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Assessment of American Plaice in Div. 3LNO

by

L. Wheeland, K. Dwyer, R. Kumar, R. Rideout, A. Perreault and B. Rogers

Science Branch
Department of Fisheries and Oceans
P. O. Box 5667
St. John's, NF, Canada A1C 5X1

Abstract

Catches from this stock were generally in the range of 40,000 to 50,000 t per year throughout the 1970s and 1980s, before declining to low levels in the early 1990s. There has been no directed fishing on this stock since 1993 and the TAC has been set at 0 t since 1995. Since the moratorium, the majority of by-catch is taken in the Canadian yellowtail fishery within Canada's 200-mile limit and in the skate, redfish and Greenland halibut fisheries in the NAFO regulatory area (NRA). Four surveys are completed on this stock: Canadian Spring and Autumn in Div. 3LNO, and EU-Spain in 3L and in 3NO. All surveys have shown recent declines, with EU-Spain and Can-Spring indices in 2019 at or near the lowest in the time series. The assessment model used is a Virtual Population Analysis (VPA) which is carried out using the ADAPTive framework. The basemodel showed significant trends in the residuals and large retrospective pattern; give poor fit and model instability is was accepted as an indicator of stock trends, but not for absolute values of population estimates. An exploration of the assumption of natural mortality in the model was completed, and two independent population models were presented. Stock trends were similar amongst all models. Following a large decline from the mid-1980s to the mid-1990s, spawning stock biomass (SSB) gradually increased to the early 2000s, and has varied at a low level since then. SSB in 2021 remains below B*lim*. Stock weights at age have shown overall declines since the early 2000s. Estimated abundance at age 5 indicates continued poor recruitment. An increase in fishing mortality is apparent from the early 2000s to around 2015, and there is evidence of a concurrent increase in natural mortality.

Introduction

Fishery

TAC regulation

This stock has been under TAC regulation since 1973 when a TAC of 60,000 t was established. From 1973-87, the TAC varied from 47,000 t to 60,000 t (Table 1) but was lowered to 33,585 t in 1988 (Figure 1). Further reductions followed, bringing the TAC to 10,500 t in 1993. In 1994, a TAC of 4,800 t was implemented, but the Fisheries Commission of NAFO stated that no directed fisheries were to take place on this stock. The TAC has been set at 0 t since 1995.

Catch trends

Catches increased from about 20,000 t in the early 1960s to a peak of 94,000 t in 1967, were relatively stable around 45,000-50,000 t in 1973-82, then declined to 39,000 t in 1984-85 (Figure 1, Table 1). From 1977 to 1982, the catch was taken almost exclusively by Canadian vessels, but the catch by other nations increased rapidly from less than 2,000 t in 1981-82 to over 30,000 t in 1986 as new fisheries were developed in the Regulatory Area. Total catches increased to 65,000 t in 1986 and then declined rapidly thereafter, to about 7,400 t in 1994. Following the moratorium in 1995, the catch (by-catch in other fisheries) declined for a couple of years but then increased to 2005 and have declined since. Catches averaged 1142t over 2018-2020, with an average of 69% of the catch coming from Div. 3N. In 2018-2020, American plaice were mainly taken as by-catch in the Canadian yellowtail fishery, EU-Spain and EU-Portugal skate, and redfish fisheries.

Considerable doubts have arisen about some nominal catches in the 1985 to 1994 period, resulting in various catch estimates being used. These include surveillance estimates, breakdowns of unspecified flounder catches by S. Korea prior to 1991 based on reported flounder catches, and any other estimates deemed by Scientific Council to be reliable. There is also some uncertainty regarding catches prior to 1973, when large amounts of unspecified flounder catches from some nations were broken down by species based on estimates of species composition. As well, estimates of discards are not usually available, and are believed to be substantial during some periods. A detailed description of historical catch estimations at NAFO can be found in NAFO SCR Doc. 13/051.

From 2011-2014, STACFIS was unable to get a precise estimate of catch. During this period, it was decided to estimate catch in Division 3N using the ratio of total effort for the division (where effort was available) in the current year to the previous year and multiply by the agreed catch in the previous year (starting with 2010) (Dwyer et al. 2016). In 2015 and 2016 SC agreed that estimates of catch from Daily Catch Records (DCR) were to be used for American plaice in Div. 3LNO. Since 2017, catches estimates have been obtained from the Catch Estimation Strategy Advisory Group (CESAG) .

Canadian research vessel surveys

Survey coverage

Canada undertakes two depth-stratified random trawl surveys in Div. 3LNO annually, one in the spring and one in the autumn. A stratification scheme is presented of the survey area in Figure 2. Poor survey coverage has been a recurring issue. The autumn surveys in 2004 and 2014 had incomplete coverage in Div. 3L. The spring surveys in 2006 (Div. 3NO), 2015 (Div. 3NO), and 2017 (Div. 3L) were also incomplete (Healey and Dwyer 2005; Dwyer et al. 2007; Healey et al., 2012; Rideout et al. 2017; Rideout and Ings 2018, 2019, 2020; Rideout et al. 2021). There was no CAN-Spring survey in 2020 due to COVID-19 restrictions (Rideout et al. 2021). These data have been removed from the analytical assessment of this stock. The CAN-autumn survey had reduced set density across Divisions 3LNO in 2019 and 2020, however these indices are considered acceptable for use in the assessment of this stock. Updated information on the Canadian research vessel survey coverage and details on annual sets carried out can be found in Rideout et al. (2021).

Spring

Depth stratified-random surveys have been carried out on the Grand Bank by Canadian research vessels in the spring (April to June period) of each year from 1971 to 2019, with the exception of 1983. There was no survey in 2020. The data can be split into 3 time periods, based on the trawl used in each period: 1971-82 was Yankee 36, 1983-95 was Engel 145, and 1996-2019 was Campelen 1800 (see McCallum and Walsh (1996) for a description of the various trawls). Conversions exist for the first to second series (Gavaris and Brodie 1984), and from the second to the third (Morgan et al. 1998). However, data from the first series have not been converted to be comparable with the third series. Thus comparable data exist for 1971-95, and for 1984 to 2019.

Biomass estimates for each Division by stratum and depth for 1996 to 2019 are given in Tables 5 to 7. Note the shaded columns which represent years in which survey coverage was inadequate. In Div. 3L, the biomass index increased consecutively from 2009 to 2013, then decreased to 2019. From 1996 to 1998 the estimate for Div. 3N biomass was approximately half of the estimate for Div. 3O, however the biomass index for Div. 3N increased from the mid-1990s to 2008, and was been the highest of the three divisions from 2005 to 2018, before declining to 2019. In Div. 3O, the biomass estimate has been slowly declining since 1999. Overall, biomass in Div. 3LNO increased from 2009 to 2014, but a rapid decline was observed to 2019, with the biomass estimate the lowest since 1996 (Figure 3). Mean weight per tow for Divisions 3LNO combined (Figure 4) shows the same trend as the swept area estimate of biomass.

Total abundance index for Div. 3LNO combined increased from the mid-1990s to 2014 (remaining below the levels of the 1980s), but subsequently decreased to 2019 (Figure 3). The increase in abundance from 2010 to 2014 was associated with increases in ages 1-4 in Div. 3L. Mean number per tow for Div. 3LNO show the same trend (Figure 4).

Tables 11 to 14 show the abundance at age from the Canadian spring surveys by division and for Div. 3LNO combined. A high abundance of pre-recruit fish (<age 5) was noted in the last assessment of this stock (Wheeland et al. 2018). With the proportion of fish that were ages 0 to 5 in 2016 reaching 82%, the highest value in the time series. However, this declined to 22% by 2019 as these fish aged and no significant pre-recruitment pulses were detected entering the survey since then.

Expanding symbol distribution plots of catch of American plaice from the Canadian Spring RV Survey indicate that American plaice are distributed over the entire Grand Bank (Figure 8, Figure 9). Estimates of biomass by strata (Tables 5 to 7) indicate which strata are important in the distribution of American plaice. In the mid-1980s, many strata were important for American plaice but especially Strata 348 and 364 in Div. 3L (see tables in Wheeland et. al 2018). In the 1990s most of the biomass in these strata (and many others) had disappeared. Abundance of young fish (ages 4-5) that were notable in the 2018 assessment of this stock in Div. 3L seem to have expanded their distribution into Div. 3N and 3O by ages 7 and 7 in 2019 (Figure 10).

Fall

Stratified-random surveys have been conducted in Div. 3L in the fall since 1981, usually in October-November, in some years extending into December. Since 1990, fall surveys were also carried out in Div. 3NO. Surveys from 1983 to 1994 were done with the Engel trawl and starting in fall 1995, a Campelen 1800 trawl was used.

Biomass estimates by stratum and depth are given for each Division in Tables 8 to 10. Biomass estimates from the fall survey declined sharply at the time series, and then increased somewhat to the early 2000s. Since then, indices have generally fluctuated at a level well below the 1990 value (Figure 5). There is large uncertainty associated with the biomass index estimate in 2020 driven by two very large sets in the survey in Div. 3N. Since 2000, there had been a large biomass estimate in Div. 3N fairly consistently, which is heavily influenced by large sets in stratum 360 (Table 9), however, this declined in 2016 and 2017 to values similar to that from the 1990s period. The biomass estimates for Div. 3O has reached the highest point in the survey in 2008, but declined to 2010 and has since remained at a low level. Mean weight per tow shows similar trends to the total survey biomass (Figure 6).

Abundance for Div. 3LNO combined (Figure 5) showed a substantial decline from 1990 to 1998. An increase was observed from the early 2000s to a peak in 2015 where abundance indices reached levels similar to those observed in 1990. This increase in abundance was driven by Division 3L. However, abundance indices have declined steadily since. Mean numbers per tow show the same pattern (Figure 6).

Tables 15 to 18, and Figure 7 show the abundance by age for the fall survey.

Plots of distribution (number and weight per tow) (Figure 11, Figure 12) show that American plaice are distributed throughout the Div. 3LNO area in the fall. Two very large sets were recorded in Div. 3N in 2020. Distribution of numbers at age shows a high amount of pre-recruits, particularly age 2 – in Div 3L and Div. 3O in the fall of 2020 (Figure 13).

Maturities

Age and length at 50% maturity were produced from CAN-Spring RV data. Maturity data were collected during research vessel surveys from 1960-2019. Stratified random surveys were used where possible (1971-2016). 2006, 2015, and 2017 surveys were not used because survey coverage was considered too poor to be representative. Data from earlier years came from surveys that were conducted mainly as line transects where the coverage of a stock area would generally not be as complete as the stratified random surveys. For the period of the stratified random surveys, observed proportion mature at age was calculated according to the method of Morgan and Hoenig (1997) to account for the length stratified method of sampling. Prior to this, only data from the aged fish was used without weighting by the length frequencies. This should not have a large impact on the model estimates (Morgan and Hoenig 1997). Data from 1985-1995 were converted to Campelen equivalents.

Estimates were produced by cohort. For males, A_{50} were fairly stable for cohorts of the 1960's to mid-1970's, with perhaps a slight increase over that time period. Male A_{50} then began a fairly steady decline to the 1991 cohort which had an A_{50} of just over 3 years. Male A_{50} has increased somewhat but is still below the 1960's and 1970's with an A_{50} of about 4 years compared to 6 years at the beginning of the time series (Figure 14). For females, estimates of A_{50} have shown a large, almost continuous decline, from the beginning of the time series to about 1990. Cohorts since then females have had a fairly constant A_{50} near 8 years compared to 11 years for cohorts at the beginning of the time series.

Estimates of maturity at length were produced using the data described above and are presented by cohort in Figure 15. Overall, L_{50} declined for both sexes for cohorts from 1965 to present. Males reached a minimum size at maturity in 1990 with a low period from 1989 to 1991. A recent low is apparent for the 2012 and 2013 cohorts with the lowest L_{50} since 1991. The recent L_{50} for males of about 16 cm is 7 to 8 cm lower than the earliest cohorts estimated. The L_{50} of most recent cohorts for females are among the lowest in the time series, in the range of 32-33 cm, 8 to 9cm lower than the 41 cm of the earliest cohorts.

EU-Spain Div. 3NO survey (SCR 20/08)

Abundance and Biomass Trends

Since 1995, Spain has carried out a stratified random spring bottom trawl survey in Div. 3NO of the NAFO Regulatory Area (NRA), with depth strata expanded in 1997. In 2001, the trawl vessel (C/V *Playa de Menduiña*) and gear (*Pedreira*) were replaced by the R/V *Vizconde de Eza* using a *Campelen* trawl. There was no survey in 2020. Estimates of both indices from the EU-Spain survey varied without trend from 2000-2013, but have shown steady declines from 2013-2019, with 2019 being the lowest in the time series (González-Troncoso et al. 2020).

Numbers at Age

Numbers at age (1998 to present) are used in the assessment model. Annual Canadian spring RV age length keys (for Div. 3N only, as the Survey by EU-Spain Div. 3NO survey only covers a small portion of Div. 3O) were applied to EU-Spain length frequency data (separate sexes, mean number per tow) to get numbers at age, except in 2006 where there Canadian spring survey was incomplete, therefore the combined 1997-2005 age length keys were applied to the 2006 data. In addition, in 2015 and 2017, Canadian spring survey age length keys were unavailable due to survey coverage issues, therefore the age length key from the previous year's Canadian spring survey was used. This resulting mean numbers per tow at age data is found in Table 19 and is used as input to the analytical assessment.

EU-Spain Div. 3L survey (SCR 20/013)

There is also a survey carried out in the NRA of Div. 3L which indicates a general increase in biomass and abundance indices for American plaice from 2010 to 2015, followed by a decrease to 2019 (Román-Marcote et al. 2020). No survey was completed in 2020.

Catch at age

Catch at age from Canadian fisheries in 2018-2020

Results of the catch at age calculations for American plaice catches prior to 2018 are given in Wheeland *et al*. (2018), Dwyer *et al*. (2005, 2007, 2009, 2010, 2014, 2016), Rideout *et al*. (2011), and Morgan *et al*. (1999a,b; 2001; 2002, 2003).

In 2018-20, sampling data collected by observers were available from by-catch of American plaice in Canadian fisheries targeting yellowtail in Div. 3NO and from Greenland halibut fisheries in Div. 3L. In 2018, the Canadian catch of American plaice in Divs. 3LNO was 540 t, ~25% higher than the average from 2011-2015 of 590 t. In 2019, the bycatch was 632 t and bycatch in 2020 was 721 t. Most bycatch came from the directed fishery for yellowtail flounder (72% in 2018, 93% in 2019, 96% in 2020), with American plaice catches in this fishery coming primarily from Div. 3N (Tables 2 to 4. This percentage is about where it has been in recent years (~87% for since 2010).

The same weight-length relationship was used as in recent years (log weight = 3.3247 log length – 5.553) and the sum of products check in 2018-2020 was within an average of 11.5% of the catch. Commercial aging for 2020 was not available and as such, 2019 ALKs were used to calculate catch-at-age in 2020. Patterns in ALKs from 2017-2020 were largely similar and would allow for the use of 2019 ages in 2020.

The Canadian catch in 2018-20 consisted of about 1.7, 2.0, and 1.4 million respectively, (Table 20, Table 21, Table 22). Ages in the 2018 catch ranged from 3 to 25, and catch was comprised mainly of fish aged 7 to 10 years old, with the peak being the 2008 year class (age 10). Ages in the 2019 catch ranged from 3 to 24, and catch was comprised mainly of fish aged 7 to 11 years old, with the peak being the 2012 year class (age 7). Ages in the 2020 catch ranged from 3 to 22, and catch was comprised mainly of fish aged 8 to 11 years old, with the peak being the 2009 year class (age 11).

The mean fish weight in the 2018 catch was 0.52 kg per fish, in 2019 was 0.52 kg per fish, and was 0.75 kg per fish in 2020. Reasons for the annual fluctuations are likely due to the considerable seasonal and temporal differences in the catches, as noted above, however it was noted that low sampling numbers from the commercial fishery may also be contributing to the degree of fluctuations observed.

Catch at age from other countries

For 2018, 2019, and 2020, length frequency data were available from EU-Portugal and EU-Spain (in addition to the Canadian data above). No sampling from other countries was available. Unsampled catch was assigned to a combined and catch-weighted length frequency from countries where sampling was available. Details on the sampling levels and descriptions of the fisheries are contained in Vargas *et al.* (2019, 2020, 2021), and González-Costas *et al*. (2019, 2020, 2021). In all cases, age-length keys from the Canadian spring surveys in Div. 3LNO were used to derive age compositions, which were then combined and adjusted to the total catch to account for all non-sampled catches. Catch at age, weight at age (using the weight-length relationship described above) and sum of products (SOP) for 2018-2020 are given in Tables 20 to 22.

Length frequency data were available from the Canadian by-catch of American plaice in Div. 3LNO, mainly from the yellowtail fishery (see above). In 2018, length frequency sampling came from Divisions 3NO in the 130 mm mesh fisheries from Portugal with peak catches ranging from 34-44 cm for the 130 mm mesh size. Spanish frequencies indicated a peak at 42 cm in 2018.. In 2019, length frequency sampling came from Division 3NO in the 130 mm mesh fisheries from Portugal with peak catches ranging from 36-40 cm for the 130 mm mesh size. Spanish frequencies indicated a peak ranging from 38-42 cm in 2019. In 2020, length frequency sampling came from Division 3O in the 130 mm mesh fisheries from Portugal with peak catches at 44 cm for the 130 mm mesh size. Spanish frequencies indicated a peak ranging from 36-44 cm in 2020.

Mean lengths and weights at age in the Canadian fishery were slightly higher at younger ages than in international catches, likely a result of larger mesh size used in the Canadian fishery and also the use of research vessel age-length keys for the catches of non-Canadian fleets.

Virtual Population Analysis (VPA)

A formulation of ADAPT using the same base structure that was used in the accepted VPA from the 2018 assessment (Wheeland et al. 2018) was run. The ADAPT VPA was put in place for this stock in 1999 (Morgan et al., 1999a; 1999b) and this, or a formulation similar, has been used since (Morgan et al. 2001; 2002; 2003; Dwyer *et al*., 2007a, 2008, 2009, 2010, 2014; Rideout *et al*., 2011). The ADAPT used catch–at-age for ages 5 to 14 with an age 15 plus group which included all catch from ages 15 to 22 (Table 22). The ratio of F on the plus group to F on the last true age was set at 1.0. M was set at 0.2 except at 0.53 for all ages from 1989 to 1996 (Morgan and Brodie, 2001; Dwyer *et al*., 2007b; 2008). Beginning of the year weights-at-age and maturities-at-age are given in Table 24 and Table 25. The calibration matrix consisted of the following input data:

- Catch at age (1960-2017) (ages 5-15+) (Table 23);
- Canadian spring RV survey (1985-2019) (no 2006, -15, -17 value) (ages 5-14) (Table 27);
- Canadian autumn RV survey (1990-2020) (no 2004 or -14 value) (ages 5-14) (Table 26);
- EU-Spanish Div. 3NO survey (1998-2019) (ages 5-14) (Table 28).

The results of an ADAPT run using the formulation described above are given in Table 29 and Figures 16 to 20. The mean square of the residuals was 0.61. Relative errors on the population estimates ranged from 0.19 to 0.80. The relative errors on the catchabilities (q) were all ≤0.17. There are significant patterns in the residuals for all survey indices. The residuals from the Canadian spring survey showed a general increasing trend to 2015, and a subsequent decrease in 2019. Residuals from the Canadian fall survey show no overall trend from 1990 to 2005, but then increase consistently to 2014, before decreasing to 2020. The residuals from the EU-Spain Div. 3NO survey increased steadily from 2000 to 2013 and have declined sharply since then; residuals on this index in 2019 were negative for all ages and overall are the largest magnitude in the series (Figure 17). In all surveys, there is evidence of auto-correlation in the residuals. Residuals at age highlight a divergence at young ages between the Canadian and Spanish surveys (Figure 16). Survey qs show some tendency for lower qs for the youngest fish (age 5), increasing to age 6 for Canadian Spring surveys and to age 7 for Canadian Fall and EU-Spain Div. 3NO surveys, before declining to around age 10 and flattening out towards the oldest ages in all surveys. (Figure 18). Biomass is calculated by multiplying the population

numbers at age by the beginning of the year weights (stock weights) at age. Spawning stock biomass is calculated by multiplying the biomass at age by the female maturity ogive.

Given instability in the model (i.e. retrospective patterns, see below) and poor overall model fit (e.g. residual patterns) the VPA analysis updated with indices to 2020 is considered to be reflective of stock trends, but magnitude of estimates of biomass, SSB, abundance, recruitment, and F are not considered to be reliable. Model output tables are therefore not provided in this assessment, and figures should be interpreted with caution. Population abundance and biomass declined fairly steadily from the mid 1970's to early 1990s (Figure 19, Figure 20). Biomass has varied at a low level since then. Average F on ages 9 to 14 showed an increasing trend from about 1965 to 1985 (Figure 19). There was a large peak in F in 1993, which may be an artifact of extremely low catches during the moratorium. Model output suggests a more recent increase in F from 1998 to 2014 and a decline since. This is a significant change in perception on fishing mortality since the last assessment (Wheeland et al. 2018), and the large retrospective pattern apparent in this model run (see below) calls into question the accuracy of these estimates.

Recruitment has been generally poor since the 1986 year class (Figure 20). SSB has shown 2 peaks, one in the mid-1960s and another in the early to mid-1980s. It declined to a time series low in 1994, and then increased to the early 2000s, though remaining well below the SSB of the pre-1990 period. Since then SSB has oscillated at this low level (Figure 19). The model output indicates that SSB remains well below B_{lim}.

Retrospective Analysis

Retrospective analyses were conducted by sequentially removing one year of data from the most recent year for a comparison of 5 years. There is a significant directional retrospective pattern present (Figure 19, Figure 20) indicating that abundance and SSB have been overestimated and F has been underestimated. The retrospective pattern present in the current assessment is larger than that observed in the previous assessment of the stock. While the exact cause of the retrospective pattern cannot be identified, contributing factors may include inconsistency in survey trends at age between Canadian and EU-Spain surveys, low F relative to M, current assumptions on M, unreported catch, etc. This large retrospective in F in the 2021 base run of the assessment model has a significant impact on the impression of relative impacts of F on this stock, and is a notable change from the previous assessment of this stock (Wheeland et al. 2020).

Model Exploration

Model misspecification of M may be reflected in retrospective patterns in F. The ADAPT VPA is not able to estimate M, rather this is defined in the model assumptions. Informed by modelling work (Perreault et al. 2020, and ongoing research) and ecosystem conditions on the Grand Bank (Koen-Alonso and Cuff, 2018), there is reason to believe that the assumption of M=0.2 used in for most ages and years in the base model is an underestimate of natural mortality in this stock for at least portions of the time series. Sensitivity analyses were therefore completed examining the impact of changing the M assumption in the VPA. Details are provided in Wheeland (2021). This is not the first time that there has been an exploration of M in this stock and model (see Morgan and Brodie 2001; Dwyer et al. 2008). All ADAPT scenarios examined here (increased M since 2005 or 2010) showed overall improved model fit, however retrospective patterns remained and some scenarios (highest examined M) led to historical population estimates that were unrealistic.

Advances in modelling approaches for this stock

Results of two independent population models – a State-Space Model (SSM) (Perreault et al. 2020) and a Spatial Survey Based Assessment Model (SSURBA) (Kumar et al. 2020) – were presented.

The SSM model was developed with the goal of addressing uncertainties in the landings data and reducing the problem of retrospective patterns noted in previous runs of the ADAPT (Dwyer et al. 2014, Wheeland et al. 2018). The SSM includes ages 1-4 which are not considered in the ADAPT, and uses the same M assumptions for ages 5+ as the base formulation of ADAPT described above. Results for the model update are presented in

Perreault et al. (2021). Model output indicates that stock size remains low, and model diagnostics suggest that the natural mortality rate assumption used here and in the base ADAPT should be reconsidered for the stock.
The SSURBA is a state-space model that fits to annual spatial (i.e. by Division) stock numbers-at-age from Can-Spring, Can-Autumn, and EU-Spain 3N survey indices to inform spatial variation in relative stock trends. The model features estimation of survey gear catchability (q) that changes spatially and temporally following changes in fish growth and survey gears, and assumes natural M is size-dependent and therefore changes with years and divisions. Results for this model update are presented in Kumar et al. (2021). This model indicates that stock size remains low, and highlights a recent decline in Div. 3N. Model estimated catch suggests that catch (bycatch) has been higher than reported values for many years in the last decade.

Model output comparison
Output of SSB, recruitment at age 5, and average F (ages 9-14) from each model (ADAPT, SSM, SSURBA) and each formulation of ADAPT (M0.4, M0.53, M-est 2005-2020, and M-est blocks, see Figure 21) were scaled relative to their series average from 1975-2020 (i.e. the longest period to common to all models) and plotted to examine consistency in stock trends among models. These are presented in Figures 21 to 23.

Overall stock trends were consistent across models, and support the conclusions of stock status from the base ADAPT.

Stochastic Projections

Given the significant retrospective in the model, no projections were completed in 2021.

Conclusion

Bycatch of American plaice in Div. 3LNO comes mainly from the yellowtail fishery inside Canada's Exclusive Economic Zone and in the yellowtail, skate and redfish fisheries in the NRA. Survey indices indicate ongoing declines in the stock: the 2019 CAN-Spring biomass was the lowest value since 1995, and the second lowest in the time series (1985-2019). Spring abundance has declined steadily since the recent peak in 2014, the CAN-autumn abundance has declined steadily since 2015, and the EU-Spain 3NO and 3L biomass and abundance indices have declined since 2013 and 2015, respectively. In 2019 EU-Spain 3NO was the lowest in the time series (1997-2019). Age at 50% maturity has declined over time. The current VPA indicates that the stock has varied at a low level since the early 2000s. However, this model has poor overall fit and shows a large retrospective pattern. Although model output is considered to reflect trends in the stock – and is supported by similar trends observed from two independent population models – absolute estimates of stock size, recruitment and F cannot be determined at this time. An increase in fishing mortality is apparent from the early 2000s to around 2015, and there is evidence of a concurrent increase in natural mortality. The combined impact of fishing and natural mortality is impeding recovery of this stock.

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Table 1. Nominal catches (t) of American Plaice for NAFO Divisions 3LNO, 1960-2020, and TAC from 1973-2021.

Year	Canada	Other	Total	STACFIS[a]	TAC
1960	21,353	20	21,373		-
1961	14,897	1,476	16,373		-
1962	15,210	982	16,192		-
1963	24,591	1,128	25,719		-
1964	35,474	3,093	38,567		-
1965	45,365	7,896	53,261		-
1966	51,225	13,786	65,011		-
1967	54,190	40,223	94,413		-
1968	48,674	24,493	73,167		-
1969	64,815	14,622	79,437		-
1970	54,929	11,724	66,653		-
1971	49,394	18,494	67,888		-
1972	41,605	17,756	59,361		-
1973	38,586	14,257	52,843		60,000
1974	35,101	11,196	46,297		60,000
1975	34,015	9,206	43,221		60,000
1976	47,806	4,019	51,825		47,000
1977	42,579	1,402	43,981		47,000
1978	48,634	1,394	50,028		47,000
1979	47,131	1,438	48,569		47,000
1980	48,296	790	49,086		47,000
1981	48,177	1,981	50,158		55,000
1982	49,620	717	50,337		55,000
1983	35,907	1,813	37,720		55,000
1984	33,756	2,307	36,063		55,000
1985	40,024	8,057	48,081	54,212	49,000
1986	33,409	24,040	57,449	64,570	55,000
1987	33,967	19,490	53,457	55,012	48,000
1988	26,832	12,096	38,928	40,835	33,585[c]
1989	27,901	13,305	41,206	43,369	30,300
1990	22,600	1,406	24,006	32,501	24,900
1991	22,510	2,993	25,503	34,681	25,800
1992	9,663	1,207	10,870	13,350	25,800
1993[b]	7,454	462	7,916	17,122	10,500
1994	73	487	560	7,378	4,800[d]
1995	67	481	548	637	0
1996	49	826	875	913	0
1997	75	1,290	1,365	1,401	0
1998	227	1,333	1,560	1,618	0
1999	323	2,113	2,436	2,565	0
2000[e]	623	2,071	2,694	5,176	0
2001	1,618	1,850	3,468	5,739	0
2002	1,374	1,795	3,169	4,870	0
2003[e]	1,607	2,062	3,669	8,727	0
2004	1,290	1,368	2,658	6,158	0
2005	1,466	889	2,355	4,110	0
2006	90	799	889	2,828	0
2007	430	1,020	1,450	3,606	0
2008	875	1,017	1,892	2,515	0
2009	1,075	695	1,770	3,015	0
2010	1,155	316	1,471	2,898	0
2011	450	797	1,247	2363[f]	0
2012	266	1,042	1,311	2148[f]	0
2013	1,041	1,079	2,177	3016[f]	0
2014	747	642	1,389	2265[f]	0
2015	442	665	1,107	1149[g]	0
2016	745	920	1,665	1666[g]	0
2017	219	953	1,172	1172[h]	0
2018	463	539	1,002	1002[h]	0
2019	633	615	1,245	1245[h]	0
2020	450	721	1,171	1171[h]	0

[a] May include some catch estimated from surveillance reports or miscellaneous information. See text for details.
[b] Catch may have been as high as 19,400.
[c] Effective TAC.
[d] No directed fishing.
[e] STACFIS unable to determine precise estimates because of discrepancies between various sources.
[f] Estimated catch based on ratio of effort in Div. 3N (ex. $Catch_{2011}=(Effort_{2011}/Effort_{2010})*Catch_{2010}$) (see text for details).
[g] From Daily Catch Records (DCR)
[h] From CESAG estimated using CDAG method

Table 2. Canadian catches (tonnes) of American Plaice by Division, month and gear (OT = otter trawl; GN =gill net) during 2018.

	3L		3N	3O	3LNO
	GN	**OT**	**OT**	**OT**	**TOTAL**
Jan		1	<1		2
Feb		13	<1		13
Mar				1	1
April		62		23	85
May		20	19	8	47
Jun			62	4	66
Jul		<1	47		47
Aug	<1				<1
Sept	<1		7	33	40
Oct	<1		35	21	57
Nov			82	9	91
Dec			3	2	15
Total	**<1**	**107**	**255**	**101**	**464**

Table 3. Canadian catches (tonnes) of American Plaice by Division, month and gear (OT = otter trawl; GN = gill net) during 2019.

	3L		3N	3O	3LNO
	OT	**GN**	**OT**	**OT**	**TOTAL**
Jan	21		4		25
Feb			3		3
Mar			5	2	6
April			14	19	33
May	<1		28	<1	28
Jun		<1	59	1	60
Jul	<1		16	<1	16
Aug		1			1
Sept		1	27	5	33
Oct		0	263		263
Nov			133		133
Dec	<1		32		32
Total	**2**	**21**	**26**	**584**	**632**

Table 4. Canadian catches (tonnes) of American Plaice by Division, month and gear (OT = otter trawl; GN = gill net) during 2020

	3L		3N	3O	3LNO
	OT	**GN**	**OT**	**OT**	**TOTAL**
Jan			7		7
Feb			3		3
Mar			1	13	14
April			8	1	9
May			28		28
Jun	2		8		11
Jul	<1		1		1
Aug	<1	<1	23		23
Sept		1	33	30	63
Oct		<1	103	25	128
Nov		<1	105		105
Dec	9		42		52
Total	**12**	**1**	**68**	**68**	**443**

Table 5. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian spring surveys in Div. 3L in 2000-2019 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. No survey was undertaken in 2020. Previous years can be found in Wheeland et al. 2018

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<57	784	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57-92	350	1.8	0.5	0.2	0.7	0.7	1.2	1.7	2.3	3.1	0.6	0.2	2.3	4.1	2.4	3.2	-	0.4	0.5	0.5	0.5
	363	6.2	0.7	0.1	3.4	2.1	4.1	4.5	4.4	6	1.3	0.4	1.4	8	3.4	6	-	0.2	0.1	1.2	1.1
	371	0.9	0.1	+	1	0.5	1.3	1.3	1.4	1.9	+	1	0.8	1.8	1.4	1.3	-	0.1	0.5	0.5	0.5
	372	3.7	1.2	0.3	2.2	1.2	1.8	2.5	1.6	1.8	0.8	2.1	1.5	2	2.5	2.1	-	0.6	0.8	2.2	0.7
	384	1.2	0.3	0.4	0.3	0.5	0.9	1.6	1.6	2.5	0.1	0.3	1.2	1.8	3.9	5.1	3	0.2	0.2	1.9	0.1
	785	-	0.7	0.1	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	328	0.9	1.4	0.5	0.2	0.6	3.6	1.6	1.4	-	2.9	0.9	6.2	3.4	7.2	3.4	-	4	-	1.2	0.7
	341	0.8	1.6	0.2	0.6	0.6	2.3	1.7	1.2	4.4	0.9	0.4	2.8	6.1	3.8	6.6	-	1.5	0.4	1.6	1.1
	342	0.2	0.1	+	0.1	+	0.1	0.6	0.8	0.1	0.1	+	0.6	0.8	1.3	0.4	0.1	0.1	-	0.7	0.7
	343	0.2	+	+	0.1	+	0.1	0.3	0.1	+	0.2	-	0.4	0.5	0.1	0.1	0.1	+	-	0.2	0.1
	348	1.5	0.5	0.3	0.4	1.3	1.5	7	2.7	0.8	0.2	0.7	0.5	2.5	4.9	3.8	1.1	1.5	-	3.3	1.9
	349	1.3	0.5	0.3	0.6	1.1	1.1	3.6	1.6	1.8	0.3	0.5	0.8	2.1	2.3	3.3	-	0.7	-	0.7	1.2
	364	1.3	1.6	1.2	0.7	1.7	5.8	7.5	0.7	3.5	0.4	1.1	1.8	5.2	4.7	3.7	1.1	2.8	-	3.2	2.1
	365	1.2	0.4	0.6	0.6	0.5	1.3	6.2	2.3	2.5	0.3	1.1	0.4	4.8	1.7	2.2	4.3	1.4	-	1.9	2.2
	370	1.9	1	0.6	0.5	1.1	4	5.1	0.8	3.1	0.4	1.4	0.6	2.3	5	2.3	1.6	1.3	-	1.3	1.5
	385	1.9	1.5	0.7	0.4	1.4	2.4	4	1.7	3.9	0.8	1.5	1.6	2	9.5	2.9	4.7	2.8	-	2.4	1.8
	390	0.3	0.5	1	0.3	0.2	0.9	0.9	1.8	2.6	0.1	0.2	0.3	0.5	3.9	2.3	1.1	0.3	-	0.7	0.3
	786	-	0.4	-	-	0.1	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-
	787	-	0.1	-	-	+	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-
	794	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	797	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	799	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
184-274	344	0.5	0.4	0.2	0.3	0.3	1.7	2.9	1.7	0.5	0.3	0.4	0.3	0.4	2.8	0.7	0.9	0.6	-	1.2	1.5
	347	0.2	0.4	0.1	0.5	0.3	1.7	1.7	5.3	0.2	0.5	0.2	0.2	0.3	2.2	1	2.2	0.5	-	-	0.5
	366	0.7	0.8	0.9	0.6	0.6	1.3	3	3.3	0.7	0.7	1.1	0.5	-	3.1	1.8	3	2.6	-	-	1.6
	369	0.7	1	0.8	0.4	0.5	2.8	4.4	2	0.7	0.8	1.3	0.3	0.9	5.4	1.5	2.1	1.5	-	1.3	1.5
	386	1.7	0.5	0.5	0.4	0.5	2	2.6	2.5	0.9	0.5	1.2	0.2	0.7	4.8	1.7	-	1	-	1.7	0.9
	389	0.8	0.8	0.3	0.4	0.7	0.4	1.1	0.7	0.7	0.2	0.7	0.9	0.8	3.8	1.3	-	0.9	-	1	0.7
	391	+	0.2	0.2	0.2	0.1	0.1	0.1	0.4	0.6	0.1	0.1	0.5	0.7	0.2	1.7	0.2	0.2	-	0.2	0.1
	795	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
275-366	345	0.5	0.8	0.7	0.2	0.4	2.9	1.4	1.9	0.7	1.2	0.6	0.5	0.5	2.2	1.9	1.2	0.4	-	1.5	0.6
	346	0.5	0.2	0.8	0.8	0.9	1.6	0.7	1.2	0.8	1	1.1	0.4	0.9	0.9	0.9	0.3	0.5	-	-	0.6
	368	0.4	0.2	0.2	0.2	0.2	0.1	0.1	+	0.5	0.7	0.5	0.3	0.7	0.6	0.3	0.7	1.4	-	1.1	0.8
	387	1.6	0.8	0.1	0.4	0.4	0.7	0.6	0.5	1.8	0.2	0.6	1.6	3.3	1.1	1.1	-	0.5	-	1.1	1.1
	388	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.2	0.9	0.2	0.3	0.7	0.5	1	2.4	-	0.4	-	1.2	0.3
	392	0.1	0.2	0.3	0.1	0.2	+	+	+	+	0.3	1.1	0.1	0.6	0.3	0.1	0.5	0.3	-	0.4	0.2
	796	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	798	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	789	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
367-549	729	1.3	1.1	1.3	1.2	0.1	+	+	+	+	1.5	-	0.2	0.4	0.2	+	+	0.6	-	+	0.7
	731	1.2	0.4	0.2	0.1	+	+	+	0.1	+	0.4	0.1	0.1	0.1	+	0.1	-	1.9	-	+	+
	733	0.1	2.4	0.5	2.1	0.1	+	0.1	+	0.5	+	0.7	0.1	1.5	+	0.1	-	0.1	-	1.6	0.1
	735	1.2	2.1	1.2	4.9	0.3	+	+	0.1	2.3	0.9	1.3	5.6	2	0.2	0.6	0.3	0.6	-	0.5	1.6
	792	-	0.2	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
550-731	730	0.1	0.1	0.3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+
	732	0.3	3.4	0.6	0.6	+	+	+	+	+	0.2	+	-	+	+	+	-	0.7	-	+	+
	734	+	0.1	0.9	0.5	+	+	+	+	-	1.2	0.1	+	+	+	+	-	+	-	+	+
	736	+	+	0.5	0.1	+	+	+	+	0.1	0.5	0.1	+	0.1	+	+	+	+	-	+	+

Table 6. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian spring surveys in Div. 3N in 2000-2019 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. No survey was undertaken in 2020. Previous years can be found in Wheeland et al. 2018.

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<57	375	5.1	2.1	3.9	2.1	2.3	0.6	4.5	3.7	6.3	2.2	2.6	2.2	2.1	1.9	1.2	2.7	0.6	0.7	0.2	0.4
<57	376	5.1	9.3	8.6	9.6	11.7	37.2	32.1	7.5	7.9	9.7	3.3	6.9	4	6.1	4.1	11.4	3	1.4	5.7	1.7
57-92	360	22.8	50.4	28	29.6	29.2	37.5	54.2	100.7	78.3	17.8	47.1	42.4	35.2	46.4	34.6	49.3	2.1	21.7	26	2.7
	361	4.2	9	6	9.3	8.3	4.7	3.8	2.8	3.1	2.1	1.2	3	0.4	3.6	1.5	0.1	0.2	0.6	0.2	2
	362	6.6	7.1	2.7	5.1	2.5	5.7	4.5	4.2	4.5	2.4	2.7	4.1	1.8	5.4	6.3	1.8	1.1	0.8	2.1	1.4
	373	3.2	2.6	0.4	2.7	1.1	2.7	-	3	10.2	1.5	4.9	1.2	5.8	5.3	4.4	2.7	1	0.9	2.3	0.9
	374	0.9	1.1	0.6	3.2	2.1	3.5	0.1	5	5	2.9	7.4	4.5	2.8	5.6	8.8	8	0.2	0.4	2.2	0.1
	383	0.2	0.1	+	0.3	0.5	1.8	-	2.7	2.6	0.2	0.4	0.2	6.4	2.6	9.4	1.8	0.2	0.1	2.1	0.1
93-183	359	5.1	5.1	0.6	7	3.7	15.3	-	4.1	9.3	4.5	11.7	3.5	4.9	6.3	2.7	4.3	0.5	10.6	3.9	1.7
	377	+	0.9	0.1	0.2	0.2	0.4	-	4.8	2	0.8	0.6	0.5	1.2	9.6	1	1.1	+	0.1	2.5	0.1
	382	0.4	0.1	0.1	0.1	0.1	3.9	-	0.1	1.6	+	0.5	0.1	0.5	6.4	39.7	4.4	+	0.1	14.2	0.1
184-274	358	0.6	0.6	0.1	0.3	0.3	0.4	-	0.7	0.5	1.5	0.7	0.2	+	0.8	0.2	0.1	0.5	0.2	0.1	0.7
	378	+	0.2	0.1	0.5	0.4	0.1	-	0.4	0.3	9	1.1	1.5	0.2	3.8	0.1	+	0.3	1.6	0.2	0.6
	381	0.1	0.1	0.1	0.2	0.8	0.1	-	0.7	0.8	0.2	1	0.1	2.1	0.2	1.6	3.3	0.2	+	0.3	0.8
275-366	357	0.1	0.2	0.1	0.1	0.1	0.1	-	0.1	+	0.4	+	+	+	+	+	+	0.1	+	+	+
	379	0.1	0.1	0.1	0.3	+	+	-	+	+	0.2	+	0.1	+	+	+	+	0.5	1.9	+	0.6
	380	+	0.1	+	0.4	0.2	+	-	+	0.1	0.3	0.3	0.3	0.1	0.7	+	0.1	0.2	0.2	1.3	0.3
367-549	723	+	0.1	0.3	1.1	0.1	0.1	-	+	+	+	+	+	+	+	+	+	+	+	+	+
	725	0.4	0.1	+	0.3	+	+	-	+	+	+	+	0.7	+	+	+	+	4.1	+	+	0.3
	727	1.2	2.5	0.1	0.5	0.4	+	-	+	+	1.7	0.1	8.3	0.3	2.3	+	+	5	38.1	+	1.3
550-731	724	0.1	0.2	0.5	0.1	+	0.1	-	+	-	+	+	+	-	+	+	+	+	-	+	+
	726	0.1	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	0.4	+	+	+
	728	0.5	1	0.4	0.1	+	0.1	-	+	+	3.8	0.2	0.5	0.2	+	+	+	0.4	+	+	+

Table 7. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian spring surveys in Div. 3O in 2000-2019 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. No survey was undertaken in 2020. Previous years can be found in Wheeland et al. 2018.

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	330	5.9	4.2	2.1	1.3	2.9	6.5	4.9	4.7	6.5	3.2	3.7	4.9	3.5	4.2	5.4	1.1	1.1	1.1	1.7	1.2
	331	2.3	2.7	2.2	2.6	0.8	0.9	-	2.5	1.9	0.4	1.2	0.6	1.5	0.9	1.6	0.7	0.4	0.4	0.4	0.5
	338	2.3	6	3.1	5	4.3	4.5	6.4	3.2	2.5	3.2	3.3	3.4	4.2	3.2	1.6	1.8	2.6	1.3	1.6	1.3
57-92	340	1.9	1.7	0.5	1.5	0.7	1.7	1.4	2.4	3.5	1.4	3	1.9	3.7	3.2	4.1	2.7	0.7	0.4	1.5	1
	351	3.4	6.5	3.2	2.4	3.5	4.5	3.2	6	4.4	0.6	3	3.7	4.8	4.6	7	2.5	0.6	1.1	1.8	1.1
	352	13.4	17.6	18.6	10.1	10	13.2	10.7	8.9	4.9	2	9.1	8.9	6.6	4.5	1.7	2.8	1.1	1.8	3.3	2
	353	21.1	20.6	14.8	25.2	21.2	10.1	15.9	7.8	10.6	15.7	9.6	3.8	3.4	8.9	5.5	3.4	1.3	1.7	4.1	0.4
	329	3.9	2	1.4	1.8	3.1	2.3	-	2.8	3.4	2.2	4.5	3.5	2.8	2.4	10	3.4	1.7	0.8	2.7	4.6
	332	0.9	2.2	3.1	1.4	1.9	2.2	-	1	3.1	3.6	1.7	1.3	0.8	1.1	3	1	3.3	0.3	1.3	1.9
93-183	337	1.5	1.2	1.4	1.4	1.6	2.5	-	0.7	2.5	1.1	0.4	0.4	4.3	1.8	0.9	0.8	1.1	0.4	0.7	0.2
	339	2.1	2.6	0.9	0.9	0.7	1.7	1.2	1	1.3	2.3	0.3	0.7	2.7	1.3	2.7	1.4	0.6	1.5	2.6	0.7
	354	1.3	1.6	6.4	5.3	8.1	1.9	-	2.7	6.9	5.1	1	4.3	0.6	2.7	0.8	2.8	1.7	1	1	0.4
	333	+	+	0.3	+	+	0.2	-	0.1	+	+	+	+	+	+	+	+	+	+	+	+
184-274	336	+	0.1	+	+	+	0.1	-	0.2	+	+	+	+	+	+	+	+	+	+	+	+
	355	0.1	0.4	0.4	0.6	0.3	0.2	-	0.2	+	0.2	+	0.1	0.1	0.1	0.1	+	0.1	0.1	+	+
	334	+	+	0.2	0.2	+	+	-	0.1	+	+	+	+	+	+	+	+	+	+	+	+
275-366	335	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
	356	+	+	+	0.4	+	+	-	0.1	+	0.1	+	+	+	+	+	+	+	+	+	+
	717	+	+	0.4	0.2	+	0.1	-	+	+	+	+	+	+	+	+	+	-	+	+	+
367-549	719	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
	721	+	0.3	+	0.1	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
	718	+	+	+	0.3	+	+	-	+	+	+	+	+	+	+	+	+	-	+	+	-
550-731	720	+	0.1	+	+	+	+	-	+	+	+	+	-	+	+	+	+	+	+	+	+
	722	0.1	0.3	0.1	0.2	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 8. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian autumn surveys in Div. 3L in 2000-2020 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. Previous years can be found in Wheeland et al. 2018.

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<57	784	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57-92	350	0.5	7.8	0.5	0.2	0.4	0.2	0.7	0.1	0.8	0.3	1.4	0.4	3.1	1.6	0.4	0.2	1.3	0.4	0.7	0.5	1.4
	363	2.3	3.7	0.7	0.3	0.5	0.6	2.3	1.1	0.7	1.5	2.2	1.5	0.5	2.4	0.1	1.3	1	1.6	3.4	2.1	3.4
	371	0.8	0.8	1.8	0.3	0.2	0.3	0.1	1.3	0.7	0.8	0.2	0.3	0.7	3	0.7	2	4.5	4.9	1.3	1.3	3.2
	372	0.6	2.6	0.9	1.1	0.4	0.3	0.9	0.5	0.6	0.6	1.2	0.7	1.2	1	0.8	0.6	0.5	1	0.8	0.8	2.6
	384	0.1	1.4	2.2	0.1	0.1	0.1	0.6	0.1	0.5	0.9	0.8	0.6	1.5	5.4	0.6	1.5	0.6	3	1.9	1.7	3.8
	785	+	0.1	0.1	0.1	+	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93-183	328	0.8	1.6	7.3	0.7	1.1	2.5	2.9	0.3	0.6	0.8	4.1	1	5	1.9	1	2.4	1.4	2.8	6	5.5	1.2
	341	0.7	0.9	0.8	0.4	0.3	1.3	2.2	0.9	2.8	0.3	0.8	1.6	5.1	9.7	0.3	2.2	1.4	1	2.8	3.5	1.4
	342	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	+	+	0.1	0.1	0.5	0.7	+	1.2	0.5	1.4	0.3	0.5	2.5
	343	+	0.1	0.1	0.1	+	0.1	0.1	+	0.1	0.1	+	0.1	0.3	0.5	+	0.1	0.4	0.8	0.8	1.5	0.4
	348	0.4	0.6	1	0.6	1	1.9	2	2.3	2.3	0.9	2.4	4.7	3.3	12.9	0.5	3.9	4	8.3	8.1	15.1	12.8
	349	0.3	0.7	0.1	0.7	1.3	1.6	2.7	0.9	1.2	0.7	1.7	1.9	3.1	5.5	0.4	1.4	1.6	1.5	2.7	1.8	4.8
	364	1.8	3	2.1	1	0.7	2.1	5.1	3.8	6.3	0.8	3.9	3.8	7.7	5.8	0.8	9.6	2.9	11.3	10.7	10.7	16.1
	370	1.1	2.2	3.7	0.8	-	0.8	2.4	2.4	2	0.8	4.8	5.1	5.5	5.1	1.6	5.8	14.5	12.3	7.2	11.7	7.8
	385	0.8	3.6	5.4	3.3	6.5	1.4	3.2	4	4.2	3.5	4.8	8.4	11.9	10.9	10.2	8.3	13.5	11.4	10.7	10	15.4
	390	0.7	3.1	1	0.5	0.6	0.5	0.7	0.5	1.4	2.2	2.6	3.6	2.6	4.7	2.5	3.4	6.7	3	8.3	3.6	3.7
	786	0.1	0.2	0.1	0.1	0.1	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	787	0.1	0.1	0.1	0.1	0.1	0.2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	788	0.1	+	0.3	+	0.2	0.3	0.4	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-
	790	+	+	+	+	0.1	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	793	+	0.1	+	+	0.1	0.1	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	797	+	+	0.1	+	+	0.1	0.1	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	799	+	+	0.4	+	+	0.1	0.1	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	365	-	0.4	0.6	0.5	-	3.2	2.1	1.9	2.4	0.4	1.4	3.4	2.5	8.6	4.7	8.8	9.8	5.6	5.1	2.4	5.6
	794	-	+	+	+	+	0.1	0.1	-	-	-	+	-	-	-	-	-	-	-	-	-	-
184-274	344	0.4	0.7	0.7	0.3	0.8	1.8	1.2	1.6	2.2	0.7	0.7	1.6	4.9	4.5	2.7	1.7	2.7	3.5	8.3	9.1	5.5
	347	0.4	0.4	0.7	0.2	0.7	2	1.5	0.6	4.3	0.4	0.7	1.5	2.8	5.9	10.6	2.3	1.7	8.9	3.2	2.4	1.2
	366	0.5	0.4	0.4	0.7	-	2.9	5.7	5.4	7.6	0.5	2.6	2.8	2.8	6.6	4.8	5.1	4	6.8	4.3	4.6	0.3
	369	0.8	2.8	1.1	0.3	-	1.1	2.6	3.1	4.2	1.4	2.2	4.9	4.8	3.8	7.5	4	8	4.3	4.2	1.2	1.2
	386	0.4	1.3	2.3	0.9	-	0.8	2.5	1.1	2.6	1.1	2	0.9	4.4	2	5.3	7.8	11.1	4	2.1	5.9	1.6
	389	0.4	1.4	0.4	0.6	0.4	0.5	0.7	1	1.3	1.7	1.3	0.9	2.2	2.1	5	6.1	1	5.3	2	2.4	4.3
	391	0.1	0.2	0.1	0.4	0.1	0.2	0.2	0.4	0.3	0.2	0.3	0.1	+	0.4	5.4	0.7	1.8	1.1	0.4	1.7	0.6
	791	0.3	0.4	0.7	0.2	0.2	0.5	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
	795	+	+	0.1	+	+	0.2	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-
275-366	345	0.6	0.9	1.3	0.6	1.9	1.4	3.7	1.8	2.4	1.1	2.4	2	1.6	2.9	6.1	3.7	3.6	1.3	1	3	1.2
	346	0.4	1	0.8	0.5	1.4	2.1	2.1	4.6	2.4	1.1	1.1	2.2	2.1	1.5	2.3	3.8	1.3	1.3	1.5	2.4	1.2
	368	0.6	0.3	0.5	0.1	-	0.2	0.4	0.7	1.2	1.2	1.2	0.5	0.2	0.1	1.6	0.3	0.3	0.2	0.1	0.3	0.1
	387	1	0.5	0.2	0.5	-	0.3	0.8	2.4	0.9	0.8	0.7	1.1	0.5	0.6	2.8	3	0.7	0.8	0.1	0.3	0.1
	388	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.6	0.7	0.7	0.3	0.4	0.4	0.5	1	0.2	0.4	0.1	0.2	0.6	0.1
	392	0.2	0.1	0.1	0.1	+	0.1	0.3	0.1	0.3	+	0.1	0.1	+	+	0.2	+	+	0.1	+	+	0.1
	789	0.1	0.2	0.1	+	0.1	0.2	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	796	0.2	0.2	0.1	0.1	0.1	0.3	0.2	-	-	-	0.2	-	-	0.6	-	-	-	-	-	-	-
	798	+	0.3	+	+	0.3	0.1	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-
	800	0.2	0.3	0.3	0.2	0.2	0.2	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-
367-549	729	1.6	0.4	+	0.1	0.1	+	0.2	0.2	0.6	0.4	0.1	0.1	0.1	+	0.9	+	+	+	+	+	+
	731	1.2	0.2	+	0.1	0.1	+	+	0.3	0.2	0.3	0.2	-	0.1	+	0.1	0.2	+	+	+	+	+
	733	1	0.6	0.3	0.4	0.2	0.4	0.6	2.6	0.3	0.4	+	1.1	+	0.1	+	+	+	+	+	+	0.1
	735	2.1	1.7	1.1	0.1	-	0.1	0.8	1.2	1.3	2.9	8.3	1.3	0.7	0.1	0.1	0.8	+	0.1	+	0.2	+
	792	0.2	0.6	0.1	0.2	0.1	0.1	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-
550-731	730	0.4	0.9	0.1	+	0.5	+	2.1	2.1	1	1.8	0.2	0.1	+	+	+	+	+	+	+	+	+
	732	0.7	1.4	+	+	0.1	0.1	+	0.5	0.5	0.2	0.1	0.1	+	+	0.2	+	0.1	+	+	+	+
	734	+	+	+	+	-	+	0.1	0.1	+	0.6	+	1.2	+	+	+	+	+	+	-	+	+
	736	1.5	1.3	1.7	0.3	-	0.1	0.9	0.3	0.3	0.5	0.3	0.6	0.2	+	0.1	0.1	0.1	+	+	+	+
>732	738	+	+	+	2.2	-	-	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	742	+	+	+	3.5	-	-	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	746	+	+	+	+	-	-	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	749	+	+	+	+	-	-	-	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	739	+	+	+	+	-	+	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	743	+	+	+	+	-	-	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	747	+	+	+	+	-	-	0.1	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	750	+	+	+	+	-	-	-	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	740	+	+	+	+	-	+	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	744	+	+	+	+	-	-	+	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	751	+	+	+	+	-	-	-	+	-	+	+	-	-	-	+	-	-	-	-	-	-
	737	+	1.4	1	1.1	-	2	1.1	0.1	-	+	2.1	-	-	-	0.6	-	-	-	-	-	-
	741	+	+	0.6	0.1	-	-	+	+	-	0.8	+	-	-	-	0.1	-	-	-	-	-	-
	745	+	+	+	0.3	-	-	+	+	-	+	+	-	-	-	0.1	-	-	-	-	-	-
	748	+	+	+	1.1	-	-	0.5	+	-	+	0.4	-	-	-	+	-	-	-	-	-	-

Table 9. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian autumn surveys in Div. 3N in 2000-2020 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. Previous years can be found in Wheeland et al. 2018.

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2015	2016	2017	2018	2019	2020
<57	375	1.7	0.7	9.8	2.3	2.3	3	2.2	2.8	7.3	3.4	0.9	2.7	4	1.3	0.8	1.6	1.1	4.1	0.6	0.5
<57	376	35.8	15.4	34.1	6.4	11.1	20.3	16	11	9	1.8	14	14.7	3.3	11.9	8.7	2.1	8.8	2.5	8.6	5.5
57-92	360	96.4	46	67.4	99.9	105.5	80.6	67.6	65.4	118.5	105.7	118.8	110.7	54.6	63.2	34.4	23.3	28.2	31.5	46.2	32.2
	361	3.9	2.4	9.2	3.1	7.2	2.8	2.9	9	1.7	2.2	1.2	2.7	2.3	2.3	0.7	1.1	2.5	2.1	1.2	0.3
	362	2.6	5.3	6.1	2.6	2.2	6.2	3.1	2.4	3.4	2.5	3.8	4.1	7.7	5.6	7	2.1	1.9	4.1	1.7	3.5
	373	1.7	6.9	2.9	1.9	0.5	2.6	2.4	1.2	3.7	1	7.5	2.3	3.7	9.2	3	3	1.3	1.8	0.7	0.5
	374	1.7	3.7	0.5	0.6	0.6	4.4	4	3.3	9.9	7.6	3.8	18.9	12.2	57.9	31.4	2.4	3.2	2.1	0.4	1.1
	383	+	0.6	0.5	0.1	+	0.4	0.3	0.7	2.2	1.4	1.1	1.5	3.6	2.2	2.7	0.1	0.8	1.2	0.5	1.4
93-183	359	32.2	4	17.5	7.1	9.2	1.2	14.1	3.9	4.4	6	6.6	5.7	2.3	4.4	0.7	4.3	4.2	3.3	0.6	0.1
	377	0.7	3.1	6.1	1.9	1.4	3.8	5	6.1	2.6	2.3	2	0.9	1.9	3.2	7.8	0.9	1.8	8	1.3	8.6
	382	1	3.6	2.2	+	0.2	0.9	0.5	7.8	3.3	4.5	1.9	7.6	2.3	32.4	8.9	0.6	1.9	2.6	8.3	60.7
184-274	358	0.6	1	0.2	+	0.4	+	0.1	0.5	0.4	1.2	0.1	+	0.1	+	+	0.1	0.4	0.3	0.4	0.3
	378	0.2	0.2	0.4	0.5	0.3	0.2	0.4	0.9	0.5	0.6	-	0.3	0.2	1.4	0.9	0.2	0.6	0.6	1.1	0.5
	381	0.3	0.3	0.1	0.5	0.6	0.6	0.6	4.6	0.5	0.3	0.1	0.1	0.9	0.3	0.2	0.3	0.7	0.8	1.3	0.3
275-366	357	+	+	+	+	+	0.2	+	0.1	+	+	+	+	+	+	+	0.1	+	+	+	+
	379	+	0.1	+	+	0.5	+	+	+	0.4	+	+	+	+	+	0.1	+	0.1	+	+	+
	380	0.3	0.1	+	0.1	0.1	0.1	0.2	4.2	+	0.2	+	0.1	+	+	0.2	+	0.1	+	0.4	0.1
367-549	723	+	+	+	+	+	+	+	+	0.1	+	+	+	+	+	+	+	+	+	+	+
	725	0.2	+	+	+	-	0.1	+	+	0.1	+	-	+	+	+	+	0.1	+	+	0.1	+
	727	0.4	0.1	0.3	0.3	0.2	0.2	0.1	0.1	+	+	+	0.1	+	+	0.1	+	+	+	+	+
550-731	724	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	726	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-
	728	0.6	+	0.1	+	1.1	0.2	+	1.7	1.2	0.5	0.1	0.1	+	+	+	0.1	+	+	+	+
>732	753	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	757	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	761	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	754	+	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-
	758	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	762	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	755	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	759	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	763	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	752	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	756	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
	760	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-

Table 10. Biomass estimates ('000t) of Am. Plaice, by stratum and depth zone (m), from Canadian autumn surveys in Div. 3O in 2000-2020 (Campelen). (+) indicates biomass <50t, (-) means stratum was not surveyed. Shaded columns indicate years when the survey is considered to be incomplete. Previous years can be found in Wheeland et al. 2018.

Depth (m)	Stratum	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2015	2016	2017	2018	2019	2020
57-92	330	5.3	6	4.5	4	5.6	4.5	6.6	4.2	8.4	9.2	6.3	10.3	5.2	4.4	4.2	6.3	1.6	4.5	6.7	0.5
	331	1	1.2	1.2	1.5	1	1.6	1	2	0.6	1.2	1.7	1.3	0.6	1.7	1.6	1.4	0.8	0.4	1.5	1.6
	338	2.1	4.5	3.2	6.7	5.3	5.4	2.8	2.8	10.6	6.5	3.4	2.6	2.3	2.1	5.4	2	3.3	5	2.6	5.9
	340	2.2	1.8	3.7	0.9	2.6	2.6	1.7	5.5	11.1	6.3	2.1	1.4	5.1	3.7	2	2.4	3.6	2.3	0.3	1.2
	351	6.3	4.4	2.9	3.7	3.9	2.2	3.5	6.2	4.2	1.9	3.8	2.2	5.2	1.1	3.8	2.1	3.6	2.9	1.4	1.6
	352	8.4	8	6.7	7.7	10.9	11.3	6.9	3.6	11.2	10.2	3.1	4.9	5.7	6.2	3.7	0.9	5	3.1	3	2.6
	353	14.5	14	11.3	14.4	24.6	15.6	21	27.9	29.1	29.3	11.6	12.3	6.5	8.2	8.6	6.3	3.4	3.2	9.1	4.7
93-183	329	8	7.7	3.7	1.6	5.2	3.6	2.5	2	9.3	4.3	15.4	3.7	1.5	6.2	4.4	3.2	3.4	4.4	4.3	4
	332	2.8	1.3	2.5	3	3.7	4.1	4.7	2.1	5.2	0.8	2.1	0.7	1.7	1	1.6	3.1	4.2	2.7	2.6	2.4
	337	1.8	0.5	1.3	0.6	1.1	2.2	1.7	2.2	6.6	1.3	1.9	0.8	2.1	1	2.3	1.7	2.5	0.7	1.2	0.5
	339	3.8	2.5	3.2	3.3	2.2	4.9	1.2	2.9	3.8	2.7	4	2.4	4.7	8.6	3.7	3.4	3.1	4.2	3.8	4
	354	3.8	2.7	3	21.1	1.9	0.8	2.1	3.4	2.6	5.8	4	1.1	1.3	2.6	0.9	1.7	1.5	1.4	1.2	0.3
184-274	333	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	336	0.1	+	+	+	+	+	0.1	0.3	0.1	-	+	+	+	+	+	-	+	+	+	+
	355	+	0.1	0.1	+	0.1	0.1	0.1	0.2	0.3	0.1	0.1	+	0.1	0.1	+	+	+	+	+	+
275-366	334	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	335	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	356	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
367-549	717	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	719	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	721	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
550-731	718	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
	720	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	722	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
>732	765	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	769	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	773	+	+	+	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	766	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	770	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	774	+	+	+	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	767	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	771	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	775	+	+	+	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	764	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	768	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
	772	+	-	+	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-

Table 11. Abundance index (millions) at age for Am. Plaice in Div. 3L from Canadian spring surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	
1	2.29	1.15	0.00	0.13	0.05	1.42		1.64	4.33	0.63	3.13	0.00	2.04	10.88	6.24		1.78		2.14	0.24	
2	17.73	37.91	7.65	1.66	3.76	10.61		18.24	27.16	79.34	21.21	49.02	16.62	114.76	233.28		65.23		15.26	0.00	
3	12.32	32.83	34.07	20.64	9.38	31.58		28.17	39.19	71.37	72.35	102.95	124.06	77.27	148.66		241.96		78.68	7.18	
4	4.94	15.63	18.24	29.59	24.62	39.64		34.52	36.20	28.94	58.97	134.47	104.66	217.47	61.39		248.81		198.74	17.99	
5	8.95	5.95	7.98	17.73	35.53	95.80		16.61	35.83	21.11	20.65	75.43	76.09	118.18	116.70		44.89		77.99	68.13	
6	29.81	9.41	5.19	8.55	14.35	72.72		19.83	28.83	14.26	19.52	30.02	79.95	73.93	73.67		27.46		37.17	109.31	
7	28.55	18.61	9.46	7.73	8.27	25.87		42.04	27.25	8.24	14.03	17.15	39.32	50.53	48.47		18.14		17.30	75.63	
8	27.47	16.40	9.72	11.96	4.93	11.24		42.47	30.88	7.44	6.86	12.16	21.34	29.65	28.85		9.17		11.12	18.75	
9	18.83	17.27	8.67	10.35	5.64	9.96		17.46	18.93	9.55	7.87	5.07	16.81	13.77	14.22		4.98		4.08	8.34	
10	10.78	15.22	6.50	6.90	4.66	6.98		4.56	6.23	5.99	6.82	5.02	8.43	10.27	10.12		2.88		3.72	5.44	
11	5.46	7.50	4.22	4.04	3.62	6.50		4.72	4.58	2.26	3.30	4.18	5.26	7.64	5.49		1.09		1.87	4.38	
12	1.31	2.97	1.00	2.42	1.92	2.47		1.71	2.48	0.49	0.94	3.79	3.75	5.52	4.30		1.01		1.42	2.60	
13	0.25	0.81	0.35	0.73	0.69	0.99		2.00	1.61	0.12	0.57	1.21	2.31	1.82	3.13		1.00		0.59	1.82	
14	0.09	0.13	0.14	0.23	0.21	0.00		2.04	0.82	0.76	0.38	0.16	0.51	0.56	2.54		0.93		0.05	0.66	
15	0.00	0.05	0.00	0.00	0.00	0.00		1.00	0.11	0.17	0.48	0.52	0.26	0.36	0.68		0.11		0.08	0.08	
16	0.07	0.10	0.00	0.00	0.01	0.04		1.42	0.38	0.76	0.26	0.17	0.09	0.10	0.21		0.15		0.11	0.09	
17	0.00	0.00	0.00	0.00	0.00	0.07		1.25	0.00	0.07	0.54	0.34	0.23	0.05	0.12		0.00		0.06	0.05	
18	0.00	0.00	0.00	0.00	0.00	0.00		0.49	0.05	0.14	0.11	0.17	0.24	0.00	0.16		0.00		0.00	0.07	
19	0.00	0.04	0.00	0.00	0.00	0.00		0.31	0.00	0.00	0.07	0.00	0.13	0.05	0.08		0.01				
20	0.00	0.00	0.00	0.00	0.00	0.00		0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.03	
21	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00		0.00		0.00	0.05	
22	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00		0.00				
unk.	0.01	0.05	0.16	0.04	0.17	0.05		0.34	0.53	5.24	0.00	2.55	0.75	0.52	0.08		0.05		0.02	1.82	
Ages 0+	168.87	182.03	113.35	122.68	117.81	315.94		240.92	265.38	256.87	238.06	444.46	502.86	733.32	758.38		669.64		450.41	322.66	
Ages 6+	122.63	88.51	45.24	52.90	44.30	136.84		141.40	122.14	50.24	61.76	80.04	178.64	194.23	192.03		66.92		77.58	227.30	
Ages 9+	36.80	44.09	20.87	24.66	16.75	27.01		37.07	35.19	20.30	21.34	20.70	38.02	40.13	41.04		12.15		11.98	23.60	
Ages 12+	1.72	4.10	1.48	3.38	2.83	3.57		10.32	5.45	2.51	3.35	6.42	7.52	8.45	11.22		3.20		2.31	5.44	
Ages 15+	0.07	0.18	0.00	0.00	0.01	0.11		4.58	0.54	1.15	1.46	1.26	0.95	0.55	1.25		0.26		0.25	0.37	
Ages 1-5	46.22	93.48	67.94	69.74	73.34	179.05		99.18	142.71	201.38		361.87	323.47	538.57	566.27		602.67		372.82	93.54	

Table 12. Abundance index (millions) at age for Am. Plaice in Div. 3N from Canadian spring surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	
1	0.46	1.31	0.00	0.00	3.34	0.44		6.23	1.52	1.79	0.00	0.00	0.46	2.67	2.26		0.00		0.00	0.83	
2	12.74	16.04	3.61	1.02	2.68	24.36		0.38	24.59	2.74	27.44	8.03	0.54	1.71	14.40		0.35		2.20	1.24	
3	44.81	155.19	15.10	10.97	2.76	46.38		8.33	6.41	18.24	23.92	47.17	1.70	5.44	32.68		9.67		5.28	0.00	
4	20.53	47.80	34.75	18.51	11.47	6.71		197.39	14.21	5.50	45.74	30.51	21.59	7.81	12.82		13.84		11.79	2.00	
5	3.95	4.18	14.76	75.91	25.09	18.09		122.05	112.44	26.39	28.25	45.37	23.04	51.41	11.95		3.12		21.97	5.52	
6	6.59	7.98	7.29	28.56	67.31	47.79		43.72	62.05	43.70	74.73	53.31	52.78	64.95	60.48		3.96		38.35	9.88	
7	17.71	22.99	7.95	16.07	18.39	78.87		76.16	27.65	18.94	97.08	53.59	43.90	87.44	60.67		13.06		36.75	12.88	
8	15.26	21.47	16.35	16.26	7.18	32.98		55.78	59.84	12.71	23.37	39.38	36.70	42.55	70.22		14.02		25.35	4.58	
9	21.08	23.17	10.66	18.41	6.61	15.60		47.84	32.54	10.67	11.32	9.30	23.92	30.16	39.69		7.59		13.55	3.50	
10	16.79	17.00	6.91	6.86	6.80	6.62		6.47	28.47	12.21	7.43	5.46	10.19	17.23	23.60		6.93		14.34	3.20	
11	9.95	18.15	8.76	6.04	3.22	4.81		3.81	8.98	10.68	6.21	4.61	3.88	7.54	18.90		3.43		7.89	1.08	
12	4.75	7.67	6.70	6.37	4.48	4.48		1.60	3.94	4.49	6.82	3.38	2.72	5.68	6.83		2.20		3.71	0.65	
13	2.08	2.28	1.82	2.15	2.57	3.81		1.14	1.49	1.16	2.18	1.63	1.72	2.70	3.66		0.81		1.24	1.05	
14	0.33	1.17	1.39	1.04	1.93	3.69		1.17	2.00	1.02	0.57	0.73	1.39	2.00	4.67		0.57		0.46	0.10	
15	0.59	0.82	0.13	0.54	0.50	3.47		0.93	1.54	1.59	0.74	0.34	0.36	0.86	2.63		0.08		0.10	0.13	
16	0.37	0.35	0.26	0.21	0.12	1.71		0.39	1.34	1.64	1.53	0.73	0.95	1.08	0.94		0.08		0.40	0.14	
17	0.10	0.34	0.04	0.08	0.00	0.25		0.21	0.44	1.29	0.65	0.82	1.04	0.57	1.07		0.07		0.09	0.06	
18	0.05	0.22	0.00	0.04	0.11	0.92		0.26	0.00	0.87	0.30	0.34	0.44	0.75	0.56		0.03		0.06	0.00	
19	0.00	0.09	0.04	0.00	0.00	0.12		0.00	0.19	0.28	0.37	0.41	0.13	0.25	0.37		0.00		0.16	0.00	
20	0.00	0.00	0.00	0.04	0.00	0.00		0.07	0.00	0.12	0.00	0.26	0.11	0.13	0.07		0.04		0.04	0.14	
21	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.05	0.00	0.00	0.00	0.02	0.09	0.17		0.00		0.03	0.00	
22	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00		0.00		0.04	0.00	
unk.	0.00	0.08	0.08	0.54	0.52	0.33		0.22	0.05	0.06	0.02	0.00	0.24	1.12	0.01		0.09		0.59	1.13	
Ages 0+	178.15	348.31	136.60	209.62	165.06	301.43		574.14	389.72	176.09	358.65	305.51	227.81	334.16	368.65		79.95		184.40	48.11	
Ages 6+	95.66	123.71	68.30	102.68	119.20	205.11		239.53	230.51	121.37	233.29	174.43	180.25	264.00	294.52		52.88		142.56	37.39	
Ages 9+	56.11	71.27	36.71	41.79	26.33	45.48		63.87	80.97	46.02	38.11	28.16	46.88	69.06	103.16		21.84		42.11	10.05	
Ages 12+	8.28	12.93	10.38	10.49	9.70	18.45		5.76	10.98	12.46	13.15	8.78	8.89	14.12	20.97		3.88		6.33	2.27	
Ages 15+	1.11	1.82	0.48	0.92	0.72	6.47		1.85	3.55	5.79	3.58	3.05	3.06	3.74	5.80		0.31		0.91	0.47	
Ages 1-5	82.49	224.52	68.22	106.40	45.34	95.98		334.39	159.16	54.66		131.08	47.32	69.05	74.12		26.98		41.25	9.59	

Table 13. Abundance index (millions) at age for Am. Plaice in Div. 3O from Canadian spring surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	
1	2.00	2.76	0.31	0.10	3.66	3.21		9.03	4.86	4.63	0.43	0.00	30.78	5.37	0.00		0.00		0.00	3.50	
2	24.09	47.02	26.61	5.19	11.26	96.22		9.14	81.19	28.88	76.55	22.10	26.94	47.86	55.31		10.70		4.14	14.26	
3	92.19	87.85	49.52	42.95	17.01	145.20		30.40	52.61	98.35	69.32	57.54	68.05	44.19	211.40		33.48		23.72	10.86	
4	47.07	49.56	97.60	46.99	41.71	32.14		88.28	51.28	44.94	86.49	44.47	107.83	41.85	52.77		52.72		46.17	17.95	
5	22.08	18.72	33.76	94.61	35.92	35.77		55.20	90.71	27.66	36.46	68.49	59.95	50.06	47.27		27.29		44.55	28.99	
6	30.61	18.96	28.85	35.39	80.28	43.32		26.09	25.58	71.85	52.65	33.14	40.59	48.14	62.65		15.40		29.05	28.92	
7	31.75	32.26	34.53	22.26	24.63	39.13		26.27	37.05	18.53	27.04	26.27	31.29	44.68	31.33		10.74		12.25	18.03	
8	21.84	24.57	27.75	21.53	17.22	10.88		17.24	26.31	14.80	10.37	15.13	13.41	26.04	22.40		7.16		7.20	3.20	
9	19.25	17.98	18.93	11.21	7.67	6.30		17.31	18.67	18.72	8.88	6.21	6.20	9.47	13.21		3.88		3.44	1.76	
10	19.62	12.82	11.01	4.32	4.10	2.91		5.76	7.89	8.33	4.11	2.68	4.21	5.63	3.86		2.22		2.17	1.67	
11	12.52	8.91	7.05	3.69	2.37	2.37		2.40	1.24	3.85	2.60	2.10	2.88	2.39	2.73		1.63		0.46	0.83	
12	3.47	5.37	4.86	2.67	1.80	1.28		1.74	0.88	1.39	1.15	3.35	0.61	0.89	1.02		0.52		0.74	0.25	
13	1.70	2.45	1.84	1.62	1.22	1.42		1.24	0.70	0.47	0.51	0.24	0.45	0.57	1.24		0.16		0.22	0.17	
14	0.48	1.47	0.48	0.89	0.57	0.97		0.62	0.51	0.27	0.28	0.08	0.15	0.58	0.00		0.00		0.13	0.04	
15	0.63	1.10	0.40	0.49	0.29	0.51		0.22	0.39	0.70	0.30	0.08	0.17	0.50	0.11		0.00		0.10	0.00	
16	0.19	0.61	0.44	0.34	0.20	0.28		0.31	0.52	0.34	0.17	0.43	0.34	0.15	0.30		0.00		0.00	0.00	
17	0.29	0.38	0.17	0.16	0.00	0.22		0.20	0.19	0.07	0.26	0.06	0.12	0.26	0.10		0.00		0.03	0.00	
18	0.14	0.15	0.10	0.09	0.01	0.00		0.24	0.18	0.23	0.11	0.53	0.25	0.10	0.29		0.08		0.00	0.03	
19	0.00	0.04	0.00	0.19	0.00	0.00		0.00	0.00	0.12	0.07	0.17	0.01	0.00	0.15		0.00		0.08	0.00	
20	0.11	0.04	0.00	0.00	0.00	0.00		0.08	0.26	0.00	0.00	0.00	0.10	0.11	0.11		0.00		0.00	0.05	
21	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.07	0.00	0.09	0.00	0.00	0.06		0.00		0.09	0.04	
22	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.04	0.00	0.08	0.00	0.00	0.00		0.00		0.00	0.05	
unk.	0.04	0.71	0.24	0.00	0.29	0.50		0.22	0.13	0.04	0.03	0.12	2.28	1.50	0.17		0.00		1.00	0.25	
Ages 0+	330.07	333.74	344.45	294.69	250.20	422.62		292.02	401.15	344.30	377.77	283.36	396.63	330.35	506.49		165.98		175.55	130.84	
Ages 6+	142.60	127.12	136.41	104.86	140.35	109.60		99.74	120.36	139.79	108.49	90.63	100.79	139.51	139.57		41.78		55.98	55.04	
Ages 9+	58.40	51.34	45.28	25.68	18.22	16.26		30.14	31.42	34.61	18.43	16.09	15.49	20.65	23.18		8.48		7.47	4.89	
Ages 12+	7.01	11.62	8.29	6.46	4.09	4.68		4.66	3.62	3.70	2.84	5.10	2.20	3.17	3.38		0.77		1.39	0.63	
Ages 15+	1.36	2.32	1.11	1.27	0.50	1.01		1.06	1.55	1.58	0.91	1.43	0.99	1.12	1.12		0.08		0.30	0.17	
Ages 1-5	187.44	205.91	207.80	189.84	109.56	312.53		192.05	280.65	204.47		192.61	293.56	189.34	366.75		124.19		118.58	75.56	

Table 14. Abundance index (millions) at age for Am. Plaice in Divs. 3LNO from Canadian spring surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00	0.00	
1	4.76	5.22	0.31	0.22	7.05	5.07		16.91	10.72	7.04	3.56	0.00	33.28	18.93	8.50		1.78		2.14	4.57	
2	54.56	100.97	37.86	7.86	17.71	131.19		27.76	132.94	110.97	125.19	79.15	44.10	164.34	302.99		76.28		21.61	15.49	
3	149.32	275.88	98.69	74.56	29.15	223.16		66.90	98.21	187.96	165.59	207.66	193.81	126.91	392.74		285.11		107.68	18.04	
4	72.54	112.98	150.59	95.08	77.80	78.49		320.19	101.69	79.38	191.20	209.45	234.09	267.13	126.99		315.37		256.71	37.95	
5	34.98	28.85	56.50	188.24	96.53	149.66		193.86	238.98	75.16	85.36	189.29	159.08	219.65	175.92		75.30		144.51	102.64	
6	67.02	36.35	41.33	72.50	161.93	163.83		89.64	116.46	129.80	146.90	116.47	173.32	187.01	196.79		46.82		104.57	148.11	
7	78.01	73.86	51.94	46.06	51.28	143.87		144.47	91.95	45.72	138.16	97.00	114.51	182.65	140.46		41.93		66.31	106.54	
8	64.57	62.44	53.82	49.75	29.34	55.10		115.49	117.02	34.95	40.60	66.68	71.45	98.24	121.48		30.35		43.67	26.53	
9	59.16	58.43	38.25	39.97	19.92	31.86		82.61	70.14	38.94	28.07	20.59	46.93	53.39	67.11		16.45		21.07	13.60	
10	47.19	45.04	24.42	18.07	15.55	16.51		16.80	42.58	26.53	18.36	13.17	22.83	33.13	37.58		12.03		20.24	10.30	
11	27.93	34.57	20.03	13.76	9.21	13.68		10.94	14.80	16.79	12.12	10.89	12.02	17.57	27.12		6.15		10.22	6.30	
12	9.54	16.02	12.56	11.46	8.20	8.24		5.06	7.29	6.36	8.91	10.52	7.08	12.09	12.16		3.73		5.87	3.49	
13	4.04	5.54	4.01	4.51	4.49	6.22		4.37	3.80	1.75	3.26	3.07	4.48	5.10	8.03		1.97		2.04	3.04	
14	0.90	2.77	2.01	2.17	2.71	4.66		3.82	3.32	2.04	1.23	0.97	2.06	3.14	7.21		1.50		0.64	0.79	
15	1.22	1.96	0.53	1.03	0.78	3.98		2.15	2.04	2.46	1.51	0.94	0.80	1.71	3.43		0.19		0.28	0.21	
16	0.63	1.05	0.70	0.55	0.33	2.03		2.12	2.24	2.74	1.96	1.33	1.38	1.33	1.45		0.23		0.51	0.23	
17	0.39	0.72	0.21	0.25	0.00	0.53		1.66	0.63	1.43	1.45	1.23	1.40	0.88	1.29		0.07		0.18	0.11	
18	0.19	0.37	0.10	0.13	0.12	0.92		0.99	0.23	1.24	0.52	1.04	0.92	0.86	1.00		0.11		0.06	0.03	
19	0.00	0.18	0.04	0.19	0.00	0.12		0.31	0.19	0.40	0.50	0.58	0.27	0.30	0.60		0.01		0.25	0.05	
20	0.11	0.04	0.00	0.04	0.00	0.00		0.26	0.26	0.12	0.00	0.26	0.21	0.25	0.17		0.04		0.04	0.19	
21	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.05	0.07	0.00	0.13	0.02	0.09	0.23		0.00		0.14	1.87	
22	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.04	0.00	0.25	0.00	0.00	0.00		0.00		0.04	0.05	
unk.	0.05	0.83	0.48	0.58	0.98	0.87		0.78	0.71	5.34	0.05	2.67	3.27	3.14	0.26		0.13		452.00	324.03	
Ages 0+	677.09	864.09	594.40	626.99	533.07	1039.99		1107.07	1056.26	777.25	974.49	1033.33	1127.30	1397.83	1633.52		915.56		1260.79	824.16	
Ages 6+	360.89	339.34	249.95	260.44	303.85	451.55		480.67	473.02	311.39	403.55	345.10	459.68	597.74	626.11		161.58		276.13	321.45	
Ages 9+	151.30	166.69	102.86	92.13	61.30	88.75		131.08	147.58	100.92	77.89	64.95	100.39	129.84	167.39		42.48		61.58	40.27	
Ages 12+	17.02	28.65	20.16	20.33	16.62	26.70		20.74	20.06	18.67	19.34	20.31	18.61	25.74	35.57		7.85		10.04	10.07	
Ages 15+	2.54	4.32	1.58	2.19	1.23	7.58		7.49	5.64	8.52	5.94	5.75	5.00	5.41	8.18		0.65		1.49	2.74	
Ages 1-5	316.15	523.91	343.96	365.97	228.23	587.57		625.62	582.53	460.51	570.89	685.56	664.35	796.96	1007.15		753.84		532.65	178.69	
Proportion ages 0-5	0.47	0.61	0.58	0.58	0.43	0.56		0.57	0.55	0.59	0.59	0.66	0.59	0.57	0.62		0.82		0.42	0.22	
proportion ages 9+	0.22	0.19	0.17	0.15	0.12	0.09		0.12	0.14	0.13	0.08	0.06	0.09	0.09	0.10		0.05		0.05	0.05	

Table 15. Abundance index (millions) at age for Am. Plaice in Div. 3L from Canadian autumn surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.00		0.00	0.05	0.04	0.72	2.09	0.43	0.00	1.70	5.89		7.50	0.00	0.21	0.00	0.00	0.00
1	15.45	8.93	3.06	1.22		11.78	11.44	22.61	41.78	20.02	63.88	2.42	56.02	325.85		38.56	4.14	4.87	3.49	2.97	3.62
2	31.38	102.85	66.37	18.37		27.80	34.76	60.08	107.63	133.02	110.83	176.28	26.80	252.62		425.37	70.87	83.09	45.10	13.76	53.88
3	26.11	70.83	119.40	78.66		33.21	42.72	61.53	73.97	96.84	185.24	141.10	224.38	189.41		881.38	721.07	348.99	85.70	36.88	53.41
4	8.33	34.66	35.23	77.91		54.99	31.70	52.93	51.83	50.36	147.92	146.45	174.70	325.82		209.01	676.04	887.17	285.15	254.33	133.14
5	27.69	21.19	16.94	26.20		73.06	35.44	31.14	61.54	30.54	61.46	107.89	180.60	165.00		109.82	93.87	255.47	430.57	314.85	265.02
6	34.64	21.41	14.52	9.13		55.74	72.86	31.96	35.06	30.19	48.44	43.99	92.81	119.37		89.87	71.49	64.21	249.84	357.12	256.76
7	22.80	34.83	21.47	7.27		21.49	68.18	45.03	32.66	10.55	22.25	28.56	37.13	45.49		48.28	44.66	38.82	67.90	93.57	120.83
8	12.56	30.02	25.94	8.56		10.85	27.59	35.87	41.08	8.49	12.74	12.54	19.68	21.32		28.79	18.25	22.69	25.56	34.17	27.75
9	8.54	25.06	18.13	5.09		3.97	5.26	10.21	28.36	8.67	8.17	5.90	8.95	11.44		13.54	14.55	13.62	18.02	14.86	12.96
10	2.73	10.39	10.36	4.51		4.52	3.53	5.10	7.15	4.05	16.15	6.32	4.60	6.23		6.23	6.81	8.34	11.57	11.46	4.34
11	1.77	8.21	7.94	2.73		1.52	1.81	1.95	1.91	1.60	4.83	4.99	3.99	4.54		3.55	1.58	2.64	7.28	5.47	3.39
12	0.33	3.61	2.04	0.87		2.36	3.66	1.43	1.33	1.06	1.92	3.37	2.95	3.67		2.04	2.24	1.79	1.97	6.51	3.10
13	0.12	0.55	0.25	0.33		1.72	1.47	0.43	0.93	0.73	1.20	1.20	1.56	2.08		1.18	0.48	0.80	0.97	0.90	0.19
14	0.00	0.31	0.05	0.04		0.73	1.22	1.13	0.44	0.41	1.39	0.25	0.21	0.77		0.53	0.39	0.67	0.66	0.85	1.20
15	0.05	0.07	0.00	0.00		0.95	1.73	0.43	0.52	0.23	0.36	0.20	0.12	0.22		0.18	0.35	0.38	0.41	0.47	0.34
16	0.05	0.00	0.00	0.00		0.30	1.13	0.50	0.32	0.09	0.73	0.18	0.25	0.51		0.07	0.21	0.11	0.43	0.36	0.00
17	0.00	0.00	0.00	0.00		0.05	0.15	0.52	0.13	0.15	0.37	0.03	0.06	0.00		0.00	0.15	0.04	0.12	0.00	0.00
18	0.00	0.00	0.00	0.00		0.12	0.01	0.44	0.43	0.02	0.38	0.19	0.00	0.13		0.20	0.06	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00		0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00		0.07	0.15	0.00	0.00	0.18	0.29
20	0.00	0.00	0.00	0.00		0.00	0.00	0.24	0.06	0.00	0.00	0.00	0.00	0.08		0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08		0.00	0.00	0.10	0.00	0.06	0.00
22	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.04	0.00	0.06	0.00
unk.	0.17	0.46	0.22	0.01		0.04	0.18	1.04	0.24	2.17	0.32	0.46	0.51	4.22		0.15	1.02	4.21	0.60	3.42	12.08
Ages 0+	192.73	373.37	341.93	240.91		305.20	344.85	364.91	488.08	401.29	688.99	682.31	837.03	1484.75		1866.31	1728.38	1738.26	1235.33	1152.24	952.31
Ages 6+	83.59	134.45	100.71	38.54		104.31	188.58	135.55	150.38	66.25	118.92	107.71	172.31	215.93		194.53	161.38	154.25	384.73	526.03	431.17
Ages 9+	13.59	48.20	38.79	13.57		16.24	19.96	22.69	41.58	17.02	35.49	22.62	22.68	29.75		27.59	26.98	28.53	41.43	41.18	25.82
Ages 12+	0.56	4.54	2.35	1.24		6.23	9.36	5.44	4.15	2.70	6.34	5.42	5.14	7.54		4.26	4.04	3.94	4.56	9.39	5.12
Ages 15+	0.10	0.07	0.00	0.00		1.42	3.02	2.46	1.45	0.49	1.84	0.60	0.42	1.02		0.51	0.93	0.68	0.96	1.13	0.63
Ages 1-5	108.96	238.46	241.00	202.37		200.85	156.05	228.29	336.74	330.78	569.32	574.15	662.51	1258.71		1664.14	1565.98	1579.58	850.00	622.79	509.07

Table 16. Abundance index (millions) at age for Am. Plaice in Div. 3N from Canadian autumn surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.05		0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.73		0.00	0.00	0.00	0.47	22.02	5.66
1	20.47	8.24	1.79	7.76		5.47	1.04	30.08	28.54	59.96	3.89	3.46	3.86	54.58		8.81	0.38	0.04	7.82	2.55	19.66
2	158.97	19.95	25.17	6.13		257.10	4.64	14.88	135.88	64.49	118.38	28.81	4.17	22.26		57.64	7.32	4.87	11.49	4.59	3.24
3	264.88	130.79	50.82	41.45		61.80	47.24	27.72	37.39	92.21	94.09	112.37	20.53	20.11		79.25	27.64	11.49	21.46	11.43	6.39
4	53.91	42.75	190.06	95.11		12.17	21.36	128.44	137.17	68.40	217.27	111.09	60.17	70.48		17.56	41.76	30.63	39.73	29.46	18.58
5	22.80	5.07	63.36	196.95		47.15	14.79	31.08	260.67	112.38	94.18	125.59	50.85	141.33		32.08	19.30	45.39	52.73	55.02	36.59
6	38.99	17.05	11.46	39.70		85.33	31.63	14.95	62.42	109.10	165.54	112.97	77.02	180.98		54.19	20.45	20.89	21.31	42.07	38.30
7	59.27	27.83	26.02	19.89		76.49	35.33	31.80	41.76	40.02	93.85	98.15	59.96	86.58		57.96	27.33	30.17	18.67	23.61	23.41
8	53.08	22.08	29.25	13.36		18.79	63.02	42.04	34.70	20.98	27.14	61.05	30.57	53.52		35.77	13.91	23.85	14.08	7.95	10.61
9	39.83	12.52	17.22	7.71		5.66	16.67	45.05	28.03	14.02	14.25	18.21	31.30	25.25		22.85	10.59	12.49	8.30	7.21	10.74
10	39.29	9.91	13.31	6.11		5.71	3.76	17.24	14.65	12.14	14.20	7.40	11.19	11.67		12.21	5.52	8.77	4.22	4.26	20.37
11	19.14	13.06	16.11	5.38		4.17	6.70	5.82	5.22	8.03	3.88	7.30	4.59	7.37		10.03	2.47	5.99	2.87	2.20	6.24
12	5.20	6.16	11.43	4.00		1.50	4.16	5.75	2.64	2.21	1.42	4.91	3.58	6.32		4.99	1.06	3.17	0.54	1.20	6.68
13	2.49	1.39	6.35	1.25		2.23	3.01	0.32	1.10	1.59	1.23	1.89	2.15	3.96		2.50	0.07	0.43	1.34	0.49	0.00
14	0.68	0.58	0.54	0.33		2.10	1.83	3.12	1.77	1.67	0.94	0.95	1.15	1.16		0.55	0.51	0.84	0.33	0.07	2.81
15	0.34	0.27	1.05	0.27		0.77	2.22	3.72	1.13	1.40	0.34	1.05	1.16	0.16		0.55	0.43	0.17	0.05	0.40	0.19
16	0.00	0.11	1.06	0.18		0.29	0.74	2.32	0.46	2.07	0.91	0.94	0.53	1.05		0.20	0.27	0.17	0.21	0.09	0.18
17	0.34	0.12	0.00	0.00		0.15	0.70	1.34	0.44	0.55	0.58	0.37	0.00	0.76		0.15	0.00	0.38	0.00	0.01	0.22
18	0.00	0.00	0.00	0.00		0.00	0.23	0.40	0.26	0.07	0.19	0.88	0.52	0.41		1.19	0.06	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00		0.00	0.00	0.31	0.23	0.00	0.00	0.94	0.32	0.00		0.04	0.26	0.08	0.11	0.16	0.19
20	0.00	0.00	0.00	0.05		0.00	0.05	0.00	0.06	0.00	0.29	0.07	0.00	0.00		0.00	0.11	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.15	0.05	0.03	0.05	0.00	0.00
22	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.13		0.00	0.00	0.00	0.93	7.10	34.88
unk.	0.00	0.18	0.08	0.23		0.17	0.32	0.43	1.15	3.20	0.03	0.59	0.78	0.05		0.83	0.77	0.50			
Ages 0+	779.69	318.06	465.09	445.89		587.04	259.45	406.84	795.75	614.56	852.61	699.00	364.41	688.84		399.50	180.27	200.34	206.70	221.89	244.94
Ages 6+	258.66	111.09	133.82	98.22		203.17	170.05	174.18	194.94	213.84	324.77	317.09	224.05	379.31		203.32	83.10	107.43	73.00	96.83	154.83
Ages 9+	107.32	44.12	67.08	25.27		22.57	40.07	85.39	56.06	43.75	38.24	44.92	56.51	58.23		55.40	21.40	32.52	18.95	23.19	82.50
Ages 12+	9.07	8.63	20.44	6.08		7.03	12.94	17.28	8.16	9.56	5.91	12.00	9.42	13.94		10.31	2.82	5.27	3.56	9.52	45.15
Ages 15+	0.69	0.51	2.11	0.51		1.21	3.94	8.09	2.65	4.09	2.31	4.26	2.54	2.51		2.28	1.18	0.83	1.35	7.76	35.66
Ages 1-5	521.03	206.80	331.20	347.39		383.69	89.08	232.22	599.66	397.44	527.81	381.32	139.58	308.75		195.35	96.40	92.41	133.23	103.05	84.45

Table 17. Abundance index (millions) at age for Am. Plaice in Div. 3O from Canadian autumn surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.05		0.00	0.10	0.00	0.00	0.00	0.00	0.00	1.93	0.00		0.00	0.00	0.00	0.00	0.00	0.00
1	54.15	28.67	5.95	8.76		52.70	5.38	151.39	99.68	139.86	20.11	3.72	34.25	135.71		15.30	1.12	0.00	0.00	0.00	0.00
2	139.26	61.24	58.23	22.83		200.34	97.71	66.49	375.72	122.36	204.61	67.13	34.78	145.50		139.02	54.84	20.90	4.70	133.90	3.68
3	124.51	100.89	53.27	56.51		70.54	175.59	88.31	81.82	274.80	115.28	82.33	51.23	76.64		190.85	126.85	101.87	25.10	62.34	179.86
4	60.63	39.78	70.08	101.12		46.91	53.84	147.13	167.21	54.22	158.28	51.30	51.80	55.02		60.19	98.13	129.40	65.71	27.09	32.58
5	23.18	28.22	25.26	101.92		50.30	24.05	55.84	193.42	86.29	44.19	53.06	54.42	75.54		36.90	42.37	78.48	62.70	41.70	14.83
6	58.38	29.01	16.41	36.56		55.96	36.65	21.07	48.93	91.38	41.13	27.82	65.24	48.51		28.12	28.80	49.97	66.49	32.09	27.76
7	33.52	35.87	25.42	21.92		34.12	34.80	51.60	43.09	27.79	18.97	18.35	15.19	26.19		24.00	15.59	15.57	34.48	40.97	4.11
8	18.16	10.37	20.70	13.07		8.47	18.15	43.26	27.88	22.71	6.81	17.67	16.94	10.48		14.11	7.77	7.77	15.65	25.65	8.23
9	13.45	11.08	5.70	6.15		4.22	4.39	18.84	12.73	18.88	5.80	5.15	9.35	5.39		5.96	4.01	3.29	6.94	10.32	1.49
10	6.91	6.58	3.14	1.72		3.04	1.91	2.07	6.42	5.12	6.28	3.26	4.08	2.36		4.04	3.24	1.70	3.27	5.99	1.82
11	4.47	4.91	2.95	2.89		1.60	1.95	1.29	1.14	4.79	2.95	2.03	2.33	1.52		1.40	1.37	1.15	2.66	1.02	0.00
12	1.53	2.29	2.32	1.45		1.25	2.11	1.45	0.69	0.47	1.28	1.86	1.22	0.76		0.67	0.51	1.02	0.93	2.76	1.24
13	0.48	0.90	1.25	0.21		0.96	1.11	1.98	0.56	0.75	0.98	0.58	0.68	0.34		0.11	0.09	0.19	0.92	1.89	0.78
14	0.16	0.23	0.40	0.47		0.51	0.57	0.62	0.48	0.27	0.64	0.03	0.18	0.41		0.36	0.13	0.00	0.30	0.57	0.00
15	0.13	0.16	0.31	0.30		0.62	0.81	0.69	0.73	0.31	1.13	0.08	0.09	0.17		0.07	0.00	0.00	0.07	0.48	0.00
16	0.19	0.27	0.27	0.34		0.05	0.55	0.25	0.77	0.54	0.00	0.14	0.10	0.16		0.00	0.10	0.00	0.00	0.05	0.00
17	0.37	0.11	0.18	0.00		0.00	0.27	0.18	0.08	0.53	0.00	0.12	0.05	0.09		0.05	0.10	0.00	0.05	0.00	0.26
18	0.00	0.16	0.00	0.13		0.00	0.24	0.14	0.00	0.16	0.49	0.05	0.32	0.27		0.00	0.05	0.00	0.09	0.05	0.00
19	0.00	0.00	0.04	0.00		0.00	0.13	0.03	0.00	0.09	0.51	0.00	0.04	0.08		0.00	0.10	0.12	0.10	0.14	0.00
20	0.00	0.00	0.00	0.00		0.00	0.05	0.03	0.04	0.00	0.00	0.00	0.05	0.17		0.15	0.00	0.12	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00		0.00	0.07	0.00	0.00	0.08	0.00	0.00	0.00	0.06		0.05	0.03	0.00	0.00	0.08	0.00
22	0.00	0.00	0.00	0.00		0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.12		0.00	0.03	0.20	0.00	0.00	0.00
unk.	0.09	0.10	0.00	0.25		0.20	1.51	0.54	1.76	4.46	0.77	2.61	0.22	0.27		2.61	0.79	0.05	0.46	0.04	9.54
Ages 0+	539.58	360.86	291.89	376.63		531.80	461.96	653.21	1063.15	855.87	630.20	337.26	344.48	585.75		523.96	386.04	411.81	290.63	387.14	286.17
Ages 6+	137.74	101.94	79.10	85.20		110.80	103.78	143.51	143.53	173.87	86.96	77.12	115.84	97.08		79.10	61.93	81.11	65.47	89.98	17.92
Ages 9+	27.70	26.69	16.56	13.65		12.25	14.18	27.58	23.63	31.99	20.05	13.27	18.47	11.90		12.87	9.77	7.79	8.40	13.04	4.10
Ages 12+	2.86	4.12	4.76	2.89		3.39	5.95	5.38	3.35	3.21	5.02	2.84	2.72	2.62		1.47	1.15	1.66	1.54	3.27	1.04
Ages 15+	0.69	0.70	0.80	0.77		0.67	2.16	1.33	1.61	1.71	2.13	0.38	0.65	1.10		0.32	0.42	0.44	0.25	0.32	0.26
Ages 1-5	401.74	258.81	212.79	291.13		420.79	356.57	509.15	917.85	677.53	542.47	257.53	226.49	488.40		442.25	323.32	330.65	224.70	297.12	258.71

Table 18. Abundance index (millions) at age for Am. Plaice in Divs. 3LNO from Canadian autumn surveys from 2000-2020. Previous years can be found in Wheeland et al. 2018.

Age/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	0.00	0.00	0.00	0.10		0.00	0.14	0.04	0.72	2.16	0.43	0.00	3.62	6.62		7.50	0.00	0.21	0.47	22.02	5.66
1	90.06	45.83	10.80	17.74		69.96	17.86	204.09	170.00	219.84	87.89	9.60	94.13	516.14		62.66	5.64	4.90	16.01	139.42	26.96
2	329.62	184.04	149.76	47.32		485.24	137.11	141.45	619.23	319.87	433.82	272.22	65.76	420.38		622.04	133.03	108.86	81.68	80.69	236.98
3	415.51	302.51	223.50	176.62		165.55	265.55	177.56	193.18	463.85	394.60	335.80	296.14	286.16		1151.48	875.56	462.35	172.87	75.40	92.37
4	122.87	117.20	295.37	274.14		114.07	106.89	328.50	356.20	172.98	523.46	308.84	286.68	451.32		286.76	815.93	1047.20	387.58	325.48	166.54
5	73.67	54.49	105.56	325.07		170.52	74.28	118.06	515.63	229.21	199.84	286.53	285.87	381.87		178.81	155.53	379.33	549.79	401.96	329.37
6	132.01	67.47	42.39	85.38		197.03	141.13	67.98	146.42	230.66	255.12	184.78	235.07	348.87		172.18	120.74	135.07	305.63	440.15	299.17
7	115.59	98.53	72.91	49.09		132.09	138.30	128.43	117.52	78.37	135.07	145.07	112.28	158.25		130.24	87.59	84.56	102.22	142.83	152.46
8	83.79	62.47	75.89	34.99		38.11	108.77	121.17	103.65	52.18	46.69	91.25	67.19	85.32		78.67	39.92	54.32	46.58	52.44	39.86
9	61.82	48.66	41.06	18.96		13.85	26.31	74.10	69.11	41.57	28.22	29.25	49.60	42.09		42.35	29.15	29.39	29.58	28.06	25.53
10	48.92	26.88	26.82	12.33		13.27	9.19	24.41	28.22	21.31	36.63	16.98	19.88	20.27		22.48	15.57	18.80	18.44	16.73	24.71
11	25.38	26.18	27.00	11.00		7.28	10.46	9.05	8.28	14.41	11.66	14.32	10.91	13.43		14.98	5.41	9.78	11.09	10.44	10.86
12	7.07	12.06	15.79	6.32		5.11	9.92	8.62	4.66	3.75	4.62	10.14	7.75	10.75		7.70	3.81	5.98	3.43	9.60	10.56
13	3.09	2.83	7.85	1.79		4.91	5.59	2.72	2.59	3.08	3.41	3.66	4.39	6.38		3.79	0.64	1.43	2.60	1.97	0.19
14	0.84	1.12	0.99	0.83		3.34	3.62	4.87	2.69	2.35	2.96	1.22	1.54	2.34		1.44	1.03	1.51	1.06	1.40	4.02
15	0.53	0.50	1.36	0.57		2.33	4.76	4.84	2.38	1.93	1.83	1.33	1.37	0.54		0.80	0.79	0.55	0.46	0.92	0.53
16	0.24	0.38	1.33	0.52		0.64	2.42	3.07	1.55	2.71	1.64	1.27	0.88	1.72		0.27	0.58	0.28	0.69	0.45	0.44
17	0.71	0.23	0.18	0.00		0.20	1.11	2.04	0.65	1.23	0.95	0.52	0.10	0.85		0.20	0.26	0.42	0.21	0.06	0.22
18	0.00	0.16	0.00	0.13		0.12	0.48	0.98	0.70	0.25	1.06	1.11	0.84	0.81		1.39	0.17	0.00	0.10	0.32	0.29
19	0.00	0.00	0.04	0.00		0.00	0.13	0.67	0.23	0.09	0.51	0.94	0.36	0.08		0.11	0.51	0.20	0.11	0.22	0.19
20	0.00	0.00	0.00	0.05		0.00	0.10	0.28	0.16	0.00	0.29	0.07	0.05	0.25		0.15	0.11	0.12	0.00	0.14	0.00
21	0.00	0.00	0.00	0.00		0.00	0.07	0.00	0.00	0.08	0.00	0.00	0.00	0.14		0.20	0.09	0.14	0.65	3.42	12.08
22	0.00	0.00	0.00	0.00		0.00	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.25		0.00	0.03	0.24	1.39	7.14	44.42
unk.	0.27	0.74	0.30	0.49		0.42	2.02	2.01	3.15	9.83	1.12	3.65	1.51	4.54		3.59	2.58	4.76	1235.33	1152.24	952.31
Ages 0+	1511.99	1052.29	1098.91	1063.43		1424.04	1066.27	1424.95	2346.97	1871.71	2171.80	1718.57	1545.92	2759.34		2789.77	2294.68	2350.41	2968.00	2913.51	2435.73
Ages 6+	479.99	347.48	313.63	221.95		418.29	462.41	453.24	488.85	453.96	530.65	501.91	512.20	692.32		476.95	306.40	342.79	524.26	716.30	625.54
Ages 9+	148.60	119.02	122.42	52.50		51.06	74.21	135.66	121.27	92.75	93.78	80.81	97.67	99.88		95.86	58.15	68.84	69.83	80.87	134.04
Ages 12+	12.48	17.29	27.55	10.21		16.65	28.25	28.10	15.66	15.47	17.27	20.26	17.28	24.10		16.05	8.02	10.87	10.72	25.64	72.94
Ages 15+	1.48	1.27	2.92	1.27		3.29	9.12	11.88	5.72	6.29	6.28	5.24	3.61	4.63		3.12	2.53	1.95	3.62	12.67	58.17
Ages 1-5	1031.73	704.06	784.99	840.89		1005.34	601.70	969.66	1854.25	1405.75	1639.61	1213.00	1028.58	2055.86		2301.74	1985.70	2002.64	1207.93	1022.96	852.22
proportion ages 0-5	0.68	0.67	0.71	0.79		0.71	0.56	0.68	0.79	0.75	0.76	0.71	0.67	0.75		0.83	0.87	0.85	0.41	0.36	0.35
proportion ages 9+	0.10	0.11	0.11	0.05		0.04	0.07	0.10	0.05	0.05	0.04	0.05	0.06	0.04		0.03	0.03	0.03	0.02	0.03	0.06

Table 19. American plaice age numbers from the EU-Spain Survey of NAFO 3NO: 1997-2019. No survey was completed in 2020.ALK used: Canadian Spring survey in 3N.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Age	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
0																							
1					1.80	0.05	0.65	56.59	1.71	0.10	4.94	3.81	2.61	0.32	0.08	0.68	2.52	0.32	0.43				
2	0.10	0.15	21.79	50.52	25.51	10.78	4.19	20.50	76.18	13.80	1.20	65.15	3.55	41.96	6.42	0.32	0.72	2.73	6.45	0.02	0.05	0.14	0.18
3	1.96	0.45	14.37	189.34	256.81	25.04	35.35	13.07	130.08	161.73	10.55	10.66	30.98	28.13	84.24	3.96	1.07	14.10	60.61	4.79	2.11	1.11	0.17
4	4.80	5.87	4.14	67.85	78.07	165.33	57.98	35.03	17.07	217.72	158.79	33.75	6.74	67.85	70.92	58.35	12.15	9.61	19.64	19.81	12.01	4.03	0.95
5	6.14	8.58	12.89	11.00	4.81	38.40	235.17	76.80	40.63	105.85	97.64	282.61	50.51	43.50	116.78	71.40	132.64	9.69	13.86	6.89	6.45	16.47	4.39
6	19.92	14.25	37.92	19.64	11.44	11.40	56.43	204.71	91.46	85.84	33.62	121.99	97.16	108.88	137.16	167.96	160.50	60.94	77.09	11.26	10.19	34.44	7.96
7	25.74	29.99	32.15	49.71	30.59	10.04	22.53	47.14	121.13	92.85	61.14	36.95	35.08	141.00	128.10	125.20	182.84	67.50	157.46	29.70	23.67	38.64	10.72
8	13.68	48.49	42.53	39.49	28.50	18.84	16.91	12.83	42.37	78.66	45.09	75.11	19.65	29.71	82.41	84.46	64.82	74.63	39.00	22.44	16.20	22.58	3.45
9	4.55	33.83	60.52	51.90	27.17	14.28	19.43	11.17	17.82	57.88	56.80	38.91	17.17	13.66	14.83	49.52	41.94	42.27	27.75	11.25	8.63	9.21	3.21
10	1.26	13.68	50.12	46.98	20.44	8.86	8.11	11.95	6.11	25.60	10.92	32.57	23.13	9.56	9.97	17.64	21.77	22.41	10.99	7.73	5.23	11.04	3.03
11	0.48	5.39	20.46	29.09	21.20	10.67	8.50	6.44	4.39	11.87	3.75	8.91	20.54	9.44	8.76	6.98	8.17	14.86	6.05	3.37	2.79	5.09	1.37
12	0.40	1.97	9.19	13.56	8.26	7.45	10.41	7.90	4.29	6.46	3.07	4.69	8.02	11.11	6.36	5.10	5.23	3.64	2.10	2.01	2.06	2.08	0.72
13	0.12	0.95	5.00	6.38	2.27	1.84	3.88	4.39	3.30	3.47	2.24	1.69	1.50	3.50	2.18	2.67	2.62	1.71	0.71	0.65	0.82	0.69	1.08
14	0.11	1.03	1.87	0.97	0.96	1.03	1.73	3.80	2.38	2.28	2.27	2.44	1.11	1.34	0.90	1.65	1.31	1.88	0.38	0.73	0.95	0.18	0.11
15	0.03	0.19	1.20	3.32	0.76	0.09	0.78	0.66	1.76	1.48	1.92	2.36	2.31	1.39	0.35	0.39	0.61	1.12	0.23	0.09	0.12	0.04	0.10
16	0.04	0.09	0.48	1.59	0.22	0.27	0.48	0.21	0.82	0.75	0.79	2.46	1.95	2.58	0.76	0.79	0.52	0.38	0.10	0.05	0.09	0.20	0.10
17			0.39	0.48	0.20	0.05	0.11		0.09	0.31	0.41	0.73	1.62	1.55	0.91	0.64	0.32	0.53	0.37	0.24	0.15	0.03	0.02
18	0.01	0.05	0.35		0.17		0.04	0.08	0.63	0.22	0.66	0.02	0.86	0.52	0.29	0.20	0.48	0.23	0.07	0.01	0.05	0.03	0.02
19	0.01	0.05			0.02	0.01		0.02	0.08	0.04	0.00	0.24	0.37	0.49	0.56	0.07	0.13	0.11	0.16		0.00	0.05	0.00
20			0.05	0.10	0.01					0.03	0.23	0.01	0.20	0.01	0.16	0.08	0.11	0.04	0.07	0.07	0.06	0.01	0.04
21												0.29	0.00	0.00		0.01	0.19	0.02	0.24		0.00	0.04	0.00
22														0.00	0.07				0.06	0.02	0.00	0.01	0.00
23														0.15							0.00		
24														0.00					0.08	0.01	0.00		
Ages 0+	79.33	165.01	315.43	581.93	519.24	324.45	482.68	513.30	562.29	866.94	496.03	725.34	325.04	516.65	672.20	598.08	640.66	328.71	423.89	121.17	91.63	146.13	37.62
Ages 6+	66.33	149.96	262.23	263.21	152.23	84.84	149.34	311.31	296.62	367.74	222.91	329.37	230.65	334.88	393.77	463.38	491.55	292.26	322.91	89.65	71.00	124.37	31.92
Ages 9+	6.99	57.23	149.63	154.37	81.70	44.55	53.47	46.63	41.66	110.39	83.05	95.32	78.76	55.29	46.10	85.75	83.39	89.19	49.36	26.24	20.95	28.71	9.79
Ages 12+	0.71	4.33	18.54	26.39	12.88	10.74	17.43	17.06	13.35	15.05	11.59	14.94	17.93	22.63	12.53	11.60	11.51	9.65	4.57	3.90	4.30	3.37	2.19
Ages 15+	0.08	0.38	2.47	5.49	1.39	0.42	1.41	0.97	3.38	2.83	4.01	6.11	7.30	6.69	3.10	2.18	2.35	2.42	1.39	0.50	0.47	0.42	0.27
Ages 1-5	13.00	15.04	53.19	318.72	367.01	239.61	333.34	201.99	265.68	499.19	273.12	395.97	94.39	181.76	278.43	134.71	149.11	36.45	100.98	31.52	20.63	21.76	5.69

Table 20. Catch at age of American Place in Divs. 3LNO by Country in 2018.

	PT				Spain				Canada				Overall (LF data available)				Japan	Russia	Estonia	USA	France
Age	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P					
1	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
2	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
3	0	0.0	0.0	0.0	140	0.1	23.6	14.0	0	0.0	0.0	0.0	249	0.1	23.2	23.2					
4	4	0.2	28.5	0.7	939	0.1	25.7	126.8	1750	0.1	25.1	227.5	1099	0.1	24.3	123.1					
5	13	0.2	29.2	2.5	6126	0.1	26.0	851.5	7049	0.2	27.7	1170.1	6854	0.1	24.3	774.5					
6	10407	0.4	35.6	3809.0	32940	0.2	30.1	7213.9	25889	0.2	31.5	6420.5	40511	0.3	32.3	10978.5					
7	21452	0.4	35.2	7551.1	50640	0.3	32.2	13419.6	112273	0.3	33.8	34692.4	93278	0.3	33.5	28076.7					
8	40239	0.4	36.9	16457.8	45111	0.4	37.0	18856.4	117862	0.4	36.9	48912.7	211793	0.5	38.0	95518.6					
9	54237	0.5	38.8	25925.3	28562	0.5	39.4	14480.9	143176	0.5	38.0	65145.1	153009	0.5	40.1	81706.8					
10	41090	0.5	39.7	21161.4	36314	0.6	40.6	20372.2	156533	0.5	40.3	84840.9	212695	0.6	41.6	127404.3					
11	14898	0.7	44.3	10771.3	32214	0.7	43.8	22517.6	113218	0.6	41.9	69742.3	224871	0.7	44.2	161907.1					
12	22922	0.7	43.8	16182.9	19640	0.8	45.9	15888.8	82812	0.6	42.3	51840.3	165147	0.8	46.5	139714.4					
13	8754	0.9	46.7	7581.0	8612	1.0	49.7	8982.3	33516	0.6	42.3	21215.6	100719	1.1	50.0	107366.5					
14	4990	1.0	48.9	4965.1	4071	1.3	53.9	5463.3	24002	0.7	43.9	17209.4	50096	1.4	54.2	68280.8					
15	271	1.9	60.5	520.9	356	1.9	60.5	684.2	11907	0.7	43.2	7942.0	5067	1.9	60.5	9738.8					
16	1351	1.4	54.3	1881.9	2742	1.5	55.7	4124.0	6001	1.1	50.4	6793.1	61039	1.5	56.2	93878.0					
17	407	1.5	56.5	630.0	353	1.5	56.5	546.4	5996	1.4	54.4	8418.4	26129	1.5	56.5	40447.7					
18	0	0.0	0.0	0.0	534	1.7	58.5	922.8	4097	1.3	52.9	5268.7	8787	1.7	58.5	15183.9					
19	271	1.9	60.5	520.9	864	2.0	61.7	1766.0	1078	1.2	52.5	1323.8	12217	2.0	61.7	24959.3					
20	0	0.0	0.0	0.0	507	2.1	62.5	1079.9	2453	1.5	55.5	3679.5	7149	2.1	62.5	15227.4					
21	0	0.0	0.0	0.0	806	2.4	64.5	1895.7	0	0.0	0.0	0.0	3649	2.4	64.5	8582.4					
22	0	0.0	0.0	0.0	507	2.1	62.5	1079.9	2232	1.4	54.7	3160.5	7149	2.1	62.5	15227.4					
23	0	0.0	0.0	0.0	0	0.0	0.0	0.0	244	1.1	50.5	265.0	0	0.0	0.0	0.0					
24	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
25	0	0.0	0.0	0.0	0	0.0	0.0	0.0	2292	2.0	61.4	4627.5	0	0.0	0.0	0.0					
Total SOP				117962				140286				442895				1045119					
Catch				144				161				464				1003	81	45	41	51	54

Table 21. Catch at age of American Place in Divs. 3LNO by Country in 2019.

	PT				Spain				Canada				Overall (LF data available)				Japan	Russia	Estonia	USA	France
Age	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P					
1	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
2	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
3	0	0.0	0.0	0.0	50	0.1	24.5	0.1	0	0.0	0.0	0.0	62	0.1	24.5	6.9					
4	0	0.0	0.0	0.0	525	0.2	27.7	86.6	1741	0.2	28.5	309.9	2822	0.2	28.3	493.9					
5	0	0.0	0.0	0.0	2928	0.2	27.7	486.0	11775	0.3	32.4	3214.6	18312	0.3	31.5	4614.6					
6	9491	0.3	34.4	3084.6	27341	0.2	30.7	6370.5	117814	0.3	33.4	35226.4	192567	0.3	33.0	55651.9					
7	20693	0.3	34.1	6580.4	47061	0.3	32.5	12847.7	303266	0.4	35.8	113118.2	462157	0.4	35.3	164990.0					
8	36916	0.4	36.7	14987.9	68492	0.4	37.5	29794.0	175354	0.4	37.7	76629.7	349332	0.4	37.6	151260.8					
9	32208	0.5	39.1	15878.5	44817	0.5	39.6	23035.9	94302	0.5	38.4	43850.4	213081	0.5	38.8	102918.1					
10	28203	0.5	40.2	15145.0	60086	0.6	41.1	34910.0	98756	0.6	42.0	60833.7	232590	0.6	41.4	137925.9					
11	15450	0.7	43.6	10614.2	55285	0.7	43.8	38699.5	107219	0.7	43.5	73445.0	221375	0.7	43.6	152748.8					
12	17932	0.7	44.3	13072.4	34349	0.8	45.8	27650.9	80007	0.7	43.8	56084.9	164576	0.7	44.4	120305.1					
13	9905	1.0	48.2	9568.2	10551	1.0	48.4	10129.0	31858	0.9	47.0	27939.5	65087	0.9	47.5	59229.2					
14	6101	1.1	50.4	6753.8	2865	1.3	53.1	3655.7	12865	0.9	48.0	12003.0	27162	1.0	49.4	27868.2					
15	2511	1.2	52.5	3083.5	0	0.0	0.0	0.0	12983	1.0	48.6	12840.2	19304	1.0	49.2	19825.2					
16	1090	1.7	58.5	1883.5	2532	1.4	54.5	3549.9	3628	1.3	52.7	4556.8	9014	1.4	54.2	12421.3					
17	15080	1.4	54.5	20840.6	972	1.5	56.5	1504.7	3445	1.2	52.1	4144.3	24205	1.4	54.2	32870.4					
18	545	1.7	58.5	941.8	274	1.7	58.5	473.5	880	1.5	56.4	1357.0	2113	1.6	57.4	3446.3					
19	0	0.0	0.0	0.0	365	2.1	62.5	777.5	603	1.1	50.5	654.9	1204	1.5	55.0	1779.5					
20	0	0.0	0.0	0.0	365	2.1	62.5	777.5	649	1.5	55.5	980.0	1261	1.7	58.0	2185.3					
21	0	0.0	0.0	0.0	548	2.4	64.5	1288.9	0	0.0	0.0	0.0	679	2.4	64.5	1597.0					
22	0	0.0	0.0	0.0	365	2.1	62.5	777.5	0	0.0	0.0	0.0	452	2.1	62.5	962.8					
23	0	0.0	0.0	0.0	0	0.0	0.0	0.0	11	2.1	62.5	23.4	13	2.1	62.5	27.7					
24	0	0.0	0.0	0.0	0	0.0	0.0	0.0	32	2.4	64.5	75.3	40	2.4	64.5	94.1					
25	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0					
Total SOP				122434				196815				527287				1053223					
Catch				142				226				632				1247	18	128	38	14	50

Table 22. Catch at age of American Place in Divs. 3LNO by Country in 2020.

	PT				Spain				Canada				Overall (LF data available)				Japan	Russia	Estonia	USA	France
Age	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P	3LNO	Mean Wgt	Mean Len	S.O.P					
1	0	0.0	0.0	0.0	0	0.0	0.0	0.0					0	0.0	0.0	0.0					
2	0	0.0	0.0	0.0	0	0.0	0.0	0.0					0	0.0	0.0	0.0					
3	0	0.0	0.0	0.0	103	0.1	23.2	9.6					249	0.1	23.2	23.2					
4	0	0.0	0.0	0.0	454	0.1	24.3	50.8					1099	0.1	24.3	123.1					
5	0	0.0	0.0	0.0	2831	0.1	24.3	319.9					6854	0.1	24.3	774.5					
6	3031	0.3	34.3	979.0	13701	0.3	31.8	3562.3					40511	0.3	32.3	10978.5					
7	8787	0.3	34.5	2873.3	29737	0.3	33.2	8712.9					93278	0.3	33.5	28076.7					
8	40851	0.5	38.7	19608.5	46619	0.4	37.3	19859.7					211793	0.5	38.0	95518.6					
9	34108	0.6	40.5	18895.8	29085	0.5	39.6	14891.5					153009	0.5	40.1	81706.8					
10	48712	0.6	42.0	29957.9	39131	0.6	41.1	22656.8					212695	0.6	41.6	127404.3					
11	57592	0.7	44.3	41869.4	35279	0.7	44.0	25012.8					224871	0.7	44.2	161907.1					
12	45370	0.9	46.7	38882.1	22836	0.8	46.1	18816.9					165147	0.8	46.5	139714.4					
13	31017	1.1	50.3	33591.4	10580	1.0	49.3	10728.1					100719	1.1	50.0	107366.5					
14	18751	1.4	54.3	25688.9	1939	1.3	53.4	2516.8					50096	1.4	54.2	68280.8					
15	1551	1.9	60.5	2981.0	541	1.9	60.5	1039.8					5067	1.9	60.5	9738.8					
16	21301	1.6	56.5	33208.3	3908	1.4	54.8	5576.7					61039	1.5	56.2	93878.0					
17	9226	1.5	56.5	14281.8	1566	1.5	56.5	2424.2					26129	1.5	56.5	40447.7					
18	3507	1.7	58.5	6060.1	122	1.7	58.5	210.8					8787	1.7	58.5	15183.9					
19	3136	2.0	61.5	6356.7	1910	2.1	61.9	3955.6					12217	2.0	61.7	24959.3					
20	1584	2.1	62.5	3373.9	1368	2.1	62.5	2913.8					7149	2.1	62.5	15227.4					
21	0	0.0	0.0	0.0	1507	2.4	64.5	3544.5					3649	2.4	64.5	8582.4					
22	1584	2.1	62.5	3373.9	1368	2.1	62.5	2913.8					7149	2.1	62.5	15227.4					
23	0	0.0	0.0	0.0	0	0.0	0.0	0.0					0	0.0	0.0	0.0					
24	0	0.0	0.0	0.0	0	0.0	0.0	0.0					0	0.0	0.0	0.0					
25	0	0.0	0.0	0.0	0	0.0	0.0	0.0					0	0.0	0.0	0.0					
Total SOP				281982				149717				0				1045119					
Catch				307				174				443				1165	1	94	40	51	54

Table 23. Catch at age used in the VPA, with effort method for catch in 2014, DCRs in 2015 and 2016, and CDAG for 2017-2020.

Catch	5	6	7	8	9	10	11	12	13	14	15
1960	44.7	318.8	841.8	1365.9	1738.3	2280.0	2540.0	3473.6	2752.5	2564.7	4588.8
1961	28.1	200.4	531.2	1230.9	2463.9	3174.2	2467.1	2272.0	3894.1	2579.4	5102.7
1962	62.4	445.1	657.2	1096.1	1184.5	1669.1	2432.4	2697.6	2409.5	3276.8	5958.8
1963	144.3	1029.7	1866.4	1434.1	1546.8	2237.6	3104.3	4174.8	3896.9	3851.9	5622.8
1964	268.6	1916.7	4997.5	3253.4	6174.5	8768.6	6960.2	6149.8	3245.9	3033.6	5552.8
1965	475.5	3157.0	7234.8	9305.9	7048.0	7562.9	5731.6	5790.8	5214.6	4333.2	6510.2
1966	1759.8	6271.7	10036.6	11132.5	9516.7	7266.3	7106.4	5667.6	5731.0	5009.8	8475.7
1967	433.9	3345.3	10834.8	7647.2	9504.5	13713.2	13672.7	14564.6	9495.5	6572.1	13247.8
1968	275.8	2342.3	4139.2	9785.9	11210.5	11631.0	7735.4	13842.2	8778.0	6339.2	8419.3
1969	690.3	2453.1	7875.0	14186.6	18181.9	12778.9	12735.3	10396.6	7053.8	5305.1	7666.2
1970	115.9	2172.2	2554.1	10006.8	13536.7	11286.1	11179.1	8248.5	5556.4	4661.3	9285.0
1971	1135.9	1749.6	8411.7	10457.6	15504.1	14164.8	10993.1	9026.5	5195.2	3720.6	7130.5
1972	578.2	2573.8	2367.8	7696.8	11301.7	12765.9	12718.0	10706.0	6783.8	4354.0	7033.1
1973	46.4	1079.1	6329.1	10518.1	13016.7	10042.3	9980.4	6762.3	6589.6	3733.8	7013.8
1974	354.0	5955.0	10475.0	10069.0	7768.0	9004.0	7086.0	4596.0	3809.0	2278.0	2164.0
1975	883.0	3128.0	7220.0	9433.0	9234.0	7903.0	5701.0	4732.0	3788.0	2617.0	2933.0
1976	837.0	3907.0	8781.0	19363.0	16597.0	12338.0	8323.0	5156.0	3024.0	2309.0	2241.0
1977	974.0	6723.0	8743.0	11730.0	13559.0	11157.0	6520.0	4257.0	2369.0	1493.0	1625.0
1978	1558.0	4467.0	9195.0	10397.0	12743.0	13881.0	9938.0	6823.0	3655.0	2239.0	2440.0
1979	1257.0	6551.0	13532.0	18747.0	14977.0	12506.0	8791.0	3775.0	1843.0	714.0	580.0
1980	263.0	2977.0	9531.0	12578.0	14111.0	14212.0	11288.0	8088.0	3732.0	1565.0	1022.0
1981	154.0	554.0	2248.0	4786.0	7921.0	11425.0	13565.0	11872.0	8693.0	5591.0	4697.0
1982	27.0	314.0	1814.0	4799.0	8946.0	12836.0	15801.0	14489.0	7942.0	4224.0	2943.0
1983	119.0	991.0	3053.0	5797.0	8343.0	7707.0	8493.0	7517.0	4588.0	2480.0	1771.0
1984	48.0	397.0	1516.0	3311.0	5853.0	9958.0	12887.0	8964.0	5072.0	2515.0	1602.0
1985	296.0	788.0	2362.0	5652.0	10694.0	15741.0	14528.0	9233.0	4108.0	1969.0	1792.0
1986	4407.0	9707.0	12556.0	12530.0	13372.0	13874.0	14246.0	10376.0	5947.0	2637.0	2155.0
1987	2237.0	4941.0	7691.0	10893.0	15867.0	17640.0	11404.0	6986.0	3076.0	1303.0	1046.0
1988	2908.0	3213.0	4853.0	7269.0	10123.0	10325.0	9260.0	6040.0	2692.0	1156.0	962.0
1989	12745.0	11553.0	11432.0	9652.0	14180.0	12387.0	8405.0	4972.0	2029.0	1027.0	715.0
1990	15134.0	7694.0	4489.0	4604.0	8666.0	8666.0	6452.0	3633.0	1702.0	945.0	548.0
1991	6103.0	12152.0	7846.0	9331.0	7856.0	6589.0	4394.0	2294.0	811.0	364.0	484.0
1992	148.0	1023.0	2591.0	3395.0	3618.0	2154.0	1507.0	875.0	576.0	513.0	579.0
1993	1172.4	3712.9	8820.9	11590.5	5720.0	3376.9	1853.1	1002.5	526.9	354.7	526.8
1994	4316.3	3837.1	5426.1	4459.7	2777.0	736.9	475.6	162.8	120.9	54.7	27.7
1995	99.2	313.9	453.2	333.0	203.3	65.5	13.6	4.1	0.1	0.1	0.4
1996	180.9	742.8	975.0	452.7	211.1	51.9	10.4	8.1	2.3	1.0	1.3
1997	19.4	134.9	543.7	719.4	409.4	149.3	93.5	56.8	26.2	1.4	1.4
1998	10.6	54.8	272.7	767.1	804.9	455.5	278.5	117.3	69.0	49.2	18.3
1999	26.0	174.5	268.4	579.2	1029.9	1079.4	627.4	278.1	125.6	39.6	38.3
2000	15.2	226.3	726.8	915.1	1442.7	1532.7	979.1	429.1	195.2	43.9	116.6
2001	111.0	331.5	1139.1	1413.3	1583.8	1595.5	1403.9	665.1	232.4	86.1	109.1
2002	312.2	308.3	609.9	1488.3	1431.7	1082.1	1059.3	605.2	203.5	62.4	60.6
2003	1212.4	983.0	1104.7	1707.9	1993.6	1201.8	999.9	879.7	358.2	156.5	131.8
2004	346.2	1898.8	1215.9	967.5	1086.1	1013.6	739.9	591.1	320.1	201.4	124.4
2005	58.6	289.0	999.0	842.9	778.7	579.7	536.2	341.9	260.0	178.0	250.4
2006	76.1	228.4	637.2	558.5	469.0	354.4	311.7	252.7	210.7	154.5	238.8
2007	53.9	73.3	375.1	627.6	738.8	366.3	283.3	249.6	247.8	247.3	564.6
2008	82.3	136.2	292.8	722.4	736.4	511.0	226.9	198.8	111.5	101.3	227.8
2009	189.3	689.5	544.6	691.0	787.2	645.5	472.2	214.3	88.4	87.3	356.0
2010	126.1	687.0	882.4	555.1	483.1	579.1	408.6	295.5	155.7	88.7	289.9
2011	724.1	795.2	1003.7	963.5	439.2	369.0	272.0	254.1	79.6	31.9	111.5
2012	285.4	762.7	841.6	710.9	732.8	369.9	239.1	221.4	143.3	70.5	115.0
2013	332.8	635.5	1139.4	1069.4	923.5	721.4	355.8	243.3	140.3	90.6	192.0
2014	72.5	371.4	759.7	936.9	692.5	519.4	285.2	176.3	121.7	90.7	200.6
2015	61.6	171.6	269.9	369.3	312.3	225.3	200.0	145.0	88.1	62.6	134.4
2016	120.3	268.2	461.5	635.9	476.2	406.6	237.7	152.8	86.0	43.3	51.6
2017	55.5	96.7	250.1	377.5	282.0	275.3	259.0	150.7	88.3	56.6	30.9
2018	18.2	91.4	245.9	264.4	290.1	306.5	215.4	163.9	66.7	43.6	17.2
2019	18.3	192.6	462.2	349.3	213.1	232.6	221.4	164.6	65.1	27.2	19.3
2020	6.9	40.5	93.3	211.8	153.0	212.7	224.9	165.1	100.7	50.1	5.1

Table 24. Stock weights (kg) for American plaice as calculated by Rivard's (Rivard 1980) method (January 1).

beg of year	5	6	7	8	9	10	11	12	13	14	15+
1960	0.227	0.198	0.232	0.320	0.423	0.539	0.663	0.775	0.872	1.041	1.274
1961	0.227	0.198	0.232	0.320	0.423	0.539	0.663	0.775	0.872	1.041	1.274
1962	0.201	0.192	0.227	0.326	0.441	0.549	0.663	0.810	0.885	1.035	1.281
1963	0.179	0.218	0.229	0.326	0.447	0.569	0.668	0.790	0.876	1.021	1.357
1964	0.178	0.244	0.293	0.382	0.458	0.579	0.687	0.789	0.882	1.023	1.352
1965	0.182	0.246	0.323	0.434	0.554	0.620	0.727	0.813	0.891	1.076	1.420
1966	0.178	0.241	0.327	0.427	0.565	0.702	0.828	0.904	0.925	1.095	1.444
1967	0.182	0.245	0.326	0.416	0.552	0.710	0.817	1.003	1.025	1.161	1.563
1968	0.177	0.240	0.316	0.415	0.531	0.652	0.819	0.916	1.052	1.219	1.612
1969	0.182	0.246	0.303	0.379	0.504	0.635	0.740	0.914	1.020	1.227	1.623
1970	0.188	0.240	0.309	0.363	0.470	0.619	0.730	0.813	1.012	1.106	1.495
1971	0.181	0.233	0.302	0.365	0.443	0.573	0.725	0.850	0.933	1.087	1.354
1972	0.193	0.241	0.310	0.400	0.461	0.557	0.679	0.818	0.922	1.102	1.365
1973	0.190	0.226	0.285	0.376	0.501	0.576	0.716	0.885	1.038	1.117	1.466
1974	0.191	0.229	0.288	0.349	0.465	0.600	0.759	0.951	1.190	1.396	1.705
1975	0.192	0.231	0.296	0.376	0.484	0.627	0.789	0.994	1.208	1.439	1.817
1976	0.183	0.236	0.296	0.380	0.482	0.610	0.757	0.955	1.109	1.332	1.683
1977	0.187	0.234	0.305	0.386	0.504	0.612	0.761	0.919	1.119	1.271	1.631
1978	0.152	0.233	0.305	0.384	0.469	0.614	0.718	0.897	1.098	1.303	1.626
1979	0.167	0.251	0.312	0.400	0.476	0.558	0.657	0.847	1.061	1.414	1.681
1980	0.155	0.262	0.362	0.425	0.495	0.560	0.629	0.720	0.958	1.290	1.757
1981	0.175	0.281	0.365	0.430	0.484	0.538	0.560	0.663	0.765	0.993	1.446
1982	0.210	0.250	0.369	0.416	0.469	0.509	0.565	0.638	0.812	1.005	1.336
1983	0.290	0.313	0.375	0.447	0.530	0.582	0.610	0.671	0.842	1.091	1.502
1984	0.245	0.306	0.382	0.466	0.553	0.609	0.676	0.771	0.923	1.177	1.638
1985	0.222	0.298	0.367	0.425	0.503	0.601	0.679	0.849	1.120	1.463	1.921
1986	0.079	0.203	0.302	0.420	0.509	0.605	0.713	0.901	1.195	1.570	2.082
1987	0.219	0.189	0.278	0.349	0.452	0.599	0.749	0.925	1.175	1.500	2.017
1988	0.163	0.242	0.317	0.421	0.463	0.547	0.712	0.934	1.229	1.560	2.062
1989	0.065	0.178	0.257	0.365	0.467	0.545	0.696	0.909	1.223	1.572	2.070
1990	0.103	0.158	0.253	0.341	0.464	0.586	0.745	0.986	1.317	1.697	2.049
1991	0.168	0.215	0.321	0.408	0.520	0.661	0.845	1.104	1.478	1.880	2.224
1992	0.234	0.238	0.330	0.415	0.514	0.667	0.861	1.096	1.412	1.806	2.327
1993	0.088	0.228	0.279	0.358	0.453	0.568	0.730	0.926	1.205	1.466	2.008
1994	0.084	0.148	0.244	0.320	0.441	0.613	0.727	0.906	1.163	1.444	1.792
1995	0.166	0.168	0.252	0.341	0.515	0.742	1.102	1.226	1.313	1.849	1.776
1996	0.116	0.194	0.265	0.386	0.537	0.807	1.058	1.457	1.625	2.109	2.353
1997	0.162	0.189	0.266	0.379	0.542	0.745	0.953	1.187	1.531	1.924	2.613
1998	0.136	0.165	0.255	0.350	0.495	0.633	0.806	0.985	1.260	1.732	2.014
1999	0.153	0.212	0.227	0.316	0.411	0.553	0.673	0.860	1.064	1.356	1.809
2000	0.119	0.238	0.313	0.360	0.445	0.566	0.716	0.896	1.147	1.356	1.756
2001	0.185	0.231	0.345	0.426	0.468	0.584	0.750	0.932	1.164	1.391	1.789
2002	0.185	0.268	0.356	0.435	0.510	0.581	0.723	0.940	1.128	1.404	1.742
2003	0.209	0.273	0.369	0.444	0.541	0.637	0.760	0.943	1.201	1.407	1.883
2004	0.177	0.280	0.373	0.468	0.570	0.709	0.838	0.976	1.204	1.535	1.978
2005	0.167	0.276	0.386	0.486	0.581	0.709	0.857	1.012	1.220	1.461	1.931
2006	0.123	0.228	0.377	0.498	0.587	0.687	0.876	0.996	1.208	1.516	1.862
2007	0.215	0.225	0.336	0.469	0.580	0.679	0.813	1.111	1.211	1.382	1.708
2008	0.171	0.260	0.344	0.476	0.587	0.718	0.841	1.097	1.315	1.476	1.629
2009	0.140	0.218	0.306	0.411	0.528	0.658	0.804	0.964	1.332	1.452	1.713
2010	0.218	0.242	0.308	0.392	0.494	0.598	0.712	0.868	1.057	1.358	1.654
2011	0.145	0.216	0.324	0.409	0.494	0.626	0.739	0.827	1.073	1.240	1.655
2012	0.121	0.171	0.237	0.358	0.478	0.557	0.739	0.851	0.978	1.236	1.596
2013	0.106	0.174	0.237	0.335	0.457	0.575	0.656	0.836	0.940	1.158	1.584
2014	0.132	0.184	0.253	0.346	0.428	0.548	0.650	0.779	0.961	1.055	1.539
2015	0.068	0.172	0.247	0.325	0.409	0.478	0.609	0.756	0.933	1.054	1.348
2016	0.192	0.173	0.259	0.352	0.452	0.519	0.644	0.780	0.972	1.181	1.379
2017	0.184	0.225	0.299	0.383	0.516	0.618	0.689	0.858	1.035	1.090	1.507
2018	0.111	0.223	0.270	0.366	0.446	0.539	0.643	0.706	0.836	0.984	1.158
2019	0.243	0.210	0.296	0.360	0.448	0.526	0.611	0.684	0.780	0.869	1.034
2020	0.049	0.261	0.295	0.401	0.481	0.538	0.653	0.764	0.883	1.114	1.321
2021	0.136	0.232	0.287	0.376	0.458	0.534	0.636	0.718	0.833	0.989	1.171

Table 25. Estimated proportion mature-at-age for Div. 3LNO American plaice.

	5	6	7	8	9	10	11	12	13	14	15
1960	0.00	0.00	0.02	0.04	0.13	0.23	0.56	0.81	0.93	0.98	0.99
1961	0.00	0.00	0.01	0.05	0.11	0.33	0.56	0.81	0.93	0.98	0.99
1962	0.00	0.01	0.01	0.04	0.13	0.25	0.63	0.85	0.93	0.98	0.99
1963	0.00	0.01	0.03	0.04	0.12	0.30	0.49	0.86	0.96	0.98	0.99
1964	0.00	0.00	0.02	0.08	0.10	0.29	0.56	0.73	0.95	0.99	0.99
1965	0.01	0.00	0.01	0.06	0.22	0.24	0.56	0.79	0.88	0.99	1.00
1966	0.01	0.02	0.02	0.04	0.16	0.47	0.47	0.80	0.92	0.96	1.00
1967	0.00	0.03	0.05	0.06	0.14	0.37	0.73	0.72	0.92	0.97	0.98
1968	0.00	0.01	0.08	0.14	0.21	0.40	0.65	0.90	0.88	0.97	0.99
1969	0.00	0.01	0.03	0.19	0.35	0.51	0.74	0.85	0.96	0.95	0.99
1970	0.00	0.01	0.02	0.08	0.38	0.63	0.80	0.92	0.95	0.99	0.98
1971	0.00	0.00	0.02	0.06	0.18	0.62	0.84	0.94	0.98	0.98	1.00
1972	0.00	0.00	0.01	0.06	0.16	0.37	0.81	0.94	0.98	0.99	0.99
1973	0.00	0.00	0.01	0.03	0.16	0.35	0.61	0.92	0.98	1.00	1.00
1974	0.00	0.00	0.01	0.02	0.09	0.34	0.61	0.81	0.97	0.99	1.00
1975	0.00	0.01	0.01	0.03	0.09	0.25	0.58	0.82	0.92	0.99	1.00
1976	0.00	0.01	0.02	0.03	0.11	0.26	0.54	0.79	0.93	0.97	1.00
1977	0.00	0.01	0.02	0.07	0.12	0.36	0.56	0.80	0.91	0.97	0.99
1978	0.00	0.00	0.02	0.07	0.21	0.39	0.72	0.83	0.93	0.97	0.99
1979	0.00	0.00	0.02	0.07	0.21	0.49	0.74	0.92	0.95	0.98	0.99
1980	0.00	0.00	0.01	0.06	0.19	0.47	0.78	0.93	0.98	0.99	0.99
1981	0.00	0.01	0.02	0.05	0.19	0.43	0.75	0.93	0.98	1.00	1.00
1982	0.00	0.01	0.03	0.12	0.22	0.48	0.71	0.91	0.98	1.00	1.00
1983	0.00	0.00	0.05	0.15	0.44	0.63	0.79	0.88	0.97	0.99	1.00
1984	0.00	0.01	0.03	0.23	0.50	0.82	0.91	0.94	0.96	0.99	1.00
1985	0.00	0.00	0.06	0.23	0.62	0.85	0.96	0.98	0.98	0.99	1.00
1986	0.01	0.02	0.05	0.35	0.74	0.90	0.97	0.99	1.00	1.00	1.00
1987	0.00	0.04	0.11	0.42	0.80	0.96	0.98	0.99	1.00	1.00	1.00
1988	0.00	0.02	0.15	0.41	0.90	0.97	1.00	1.00	1.00	1.00	1.00
1989	0.00	0.01	0.08	0.47	0.80	0.99	1.00	1.00	1.00	1.00	1.00
1990	0.00	0.01	0.05	0.27	0.82	0.96	1.00	1.00	1.00	1.00	1.00
1991	0.01	0.01	0.05	0.21	0.63	0.96	0.99	1.00	1.00	1.00	1.00
1992	0.00	0.02	0.06	0.24	0.57	0.88	0.99	1.00	1.00	1.00	1.00
1993	0.01	0.01	0.08	0.23	0.65	0.87	0.97	1.00	1.00	1.00	1.00
1994	0.03	0.03	0.07	0.26	0.59	0.91	0.97	0.99	1.00	1.00	1.00
1995	0.08	0.11	0.19	0.38	0.58	0.88	0.98	0.99	1.00	1.00	1.00
1996	0.01	0.17	0.35	0.63	0.84	0.84	0.97	1.00	1.00	1.00	1.00
1997	0.00	0.04	0.35	0.70	0.92	0.98	0.95	0.99	1.00	1.00	1.00
1998	0.02	0.03	0.16	0.58	0.91	0.99	1.00	0.99	1.00	1.00	1.00
1999	0.02	0.07	0.14	0.46	0.78	0.98	1.00	1.00	1.00	1.00	1.00
2000	0.01	0.07	0.22	0.49	0.80	0.90	1.00	1.00	1.00	1.00	1.00
2001	0.04	0.04	0.24	0.52	0.85	0.95	0.96	1.00	1.00	1.00	1.00
2002	0.05	0.15	0.21	0.57	0.81	0.97	0.99	0.98	1.00	1.00	1.00
2003	0.08	0.16	0.38	0.61	0.84	0.94	1.00	1.00	0.99	1.00	1.00
2004	0.02	0.20	0.38	0.69	0.90	0.96	0.98	1.00	1.00	1.00	1.00
2005	0.06	0.06	0.41	0.67	0.89	0.98	0.99	1.00	1.00	1.00	1.00
2006	0.02	0.14	0.19	0.66	0.87	0.97	1.00	1.00	1.00	1.00	1.00
2007	0.02	0.06	0.30	0.44	0.85	0.96	0.99	1.00	1.00	1.00	1.00
2008	0.03	0.07	0.21	0.54	0.73	0.94	0.99	1.00	1.00	1.00	1.00
2009	0.04	0.10	0.22	0.51	0.76	0.90	0.98	1.00	1.00	1.00	1.00
2010	0.02	0.10	0.28	0.52	0.80	0.90	0.97	0.99	1.00	1.00	1.00
2011	0.01	0.06	0.26	0.60	0.80	0.94	0.96	0.99	1.00	1.00	1.00
2012	0.01	0.04	0.18	0.51	0.85	0.94	0.98	0.98	1.00	1.00	1.00
2013	0.01	0.04	0.14	0.43	0.76	0.95	0.98	1.00	0.99	1.00	1.00
2014	0.01	0.05	0.16	0.41	0.73	0.91	0.99	1.00	1.00	1.00	1.00
2015	0.01	0.07	0.21	0.46	0.74	0.90	0.97	1.00	1.00	1.00	1.00
2016	0.05	0.07	0.31	0.61	0.78	0.92	0.97	0.99	1.00	1.00	1.00
2017	0.02	0.13	0.31	0.71	0.90	0.94	0.98	0.99	1.00	1.00	1.00
2018	0.02	0.09	0.30	0.74	0.93	0.98	0.99	1.00	1.00	1.00	1.00
2019	0.02	0.09	0.31	0.55	0.95	0.99	1.00	1.00	1.00	1.00	1.00
2020	0.02	0.09	0.31	0.67	0.77	0.99	1.00	1.00	1.00	1.00	1.00
2021	0.02	0.09	0.31	0.67	0.88	0.91	1.00	1.00	1.00	1.00	1.00
2022	0.02	0.09	0.31	0.67	0.88	0.96	0.97	1.00	1.00	1.00	1.00
2023	0.02	0.09	0.31	0.67	0.88	0.96	0.99	0.99	1.00	1.00	1.00
2024	0.02	0.09	0.31	0.67	0.88	0.96	0.99	1.00	1.00	1.00	1.00
2025	0.02	0.09	0.31	0.67	0.88	0.96	0.99	1.00	1.00	1.00	1.00

Table 26. Indices of numbers at age of American Plaice from the Canadian fall RV survey (1990-2020; no 2004 or 2014) used in the VPA.

Fall	5	6	7	8	9	10	11	12	13	14
1990.9	853.098	642.862	369.626	191.668	124.519	55.198	29.201	17.430	12.054	9.316
1991.9	724.397	578.812	249.380	116.271	81.837	44.303	25.916	13.857	12.207	6.977
1992.9	367.927	499.192	226.077	76.712	35.653	17.680	8.451	6.848	3.333	3.151
1993.9	360.452	372.076	316.567	104.116	33.000	15.316	6.798	5.095	3.077	2.383
1994.9	190.297	151.085	134.913	89.251	28.649	7.822	2.667	1.723	0.919	1.168
1995.9	295.940	336.345	151.960	61.447	39.520	10.745	1.880	1.308	0.452	0.307
1996.9	208.293	174.079	82.201	21.365	8.820	3.077	1.781	0.587	0.098	0.116
1997.9	153.853	159.848	119.979	53.224	23.331	7.304	3.217	1.208	0.849	0.595
1998.9	121.174	129.090	112.639	83.420	68.417	17.949	6.944	3.630	2.041	0.844
1999.9	92.461	93.426	79.565	98.916	72.701	33.661	18.853	12.311	4.889	1.076
2000.9	73.671	132.006	115.595	83.788	61.816	48.924	25.380	7.069	3.091	0.843
2001.9	53.977	67.182	97.770	63.670	48.712	27.344	26.360	11.691	2.834	1.128
2002.9	105.561	42.394	72.913	75.893	41.055	26.800	26.982	15.759	7.846	0.989
2003.9	325.025	85.303	49.333	35.469	19.314	12.574	11.135	6.373	1.987	0.857
2005.9	170.458	196.940	131.951	38.038	13.807	13.226	7.264	5.099	4.833	3.319
2006.9	74.278	141.128	138.301	108.766	26.315	9.192	10.458	9.922	5.594	3.616
2007.9	118.060	67.983	128.426	121.169	74.096	24.413	9.052	8.624	2.724	4.867
2008.9	515.631	146.418	117.517	103.649	69.111	28.220	8.278	4.662	2.591	2.692
2009.9	229.210	230.664	78.367	52.175	41.569	21.308	14.411	3.746	3.075	2.354
2010.9	199.835	255.117	135.066	46.686	28.221	36.627	11.657	4.620	3.412	2.958
2011.9	286.533	184.782	145.066	91.254	29.255	16.977	14.320	10.137	3.661	1.222
2012.9	285.869	235.071	112.276	67.188	49.599	19.879	10.906	7.745	4.388	1.539
2013.9	381.866	348.866	158.255	85.324	42.086	20.265	13.427	10.748	6.377	2.342
2015.9	178.805	172.180	130.237	78.668	42.352	22.481	14.980	7.703	3.788	1.440
2016.9	155.534	120.740	87.585	39.925	29.152	15.570	5.413	3.813	0.639	1.034
2017.9	379.334	135.071	84.559	54.318	29.392	18.804	9.776	5.981	1.426	1.514
2018.9	538.171	330.377	107.426	51.822	38.167	21.906	13.284	6.104	1.781	2.077
2019.9	377.950	457.204	163.622	67.608	29.356	19.768	13.457	9.622	3.213	1.997
2020.9	311.800	296.097	186.767	53.001	27.881	17.527	17.189	12.863	7.737	1.446

Table 27. Indices of numbers at age of American Plaice from Canadian spring RV survey (1985-2019; no 2006, 2015, 2017, or 2020) used in the VPA.

Spring	5	6	7	8	9	10	11	12	13	14
1985.5	263.811	454.551	595.652	389.798	208.007	140.238	84.297	45.199	22.716	13.977
1986.5	256.002	561.361	577.156	307.058	193.651	98.117	45.955	34.378	21.735	8.903
1987.5	460.214	747.454	656.206	398.314	184.639	101.101	41.829	33.798	19.928	11.136
1988.5	368.612	616.621	543.875	314.972	217.849	85.292	48.628	32.575	18.745	11.969
1989.5	336.143	551.765	470.169	273.725	187.637	74.679	39.843	27.071	16.825	9.650
1990.5	618.749	377.901	371.001	200.264	130.479	77.524	32.385	21.463	14.428	8.809
1991.5	398.190	364.155	180.205	112.916	67.544	35.190	22.260	13.356	7.224	5.529
1992.5	110.276	190.141	150.915	63.403	34.120	17.503	9.447	5.402	3.343	1.767
1993.5	138.054	180.137	160.064	89.449	32.226	16.510	7.626	4.264	1.783	1.325
1994.5	99.220	106.040	85.372	43.270	19.992	5.397	3.952	1.396	1.241	0.996
1995.5	41.914	57.524	59.883	49.937	27.484	8.339	2.664	0.539	0.093	0.035
1996.5	133.678	130.513	97.122	39.511	16.189	4.502	1.942	2.233	0.518	0.250
1997.5	65.278	84.402	79.311	48.718	18.944	6.047	2.678	1.819	0.562	0.174
1998.5	69.797	69.196	76.743	79.391	47.909	19.560	9.928	3.281	1.624	0.445
1999.5	66.741	104.510	104.869	111.518	107.309	65.322	30.521	13.021	6.508	1.894
2000.5	34.977	67.015	78.009	64.565	59.164	47.188	27.929	9.536	4.042	0.900
2001.5	28.853	36.351	73.856	62.438	58.427	45.042	34.569	16.018	5.541	2.771
2002.5	56.503	41.334	51.938	53.824	38.253	24.420	20.028	12.561	4.006	2.010
2003.5	188.242	72.503	46.058	49.745	39.965	18.074	13.764	11.463	4.506	2.168
2004.5	96.532	161.935	51.282	29.336	19.920	15.555	9.207	8.200	4.490	2.707
2005.5	149.659	163.831	143.874	55.103	31.863	16.505	13.679	8.236	6.219	4.662
2007.5	193.863	89.640	144.469	115.486	82.606	16.796	10.938	5.057	4.373	3.821
2008.5	238.975	116.455	91.953	117.024	70.142	42.584	14.799	7.295	3.804	3.320
2009.5	72.302	130.149	44.734	34.017	36.716	24.987	16.124	6.078	1.739	1.933
2010.5	85.360	146.905	138.156	40.600	28.066	18.356	12.121	8.913	3.263	1.226
2011.5	189.294	116.466	97.005	66.677	20.587	13.165	10.890	10.524	3.073	0.965
2012.5	159.077	173.322	114.512	71.450	46.929	22.829	12.022	7.077	4.479	2.055
2013.5	219.654	187.014	182.652	98.236	53.393	33.133	17.571	12.086	5.101	3.142
2014.5	175.924	196.794	140.458	121.475	67.114	37.581	27.119	12.161	8.025	7.210
2016.5	75.296	46.819	41.934	30.354	16.447	12.028	6.151	3.729	1.973	1.496
2018.5	148.476	100.843	65.952	45.168	20.747	20.710	10.665	5.724	2.042	0.702
2019.5	99.096	148.673	106.172	28.770	13.920	10.586	6.313	3.659	3.037	0.770

Table 28. Indices of numbers at age (mean # per tow) of American Plaice from the the EU-Spain Div. 3NO survey (1998-2019, no 2020) used in the VPA.

Spain	5	6	7	8	9	10	11	12	13	14
1998.5	8.58	14.25	29.99	48.49	33.83	13.68	5.39	1.97	0.95	1.03
1999.5	12.89	37.92	32.15	42.53	60.52	50.12	20.46	9.19	5.00	1.87
2000.5	11.00	19.64	49.71	39.49	51.90	46.98	29.09	13.56	6.38	0.97
2001.5	4.81	11.44	30.59	28.50	27.17	20.44	21.20	8.26	2.27	0.96
2002.5	38.40	11.40	10.04	18.84	14.28	8.86	10.67	7.45	1.84	1.03
2003.5	235.17	56.43	22.53	16.91	19.43	8.11	8.50	10.41	3.88	1.73
2004.5	76.80	204.71	47.14	12.83	11.17	11.95	6.44	7.90	4.39	3.80
2005.5	40.63	91.46	121.13	42.37	17.82	6.11	4.39	4.29	3.30	2.38
2006.5	105.85	85.84	92.85	78.66	57.88	25.60	11.87	6.46	3.47	2.28
2007.5	97.64	33.62	61.14	45.09	56.80	10.92	3.75	3.07	2.24	2.27
2008.5	282.61	121.99	36.95	75.11	38.91	32.57	8.91	4.69	1.69	2.44
2009.5	50.51	97.16	35.08	19.65	17.17	23.13	20.54	8.02	1.50	1.11
2010.5	43.50	108.88	141.00	29.71	13.66	9.56	9.44	11.11	3.50	1.34
2011.5	116.78	137.16	128.10	82.41	14.83	9.97	8.76	6.36	2.18	0.90
2012.5	71.40	167.96	125.20	84.46	49.52	17.64	6.98	5.10	2.67	1.65
2013.5	132.64	160.50	182.84	64.82	41.94	21.77	8.17	5.23	2.62	1.31
2014.5	9.69	60.94	67.50	74.63	42.27	22.41	14.86	3.64	1.71	1.88
2015.5	13.86	77.09	157.46	39.00	27.75	10.99	6.05	2.10	0.71	0.38
2016.5	6.89	11.26	29.70	22.44	11.25	7.73	3.37	2.01	0.65	0.73
2017.5	6.45	10.19	23.67	16.20	8.63	5.23	2.79	2.06	0.82	0.95
2018.5	16.47	34.44	38.64	22.58	9.21	11.04	5.09	2.08	0.69	0.18
2019.5	4.39	7.96	10.72	3.45	3.21	3.03	1.37	0.72	1.08	0.11

Table 29. ADAPT parameter estimates for Div. 3LNO American plaice using Canadian Div. 3LNO spring and fall surveys and EU-Spain Div. 3NO survey.

Parameter	Estimate	Standard Error	Bias	Rel. Err.	Rel.Bias
N[2021 6]	19166.465	15276.083	6103.27	0.797	0.318
N[2021 7]	8023.242	3216.248	649.34	0.401	0.081
N[2021 8]	8544.806	2628.536	404.31	0.308	0.047
N[2021 9]	4314.091	1259.206	171.85	0.292	0.040
N[2021 10]	1988.122	549.170	65.67	0.276	0.033
N[2021 11]	1345.818	378.765	42.48	0.281	0.032
N[2021 12]	1140.110	330.559	35.52	0.290	0.031
N[2021 13]	1117.730	302.567	30.21	0.271	0.027
N[2021 14]	644.230	183.250	18.25	0.284	0.028
N[2021 15]	985.753	192.270	13.88	0.195	0.014
q ID#[1]	0.016	0.002	1.66E-04	0.150	0.010
q ID#[2]	0.018	0.003	1.82E-04	0.147	0.010
q ID#[3]	0.016	0.002	1.70E-04	0.147	0.010
q ID#[4]	0.014	0.002	1.46E-04	0.147	0.011
q ID#[5]	0.012	0.002	1.25E-04	0.147	0.011
q ID#[6]	0.010	0.001	1.05E-04	0.146	0.011
q ID#[7]	0.009	0.001	1.02E-04	0.146	0.011
q ID#[8]	0.010	0.001	1.08E-04	0.146	0.011
q ID#[9]	0.008	0.001	9.25E-05	0.147	0.011
q ID#[10]	0.010	0.001	1.05E-04	0.147	0.011
q ID#[11]	0.006	0.001	5.28E-05	0.140	0.009
q ID#[12]	0.008	0.001	7.46E-05	0.139	0.009
q ID#[13]	0.010	0.001	8.80E-05	0.139	0.009
q ID#[14]	0.009	0.001	8.27E-05	0.139	0.009
q ID#[15]	0.008	0.001	7.52E-05	0.139	0.009
q ID#[16]	0.006	0.001	6.20E-05	0.139	0.010
q ID#[17]	0.006	0.001	6.13E-05	0.139	0.010
q ID#[18]	0.007	0.001	6.37E-05	0.139	0.010
q ID#[19]	0.006	0.001	5.81E-05	0.139	0.010
q ID#[20]	0.006	0.001	6.00E-05	0.139	0.010
q ID#[21]	0.003	0.001	3.94E-05	0.170	0.013
q ID#[22]	0.005	0.001	7.16E-05	0.169	0.013
q ID#[23]	0.008	0.001	1.02E-04	0.169	0.013
q ID#[24]	0.007	0.001	9.26E-05	0.168	0.014
q ID#[25]	0.007	0.001	9.07E-05	0.168	0.014
q ID#[26]	0.006	0.001	8.50E-05	0.168	0.014
q ID#[27]	0.006	0.001	7.98E-05	0.168	0.014
q ID#[28]	0.006	0.001	8.44E-05	0.168	0.014
q ID#[29]	0.005	0.001	6.57E-05	0.168	0.014
q ID#[30]	0.005	0.001	6.96E-05	0.168	0.014

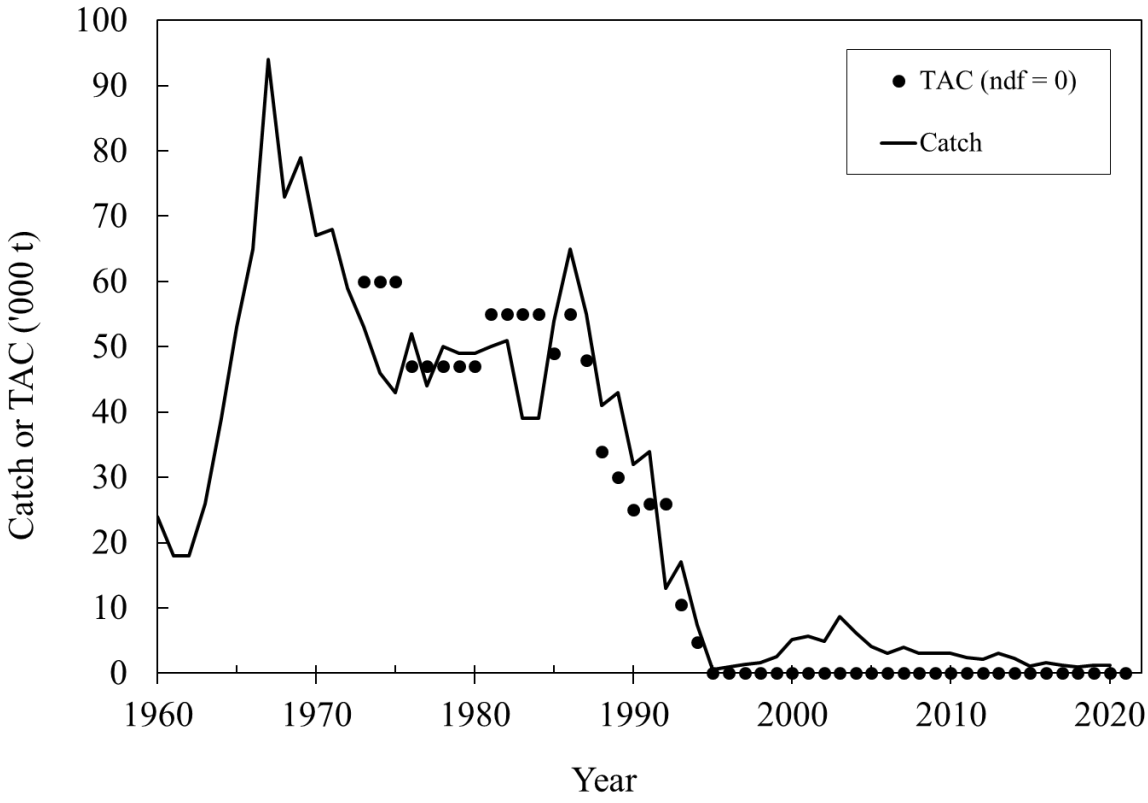

Figure 1. American Plaice catches ('000 t) from 1960-2020 and total allowable catch (TAC) from 1973-2021.

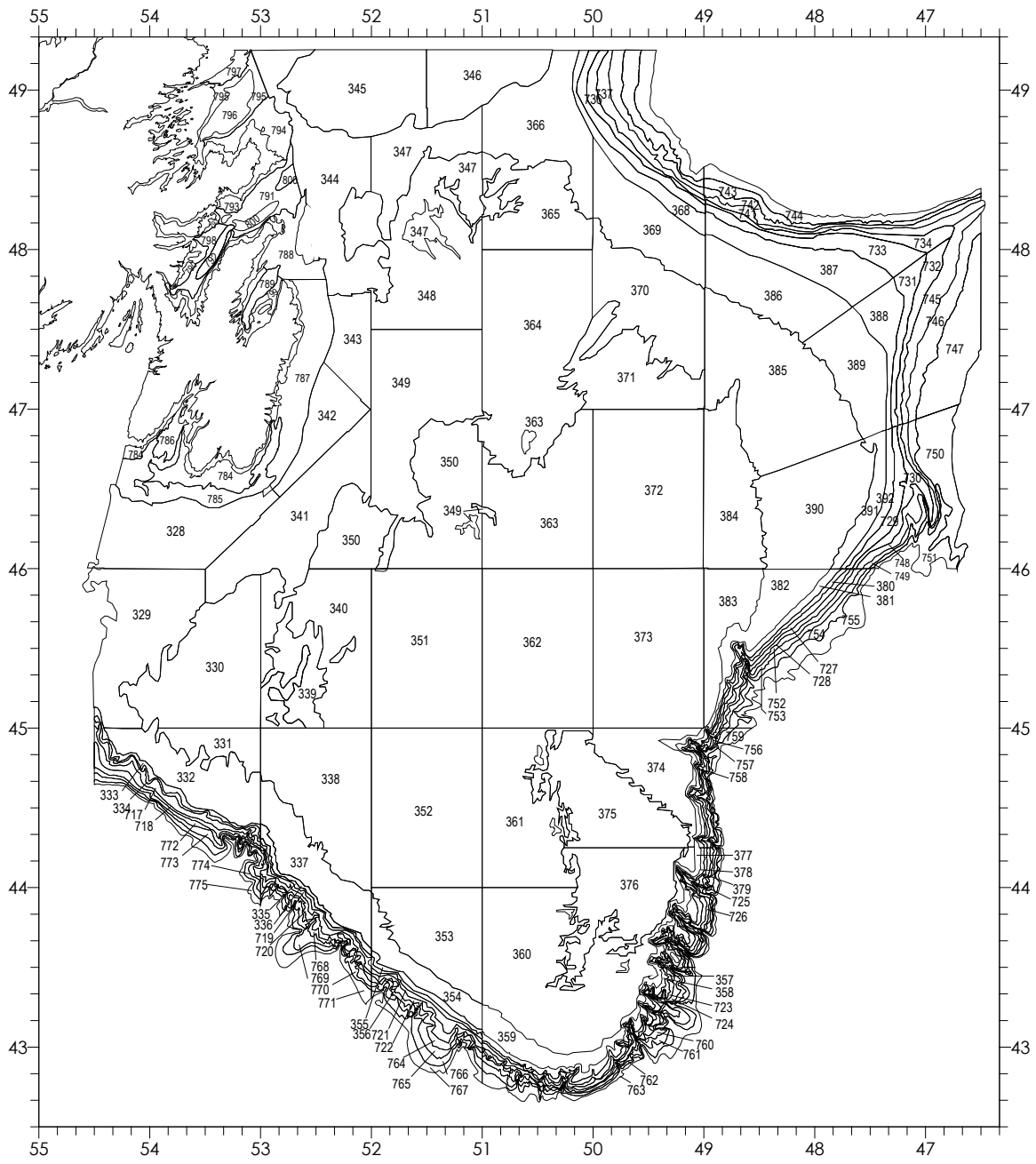

Figure 2. Stratification scheme used in Canadian research vessel surveys of Div. 3LNO.

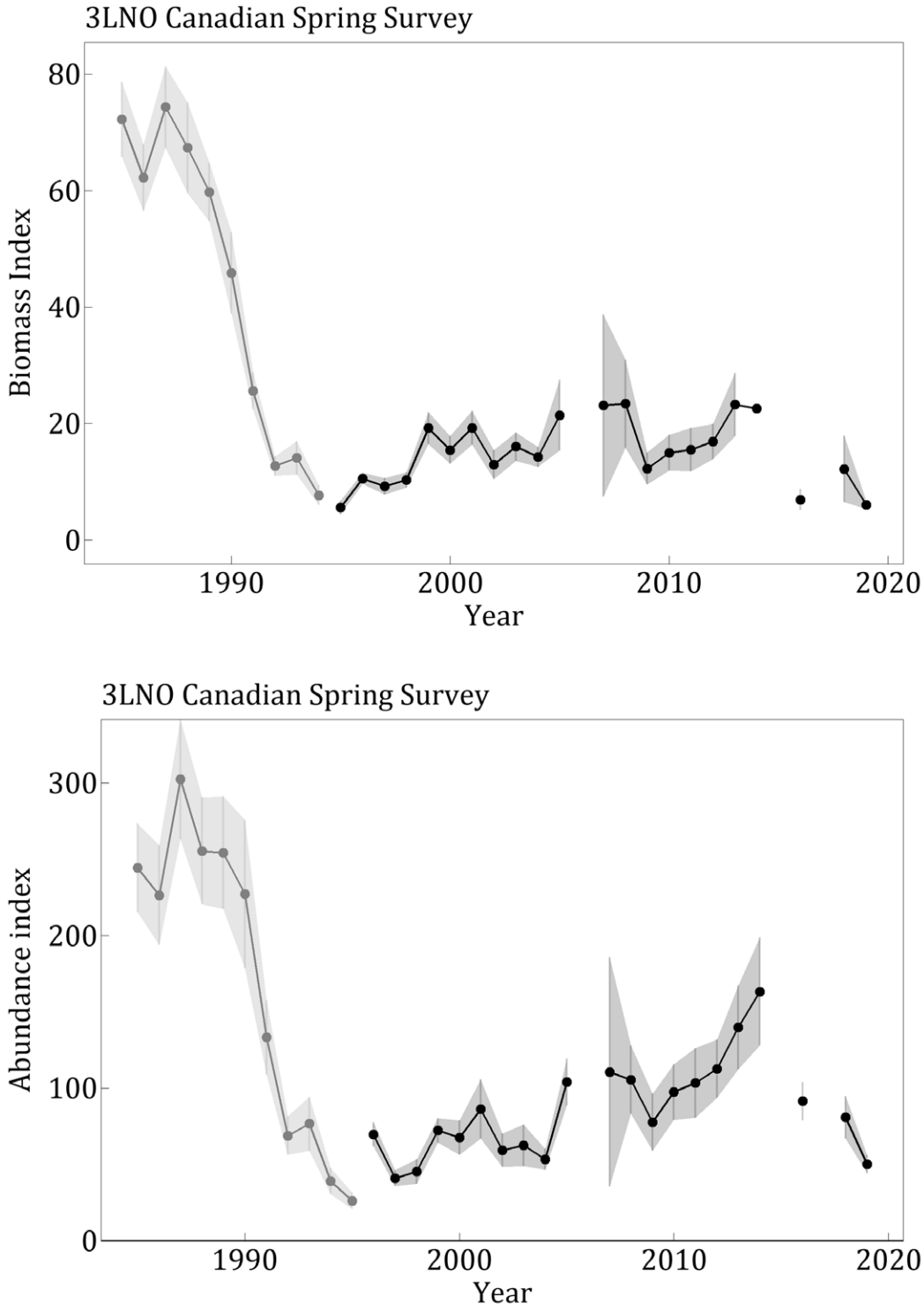

Figure 3. Total biomass (000 t) and abundance (millions) with associated 95% CIs for American Plaice in Divs. 3LNO for spring. Grey points and line are Campelen equivalent units.

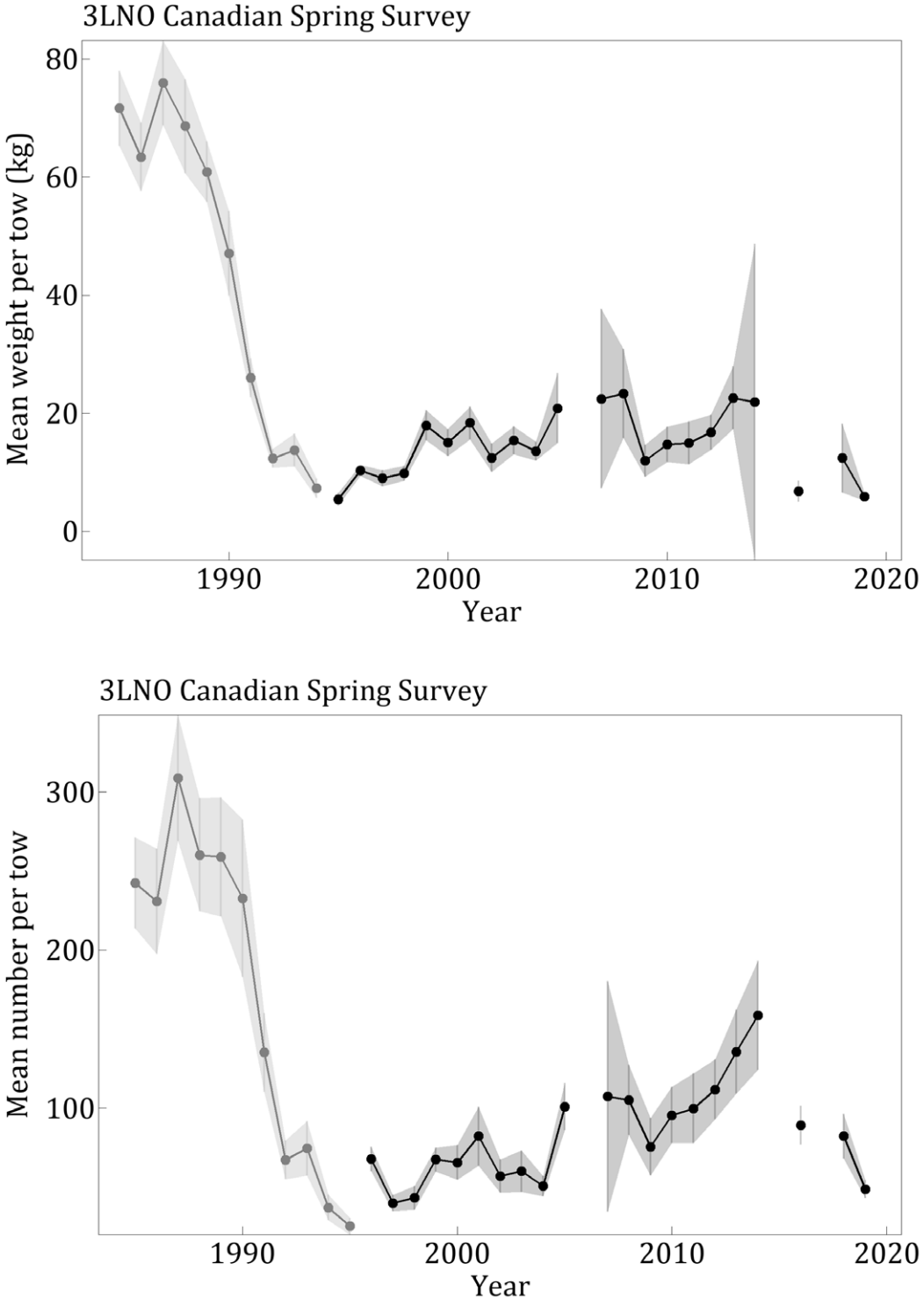

Figure 4. Mean weight (top) and number (bottom) per tow with associated 95% CIs for American Plaice in Divs. 3LNO for spring. Grey points and line are Campelen equivalent units.

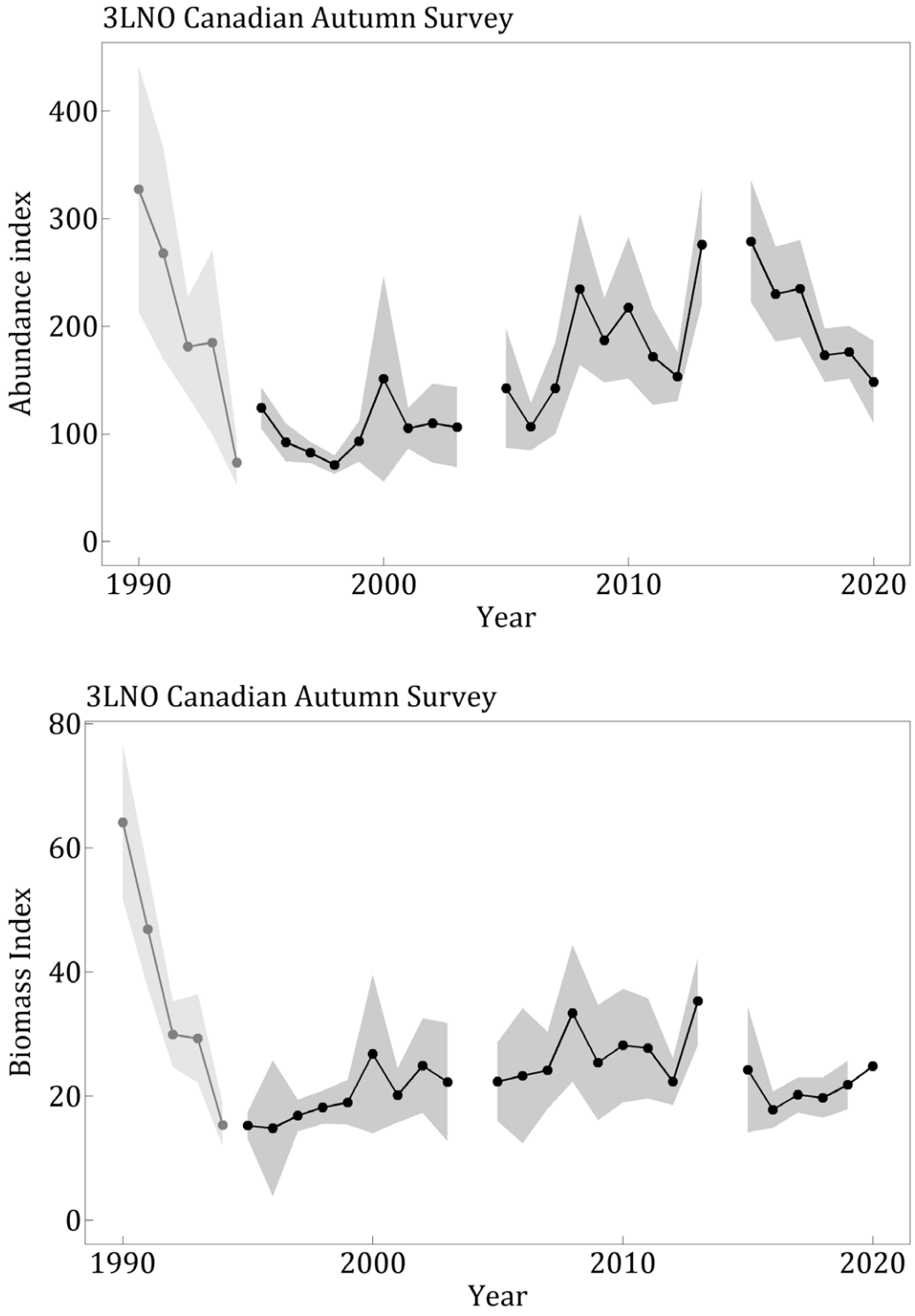

Figure 5. Total biomass (000 t) and abundance (millions) with associated 95% CIs for American Plaice in Divs. 3LNO for autumn. Grey points and line are Campelen equivalent units.

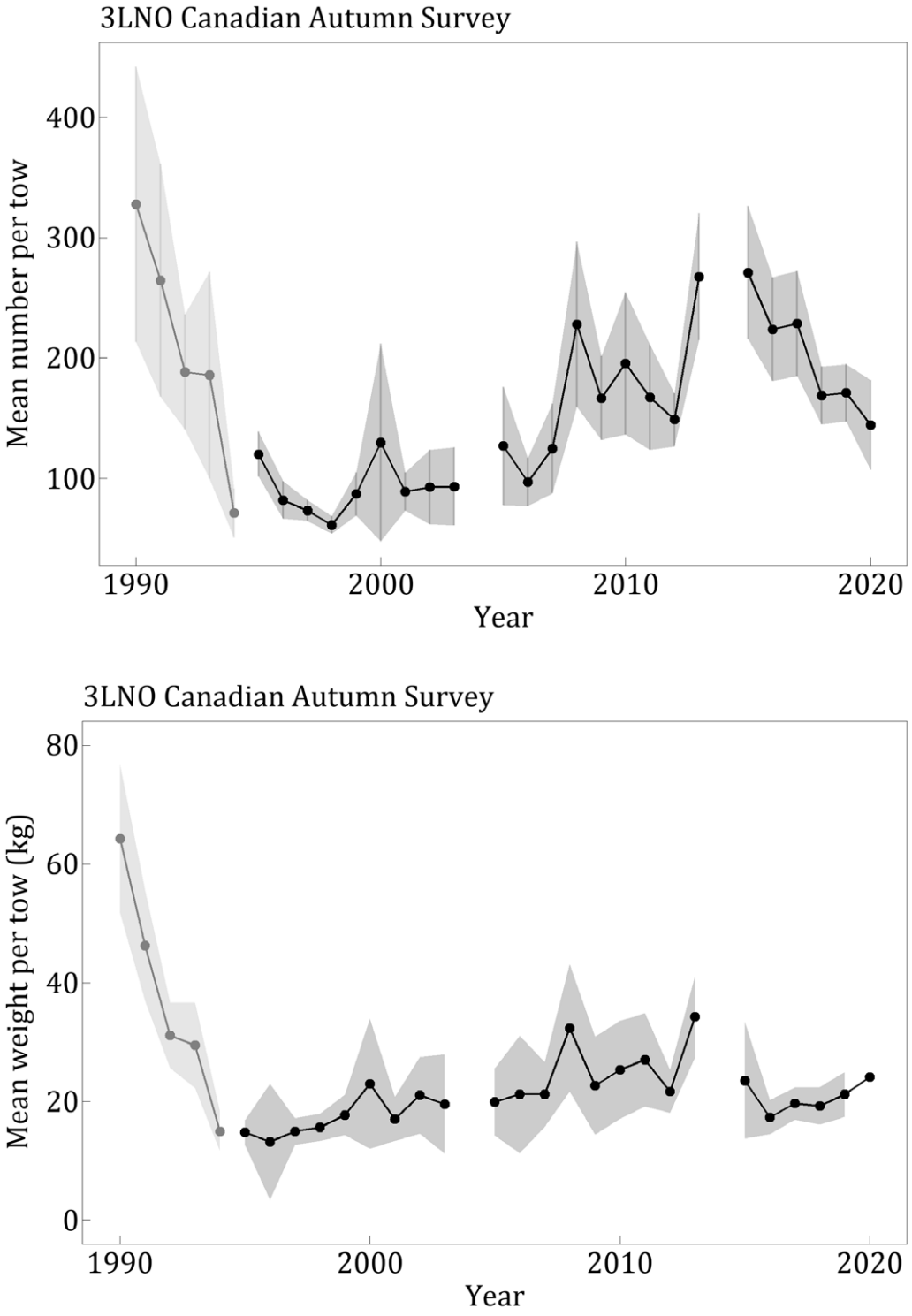

Figure 6. Mean weight (top) and number (bottom) per tow with associated 95% CIs for American Plaice in Divs. 3LNO for autumn. Grey points and line are Campelen equivalent units.

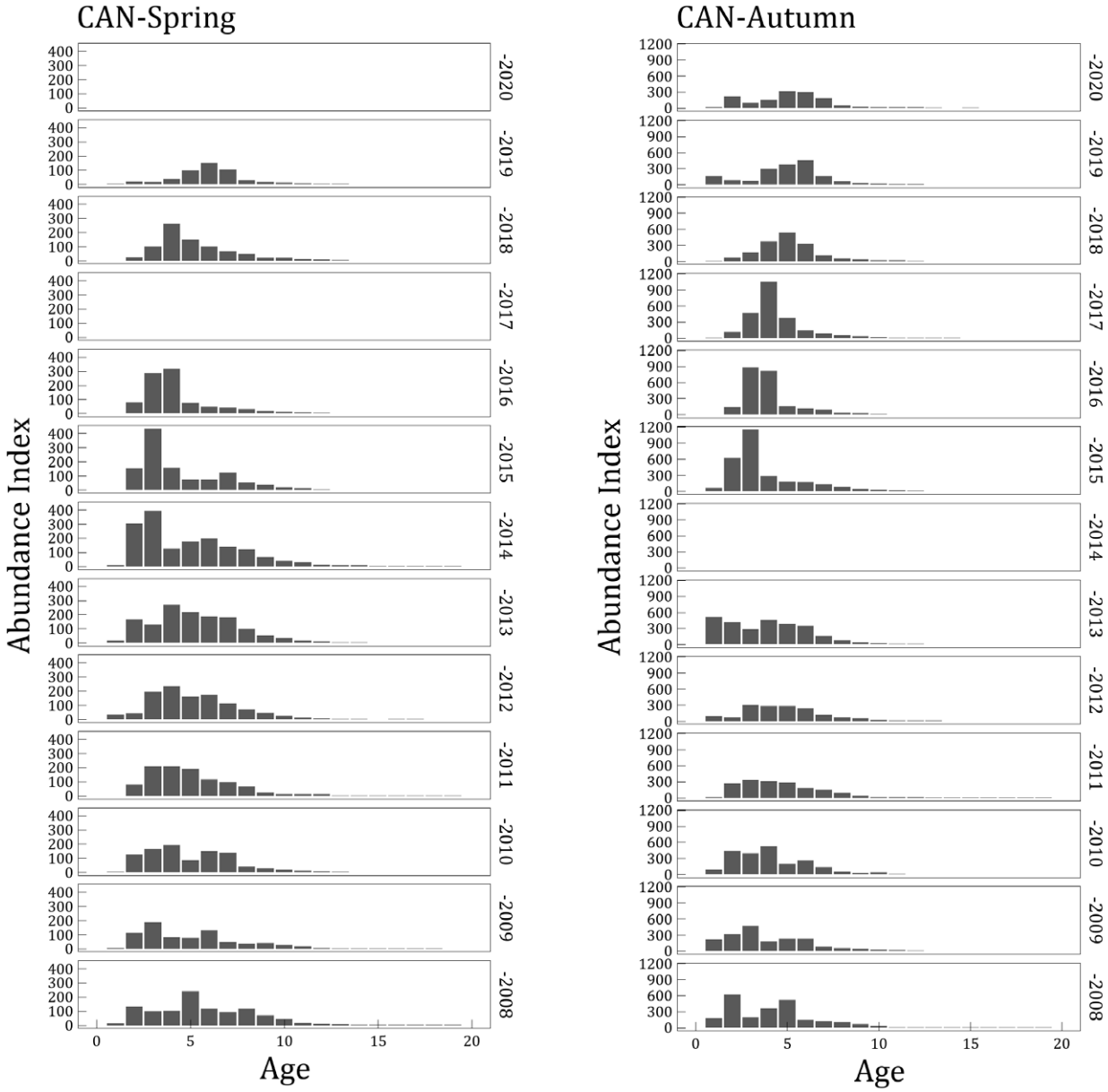

Figure 7. Abundance at age (millions of fish) since 2008 in the Canadian spring (left) and autumn (right) surveys. Survey coverage was poor in 2015, and 2017 spring and 2014 autumn. There was no spring survey in 2020.

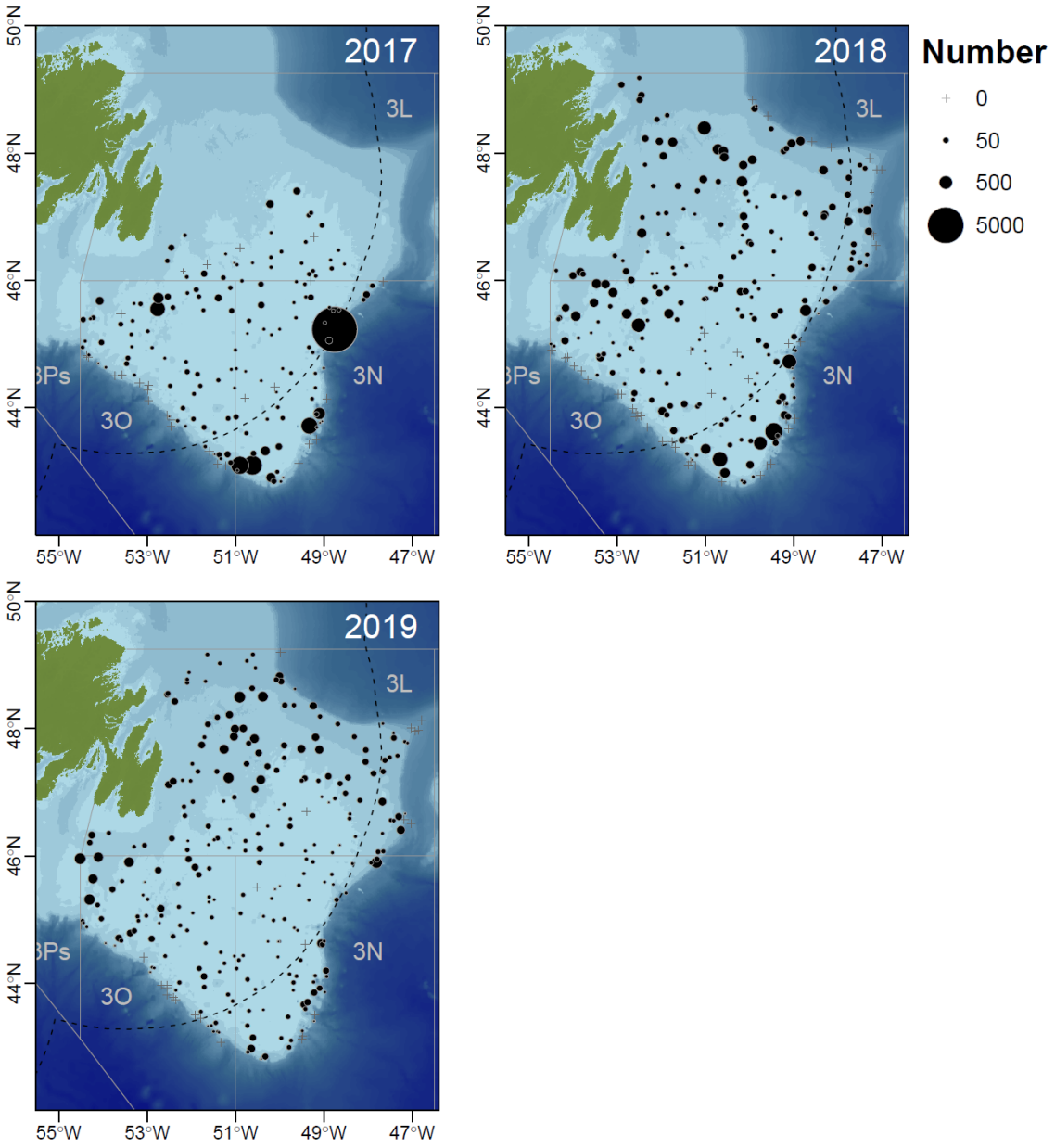

Figure 8. Distribution of American plaice (number per tow) from Canadian spring surveys in NAFO Divs. 3LNO from 2017-2019. There was no survey in 2020.

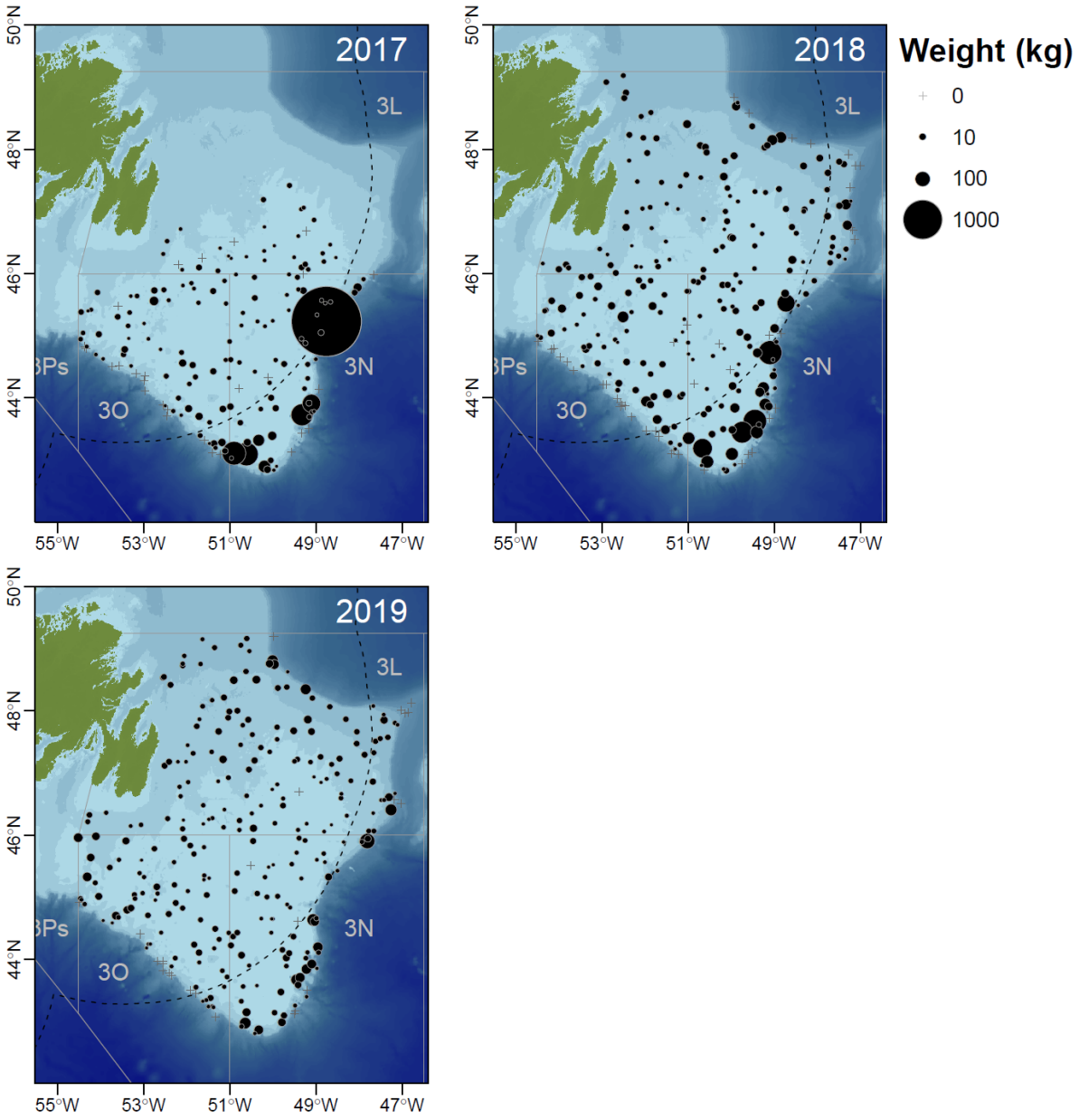

Figure 9. Distribution of American plaice (weight per tow) from Canadian spring surveys in NAFO Divs. 3LNO from 2017-2019. There was no survey in 2020.

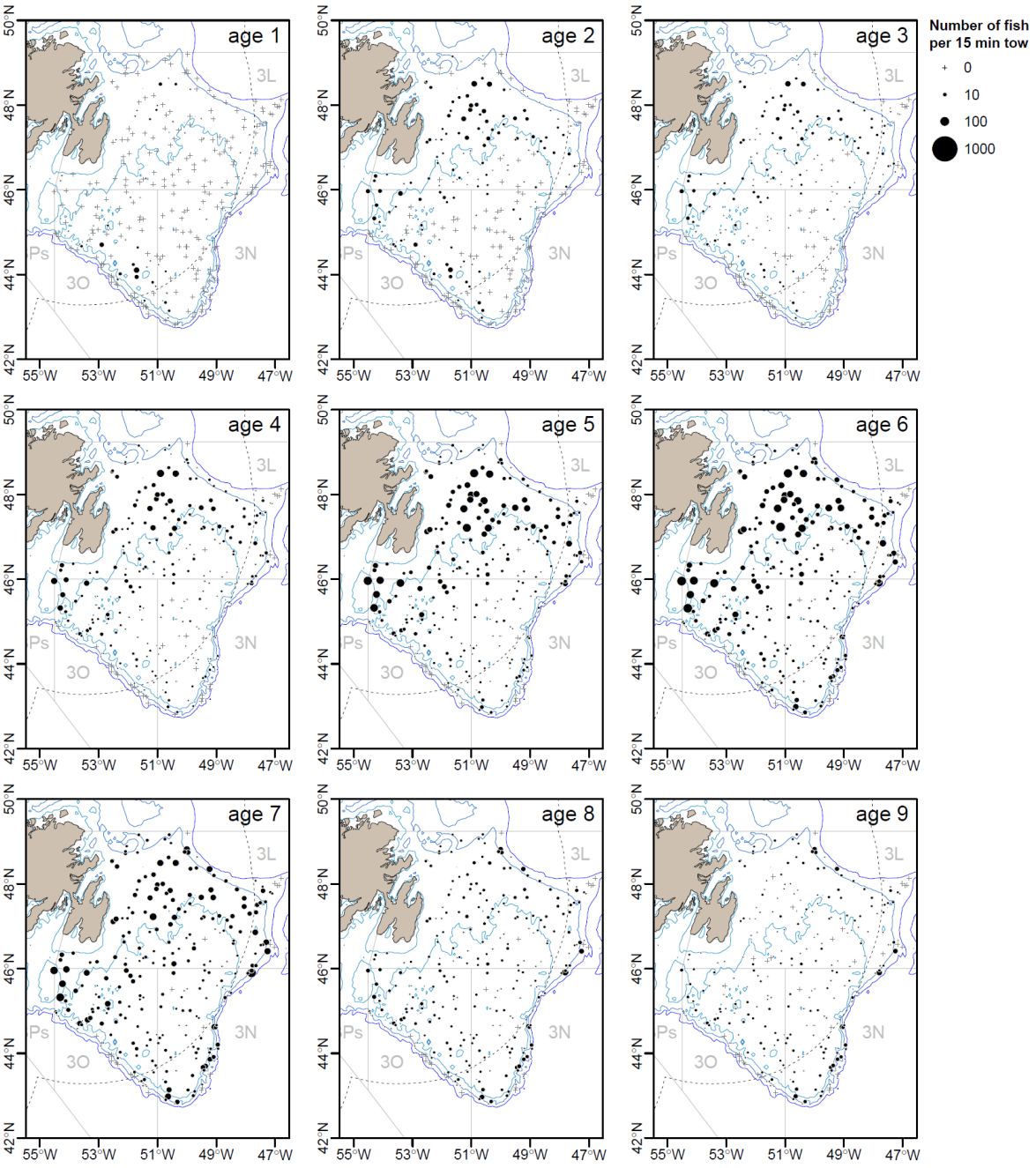

Figure 10. Distribution of American plaice (number per tow) by age from Canadian spring survey of NAFO Divs. 3LNO in 2019.

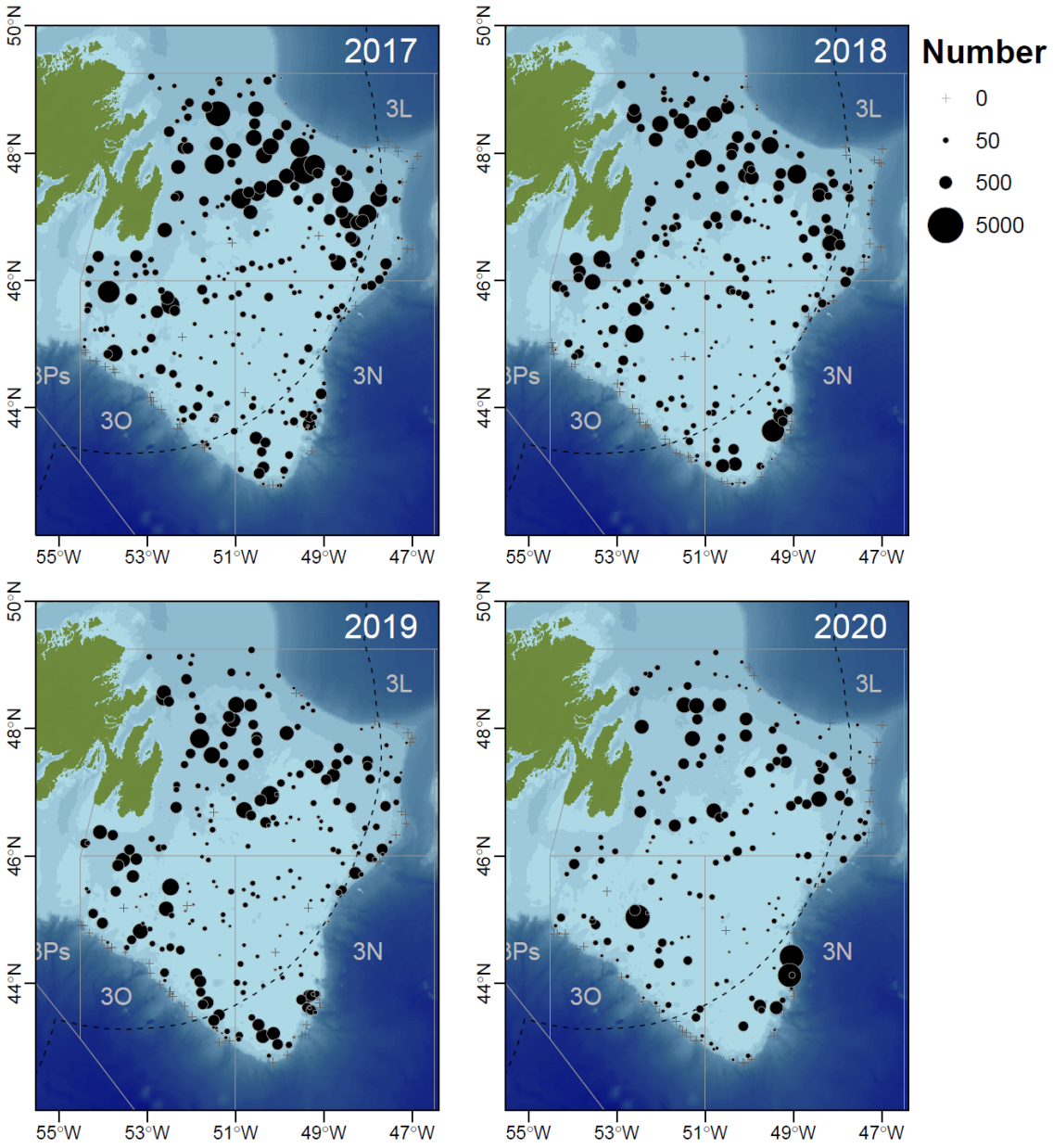

Figure 11. Distribution of American plaice (number per tow) from Canadian autumn surveys in NAFO Divs. 3LNO from 2017-2020.

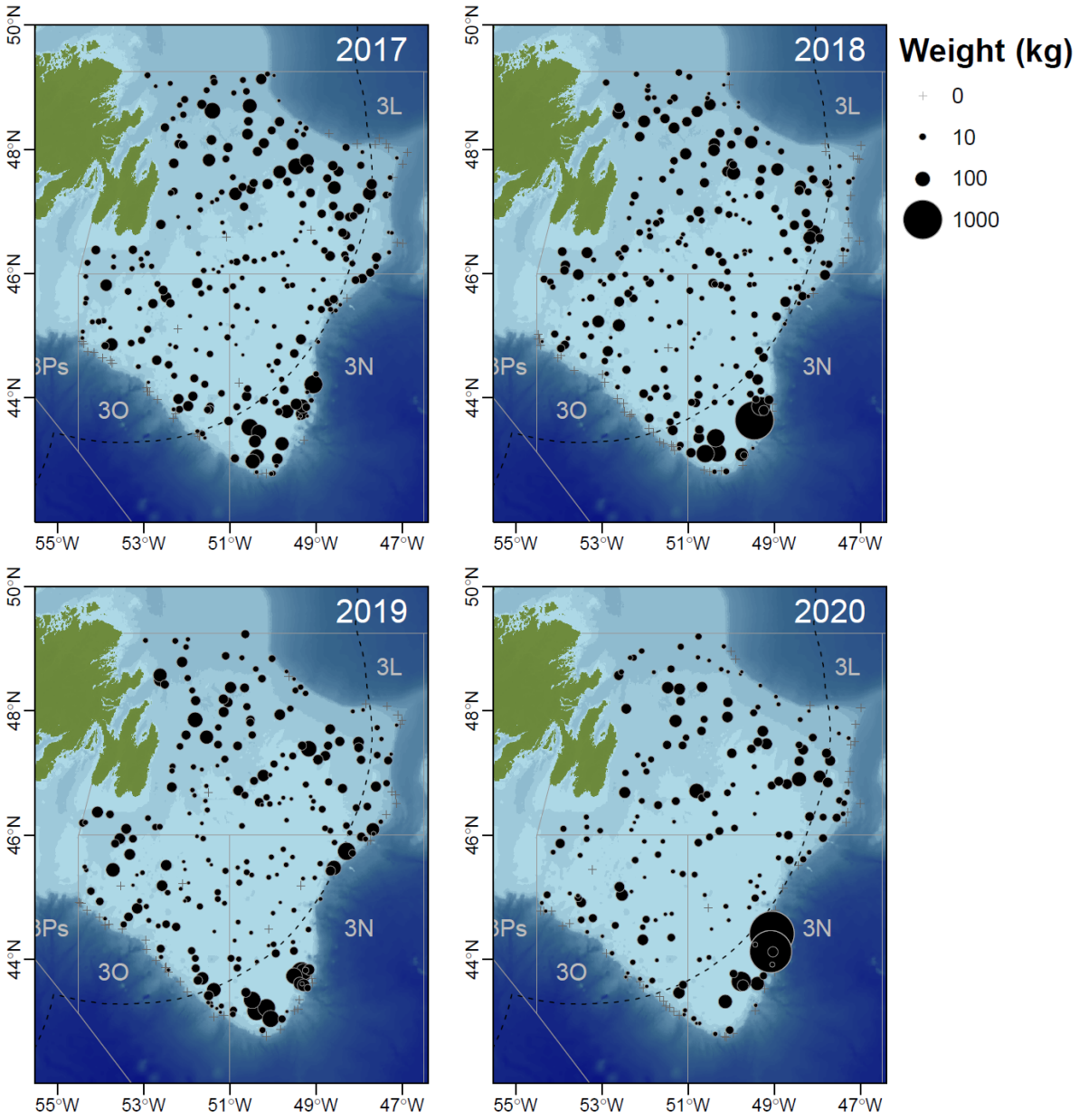

Figure 12. Distribution of American plaice (weight per tow) from Canadian autumn surveys in NAFO Divs. 3LNO from 2017-2020.

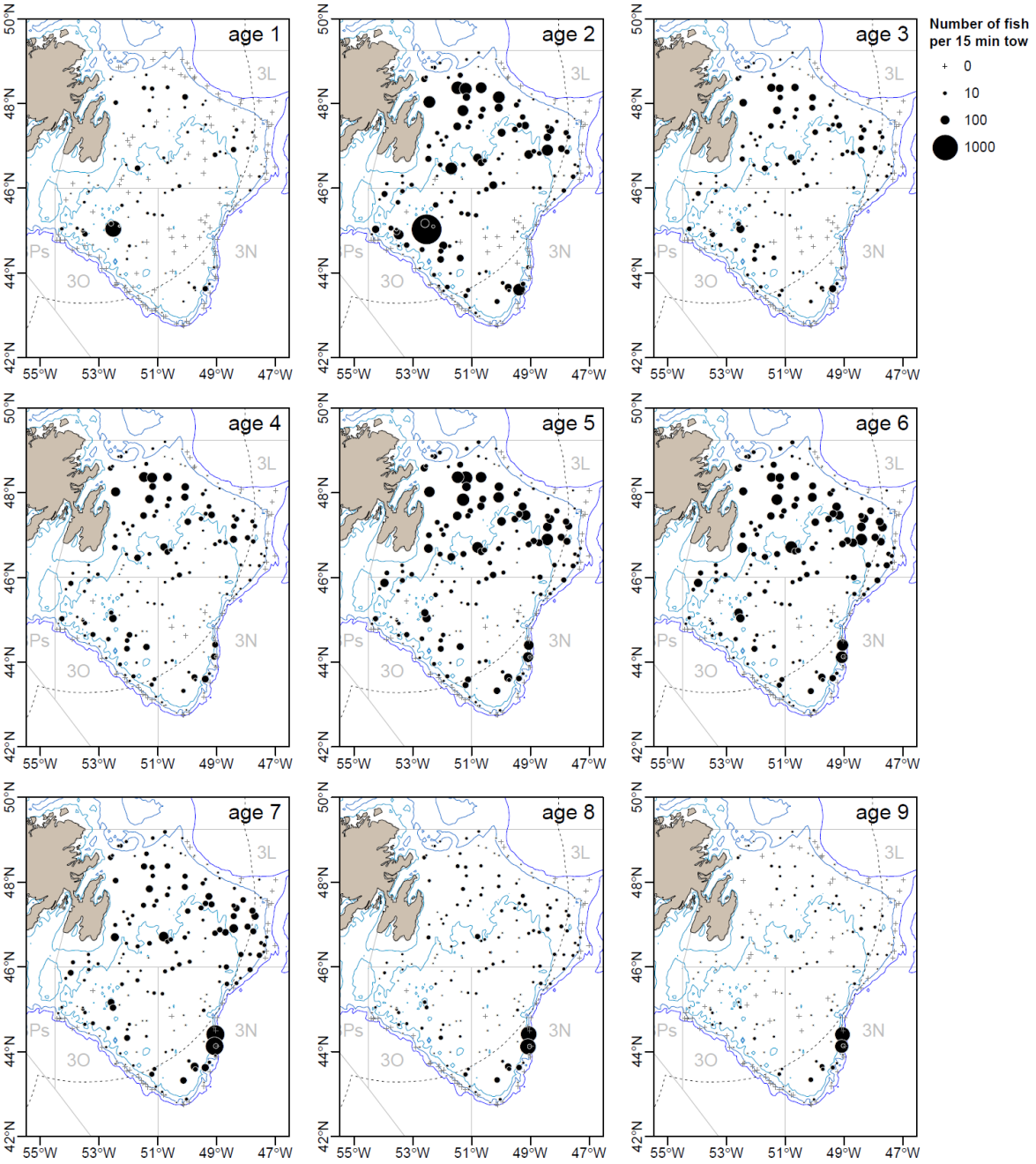

Figure 13. Distribution of American plaice (number per tow) by age from Canadian autumn survey of NAFO Divs. 3LNO in 2020.

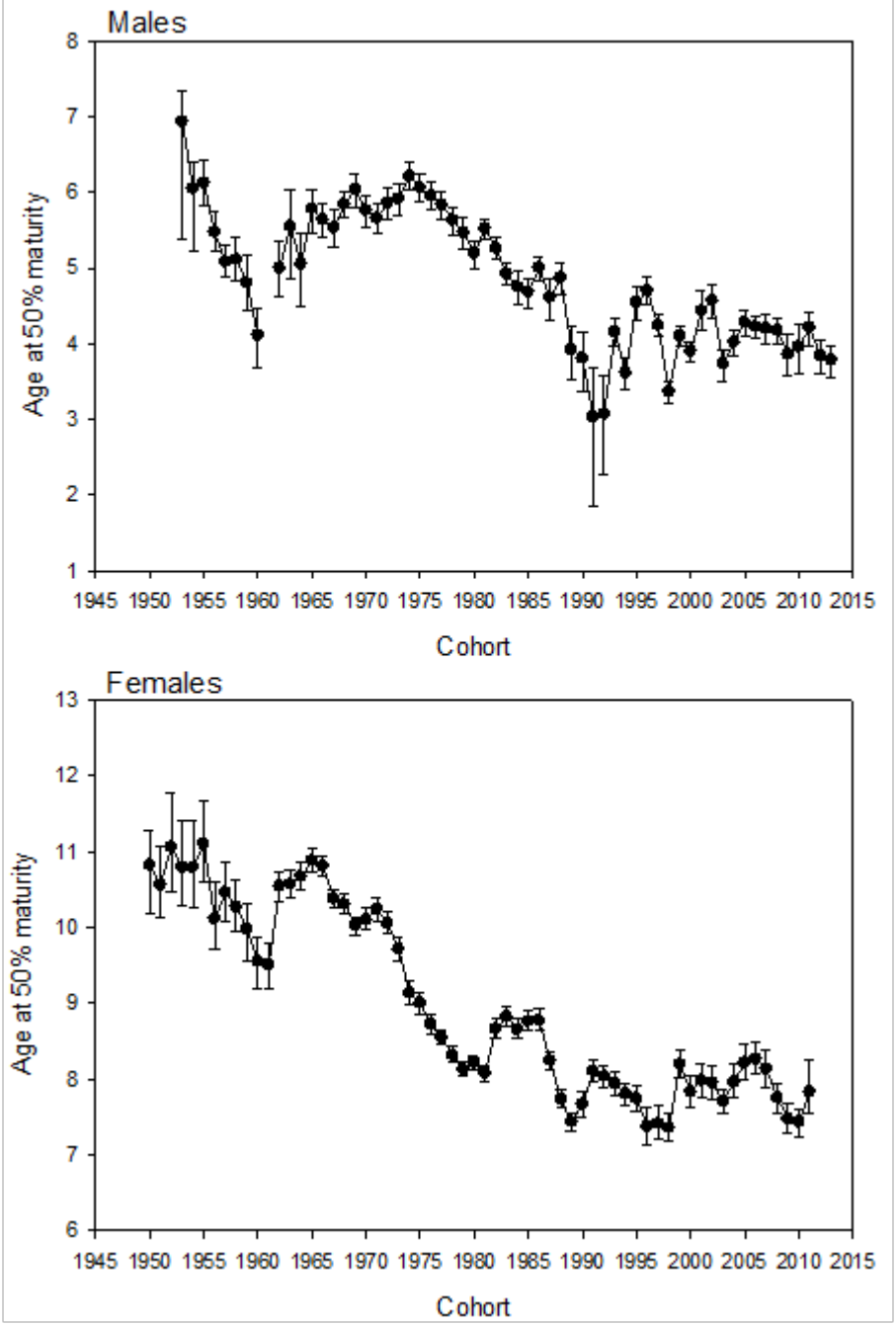

Figure 14. Age at 50% maturity (+ 95% fiducial limits) by cohort for male and female American plaice in NAFO Div. 3LNO.

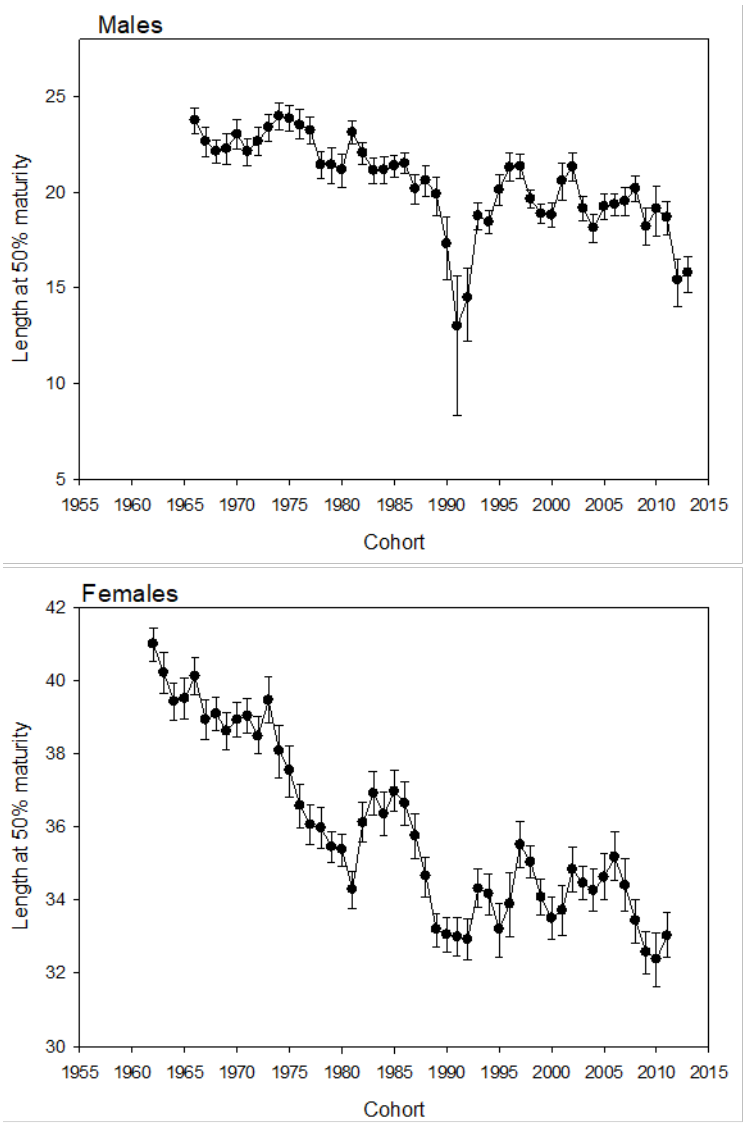

Figure 15. Length at 50% maturity (+ 95% fiducial limits) by cohort for male and female American plaice in NAFO Div. 3LNO.

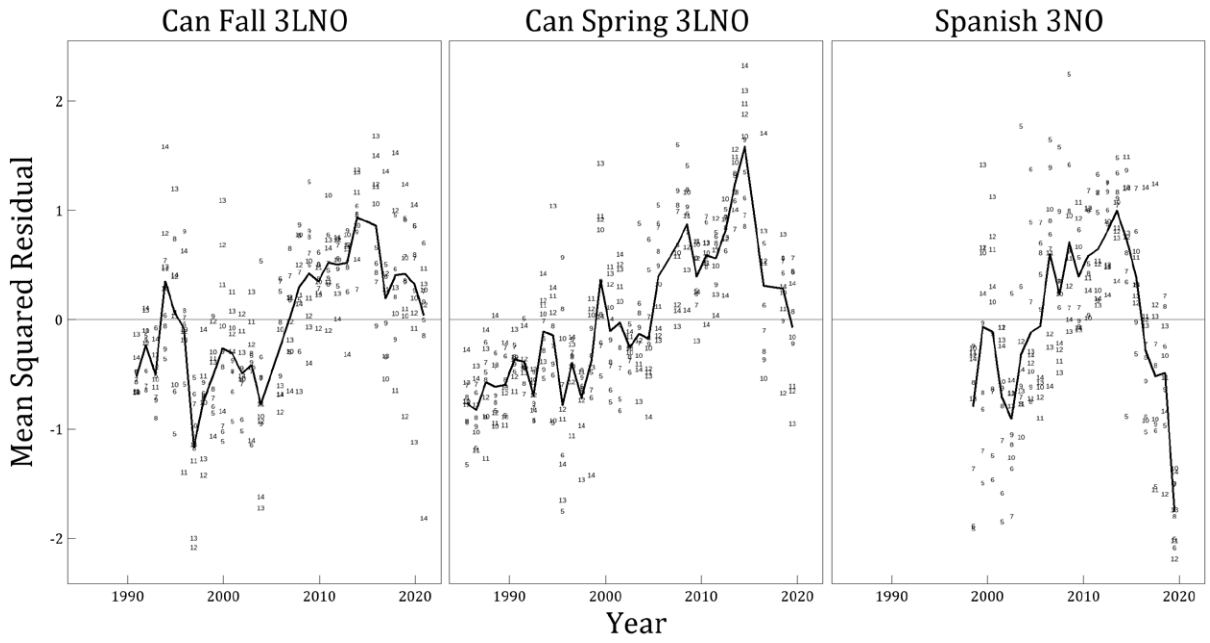

Figure 16. Residuals by year (numbers represent ages) for Canadian autumn survey (left), Canadian spring survey (middle), and EU-Spain Divs. 3NO survey (right).

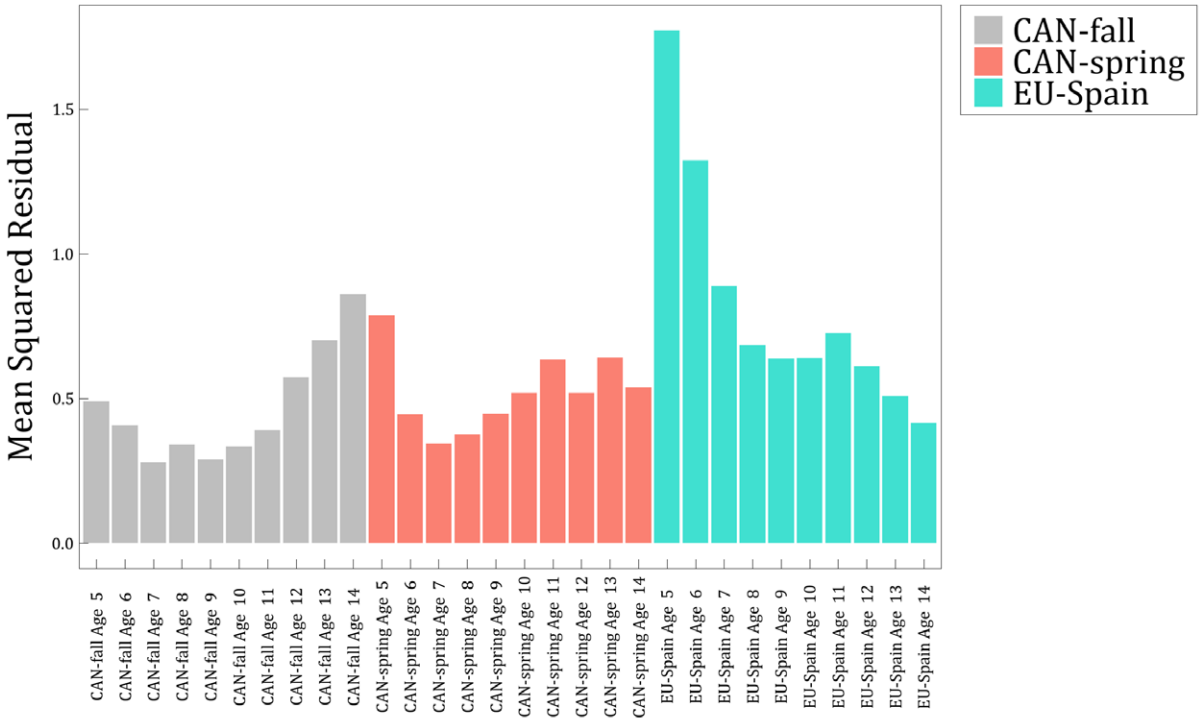

Figure 17. Mean squared residuals by age for fall, spring, and EU-Spain Divs. 3NO surveys (MSE=0.46).

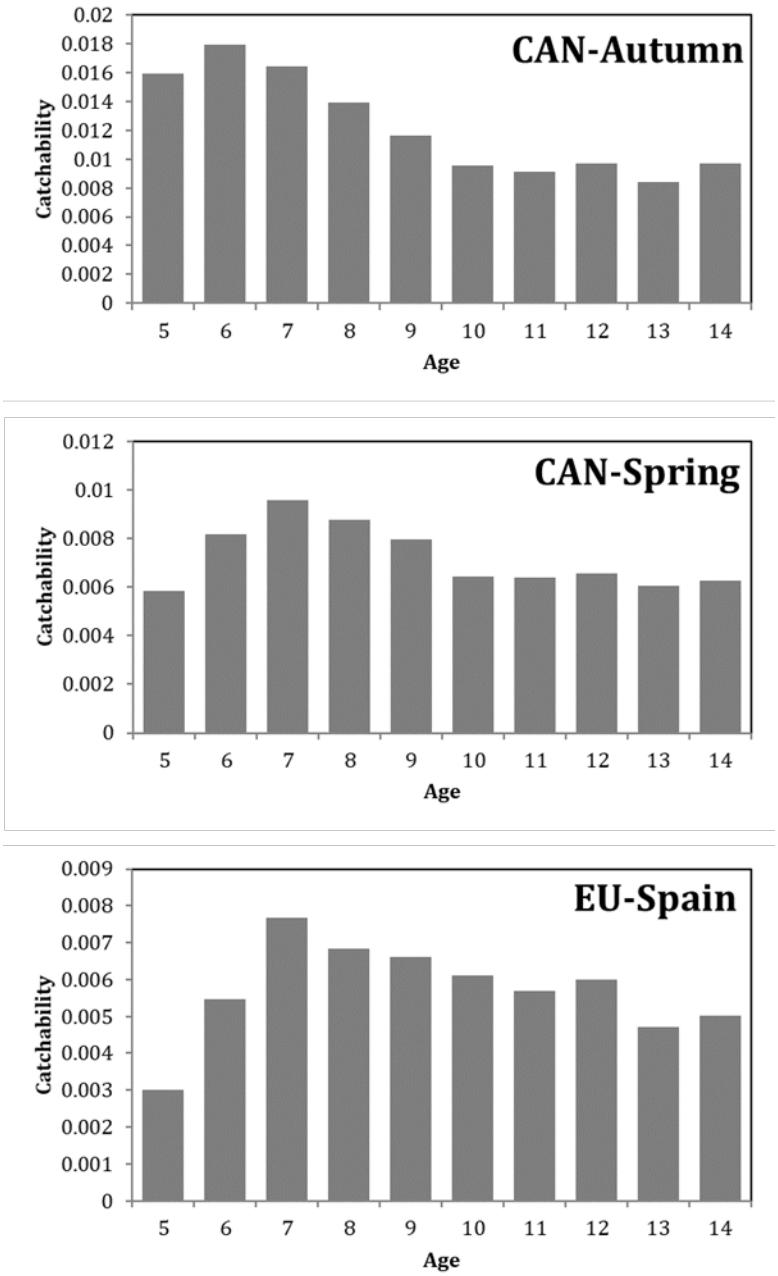

Figure 18. Survey catchabilities (q) for each survey by age.

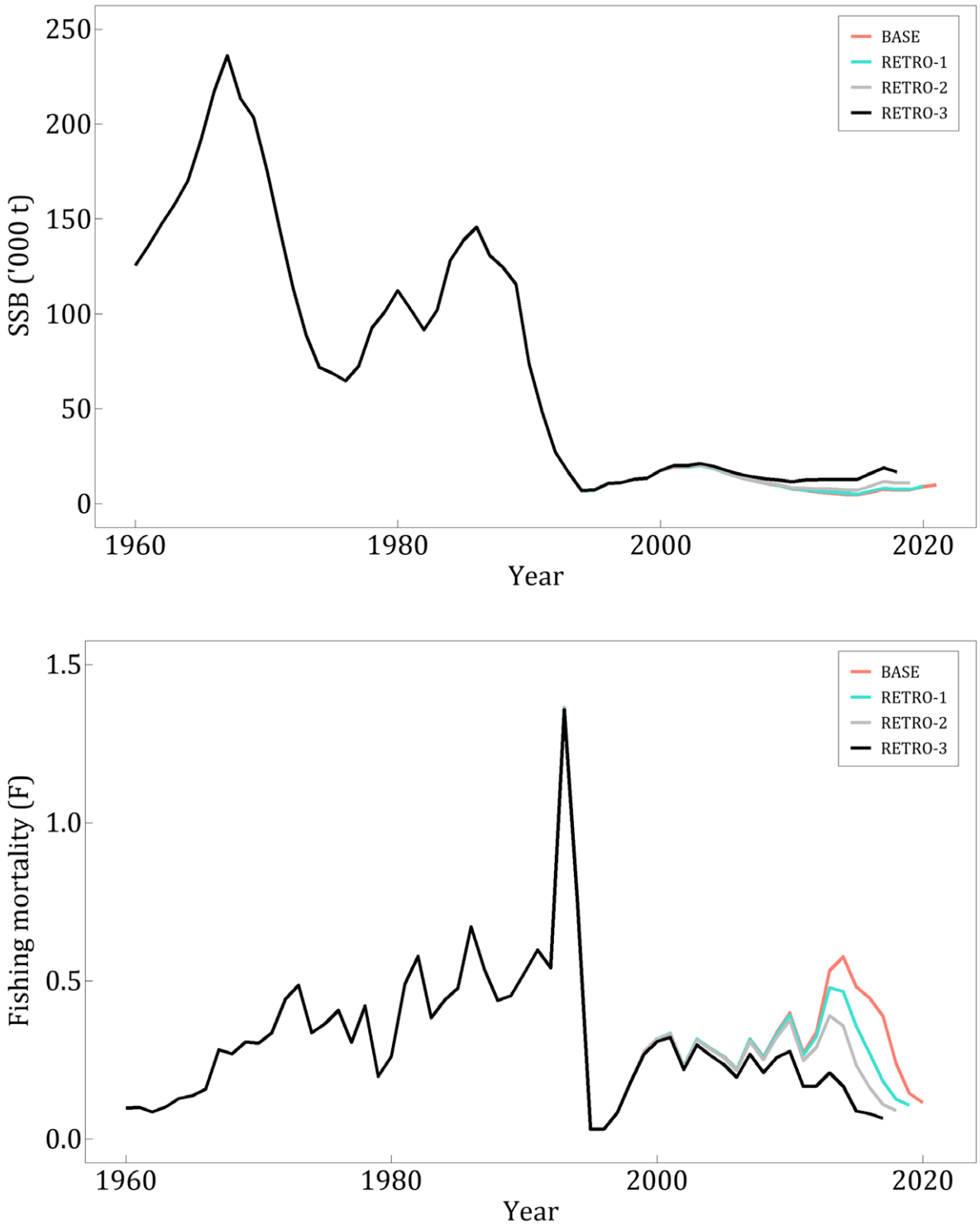

Figure 19. Retrospective analysis of SSB and average F (ages 9-14) in the baserun of ADAPT. Given the large retrospective pattern and poor model fit the magnitude of estimates of SSB and F shown here is not considered to be reliable.

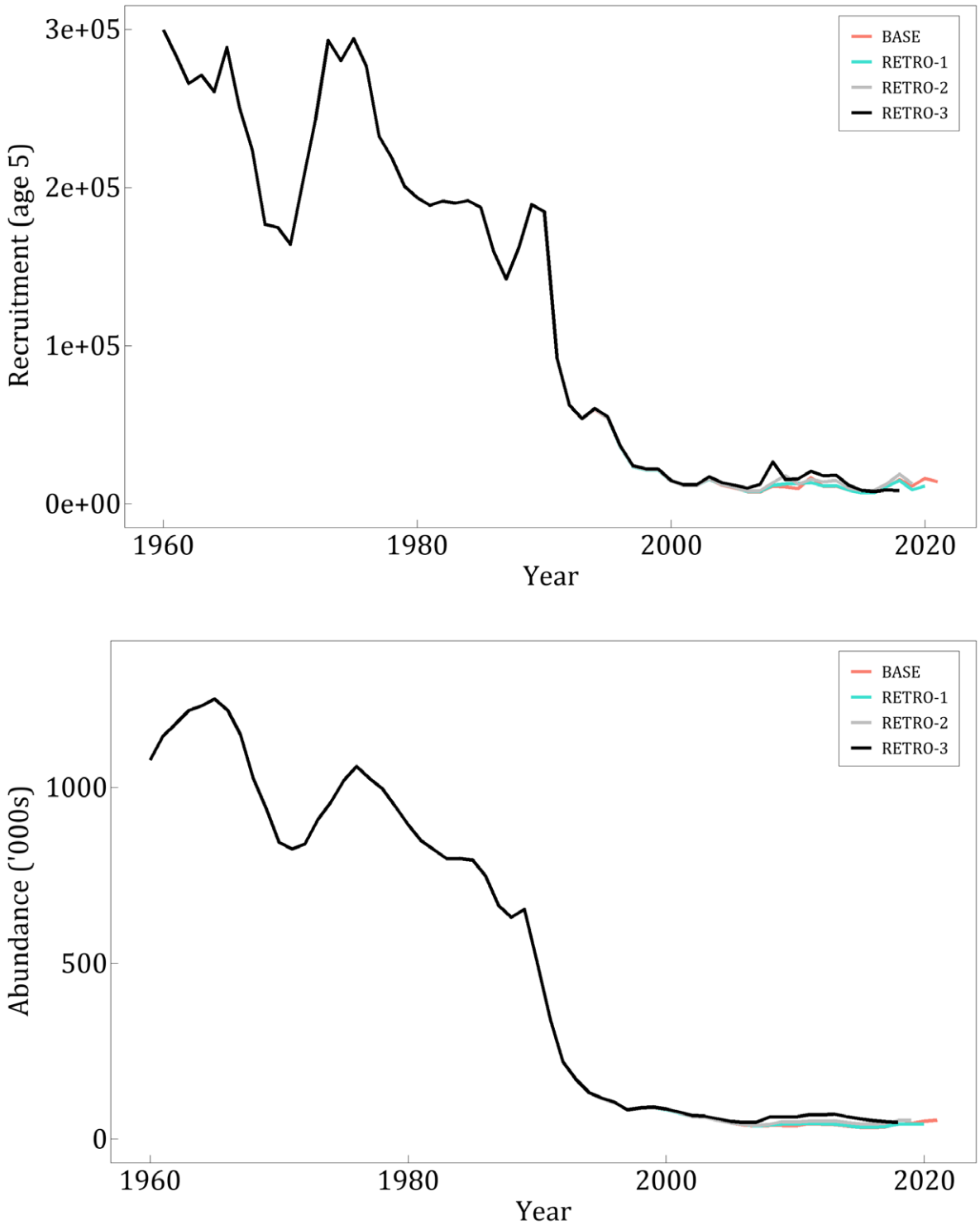

Figure 20. Retrospective analysis of recruitment (abundance of age 5s) and population numbers in the baserun of ADAPT. Given the large retrospective pattern and poor model fit the magnitude of estimates of recruitment and abundance shown here is not considered to be reliable.

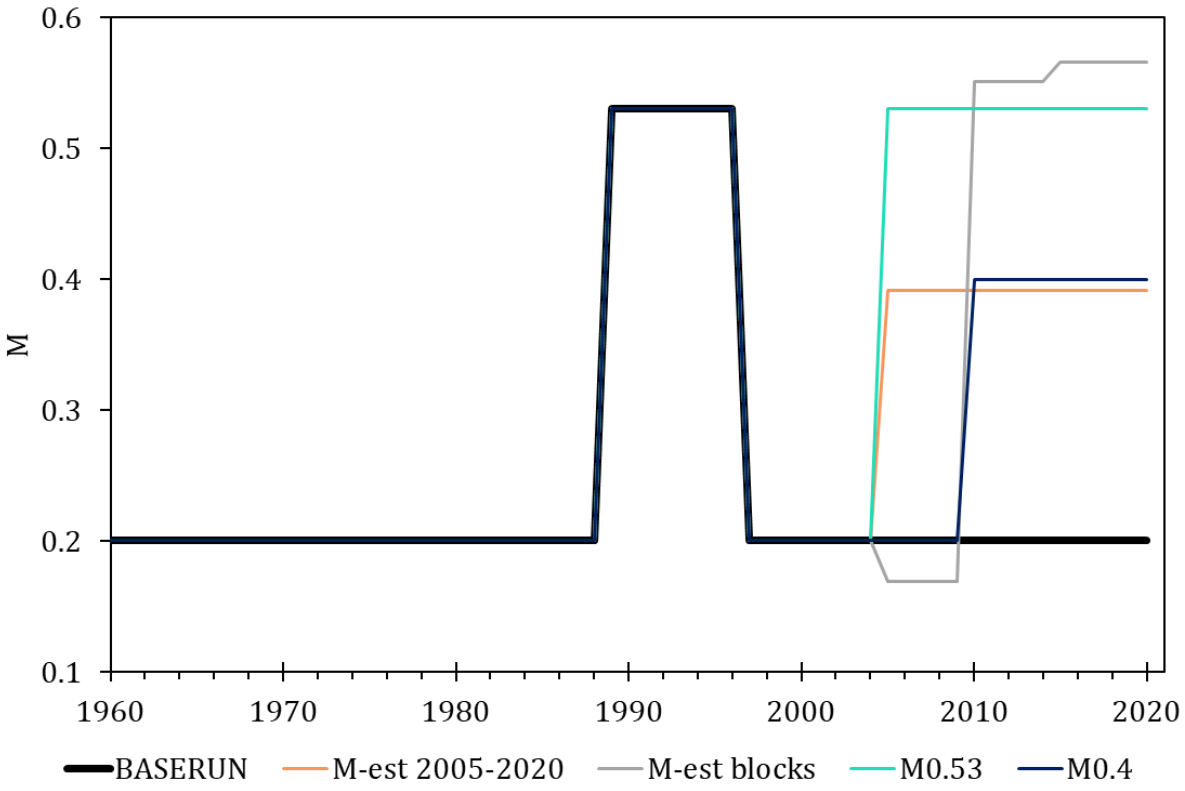

Figure 21. Schematic of different natural mortality (M) assumption scenarios examined in the ADAPT VPA. See Wheeland 2021 for details.

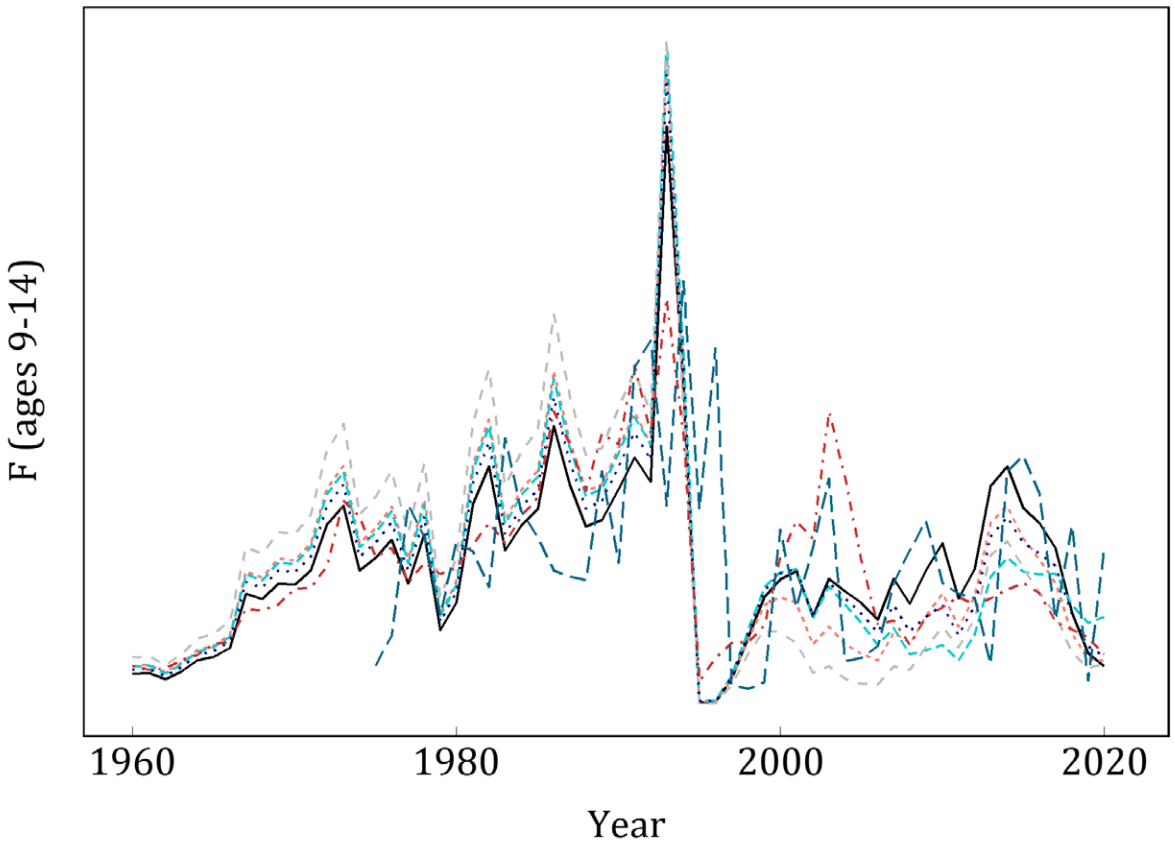

Figure 22. Comparison of fishing mortality (F) estimates from all ADAPT formulations (solid black line = baserun of ADAPT) and alternate models examined (SSM, SSURBA). All series are shown relative to their mean from 1975-2020.

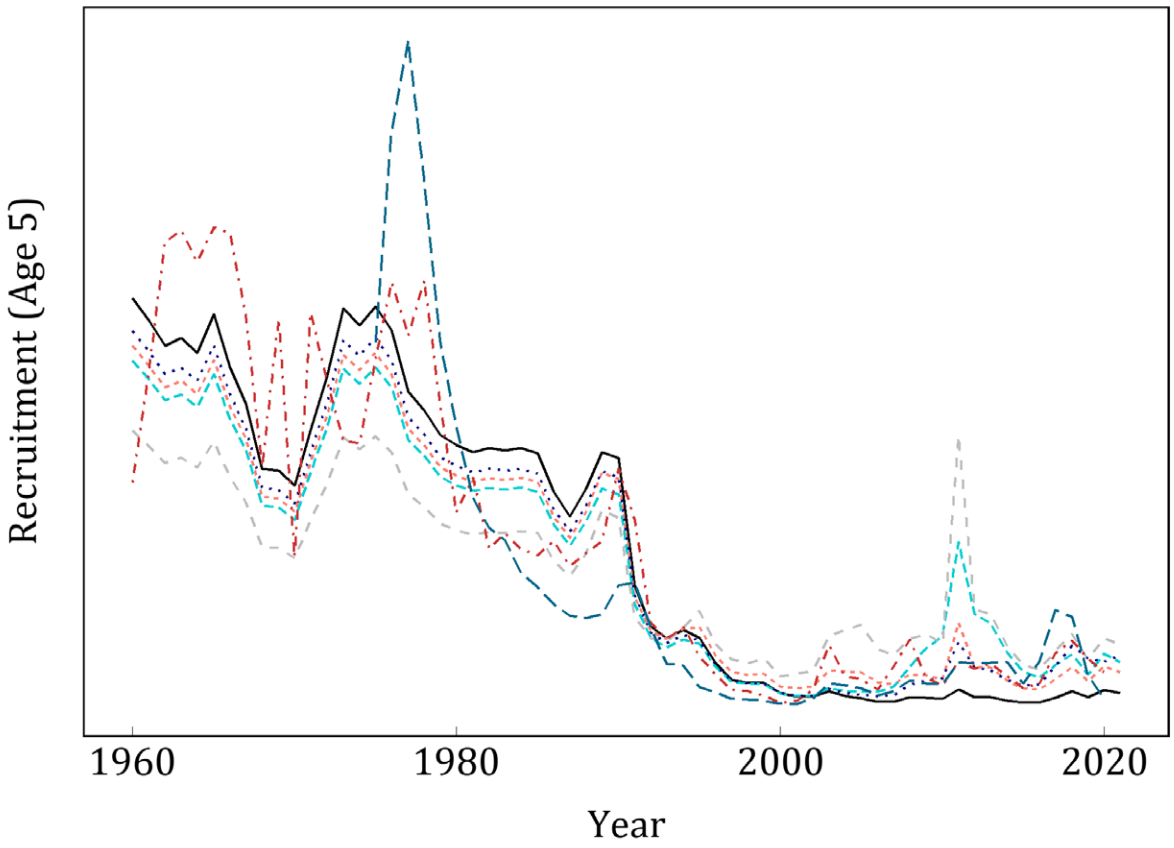

Figure 23. Comparison of recruitment (R) estimates from all ADAPT formulations (solid black line = baserun of ADAPT) and alternate models examined (SSM, SSURBA). All series are shown relative to their mean from 1975-2020.

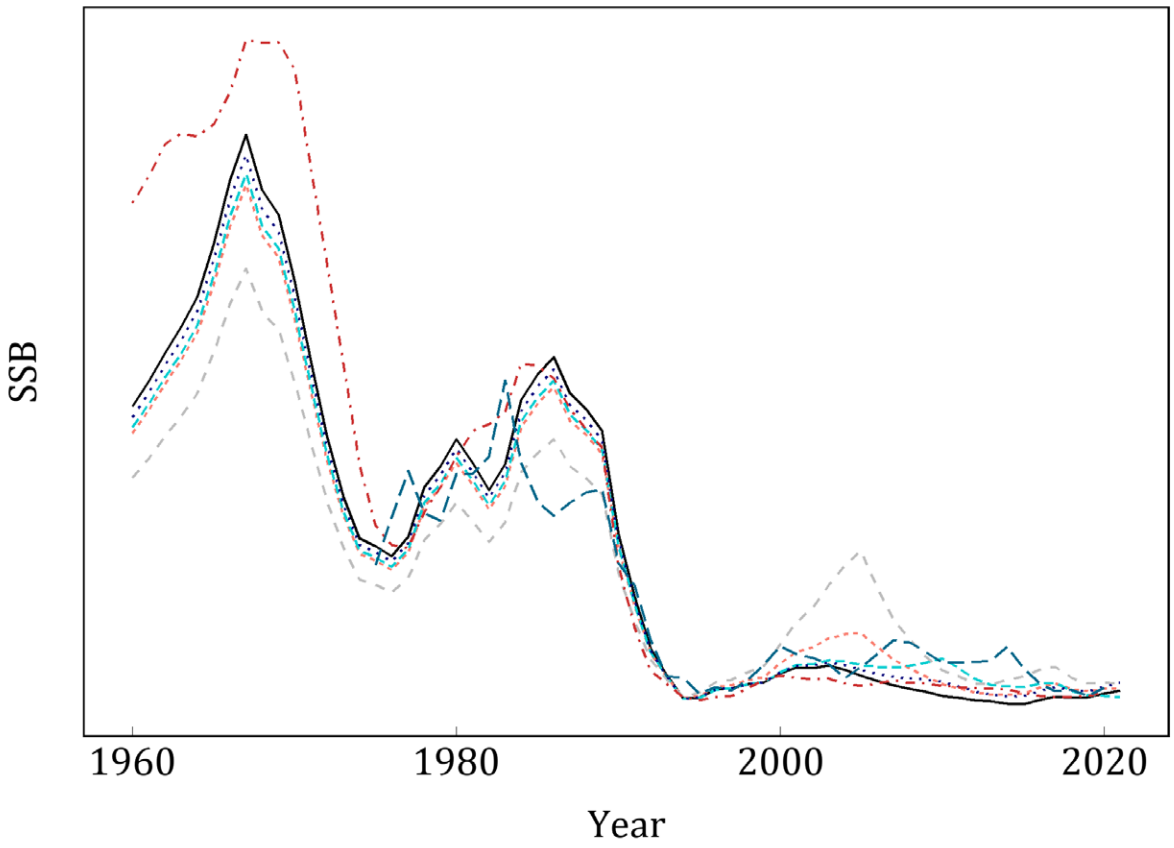

Figure 24. Comparison of spawning stock biomass (SSB) estimates from all ADAPT formulations (solid black line = baserun of ADAPT) and alternate models examined (SSM, SSURBA). All series are shown relative to their mean from 1975-2020.