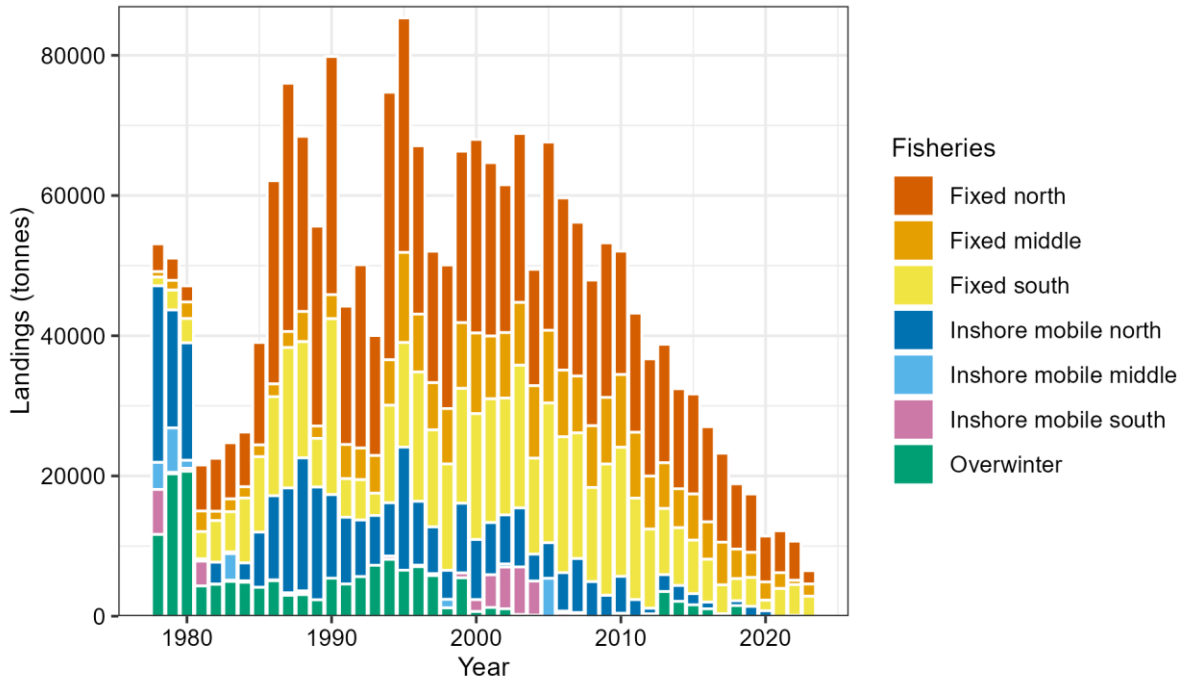


Figure 29: Annual landings by fishery, region, and gear type.

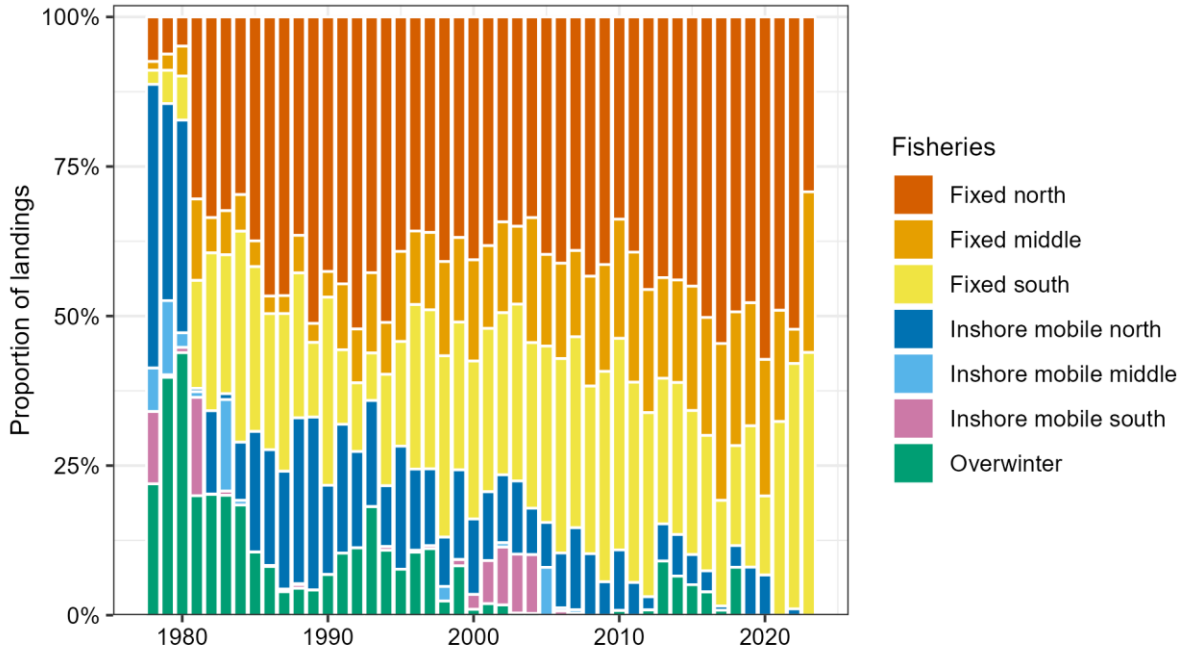


Figure 30: Annual proportion of landings by fishery, region, and gear type.

CPUE

Catch-per-unit-effort (CPUE) is widely used as an index of relative fish abundance, but its reliability depends on accounting for numerous factors that influence catch rates beyond stock size, such as variation in fishing effort, gear characteristics, fisher behaviour (Walters 2003; Carruthers et al. 2011; Wilberg et al. 2010; Feenstra et al. 2019.

In schooling species like herring, CPUE can be particularly prone to bias due to hyperstability, where catch rates remain high despite declining abundance or hyperdepletion, where catch rates fall even if overall abundance is stable (Carruthers et al. 2011; Hoyle et al. 2024). Standardization methods aim to correct these biases, but the fall herring fishery lacks the detailed spatial and effort data required for robust modeling (Landry et al. 2022). These challenges prompted a comprehensive review of the CPUE index to evaluate its suitability for use in the assessment (Maynard et al. 2026).

This review revealed that the CPUE index is highly sensitive to the choice of input data and model configuration, resulting in considerable uncertainty and a lack of confidence in its reliability. Consequently, the CPUE index should not be used the population models.

RESEARCH VESSEL SURVEY

METHODS

DFO conducts a multispecies bottom-trawl research vessel survey (RV survey) in the sGSL. The survey has been conducted in the fall (each September) since 1971 (for details see Hurlbut and Clay 1990 and Chadwick et al. 2007). This survey uses a stratified random design, with stratification based on depth and geographic region (Figure 31). Total catch weights and numbers, a representative length frequency, and representative individual length-weight data have been recorded for each fish species in each survey set since 1971. Since 1994, additional sampling of herring catches has been undertaken to disaggregate catches by spawning component (spring or fall) and age.

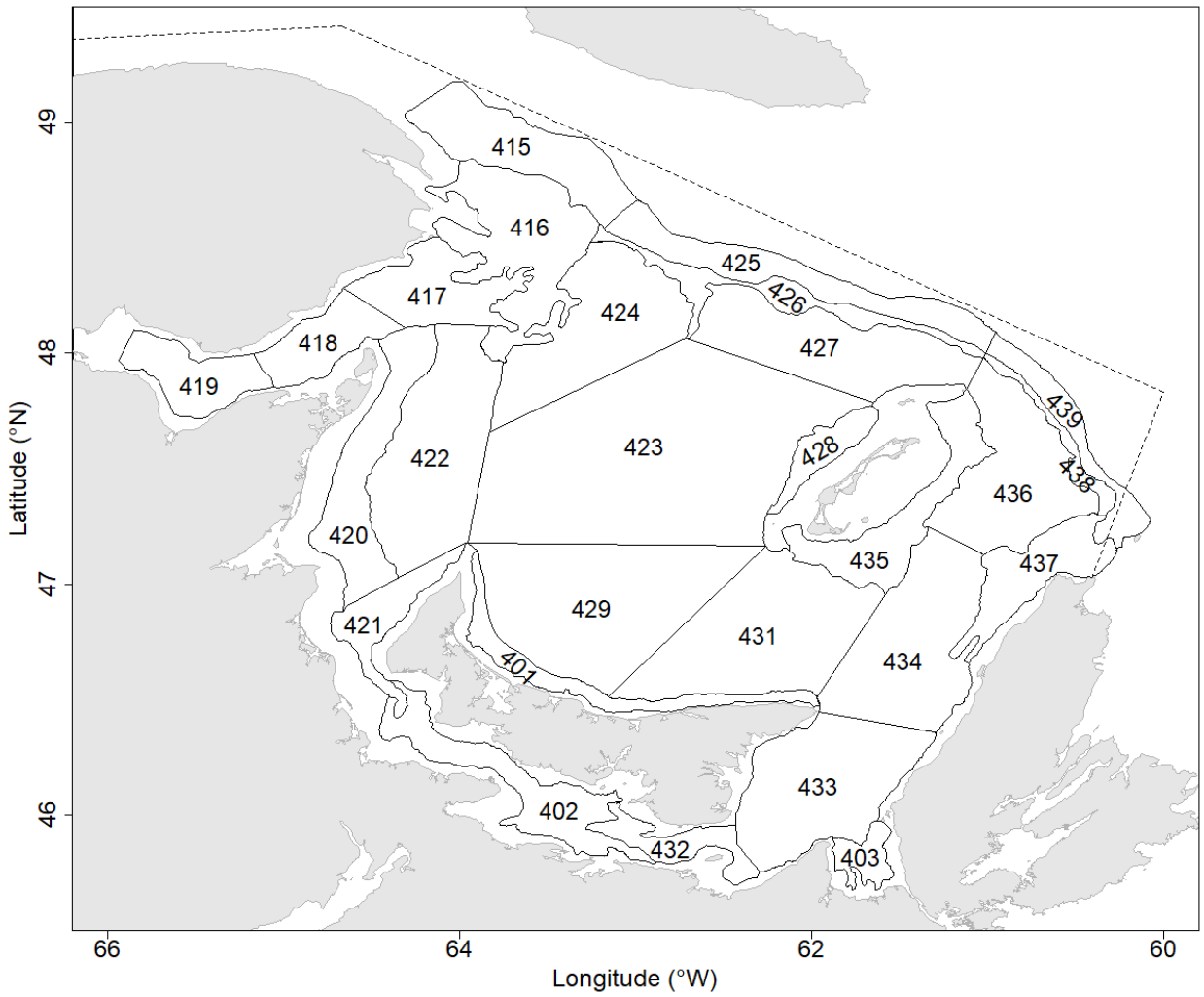


Figure 31: Stratification scheme used for the August sentinel and September research surveys of the southern Gulf of St. Lawrence.

A number of vessels and gear changes have occurred over the timespan of the survey (Figure 32). A selection of correction factors for vessel and gear changes were applied as follows. Herring length based correction factors were not recommended from the results of any comparative fishing experiment (Benoît and Swain 2003a; Benoît 2006; Benoît and Yin 2023), and were not applied here. The Hammond and Needler fishing vessels did not differ significantly in relative fishing efficiency for herring (Benoît and Swain 2003a). The Needler, Hammond and E.E. Prince catches were divided by 1.52 to get Teleost equivalents (Benoît 2006). Only weak vessel effects were found between the Teleost and Cartier (Ricard et al. 2023; Benoît and Yin 2023), and correction factors for fishing efficiency between these vessels were not used.

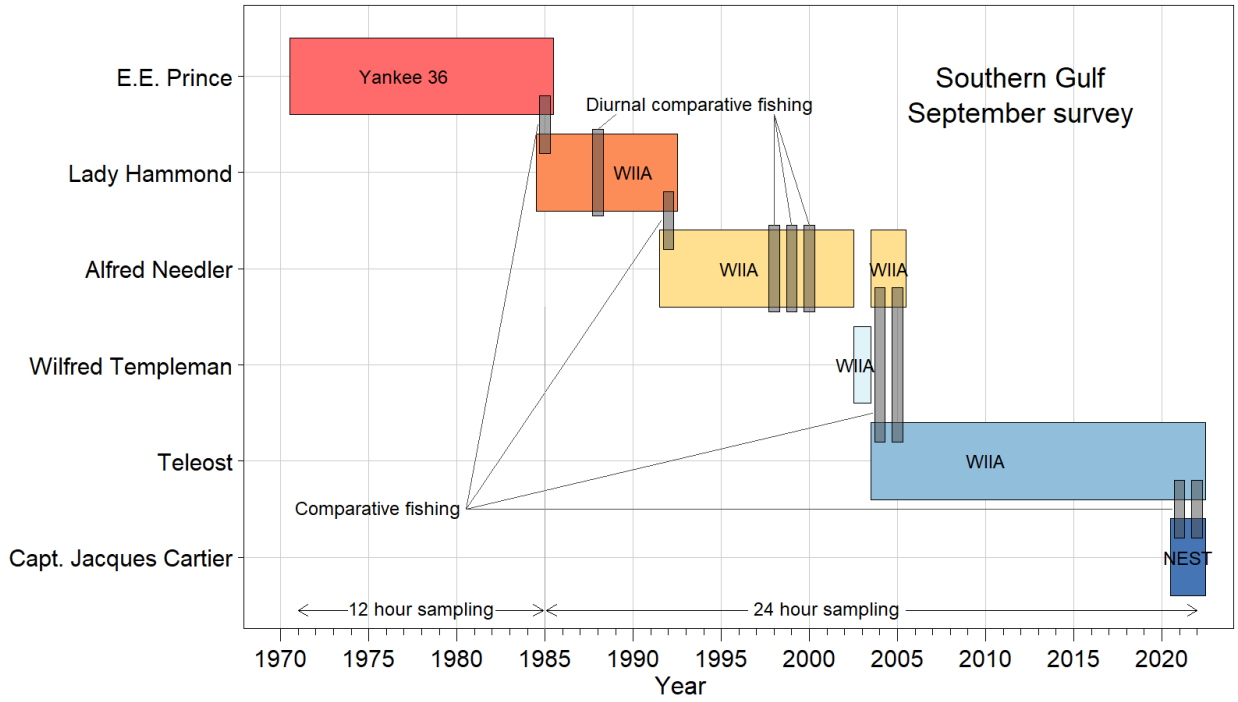


Figure 32: Timeline of the research vessels and gear types used in the southern Gulf of St. Lawrence survey. The x axis show years, the y axis shows the vessel names and the gear type used is written on each rectangle. Comparative fishing experiments are identified by gray polygons overlapping the survey platforms under comparison.

Herring were more catchable during the day by both the Lady Hammond and the Alfred Needler in diel catchability experiments (Benoît and Swain 2003b). The diel correction factors estimated for Atlantic herring imply that night catches should be multiplied by factors of 7 to 10 in order to obtain daytime equivalents. However, applying these corrections often generates unrealistically large catches, inconsistent with field observations. This limitation is underscored by the very high estimates of extra-Poisson variation ($\varphi \approx 20$), which indicate that diel effects explain only a small portion of the extreme variability in herring catches. The high overdispersion is expected given the species' schooling behavior and aggregations that vary across spawning and feeding areas over the space and time frames of the survey. As a result, diel corrections applied uniformly across the survey likely fail to capture the spatial and temporal heterogeneity in herring distribution and behavior, potentially inflating variance and biasing index estimates. A more appropriate approach may be to account for diel effects within a spatiotemporal modeling framework, rather than applying global correction factors to the time series. Considering the uncertainty relating to diel effects, the associated correction factors were not applied and catches were adjusted for tow duration and identified vessel effects only.

The RV survey data was spatially disaggregated in the three regions used for the assessment of NAFO Division 4TVn fall spawning Atlantic Herring (North, Middle and South). Annual mean weight-at-age vectors were calculated for all region-years. Missing weight-at-age were predicted using a Gompertz growth model fit to age and weight data where a minimum of 3 observations were available for an age-year. There was no missing data between 1994 to 1997. Two predictive models were fit to account for the trend in weight at age over time; one to data for years 1998 to 2010 and one for years 2011 to 2023. Mean annual weight caught (in kg per tow) was calculated and scaled to the region area using the number of trawlable units in each region.

The proportion of fall spawners was calculated using biological samples for each fishing set and applied to the total herring weight caught per set. Annual age-length keys were derived, applied to annual length frequency data and scaled to the weight caught per set using the sampling ratio to obtain the catch at age per set. Catch CVs where calculated by year and region across fishing sets. The number of trawlable units for each region was obtained using the *sf* package in R and each regions boundaries. The total weight caught was scaled to the region's area. Annual age-aggregated biomass indices per region were calculated by doing the product of numbers-at-age and weight-at-age per region and summing over ages.

RESULTS

Catches

Fall herring catches occurred in all regions across the time series (Figure 33). Herring were primarily distributed in shallow waters (< 100 m depth), with catches concentrated in the southwest portion of the sGSL, particularly in nearshore areas. In contrast, less frequent catches did occur in deeper waters of the northeast sGSL and the Laurentian Channel.

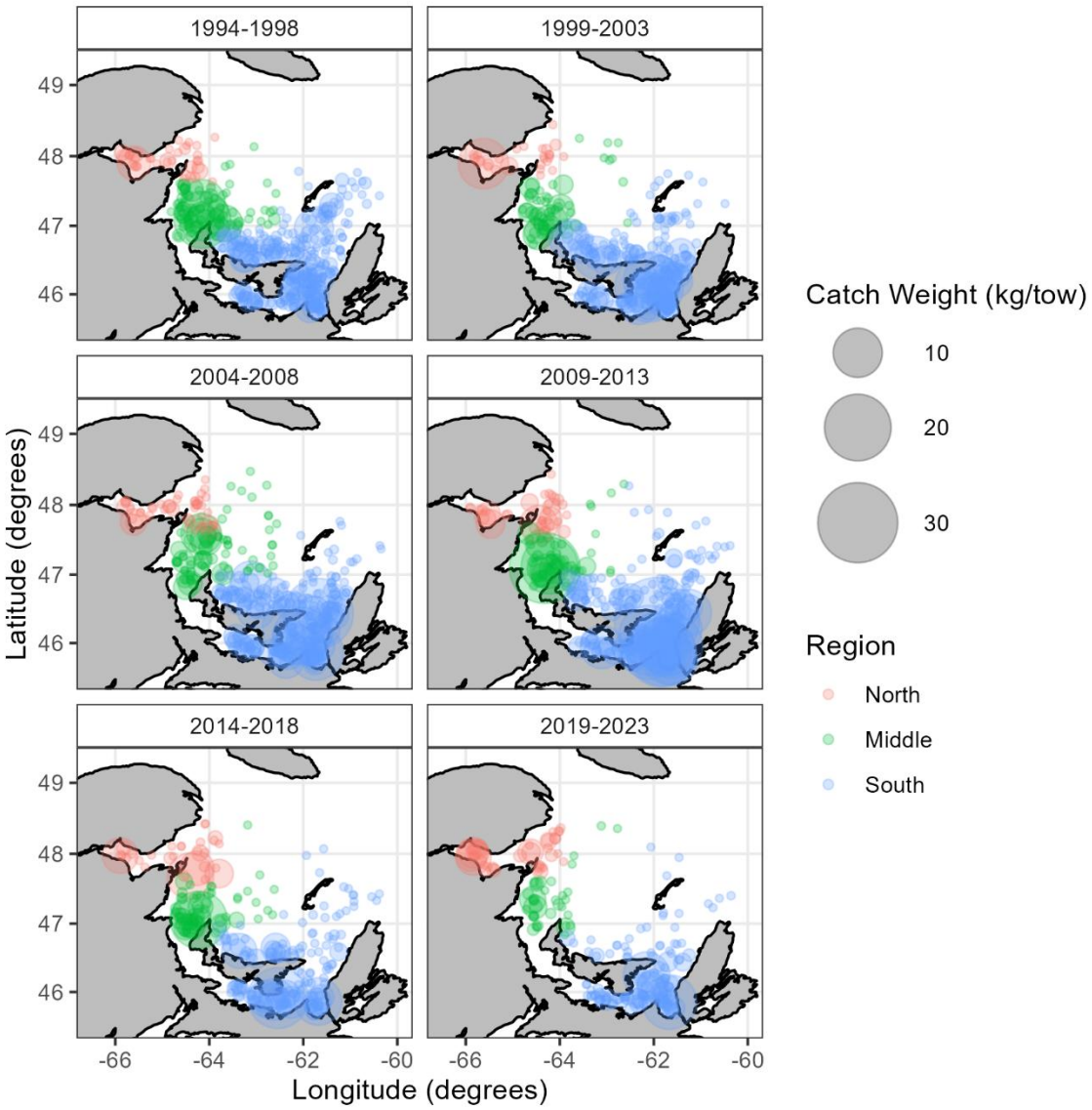


Figure 33: Fall spawning Atlantic herring catch (kg/tow) in the annual southern Gulf of St. Lawrence survey for three regions; North (green), Middle (red) and South (blue). The size of the circles is proportional to the value of the catch weight. Individual maps are presented for 5-year blocks for the period 1994 to 2023.

Growth

Trends in mean weight-at-age for ages 3, 5, 8, and 10 did not show major differences between regions (Figure 34), however year effects were observed in some years due to low sample sizes or fewer older aged fish. Consequently, a single weight-at-age matrix was used for all regions.

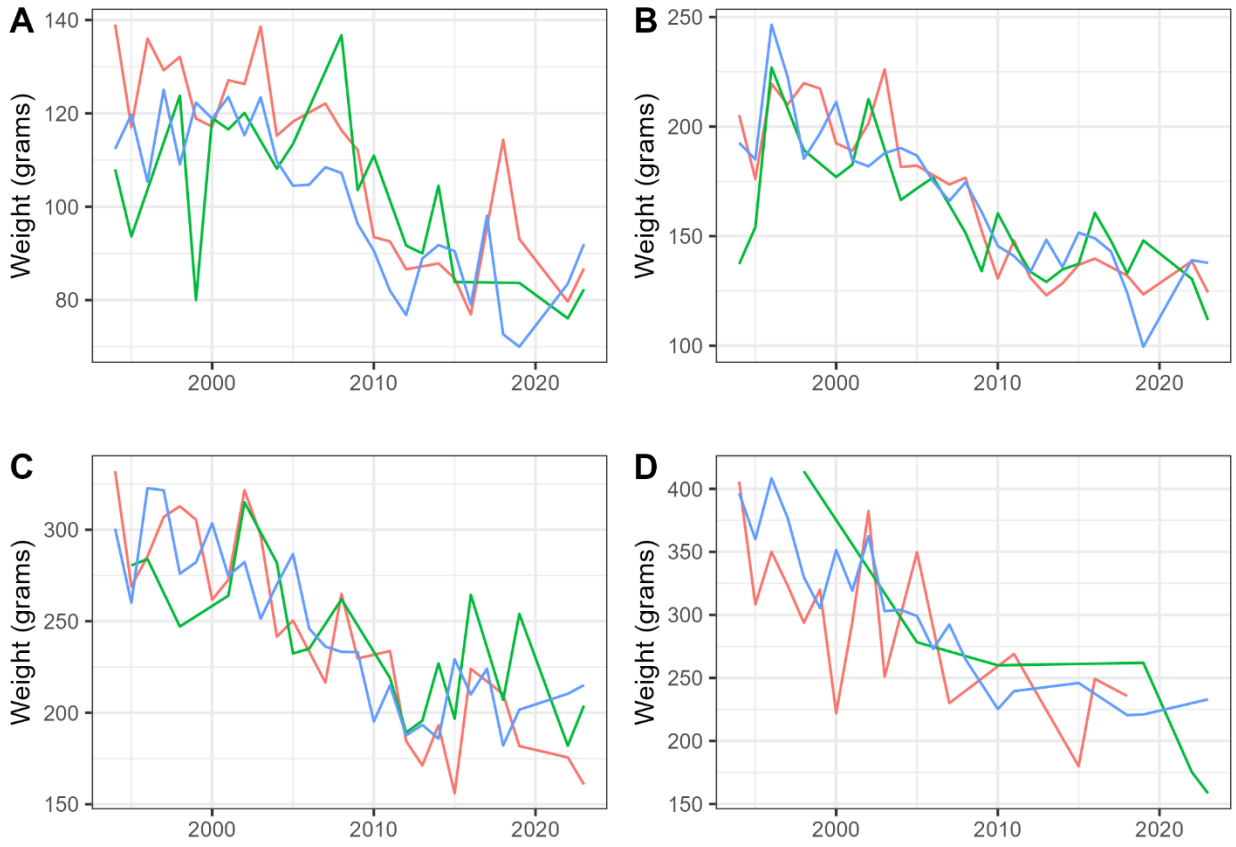


Figure 34: Mean weight-at-age for age 3 (A; upper left), age 5 (B; upper right), ages 8 (C; bottom left) and 10 (D; bottom right) fall spawning herring caught in the southern Gulf of St. Lawrence research vessel (RV) survey between 1994 and 2023, by North (red), Middle (green) and south (blue) region.

The Gompertz growth model parameters were significant (p< 2e-16) for both periods (1998-2010 and 2011-2023). The asymptotic weight was estimated to be 345.81 grams (g) for 1998-2010 and 251.68 g for 2011-2023. The model fit to data from both decades was good. Weight-at-age was generally highest at the beginning of the time series and decreased over time across all ages (Figure 35). Model predicted values were used for older herring (9 to 11) in most but not all years post-2008.



Figure 35: Annual mean weight-at-age of fall spawning herring caught in the southern Gulf of St. Lawrence research vessel (RV) survey between 1994 and 2023, with missing weight-at-age predicted from Gompertz models.

Maturity

Over all years of the survey, the proportion of spawning fish was smaller in the North region, intermediate in the Middle region and greatest in the South region (Figure 36). Fish that are about to spawn or actively spawning (stage 4; final maturation, stage 5; ripening and stage 6; ripe/active spawning) represented 15% of the sampled fish in the North region, 30% in the Middle and 39% in the South. In the North region, 50% of the fish were in a post-spawning stage (stage 8; recovering), comparatively to 40% in the Middle, and 32% in the South.

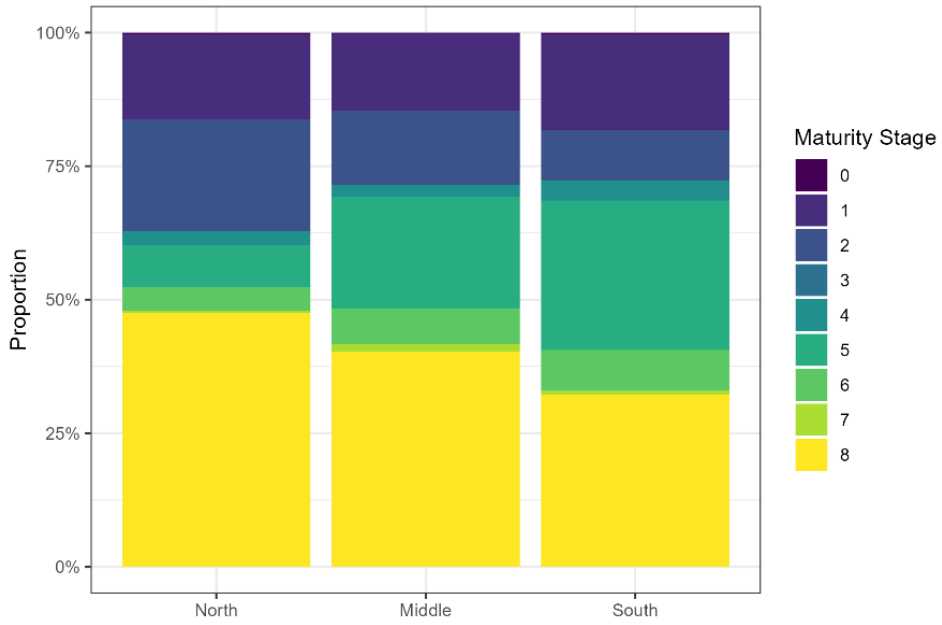


Figure 36: Gonad maturity stage proportions for fall spawning Atlantic Herring from the biological samples of the research vessel survey.

Biomass and proportion-at-age

North region

The biomass index was highly variable over the time series (Figure 37). Trawlable biomass was 16,281 t in 1994. Biomass declined to low levels until 2010 except for a peak in the trawlable biomass of 32,496 t in 2001. Biomass consistently increased between 2010 and 2015 before slowly declining until 2018 where it has since remained. The average survey biomass was 7,501 t and the standard deviation was 10,909 t.

Cohort tracking in the survey indicates substantial variability in cohort strength and survival across years (Figure 38). Several cohorts are evident, with some maintaining relatively high representation to older ages, reflecting good survival and persistence in the population (e.g., 2005-2006 cohorts). In contrast, other cohorts appeared strong at younger ages but declined rapidly with age, suggesting weaker survival. More recent cohorts (2007 and up) show moderate to weak persistence, with few maintaining strong signals beyond age 5. Overall, ages 3 to 6 dominated the survey catch across years, while older ages (7–10) were consistently present but at lower proportions. The catch curves showed important fluctuations in the observation across years, where slopes changed often for single cohorts (Figure 39).

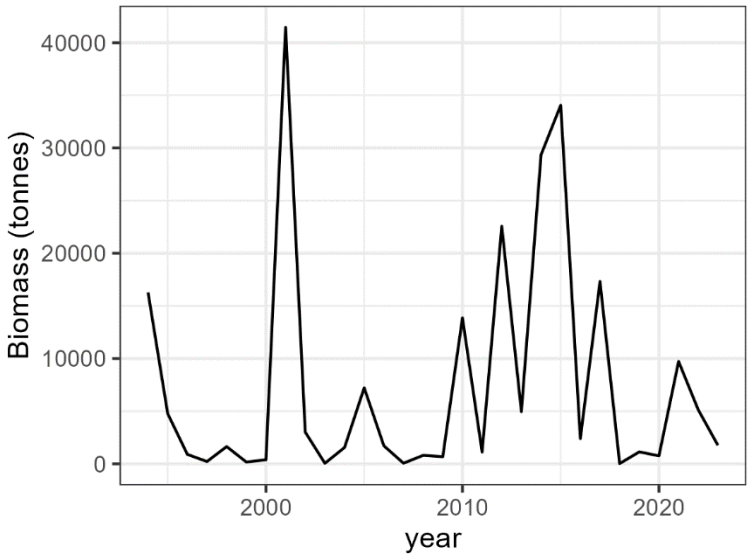


Figure 37: North region fall spawning Herring annual mean trawlable biomass (tonnes) from the southern Gulf of St. Lawrence research vessel survey.

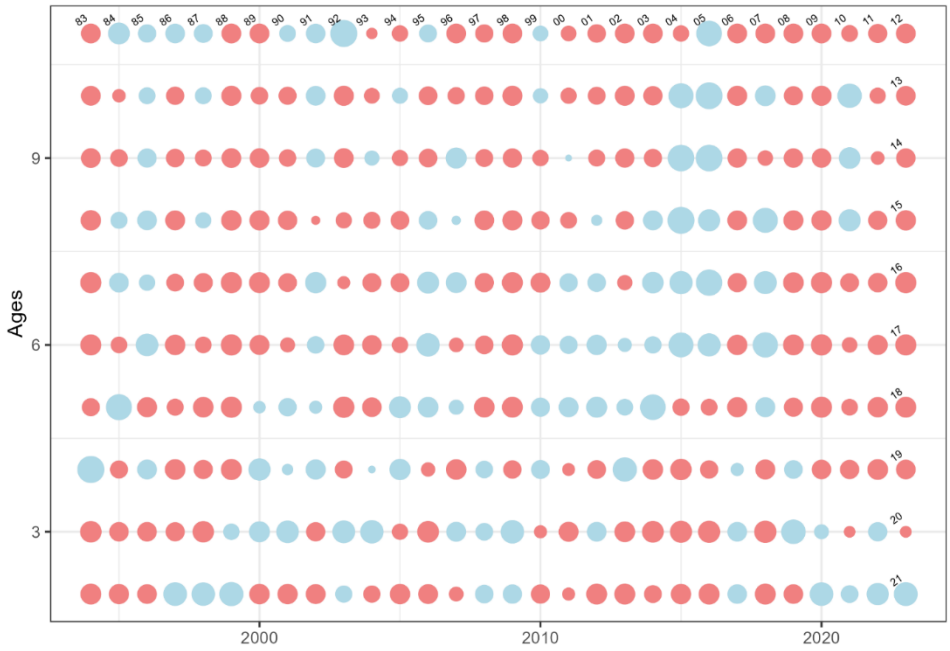


Figure 38: North region fall spawning Herring standardized proportion-at-age across years in mean trawlable biomass for ages 2 to 11 and years 1994 to 2023 from the southern Gulf of St. Lawrence research vessel survey. Blue points indicate higher proportions, red points indicate lower proportions. Points diameter indicate the size of the proportion.

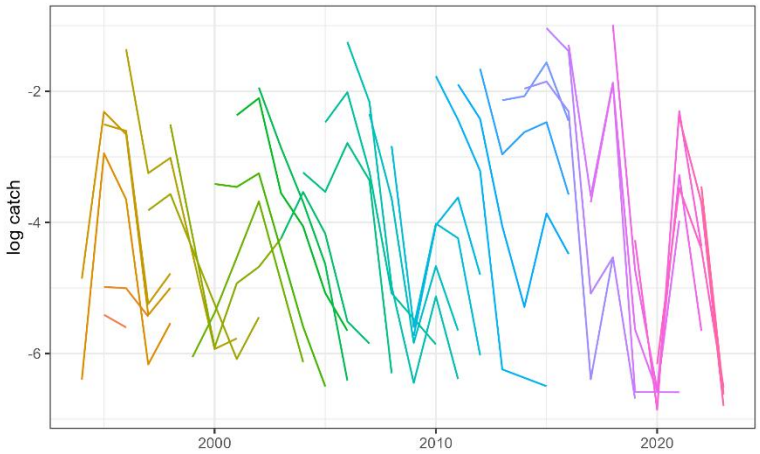


Figure 39: Southern Gulf of St. Lawrence research vessel survey catch curves for ages 5+ for all years for all years and all ages in the North region.

Middle region

The biomass index was highly variable over the time series (Figure 40). Trawlable biomass was 2,327 t in 1994. Biomass reached two peaks above 40,000 t in 1995 and 1997. Except for a peak in 2005, biomass was then low until 2010 when biomass reached 46,531 t. Biomass fluctuated but generally decrease until 2020 and stayed at low levels since. The mean survey biomass was 11,631 t and the standard deviation was 15,315 t.

Cohort tracking is weaker in the Middle region and no strong cohort can be identified from the proportion-at-age (Figure 41). Some cohorts can be tracked for several years, but their representation in eventually declines sharply. Overall, ages younger than 7 dominate the survey catch across years. The catch curves showed important fluctuations in the observation across years, where slopes changed often for single cohorts (Figure 42).

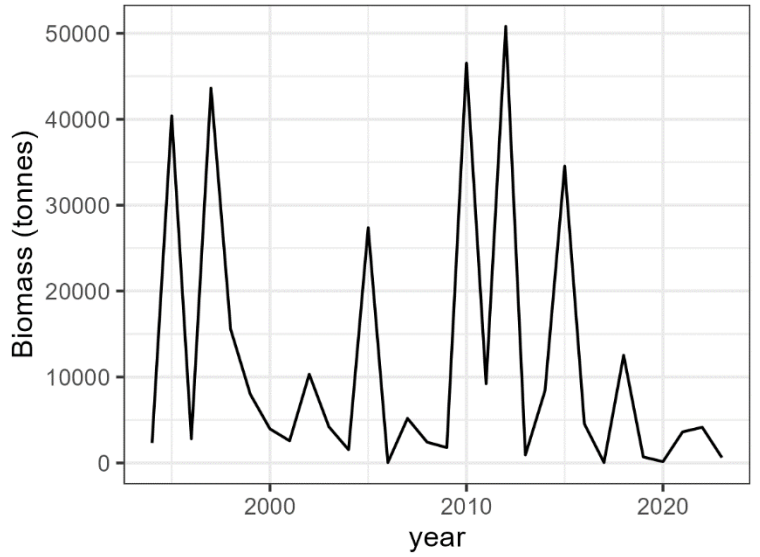


Figure 40: Middle region fall spawning Herring annual mean trawlable biomass (tonnes) from the southern Gulf of St. Lawrence research vessel survey.

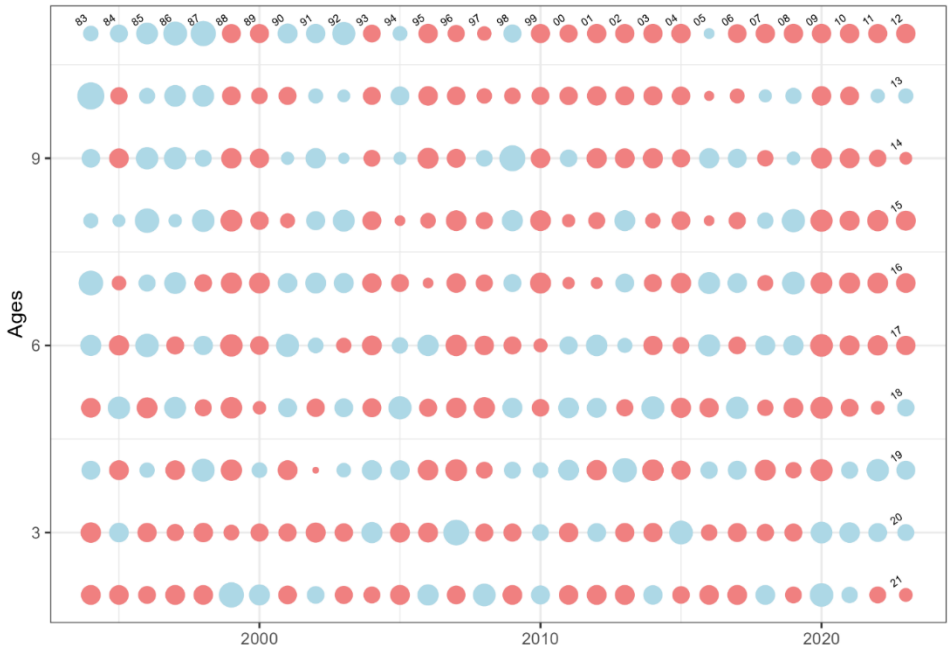


Figure 41: Middle region fall spawning Herring standardized proportion-at-age across years in mean trawlable biomass for ages 2 to 11 and years 1994 to 2023 from the southern Gulf of St. Lawrence research vessel survey. Blue points indicate higher proportions, red points indicate lower proportions. Points diameter indicate the size of the proportion.

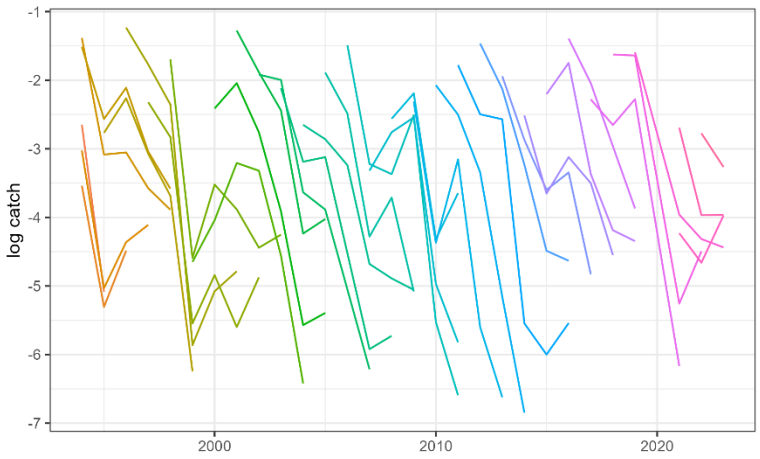


Figure 42: Southern Gulf of St. Lawrence research vessel survey catch curves for ages 5+ for all years and all ages in the Middle region.

South region

The biomass index in the South region was less variable than in the North and Middle regions and biomass was generally higher (Figure 43). The mean survey biomass was 47,815 t and the standard deviation was 43,070 t. Trawlable biomass was 57,924 t in 1994 and decreased until 1996. Biomass increased gradually until the early 2000s and remained somewhat stable around 50,000 t, albeit some annual variation. The biomass increased rapidly to reach 201,195 t in 2012, before rapidly decreasing to low levels by 2018. Biomass remained low until 2023.

Cohort tracking is generally better in the South region proportion-at-age (Figure 44). The 1984-1989 cohorts still had good representation in the population at age 10. Strong cohorts then appeared from the late-1990s and early-2000s. However, the cohorts from the early-2000s had high representation in the population until they reached ages 7-8, where their proportions appeared to diminish rapidly. The catch curves showed some fluctuations in the observation across years. Although slopes sometimes changed for single cohorts, the slopes where more consistent than in other regions (Figure 45).

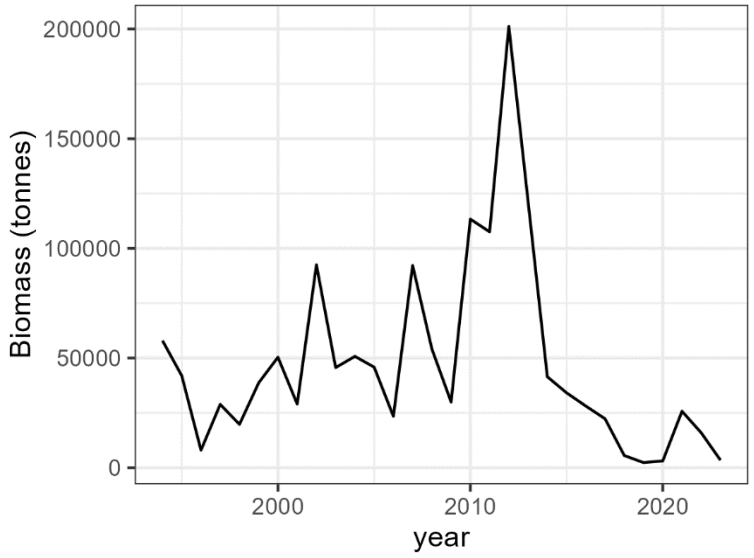


Figure 43: South region fall spawning Herring annual mean trawlable biomass (tonnes) from the southern Gulf of St. Lawrence research vessel survey.

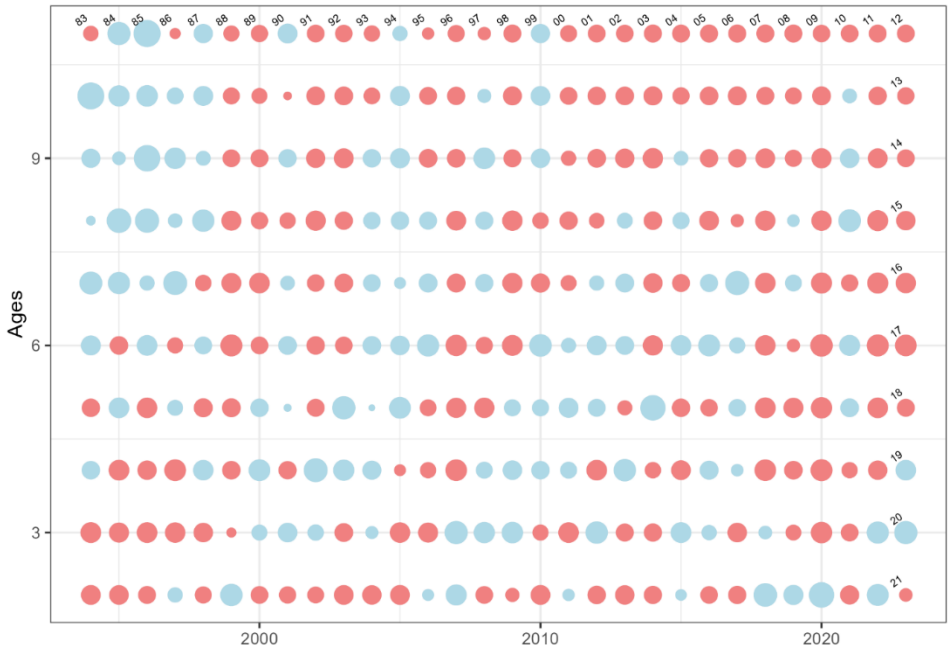


Figure 44: South region fall spawning Herring standardized proportion-at-age across years in mean trawlable biomass for ages 3 to 10 and years 1994 to 2023 from the southern Gulf of St. Lawrence research vessel survey. Blue points indicate higher proportions, red points indicate lower proportions. Points diameter indicate the size of the proportion.

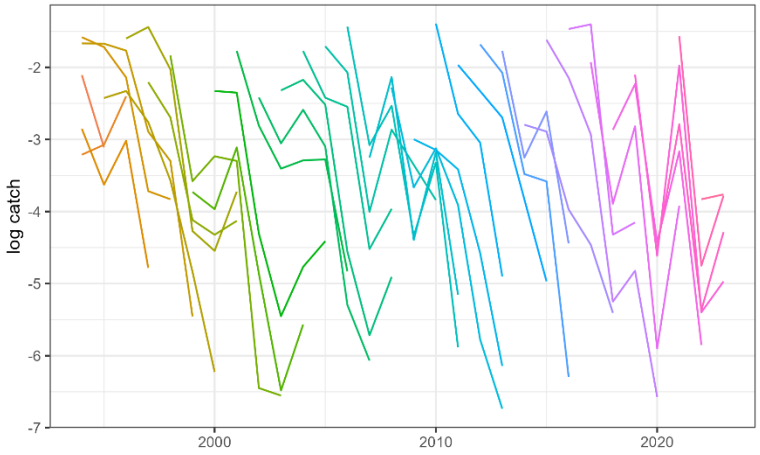


Figure 45: Southern Gulf of St. Lawrence research vessel survey catch curves for ages 5+ for all years for all years and all ages in the South region.

CHALEUR BAY/MISCOU ACOUSTIC SURVEY

Since 1991, DFO has conducted an annual fishery-independent acoustic survey in early fall (September–October) to assess concentrations of herring in the sGSL (Figure 46). The standard survey area includes Chaleur Bay and Miscou region (NAFO 4Tmno), where some portion of both the spring and fall-spawning components aggregate. The utility of this survey in population models has varied over time.

LeBlanc et al. (2015) evaluated an age-disaggregated abundance index (ages 3–8) derived from the acoustic survey but found that its inclusion increased the mean square error of model fits. Owing to poor internal consistency, it was not retained as an abundance index for older ages. A subsequent assessment model incorporated an alternative index based on ages 2 and 3 as a juvenile abundance index. At the time, this decision was justified by the survey's limited spatial coverage: older herring were believed to be more broadly distributed across spawning areas throughout the sGSL during the survey period. However, no clear justification was provided for using ages 2 and 3 as juvenile abundance indices, particularly given uncertainties regarding herring movement within the sGSL. Perhaps the juvenile herring surveys from 1991 to 1994 were used in part to support this decision, however this was never documented.

It is therefore pertinent to revisit current knowledge of fall-spawner movements to reevaluate which portions of the population are actually represented by the acoustic survey. McQuinn et al. (2012) reported that summer and fall distributions are extensive: herring occur in Chaleur Bay, the Miscou Bank, northern Prince Edward Island, St. Georges Bay, and the Cape Breton Trough. Spatial patterns of herring prey vary across years, and foraging schools are known to track prey distributions. During the survey period (mid-September to mid-October), a portion of the fall-spawning stock is also likely still spawning, given the historical fall spawning window of early August to early October (Messieh 1987). After spawning, individuals feed intensively to recondition before migrating to overwintering areas, and may therefore remain near productive feeding grounds.

Given this understanding, it is unlikely that the majority of the fall-spawning population from all three regions (North, Middle and South) consistently congregates in the Chaleur Bay region during the fall acoustic survey. The survey likely provides a reasonable index for herring originating from the North region across age classes, but substantial proportions of fish from the Middle and South regions likely remain feeding or spawning elsewhere. Evidence that supports this comes from the research vessel survey in the section above which showed that while in September the percentage of herring that had finished spawning declined on a North to South gradient. Juveniles from each region are also expected to use nearby nursery areas rather than concentrating within the survey area (LeBlanc et al. 1995).

For this assessment framework review, the methods used in previous assessments was used and the quality of the age composition data was assessed.

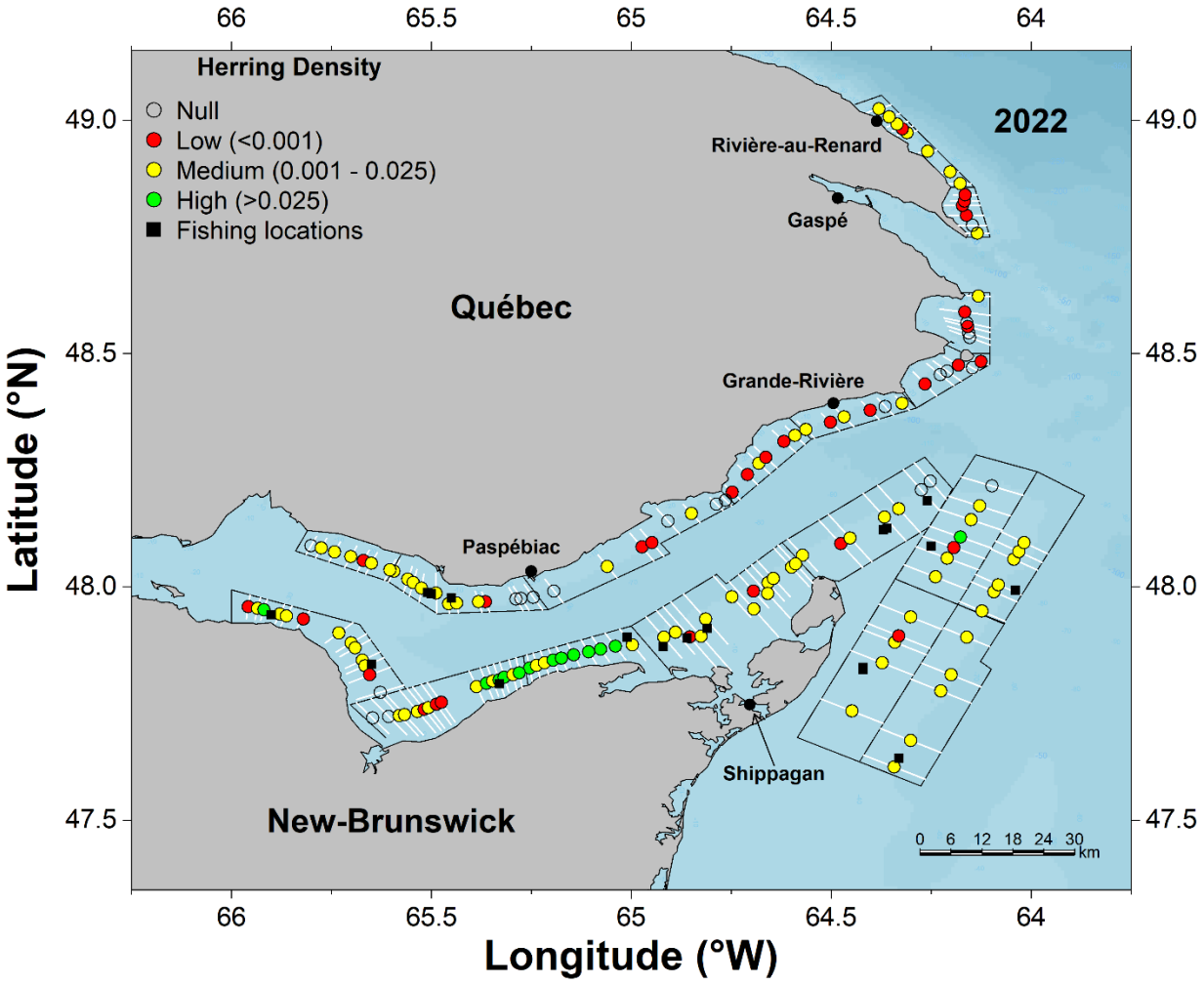


Figure 46: Standard acoustic survey strata (black line boxes) and surveyed transects (whites lines) covered during the 2022 survey. Herring biomass density from the 2022 survey showed in colored circles, by transect. Fishing sets from the trawl component of the survey showed by black points.

METHODS

The survey used a random stratified design consisting of parallel transects within standard strata. Surveys were conducted at night using two vessels: an acoustic vessel to quantify biomass of herring schools with a hull-mounted 120 kHz transducer, and a fishing vessel to sample aggregates of fish using a trawl (LeBlanc et al. 2015; LeBlanc and Dale 1996). Trawl samples were used to partition the estimated biomass by spawning component and age, determine species composition, and obtain size distributions necessary for target strength estimation (LeBlanc and Dale 1996; LeBlanc et al. 2015). For each fishing set, up to 350 herring were measured for length frequency. Additionally, a subsample of three herring per 0.5 cm length group was frozen for detailed laboratory analysis.

The data analysis followed procedures used in previous assessments. Distinct length-frequency samples within a stratum were combined to produce an average length-frequency for the entire stratum. Catch-at-age was calculated using the SAS software and determined with age-length

keys, with one annual key applied for each spawning group. When acoustic survey samples were insufficient, catch-at-age was supplemented with available data from other representative gear and surveys.

Mean biomass density and the variance of area biomass indices were calculated following procedures outlined by O'Boyle and Atkinson (1989). Target strength was calculated using Foote's (1987) equation, based on the length and weight of sampled fish. Mean lengths were derived from the length-frequency samples, while weight-length relationships were obtained from the biological samples. A target strength value was computed for each stratum where biological samples were available. For strata without samples, target strength was estimated from the mean herring size of the nearest successful trawl set in adjoining strata. Biological sample weights were scaled up to acoustic biomass per stratum in proportion to the spawning component proportions observed in the biological samples.

Weight-at-age of older fish was missing in some years. Missing weight-at-age were predicted using a Gompertz growth model fit to age and weight data were a minimum of 3 observations were available for an age-year (See RV survey methods for model equation). To account for the decline in weight-at-age, two model were fit: one to 1994 to 2007 data and one to 2008 to 2023 data. For each year, the biomass CV was calculated across estimates by strata.

RESULTS

The annual proportion of spring and fall spawners in the biological samples varied around 50% between 1994 and 2004 (Figure 47). The proportion of spring spawners then decreased to less than 25% in most years until 2019. The proportions in 2019 are deemed unreliable due to the very low sample size. The proportion of spring spawners was higher in 2020, 2021 and 2023. Overall, the survey caught more fall spawning fish.

The proportion of fish in each maturity stage varied among spring, fall and indeterminate spawners (Figure 48). Fall spawners were predominately in the spent/resting stage of gonadal maturity, indicating recent spawning. The next most common maturity stages were stage 1 and stage 2.

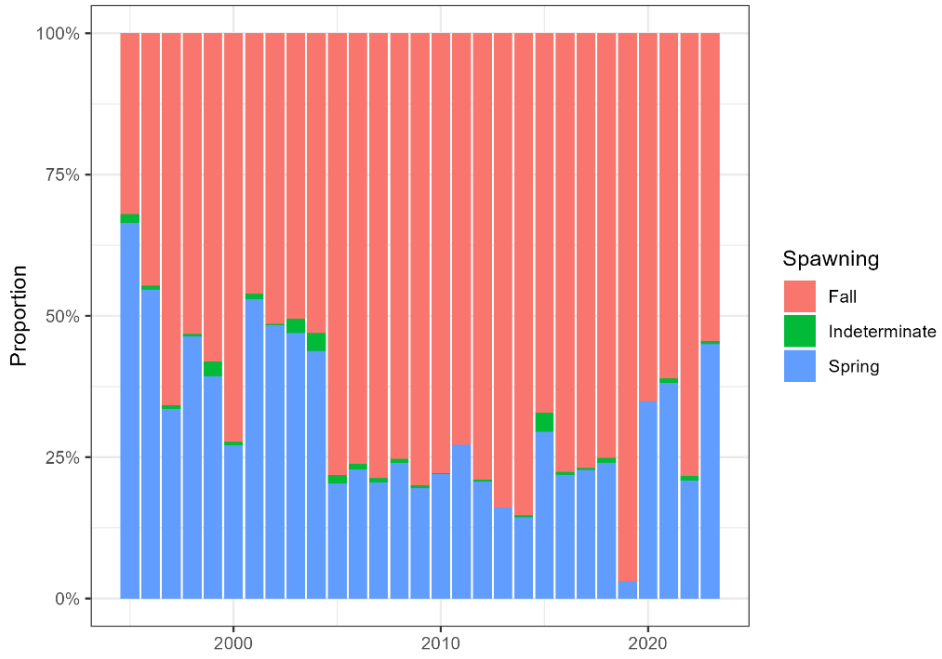


Figure 47: Annual proportions of spring and fall spawning Atlantic Herring from the biological samples obtained by the trawl component of the Chaleur Bay/Miscou acoustic survey.

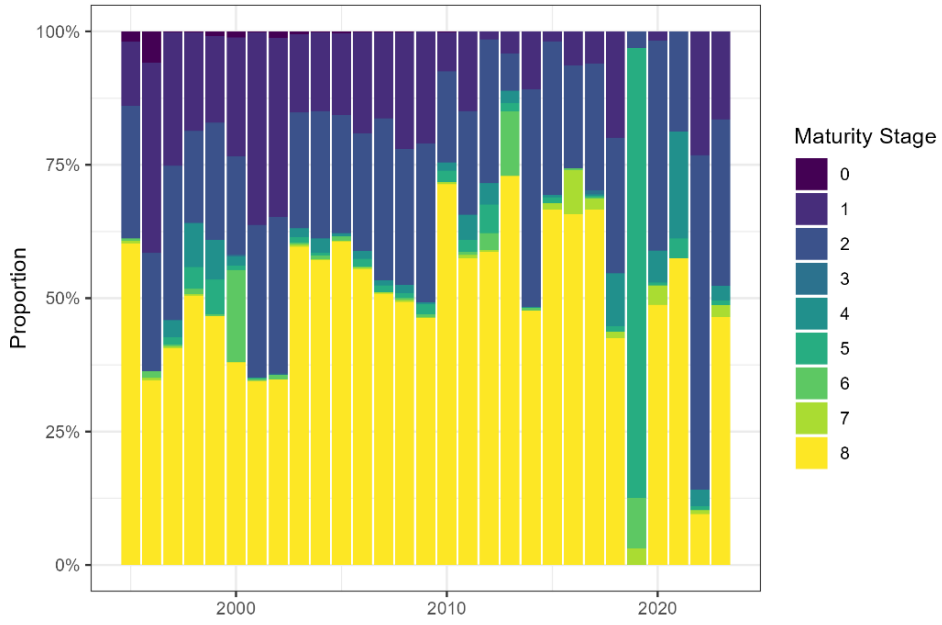


Figure 48: Annual gonad maturity stage proportions for fall spawning Atlantic Herring from the biological samples obtained by the trawl component of the Chaleur Bay/Miscou acoustic survey.

Age-aggregated acoustic biomass by spawning group was highly variable year to year, but trends were evident for both spring and fall spawners (Figure 49). For fall spawners, biomass was greater early in the time series before declining to low levels in 2001. Biomass then

gradually increased to peak at 125,000 t in 2015, before rapidly declining until 2019. Biomass was relatively stable between 2020 and 2023.

The numbers-at-age in the catch shows that the survey catches mostly ages 2 to 6, with some stronger cohorts tracking up to ages 8 and 9 (Figure 50). Cohort tracking was good across years but was better in years 2001 to 2023. The 2001 and 2002 cohorts showed important representation in the population at ages 2 to 5 but disappeared by age 6 (Figure 51). Cohorts from 2006 to 2010 showed good tracking and high absolute and relative representation through time. Recent cohorts (2019 to 2021) showed higher numbers and proportions than cohorts of the late 2010s. The catch curves showed some fluctuations in the observation across years. Although slopes sometimes changed for single cohorts, the slopes where moderately consistent (Figure 52).

The Gompertz growth model parameters were significant (p< 2e-16) for both periods (1994-2007 and 2008-2023). The asymptotic weight was estimated to be 311 g for 1994-2007 and 232 g for 2008-2023. The model fit to data from both decades was good. Weight-at-age was generally highest at the beginning of the time series and decreased over time at all ages (Figure 53).

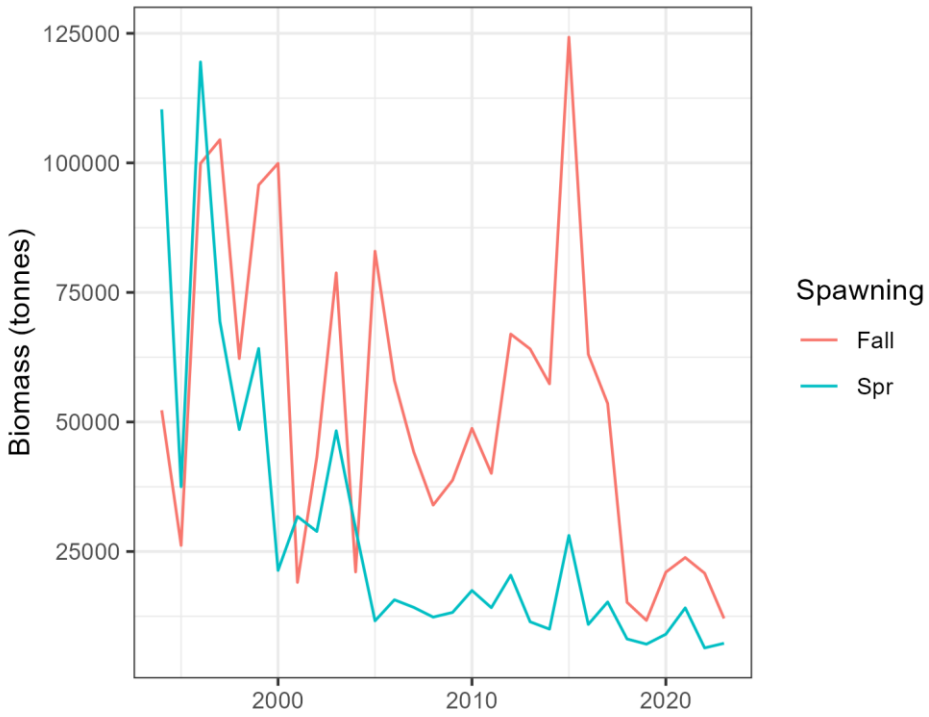


Figure 49: Chaleur Bay/Miscou acoustic survey biomass (tonnes) for spring (blue line) and fall (red line) spawners between 1994 and 2023.

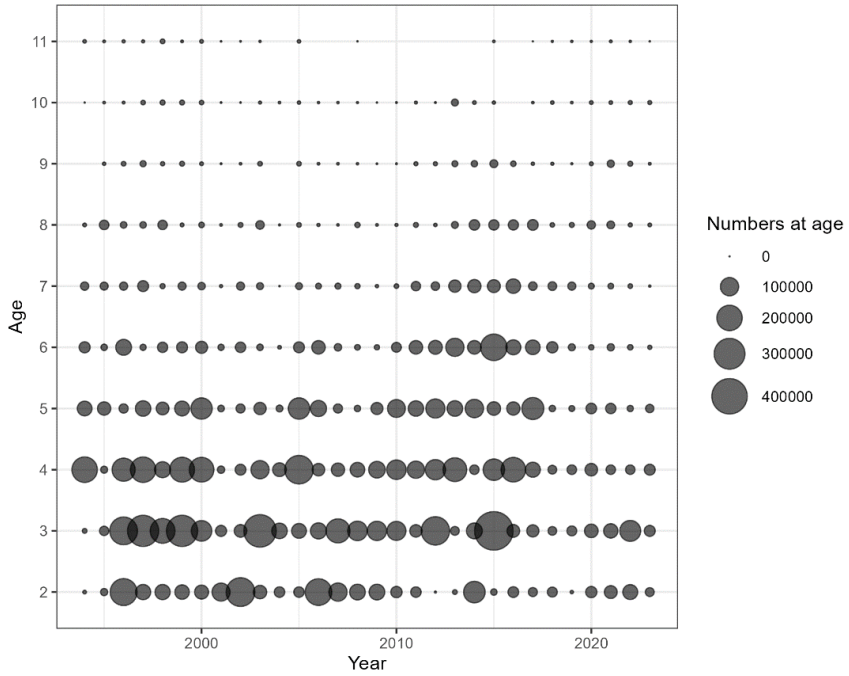


Figure 50: Numbers-at-age of fall spawning Atlantic Herring between 1994 and 2023 in the Chaleur Bay/Miscou acoustic survey.



Figure 51: Chaleur Bay/Miscou acoustic survey standardized proportions at age of fall spawning Atlantic Herring between 1994 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

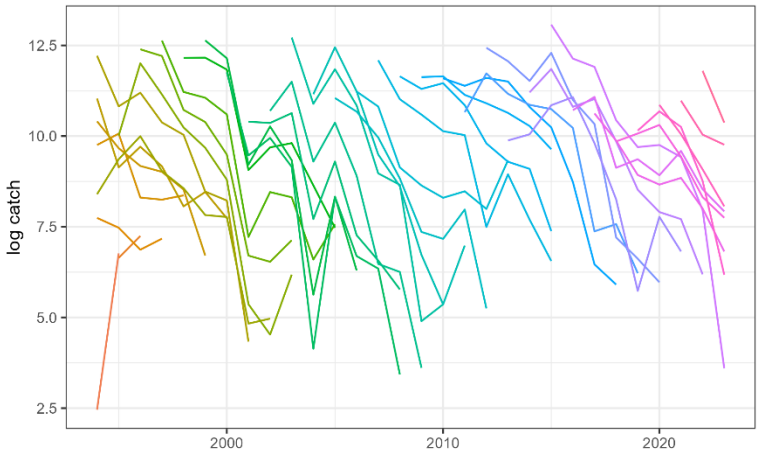


Figure 52: Catch curves for ages 2+ for all years for all years and all ages in the BDCM acoustic survey.



Figure 53: Annual mean weight-at-age of fall spawning herring caught in the Chaleur Bay/Miscou acoustic survey between 1994 and 2023, with missing weight-at-age predicted from Gompertz models.

EXPERIMENTAL GILLNETS

Experimental gillnets consisting of multiple panels of varying mesh size were deployed by fishermen during the fall fishing season. Harvesters were to set their nets once weekly for one hour among their commercial fishing nets on the spawning grounds (Figure 54). Length frequency and biological samples of the catch were collected by DFO personnel.

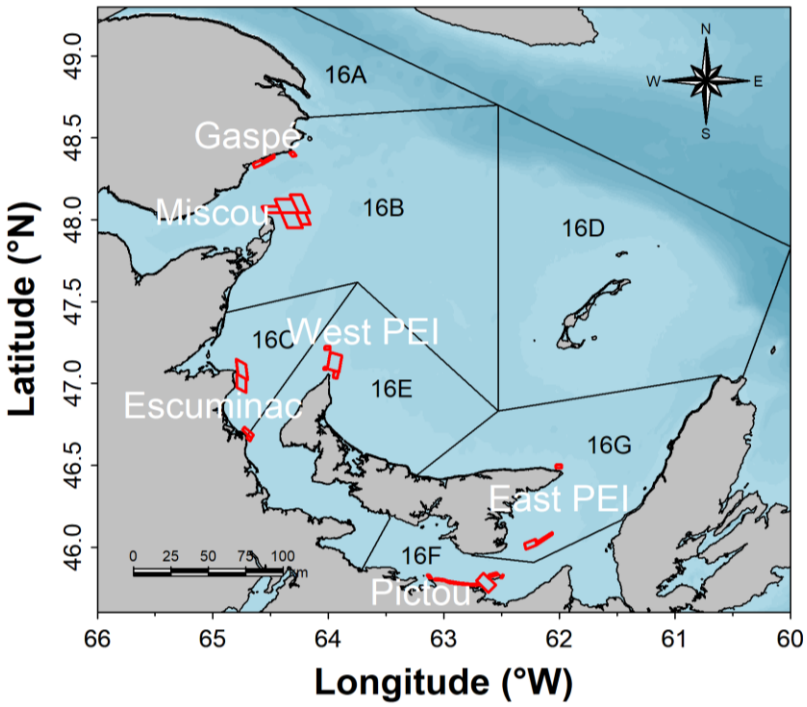


Figure 54: Map of experimental gillnet and spawning ground acoustic strata (red lines), showing the Herring Fishing Areas 16A-G, and strata names in white.

Each experimental gillnet had five panels, each with a different mesh size, from a set of seven possible mesh sizes ranging from 2" to 2¾" in ⅛" increments. All gillnets had panels with mesh sizes of 2½", 2⅝", and 2¾", plus two smaller mesh sizes that varied among fishermen. For the following analyses, only mesh sizes common to all regions and years were retained : (2, 2 ¼, 2 ½, 2⅝ and 2¾").

Harvesters in the fall fishing season participated in the study on the following spawning grounds: Miscou Bank (North; HFA 16B), Gaspé (North; 16B), Escuminac (Middle; 16C), West PEI (Middle; 16E), Fisherman's Bank (South; 16G), and Pictou (South; 16F) (Figure 54). Data from Pictou prior to 2015 were corrected for gillnet height as nets in this region were 5 m (17 feet) high compared with the standard 2.4 m (8 feet) used on other spawning grounds. A correction factor of 8/17 (feet) was applied to the Pictou nets to address the difference in net height.

The experimental gillnets data were used in two ways:

1. to provide information on the relative selectivity-at-length and -age of various mesh sizes, and
2. to provide age composition data from the catch.

The calculations for each were performed as in Surette et al. (2016) and as in previous fall herring stock assessments, except were described below.

SELECTIVITY-AT-AGE

Methods

Catches from the experimental nets were used to estimate the relative length-selectivity of gillnets of different mesh sizes as in Surette et al. (2016). The fixed fishing power, gamma

selectivity curve and negative binomial count model was fit to data from all regions and all years up to 2023. Selectivity-at-length curves were predicted for all mesh sizes.

Age-length keys were derived using the biological samples from the experimental nets and the commercial gillnet fishery by year and region. Selectivity-at-age curves were generated using the relative length selectivity of gillnets by mesh size, the proportion of gillnet mesh sizes by year and region and the age-length keys by year and region. GAMs were fit to annual regional selectivity at age vectors by smoothing over ages with k=5. These predicted annual curves were referred to as expected selectivity curves to avoid confusion with the realized selectivity, which is also affected by the abundance at age in the population.

Results

Model estimated modal selectivity sizes (Figure 55), i.e., the fish sizes which are maximally caught by each mesh, were estimated at 25.4 cm (2" mesh), 28.6 cm (2¼" mesh), 31.7 cm (2½" mesh), 33.4 cm (2⅝" mesh) and 34.9 cm (2¾" mesh). The modes were almost identical (within a 0.3 cm difference) to Surette et al. (2016).

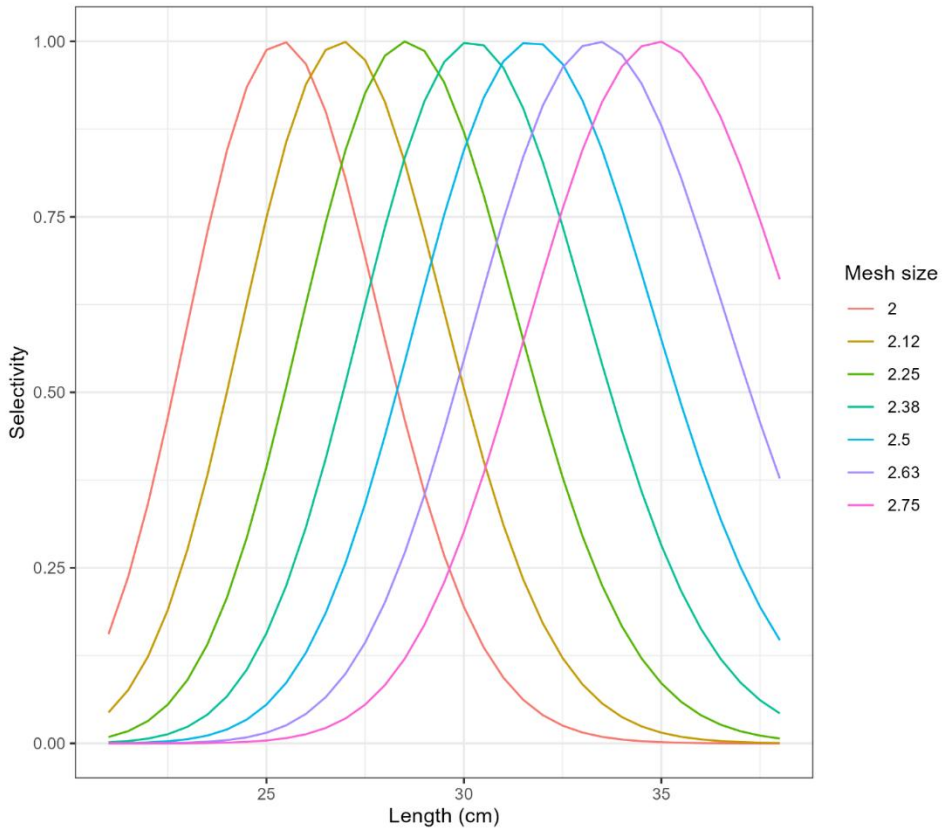


Figure 55: Model predicted relative selectivity at length for mesh sizes ranging between 2 and 2.75 inches from the experimental nets survey.

The median age at a given length has generally decreased over time in all regions (Figure 56). The decrease occurred mostly between 2001 and 2010 across ages. From 2010 and onwards the variation in age at length was more random and less directional. In the north region, the decrease between 2001 and 2010 was more pronounced for younger fish, while a small decrease was observed for all ages between 2010 and 2018 (Figure 57). In the Middle region, the decrease was substantial at all ages between 2001 and 2010, while only a slight difference

was found for younger fish between 2010 and 2018. In the south region, the decrease was substantial at all ages between 2001 and 2010, while between 2010 and 2018 the age at a given length decrease only for younger fish.

After accounting for mesh size selectivity and annual proportions of mesh sized used in the commercial fishery (Figure 58), the expected selectivity at age is moving towards the right of the selectivity schedule with years in all regions (Figure 59 and 60). Consequently, the expected selectivity of younger fish is decreasing, while the selectivity of the oldest age group is increasing as the descending limb of the selectivity curves is moving outside of the range of ages. Observing the trends in expected selectivity of a subset of ages allows to identify periods of change more easily (Figure 61). Selectivity at ages 4 and 7 has generally decreased across regions over years. The decrease rapid in the 2002 to 2010 period, while selectivity at these ages then seemed to stabilize. Selectivity at age 10 has increased over time, again with faster changes occurring between 2002 and 2010. Selectivity peaks frequently at age 10 in recent years.

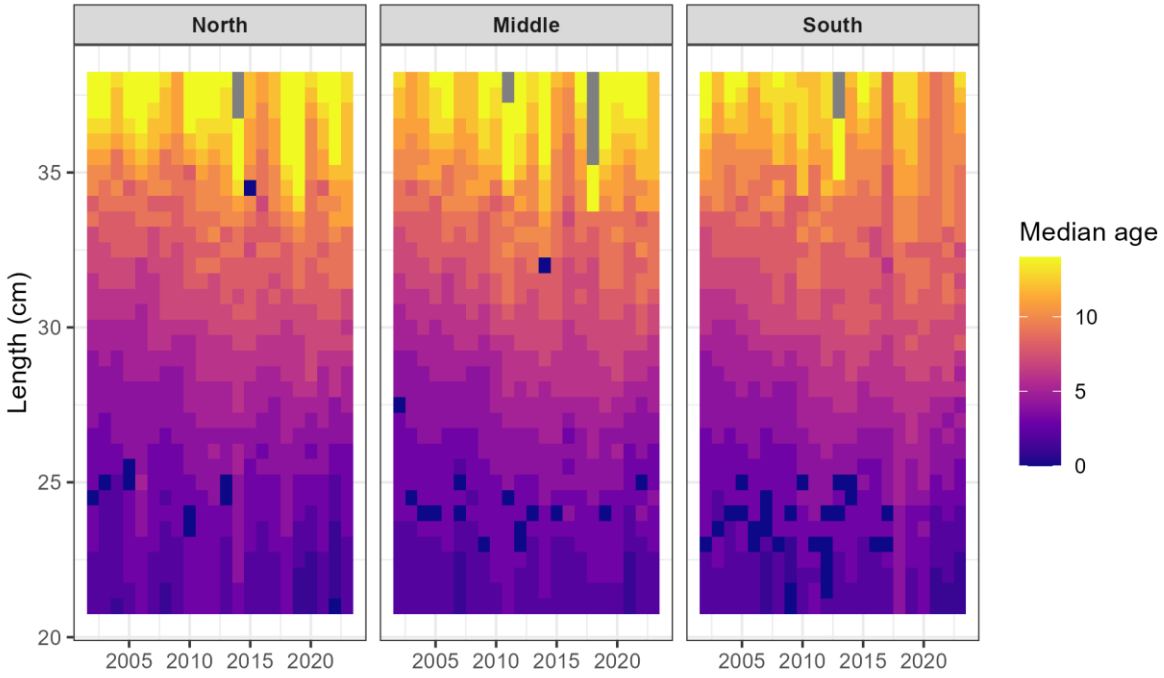


Figure 56: Median age at length (colors from purple to yellow) at length (y axis) by year and region from age-length keys from the experimental nets sampling program.

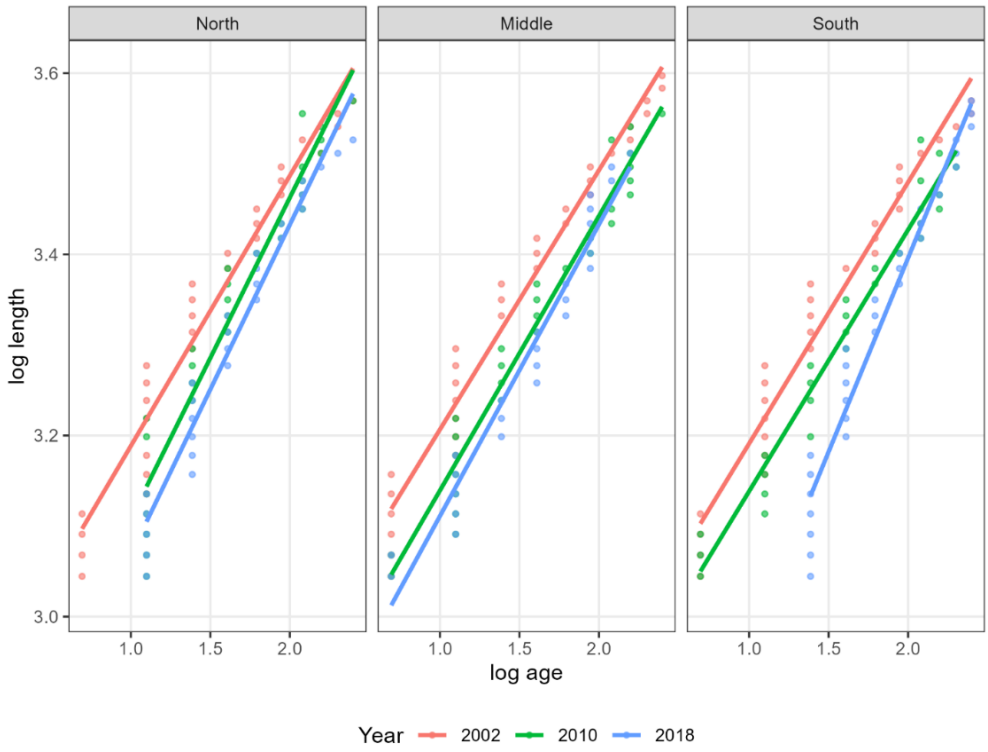


Figure 57: Median age at length on the log scale from age length keys in the experimental nets biological samples for selected years (2002, 2010 and 2018) and by region North, Middle, and South.

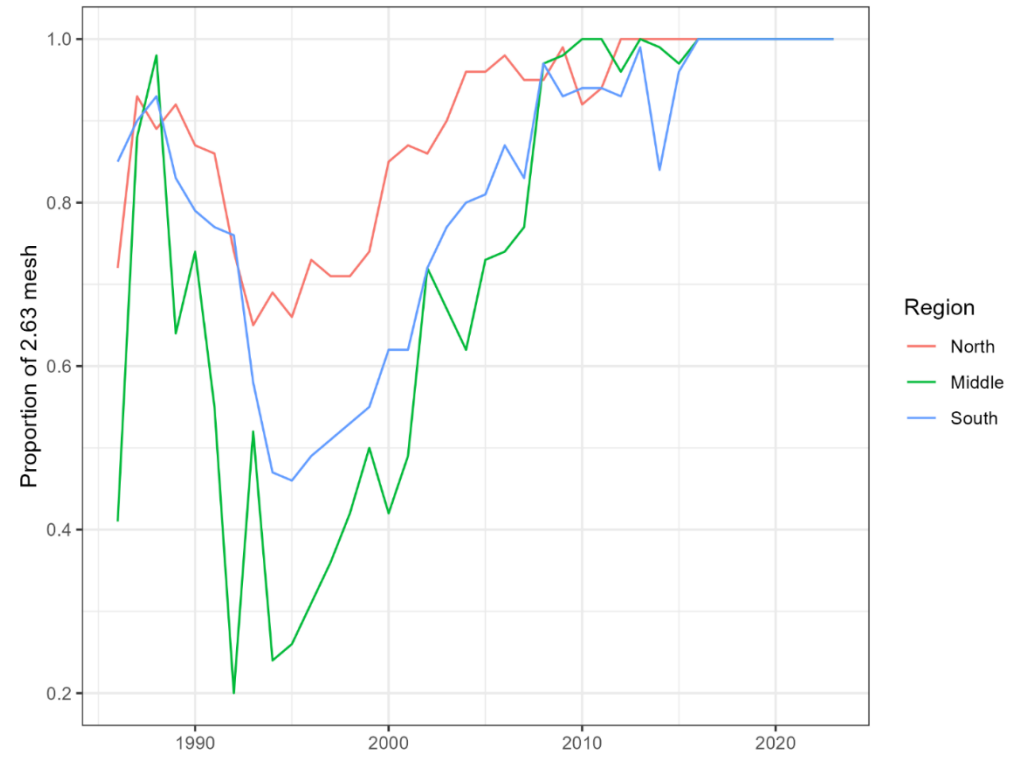


Figure 58: Annual proportions of gillnets with mesh sizes 2⅝ inches by region, 1986 to 2023. It is assumed that all other nets used were of mesh size 2¾ inches.

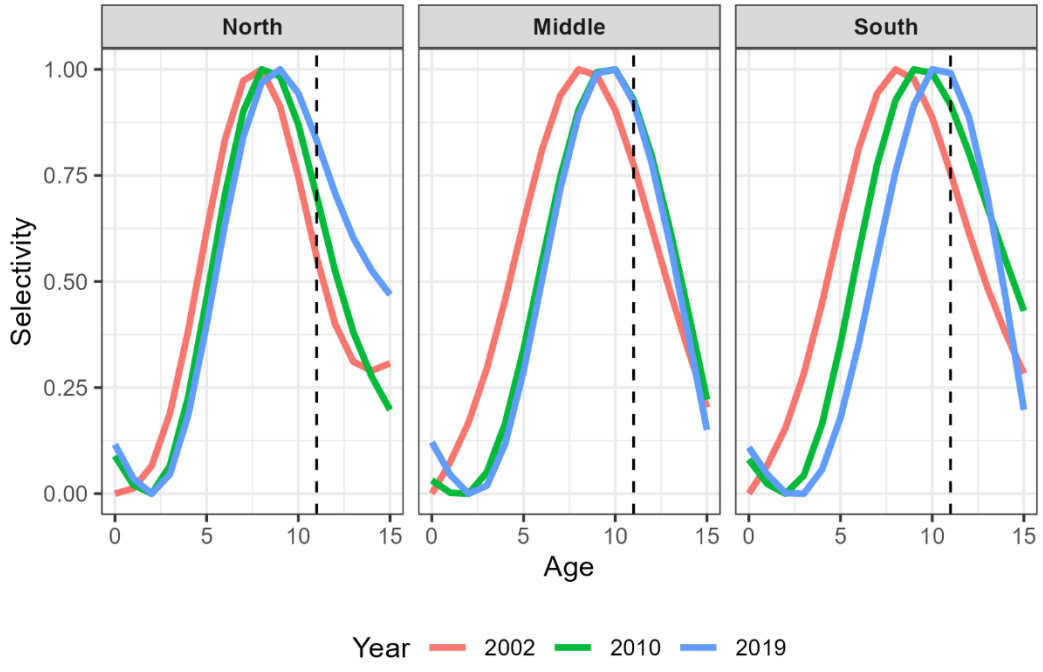


Figure 59: GAM predicted annual regional selectivity at age for selected years (2002, 2010 and 2019).

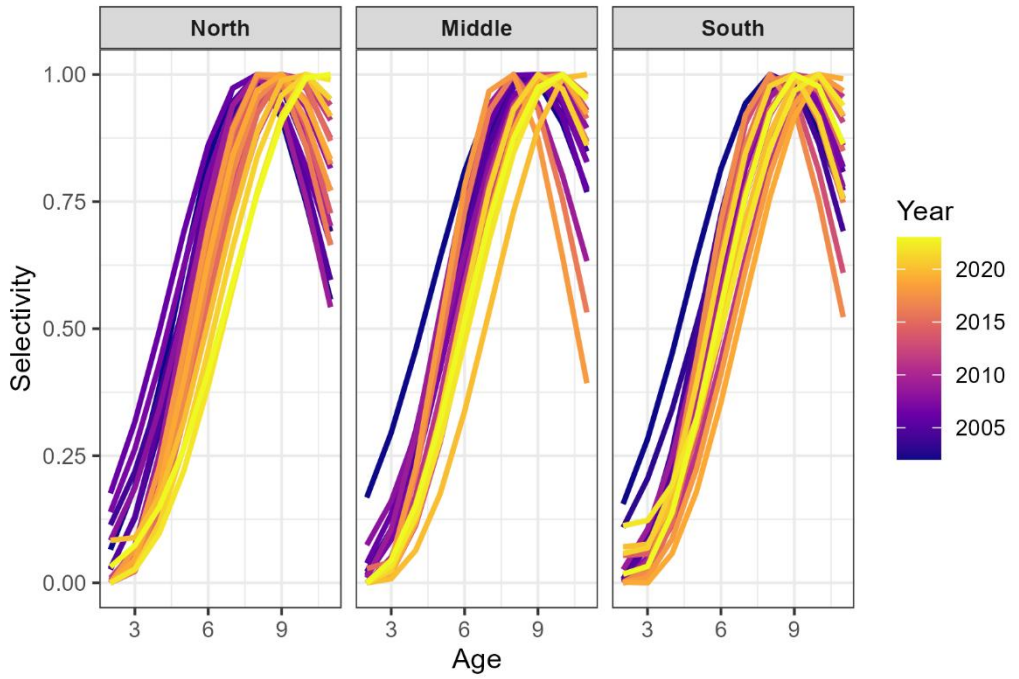


Figure 60: GAM predicted annual regional selectivity at age for all years.

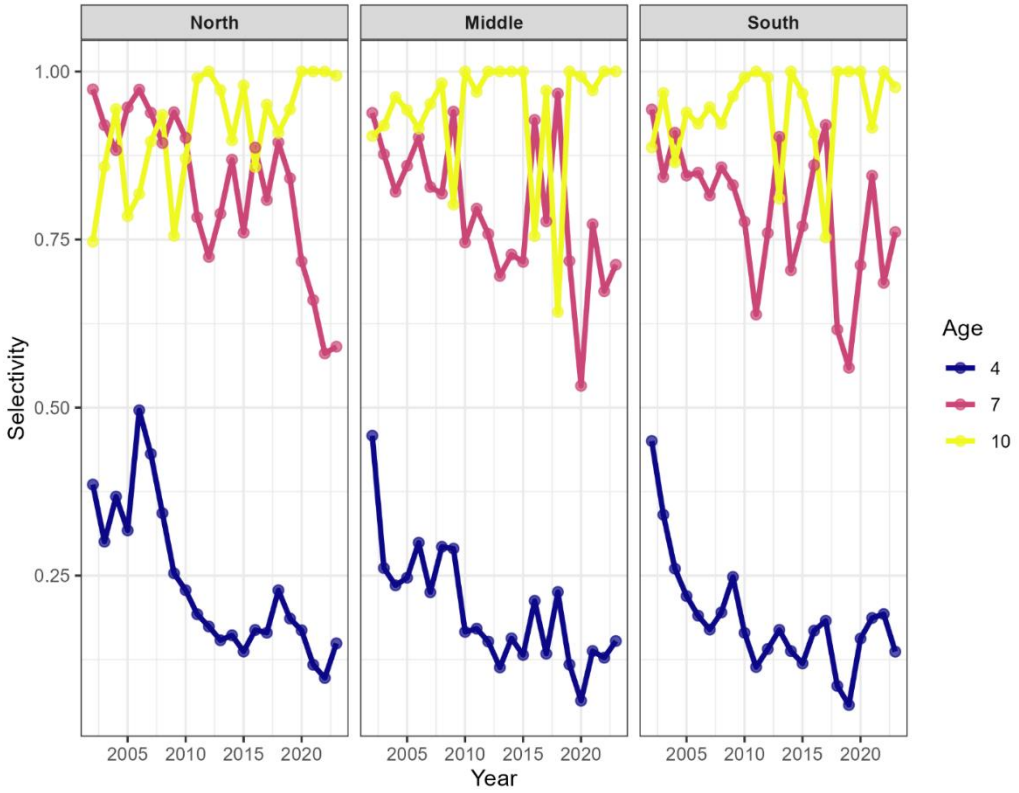


Figure 61: GAM predicted annual regional selectivity at age for selected ages (4; blue, 7; red and 10; yellow).

AGE COMPOSITION

Methods

As in Turcotte et al. (2021b), the observed catch at length of each mesh size was summed per day and per spawning ground, and then the mean catch at length per region per year was calculated. The catch at age data was then constructed using age-length keys derived the experimental nets survey. Regional age-aggregated biomass indices from experimental net data were calculated as the sum of the mean catch at age (in biomass units) per region and year. To assess the quality of the age composition data, catch curves and standardized proportions at age. Catch curves were constructed using the log of the catch for ages 5 and older.

Results

The numbers-at-age in the catch showed important catches of ages 4 to 8 over most years across regions. From 2010 and onwards, the catch was mostly of ages 6+ (Figure 62). Larger catches of younger fish occurred more often in the South region. In the North region, strong cohorts appeared at age 2 in 2008 and 2009 and persisted through time but otherwise the age composition data seem to lack cohort tracking signals (Figure 63). In the Middle region, strong cohorts appeared across years 2003 to 2015 but their tracking through time was not uniform. There was little cohort signals in the age composition after 2018. In the south region strong cohorts appeared around years 2003 and 2006 and their tracking was relatively good through time. However there was no cohort signal afterwards were large catches of all ages 5+ occurred. Overall years and regions, immature fish were relatively absent from the catch (less than 0.1%).

The catch curves showed important fluctuations in the observation across regions and years, where slopes changed often for single cohorts (Figure 64). The catch curves seemed to be of better quality around the year 2010, perhaps as a result of larger catches and stronger cohort signals. Curves appeared of lesser consistency in slopes after 2015.

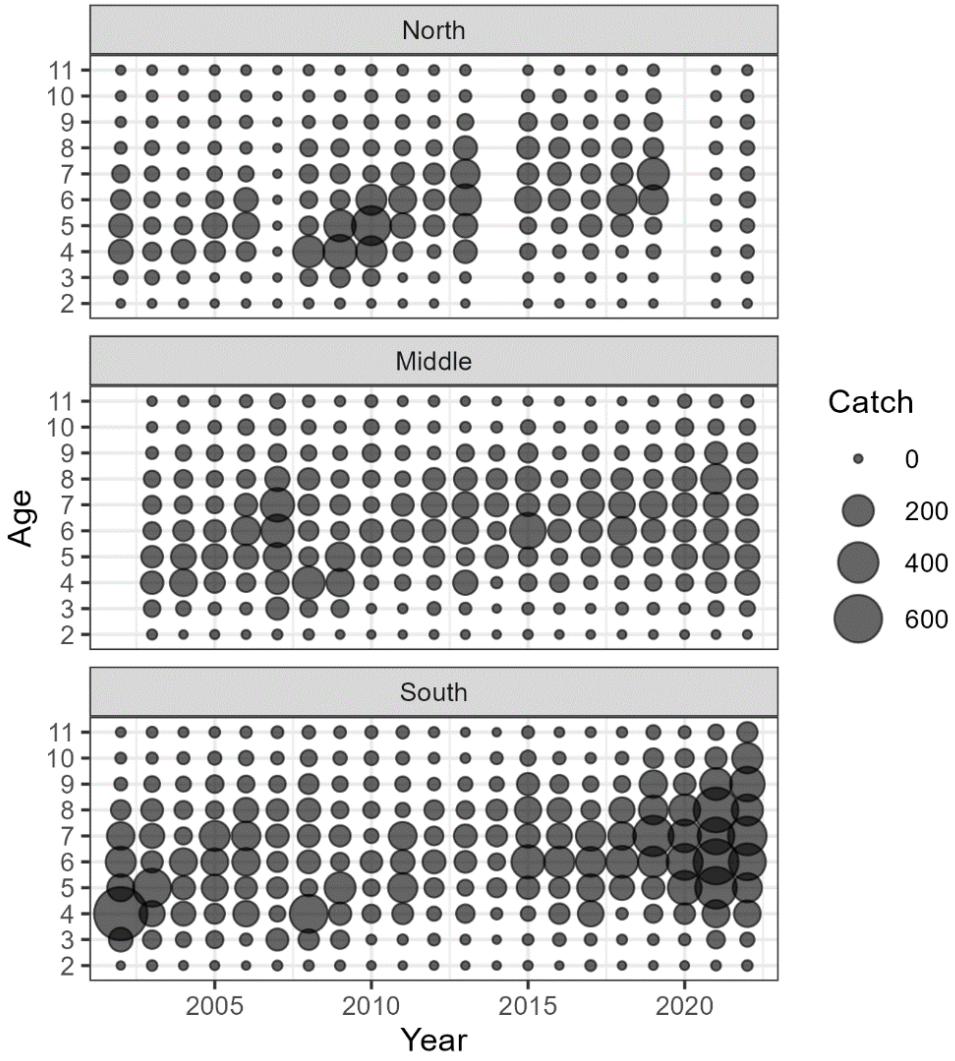


Figure 62: Numbers at age in the experimental gillnets survey of fall spawning Atlantic Herring between 2002 and 2022 for the North, Middle and South regions.

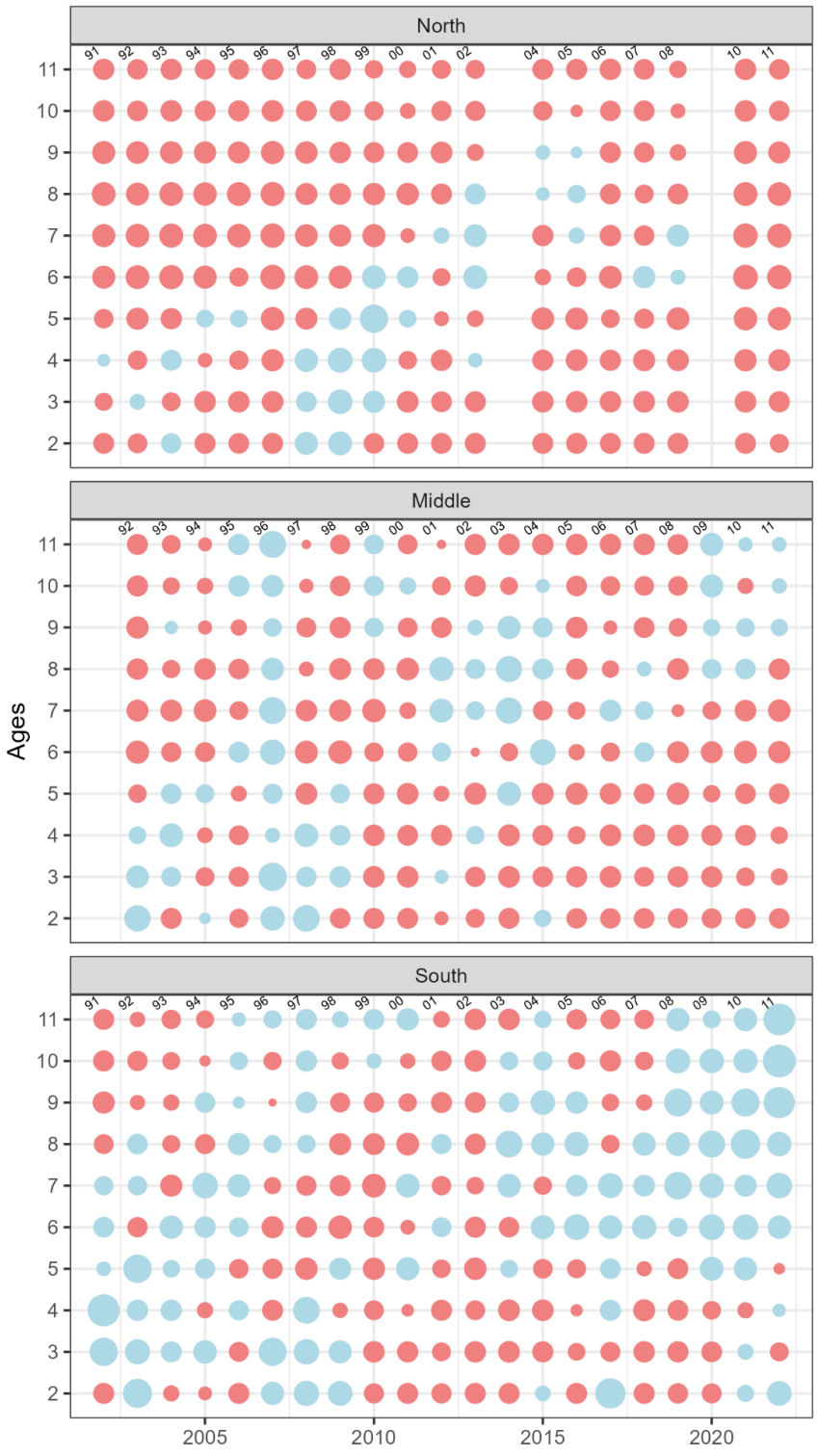


Figure 63: Standardized proportions at age of fall spawning Atlantic Herring between 1978 and 2022 in the North, Middle and South regions. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

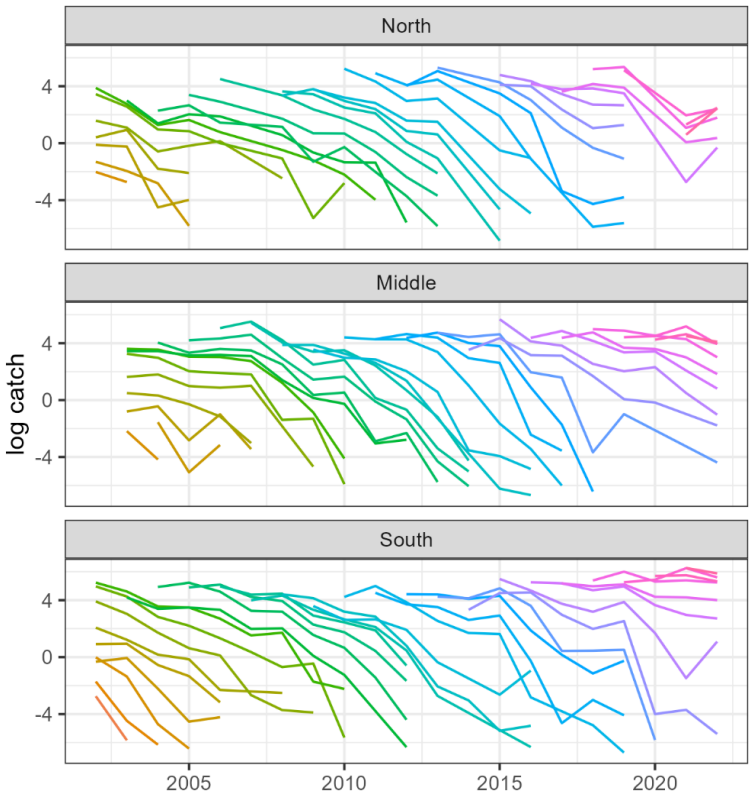


Figure 64: Catch curves by cohort (colored lines), region (North, Middle, and South) and years for ages 5+ in the experimental gillnet survey.

SPAWNING GROUND ACOUSTIC SURVEY

The spawning ground acoustic survey has been conducted annually since 2015 on six major herring fall spawning grounds in the sGSL (Gaspé (QC), Miscou (NB), Escuminac (NB), West PEI, East PEI and Pictou (NS); Figure 54). This survey is the result of a partnership between DFO and fishery associations. One or two fishing vessels per spawning ground collected acoustic data up to a week prior to the fishing season, during the weekend closures and up to a week following the closure of the fishing season. Generally, a maximum of five surveys were performed per spawning ground per year. Sampling effort varied between spawning ground and years, as a result of participant availability, weather dependence, weekend fishery closures and equipment or vessel malfunctions. The spawning ground acoustic index was recently developed (Turcotte et al. 2022) and continues to perform similarly. Therefore, this index was deemed adequate and will be used as is. This survey is an acoustic survey only, and no biological sampling is performed ton inform age composition.

Biomass trends varied across regions (Figure 65). In the North region, biomass peaked in 2016 at over 8,000 t before declining sharply and remaining below 2,000 t after 2018. The Middle and South regions showed lower and more stable biomass levels throughout the time series, generally under 4,000 t, with modest increases observed in 2021 and 2023.

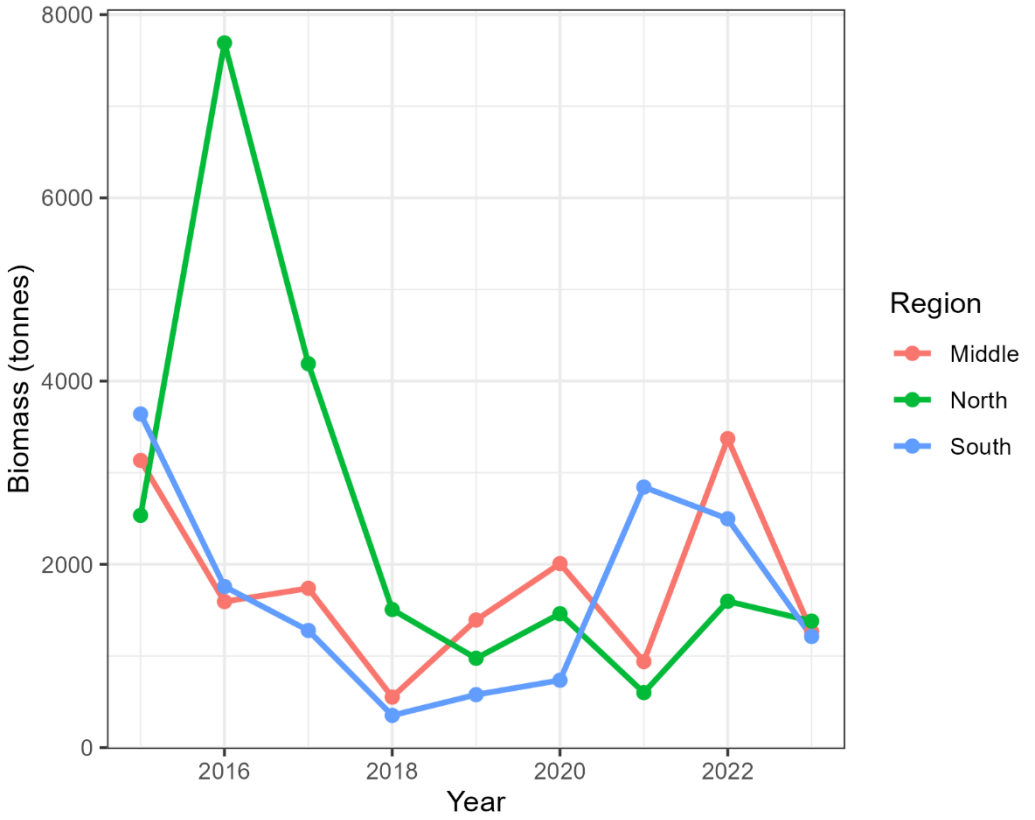


Figure 65: Nightly Atlantic Herring biomass estimates (tonnes) by region from the spawning ground acoustic surveys for years 2015 to 2023.

AGE-AT-MATURITY

Historically, the fall spawning herring assessment used a knife-edge maturity where all herring were assumed to be immature at age 3 and mature at age 4 across all years. This was a simplification of the maturity ogive. As such, we developed a maturity-at-age model for sGSL fall spawning Atlantic herring to provide time-varying estimates of age-at-maturity to inform the population model.

METHODS

Age and maturity stage are recorded from all sampling sources described above. These data were combined for the analysis to maximize the amount of information available to estimate annual age-at-maturity in each year. Sensitivity runs were performed by sequentially excluding data sources, with negligeable change in results. Maturity stage was reclassified into a binomial variable, with individuals of maturity stages 0-2 classified as immature and fish of maturity stages 3-8 classified as mature.

A binomial General Linear Mixed Model (GLMM) was fitted using the *glmmTMB* package in R, with age and year as fixed effects and cohort (year spawned) as a random effect. This approach accounts for temporal variability and cohort influence on age at maturity. Model assumptions and parameter significance were evaluated, and predicted probabilities of maturity by age were used to estimate age at 50% maturity (A50) for each year.

RESULTS

A50 increased over the 46-year time series, rising from about 2.75 years in the late-1970s to 3.26 in 2023 and up again to 3.43 in 2024 (Figure 66). This represents an overall increase of roughly 0.7 years. While the overall trend is upward, there were extended periods of stability. The current A50 is now relatively close to the knife-edge maturity of age of 4 used in previous estimates, however the historically A50 was nearly 1 year younger. The proportion mature at age for each year predicted by the model can be utilized in stock assessment models to help better inform SSB (Figure 67).

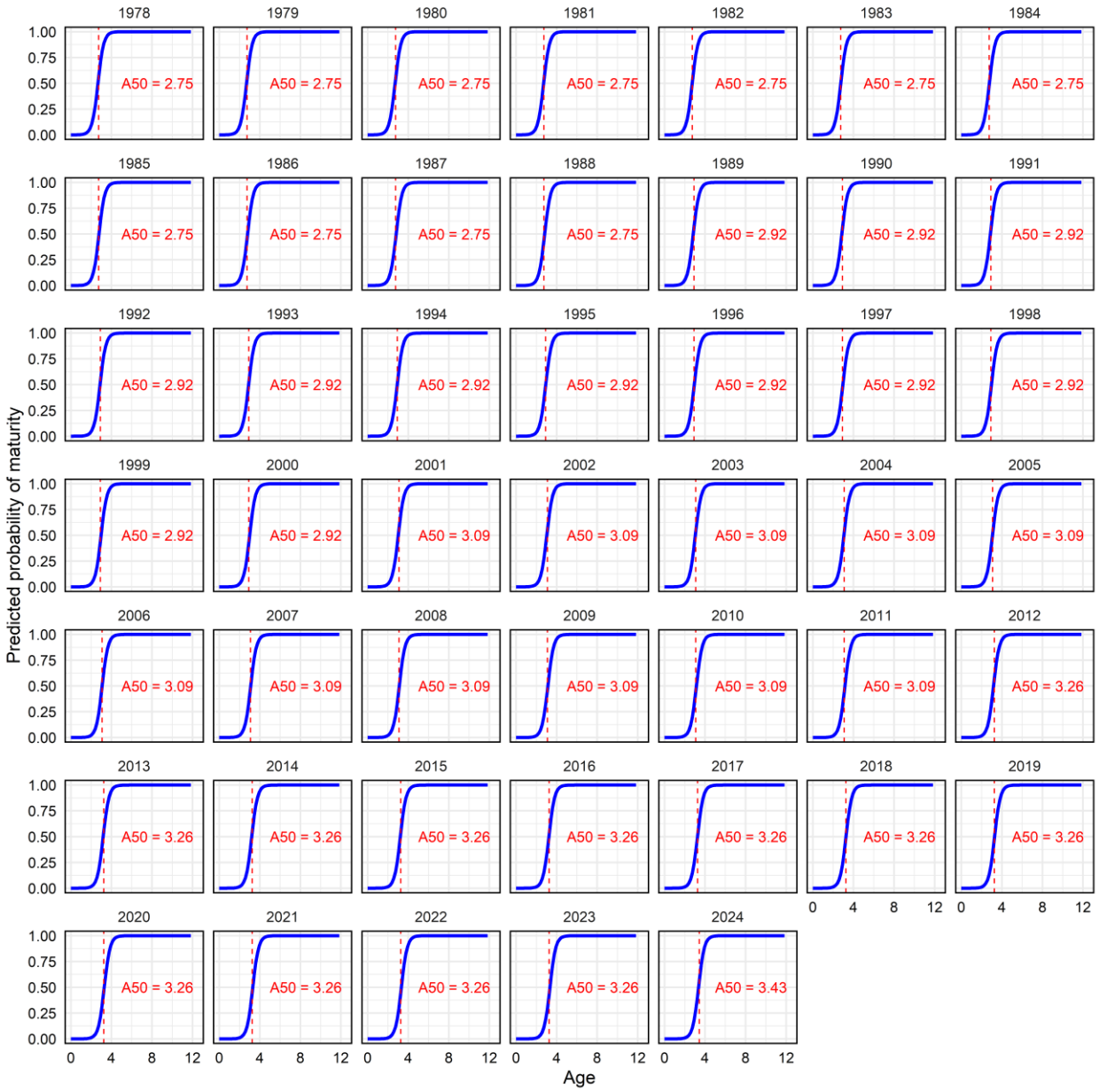


Figure 66: Maturity ogives (blue) across years with the estimated age-at-maturity (A50) displayed in red.

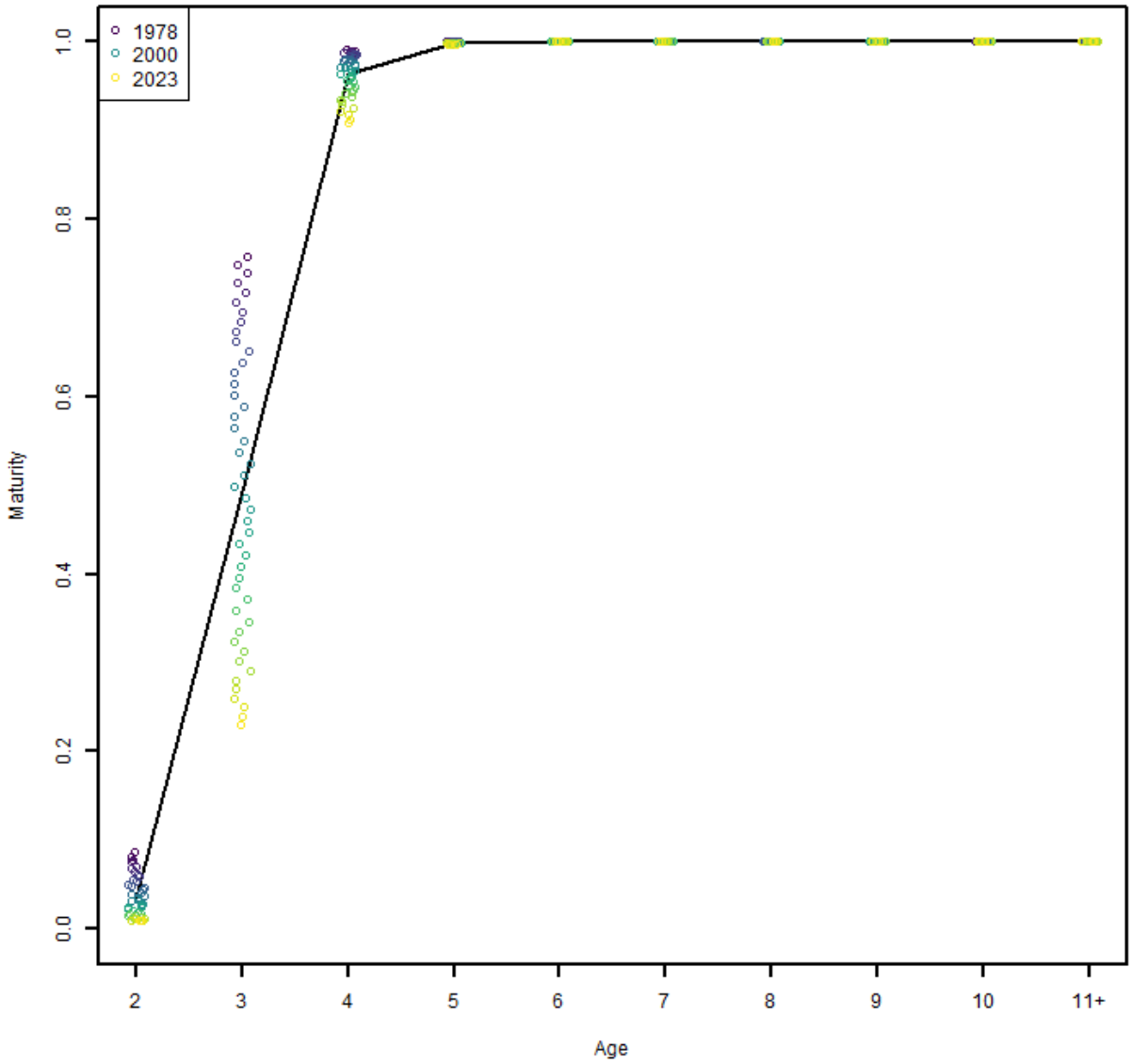


Figure 67: Mean maturity ogive across years (black line) and annual proportion mature at age (colored points) between 1978 and 2023.

DISCUSSION

COMMERCIAL FISHERY LANDINGS

Distinct matrices of total catch, catch-at-age, and weight-at-age by fishing fleet (gillnets: fixed gear; seiners: mobile gear) were successfully produced using a revised catch-at-age calculations based on predefined criteria to select samples characterizing each fishery year catch. This approach removed the subjectivity and inconsistency of methods through time that was introduced in previous assessments were the selection of samples was based on expert judgement.

The resulting landings values were similar in trend over time compared to previous assessments, but the scale of fall spawning herring landings was generally higher. This difference was markedly more important in 1978 to 1980, where current estimates are

approximately 50,000 t annually, whereas landings ranged between 10,000 and 25,000 t for these years in previous assessments. This difference in landings was attributed to differences in attributing catch to spring or fall spawners, as previous assessments estimated higher landings of spring spawner in mobile catches in these years. Here, we attribute the catch proportionally to the length distribution of the samples, whereas former assessment attributed catch proportionally to spring and fall spawners based on the mean proportion of each over the mean proportions across samples, irrespective of the size distribution and the underlying potential length frequency effect.

The largest sources of catch in 1978 to 1980 were the Overwinter fishery and the Inshore north mobile fishery. Previous assessments attributed large spring spawner catch to the Mobile fishery both in the spring (Edge catches) and fall seasons (combination of Inshore mobile and Winter catches). Here, the Overwinter fishery catch in 1978 to 1980 was well characterized using the first criteria of the sample selection algorithm in all years for both the biological and length frequency samples. Edge samples were available in 1980 (885 fish), and Edge and Winter fisheries samples in 1979 and 1980 (1,170 and 1,886 fish). For the Inshore north fishery, the first criteria was also used to characterize the catch for both biological and length frequency samples. All samples were from the Inshore mobile north fishery with 680, 1,604 and 950 fish in the samples in 1978 to 1980, respectively. Hence, the current numbers are likely accurate.

Both the Winter and Edge fisheries are assumed to occur in times and places where fish from all spawning components and subpopulations of fall spawners are mixed while overwintering. As the fall spawning subpopulation cannot be determined from the available biological samples, it is impossible to attribute a specific proportion of the catch to individual subpopulations. One way to address this issue would be to allocate the Mobile Winter and Edge catches proportionally to the estimated biomass in each region for each year. This approach assumes equal catchability of fish from all regions in these fisheries and could be incorporated into the population model. Until a regional model can separate all fisheries and allow movement of North, Middle, and South region fish into the overwinter area and the Overwinter fishery catch be split relative to the subpopulations stock size, assumptions about the split need to be made. This framework review used the annual proportions of Fixed gear fishery catch between subpopulation and split the Overwinter fishery catch accordingly, as was done in previous assessments.

The total catch is expected to be accurate as DMP coverage is 100% for NAFO 4TVn herring fisheries. The largest uncertainty about total catch values likely lies in the attribution between spring and fall spawners, which is dependent of the quality of the sampling data. The catch at age is also expected to be accurate as sample sizes are high for the commercial catches, especially for the fixed gear. The sample selection for both the biological samples and the length frequency samples were mostly of the first criteria which is a perfect match to the fishery year to characterize.

RESEARCH VESSEL SURVEY

The greater proportion of pre-spawning and spawning fish in the South region survey catches aligns with expectations that South region herring are actively spawning during the survey period, whereas a substantial proportion of fish captured in the North and Middle region have mostly completed spawning. Fish from these northern areas may also be dispersed elsewhere in the Gulf to feed or may have begun migrating to overwintering areas. This could explain the larger catches observed in the South region, where fish are aggregated and more susceptible to trawling. It also supports the conclusion that fish sampled in the South are indeed local spawners, consistent with the tendency of herring to return to their natal region to spawn

(Brophy et al. 2006; Moll et al. 2025). Accordingly, the South region age composition and biomass indices from the RV survey are likely the most reliable among the three regions.

These differences in expected regional availability to the survey are reflected in the quality of the data in two main ways. First, age-aggregated biomass indices for the North and Middle regions had higher standard deviations and the biomass was often near zero. Both regions also exhibited implausible year-to-year fluctuations, with years of very high biomass surrounded by years of near-zero biomass. Such patterns are unlikely to reflect true population dynamics and more likely result from occasional trawl sets intersecting transient herring schools. Second, cohort tracking is weak in the proportions-at-age data, particularly in the Middle region. The North region shows somewhat better consistency, while the South region data display clearer separation between strong and weak cohorts and more coherent temporal progression. Correlation matrices further confirm that cohort tracking for ages 2–5 is generally unreliable, especially in the North and Middle regions, whereas tracking at older ages, particularly in the South, is more consistent.

McQuinn (2009) suggested that increases in herring catches from bottom-trawl surveys may reflect increased association of herring with the seafloor, potentially due to reduced predation pressure following groundfish stock collapses. In such cases, higher survey catches would primarily result from increased catchability rather than true abundance increases. However, given the scale and trajectory of herring catches in the sGSL RV survey, it would be difficult to justify catchability changes alone as an adequate explanation.

The sGSL is shallower than neighboring herring habitats (nGSL, Newfoundland, Bay of Fundy). sGSL herring may therefore be more susceptible to bottom trawl capture than those in other Canadian regions. The annual DFO acoustic–trawl herring survey uses a bottom trawl to collect biological samples from acoustically detected schools, as it has proven more effective than midwater trawls in the shallow coastal waters of the sGSL. Furthermore, the proportion of herring schools detected in the BDCM acoustic survey that were near-bottom increased from an average of 42% in 1994–1998 to 52% in 2005–2009 and 69% in 2017–2021 (unpublished data). If these findings are transferable to the RV survey, they suggest that sGSL herring are sufficiently vulnerable to bottom trawl sets of the RV survey for the data to be used as a reasonable abundance index. They may also indicate an increasing bottom association of sGSL herring, and consequently an increase in survey catchability over time. Temporal variation in the RV survey catchability should therefore be considered when building stock assessment models.

Given the high variability and questionable reliability of RV survey biomass estimates in the North and Middle regions, only the South region biomass index should be used for assessment purposes. The age composition data appear suitable for the South region, and potentially usable for the North region, but are too inconsistent to inform population modeling in the Middle region.

CHALEUR BAY/MISCOU ACOUSTIC SURVEY

Considering the available herring movement information, the BDCM acoustic survey should only be used for the North region. During the survey period (mid-September to mid-October), a portion of the fall-spawning stock is also likely still spawning, given the historical fall spawning window of early August to early October (Messieh 1987). After spawning, individuals feed intensively to recondition before migrating to overwintering areas, and may therefore remain near productive feeding grounds. Given this understanding, it is unlikely that the majority of the fall-spawning population from all three regions (North, Middle and South) consistently congregates in the Chaleur Bay region during the fall acoustic survey. The biomass index, age

composition and weight at age data were of good quality and should be considered for the population modeling.

A review of the sample selection and catch at age calculation was not feasible in time for this framework review process but should be performed in the future to address the uncertainty in age composition data.

SELECTIVITY AT AGE

The results of the selectivity-at-age analysis indicate that the selectivity of younger fish in gillnet catches has declined over time. This is supported by the relative decrease in the contribution of ages 2–5 in commercial gillnet catches (see Commercial fishery landings section). Historically, catches were dominated by fish aged 4–8, whereas after 2010, the majority of catches comprise fish aged 6 and older.

Given the considerable variation in the age composition of gillnet catches caused by changes in size-at-age and gillnet mesh sizes over the years, the commercial gillnet selectivity should be modeled using random effects in the population model. The expectation is that selectivity for younger fish will decrease over time. A mean selectivity curve is anticipated to be dome-shaped initially, but as the peak selected age shifts toward 11+, it will increasingly resemble a logistic curve.

It is important to note that this reflects gear selectivity rather than the realized selectivity, which is used in stock assessment models to allocate fishing mortality across ages. For example, if gear selectivity is 1 at ages 11+ in a given year but no fish of that age are present in the population due to age truncation, the realized selectivity at ages 11+ will be lower than 1. This discrepancy is not problematic if fall-spawning herring were abundant at all ages in all years. However, the current age truncation creates a disconnect between realized selectivity in the catch and gear selectivity. This represents a source of uncertainty that is challenging to reconcile within existing assessment frameworks.

EXPERIMENTAL GILLNETS AGE COMPOSITIION

Use of the experimental net biomass indices and age compositions has been challenging in previous assessments, and their application has therefore varied across assessment cycles. The analyses presented here suggest that the Middle region age composition data may be suitable for inclusion in stock-assessment models. In contrast, the North and South data appear to be of lower quality. Their use in modelling could still be considered, but likely only if other survey sources are insufficient to support stable models.

We expect the experimental nets selectivity pattern to approximate a logistic curve over the combined catch by mesh size: the smallest mesh sizes will fully select the youngest fully-vulnerable ages, and the larger meshes will fully select the older ages, producing a smooth increase to full selectivity.

AGE AT MATURITY

Recent directed research has shown that age-at-maturity in Canadian Atlantic herring stocks is temporally variable (Beaudry-Sylvestre et al. 2022). For sGSL Fall spawners in particular, age-at-maturity has increased over time, consistent with expectations that spawning-directed fisheries favour individuals that delay maturation (Law and Grey 1989). Historically, A50 values were close to 3 years for much of the time series, which differs substantially from the knife-edge maturity schedule previously used in assessments, where all fish aged 4+ were assumed to be

mature. This mismatch could have influenced historical estimates of spawning stock biomass (SSB).

Across the 46-year time series, A50 increased from roughly 2.75 years in the late 1970s to 3.26 in 2023 and 3.43 in 2024—an overall rise of about 0.7 years, though with periods of relative stability. Because the current A50 is now closer to the previous knife-edge assumption, the implications for SSB estimates differ through time: adopting the time-varying maturity schedule will generally increase SSB estimates in earlier years and reduce them in more recent years, when fewer fish mature at younger ages than previously assumed. The annual maturity-at-age estimates predicted by the model can therefore be used directly in stock-assessment modelling to better characterize temporal changes in SSB.

ECOSYSTEM INFORMATION

Recruitment drivers

Recruitment variability in fall spawning Atlantic herring is driven by a complex interplay of environmental and biological factors, with bottom-up processes playing a leading role. Brosset et al. (2019) showed that recruitment dynamics are explained more by zooplankton abundance and phenology than by spawning stock biomass or predation. Specifically, declining cold-water copepods suppressed spring recruitment, whereas fall recruitment responded strongly to warmer conditions and favorable zooplankton timing. Burbank et al. (2023a) supported this by applying a framework that found both physical (temperature, currents) and biological (prey, competition) ecosystem factors significantly influenced recruitment, varying across spawning components.

Burbank et al. (2023b) reviewed multiple life stages and identified temperature, prey availability, and predation as key drivers with large annual differences underpinned by the combined effects of nine biotic and eight abiotic variables. Overall, recruitment success in fall spawning herring is best predicted by ecosystem conditions, particularly zooplankton dynamics and temperature rather than by stock size alone, highlighting the importance of bottom-up forces.

Predators abundance

Abundances of a number of key predators of herring in the sGSL have changed throughout the time series (Rolland et al. 2022). Atlantic cod and white hake were historically key predators of young herring (ages 2-6), however abundances of these species declined drastically to very low levels in the early-1990s where they have since remained. Three top predators have seen important increases in abundance and/or consumption across the time series; Atlantic bluefin tuna, grey seals, and northern gannets. Previous stock assessments found that the time-varying natural mortality of older herring (ages 7-11+) estimated by the model was strongly and positively correlated with abundances of all three of these important predators. Northern gannets abundance is only described with sporadic data in the first decades of the time series and was not used in the assessment framework review.

Relative abundance indices for Atlantic bluefin tuna were obtained from Akia et al. (2025). These indices represent size-specific trends for three classes: small (<9 years or < 209 cm curved fork length), medium (9–15 years), and large (> 15 years or > 260 cm). While not absolute abundance, these indices provide a consistent measure of spatiotemporally smoothed changes in encounter probability and were selected as the predator indicator for this assessment.

Herring availability appears to be a critical factor in the decline of large bluefin tuna populations across both the sGSL and the Gulf of Maine. Turcotte et al. (2021c) used hydroacoustic data to

monitor bluefin tuna on two major fall spawning grounds of Atlantic herring over a 10-year period. Their findings revealed a 22-fold increase in bluefin tuna detections from 2002 to 2012. During this period, large bluefin tuna were the predominant size class in the sGSL. Furthermore, Burbank et al. (2024) suggested that large bluefin tuna, particularly those around 254 cm in length (254 curve fork length; approximately 15 years old based on conversion), tend to consume more herring as they grow, following an earlier preference for mackerel (Burbank et al. 2024). This is corroborated by the increasing contribution of Mackerel in the stomach contents of bluefin tuna caught in the commercial fishery as the caught are smaller with time (Turcotte et al. 2023).

The size of herring found in Atlantic bluefin tuna stomachs from the sGSL are of mature herring (Turcotte et al. 2023). Chase (2002) also found herring between 18 and 31 cm in the diet of Atlantic bluefin tuna from the Northeast United States coast, and Pleizier et al. (2012) found gravid herring in the 2010 bluefin tuna diet in the sGSL. Finally, Turcotte et al. (2021c) showed that Atlantic bluefin tuna targeted fall herring spawning grounds in the sGSL. This information suggests bluefin tuna feed on the spawning stock biomass (ages 3+) of herring in the sGSL. Mackerel found in bluefin tuna stomachs from this study ranged in length from 10 to 34 cm, which includes both juvenile and mature Mackerel. Chase (2002) also found mackerel between 10 and 36 cm in the diet of bluefin tuna from the Northeast coast of the United States. This information suggests that bluefin tuna feed on the mackerel stock biomass (ages 1+) in the sGSL.

Herring consumption estimates from bluefin tuna vary between sources based on the data, assumptions and methods used for the calculations. Benoît and Rail (2016) estimated an annual consumption of 5,206 t of herring for years prior to 2012. This estimate may still be conservative given that the fishing mortalities in the western bluefin tuna assessment are for the entire stock, and the CPUE index for the sGSL suggests a disproportionate abundance increase in the area relative to the entire stock (ICCAT 2014). Using the Atlantic bluefin tuna VPA estimates of numbers at age, Turcotte et al. (2021c) estimated the annual consumption of Atlantic herring by bluefin tuna in the sGSL to increase from approximately 8,000 t in 1994 to 13,000 t in 2015.

For this assessment framework review, the sum of the relative abundance per size class from Akia et al. (2025) was used as the Atlantic bluefin tuna abundance indicator, reflecting their ecological role and documented consumption of mature herring.

Grey seal population estimates from Hammill et al. (2023) indicate that pup production increased slightly from 92,300 individuals (95% CI: 86,700–100,100) in 2016 to 99,300 (90,900–107,700) in 2021, while total abundance rose from 339,400 (317,900–361,500) to 366,400 (317,800–409,400) over the same period. Although abundance continues to increase, the annual rate has slowed from approximately 4% in the previous assessment to 1.5% between 2016 and 2021, likely due to density-dependent effects on juvenile survival. Overall, the population has expanded from a few thousand animals in 1960 to over 366,000 in 2021.

Grey seal predation on herring is well documented. Multispecies modeling by Rossi et al. (2024) estimated herring consumption by grey seals at nearly 10,000 t annually between 2010 and 2020, while Benoît and Rail (2016) estimated an average of 11,220 t per year from 2005 to 2014 using a bioenergetics approach. Diet studies show seasonal variation. In coastal areas of the sGSL during late spring to August, herring comprised 11% of grey seal diets by weight (Hammill et al. 2007). Sampling off western Cape Breton and St. Paul’s Island suggests that male seals consume approximately 15.8% herring in the fall and 2.3% in winter, while females consume around 5.8% in fall and 25.8% in winter (Hammill et al. 2014). Consumed herring

typically range from 20–35 cm, with most between 26–30 cm, indicating predation on mature herring.

For this assessment framework review, grey seal abundance from the Gulf herd (Hammill et al. 2023) was used as the predator abundance indicator, reflecting their ecological role and documented consumption of mature herring.

REFERENCES CITED

Akia, S.A., Hanke, A., and Duplisea, D., 2025. Size-specific abundance dynamics of Atlantic Bluefin Tuna in Canadian waters. Fish. Res. 291: 107567.

Beaudry-Sylvestre, M., Benoit, H. P., & Hutchings, J. A. 2022. Combined effects of exploitation and environmental change on life history : a comparative analysis on Atlantic herring. ICES J. Mar. Sci. 79: 2728–2740.

Benoît, H.P., and Swain, D.P. 2003a. Standardizing the southern Gulf of St. Lawrence Bottom-Trawl Survey Time Series : Adjusting for Changes in Research Vessel, Gear and Survey Protocol. Can. Tech. Rep. Fish. Aquat. Sci. 2505: iv + 95 p.

Benoît, H.P., and Swain, D.P. 2003b. Accounting for length- and depth-dependent diel variation in catchability of fish and invertebrates in an annual bottom-trawl survey. ICES J. Mar. Sci. 60(6): 1298–1317.

Benoît, H.P. 2006. Standardizing the southern Gulf of St. Lawrence bottom trawl survey time series: Results of the 2004-2005 comparative fishing experiments and other recommendations for the analysis of the survey data. DFO Can. Sci. Advis. Sec. Res. Doc. 2006/008. iii + 127 p.

Benoît, H.P., LeBlanc, C., Surette, T., and Mallet, A. 2016. Background and data inputs for models evaluated as part of the 2015 southern Gulf of St. Lawrence fall-spawning herring assessment framework review. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/063. ix + 49 p.

Benoît, H.P., and Rail, J.-F. 2016. Principal predators and consumption of juvenile and adult Atlantic Herring (*Clupea harengus*) in the southern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/065. viii + 42 p.

Benoît, H.P., and Yin, Y. 2023. Results of Comparative Fishing Between the CCGS *Teleost* Fishing the Western IIA Trawl and CCGS *Capt. Jacques Cartier* Fishing the NEST Trawl in the Southern Gulf of St. Lawrence in 2021 and 2022. DFO Can. Sci. Advis. Sec. Res. Doc. 2023/083. xiii + 183 p.

Brophy, D., Danilowicz, B.S., and King, P.A. 2006. Spawning season fidelity in sympatric populations of Atlantic herring (*Clupea harengus*). Can. J. Fish. Aquat. Sci. 63(3): 607–616.

Brosset, P., Doniol-Valcroze, T., Swain, D.P., Lehoux, C., Van Beveren, E., Mbaye, B.C., Emond, K., and Plourde, S. 2019. Environmental variability controls recruitment but with different drivers among spawning components in Gulf of St. Lawrence herring stocks. Fish. Oceanogr. 28: 1-17.

Burbank, J., Turcotte, F., Sylvain, F.-É., and Rolland, N. 2023a. A statistical framework for identifying the relative importance of ecosystem processes and demographic factors on fish recruitment, with application to Atlantic herring (*Clupea harengus*) in the southern Gulf of St. Lawrence. Can. J. Fish. Aquat. Sci. 80(10): 1616-1630.

Burbank, J., DeJong, R.A., Turcotte, F., & Rolland, N. 2023b. Understanding factors influencing Atlantic herring (*Clupea harengus*) recruitment: From egg deposition to juveniles. Fish. Oceanography. 32(2): 147–159.

Burbank, J., Kelly, B., Hanke, A., Benoît, H.P., and Power, M. 2024. Ontogenetic shifts in isotope-inferred trophic ecology of Atlantic bluefin tuna *Thunnus thynnus* in Atlantic Canada. Mar. Ecol. Prog. Ser. 744: 147-160.

Carruthers, T., Ahrens, R. N. M., McAllister, M. K., and Walters, C. J. 2011. Integrating imputation and standardization of catch rate data in the calculation of relative abundance indices. Fish. Res. 109(1): 157–167.

Chadwick, E.M.P., Cairns, D.K., and Dupuis, H.M. 1989. Assessment of Atlantic herring in NAFO Division 4T, 1988. DFO Can. Sci. Advis. Sec. Res. Doc.1989/063. 60 p.

Chadwick, E.M.P., Brodie, W., Clark, D., Gascon, D., and Hurlbut, T. 2007. History of annual multi-species trawl surveys on the Atlantic Coast of Canada / Historique des relevés de chalut multi-spécifiques annuels sur la côte Atlantique du Canada. AZMP Bulletin No. 6 (April 2007): 25–42.

Chase, B.C. 2002. Differences in diet of Atlantic bluefin tuna (*Thunnus thynnus*) at five seasonal feeding grounds on the New England continental shelf. Fish. Bull. 100: 168-180.

Claytor, R.R. 2001. Fishery acoustic indices for assessing Atlantic herring populations. Can. Tech. Rep. Fish. Aquat. Sci. 2359: 213 p.

Claytor, R.R., Nielsen, G., Dupuis, H.M.C., and Cairns, D.K. 1991. Assessment of Atlantic herring in NAFO Division 4T, 1990. DFO Can. Sci. Advis. Sec. Res. Doc. 1991/066. 76 p.

Cleary, L., Hunt, J., Moores, J., and Tremblay, D. 1982. Herring aging workshop, St. John's, Newfoundland, March 1982. DFO CAFSAC Res. Doc. 82/41. 10 p.

Darbyson, E., Swain, D.P., Chabot, D., & Castonguay, M. 2003. Diel variation in feeding rate and prey composition of herring and mackerel in the southern Gulf of St. Lawrence. J. Fish Biol. 63(5): 1235–1257.

Feenstra, J., McGarvey, R., Linnane, A., Haddon, M., Matthews, J., & Punt, A. E. 2019. Impacts on CPUE from vessel fleet composition changes in an Australian lobster (*Jasus edwardsii*) fishery. New Zealand J. Mar. Freshwater Res. 53(2): 292–302.

Foote, K.G. 1987. Fish Target Strengths For Use in Echo Integrator Surveys. J. Acoust. Sci. Am. 82(3): 981-987.

Hammill, M.O., Stenson, G.B., Proust, F., Carter, P., and McKinnon, D. 2007. Feeding by Grey Seals in the Gulf of St. Lawrence and around Newfoundland. In Grey Seals in the North Atlantic and the Baltic, pp. 135–152. Ed. T. Haug, M. Hammill, D. Olafsdottir. NAMMCO Scientific Publication 6.

Hammill, M.O., den Heyer, C.E., and Bowen, W.D. 2014. Grey Seal Population Trends in Canadian Waters, 1960-2014. DFO Can. Sci. Advis. Sec. Res. Doc. 2014/037. iv + 43 p.

Hammill, M.O., Rossi, S.P., Mosnier, A., den Heyer, C.E., Bowen, W.D., and Stenson, G.B. 2023. Grey Seal Abundance in Canadian Waters and Harvest Advice. DFO Can. Sci. Advis. Sec. Res. Doc. 2023/053. iv + 40 p.

Hoyle, S. D., Campbell, R. A., Ducharme-Barth, N. D., Grüss, A., Moore, B. R., Thorson, J.T., Tremblay-Boyer, L., Winker, H., Zhou, S., & Maunder, M. N. 2024. Catch per unit effort modelling for stock assessment: A summary of good practices. Fish. Res. 269 (September 2023): 106860.

Hurlbut, T., and Clay, D. 1990. Protocols for research vessel cruises within the Gulf Region (demersal fish) (1970-1987). Can. Manuscr. Rep. of Fish. Aquat. Sci. 2082: 143 p.

ICCAT (International Commission for the Conservation of Atlantic Tunas). 2014. Report of the 2010 Atlantic Bluefin Tuna Stock Assessment Session. ICCAT, Madrid, Spain.

Jac, R., Piczak, M. L., Van Beveren, E., Boldt, J.L., Brosset, P., Burbank, J., Cleary, J.S., Flostrand, L.A., Harris, L.N., Hawkshaw, S., Pettitt-Wade, H., Robinson, C.L.K., Brown, C.R., & Lennox, R.J. 2025. Tracking the schools: a review of approaches to address knowledge gaps in the migratory ecology and habitat use of Canadian forage fishes. Reviews in Fish Biology and Fisheries. 35: 1751-1780.

Landry, L., Turcotte, F., Rolland, N. , McDermid, J. L., Cosandey-Godin, A. et Harbicht, A. B. 2024. Mise à jour de programmes de calcul de capture par unité d'effort pour les souspopulations de hareng du sud du Golfe du Saint-Laurent par la traduction du langage SAS vers le langage R. Rapp. manus. can. sci. halieut. aquat. 3286 : x + 66 p.

Law, R., and Grey, D. R. 1989. Evolution of yields from populations with age-specific cropping. Evolutionary Ecol. 3: 343–359.

LeBlanc, C., Mello, L., Dupuis, H., and Dale, J. 1995. Results of the December juvenile herring surveys from 1991 to 1994, and an overview of some other juvenile indices. DFO Atl. Fish. Res. Doc. 95/135: 31 p.

LeBlanc, C., and Dale, J. 1996. Distribution and acoustic backscatter of herring in NAFO divisions 4T and 4Vn, Sept. 23 - Oct. 08, 1995. DFO Atl. Fish. Res. Doc. 96/125. 28 p.

LeBlanc, C.H., Mallet, A., MacDougall, C., Bourque, C., and Swain, D. 2012. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence herring stocks in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/111. vi + 167 p.

LeBlanc, C.H., Mallet, A., Surette, T., and Swain, D. 2015. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence Atlantic herring (*Clupea harengus*) stocks in 2013. DFO Can. Sci. Advis. Sec. Res. Doc. 2015/025. vi + 142 p.

Maynard, L, Burbank, J., DeJong, R., Turcotte, F., McDermid, J., Sylvain, F.-E. and Rolland, N. 2024. Supporting Material for Stock Assessment of NAFO Division 4TVn Southern Gulf of St. Lawrence Atlantic Herring (*Clupea harengus*) in 2022-2023. DFO Can. Sci. Advis. Sec. Res. Doc. 2024/058. xi + 147 p.

Maynard, L.D., Landry, L., and Burbank, J. 2026. NAFO Division 4TVn Fall Spawning Atlantic Herring (*Clupea harengus*) Assessment Framework Review: Catch per Unit Effort Index. DFO Can. Sci. Advis. Sec. Res. Doc. 2026/061. iv + 31 p.

McQuinn, I.H. 1997. Metapopulations and the Atlantic herring. Reviews in Fish Biology and Fisheries. 7(3): 297–329.

McQuinn, I.H. 2009. Pelagic fish outburst or suprabenthic habitat occupation: legacy of the Atlantic cod (*Gadus morhua*) collapse in eastern Canada. Can. J. Fish. Aquat. Sci. 66: 2256-2262.

McQuinn, I.H. 1989. Identification of spring- and autumn spawning herring (*Clupea harengus*) using maturity stages assigned from a gonadosomatic index model. Can. J. Fish. Aquat. Sci. 46: 969-980.

McQuinn, I. H., Bourassam, M.-N., Tournois, C., Gregoire, F., and Baril, D. 2012. Ecologically and biologically significant areas in the Estuary and Gulf of St. Lawrence: small pelagic fishes. DFO Can. Sci. Advis. Sec. Res. Doc., 2012/087. ii + 76 p.

Messieh, S.N. 1972. Use of otoliths in identifying herring stocks in the southern Gulf of St. Lawrence and adjacent waters. J. Fish. Res. Bd. Canada 29: 1113-1118.

Messieh, S.N. 1987. Some Characteristics of Atlantic Herring (*Clupea harengus*) Spawning in the Southern Gulf of St. Lawrence. NAFO Science Council Studies. 11: 53–61.

Moll, D., Polte, P., Jochum, K.P., Gröhsler, T., Bekkevold, D., Mcquinn, I., Möllmann, C., Zimmermann, C., and Kotterba, P. 2025. Direct evidence of natal homing in an Atlantic herring metapopulation. Sci. Adv. 11.

O'Boyle, R.N. and Atkinson, D.B. 1989. Hydroacoustic Survey Methodologies for Pelagic Fish as Recommended by CAFSAC. CAFSAC Res. Doc. 89/72. 12 p.

Pleizier, N.K., Campana, S.E., Schallert, R.J., Wilson, S.G., and Block, B.A. 2012. Atlantic bluefin tuna (*Thunnus thynnus*) diet in the Gulf of St. Lawrence and on the eastern Scotian Shelf. J. Northwest Atl. Fish. Sci. 44: 67-76.

Ricard, D., Fishman, D., Rolland, N., Sylvain, F.-É., Turcotte, F., and Vergara, P. 2023. Validation of the paired sets from the comparative fishing experiments conducted between CCGS *Teleost* and CCGS *Capt. Jacques Cartier* in the southern Gulf of St. Lawrence, September 2021 and 2022. Can. Tech. Rep. Fish. Aquat. Sci. 3547: v + 274 p.

Rolland, N., Turcotte, F., McDermid, J.L., DeJong, R.A., and Landry, L. 2022. Assessment of the NAFO Division 4TVn southern Gulf of St. Lawrence Atlantic Herring (*Clupea harengus*) in 2020-2021. DFO Can. Sci. Advis. Sec. Res. Doc. 2022/068. xii + 142 p.

Rossi, S., Cox, S., and Benoît, H. 2024. Absence of predator control increases cod extirpation risk in a Northwest Atlantic ecosystem: inference from multispecies modelling. Mar. Ecol. Prog. Ser. 746: 99–119.

Simon, J., and Stobo, W.T. 1983. The 1982-1983 4Vn herring biological update. DFO Can. Atl. Fish. Sci. Adv. Comm. Res. Doc. 83/49. 28 p.

Surette, T.J. 2016. Abundance indices of Atlantic herring (*Clupea harengus*) from the southern Gulf of St. Lawrence based on the September multispecies bottom trawl survey. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/064. vii + 33 p.

Surette, T.J., LeBlanc, C.H., and Mallet, A. 2016. Abundance indices and selectivity curves from experimental multi-panel gillnets for the southern Gulf of St. Lawrence fall herring fishery. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/067. vi + 23 p.

Swain, D.P. 2016. Assessment framework for fall-spawning Atlantic herring (*Clupea harengus*) in the southern Gulf of St. Lawrence (NAFO Div. 4T): Population models and status in 2014. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/066. x + 58 p.

Turcotte, F., Swain, D. P., and McDermid, J. L. 2021a. NAFO 4TVn Atlantic herring population models: from Virtual Population Analysis to Statistical Catch-at-Age estimating time-varying natural mortality. DFO Can. Sci. Advis. Sec. Res. Doc. 2021/029. vi + 52 p.

Turcotte, F., Swain, D.P., McDermid, J.L., and DeJong, R. 2021b. Assessment of the NAFO Division 4T southern Gulf of St. Lawrence Atlantic herring (*Clupea harengus*) in 2018 and 2019. DFO Can. Sci. Advis. Sec. Res. Doc. 2021/030. xiv + 158 p.

Turcotte, F., McDermid, J.L., Tunney, T.D., and Hanke, A. 2021c. Increasing occurrence of Atlantic bluefin tuna on Atlantic herring spawning grounds: a signal of escalating pelagic predator–prey interaction? Mar. Coastal Fish. 13: 240–252.

Turcotte, F., McDermid, J.L., DeJong, R.A., Landry, L. and Rolland, N. 2022. Biomass indices of NAFO Division 4TVn fall spawning Atlantic Herring (*Clupea harengus*) from hydroacoustic surveys on spawning grounds. DFO Can. Sci. Advis. Sec. Res. Doc. 2022/046. iv + 18 p.

Turcotte, F., Hanke, A., and McDermid, J.L. 2023. Atlantic bluefin tuna diet variability in the southern Gulf of St. Lawrence, Canada. Mar. Environ. Res. 187: 105949.

Walters, C. 2003. Folly and fantasy in the analysis of spatial catch rate data. Can. J. Fish. Aquat. Sci. 60(12): 1433–1436.

Wheeler, J.P., Squires, B., and Williams, P. 2006. An assessment of Newfoundland east and south coast herring stocks to the spring of 2006. DFO Can. Sci. Advis. Sec. Res. Doc. 2006/101. 93 p.

Wheeler, J.P., and Winters, G.H., 1984. Homing of Atlantic herring (*Clupea harengus harengus*) in Newfoundland waters as indicated by tagging data. Can. J. Fish. Aquat. Sci. 41: 108-117.

Wilberg, M. J., Thorson, J. T., Linton, B. C., & Berkson, J. 2010. Incorporating time-varying catchability into population dynamic stock assessment models. Rev. Fish. Sci. 18(1): 7–24.

Winters, G.H., and Beckett, J.S. 1978. Migrations, biomass and stock interrelationships of southwest Newfoundland-southern Gulf herring from mark-recapture experiments. ICNAF Res. Bull. 13: 67–79.

APPENDIX 1: EDGE AND WINTER CATCH AT AGE RESULTS

EDGE

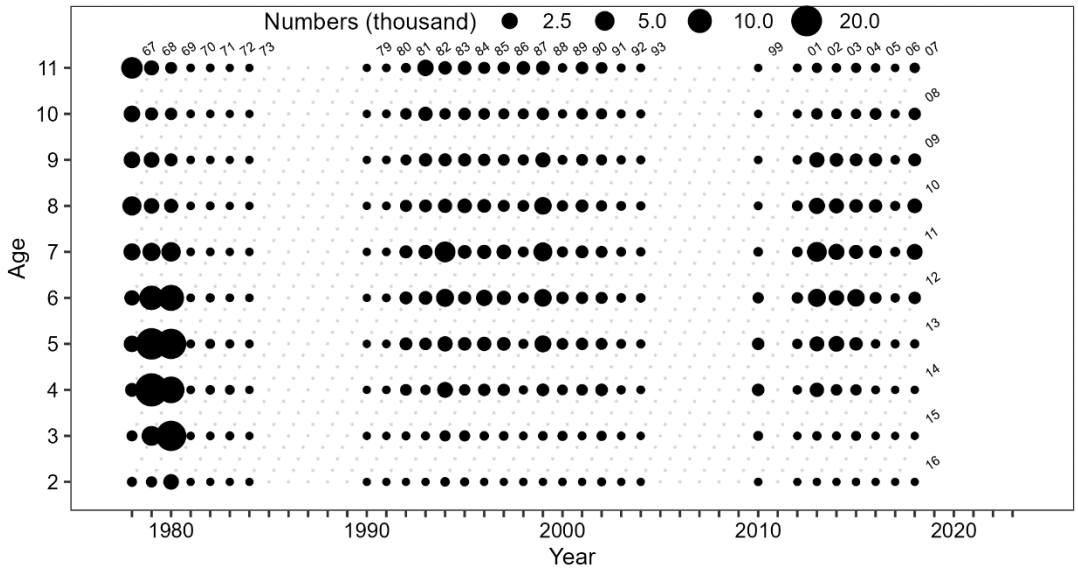


Figure A1: Edge fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

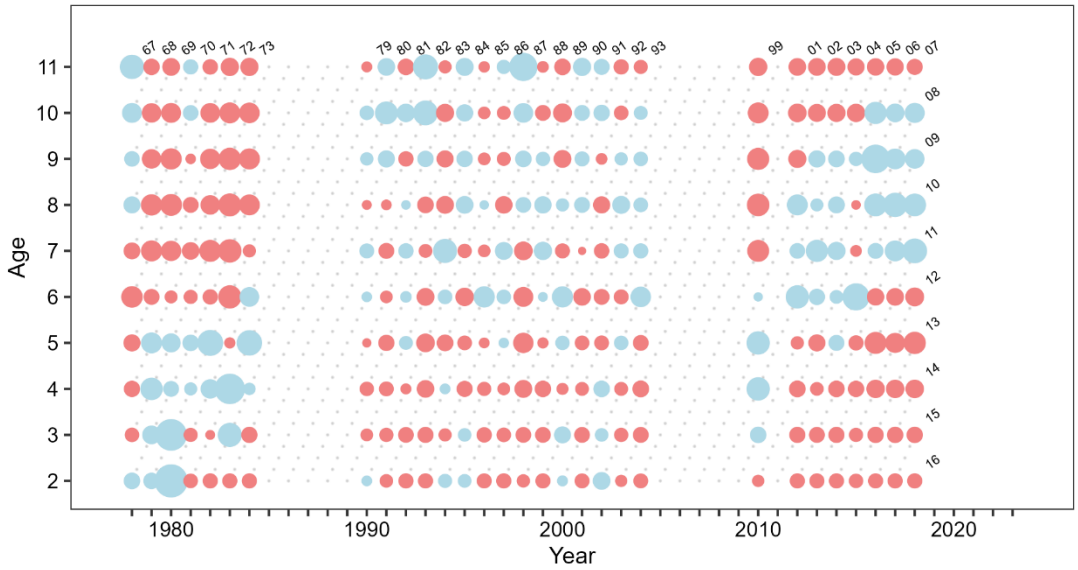


Figure A2: Standardized proportions at age of fall spawning Atlantic Herring in the Edge fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

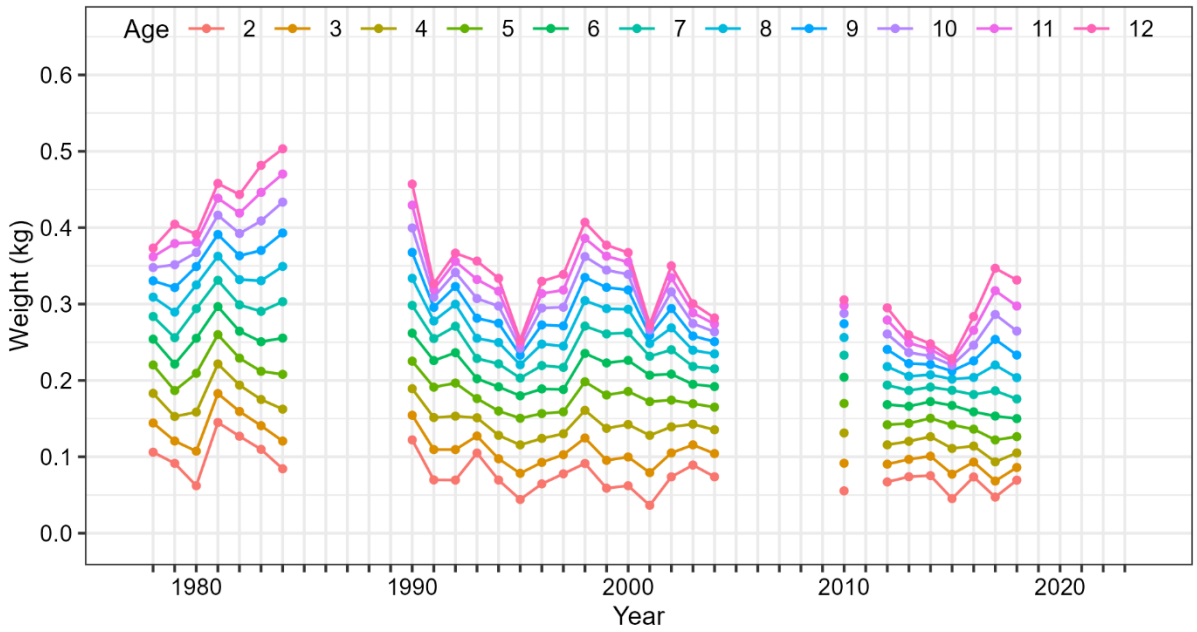


Figure A3: Edge fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

WINTER

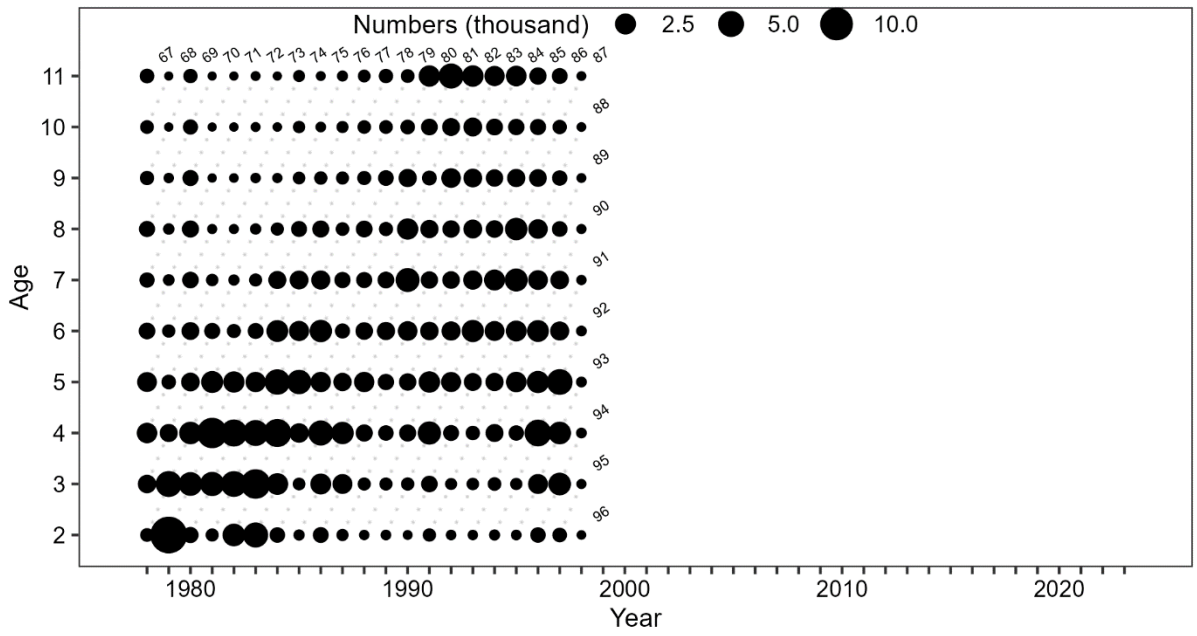


Figure A4: Winter fishery numbers at age of fall spawning Atlantic Herring between 1978 and 2023.

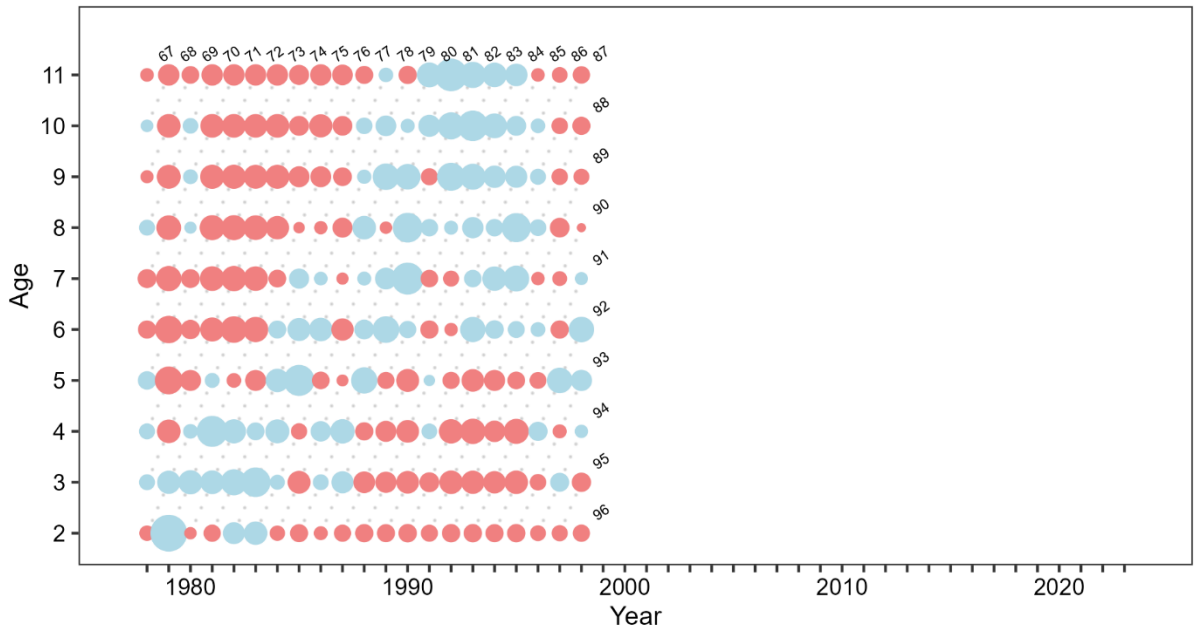


Figure A5: Standardized proportions at age of fall spawning Atlantic Herring in the Winter fishery between 1978 and 2023. Points show positive (blue) and negative (red) deviations from the mean proportional age composition across years. The size of each point is proportional to the magnitude of the standardized anomaly. Labels indicate the year class (last two digits) corresponding to cohorts.

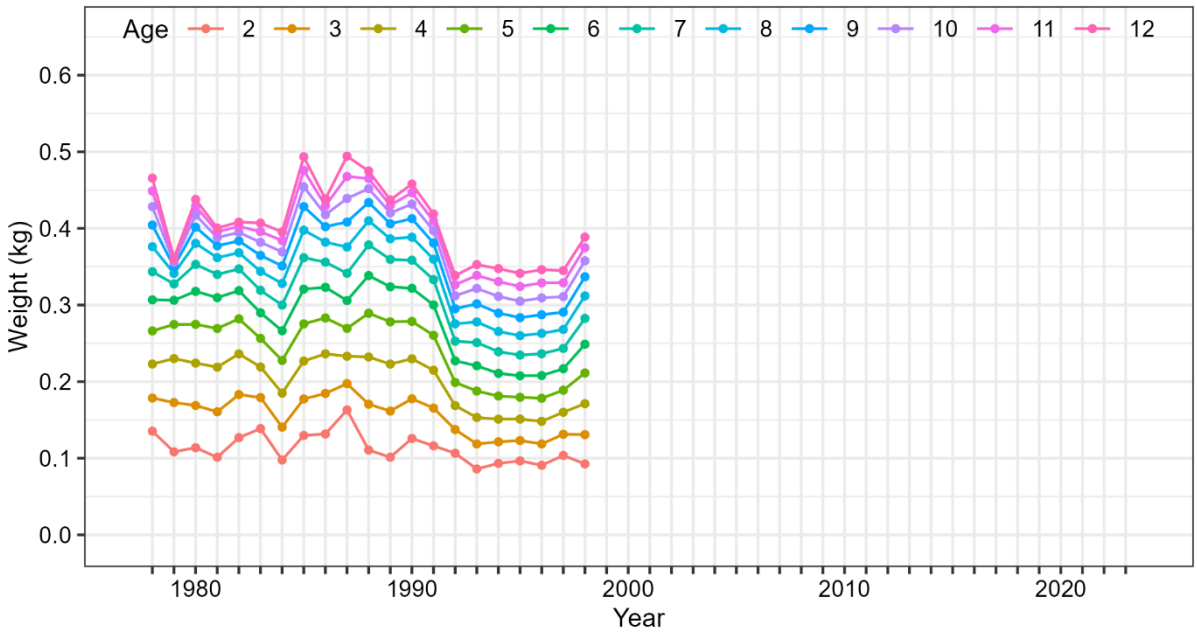


Figure A6: Winter fishery weight (kg) at age across years of fall spawning Atlantic Herring for ages 2 to 12 and years 1978 to 2023.

APPENDIX 2: CATCH AT AGE COMPARISON

MOBILE GEAR FISHERIES

Edge

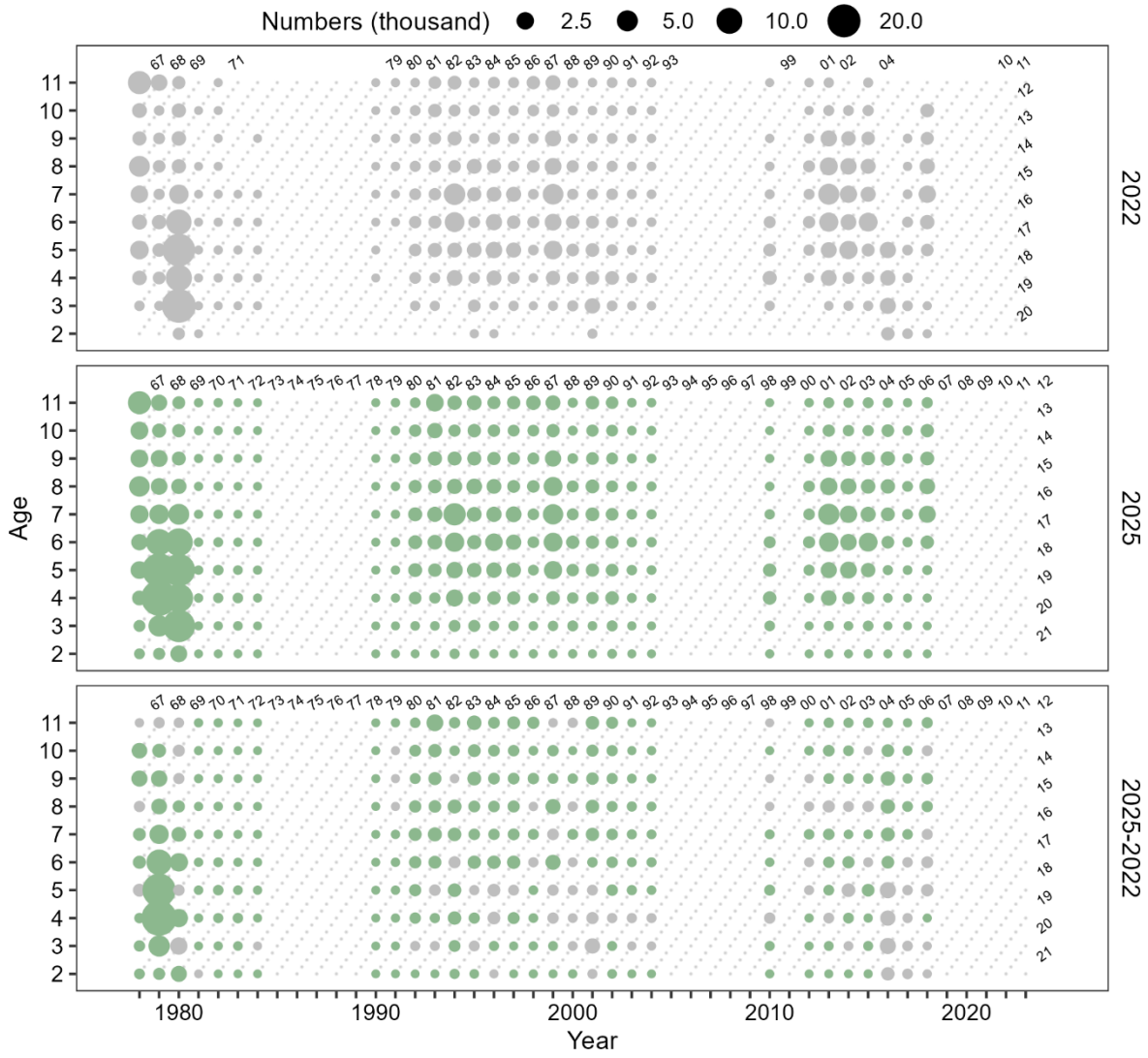


Figure A7: Edge fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

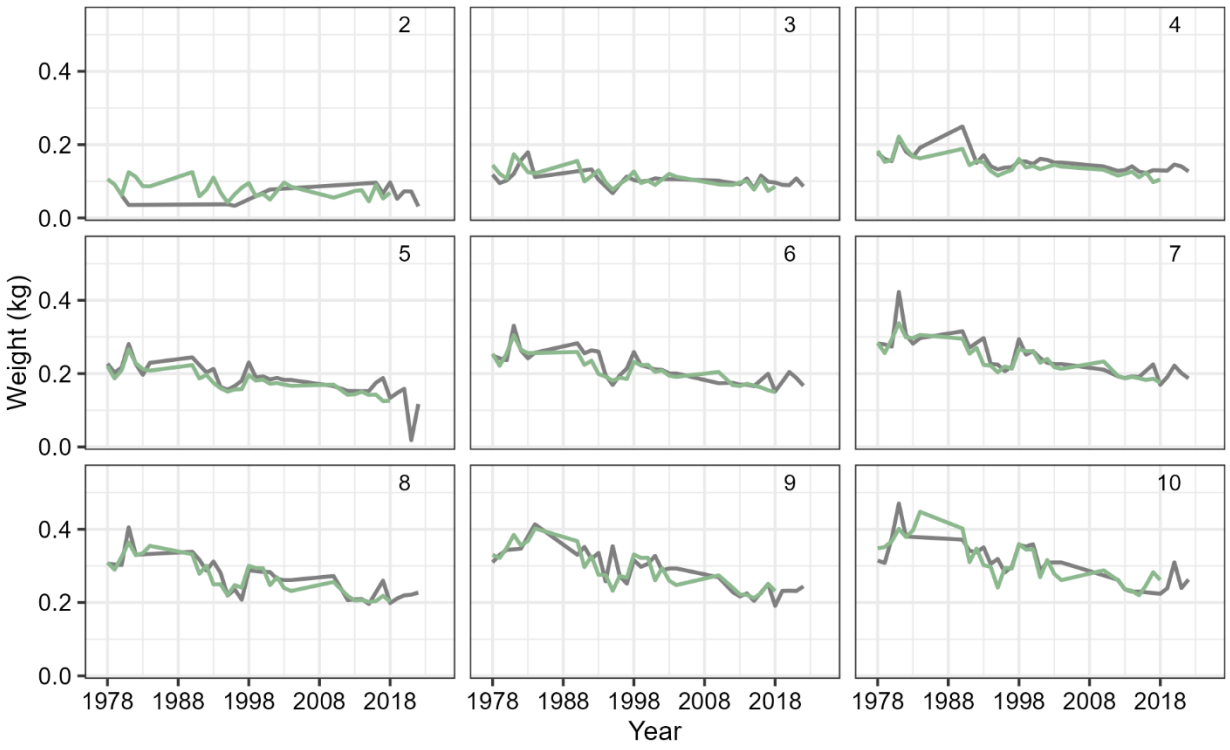


Figure A8: Edge fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Winter

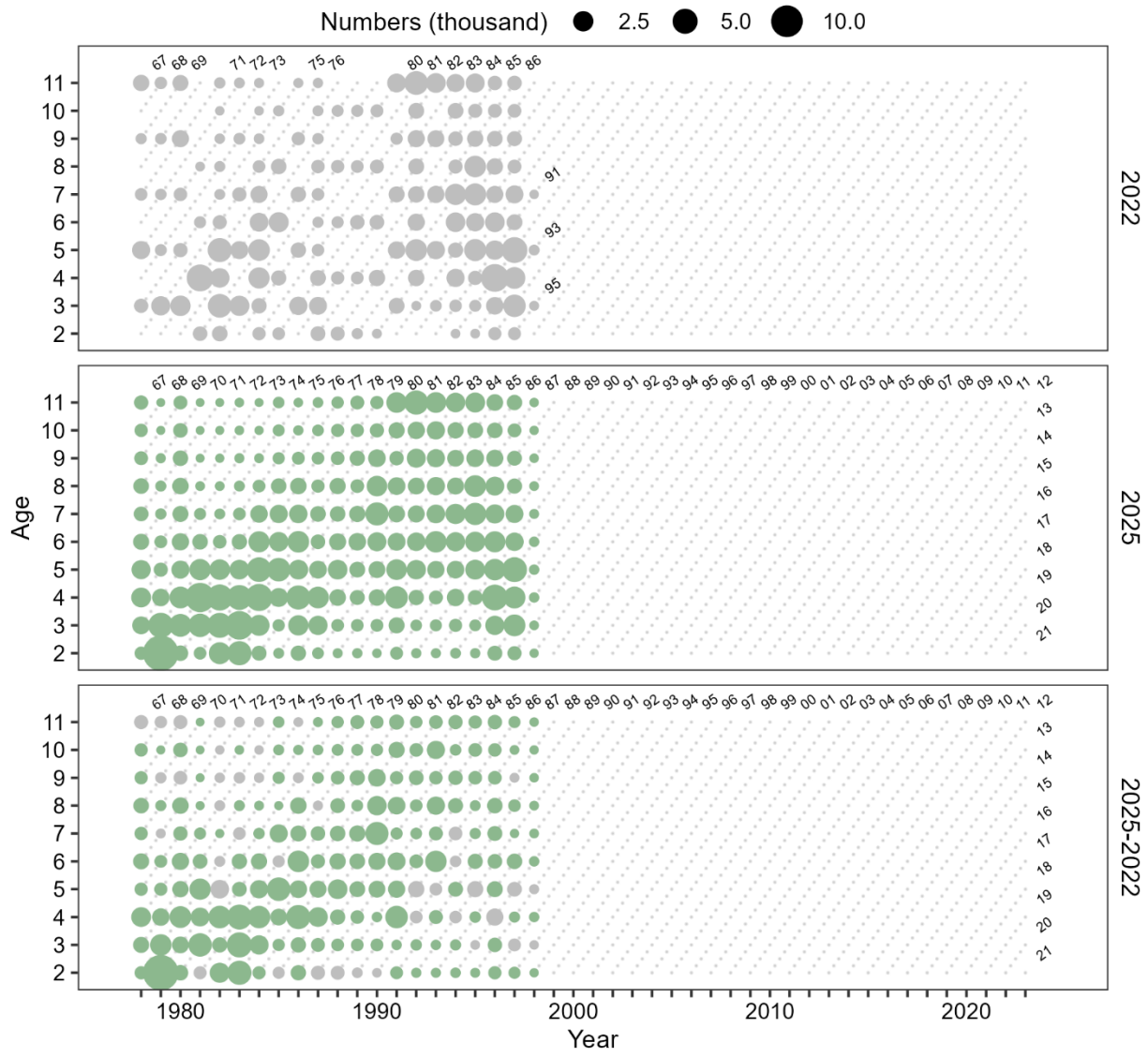


Figure A9: Winter fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

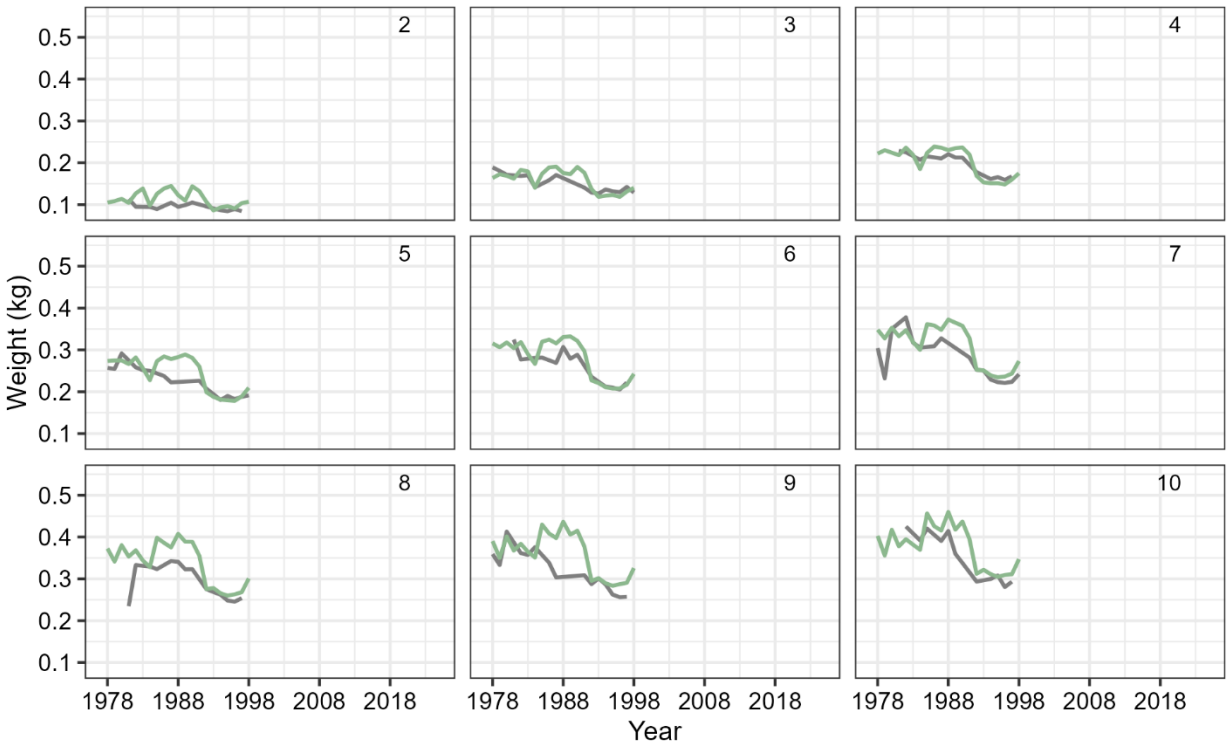


Figure A10: Winter fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Inshore North

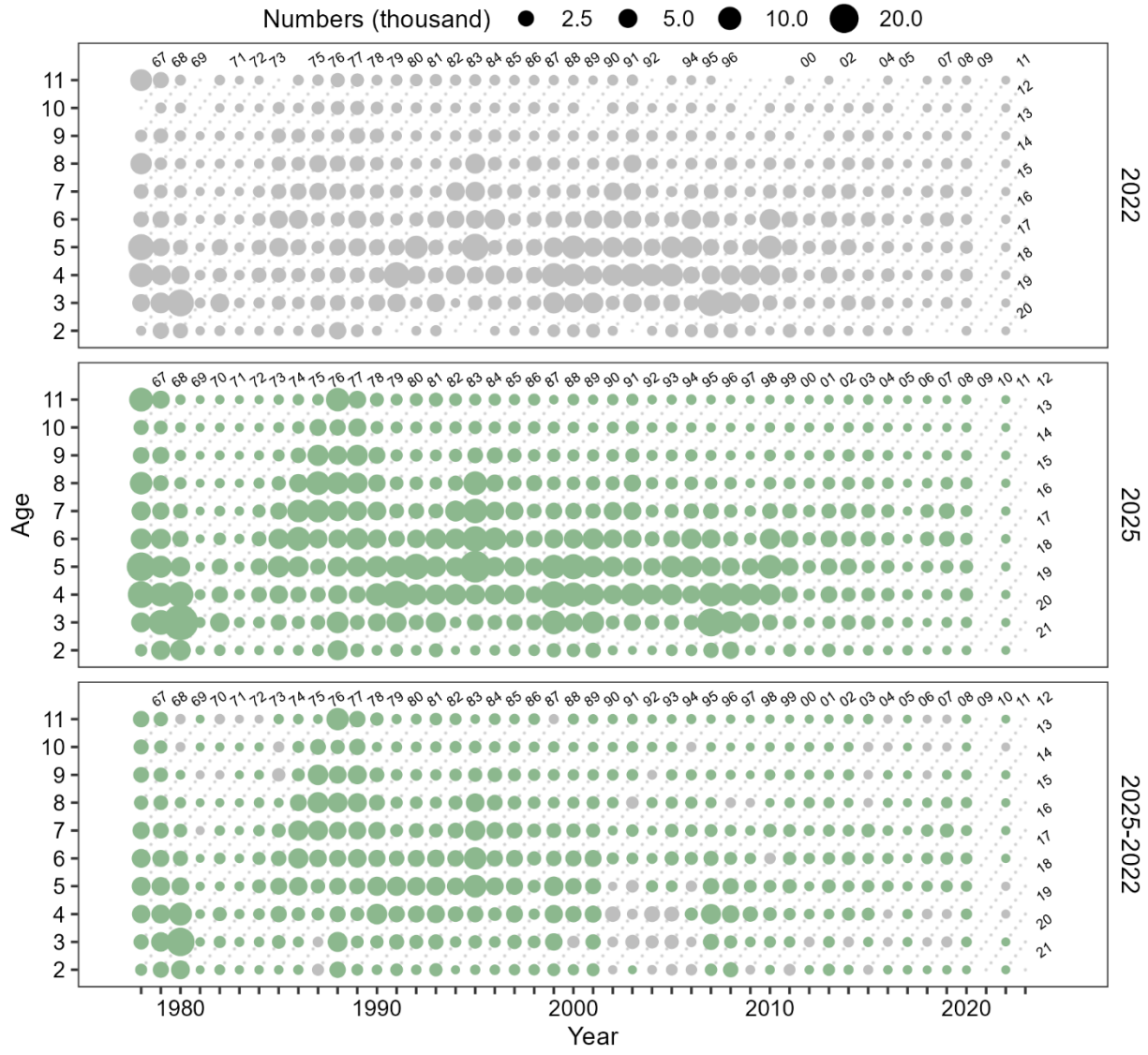


Figure A11: Inshore north fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

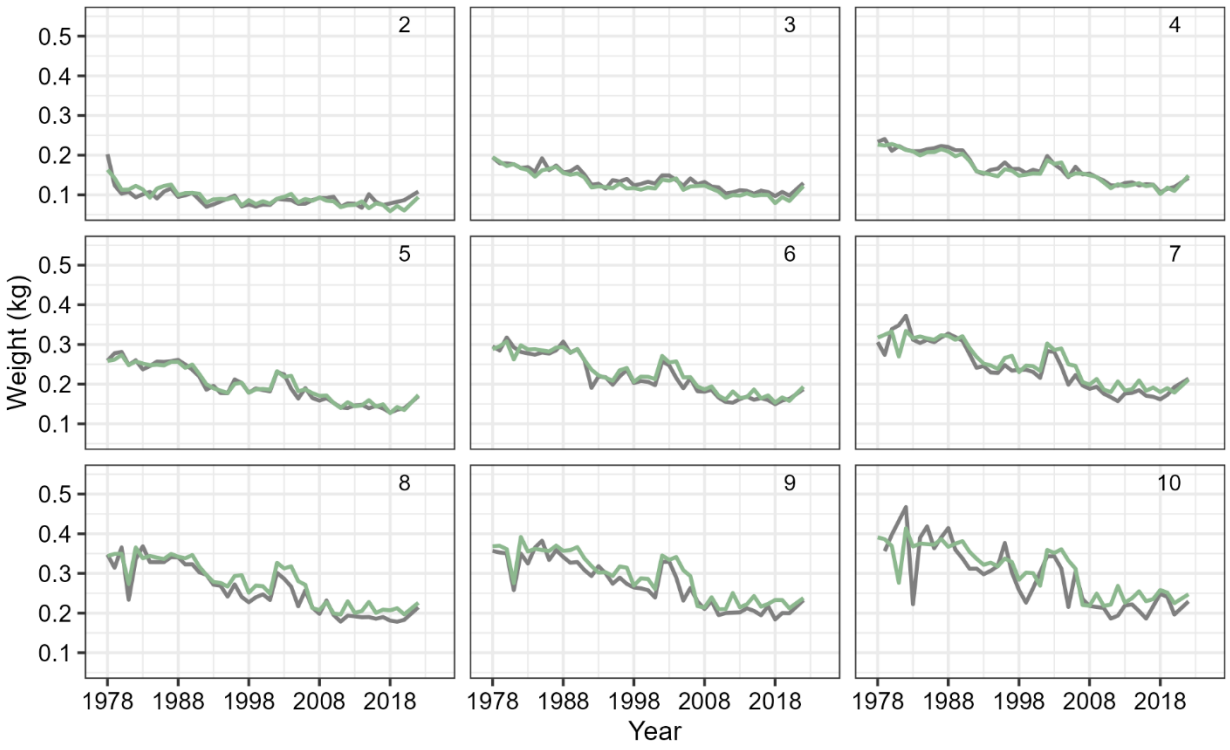


Figure A12: Inshore north fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Inshore Middle

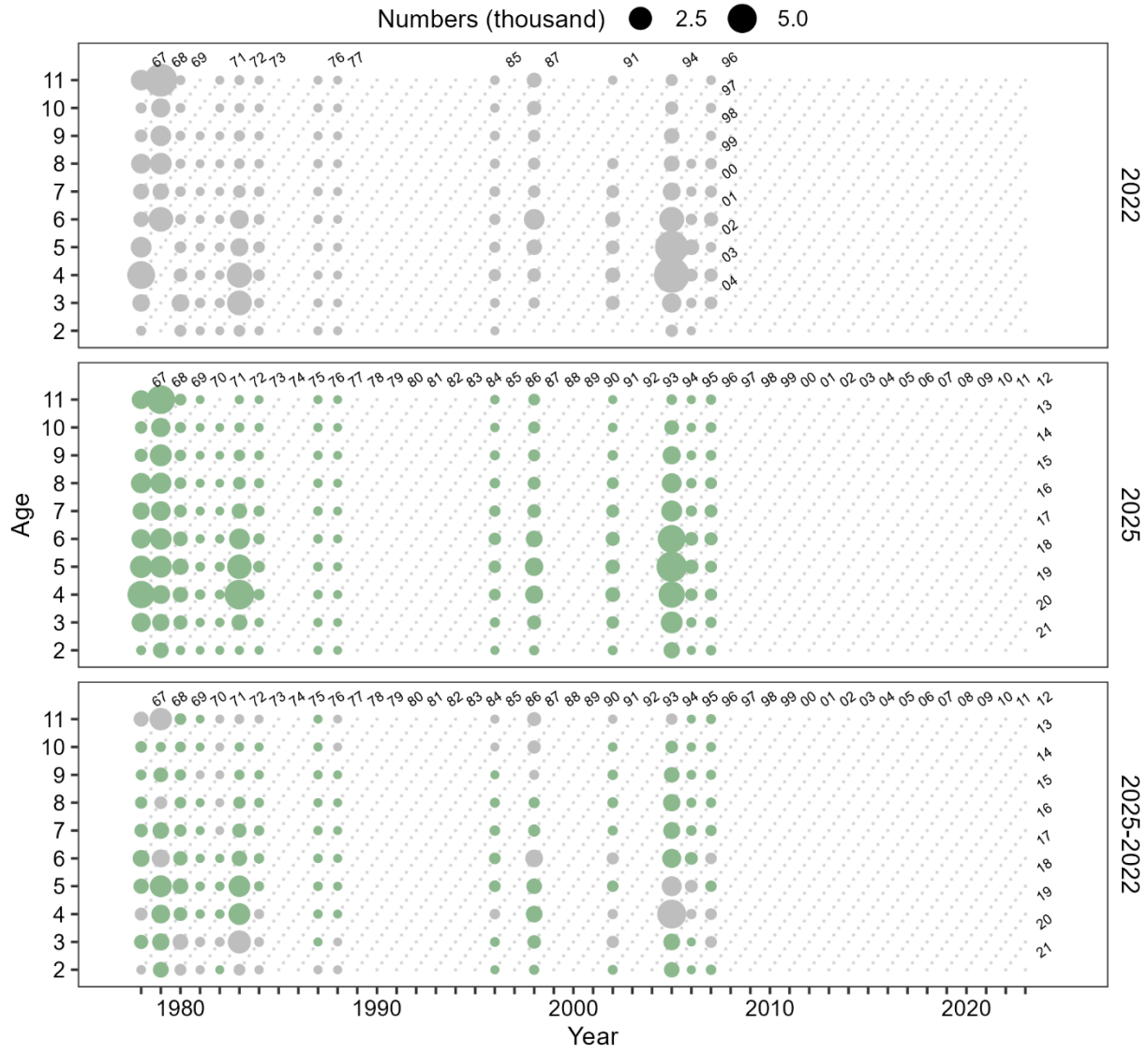


Figure A13: Inshore middle fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

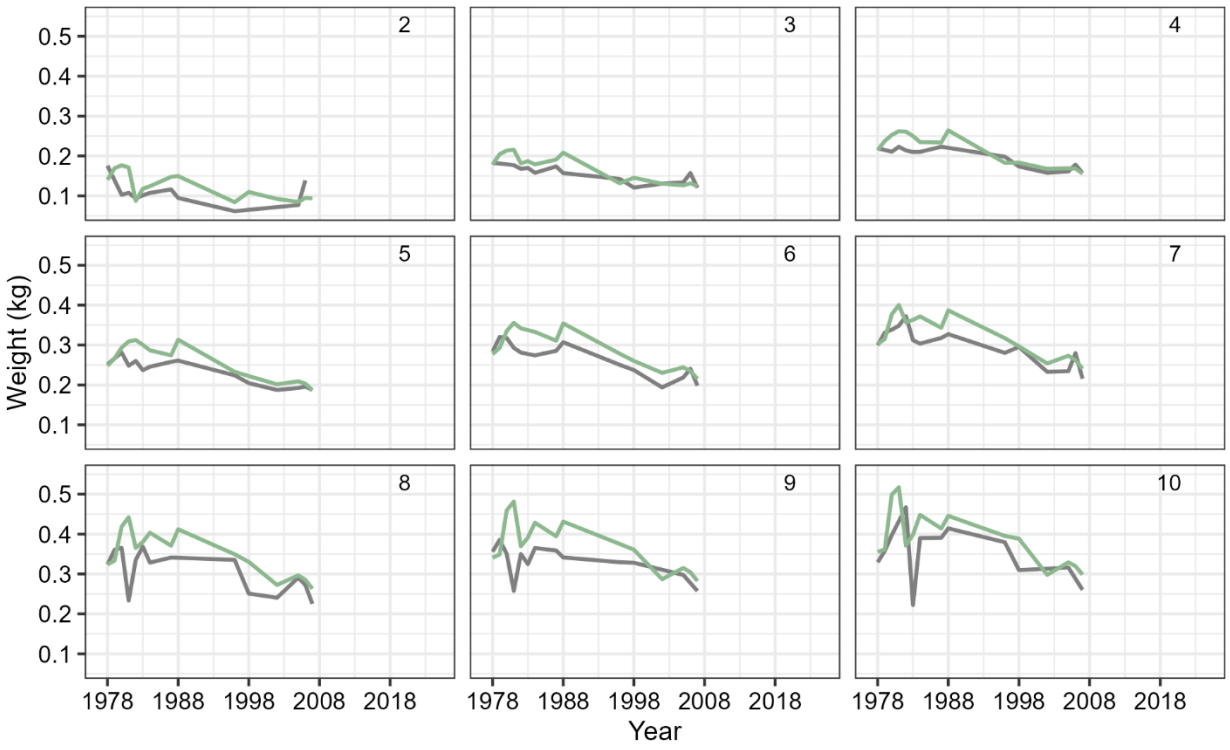


Figure A14: Inshore middle fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Inshore South

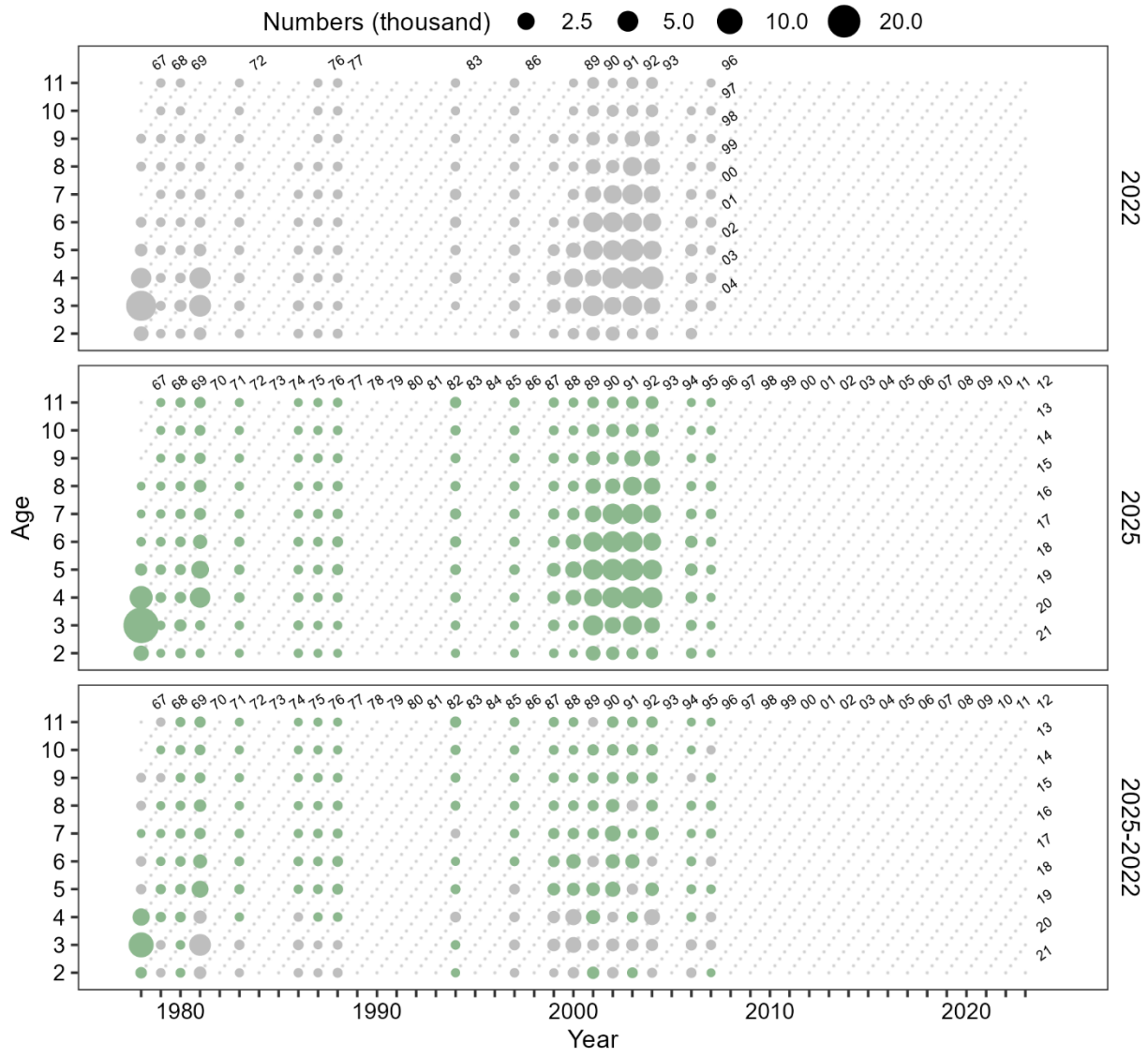


Figure A15: Inshore south fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

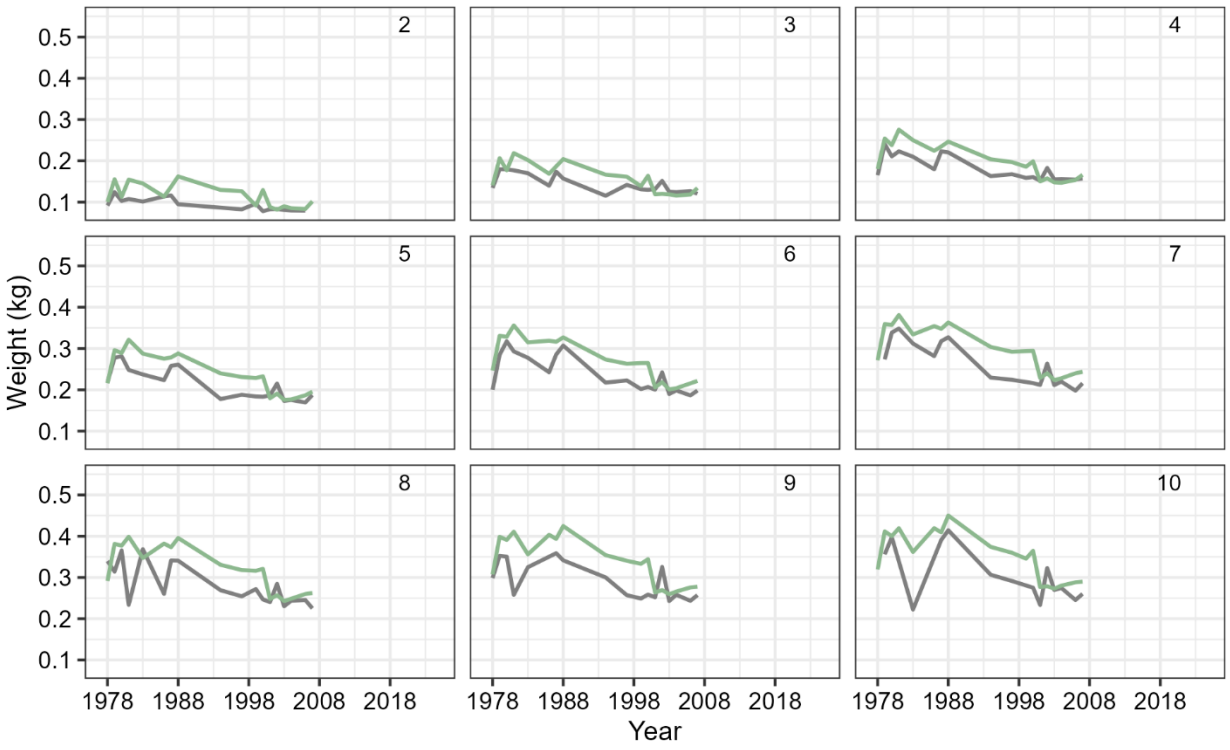


Figure A16: Inshore south fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

FIXED GEAR FISHERIES

Fixed North

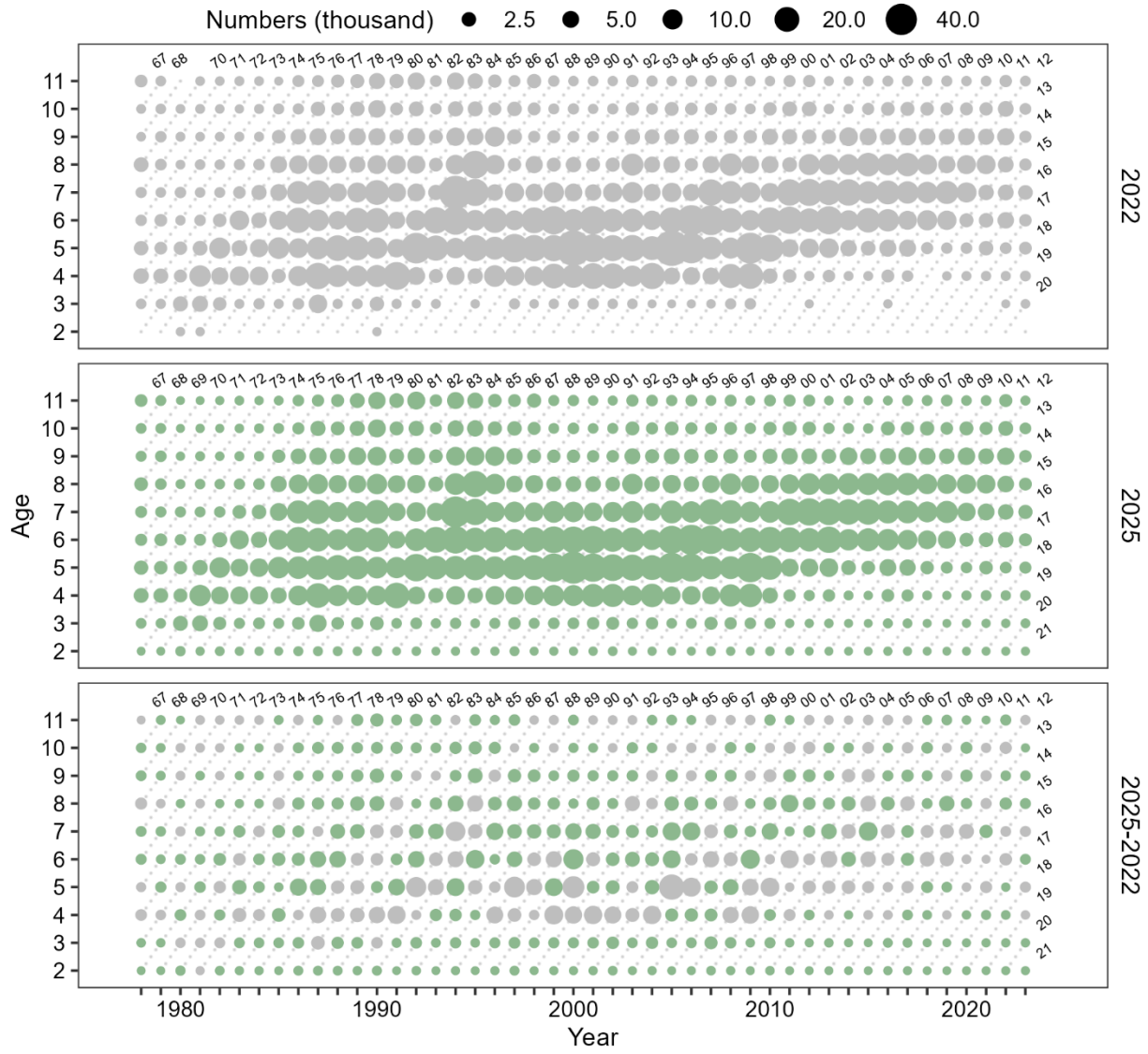


Figure A17: Fixed north fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document fall spawning for Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

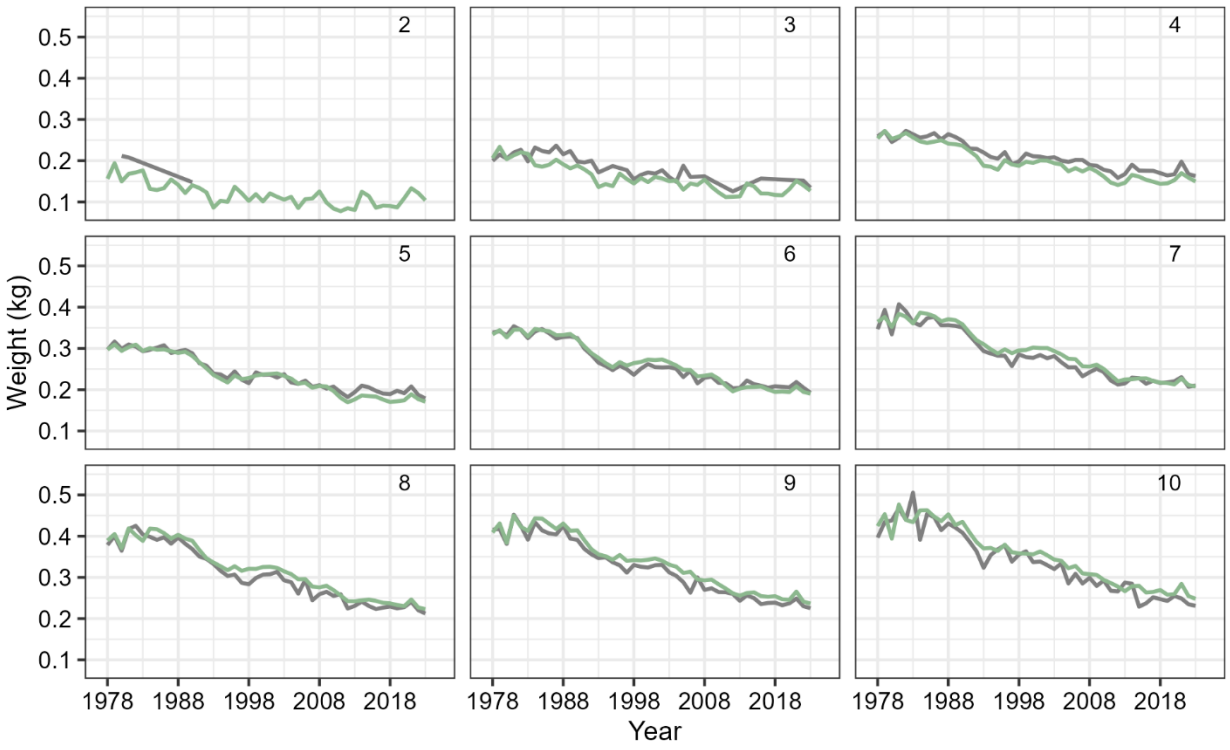


Figure A18: Fixed north fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Fixed Middle

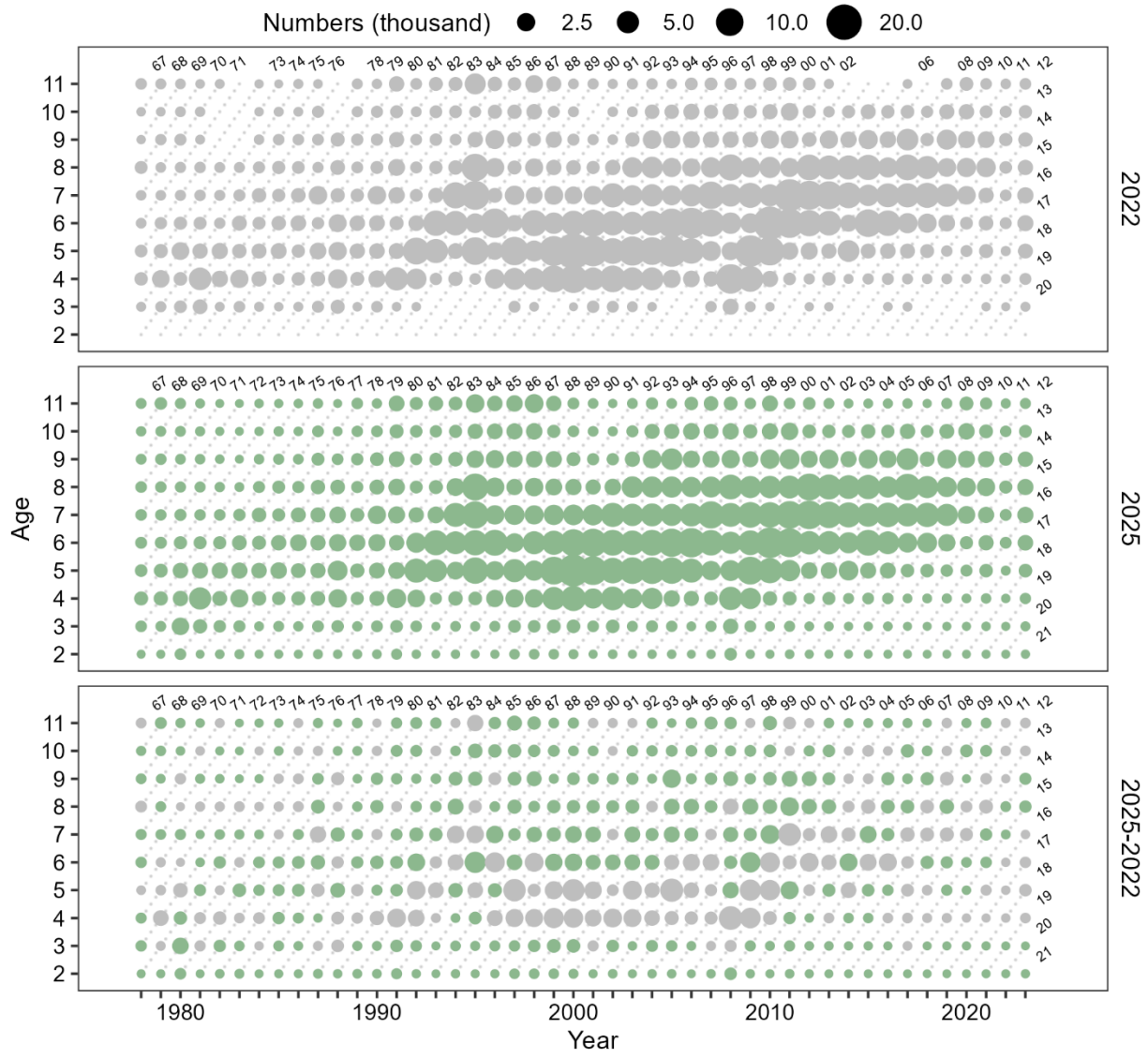


Figure A19: Fixed middle fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

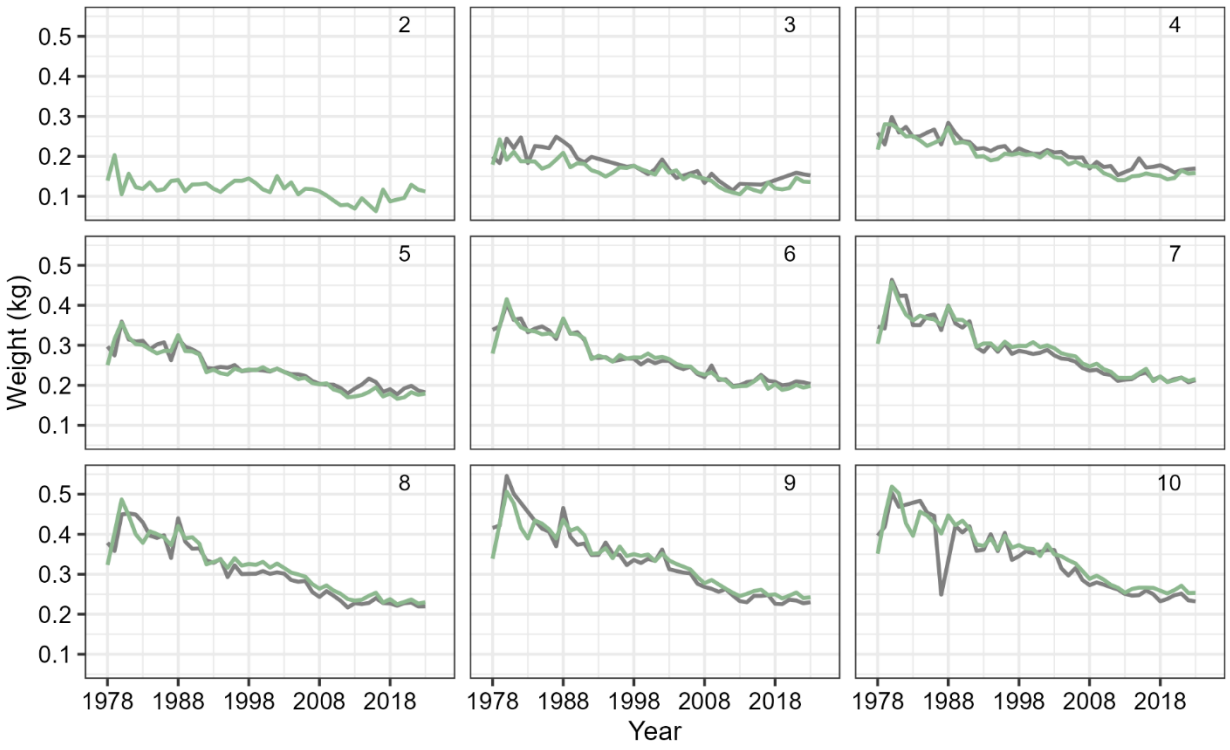


Figure A20: Fixed middle fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

Fixed South

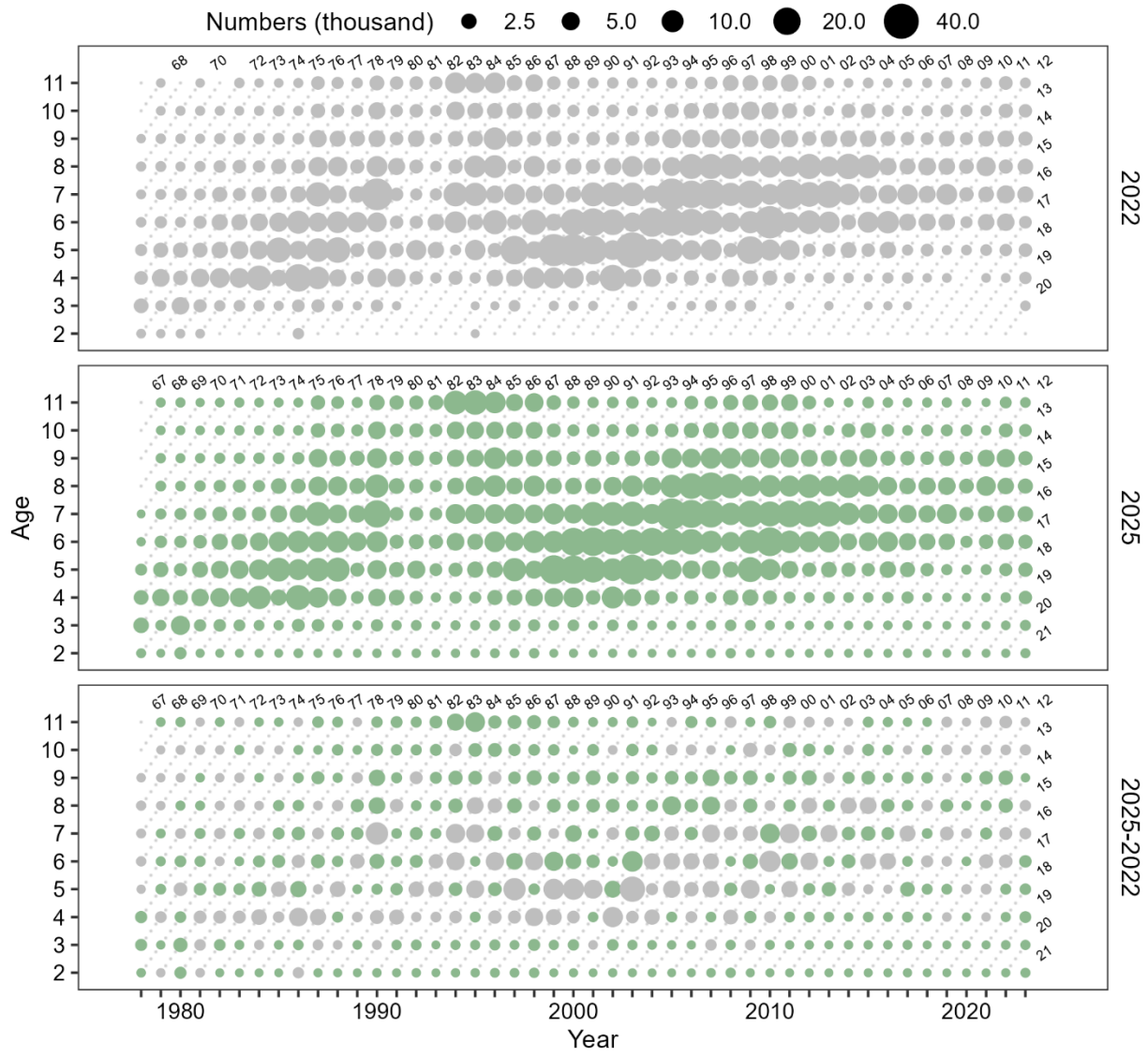


Figure A21: Fixed south fishery differences in number-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Bubble size and color show positive or present 2025 method (green) and negative or original 2022 method (grey). Labels indicate the year class (last two digits) corresponding to cohorts.

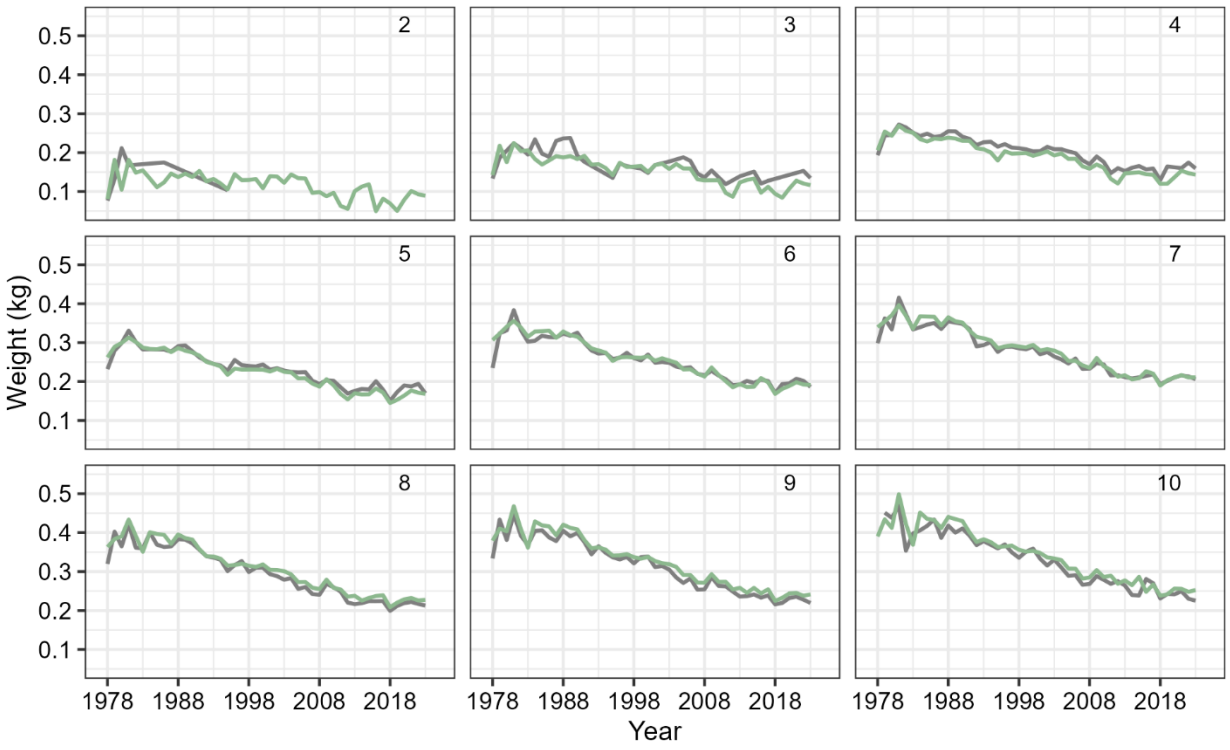


Figure A22: Fixed south fishery comparison in weight-at-age between the original approach (Rolland et al. 2022) and the revised method presented in this document for fall spawning Atlantic Herring between 1978 and 2023. Color show present 2025 method (green) and original 2022 method (grey). Panel labels indicate the age group.

APPENDIX 3: SAMPLE SELECTION ALGORITHM SUMMARY

Table A1: Biological samples strata summary for each fisheries resulting from the sample selection algorithm presented in this framework. The numbers followed by a colon represent the criteria used. Fishery to Match: the fishery to characterize. Year to Match: the year to characterize. Years, Months, Seasons, Fisheries, Gear types, Gears, Regions variables correspond to the identification of the selected samples. N Fish: the number of fish selected in the samples. N Fish Criteria: the number of fish that was available.

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
Fixed Middle										
	1978	3: 1978	3: 10, 9	3: Fall	3: Inshore Middle	3: Mobile	3: PS1	3: Middle	3: 125	3: 421
	1979	1: 1979	1: 9, 7	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 189	1: 189
	1980	1: 1980 4: 1980	1: 7 4: 10, 9	1: Fall 4: Fall	1: Fixed Middle 4: Inshore North, Fixed North	1: Fixed 4: Mobile, Fixed	1: GNS 4: PS1, GNS	1: Middle 4: North	1: 88 4: 37	1: 88 4: 917
	1981	1: 1981	1: 8, 9, 7	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 764	1: 764
	1982	4: 1982	4: 8, 7, 10, 9	4: Fall	4: Fixed South, Fixed North, Inshore North	4: Fixed, Mobile	4: GNS, PS1	4: South, North	4: 125	4: 2642
	1983	1: 1983	1: 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 154	1: 154
	1984	1: 1984	1: 8, 10, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 385	1: 385
	1985	4: 1985	4: 10, 9, 7, 8	4: Fall	4: Inshore North, Fixed North, Fixed South	4: Mobile, Fixed	4: PS1, GNS	4: North, South	4: 125	4: 933
	1986	4: 1986	4: 8, 10, 9, 7	4: Fall	4: Fixed North, Inshore North, Fixed South, Inshore South	4: Fixed, Mobile	4: GNS, PS1, GND, PS2	4: North, South	4: 125	4: 1392
	1987	1: 1987 4: 1987	1: 9 4: 8, 10, 9, 7	1: Fall 4: Fall	1: Fixed Middle 4: Fixed North, Fixed South, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: Middle 4: North, South	1: 31 4: 94	1: 31 4: 2819

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1988	1: 1988 4: 1988	1: 9 4: 8, 7, 9, 10	1: Fall 4: Fall	1: Fixed Middle 4: Fixed North, Fixed South, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: Middle 4: North, South	1: 87 4: 38	1: 87 4: 1192
	1989	4: 1989	4: 10, 9, 8, 7	4: Fall	4: Inshore North, Fixed North, Fixed South	4: Mobile, Fixed	4: PS1, GNS	4: North, South	4: 125	4: 1769
	1990	1: 1990	1: 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 132	1: 132
	1991	1: 1991	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 208	1: 208
	1992	1: 1992 4: 1992	1: 9 4: 8, 9, 10	1: Fall 4: Fall	1: Fixed Middle 4: Fixed South, Fixed North, Inshore North, Inshore South	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS2, PS1, OTM2	1: Middle 4: South, North	1: 28 4: 97	1: 28 4: 2169
	1993	1: 1993	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS, GN	1: Middle	1: 321	1: 321
	1994	1: 1994 4: 1994	1: 9 4: 9, 10, 8, 7	1: Fall 4: Fall	1: Fixed Middle 4: Fixed South, Fixed North, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1, GND	1: Middle 4: South, North	1: 85 4: 40	1: 85 4: 1247
	1995	1: 1995 4: 1995	1: 9, 8 4: 9, 10, 8, 7	1: Fall 4: Fall	1: Fixed Middle 4: Fixed North, Fixed South, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: Middle 4: North, South	1: 83 4: 42	1: 83 4: 2217
	1996	1: 1996	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 164	1: 164
	1997	1: 1997	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 339	1: 339
	1998	1: 1998	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 250	1: 250
	1999	1: 1999	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 243	1: 243
	2000	1: 2000	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 301	1: 301
	2001	1: 2001	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 272	1: 272
	2002	1: 2002	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 178	1: 178

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2003	1: 2003	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 257	1: 257
	2004	1: 2004	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 283	1: 283
	2005	1: 2005 3: 2005	1: 8, 9 3: 10	1: Fall 3: Fall	1: Fixed Middle 3: Inshore Middle	1: Fixed 3: Mobile	1: GNS 3: PS1	1: Middle 3: Middle	1: 119 3: 6	1: 119 3: 23
	2006	1: 2006	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 334	1: 334
	2007	1: 2007	1: 10, 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 523	1: 523
	2008	1: 2008	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 265	1: 265
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 388	1: 388
	2010	1: 2010	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 368	1: 368
	2011	1: 2011	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 136	1: 136
	2012	1: 2012	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 220	1: 220
	2013	1: 2013	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 235	1: 235
	2014	1: 2014	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 256	1: 256
	2015	1: 2015	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 191	1: 191
	2016	1: 2016	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 156	1: 156
	2017	1: 2017	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 134	1: 134
	2018	1: 2018	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 165	1: 165
	2019	1: 2019	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 274	1: 274
	2020	1: 2020	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 137	1: 137
	2021	1: 2021	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 242	1: 242
	2022	1: 2022	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 191	1: 191

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2023	1: 2023	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 274	1: 274
Fixed North										
	1978	1: 1978	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 892	1: 892
	1979	1: 1979	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 248	1: 248
	1980	1: 1980	1: 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 270	1: 270
	1981	1: 1981	1: 8, 9, 10, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1687	1: 1687
	1982	1: 1982	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1746	1: 1746
	1983	1: 1983	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1052	1: 1052
	1984	1: 1984	1: 9, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 792	1: 792
	1985	1: 1985	1: 10, 9, 7, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 274	1: 274
	1986	1: 1986	1: 8, 7, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 488	1: 488
	1987	1: 1987	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1141	1: 1141
	1988	1: 1988	1: 8, 7, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 551	1: 551
	1989	1: 1989	1: 9, 10, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1225	1: 1225
	1990	1: 1990	1: 9, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1522	1: 1522
	1991	1: 1991	1: 9, 8, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1207	1: 1207
	1992	1: 1992	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1006	1: 1006
	1993	1: 1993	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 682	1: 682
	1994	1: 1994	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 500	1: 500
	1995	1: 1995	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1045	1: 1045
	1996	1: 1996	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 884	1: 884

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1997	1: 1997	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 680	1: 680
	1998	1: 1998	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 600	1: 600
	1999	1: 1999	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 594	1: 594
	2000	1: 2000	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GND, GNS	1: North	1: 883	1: 883
	2001	1: 2001	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 821	1: 821
	2002	1: 2002	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 380	1: 380
	2003	1: 2003	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 361	1: 361
	2004	1: 2004	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 495	1: 495
	2005	1: 2005	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 555	1: 555
	2006	1: 2006	1: 7, 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 463	1: 463
	2007	1: 2007	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 464	1: 464
	2008	1: 2008	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 545	1: 545
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 423	1: 423
	2010	1: 2010	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 456	1: 456
	2011	1: 2011	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 393	1: 393
	2012	1: 2012	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 397	1: 397
	2013	1: 2013	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 224	1: 224
	2014	1: 2014	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 225	1: 225
	2015	1: 2015	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 230	1: 230
	2016	1: 2016	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 433	1: 433
	2017	1: 2017	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 444	1: 444

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2018	1: 2018	1: 9, 7, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 366	1: 366
	2019	1: 2019	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 378	1: 378
	2020	1: 2020	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 295	1: 295
	2021	1: 2021	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 312	1: 312
	2022	1: 2022	1: 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 463	1: 463
	2023	1: 2023	1: 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 463	1: 463
Fixed South										
	1978	1: 1978 3: 1978	1: 7 3: 9, 10	1: Fall 3: Fall	1: Fixed South 3: Inshore South	1: Fixed 3: Mobile	1: GNS 3: PS1	1: South 3: South	1: 56 3: 69	1: 56 3: 359
	1979	1: 1979	1: 9, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1208	1: 1208
	1980	4: 1980	4: 7, 10, 9	4: Fall	4: Fixed Middle, Inshore North, Fixed North	4: Fixed, Mobile	4: GNS, PS1	4: Middle, North	4: 125	4: 1005
	1981	1: 1981	1: 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 577	1: 577
	1982	1: 1982	1: 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 290	1: 290
	1983	1: 1983	1: 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 858	1: 858
	1984	1: 1984	1: 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS, GND	1: South	1: 397	1: 397
	1985	1: 1985	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 446	1: 446
	1986	1: 1986	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 638	1: 638
	1987	1: 1987	1: 10, 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1553	1: 1553
	1988	1: 1988	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 541	1: 541
	1989	1: 1989	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 395	1: 395

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1990	1: 1990	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2204	1: 2204
	1991	1: 1991	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1338	1: 1338
	1992	1: 1992	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 471	1: 471
	1993	1: 1993	1: 7, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 580	1: 580
	1994	1: 1994	1: 9, 10, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 379	1: 379
	1995	1: 1995	1: 10, 9, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 676	1: 676
	1996	1: 1996	1: 7, 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 438	1: 438
	1997	1: 1997	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 813	1: 813
	1998	1: 1998	1: 9, 8, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 963	1: 963
	1999	1: 1999	1: 9, 10, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 490	1: 490
	2000	1: 2000	1: 9, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 326	1: 326
	2001	1: 2001	1: 9, 10, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 359	1: 359
	2002	1: 2002	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 435	1: 435
	2003	1: 2003	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1056	1: 1056
	2004	1: 2004	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 363	1: 363
	2005	1: 2005	1: 7, 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 488	1: 488
	2006	1: 2006	1: 9, 10, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 437	1: 437
	2007	1: 2007	1: 7, 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 426	1: 426
	2008	1: 2008	1: 9, 10, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 438	1: 438
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 343	1: 343
	2010	1: 2010	1: 9, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 446	1: 446

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2011	1: 2011	1: 7, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 452	1: 452
	2012	1: 2012	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 260	1: 260
	2013	1: 2013	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 306	1: 306
	2014	1: 2014	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 299	1: 299
	2015	1: 2015	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 219	1: 219
	2016	1: 2016	1: 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 250	1: 250
	2017	1: 2017	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 220	1: 220
	2018	1: 2018	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 197	1: 197
	2019	1: 2019	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 234	1: 234
	2020	1: 2020	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 172	1: 172
	2021	1: 2021	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 154	1: 154
	2022	1: 2022 4: 2022	1: 9, 10 4: 8, 9, 10	1: Fall 4: Fall	1: Fixed South 4: Fixed North, Fixed Middle, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS	1: South 4: North, Middle	1: 78 4: 47	1: 78 4: 697
	2023	1: 2023	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 203	1: 203
Inshore Middle										
	1978	1: 1978	1: 10, 9	1: Fall	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 421	1: 421
	1979	1: 1979	1: 10, 11	1: Fall, Winter	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 306	1: 306
	1980	1: 1980 3: 1980	1: 11 3: 7	1: Winter 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 72 3: 53	1: 72 3: 88
	1981	3: 1981	3: 8, 9, 7	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 764

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1982	4: 1982	4: 8, 7, 10, 9, 11, 12	4: Fall, Winter	4: Fixed South, Fixed North, Inshore North, Winter	4: Fixed, Mobile	4: GNS, PS1, PS	4: South, North, 4vn	4: 125	4: 2804
	1983	3: 1983	3: 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 154
	1984	3: 1984	3: 8, 10, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 385
	1985	4: 1985	4: 10, 9, 7, 8, 11	4: Fall, Winter	4: Inshore North, Fixed North, Fixed South	4: Mobile, Fixed	4: PS1, GNS	4: North, South	4: 125	4: 966
	1986	4: 1986	4: 11, 8, 10, 9, 7	4: Winter, Fall	4: Inshore North, Fixed North, Fixed South, Inshore South	4: Mobile, Fixed	4: PS1, GNS, GND, PS2	4: North, South	4: 125	4: 1400
	1987	3: 1987 4: 1987	3: 9 4: 8, 10, 9, 11, 7	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed North, Fixed South, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1	3: Middle 4: North, South	3: 31 4: 94	3: 31 4: 2861
	1988	3: 1988 4: 1988	3: 9 4: 8, 7, 9, 11, 10	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed North, Fixed South, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1	3: Middle 4: North, South	3: 87 4: 38	3: 87 4: 1244
	1989	4: 1989	4: 10, 9, 8, 11, 7	4: Fall, Winter	4: Inshore North, Fixed North, Fixed South	4: Mobile, Fixed	4: PS1, GNS	4: North, South	4: 125	4: 1950
	1990	1: 1990 3: 1990	1: 10 3: 8	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 27 3: 98	1: 27 3: 132
	1991	3: 1991	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 208
	1992	3: 1992 4: 1992	3: 9 4: 8, 9, 10, 11	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed South, Fixed North, Inshore North, Winter, Inshore South	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS2, PS1, OTM2	3: Middle 4: South, North, 4vn	3: 28 4: 97	3: 28 4: 2402
	1993	3: 1993	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS, GN	3: Middle	3: 125	3: 321

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1994	3: 1994 4: 1994	3: 9 4: 9, 10, 8, 11, 7	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed South, Fixed North, Inshore North, Winter	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1, GND	3: Middle 4: South, North, 4vn	3: 85 4: 40	3: 85 4: 1514
	1995	3: 1995 4: 1995	3: 9, 8 4: 9, 11, 8	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed South, Winter, Fixed North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1, PS2	3: Middle 4: South, 4vn, North	3: 83 4: 42	3: 83 4: 2615
	1996	1: 1996 3: 1996	1: 8 3: 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: OTM2 3: GNS	1: Middle 3: Middle	1: 80 3: 45	1: 80 3: 164
	1997	3: 1997	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 339
	1998	1: 1998 3: 1998	1: 9 3: 9, 8	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1, PS2 3: GNS	1: Middle 3: Middle	1: 81 3: 44	1: 81 3: 250
	1999	3: 1999	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 243
	2000	3: 2000	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 301
	2001	3: 2001	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 272
	2002	1: 2002 3: 2002	1: 10 3: 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 90 3: 35	1: 90 3: 178
	2003	3: 2003	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 257
	2004	1: 2004 3: 2004	1: 10 3: 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 60 3: 65	1: 60 3: 283
	2005	1: 2005 3: 2005	1: 10 3: 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 23 3: 102	1: 23 3: 119
	2006	1: 2006 3: 2006	1: 10 3: 9, 8	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 26 3: 99	1: 26 3: 334
	2007	1: 2007 3: 2007	1: 9 3: 10, 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 72 3: 53	1: 72 3: 523
	2008	3: 2008	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 265

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2009	3: 2009	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 388
	2010	3: 2010	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 368
	2011	3: 2011	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 136
	2012	3: 2012	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 220
	2013	3: 2013	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 235
	2014	3: 2014	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 256
	2015	3: 2015	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 191
	2016	3: 2016	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 156
	2017	3: 2017	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 134
	2018	3: 2018	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 165
	2019	3: 2019	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 274
	2020	3: 2020	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 137
	2021	3: 2021	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 242
	2022	3: 2022	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 191
	2023	3: 2023	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 125	3: 274
Inshore North										
	1978	1: 1978	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 680	1: 680
	1979	1: 1979	1: 11, 10, 9, 12	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 1604	1: 1604
	1980	1: 1980	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 950	1: 950

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1981	1: 1981	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1, LA	1: North	1: 557	1: 557
	1982	1: 1982	1: 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 606	1: 606
	1983	1: 1983	1: 7, 11, 10, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: LA, PS1	1: North	1: 661	1: 661
	1984	1: 1984	1: 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 617	1: 617
	1985	1: 1985	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 246	1: 246
	1986	1: 1986	1: 11, 10	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 244	1: 244
	1987	1: 1987	1: 11, 10	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 167	1: 167
	1988	1: 1988	1: 11, 10	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 152	1: 152
	1989	1: 1989	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 330	1: 330
	1990	1: 1990 3: 1990	1: 9, 10 3: 9, 8	1: Fall 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS1 3: GNS	1: North 3: North	1: 115 3: 10	1: 115 3: 1522
	1991	1: 1991	1: 10, 8, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 369	1: 369
	1992	1: 1992	1: 8, 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS2, PS1, OTM2	1: North	1: 638	1: 638
	1993	1: 1993	1: 10, 9, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 181	1: 181
	1994	1: 1994	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 356	1: 356
	1995	1: 1995	1: 10, 9, 8	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 496	1: 496

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1996	1: 1996	1: 7, 8, 9, 10	1: Fall	1: Inshore North	1: Mobile	1: OTM2, PS1	1: North	1: 451	1: 451
	1997	1: 1997	1: 9, 10, 8	1: Fall	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 279	1: 279
	1998	1: 1998	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 249	1: 249
	1999	1: 1999	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 419	1: 419
	2000	1: 2000	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 606	1: 606
	2001	1: 2001	1: 10, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 384	1: 384
	2002	1: 2002	1: 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 356	1: 356
	2003	1: 2003	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 281	1: 281
	2004	1: 2004 3: 2004	1: 9 3: 8, 9	1: Fall 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS1 3: GNS	1: North 3: North	1: 67 3: 58	1: 67 3: 495
	2005	1: 2005	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 531	1: 531
	2006	1: 2006	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 368	1: 368
	2007	1: 2007	1: 10, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 504	1: 504
	2008	1: 2008	1: 9, 10, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: OTM, PS1	1: North	1: 329	1: 329
	2009	1: 2009	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 248	1: 248
	2010	1: 2010	1: 11, 10, 12	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 422	1: 422
	2011	1: 2011	1: 9, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 257	1: 257

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2012	1: 2012 3: 2012	1: 10, 11, 12 3: 8, 9	1: Fall, Winter 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS1 3: GNS	1: North 3: North	1: 69 3: 56	1: 69 3: 397
	2013	1: 2013	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 469	1: 469
	2014	1: 2014	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 403	1: 403
	2015	1: 2015 3: 2015	1: 11 3: 8, 9, 7	1: Winter 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS1 3: GNS	1: North 3: North	1: 78 3: 47	1: 78 3: 230
	2016	1: 2016	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 272	1: 272
	2017	1: 2017	1: 11	1: Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 211	1: 211
	2018	1: 2018 3: 2018	1: 10, 11 3: 9, 7, 8	1: Fall, Winter 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS 3: GNS	1: North 3: North	1: 108 3: 17	1: 108 3: 366
	2019	1: 2019 3: 2019	1: 10, 11 3: 7, 8, 9	1: Fall, Winter 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS 3: GNS	1: North 3: North	1: 99 3: 26	1: 99 3: 378
	2020	1: 2020	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS	1: North	1: 146	1: 146
	2021	3: 2021	3: 9, 8	3: Fall	3: Fixed North	3: Fixed	3: GNS	3: North	3: 125	3: 312
	2022	1: 2022 3: 2022	1: 9, 10 3: 8, 9, 10	1: Fall 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS 3: GNS	1: North 3: North	1: 43 3: 82	1: 43 3: 463
	2023	3: 2023	3: 8, 9, 10	3: Fall	3: Fixed North	3: Fixed	3: GNS	3: North	3: 125	3: 463
Inshore South										
	1978	1: 1978	1: 9, 10	1: Fall	1: Inshore South	1: Mobile	1: PS1	1: South	1: 359	1: 359
	1979	3: 1979	3: 9, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 1208

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1980	4: 1980	4: 7, 11, 10, 9, 1, 12	4: Fall, Winter	4: Fixed Middle, Inshore Middle, Inshore North, Fixed North, Winter	4: Fixed, Mobile	4: GNS, PS1, PS	4: Middle, North, 4vn	4: 125	4: 2155
	1981	3: 1981	3: 7, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 577
	1982	3: 1982	3: 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 290
	1983	3: 1983	3: 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 858
	1984	3: 1984	3: 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS, GND	3: South	3: 125	3: 397
	1985	3: 1985	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 446
	1986	1: 1986 3: 1986	1: 9 3: 9, 8	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS2 3: GNS	1: South 3: South	1: 30 3: 95	1: 30 3: 638
	1987	3: 1987	3: 10, 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 1553
	1988	3: 1988	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 541
	1989	3: 1989	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 395
	1990	3: 1990	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 2204
	1991	3: 1991	3: 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 1338
	1992	1: 1992 3: 1992	1: 9 3: 8, 9	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 75 3: 50	1: 75 3: 471
	1993	3: 1993	3: 7, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 580
	1994	1: 1994 3: 1994	1: 7 3: 9, 10, 7, 8	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 12 3: 113	1: 12 3: 379
	1995	3: 1995	3: 10, 9, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 676
	1996	3: 1996	3: 7, 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 438
	1997	3: 1997	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 813

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1998	3: 1998	3: 9, 8, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 963
	1999	1: 1999 3: 1999	1: 11 3: 9, 10, 8	1: Winter 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 24 3: 101	1: 24 3: 490
	2000	3: 2000	3: 9, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 326
	2001	1: 2001	1: 11	1: Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 292	1: 292
	2002	1: 2002	1: 10, 11	1: Fall, Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 143	1: 143
	2003	1: 2003	1: 10, 11	1: Fall, Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 480	1: 480
	2004	1: 2004	1: 10, 11	1: Fall, Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 1191	1: 1191
	2005	3: 2005	3: 7, 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 488
	2006	1: 2006 3: 2006	1: 11 3: 9, 10, 8	1: Winter 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 82 3: 43	1: 82 3: 437
	2007	3: 2007	3: 7, 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 426
	2008	3: 2008	3: 9, 10, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 438
	2009	3: 2009	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 343
	2010	3: 2010	3: 9, 7, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 446
	2011	3: 2011	3: 7, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 452
	2012	3: 2012	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 260
	2013	3: 2013	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 306
	2014	3: 2014	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 299
	2015	3: 2015	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 219

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2016	3: 2016	3: 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 250
	2017	3: 2017	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 220
	2018	3: 2018	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 197
	2019	3: 2019	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 234
	2020	3: 2020	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 172
	2021	3: 2021	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 154
	2022	3: 2022 4: 2022	3: 9, 10 4: 8, 9, 10	3: Fall 4: Fall	3: Fixed South 4: Fixed North, Fixed Middle, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS	3: South 4: North, Middle	3: 78 4: 47	3: 78 4: 697
	2023	3: 2023	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 125	3: 203
Overwinter										
	1978	1: 1978	1: 4, 5	1: Spring	1: Edge	1: Mobile	1: PS1, OTM	1: South	1: 885	1: 885
	1979	1: 1979	1: 4, 5, 12	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: PS1, PS	1: South, 4vn	1: 1170	1: 1170
	1980	1: 1980	1: 4, 5, 1, 11, 12	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: PS1, PS	1: South, 4vn	1: 1886	1: 1886
	1981	1: 1981	1: 5, 1, 11	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: LA, PS	1: North, 4vn	1: 132	1: 132
	1982	1: 1982	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 162	1: 162
	1983	1: 1983	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 205	1: 205
	1984	1: 1984	1: 1, 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 343	1: 343
	1985	3: 1985 4: 1985	3: 6, 5 4: 10, 9, 7, 8, 11	3: Spring 4: Fall, Winter	3: 4: Inshore North, Fixed North, Fixed South	3: Fixed 4: Mobile, Fixed	3: GNS 4: PS1, GNS	3: South, North 4: North, South	3: 49 4: 76	3: 49 4: 966

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1986	3: 1986 4: 1986	3: 5, 6, 4 4: 8, 10, 9, 7	3: Spring 4: Fall	3: 4: Fixed North, Inshore North, Fixed South, Inshore South	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1, GND, PS2	3: North, South 4: North, South	3: 83 4: 42	3: 83 4: 1400
	1987	3: 1987 4: 1987	3: 5, 6 4: 8, 10, 9	3: Spring 4: Fall	3: 4: Fixed North, Fixed South	3: Fixed 4: Fixed	3: GNS 4: GNS	3: North, Middle, South 4: North, South	3: 84 4: 41	3: 84 4: 2892
	1988	3: 1988	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: North, Middle, South	3: 125	3: 303
	1989	3: 1989	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS	3: North, Middle, South	3: 125	3: 334
	1990	3: 1990	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, North, Middle	3: 125	3: 158
	1991	3: 1991	3: 5, 4, 6	3: Spring	3:	3: Fixed	3: GNS	3: Middle, North, South	3: 125	3: 155
	1992	1: 1992	1: 11, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 296	1: 296
	1993	1: 1993	1: 11	1: Winter	1: Winter	1: Mobile	1: PS1	1: 4vn	1: 631	1: 631
	1994	1: 1994	1: 11, 5, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 443	1: 443
	1995	1: 1995	1: 11, 6, 5	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1, PS2	1: 4vn, South	1: 456	1: 456
	1996	1: 1996	1: 4, 5, 6, 10, 11, 12	1: Spring, Fall, Winter	1: Edge, Winter	1: Mobile	1: PS1, OTM2, PS2	1: South, Middle, 4vn	1: 1294	1: 1294
	1997	1: 1997	1: 11, 6, 5	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 758	1: 758
	1998	1: 1998	1: 11, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 133	1: 133

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1999	1: 1999	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 222	1: 222
	2000	1: 2000 3: 2000	1: 5 3: 6, 5	1: Spring 3: Spring	1: Edge 3:	1: Mobile 3: Fixed	1: PS1 3: GND, GNS	1: South 3: North, Middle, South	1: 99 3: 26	1: 99 3: 245
	2001	3: 2001	3: 5, 4, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, Middle, North	3: 125	3: 155
	2002	1: 2002	1: 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 213	1: 213
	2003	3: 2003	3: 6, 5, 4	3: Spring	3:	3: Fixed	3: GND, GNS	3: Middle, South, North	3: 125	3: 246
	2004	3: 2004	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS	3: South, North	3: 125	3: 216
	2005	3: 2005 4: 2005	3: 4, 5, 6 4: 9, 10, 11	3: Spring 4: Fall, Winter	3: 4: Fixed North, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS, GND 4: GNS, PS1	3: South, Middle, North 4: North	3: 109 4: 16	3: 109 4: 1716
	2006	3: 2006	3: 5, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: North, South, Middle	3: 125	3: 304
	2007	3: 2007	3: 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: Middle, South, North	3: 125	3: 292
	2008	3: 2008	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: South, Middle, North	3: 125	3: 204
	2009	3: 2009 4: 2009	3: 6, 4, 5 4: 9, 8, 10	3: Spring 4: Fall	3: 4: Fixed South, Fixed Middle, Inshore North, Fixed North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1	3: South, North 4: South, Middle, North	3: 94 4: 31	3: 94 4: 1402
	2010	1: 2010	1: 5	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 289	1: 289
	2011	3: 2011	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, Middle, North	3: 125	3: 264
	2012	1: 2012	1: 6, 5	1: Spring	1: Edge	1: Mobile	1: OTM, PS1	1: South	1: 231	1: 231

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2013	1: 2013	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 278	1: 278
	2014	1: 2014	1: 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 244	1: 244
	2015	1: 2015	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South, North	1: 191	1: 191
	2016	3: 2016 4: 2016	3: 4, 5, 6 4: 8, 9, 10, 11, 7	3: Spring 4: Fall, Winter	3: 4: Fixed South, Fixed North, Fixed Middle, Inshore North	3: Fixed, Other 4: Fixed, Mobile	3: GNS, GND, LHM 4: GNS, PS1	3: South, North 4: South, North, Middle	3: 73 4: 52	3: 73 4: 1111
	2017	3: 2017 4: 2017	3: 5, 4, 6 4: 11, 7, 8, 9, 10	3: Spring 4: Winter, Fall	3: 4: Inshore North, Fixed North, Fixed Middle, Fixed South	3: Fixed 4: Mobile, Fixed	3: GNS, GND 4: PS1, GNS	3: South, North 4: North, Middle, South, 4t	3: 59 4: 66	3: 59 4: 1030
	2018	1: 2018 3: 2018 4: 2018	1: 6 3: 4, 5, 6 4: 9, 10, 7, 11	1: Spring 3: Spring 4: Fall, Winter	1: Edge 3: 4: Fixed South, Fixed North, Fixed Middle, Inshore North	1: Mobile 3: Fixed 4: Fixed, Mobile	1: PS 3: GNS 4: GNS, PS	1: South 3: North, Middle, South 4: South, North, Middle	1: 51 3: 63 4: 11	1: 51 3: 63 4: 836
	2019	3: 2019	3: 6, 4, 5	3: Spring	3:	3: Fixed	3: GND, GNS	3: North, South	3: 125	3: 146
	2020	3: 2020 4: 2020	3: 4, 5, 6 4: 7, 8, 9, 10, 11	3: Spring 4: Fall, Winter	3: 4: Fixed North, Fixed Middle, Fixed South, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS	3: South, Middle, North 4: North, Middle, South	3: 30 4: 95	3: 30 4: 750
	2021	3: 2021 4: 2021	3: 4 4: 9, 8, 10	3: Spring 4: Fall	3: 4: Fixed South, Fixed North, Fixed Middle	3: Fixed 4: Fixed	3: GNS 4: GNS	3: North, South 4: South, North, Middle	3: 33 4: 92	3: 33 4: 708
	2022	3: 2022 4: 2022	3: 5 4: 8, 9, 10	3: Spring 4: Fall	3: 4: Fixed North, Fixed Middle, Fixed South, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS	3: North, South 4: North, Middle, South	3: 15 4: 110	3: 15 4: 775

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2023	3: 2023 4: 2023	3: 4, 5 4: 8, 9, 10	3: Spring 4: Fall	3: 4: Fixed North, Fixed Middle, Fixed South	3: Fixed 4: Fixed	3: GNS 4: GNS	3: Middle, North 4: North, Middle, South	3: 60 4: 65	3: 60 4: 940

Table A2: Length frequency strata summary for fisheries resulting from the sample selection algorithm presented in this framework. The numbers followed by a colon represent the criteria used. Fishery to Match: the fishery to characterize. Year to Match: the year to characterize. Years, Months, Seasons, Fisheries, Gear types, Gears, Regions variables correspond to the identification of the selected samples. N Fish: the number of fish selected in the samples. N Fish Criteria: the number of fish that was available.

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
Fixed Middle										
	1978	3: 1978	3: 10, 9	3: Fall	3: Inshore Middle	3: Mobile	3: PS1	3: Middle	3: 500	3: 515
	1979	1: 1979 3: 1979	1: 9, 7 3: 10	1: Fall 3: Fall	1: Fixed Middle 3: Inshore Middle	1: Fixed 3: Mobile	1: GNS 3: PS1	1: Middle 3: Middle	1: 195 3: 305	1: 195 3: 317
	1980	1: 1980 4: 1980	1: 7 4: 8, 10, 9	1: Fall 4: Fall	1: Fixed Middle 4: Fixed North, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: Middle 4: North	1: 175 4: 325	1: 175 4: 4901
	1981	1: 1981	1: 8, 9, 7	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 802	1: 802
	1982	4: 1982	4: 8, 7, 10, 9	4: Fall	4: Fixed South, Fixed North, Inshore North	4: Fixed, Mobile	4: GNS, PS1	4: South, North	4: 500	4: 3475
	1983	1: 1983 4: 1983	1: 8 4: 8, 7, 9, 10	1: Fall 4: Fall	1: Fixed Middle 4: Fixed South, Fixed North, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, LA, PS1	1: Middle 4: South, North	1: 220 4: 280	1: 220 4: 14455
	1984	1: 1984	1: 8, 10, 9, 7	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 4341	1: 4341
	1985	1: 1985 4: 1985	1: 9 4: 10, 9, 8, 7	1: Fall 4: Fall	1: Fixed Middle 4: Inshore North, Fixed North, Fixed South	1: Fixed 4: Mobile, Fixed	1: GNS 4: PS1, GNS	1: Middle 4: North, South	1: 418 4: 82	1: 418 4: 23744
	1986	4: 1986	4: 9, 8, 10, 7	4: Fall	4: Fixed North, Fixed South, Inshore North, Inshore South	4: Fixed, Mobile	4: GNS, PS1, GND, PS2	4: North, South	4: 500	4: 27467

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1987	1: 1987 4: 1987	1: 9 4: 8, 9, 10, 7	1: Fall 4: Fall	1: Fixed Middle 4: Fixed North, Fixed South, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: Middle 4: North, South	1: 179 4: 321	1: 179 4: 35067
	1988	1: 1988	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 661	1: 661
	1989	3: 1989 4: 1989	3: 7 4: 10, 9, 8, 7	3: Fall 4: Fall	3: Inshore Middle 4: Inshore North, Fixed North, Fixed South	3: Mobile 4: Mobile, Fixed	3: PS2 4: PS1, GNS	3: Middle 4: North, South	3: 81 4: 419	3: 81 4: 15985
	1990	1: 1990	1: 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 749	1: 749
	1991	1: 1991	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1458	1: 1458
	1992	1: 1992 4: 1992	1: 9 4: 8, 9, 10	1: Fall 4: Fall	1: Fixed Middle 4: Fixed South, Fixed North, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, OTM2, PS2, PS1	1: Middle 4: South, North	1: 411 4: 89	1: 411 4: 21055
	1993	1: 1993	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS, GN	1: Middle	1: 2240	1: 2240
	1994	1: 1994	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1072	1: 1072
	1995	1: 1995	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1307	1: 1307
	1996	1: 1996	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1190	1: 1190
	1997	1: 1997	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 3080	1: 3080
	1998	1: 1998	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2362	1: 2362
	1999	1: 1999	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 4206	1: 4206
	2000	1: 2000	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 4293	1: 4293
	2001	1: 2001	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 3191	1: 3191

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2002	1: 2002	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2758	1: 2758
	2003	1: 2003	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2267	1: 2267
	2004	1: 2004	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2614	1: 2614
	2005	1: 2005	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1283	1: 1283
	2006	1: 2006	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2697	1: 2697
	2007	1: 2007	1: 10, 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 4064	1: 4064
	2008	1: 2008	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2381	1: 2381
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 3658	1: 3658
	2010	1: 2010	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 3305	1: 3305
	2011	1: 2011	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 811	1: 811
	2012	1: 2012	1: 9, 8	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2162	1: 2162
	2013	1: 2013	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2925	1: 2925
	2014	1: 2014	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 3280	1: 3280
	2015	1: 2015	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2463	1: 2463
	2016	1: 2016	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1823	1: 1823
	2017	1: 2017	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1463	1: 1463
	2018	1: 2018	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1846	1: 1846
	2019	1: 2019	1: 8, 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2697	1: 2697
	2020	1: 2020	1: 9	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1309	1: 1309
	2021	1: 2021	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2109	1: 2109
	2022	1: 2022	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 1723	1: 1723

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2023	1: 2023	1: 9, 10	1: Fall	1: Fixed Middle	1: Fixed	1: GNS	1: Middle	1: 2179	1: 2179
Fixed North										
	1978	1: 1978	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1368	1: 1368
	1979	1: 1979	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 674	1: 674
	1980	1: 1980	1: 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 754	1: 754
	1981	1: 1981	1: 8, 9, 10, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 1923	1: 1923
	1982	1: 1982	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 2303	1: 2303
	1983	1: 1983	1: 8, 7, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 2273	1: 2273
	1984	1: 1984	1: 9, 7, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 11457	1: 11457
	1985	1: 1985	1: 9, 8, 10, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 9695	1: 9695
	1986	1: 1986	1: 9, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 7034	1: 7034
	1987	1: 1987	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 12182	1: 12182
	1988	1: 1988	1: 8, 7, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 7404	1: 7404
	1989	1: 1989	1: 9, 10, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 10255	1: 10255
	1990	1: 1990	1: 9, 8, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 13921	1: 13921
	1991	1: 1991	1: 9, 8, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 10683	1: 10683
	1992	1: 1992	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 9014	1: 9014
	1993	1: 1993	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 5241	1: 5241

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1994	1: 1994	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS, GND	1: North	1: 5197	1: 5197
	1995	1: 1995	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 8256	1: 8256
	1996	1: 1996	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 7002	1: 7002
	1997	1: 1997	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 8379	1: 8379
	1998	1: 1998	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4992	1: 4992
	1999	1: 1999	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 6531	1: 6531
	2000	1: 2000	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GND, GNS	1: North	1: 12447	1: 12447
	2001	1: 2001	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 9237	1: 9237
	2002	1: 2002	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4976	1: 4976
	2003	1: 2003	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3633	1: 3633
	2004	1: 2004	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4305	1: 4305
	2005	1: 2005	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 5302	1: 5302
	2006	1: 2006	1: 7, 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4691	1: 4691
	2007	1: 2007	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3416	1: 3416
	2008	1: 2008	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 5021	1: 5021
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3391	1: 3391
	2010	1: 2010	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3617	1: 3617
	2011	1: 2011	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3396	1: 3396
	2012	1: 2012	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 5271	1: 5271

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2013	1: 2013	1: 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 2586	1: 2586
	2014	1: 2014	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3241	1: 3241
	2015	1: 2015	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 2693	1: 2693
	2016	1: 2016	1: 8, 9, 7	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4667	1: 4667
	2017	1: 2017	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4509	1: 4509
	2018	1: 2018	1: 9, 7, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4268	1: 4268
	2019	1: 2019	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4269	1: 4269
	2020	1: 2020	1: 7, 8, 9	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3248	1: 3248
	2021	1: 2021	1: 9, 8	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 2584	1: 2584
	2022	1: 2022	1: 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 4281	1: 4281
	2023	1: 2023	1: 8, 9, 10	1: Fall	1: Fixed North	1: Fixed	1: GNS	1: North	1: 3788	1: 3788
Fixed South										
	1978	1: 1978 3: 1978	1: 7 3: 9, 10	1: Fall 3: Fall	1: Fixed South 3: Inshore South	1: Fixed 3: Mobile	1: GNS 3: PS1	1: South 3: South	1: 160 3: 340	1: 160 3: 1277
	1979	1: 1979	1: 9, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1353	1: 1353
	1980	4: 1980	4: 7, 8, 10, 9	4: Fall	4: Fixed Middle, Fixed North, Inshore North	4: Fixed, Mobile	4: GNS, PS1	4: Middle, North	4: 500	4: 5076
	1981	1: 1981	1: 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 968	1: 968
	1982	1: 1982 4: 1982	1: 8 4: 7, 8, 10, 9	1: Fall 4: Fall	1: Fixed South 4: Fixed North, Inshore North	1: Fixed 4: Fixed, Mobile	1: GNS 4: GNS, PS1	1: South 4: North	1: 373 4: 127	1: 373 4: 3102
	1983	1: 1983	1: 8, 7, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 6024	1: 6024

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1984	1: 1984	1: 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS, GND	1: South	1: 3895	1: 3895
	1985	1: 1985	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5314	1: 5314
	1986	1: 1986	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 8162	1: 8162
	1987	1: 1987	1: 9, 10, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 17899	1: 17899
	1988	1: 1988	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5690	1: 5690
	1989	1: 1989	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2891	1: 2891
	1990	1: 1990	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 18199	1: 18199
	1991	1: 1991	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 12789	1: 12789
	1992	1: 1992	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3217	1: 3217
	1993	1: 1993	1: 7, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 4302	1: 4302
	1994	1: 1994	1: 9, 10, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5194	1: 5194
	1995	1: 1995	1: 10, 9, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 8271	1: 8271
	1996	1: 1996	1: 7, 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 4779	1: 4779
	1997	1: 1997	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 6303	1: 6303
	1998	1: 1998	1: 9, 8, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 8489	1: 8489
	1999	1: 1999	1: 9, 10, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5874	1: 5874
	2000	1: 2000	1: 9, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 4806	1: 4806
	2001	1: 2001	1: 9, 10, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3907	1: 3907
	2002	1: 2002	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3185	1: 3185

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2003	1: 2003	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 9843	1: 9843
	2004	1: 2004	1: 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 9228	1: 9228
	2005	1: 2005	1: 7, 8, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5065	1: 5065
	2006	1: 2006	1: 9, 10, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 5000	1: 5000
	2007	1: 2007	1: 7, 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3222	1: 3222
	2008	1: 2008	1: 9, 10, 8, 7	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3366	1: 3366
	2009	1: 2009	1: 9, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2328	1: 2328
	2010	1: 2010	1: 9, 7, 8	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2435	1: 2435
	2011	1: 2011	1: 7, 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 3184	1: 3184
	2012	1: 2012	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2241	1: 2241
	2013	1: 2013	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2487	1: 2487
	2014	1: 2014	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2668	1: 2668
	2015	1: 2015	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2078	1: 2078
	2016	1: 2016	1: 8, 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2212	1: 2212
	2017	1: 2017	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1713	1: 1713
	2018	1: 2018	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1735	1: 1735
	2019	1: 2019	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 2501	1: 2501
	2020	1: 2020	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1492	1: 1492
	2021	1: 2021	1: 9	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1244	1: 1244
	2022	1: 2022	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 877	1: 877

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2023	1: 2023	1: 9, 10	1: Fall	1: Fixed South	1: Fixed	1: GNS	1: South	1: 1621	1: 1621
Inshore Middle										
	1978	1: 1978	1: 10, 9	1: Fall	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 515	1: 515
	1979	1: 1979 3: 1979	1: 10, 11 3: 9, 7	1: Fall, Winter 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 363 3: 137	1: 363 3: 195
	1980	1: 1980 3: 1980 4: 1980	1: 11 3: 7 4: 8, 9, 10, 11, 1, 12	1: Winter 3: Fall 4: Fall, Winter	1: Inshore Middle 3: Fixed Middle 4: Fixed North, Inshore North, Winter	1: Mobile 3: Fixed 4: Fixed, Mobile	1: PS1 3: GNS 4: GNS, PS1, PS	1: Middle 3: Middle 4: North, 4vn	1: 215 3: 175 4: 110	1: 215 3: 175 4: 14189
	1981	3: 1981	3: 8, 9, 7	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 802
	1982	4: 1982	4: 8, 7, 10, 9, 11, 12	4: Fall, Winter	4: Fixed South, Fixed North, Inshore North, Winter	4: Fixed, Mobile	4: GNS, PS1, PS	4: South, North, 4vn	4: 500	4: 5719
	1983	3: 1983 4: 1983	3: 8 4: 8, 7, 9, 11, 10, 12	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed South, Fixed North, Inshore North, Winter	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, LA, PS1, PS	3: Middle 4: South, North, 4vn	3: 220 4: 280	3: 220 4: 19947
	1984	3: 1984	3: 8, 10, 9, 7	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 4341
	1985	3: 1985 4: 1985	3: 9 4: 10, 9, 11, 8, 7	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Inshore North, Fixed North, Fixed South, Winter	3: Fixed 4: Mobile, Fixed	3: GNS 4: PS1, GNS, PS	3: Middle 4: North, South, 4vn	3: 418 4: 82	3: 418 4: 26182

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1986	4: 1986	4: 11, 9, 8, 10, 12, 7	4: Winter, Fall	4: Inshore North, Fixed North, Fixed South, Winter, Inshore South	4: Mobile, Fixed	4: PS1, GNS, PS, GND, PS2	4: North, South, 4vn	4: 500	4: 30690
	1987	3: 1987 4: 1987	3: 9 4: 8, 9, 10, 11, 12, 7	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed North, Fixed South, Inshore North, Winter	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1, PS	3: Middle 4: North, South, 4vn	3: 179 4: 321	3: 179 4: 38579
	1988	3: 1988	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 661
	1989	1: 1989 4: 1989	1: 7 4: 12, 10, 9, 8, 11, 7	1: Fall 4: Winter, Fall	1: Inshore Middle 4: Winter, Inshore North, Fixed North, Fixed South	1: Mobile 4: Mobile, Fixed	1: PS2 4: PS1, GNS	1: Middle 4: 4vn, North, South	1: 81 4: 419	1: 81 4: 18852
	1990	1: 1990	1: 10	1: Fall	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 527	1: 527
	1991	3: 1991	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1458
	1992	3: 1992 4: 1992	3: 9 4: 8, 9, 10, 11	3: Fall 4: Fall, Winter	3: Fixed Middle 4: Fixed South, Fixed North, Inshore North, Winter	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, OTM2, PS2, PS1	3: Middle 4: South, North, 4vn	3: 411 4: 89	3: 411 4: 23583
	1993	3: 1993	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS, GN	3: Middle	3: 500	3: 2240
	1994	3: 1994	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1072
	1995	1: 1995 3: 1995	1: 9 3: 9, 8	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 297 3: 203	1: 297 3: 1307

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1996	1: 1996	1: 8	1: Fall	1: Inshore Middle	1: Mobile	1: OTM2	1: Middle	1: 1409	1: 1409
	1997	3: 1997	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 3080
	1998	1: 1998	1: 9	1: Fall	1: Inshore Middle	1: Mobile	1: PS1, PS2	1: Middle	1: 624	1: 624
	1999	3: 1999	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 4206
	2000	3: 2000	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 4293
	2001	3: 2001	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 3191
	2002	1: 2002	1: 10	1: Fall	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 1256	1: 1256
	2003	3: 2003	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2267
	2004	1: 2004	1: 10	1: Fall	1: Inshore Middle	1: Mobile	1: PS1	1: Middle	1: 513	1: 513
	2005	1: 2005 3: 2005	1: 10 3: 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 278 3: 222	1: 278 3: 1283
	2006	1: 2006 3: 2006	1: 10 3: 9, 8	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 444 3: 56	1: 444 3: 2697
	2007	1: 2007 3: 2007	1: 9 3: 10, 8, 9	1: Fall 3: Fall	1: Inshore Middle 3: Fixed Middle	1: Mobile 3: Fixed	1: PS1 3: GNS	1: Middle 3: Middle	1: 406 3: 94	1: 406 3: 4064
	2008	3: 2008	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2381
	2009	3: 2009	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 3658
	2010	3: 2010	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 3305
	2011	3: 2011	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 811

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2012	3: 2012	3: 9, 8	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2162
	2013	3: 2013	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2925
	2014	3: 2014	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 3280
	2015	3: 2015	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2463
	2016	3: 2016	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1823
	2017	3: 2017	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1463
	2018	3: 2018	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1846
	2019	3: 2019	3: 8, 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2697
	2020	3: 2020	3: 9	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1309
	2021	3: 2021	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2109
	2022	3: 2022	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 1723
	2023	3: 2023	3: 9, 10	3: Fall	3: Fixed Middle	3: Fixed	3: GNS	3: Middle	3: 500	3: 2179
Inshore North										
	1978	1: 1978	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 1692	1: 1692
	1979	1: 1979	1: 11, 10, 9, 12	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 4345	1: 4345
	1980	1: 1980	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 5686	1: 5686
	1981	1: 1981	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1, LA	1: North	1: 850	1: 850
	1982	1: 1982	1: 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 799	1: 799
	1983	1: 1983	1: 7, 11, 10, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: LA, PS1	1: North	1: 9367	1: 9367

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1984	1: 1984	1: 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 11566	1: 11566
	1985	1: 1985	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 10323	1: 10323
	1986	1: 1986	1: 11, 10	1: Winter, Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 13870	1: 13870
	1987	1: 1987	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 7090	1: 7090
	1988	1: 1988	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 6025	1: 6025
	1989	1: 1989	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 5268	1: 5268
	1990	1: 1990	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 3074	1: 3074
	1991	1: 1991	1: 10, 8, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 4744	1: 4744
	1992	1: 1992	1: 8, 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: OTM2, PS2, PS1	1: North	1: 9255	1: 9255
	1993	1: 1993	1: 10, 9, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 4683	1: 4683
	1994	1: 1994	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 30865	1: 30865
	1995	1: 1995	1: 10, 9, 8	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 60314	1: 60314
	1996	1: 1996	1: 7, 8, 9, 10	1: Fall	1: Inshore North	1: Mobile	1: OTM2, PS1	1: North	1: 16667	1: 16667
	1997	1: 1997	1: 9, 10, 8	1: Fall	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 7932	1: 7932
	1998	1: 1998	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 2214	1: 2214

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1999	1: 1999	1: 9, 10, 8	1: Fall	1: Inshore North	1: Mobile	1: PS1, PS2	1: North	1: 8478	1: 8478
	2000	1: 2000	1: 9, 10	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 8181	1: 8181
	2001	1: 2001	1: 10, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 7612	1: 7612
	2002	1: 2002	1: 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 3580	1: 3580
	2003	1: 2003	1: 10, 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 2933	1: 2933
	2004	1: 2004	1: 9	1: Fall	1: Inshore North	1: Mobile	1: PS1	1: North	1: 1201	1: 1201
	2005	1: 2005	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 7142	1: 7142
	2006	1: 2006	1: 9, 10, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 4868	1: 4868
	2007	1: 2007	1: 10, 11, 9	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 8771	1: 8771
	2008	1: 2008	1: 9, 10, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: OTM, PS1	1: North	1: 4746	1: 4746
	2009	1: 2009	1: 9, 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 5172	1: 5172
	2010	1: 2010	1: 10, 9, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 7280	1: 7280
	2011	1: 2011	1: 9, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 3450	1: 3450
	2012	1: 2012	1: 10, 11, 12	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 801	1: 801
	2013	1: 2013	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 7100	1: 7100

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2014	1: 2014	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 9203	1: 9203
	2015	1: 2015	1: 11	1: Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 933	1: 933
	2016	1: 2016	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 2953	1: 2953
	2017	1: 2017	1: 11	1: Winter	1: Inshore North	1: Mobile	1: PS1	1: North	1: 1861	1: 1861
	2018	1: 2018	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS	1: North	1: 1240	1: 1240
	2019	1: 2019	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS	1: North	1: 1382	1: 1382
	2020	1: 2020	1: 10, 11	1: Fall, Winter	1: Inshore North	1: Mobile	1: PS	1: North	1: 1530	1: 1530
	2021	3: 2021	3: 9, 8	3: Fall	3: Fixed North	3: Fixed	3: GNS	3: North	3: 500	3: 2584
	2022	1: 2022 3: 2022	1: 9, 10 3: 8, 9, 10	1: Fall 3: Fall	1: Inshore North 3: Fixed North	1: Mobile 3: Fixed	1: PS 3: GNS	1: North 3: North	1: 420 3: 80	1: 420 3: 4281
	2023	3: 2023	3: 8, 9, 10	3: Fall	3: Fixed North	3: Fixed	3: GNS	3: North	3: 500	3: 3788
Inshore South										
	1978	1: 1978	1: 9, 10	1: Fall	1: Inshore South	1: Mobile	1: PS1	1: South	1: 1277	1: 1277
	1979	3: 1979	3: 9, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1353
	1980	4: 1980	4: 7, 11, 8, 10, 9, 1, 12	4: Fall, Winter	4: Fixed Middle, Inshore Middle, Fixed North, Inshore North, Winter	4: Fixed, Mobile	4: GNS, PS1, PS	4: Middle, North, 4vn	4: 500	4: 14579
	1981	3: 1981	3: 7, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 968

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1982	3: 1982 4: 1982	3: 8 4: 7, 8, 10, 9, 11, 12	3: Fall 4: Fall, Winter	3: Fixed South 4: Fixed North, Inshore North, Winter	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS1, PS	3: South 4: North, 4vn	3: 373 4: 127	3: 373 4: 5346
	1983	3: 1983	3: 8, 7, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 6024
	1984	3: 1984	3: 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS, GND	3: South	3: 500	3: 3895
	1985	3: 1985	3: 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 5314
	1986	1: 1986 3: 1986	1: 9 3: 8, 9	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS2 3: GNS	1: South 3: South	1: 210 3: 290	1: 210 3: 8162
	1987	3: 1987	3: 9, 10, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 17899
	1988	3: 1988	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 5690
	1989	3: 1989	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2891
	1990	3: 1990	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 18199
	1991	3: 1991	3: 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 12789
	1992	1: 1992 3: 1992	1: 9 3: 8, 9	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 100 3: 400	1: 100 3: 3217
	1993	3: 1993	3: 7, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 4302
	1994	1: 1994 3: 1994	1: 7 3: 9, 10, 7, 8	1: Fall 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 256 3: 244	1: 256 3: 5194
	1995	3: 1995	3: 10, 9, 7, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 8271
	1996	3: 1996	3: 7, 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 4779
	1997	3: 1997	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 6303

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1998	3: 1998	3: 9, 8, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 8489
	1999	1: 1999 3: 1999	1: 11 3: 9, 10, 8	1: Winter 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 261 3: 239	1: 261 3: 5874
	2000	1: 2000 3: 2000	1: 11 3: 9, 8, 7	1: Winter 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 210 3: 290	1: 210 3: 4806
	2001	1: 2001	1: 11	1: Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 1677	1: 1677
	2002	1: 2002	1: 10, 11	1: Fall, Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 858	1: 858
	2003	1: 2003	1: 10, 11	1: Fall, Winter	1: Inshore South	1: Mobile	1: PS1	1: South	1: 4762	1: 4762
	2004	1: 2004	1: 11, 10	1: Winter, Fall	1: Inshore South	1: Mobile	1: PS1	1: South	1: 21469	1: 21469
	2005	3: 2005	3: 7, 8, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 5065
	2006	1: 2006 3: 2006	1: 11 3: 9, 10, 8	1: Winter 3: Fall	1: Inshore South 3: Fixed South	1: Mobile 3: Fixed	1: PS1 3: GNS	1: South 3: South	1: 485 3: 15	1: 485 3: 5000
	2007	3: 2007	3: 7, 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 3222
	2008	3: 2008	3: 9, 10, 8, 7	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 3366
	2009	3: 2009	3: 9, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2328
	2010	3: 2010	3: 9, 7, 8	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2435
	2011	3: 2011	3: 7, 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 3184
	2012	3: 2012	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2241
	2013	3: 2013	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2487
	2014	3: 2014	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2668

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2015	3: 2015	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2078
	2016	3: 2016	3: 8, 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2212
	2017	3: 2017	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1713
	2018	3: 2018	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1735
	2019	3: 2019	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 2501
	2020	3: 2020	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1492
	2021	3: 2021	3: 9	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1244
	2022	3: 2022	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 877
	2023	3: 2023	3: 9, 10	3: Fall	3: Fixed South	3: Fixed	3: GNS	3: South	3: 500	3: 1621
Overwinter										
	1978	1: 1978	1: 4, 5	1: Spring	1: Edge	1: Mobile	1: PS1, OTM	1: South	1: 2210	1: 2210
	1979	1: 1979	1: 4, 5, 12	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: PS1, PS	1: South, 4vn	1: 5048	1: 5048
	1980	1: 1980	1: 4, 5, 1, 11, 12	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: PS1, PS	1: South, 4vn	1: 10790	1: 10790
	1981	1: 1981	1: 5, 1, 11	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: LA, PS	1: North, 4vn	1: 1383	1: 1383
	1982	1: 1982	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 2244	1: 2244
	1983	1: 1983	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 2283	1: 2283
	1984	1: 1984	1: 1, 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 2520	1: 2520
	1985	1: 1985	1: 11	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 850	1: 850
	1986	1: 1986	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 1414	1: 1414

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	1987	1: 1987	1: 11, 12	1: Winter	1: Winter	1: Mobile	1: PS	1: 4vn	1: 1408	1: 1408
	1988	3: 1988	3: 5, 4, 6	3: Spring	3:	3: Fixed	3: GNS	3: Middle, North, South	3: 500	3: 11494
	1989	1: 1989 3: 1989	1: 12 3: 5, 6, 4	1: Winter 3: Spring	1: Winter 3:	1: Mobile 3: Fixed	1: PS1 3: GNS	1: 4vn 3: Middle, North, South	1: 438 3: 62	1: 438 3: 19959
	1990	3: 1990	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, North, Middle	3: 500	3: 9292
	1991	1: 1991	1: 11	1: Winter	1: Winter	1: Mobile	1: PS1	1: 4vn	1: 1751	1: 1751
	1992	1: 1992	1: 11, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 2858	1: 2858
	1993	1: 1993	1: 5, 6, 11	1: Spring, Winter	1: Edge, Winter	1: Mobile	1: PS1	1: South, 4vn	1: 11689	1: 11689
	1994	1: 1994	1: 11, 5, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 10849	1: 10849
	1995	1: 1995	1: 11, 5, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1, PS2	1: 4vn, South	1: 12898	1: 12898
	1996	1: 1996	1: 4, 5, 6, 10, 11, 12	1: Spring, Fall, Winter	1: Edge, Winter	1: Mobile	1: PS1, OTM2, PS2	1: South, Middle, 4vn	1: 24837	1: 24837
	1997	1: 1997	1: 11, 6, 5	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 9869	1: 9869
	1998	1: 1998	1: 11, 6	1: Winter, Spring	1: Winter, Edge	1: Mobile	1: PS1	1: 4vn, South	1: 1185	1: 1185
	1999	1: 1999	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 1804	1: 1804
	2000	1: 2000 3: 2000	1: 5 3: 6, 5, 4	1: Spring 3: Spring	1: Edge 3:	1: Mobile 3: Fixed	1: PS1 3: GND, GNS	1: South 3: North, Middle, South	1: 456 3: 44	1: 456 3: 22400

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2001	3: 2001	3: 5, 4, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, North, Middle	3: 500	3: 19206
	2002	1: 2002	1: 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 1890	1: 1890
	2003	3: 2003	3: 6, 5, 4	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, Middle, North	3: 500	3: 11595
	2004	3: 2004	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS	3: South, North, Middle	3: 500	3: 11058
	2005	3: 2005	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, Middle, North	3: 500	3: 8623
	2006	3: 2006	3: 5, 6, 4	3: Spring	3:	3: Fixed	3: GNS, GND	3: North, South, Middle	3: 500	3: 5979
	2007	3: 2007	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: South, North, Middle	3: 500	3: 11677
	2008	3: 2008	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: South, Middle, North	3: 500	3: 6775
	2009	3: 2009	3: 6, 4, 5	3: Spring	3:	3: Fixed	3: GNS	3: South, North	3: 500	3: 5752
	2010	1: 2010	1: 5	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 1792	1: 1792
	2011	3: 2011	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, Middle, North	3: 500	3: 4756
	2012	1: 2012	1: 6, 5	1: Spring	1: Edge	1: Mobile	1: OTM, PS1	1: South	1: 2398	1: 2398
	2013	1: 2013	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 2821	1: 2821
	2014	1: 2014	1: 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South	1: 993	1: 993
	2015	1: 2015	1: 5, 6	1: Spring	1: Edge	1: Mobile	1: PS1	1: South, North	1: 1547	1: 1547

Fishery to Match	Year to Match	Years	Months	Seasons	Fisheries	Gear types	Gears	Regions	N Fish	N Fish Criteria
	2016	3: 2016	3: 4, 5, 6	3: Spring	3:	3: Fixed, Other	3: GNS, GND, LHM	3: South, North	3: 500	3: 6177
	2017	3: 2017	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS, GND	3: South, North	3: 500	3: 8350
	2018	1: 2018 3: 2018	1: 6 3: 4, 5, 6	1: Spring 3: Spring	1: Edge 3:	1: Mobile 3: Fixed	1: PS 3: GNS	1: South 3: North, Middle, South	1: 154 3: 346	1: 154 3: 6643
	2019	3: 2019	3: 6, 4, 5	3: Spring	3:	3: Fixed	3: GND, GNS	3: North, South	3: 500	3: 6056
	2020	3: 2020	3: 4, 5, 6	3: Spring	3:	3: Fixed	3: GNS	3: South, Middle, North	3: 500	3: 2386
	2021	3: 2021	3: 4	3: Spring	3:	3: Fixed	3: GNS	3: South, North, Middle	3: 500	3: 4709
	2022	3: 2022 4: 2022	3: 5 4: 8, 9, 10	3: Spring 4: Fall	3: 4: Fixed North, Fixed Middle, Fixed South, Inshore North	3: Fixed 4: Fixed, Mobile	3: GNS 4: GNS, PS	3: North, South 4: North, Middle, South	3: 161 4: 339	3: 161 4: 7301
	2023	3: 2023	3: 4, 5	3: Spring	3:	3: Fixed	3: GNS	3: Middle, South, North	3: 500	3: 3288