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

**Canadian Science Advisory Secretariat (CSAS)**

**Research Document 2018/039**

**Québec Region**

# The Status of the Northern Gulf of St. Lawrence (3Pn, 4RS) Cod Stock (*Gadus morhua*) in 2016

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November 2018

Canada

**Foreword**

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

**Published by:**

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

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca


ISSN 1919-5044

**Correct citation for this publication:**

Brassard, C., Gauthier, J., Lussier, J-F., Way, M. and Collier, F. 2018. The status of the Northern Gulf of St. Lawrence (3Pn, 4RS) cod stock (*Gadus morhua*) in 2016. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/039. xi + 116 p.

***Aussi disponible en français :***

*Brassard, C., Gauthier, J., Lussier, J-F., Way, M. et Collier, F. 2018. L'état du stock de morue (Gadus morhua) du nord du golfe du Saint-Laurent (3Pn, 4RS) en 2016. Secr. can. de consult. sci. du MPO. Doc. de rech. 2018/039. xi + 117 p.*

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## ABSTRACT

Assessment of the cod (*Gadus morhua*) stock of the Northern Gulf of St. Lawrence (NAFO 3Pn, 4RS) is based on data from commercial fisheries, a tagging program, an abundance index calculated from the DFO research survey, abundance indices from the fixed gear sentinel fisheries program (longlines and gillnets), an abundance index from the mobile gear sentinel fisheries program and biological data. This document describes the data and methods used to assess several indicators including abundance, biomass, spawning biomass, natural mortality, exploitation rate and recruitment. It also includes a prediction of the stock trends until 2019.

The cod stock of the northern Gulf of St. Lawrence remains in the critical zone and well below the limit reference point. The spatial distribution of this stock is now similar to that observed in the 1990s. The exploitation rate is currently low, while natural mortality is high. An annual harvest of 3,000 t for the next two seasons should allow the spawning stock biomass to increase.

# 1. INTRODUCTION

Due to a marked decline in the population of Atlantic Cod (*Gadus morhua*) in the northern Gulf of St. Lawrence in the late 1980s and early 1990s, the directed cod fishery has had two moratoriums imposed (1994 to 1996 and 2003). Since it first reopened in 1997, fishing has been carried out exclusively by Canadian fixed-gear fleets. Several management measures are in place, including total allowable catch (TAC), number and types of gear, area closures during spawning and in winter (3Ps portion), observers (5% coverage), dockside monitoring, minimum size, bycatch monitoring, and rules for the recreational fishery.

In recent years, the commercial and recreational exploitation of this stock has been mainly carried out by Newfoundland, Labrador and Quebec fishers. Since 2012, the annual TAC has been 1,500 t, and landings have been approximately 1,250 t per year. Cod landings in the recreational fishery are not known.

In 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the Laurentian North (3Pn, 4RS and 3Ps) cod population, part of which consists of 3Pn and 4RS stock, as endangered, based essentially on the extent of the decline (78–89%) in adult abundance over three generations (30 years). The Recovery Potential Assessment for the Laurentian North Designatable Unit (3Pn, 4RS and 3Ps) of Atlantic Cod (*Gadus morhua*) was carried out in 2011 (DFO 2011). Concerning the northern Gulf cod population (3Pn, 4RS), the report concluded that: 1) exploitation must be reduced to encourage stock recovery; 2) seal predation is contributing to the recent increase in cod natural mortality; 3) any decrease in natural mortality will aid in recovery; 4) it is important to maintain the fishery closure during the spawning season to facilitate successful reproduction; and 5) overfishing of local stocks must be avoided.

The northern Gulf cod spawning stock biomass has been in the critical zone, well below the limit reference point, since 1990 (Duplisea and Fréchet 2011). Consequently, a recovery plan has been developed in collaboration with a number of partners, including several fishing industry representatives.

Since 2011, the assessment of 3Pn, 4RS cod stock status has been performed every two years. The most recent peer review was conducted on February 23, 2017. In support of the notice resulting from this review (DFO 2017), this research document presents the methods, data and results of the last assessment. The previous research document on this topic was produced in 2016 (Brassard et al. 2016).

## 1.1 BIOLOGY AND ECOSYSTEM

### 1.1.1 Biology

In summer, 3Pn 4RS cod are distributed throughout the northern Gulf of St. Lawrence at depths of 50 to 200 m. In winter, the fish gather off southwestern (3Pn) and southern (3Psa and 3Psd) Newfoundland at depths of 300 to 500 m. Tagging studies indicate that this stock is generally isolated from neighbouring stocks. There seems to be little mixing with adjacent stocks, though there is some to the southwest (4T) and northeast (2J, 3KL) in summer, and to the southeast (3Ps) in winter.

Spawning takes place mainly in April and May at depths of 200 to 250 m. The main breeding area is located off Port au Port (west coast of Newfoundland). Age at 50% maturity has varied over time for this stock and is currently between four and five years. After spawning, the eggs disperse with the surface currents, and in fall, juveniles return to deeper environments.

Cod have a varied diet (zooplankton, crustaceans, and pelagic and benthic fish). Large cod eat mainly herring, flatfish, cod and crab.

Cod's main natural predator is the seal, which could compromise the recovery of a cod stock (Cook et al. 2015). Predation on northern Gulf cod is poorly documented, but several studies conducted in the southern Gulf of St. Lawrence (4T) report potentially high grey seal predation (Bousquet et al. 2014; Hammil et al. 2014), going so far as to cause the distribution of cod to deeper sites that are less suitable for its diet (Swain et al. 2015).

### 1.1.2 Ecosystem

Every year, Fisheries and Oceans Canada's Atlantic Zone Monitoring Program (AZMP) assesses prevailing physical oceanographic conditions in the Gulf of St. Lawrence. Compared to historical averages, the surface temperatures observed throughout the Gulf reflected average conditions in 2015 and warmer conditions in 2016. The channel-bottom temperature was warmer in 2015 and 2016. The water volume of the cold intermediate layer (CIL) in summer has been decreasing since 2015 (Galbraith 2017).

The northern Gulf of St. Lawrence includes areas with low dissolved oxygen concentrations (< 30%), mainly at the head of the channels and at great depths. The cod seem to avoid these hypoxic waters according to the annual DFO survey conducted in August. The adjacent areas are nonetheless habitats that are conducive to cod.

## 1.2 MANAGEMENT MEASURES

Prior to 1999, the management year followed the calendar year, namely January 1 to December 31. Since 2000, the management year has been from May 15 of the current year to May 14 of the following year. To bridge the gap between these two calendars, the 1999 management year stretched from January 1$^{st}$, 1999 to May 14, 2000. Since the reopening after the first moratorium, the fishing pattern changed, and the fishery now takes place mainly from July to November. Management measures include, among other things, imposing an annual TAC, number and type of gear, observer coverage (5%), dockside monitoring, minimum size, a small fish protocol, regulations for the recreational fishery, and a vessel monitoring system (VMS) for large longliners. In addition, other measures are in place:

1. In order to protect the spawning period for cod, the groundfish fishery is closed for April, May and June in part of NAFO's 4R division off St. George's Bay and Port au Port Bay.
2. To limit catches of 3Pn, 4RS cod, which could be mixed with 3Ps stock in winter, the 3Ps (d) and (g) management units are closed to fishing from November 15 to May 16, while in the 3Ps (a) management unit, fishing is permitted during this period only for residents of that unit. In addition, the entire 3Ps subdivision is closed from March 1 to May 16.

# 2. METHODOLOGY

## 2.1 COMMERCIAL FISHERIES

### 2.1.1 Landing, fishing effort and observers

Since 1997, Newfoundland cod fishers have been required to complete a logbook for vessels under 10.66 m (35 ft). This logbook is an initiative from the Newfoundland DFO Science Sector. When completed, these logbooks are returned to the Science Sector by the fisher, where they are processed. They contain information such as fishing effort data that allows the assessment

of catch per unit effort (CPUE). The information in these logbooks is not captured in official DFO statistics or in the ZIFF (Zonal Interchange File Format).

Since 1999, Quebec fishers in the fleet of craft under 13.71 m (45 ft) fill out combined form groundfish logbooks. The logbooks are used to identify the characteristics of the fishery (type of gear, number, soak time), position, dates of activity and catch weights. In Quebec, logbooks also include a section on purchase slips (completed by the buyer's representative) and the weight out summary (during dockside monitoring). In this case, the information is entered by DFO's statistics sector (regional offices) and then made available in ZIFF files.

Performance indices for the commercial fishery based on logbook data for the fixed-gear fleets (gillnet and longline, Newfoundland vessels under 10.66 m, and Quebec vessels under 13.71 m) represent about 70% of annual landings in the 3Pn, 4R and 4S NAFO Divisions. The mean CPUE and confidence intervals are calculated based on the raw data. Usable data from logbooks represents over 50% of the landings from these fleets. Logbook data for the fleet of vessels over 13.71 m (45 ft) in Quebec (longliners) are presented for this first time in this stock assessment. To produce this index (longliners), the raw data are standardized (factors: month and NAFO Division) by using a multiplicative model (Gavaris 1980).

$$\text{Ln CPUE}_{ijkl} = \ln \mu + \ln D_j + \ln M_k^* + \varepsilon_{ijkl}$$

where:

$\text{CPUE}_{ijkl}$ = CPUE in the lth activity

ln μ = mean CPUE log

$D_j$ = effect of jth level of factor NAFO division

$M_k$ = effect of kth level of factor Month

$\varepsilon_{ijkl}$ = log of normally distributed residuals

In Quebec and Newfoundland, the DFO commercial catch sampling program allows regular collection of data on cod length and otoliths (see age readings, section 2.3.1). Using a program (CATCH) developed by DFO on these age and length frequency data allows the calculation of catch-at-age, weight-at-age, and mean-length-at-age for cod captured annually. The length-weight relationship from the corresponding year's DFO research survey is also necessary, as are the values for commercial landings (by month, NAFO Division and gear type).

The observer program permits monitoring of the catch rates for bycatches in the directed cod fishery. This program is also applied to the turbot, shrimp and Atlantic Halibut fisheries in order to estimate the cod bycatch in these fisheries.

### 2.1.2 Telephone survey

Since 1998, Newfoundland's Fish, Food and Allied Workers Union (FFAW) and the Lower North Shore Fisherman's Association (LNSFA) have carried out an annual telephone survey with fixed-gear fishers (random draw) who hold a directed cod fishery license. The objective is to document various issues related to northern Gulf of St. Lawrence commercial cod fisheries. Fishers are asked to answer a number of questions (Appendix 1) regarding their general view of the fishing season, their performance and the size and condition of the fish they caught.

## 2.2 SURVEYS

### 2.2.1 Fisheries and Oceans Canada (DFO) survey

Since 1990, DFO has conducted a multidisciplinary research survey (groundfish and shrimp) on the entire northern Gulf of St. Lawrence using a bottom trawl. This survey involves the use of a stratified random sampling plan (Figure 1). In 2004, there was a change in fishing vessel and gear type, and comparative fishing was carried out to ensure continuity of the series. Since 2004, the fishing gear has been a Campelen 1800 shrimp trawl with Rockhopper foot gear (McCallum and Walsh 2002). A detailed description of the fishing and sampling protocol and calculation methods are presented in Bourdages et al. (2015). In 2015, 58 stations were completed in 4R and 84 stations in 4S while in 2016, it is 48 and 79 stations respectively. Note that this sampling plan does not include 3Pn (Figure 2a).

### 2.2.2 Sentinel survey

In place since 1994 in eastern Canada, the sentinel fishery program is a collaborative program between DFO and fishers. The fishing is carried out by fishers (contracts awarded following an invitation to tender) in accordance with scientific protocols developed by DFO Science. In the northern Gulf of St. Lawrence, this program consists of two components: mobile gear (trawl) and fixed gear (gillnet and longline). Because of budget cuts to this program over the years, the number of activities has declined significantly.

DFO Science ensures that data are validated, analyzed and interpreted. Data from the sentinel fisheries program are available on the St. Lawrence Global Observatory website. The list of fishers (Quebec and Newfoundland) who participated in this program from 2014 to 2016 can be found in Appendix 2.

**Mobile gear (trawl) sentinel fisheries**

The trawl sentinel program is conducted by the Association des capitaines propriétaires de la Gaspésie (ACPG) in NAFO Division 4S and by FFAW in Subdivision 3Pn and Division 4R. This survey is conducted every July. It includes close to 300 stations distributed based on a stratified random sampling plan (Figures 1 and 2a). Calculation methods take into account the weight of each stratum in the same way as the DFO survey. The fishing gear is a *Star Balloon 300*-type trawl mounted on a *Rockhopper* bicycle. The trawl's mesh is 145 mm with a lining at the codend of 40 mm. Standard 30-minute tows are done at a speed of 2.5 knots. The 30-minute time frame is calculated from when the winches are stopped (after the gear is deployed) to when they are reactivated to raise the trawl.

It includes two periods: (1) From 1995 to 2002, where only strata deeper than 20 fathoms (37 m) were sampled (mobile sentinel over 20 ftm); and (2) from 2003 onward, when three inshore strata 10 to 20 fathoms (18 to 37 m) (mobile sentinel over 10 ftm) were added in 4R to those previously sampled.

One of the functions of this survey is to collect fish length and weight data (cod, redfish, halibut, turbot, capelin, herring) and to harvest cod and Atlantic Halibut otoliths.

**Fixed gear sentinel fisheries**

The fixed gear sentinel fisheries program is conducted by the APBCN in Division 4S and by FFAW in Subdivision 3Pn and Division 4R. In 2016, 389 gillnet and 178 longline activities were carried out in six zones (Figures 2a and 2b and Appendix 3).

Since 1998, catches per unit effort (CPUEs) from the fixed gear sentinel fisheries program (gillnet and longline) have been used as abundance indices in cod assessments. These data

are indices that are more representative of coastal fisheries. In order to produce these indices, a multiplicative model is used to standardize the raw data (Gavaris 1980) (Appendices 4 and 5). This model establishes an index that reflects the annual cod trends since 1995.

$$\text{Ln CPUE}_{ijkl} = \ln \mu + \ln A_i + \ln Z_j + \ln M_k + \ln \text{Ll} + \ln \text{Em}^* + \varepsilon_{ijkl}$$

where:

$\text{CPUE}_{ijkl}$ = CPUE in the lth activity

ln μ = mean CPUE log

$A_j$ = effect of ith level of factor Year

$Z_j$ = effect of jth level of factor NAFO division

$M_k$ = effect of kth level of factor Month

$L_l$ = effect of lth level of factor Soak time

$E_{m=}$ effect du mth of factor Gear ($^*$ Longline index only)

$\varepsilon_{ijkl}$ = log of normally distributed residuals

Data are collected at 24 sites along the coastlines in 3Pn, 4R and 4S. Average gear deployment depths are 90 m for longline (16/0 J-hooks and 12/0 circle hooks) and 80 m for gillnet. These depths vary between areas.

The use of fixed gear sentinel fishery activities as an abundance index is based on the theory that the abundance of the resource is directly proportional to the catch rate. However, the data could be biased should the gear being used become saturated, i.e. if the gear reached a maximum catch level regardless of the resource abundance.

In fact, the catch probability of a fish would decrease and the catch rate would no longer be directly proportional to abundance. The fishing gear saturation aspect is examined every year for the longline sentinel program activities (Brulotte et al. 2000) and so far saturation is not an issue.

## 2.3 BIOLOGICAL DATA

### 2.3.1 Age reading

Cod otoliths are sampled in DFO research surveys, sentinel surveys, the reproductive potential project and the commercial fishery. Sampling stratification is based on NAFO Division, time of year, fishing gear and fish size (stratification). The otolith is sawed in two in the narrow part using an IsoMet™ low-speed saw. A count of annual growth rings is done by applying a drop of alcohol and exposing the side of the otolith to light.

A collection of reference otoliths is updated regularly and shared with experts from Newfoundland and Europe to validate the accuracy of the readings. This collection is reread each year to ensure that the age readings are standardized.

### 2.3.2 Condition

Since 1994, cod have been caught in the fixed gear sentinel fishery from June to September along the Lower North Shore (4S) and from January to December along the west coast of Newfoundland (3Pn and 4R) to assess fish condition. The following measures are taken: fork length, weight (gonads, stomach content, liver and total), sex and maturity.

The health status of cod is assessed using two indices: Fulton's somatic index ($K_{som}$) and the hepatosomatic index (HSI).

Fulton's index represents specific health condition.

$K_{som}$ = 100 * somatic weight (g) / $L^3$ (cm)

The hepatosomatic index is more of a lipid energy reserve indicator:

HSI = liver weight (g) / somatic weight (g) *100.

To minimize the size effect, the cod used in the calculation of $K_{som}$ and HSI are between 30 and 55 cm in length.

In 2002 and since 2004, data for assessing condition have been collected during breeding season (May) as part of a project to assess cod reproductive potential (see section 2.3.3).

### 2.3.3 Maturity and fecundity

Fish maturity data will produce maturity ogives used to determine the proportion of mature individuals at age. These data are necessary to complete estimates of the stock's mature biomass.

From 1983 to 1990, the proportion of mature female cod at age in 3Pn, 4RS was assessed annually from data collected during DFO missions on the vessel *Gadus Atlantica* in the winter (January). This type of information was also gathered in May 1994 on the *Gadus* and in May 1995, 1997 and 1998 on the CCGS *Teleost.*

Subsequently, as part of the project to estimate the reproductive potential of cod in the northern Gulf, surveys were conducted in 1998, 2001, 2002 and have been conducted annually since 2004 (FSCP in collaboration with FFAW). This annual survey includes a grid consisting of 40 stations and is conducted during breeding season (Appendix 6). The goal is to collect cod in a *Star Balloon 300*-type trawl mounted on a *Rockhopper* bicycle with 145-mm mesh and with a 40-mm lining in the codend. The activities take place near the west coast of Newfoundland (the St. George's Bay area). Fish caught are counted, sexed, assessed for maturity, weighed (gonads, stomach content, liver and total) and measured. Cod otolith (age) and gonad (egg count) samples are also collected.

Because of the type of data available, the proportion of mature females at length was determined first; the proportion of mature females at age was estimated afterward. Females were classified as immature or mature (mature females including those in maturation and in the spawning and post-spawning stages). Proportions of mature females at length weighted by catch were estimated using the following equation:

$$P = 1/(1+e^{a+bl})$$

where $P$ is the proportion of mature females, $L$ is the length in cm (2-cm class) and $a, b$ are the equation parameters. Proportions of mature females at age were estimated from the mean lengths at age obtained from age-length keys and from matching proportions of mature females at length according to logistic equations.

Proportions of mature females at age for the missing years (1996, 1999, 2000 and 2003) were determined by interpolation using adjacent years to calculate new maturity ogives at age per cohort and applying the proportions of mature females at age for the missing ages and years. Lastly, in the absence of fish maturity data for the 1974–1982 period, the maturity ogive at age obtained for 1983 was used for all of those years.

These samples can also be used to build a fecundity-at-age matrix from a multiple regression model (Lambert 2008). This model, based on number of eggs (F), length (L) and condition factor ($K_{som}$), explains 79% of the total variability in potential fecundity:

$$F = exp\ (-0.709 + 3.630\ ln\ (L) + 1.515\ ln\ (K_{som})$$

In addition, the population's annual egg production ($TEP_t$) was estimated using the following expression:

$$TEP = \sum_{x=3}^{13} N_x R_x P_x F_x$$

Where $N_x$ represents the number of fish at age $x$; $R_x$, the proportion of females at age $x$; $P_x$, the proportion of mature females at age $x$ and $F_x$, potential fecundity at age $x$ (Lambert 2008). The numbers at age were obtained using sequential population analysis and the proportion of sexes by age comes from the DFO research surveys from 1984 to 2014. In the absence of sex ratio before 1984, a relation of 0.5 was used.

## 2.4 POPULATION ANALYSIS

### 2.4.1 Coherence at age

Annual surveys (DFO research, mobile sentinel >20 fathoms, mobile sentinel >10 fathoms, longline sentinel, gillnet sentinel) are used to monitor cohort abundance. Coherence for each survey was checked by establishing the relation between the number at age x for one year ($t$) and the number at age x+1 for the following year ($t+1$) for the entire series.

### 2.4.2 Sequential population analysis

The sequential population analysis (SPA) was conducted using the ADAPT NFT program (VPA / ADAPT, version 3.4.5, NOAA Fisheries Toolbox 2014). The NFT ADAPT model for estimating a population's age structure was developed from the Gavaris model, from which features of other ADAPT versions were incorporated. (Gavaris 1988, 1999). Population cohorts are estimated by backward projection, which requires provision of an estimate of the number of fish in the last year. These estimates are used to launch the application; the values are then adjusted by the model. It is also possible to make retrospective and bootstrap analyses, the latter with 1,000 repetitions, to estimate the accuracy of the model's parameters and the estimated values.

SPA is based on catches at age in the commercial fishery and is adjusted based on the various abundance indices. The parameters used for application in the NFT ADAPT program are presented in Appendix 7. The formulation used for this assessment is similar to that in Fréchet et al. (2009). Natural mortality (M) values were set at 0.2 from 1974 to 1985; at 0.4 from 1986 to 1996; and 0.2 from 1997 to 2001. Subsequently, the M values were estimated in blocks (2002-2004, 2005-2008, 2009-2012 and 2013-2016 (age 3-12 years) through a sensitivity analysis (VPA/ADAPT/NFT).

The NFT ADAPT model was therefore used to estimate several northern Gulf of St. Lawrence cod stock status parameters, including exploitation rate, population abundance, spawning stock biomass (SSB) and natural mortality (*M*). Natural mortality includes all potential mortality sources that are not accounted for in catch statistics. The survival rate is estimated by the number of recruits at 3 years divided by mature biomass in the year of birth of these recruits.

## 2.5 TAGGING

A tagging program tagged 80,878 cod between 1995 and 2016 in the northern Gulf to estimate an exploitation rate. Of these, 7,255 tags were returned by anglers, 89% of which came from 3Pn, 4R and 4S. This program includes double-tagged fish for estimating a tag loss rate.In recent years, this tagging was carried out by FFAW as part of a Fisheries Science Collaborative Program (FSCP) project.

In addition to providing information on the migratory behaviour of cod in the northern Gulf (Yvelin et al. 2005, Tamdrari et al. 2012), a tagging program has been used since 2008 to estimate the stock's exploitation rate independently of the sequential population analysis.

The exploitation rate calculation is a classic method that has been used since 2008 (Le Bris et al. 2009). Individual sizes between 40 and 80 cm were selected. Incomplete data and those of individuals recaptured outside 3Pn, 4RS were deleted. Of these numbers, the three years following the year of marking were used except for 1996 or only two years 1995 and 1996 were available. Also, an initial mortality rate (tag-induced mortality) of 22% was applied to individuals tagged from June to October and a 3% rate was applied to individuals tagged from November to May (J. Brattey, DFO NL, pers. comm.). The exploitation rate μ in year t is calculated using the following formula:

$$\mu_t = \frac{\sum_k R_t}{\sum_k N_t}$$

Where $R_t$ is the number of tags recovered in year $t$ corrected by the rate of tag return; $N_t$ is the number of tags available to the fishery in year $t$, and $k$ is the type of tagging (i.e., single, double, high-value). The number of tags available to the fishery matches the number of tags placed in year $t$, corrected by the initial mortality caused by tagging, by the natural mortality rate (estimated by SPA) and by the tag loss rate (Le Bris et al. 2009).

## 2.6 PROJECTIONS

The AGEPRO NFT model (version 4.2.2, NOAA Fisheries Toolbox 2014) was used to assess the impact of various catch levels on mature biomass and exploitation rate. This model makes it possible to evaluate the structure of a population over several years according to different annual landings and different recruitment hypotheses, based on the age structure of a population. It is also possible to incorporate the results of an ASP combined with a bootstrap analysis as an initial population. Therefore, using the AGEPRO model based on the SPA (ADAPT/NFT) results was helpful in making cod spawning stock biomass projections for 2018 and 2019. The projection takes into account the decision rules included in the Recovery Plan for Cod Stocks in the Northern Gulf of St. Lawrence. For example, this recovery plan states that for a spawning biomass ranging from 25,000 to 30,000 t, the control rule implies a TAC of 1,800 t (Appendix 8).

The parameters used for this projection are presented in Appendix 9. It should be noted that it was necessary to incorporate a recruitment hypothesis (1 year) as of 2017. However, this recruitment estimate will, of course, have no impact on short-term mature biomass estimates.

# 3. RESULTS

## 3.1 COMMERCIAL FISHERIES

### 3.1.1 Landings

Landings peaked in 1983 with over 100,000 t, then they and the TAC steadily declined from 1984 to 1993 (Figure 3). The stock collapsed and was under a moratorium from 1994 to 1996 and in 2003. Landings ranged between 1,772 and 6,470 t between 2004 and 2011 for TACs ranging from 2,000 to 7,000 t (Table 1). Since 2012, the annual TAC has been 1,500 t and landings were 1,263 t and 1,312 t for 2015 and 2016 (preliminary data). The TAC is split according to different procedures (fleets, period, etc.) and the 2016 quota report is presented in Table 2. Most of the landings are from NAFO Division 4R. Since the reopening of the fishery after the first moratorium in 1997, the directed fishery has been practised almost exclusively with fixed gear (gillnets and longlines). In NAFO divisions 4R and 4S, the gillnet is used the most. In subdivision 3Pn, only longline is used (Tables 3 and 4). In 2016, the recreational fishery season increased from 32 to 46 days. This fishery's catches are not known although they likely increased in 2016.

The commercial catch data expressed in catches at age, mean weight at age, mean lengths at age and proportion of maturity at age are presented in Tables 5, 6 and 7, and in Figure 4.

### 3.1.2 Catch per unit effort

Commercial fishery performance indices taken from logbook data for the fixed gear fleets (gillnet and longline, Newfoundland vessels under 10.66 m or 35 ft and Quebec vessels under 13.71 m or 45 ft) show an increase in catches per unit effort (CPUE) after the 2003 moratorium, the maximum value being observed in 2004 for gillnet and in 2006 for longline (Figure 5). CPUEs then decreased until 2009 and increased again until 2013. In 2015 and 2016, these indices exceeded the average values of their respective series. The performance index for the commercial longline fishery (Quebec Region) was more or less stable from 2007 to 2014. Since 2015, it has been well above the 1998–2014 average (Figure 6).

### 3.1.3 Incidental Catch

Since 1999, more than 90% of cod landings have come from the directed cod fishery. Cod bycatch landings are low and mainly occur in the Atlantic Halibut and Greenland Halibut directed fisheries. Bycatches in the directed northern Gulf cod fishery are low and essentially consist of Greenland Halibut and Atlantic Halibut.

Cod is also a bycatch that is not accounted for in shrimp fishery landing statistics. These catches are of 1 kg or less per tow, and the cod caught are small (under 30 cm) (1–2 years). An analysis of the at-sea observer database indicates that cod is caught in slightly more than 20% of shrimp tows. These catches (in biomass and numbers) represent less than 1% of the estimates from the DFO survey (Bourdages and Marquis 2014).

### 3.1.4 Industry telephone survey

The survey results indicate roughly the same trends as the commercial fishery CPUEs and the fixed gear sentinel fishery indices. The answers to the question about fishery performance indicate that yields were higher before 2007, decreased until 2009, increased again until 2014, and then stabilized in 2015 and 2016 for the three survey areas (3Pn, 4R and 4S) (Figure 7). Respondents also noted that the fish were smaller in 2008 and 2009 and that sizes had

increased afterwards. No noticeable change in cod condition or migration profile was noted by the survey respondents.

## 3.2 SURVEYS

### 3.2.1 DFO survey

The mean number and mean weight per tow for cod sharply decreased between 1991 and 1993. After the 1994–1996 moratorium, these indicators slightly recovered until 1999. They then remained generally low and stable (Figure 8). The 2002 and 2003 values are considered annual effects that are also present for several species in this survey. Since 2014, an increase has been observed in these indices, which are above the 1990–2014 series average. In 2016, the wide range of the size frequency distribution shows the presence of recent cohorts (2011 to 2013) and older individuals (2004 to 2006 cohort).

Cod distribution in the northeastern Gulf (4R) remained similar to that from 1994 to 2016, whereas in the western Gulf, cod concentrations show a gradual decline from 1995 to 2006. From 2007 onward, the spatial distribution of cod expanded in Division 4S, especially north and west of Anticosti Island. Cod concentrations are still high in 4R, especially in the northeast (Table 8). Lastly, recent cod distribution (2013–2016) is now similar to that observed in the early 1990s (1990–1994) (Figure 10) (Bourdages et al. 2017).

### 3.2.2 Mobile gear sentinel survey

Like the DFO survey, this survey shows that catch distribution is higher in 4R than in 4S (Table 10). In 2014, the length frequency distributions in number and percentage (Figure 11) showed a large size distribution with two modes at 25 and 35 cm that correspond to two- and three-year-old fish (2011 and 2012 cohort) (Table 11).

The number and the mean weight caught during these surveys reveal no clear trends (Figure 12). The 2015 values (mean number and weight per tow) are above the 2003–2014 average, while the 2016 values are close to the average.

### 3.2.3 Fixed gear sentinel survey

Since 1999, annual coverage by longline fisheries in NAFO subdivision 3Pn has been helpful in monitoring cod migration. Cod arrived in the Gulf through the Cabot Strait in May (day 125) and left the Gulf gradually from mid-September (day 250) to mid-December (Figure 13).

The longline index (standardized CPUE) increased between 1995 and 2006 then decreased, reaching its low in 2010. It then generally increased until 2016 to reach a value well above the series average (1995–2014). The gillnet index (standardized CPUE) shows a similar pattern and the 2015 and 2016 values are well above the 1995–2014 series average (Figure 14). The gross values (CPUE) of these indices (longline and gillnet) are presented in Appendix 10.

In 2016 for longline, cod catches consisted mainly of five- to nine-year-olds with a mode of five, whereas for gillnet, cod were mainly five- to-ten-year-olds with a mode of eight (Table 12).

In recent years, the saturation percentages for longline have been low enough to avoid biasing catch rates (Appendix 11).

## 3.3 BIOLOGICAL INDICATORS

### 3.3.1 Condition

Physical cod condition monitoring conducted mainly as part of the sentinel fisheries program shows an annual cycle. Condition indices are lower in spring before spawning; they then increase from summer until fall, when they peak. In 2015 and 2016, the values expressed using Fulton's index (somatic K) were lower than the 1998 to 2014 average. In 2015 and 2016, the hepatosomatic index (HSI), which further monitors the recent fish feeding success, also displayed values below the 1998 to 2014 average, mainly from July to November (Figure 15). The observed values are nonetheless considered to be at acceptable levels.

### 3.3.2 Maturity and fecundity

The proportion of fish that mature in four years was less than 10% before 1994, but since 1995 it has generally been greater than 15% and even greater than 40% in 1995, 1997, 1999, 2009 and 2011. It has ranged from 18 to 25% over the past three years (Table 13).

Fecundity at age decreased between 1984 and 1994. A gradual increase has been observed since 1994 and current levels are similar to those from 1985 to 1989 (Table 14).

## 3.4 POPULATION ANALYSIS

For the DFO survey, coherence at age analyses indicate that several regressions are influenced by a few high values, particularly in 1990, 1991 and 2003 (Figure 16). In the case of the mobile sentinel surveys, both series contain few data whereas coherences are good for longline and gillnet sentinels (Figure 16). It is also possible to observe the consistency between indices for each age by year (Figure 17). The same trends are observed between indices at age two and for ages over six years. At ages 3, 4 and 5, the harmony between the indices is difficult to interpret without interannual variations.

The parameters estimated by SPA are presented in Table 15. The adjustment of the ADAPT model to five abundance indices is represented in Figure 18. Regressions between the observed and predicted values are generally positive for all ages except age 2 in the pre-2002 sentinel survey and age 3 in the longline sentinel survey.

The distribution of residuals from the ADAPT model for each abundance index is presented in Figure 19. Several annual effects are detected, particularly in 2002 and 2003, in the DFO survey. In addition, the residual patterns in the longline sentinel and gillnet sentinel indices are similar to the abundance indices, which indicates that the ADAPT model gives more consideration to the other abundance indices.

The estimated values of natural mortality (M) were 0.30 for 2002 to 2004, 0.42 for 2005 to 2008, 0.52 for 2009 to 2012, and 0.46 for 2013 to 2016 (Figure 20). Possible explanations for the increase in natural mortality particularly from 2005 onward are seal predation and unaccounted fishing mortality.

The northern Gulf of St. Lawrence cod population collapsed in the late 1980s/early 1990s (Figure 21 and Table 16). Its abundance reached a high of 559 million individuals in 1980 and a low of 31 million in 1994. This abundance remained low and stable until 2005, then exhibited a few fluctuations until 2014. The 2017 estimate (109 million) is the highest since 1991.

There was a significant decrease in the abundance of mature individuals from 1982 to 1994, and it remained low and stable until 2014, at which point it increased until 2017 (Table 17). The abundance of three-year-old individuals estimated by SPA since 1990 was higher in 2007, 2008

and 2009 (2004 to 2006 cohorts), as well as during the past four years (Figure 21 and Table 16). Table 18 presents the total biomasses at age.

The spawning stock biomass has been in the critical zone, well below the limit reference point (LRP) of 116,000 t since 1990 and it has been increasing slightly since 2013 (Table 19 and Figure 21). According to the permutation analysis, the estimated value for 2017 is 37,075 t ± 4,498 t.

The estimation of the spawning stock's total egg production decreased starting in the mid-1990s and remained under 10,000 billion until 2014. The estimated values have been increasing slightly since 2015 (Table 20 and Figure 22).

The survival rate declined from 1987 to 1992, then increased until 2014 and has remained stable in recent years (Figure 23).

The exploitation rate for seven- to nine-year-old individuals, estimated using SPA, was high from 1997 to 2002 and in 2008, 2009 and 2010 but it dropped significantly from 2011 to 2016 following TAC reductions (Figure 24 and Table 21).

According to the tagging program, 7255 tags were returned by fishers, 89% of whom were from areas 3Pn, 4R and 4S (Appendix 12). The exploitation rate estimated from this tagging program increased from 2003 to 2007 before dropping to a low level, where it has been since 2011 (Figure 24).

The estimates based on SPA and the tagging program follow essentially the same trends. However, the values estimated using SPA were significantly greater from 2006 to 2011 and have been similar since then.

### 3.5 PROJECTION

The NFT AGEPRO model was used to make spawning stock biomass projections for 2018 and 2019 from the SPA results. The projection indicates that, with an annual harvest of 1,800 t or 3,000 t, the spawning stock biomass (SSB) should increase. For a harvest of 1,800 t, the estimated values for 2018 and 2019 are 41,348 t ± 5,572 and 44,610 t ± 7,657 t, respectively. For an annual harvest of 3,000 t, the estimated values for 2018 and 2019 are 40,724 t ± 5,573 and 43,494 t ± 7,658, respectively. However, the projected SSB for 2019 remains well below the limit reference point.

## 4. SOURCES OF UNCERTAINTY

The addition of several days to the recreational fishery in 2016 has inevitably increased pressure on the fishery, which will probably translate into an increase in the harvest. It becomes necessary to improve training and monitoring concerning this activity in order to estimate the quantity of fish harvested and obtain fish samples (length and otoliths).

The tagging programs in recent years have been conducted exclusively in NAFO area 4R even though cod abundance is now similar between areas 4S and 4R. This could generate bias around the exploitation rate estimate.

## 5. CONCLUSION

This assessment indicates that the cod stock in the northern Gulf of St. Lawrence cod stock remains in the critical zone and well below the estimated limit reference point of 116,000 t (Duplisea and Fréchet 2011). The estimate for 2017 is 32% of this limit reference point. The exploitation rate is currently at a low level and natural mortality would be high. Spawning stock

biomass could increase by 20% or 17% until 2019 in the event of an annual harvest of 1,800 t or 3,000 t respectively for the next two seasons.

## 6. ACKNOWLEDGEMENTS

The authors would like to thank Hugo Bourdages and Martin Castonguay for revising the manuscript. We would like to highlight the excellent collaboration of all stakeholders from various organizations (fishers' associations, scientists, directors) in ensuring the success of the FSCP and sentinel programs. For their exemplary efforts, we would also like to extend our thanks to the crew members and scientists supporting the DFO surveys on the Teleost and to the Quebec and Newfoundland sampling teams.

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## 8. TABLES

*Table 1. Historical monthly catch statistics (t) for the period 1964-2016 (NK = unknown).*

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | NK | TOTAL | TAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1964 | 1104 | 24423 | 15761 | 6058 | 3106 | 10350 | 12527 | 5853 | 2153 | 1385 | 863 | 651 | - | 84234 | - |
| 1965 | 792 | 12506 | 21171 | 3698 | 2216 | 5267 | 10422 | 5945 | 3636 | 1359 | 927 | 990 | - | 68929 | - |
| 1966 | 1965 | 22817 | 8929 | 2516 | 1638 | 8371 | 7482 | 4744 | 2490 | 1146 | 1779 | 1208 | - | 65085 | - |
| 1967 | 7872 | 7028 | 14792 | 8447 | 2017 | 7525 | 12664 | 5232 | 7154 | 3315 | 1356 | 1909 | 1 | 79312 | - |
| 1968 | 725 | 7980 | 22799 | 9061 | 3087 | 10717 | 17216 | 9400 | 4914 | 1781 | 1172 | 819 | - | 89671 | - |
| 1969 | 875 | 4654 | 9675 | 4220 | 5192 | 10958 | 12103 | 8639 | 7866 | 3557 | 2035 | 1366 | - | 71140 | - |
| 1970 | 1637 | 25487 | 18115 | 27995 | 4803 | 6020 | 8974 | 3897 | 2130 | 3170 | 1936 | 1301 | - | 105465 | - |
| 1971 | 845 | 44590 | 7580 | 5250 | 2338 | 5839 | 8420 | 3039 | 2374 | 1616 | 1004 | 915 | - | 83810 | - |
| 1972 | 1494 | 14961 | 5337 | 7400 | 7334 | 4594 | 6818 | 3296 | 2365 | 1406 | 994 | 212 | 2026 | 58237 | - |
| 1973 | 16472 | 10556 | 7586 | 4826 | 3235 | 5860 | 5125 | 4145 | 2365 | 1459 | 1016 | 567 | 2593 | 65805 | - |
| 1974 | 12995 | 10753 | 5959 | 5665 | 6231 | 5021 | 6235 | 5396 | 2214 | 1331 | 1009 | 479 | 3148 | 66436 | - |
| 1975 | 8232 | 19486 | 2702 | 2616 | 5316 | 5122 | 5042 | 4488 | 2767 | 1267 | 819 | 704 | 1672 | 60233 | - |
| 1976 | 15637 | 15204 | 3610 | 3437 | 7071 | 6930 | 6978 | 4310 | 3348 | 2286 | 1537 | 578 | 6055 | 76981 | - |
| 1977 | 11143 | 8603 | 3790 | 11312 | 10057 | 7368 | 8133 | 5780 | 3361 | 1751 | 1814 | 454 | - | 73566 | 55000 |
| 1978 | 20754 | 6307 | 5161 | 3156 | 6717 | 9796 | 13255 | 7000 | 2836 | 1979 | 1309 | 236 | - | 78506 | 55000 |
| 1979 | 15543 | 4273 | 6475 | 6647 | 8517 | 12890 | 12085 | 8660 | 2971 | 2449 | 1816 | 451 | - | 82777 | 75000 |
| 1980 | 5280 | 8965 | 9925 | 8087 | 7147 | 14096 | 23158 | 10719 | 5687 | 2773 | 1311 | 431 | - | 97579 | 75000 |
| 1981 | 9156 | 15368 | 3170 | 3763 | 12835 | 17257 | 16344 | 10343 | 5676 | 2550 | 1172 | 277 | - | 97911 | 75000 |
| 1982 | 2289 | 11671 | 10122 | 5544 | 12723 | 16826 | 22492 | 9136 | 8412 | 4463 | 1229 | 32 | - | 104939 | 93300 |
| 1983 | 4152 | 10213 | 11335 | 6251 | 21049 | 18341 | 16228 | 8173 | 5698 | 3956 | 530 | 154 | - | 106080 | 100000 |
| 1984 | 5002 | 11079 | 9494 | 4260 | 15205 | 13349 | 22300 | 10962 | 5238 | 4644 | 1113 | 997 | - | 103643 | 100000 |
| 1985 | 2436 | 16749 | 7306 | 3516 | 7139 | 12693 | 13725 | 11026 | 7713 | 3038 | 962 | 1986 | - | 88289 | 100000 |
| 1986 | 2508 | 18550 | 10011 | 4227 | 11871 | 7903 | 12418 | 5763 | 4181 | 2737 | 803 | 974 | 870 | 82816 | 92100 |
| 1987 | 8657 | 7701 | 4938 | 3294 | 6627 | 8323 | 9222 | 7501 | 5293 | 2871 | 1027 | 1093 | - | 66547 | 80300 |
| 1988 | 1440 | 2786 | 4313 | 2671 | 9955 | 5072 | 7848 | 6056 | 3243 | 1782 | 1178 | 1608 | - | 47952 | 73900 |
| 1989 | 6251 | 7620 | 2117 | 2025 | 6875 | 6331 | 6087 | 4553 | 1860 | 2219 | 745 | 236 | - | 46919 | 76540 |
| 1990 | 5022 | 2706 | 1100 | 381 | 6765 | 7901 | 4690 | 3121 | 1903 | 1590 | 1797 | 487 | - | 37463 | 58000 |
| 1991 | 1533 | 2000 | 2803 | 2270 | 3527 | 4512 | 5309 | 2890 | 3230 | 2017 | 1805 | 121 | - | 32017 | 35000 |
| 1992 | 3841 | 1784 | 228 | 1394 | 4258 | 1804 | 3420 | 3651 | 2364 | 1948 | 1885 | 1438 | - | 28015 | 35000 |
| 1993[c] | 8 | 52 | 1249 | 1248 | 1418 | 4373 | 3859 | 2233 | 1114 | 1086 | 1177 | 623 | - | 18440 | 18000 |

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | NK | TOTAL | TAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | NK | TOTAL | TAC |
| 1994 | 13 | 14 | 28 | 4 | 28 | 9 | 13 | 74 | 145 | 26 | 5 | 28 | - | 387 | 0 |
| 1995 | 0 | 0 | 0 | 0 | 8 | 6 | 18 | 79 | 24 | 14 | 0 | 0 | - | 148 | 0 |
| 1996 | 0 | 0 | 0 | 0 | 5 | 10 | 149 | 55 | 40 | 33 | 23 | 2 | - | 317 | 0 |
| 1997 | 0 | 1 | 0 | 2 | 356 | 255 | 1189 | 963 | 801 | 1050 | 148 | 27 | - | 4792 | 6000 |
| 1998 | 3 | 0 | 0 | 2 | 16 | 244 | 921 | 1082 | 432 | 561 | 32 | 3 | - | 3296 | 3000 |

| Year | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | NK | TOTAL | TAC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1999/2000[b] | 92 | 863 | 1985 | 1463 | 989 | 1058 | 395 | 40 | 1 | 51 | 132 | 50 | 11 | 7136 | 7500 |
| 2000/2001 | 523 | 907 | 1251 | 1533 | 1087 | 775 | 398 | 82 | 86 | 72 | 49 | 32 | 40 | 6834 | 7000 |
| 2001/2002[d] | 405 | 486 | 1858 | 1292 | 1288 | 905 | 313 | 125 | 1 | 167 | 6 | 10 | 43 | 7150 | 7000 |
| 2002/2003[e] | 130 | 55 | 2507 | 1488 | 854 | 858 | 404 | 7 | 0 | 0 | 0 | 0 | 4 | 6341 | 7000 |
| 2003/2004 | 1 | 14 | 117 | 131 | 48 | 31 | 39 | 5 | 0 | 0 | 0 | 13 | 7 | 406 | 0 |
| 2004/2005 | 21 | 25 | 1875 | 217 | 537 | 356 | 207 | 1 | 0 | 0 | 0 | 14 | 10 | 3264 | 3500 |
| 2005/2006 | 34 | 72 | 2409 | 596 | 848 | 476 | 22 | 3 | 0 | 0 | 0 | 24 | 7 | 4491 | 5000 |
| 2006/2007[f] | 12 | 105 | 3284 | 579 | 656 | 298 | 669 | 17 | 1 | 0 | 0 | 15 | 3 | 5715 | 6000 |
| 2007/2008 | 19 | 132 | 3707 | 398 | 1173 | 577 | 446 | 5 | 0 | 0 | 1 | 7 | 4 | 6470 | 7000 |
| 2008/2009[g] | 36 | 118 | 2952 | 888 | 1273 | 575 | 301 | 2 | 0 | 0 | 1 | 3 | 8 | 6224 | 7000 |
| 2009/2010 | 5 | 173 | 1693 | 661 | 699 | 719 | 687 | 51 | 1 | 0 | 2 | 2 | 1 | 4695 | 7000 |
| 2010/2011 | 6 | 53 | 1362 | 836 | 569 | 533 | 186 | 1 | 0 | 0 | 0 | 13 | 8 | 3567 | 4000 |
| 2011/2012 | 7 | 51 | 998 | 168 | 312 | 16 | 193 | 9 | 0 | 0 | 0 | 12 | 6 | 1772 | 2000 |
| 2012/2013 | 10 | 41 | 672 | 104 | 293 | 24 | 137 | 3 | 0 | 0 | 0 | 21 | 5 | 1311 | 1500 |
| 2013/2014 | 6 | 20 | 697 | 93 | 220 | 10 | 148 | 3 | 0 | 0 | 0 | 7 | 5 | 1208 | 1500 |
| 2014/2015 | 6 | 16 | 644 | 92 | 331 | 39 | 100 | 23 | 0 | 0 | 0 | 3 | 12 | 1266 | 1500 |
| 2015/2016[a] | 8 | 19 | 730 | 139 | 186 | 19 | 137 | 13 | 0 | 0 | 0 | 10 | 3 | 1263 | 1500 |
| 2016/2017[a] | 5 | 23 | 835 | 128 | 144 | 28 | 145 | 4 | - | - | - | - | - | 1312 | 1500 |

[a] Preliminary statistics.
[b] TAC from 1999/01/01 to 2000/05/14
[c] Established in August 1993, the initial TAC was 35,000 t
[d] Includes 253 t from recreational fishery
[e] Includes 34 t from recreational fishery
[f] Includes 75.3 t from recreational fishery
[g] Includes 67 t from recreational fishery

*Table 2. Commercial Fisheries, 2016 Quota Report.*

| Fleet | Quota | | Regions | | | | TOTAL | % | Amount remaining |
|---|---|---|---|---|---|---|---|---|---|
| | Initial | After adjustments | Maritimes | Gulf | Quebec | N&L | | | |
| FIXE < 65' NF/ July | 374.3 | 482.2 | - | - | 1.7 | 574.5 | 576.2 | 1.2 | -94.0 |
| FIXE < 65' - NF / Sept. | - | 160.7 | - | - | - | 93.2 | 93.2 | 0.6 | 67.5 |
| FIXE < 65' NF /Nov. | - | 42.9 | - | - | - | 39.1 | - | 0.0 | 42.9 |
| FIXE < 65' NF /By-catch | - | | 0.0 | - | - | 54.4 | 54.4 | - | - |
| FIXE < 65' Quebec | 145.6 | 197.4 | - | - | 219.0 | - | 219.0 | 1.1 | -21.6 |
| FIXE <65' ITQ Mobile to Quebec FIXE | - | | - | - | - | - | 0.0 | - | - |
| FIXE <65' (GEAC/FFAW, Special) | - | 85.0 | - | - | - | 95.1 | - | - | - |
| MOBILE < 45' 4ST Competitive | 1.9 | 1.9 | - | - | - | - | 0.0 | 0.0 | 1.9 |
| MOBILE < 65' 4RS,3Pn Que. buy back | 5.5 | | - | - | - | - | 0.0 | - | - |
| MOBILE < 65'4RS,3Pn NF buy back | 92.0 | | - | - | - | - | 0.0 | - | - |
| MOBILE <65' 4RS, 3Pn NF/groupe A | 265.8 | | 1.3 | - | - | - | 1.3 | - | - |
| MOBILE < 65' 3Ps,4Vn/Overlap | 6.4 | | 0.0 | - | - | - | 0.0 | - | - |
| MOBILE <65' 4S/T /Shrimpers | 24.2 | 20.9 | - | - | 0.0 | - | 0.0 | 0.0 | 20.8 |
| MOBILE <65'4T /Groundfish | 45.4 | 19.9 | - | - | 0.0 | - | 0.0 | 0.0 | 19.9 |
| MOBILE <65' 4RS, 3Pn Que. Groupe A | 21.7 | | - | - | - | - | 0.0 | - | - |
| MOBILE <65' /Bought back / 4T | 5.0 | | - | - | - | - | 0.0 | - | - |
| Shrimpers 65-100' | 19.6 | 20.4 | 0.0 | - | - | - | 0.0 | 0.0 | 20.4 |
| MOBILE 65-100' Bought back NB | 0.7 | | - | - | - | - | 0.0 | - | - |
| Groundfish 65-100' | 16.9 | 16.9 | 0.0 | - | - | - | 0.0 | 0.0 | 16.9 |
| FIXE 65-100' By-catch | - | | 2.0 | - | - | - | 2.0 | - | - |
| Danish Seiners | 17.3 | | - | - | - | - | 0.0 | - | - |
| Vessels >100' | 85.6 | 85.6 | 0.0 | - | 16.3 | - | 16.3 | 0.2 | 69.3 |
| Aboriginals Québec | 53.0 | 53.0 | - | - | - | - | 0.0 | 0.0 | 53.0 |
| Sentinel | 200.0 | 200.0 | - | - | 164.3 | 42.7 | 207.0 | 1.0 | -7.0 |
| France | 39.0 | 39.0 | - | - | - | - | 0.0 | 0.0 | 39.0 |
| Recreational fishery | 80.0 | 80.0 | - | - | - | - | 0.0 | 0.0 | 80.0 |
| Québec reserve (5%) | - | 15.2 | - | - | - | - | 0.0 | 0.0 | 15.2 |
| Total 3Pn, 4RS Cod | 1500.0 | 1521.0 | 3.3 | 0.0 | 401.3 | 899.0 | 1303.6 | 0.9 | 217.4 |

*Table 3. Nominal landings (t) (*preliminary) for NAFO Subdivision A) 3Pn, B) 4R, C) 4S and D) 3Pn, 4RS by gear category (DV=dory vessels, T=traps, GN=gillnets, HL=handlines, LL=Longline, IN=misc. inshore, DS=Danish seines, PT=pair trawl, OT=otter trawl).*

A)

| Year | NAFO 3Pn | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixed | Total mobil | Total |
| 1964 | 558 | - | - | - | 3416 | 4875 | - | 178 | 6105 | 8849 | 6283 | 15132 |
| 1965 | 113 | - | - | - | 2702 | 4815 | - | 142 | 8963 | 7630 | 9105 | 16735 |
| 1966 | 16 | - | - | - | 2499 | 2854 | - | 559 | 7696 | 5369 | 8255 | 13624 |
| 1967 | - | - | - | - | 657 | 3463 | 27 | 33 | 16248 | 4120 | 16308 | 20428 |
| 1968 | 33 | - | - | - | 85 | 5031 | 12 | 306 | 6442 | 5149 | 6760 | 11909 |
| 1969 | - | - | 444 | 270 | 3630 | 39 | 10 | 24 | 500 | 4383 | 534 | 4917 |
| 1970 | - | 46 | 643 | 675 | 3378 | - | 5 | 62 | 396 | 4742 | 463 | 5205 |
| 1971 | - | - | 364 | 217 | 5574 | 134 | - | 52 | 1503 | 6289 | 1555 | 7844 |
| 1972 | 17 | 10 | 181 | 98 | 5593 | 20 | 545 | 176 | 3717 | 5919 | 4438 | 10357 |
| 1973 | 1405 | - | 175 | 110 | 5431 | 97 | 174 | 356 | 3552 | 7218 | 4082 | 11300 |
| 1974 | 128 | - | 297 | 52 | 2460 | 915 | 58 | 1507 | 8596 | 3852 | 10161 | 14013 |
| 1975 | - | - | 61 | 152 | 2418 | 12 | 6 | - | 3584 | 2643 | 3590 | 6233 |
| 1976 | - | 9 | 163 | 225 | 4467 | 636 | 163 | - | 2802 | 5500 | 2965 | 8465 |
| 1977 | - | 37 | 73 | 163 | 5679 | - | 119 | - | 1494 | 5952 | 1613 | 7565 |
| 1978 | - | 7 | 34 | 103 | 5323 | - | 17 | - | 1318 | 5467 | 1335 | 6802 |
| 1979 | - | 25 | 40 | 116 | 7338 | - | 181 | - | 3216 | 7519 | 3397 | 10916 |
| 1980 | - | - | 13 | 83 | 6443 | - | 18 | - | 2242 | 6539 | 2260 | 8799 |
| 1981 | - | 4 | 3 | 72 | 7560 | - | 28 | - | 7463 | 7639 | 7491 | 15130 |
| 1982 | - | 1 | 8 | 87 | 7670 | - | 12 | - | 7707 | 7766 | 7719 | 15485 |
| 1983 | - | 1 | 46 | 97 | 6789 | - | 20 | 8 | 9146 | 6933 | 9174 | 16107 |
| 1984 | - | 2 | 129 | 45 | 7089 | - | 499 | - | 8177 | 7265 | 8676 | 15941 |
| 1985 | - | 4 | 35 | 24 | 5619 | - | 186 | - | 8581 | 5682 | 8767 | 14449 |
| 1986 | - | - | 6 | 46 | 5728 | - | 16 | - | 16415 | 5780 | 16431 | 22211 |
| 1987 | - | - | 23 | 11 | 6589 | - | 25 | - | 11709 | 6623 | 11734 | 18357 |
| 1988 | - | - | 12 | 3 | 3331 | - | - | - | 5712 | 3346 | 5712 | 9058 |
| 1989 | - | - | 155 | 11 | 1484 | - | - | - | 5772 | 1650 | 5772 | 7422 |
| 1990 | - | - | 180 | 14 | 912 | - | 1 | - | 4314 | 1106 | 4315 | 5421 |
| 1991 | - | - | 276 | 23 | 1218 | - | 75 | - | 5335 | 1517 | 5410 | 6927 |
| 1992 | - | - | 213 | 25 | 1208 | - | 22 | - | 6529 | 1446 | 6551 | 7997 |
| 1993 | - | - | 153 | 59 | 1388 | - | - | - | 1596 | 1600 | 1596 | 3196 |
| 1994 | - | - | - | - | - | - | - | - | 51 | 0 | 51 | 51 |

| Year | NAFO 3Pn | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixed | Total mobil | Total |
| 1995 | - | - | - | - | - | - | - | - | - | 0 | 0 | 0 |
| 1996 | - | - | 14 | 0 | 58 | - | 0 | - | 1 | 71 | 1 | 72 |
| 1997 | - | - | 5 | 20 | 1969 | - | - | - | 12 | 1994 | 12 | 2006 |
| 1998 | - | - | 2 | 16 | 860 | - | - | - | - | 878 | 0 | 878 |
| 1999 | - | - | 2 | 49 | 1110 | - | 2 | - | 2 | 1161 | 4 | 1165 |
| 2000 | - | - | 3 | 33 | 1442 | - | 0 | - | 0 | 1478 | 0 | 1478 |
| 2001 | - | - | 2 | 21 | 1715 | - | - | - | 1 | 1738 | 1 | 1739 |
| 2002 | - | - | 0 | 40 | 1657 | - | - | - | 15 | 1698 | 15 | 1713 |
| 2003 | - | - | 1 | - | 85 | - | - | - | 1 | 85 | 1 | 86 |
| 2004 | - | - | 2 | 10 | 762 | - | - | - | 0 | 774 | 0 | 774 |
| 2005 | - | - | 1 | 4 | 871 | - | - | - | 0 | 876 | 0 | 876 |
| 2006 | - | 1 | 1 | 5 | 1197 | - | - | - | 3 | 1205 | 3 | 1208 |
| 2007 | - | - | 3 | 4 | 1074 | - | - | - | 0 | 1081 | 0 | 1081 |
| 2008 | - | - | 3 | 3 | 1125 | - | - | - | 0 | 1131 | 0 | 1131 |
| 2009 | - | - | 6 | 6 | 1345 | - | - | - | 0 | 1357 | 0 | 1357 |
| 2010 | - | - | 2 | 6 | 697 | - | - | - | 0 | 705 | 0 | 705 |
| 2011 | - | 1 | 7 | 6 | 302 | - | - | - | 0 | 316 | 0 | 316 |
| 2012 | - | - | 10 | 2 | 176 | - | 0 | - | 0 | 187 | 0 | 187 |
| 2013 | - | - | 1 | 2 | 182 | - | 0 | - | - | 185 | 0 | 185 |
| 2014 | - | - | 3 | 1 | 149 | - | - | - | 0 | 153 | 0 | 153 |
| 2015 | - | - | 1 | 0 | 153 | - | - | - | 0 | 155 | 0 | 155* |
| 2016 | - | - | 0 | 2 | 143 | - | - | - | - | 146 | 0 | 146* |

*Table 3. (continued)*

B)

| Year | NAFO 4R | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total FixeD | Total mobil | Total |
| 1964 | - | - | - | - | 123 | 18789 | 185 | - | 39863 | 18912 | 40048 | 58960 |
| 1965 | - | - | - | - | 152 | 16766 | 145 | - | 26776 | 16918 | 26921 | 43839 |
| 1966 | - | - | - | - | 201 | 15532 | 53 | 38 | 28384 | 15733 | 28475 | 44208 |
| 1967 | - | - | - | - | 207 | 21015 | 47 | - | 28672 | 21222 | 28719 | 49941 |
| 1968 | - | - | 289 | - | 1138 | 26130 | 60 | 508 | 41916 | 27557 | 42484 | 70041 |
| 1969 | - | 3943 | 10905 | 1622 | 4405 | 2646 | 198 | 5 | 32908 | 23521 | 33111 | 56632 |
| 1970 | 184 | 2340 | 4319 | 1673 | 5489 | 1962 | 239 | 225 | 74715 | 15967 | 75179 | 91146 |
| 1971 | - | 3786 | 3718 | 1295 | 3076 | 436 | 247 | | 53804 | 12311 | 54051 | 66362 |
| 1972 | - | 1606 | 2835 | 1107 | 1115 | 2851 | 16 | 24 | 28029 | 9514 | 28069 | 37583 |
| 1973 | - | 2007 | 3154 | 1007 | 2564 | 3050 | 120 | 84 | 31108 | 11782 | 31312 | 43094 |
| 1974 | - | 1789 | 5182 | 1714 | 1358 | 666 | 223 | - | 28514 | 10709 | 28737 | 39446 |
| 1975 | - | 2032 | 6462 | 1413 | 978 | 490 | 221 | - | 29973 | 11375 | 30194 | 41569 |
| 1976 | - | 1572 | 7671 | 1445 | 527 | 4238 | 155 | - | 40422 | 15453 | 40577 | 56030 |
| 1977 | - | 2414 | 7866 | 1591 | 1429 | 147 | 147 | - | 39793 | 13447 | 39940 | 53387 |
| 1978 | - | 4103 | 13235 | 1749 | 2462 | - | 233 | - | 35158 | 21549 | 35391 | 56940 |
| 1979 | - | 3071 | 11479 | 3138 | 5031 | - | 311 | - | 32738 | 22719 | 33049 | 55768 |
| 1980 | - | 8354 | 11607 | 2380 | 7768 | - | 467 | - | 34107 | 30109 | 34574 | 64683 |
| 1981 | - | 5408 | 5796 | 2096 | 8936 | 327 | 384 | - | 38231 | 22563 | 38615 | 61178 |
| 1982 | - | 7473 | 9465 | 2126 | 7208 | - | 337 | - | 38878 | 26272 | 39215 | 65487 |
| 1983 | - | 3415 | 11849 | 5047 | 6614 | - | 473 | - | 38347 | 26925 | 38820 | 65745 |
| 1984 | - | 2899 | 6625 | 2815 | 7311 | - | - | - | 43643 | 19650 | 43643 | 63293 |
| 1985 | - | 3315 | 4474 | 2178 | 7275 | - | 321 | - | 36881 | 17242 | 37202 | 54444 |
| 1986 | - | 2938 | 5540 | 1000 | 4645 | - | 695 | - | 28999 | 14123 | 29694 | 43817 |
| 1987 | - | 1290 | 4949 | 746 | 4646 | - | 950 | - | 21180 | 11631 | 22130 | 33761 |
| 1988 | - | 1323 | 5110 | 803 | 2645 | - | 833 | - | 18959 | 9881 | 19792 | 29673 |
| 1989 | - | 736 | 3689 | 756 | 1473 | - | 907 | - | 21832 | 6654 | 22739 | 29393 |
| 1990 | - | 391 | 1797 | 827 | 1918 | - | 814 | - | 18837 | 4933 | 19651 | 24584 |
| 1991 | - | 2308 | 2535 | 1185 | 2274 | - | 606 | - | 10632 | 8302 | 11238 | 19540 |
| 1992 | - | 1679 | 1656 | 1287 | 1767 | - | 515 | - | 9166 | 6389 | 9681 | 16070 |
| 1993 | - | 2458 | 1750 | 846 | 562 | - | 189 | - | 7694 | 5616 | 7883 | 13499 |
| 1994 | - | - | 13 | 148 | 66 | - | 9 | - | 44 | 227 | 53 | 280 |
| 1995 | - | - | 14 | 1 | 15 | - | 4 | - | 0 | 30 | 5 | 35 |

| Year | NAFO 4R | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total FixeD | Total mobil | Total |
| 1996 | - | 4 | 30 | 0 | 33 | - | 11 | - | 1 | 67 | 13 | 80 |
| 1997 | - | 57 | 233 | 246 | 1712 | - | 8 | - | 43 | 2248 | 51 | 2299 |
| 1998 | - | 2 | 161 | 283 | 1287 | - | 29 | - | 1 | 1733 | 30 | 1763 |
| 1999 | - | 0 | 2801 | 890 | 1151 | - | 32 | - | 7 | 4842 | 40 | 4882 |
| 2000 | - | 26 | 2230 | 515 | 1435 | - | 36 | - | 24 | 4205 | 60 | 4265 |
| 2001 | - | 8 | 1683 | 716 | 1814 | - | 65 | - | 23 | 4221 | 88 | 4308 |
| 2002 | - | - | 1939 | 582 | 1371 | - | 29 | - | 17 | 3892 | 46 | 3938 |
| 2003 | - | 1 | 80 | 1 | 95 | - | 25 | - | 9 | 177 | 34 | 210 |
| 2004 | - | 0 | 956 | 288 | 564 | - | 44 | - | 28 | 1808 | 72 | 1881 |
| 2006 | - | 0 | 1976 | 175 | 1406 | - | 38 | - | 76 | 3558 | 113 | 3671 |
| 2007 | - | - | 2635 | 133 | 1740 | - | 31 | - | 0 | 4507 | 31 | 4538 |
| 2008 | - | 0 | 2285 | 204 | 1657 | - | 25 | - | 1 | 4147 | 26 | 4173 |
| 2009 | - | 1 | 1417 | 166 | 1129 | - | 23 | - | 1 | 2714 | 24 | 2738 |
| 2010 | - | 0 | 1268 | 244 | 648 | - | 13 | - | 2 | 2161 | 15 | 2176 |
| 2011 | - | 0 | 681 | 74 | 152 | - | 12 | - | 5 | 906 | 17 | 923 |
| 2012 | - | - | 558 | 67 | 101 | - | 4 | - | 1 | 727 | 5 | 732 |
| 2013 | - | 1 | 464 | 123 | 171 | - | 2 | - | 0 | 759 | 3 | 761 |
| 2014 | - | 0 | 571 | 123 | 84 | - | 3 | - | 2 | 778 | 5 | 783 |
| 2015 | - | - | 571 | 42 | 89 | - | 4 | - | - | 702 | 4 | 706* |
| 2016 | - | 1 | 604 | 57 | 115 | - | 5 | - | 1 | 776 | 6 | 782* |

*Table 3, (continued)*

C)

| Year | NAFO 4S | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixed | Total mobil | Total |
| 1964 | - | - | - | - | 486 | 6166 | - | - | 3490 | 6652 | 3490 | 10142 |
| 1965 | - | 3950 | 24 | - | 320 | - | 1 | - | 4060 | 4294 | 4061 | 8355 |
| 1966 | - | 1656 | 973 | - | 441 | 798 | - | - | 3385 | 3868 | 3385 | 7253 |
| 1967 | - | 2470 | 1618 | 710 | 305 | - | - | - | 3840 | 5103 | 3840 | 8943 |
| 1968 | - | 3070 | 1127 | 623 | 333 | - | - | - | 2568 | 5153 | 2568 | 7721 |
| 1969 | - | 2312 | 1960 | 607 | 262 | - | - | - | 4450 | 5141 | 4450 | 9591 |
| 1970 | 21 | 1789 | 846 | 771 | 251 | - | - | - | 5436 | 3678 | 5436 | 9114 |
| 1971 | - | 2410 | 963 | 503 | 565 | - | - | 1 | 5162 | 4441 | 5163 | 9604 |
| 1972 | - | 2040 | 1418 | 511 | 511 | - | - | - | 5817 | 4480 | 5817 | 10297 |
| 1973 | - | 885 | 1774 | 470 | 402 | 2248 | - | - | 5632 | 5779 | 5632 | 11411 |
| 1974 | - | 200 | 2326 | 402 | 976 | 2064 | - | - | 7009 | 5968 | 7009 | 12977 |
| 1975 | - | 579 | 2072 | 2337 | 136 | 1425 | - | - | 5882 | 6549 | 5882 | 12431 |
| 1976 | - | 992 | 2900 | 353 | 46 | 1385 | - | - | 6810 | 5676 | 6810 | 12486 |
| 1977 | - | 861 | 4089 | 303 | 36 | - | 2 | - | 7323 | 5289 | 7325 | 12614 |
| 1978 | - | 2178 | 3626 | 194 | 28 | - | 2 | - | 8736 | 6026 | 8738 | 14764 |
| 1979 | - | 1043 | 6578 | 467 | 148 | - | - | - | 7857 | 8236 | 7857 | 16093 |
| 1980 | - | - | 1376 | - | 1796 | 11658 | - | - | 9267 | 14830 | 9267 | 24097 |
| 1981 | - | 3 | 364 | - | 2678 | 12554 | - | 51 | 5953 | 15599 | 6004 | 21603 |
| 1982 | - | 13 | 27 | - | 3688 | 11629 | 3 | 340 | 8267 | 15357 | 8610 | 23967 |
| 1983 | - | - | 622 | 2 | 3890 | 11245 | 174 | - | 8295 | 15759 | 8469 | 24228 |
| 1984 | 8 | 675 | 8923 | 961 | 4301 | - | 1694 | - | 7847 | 14868 | 9541 | 24409 |
| 1985 | - | 1211 | 6182 | 891 | 4307 | - | 11 | - | 6794 | 12591 | 6805 | 19396 |
| 1986 | - | 52 | 4269 | 383 | 2672 | - | 161 | - | 9251 | 7376 | 9412 | 16788 |
| 1987 | - | 10 | 3065 | 219 | 2189 | - | 46 | - | 8900 | 5483 | 8946 | 14429 |
| 1988 | - | - | 3782 | 42 | 1232 | - | 16 | - | 4149 | 5056 | 4165 | 9221 |
| 1989 | - | 3 | 3206 | 379 | 1395 | - | 8 | - | 5113 | 4983 | 5121 | 10104 |
| 1990 | - | 1 | 1825 | 159 | 678 | - | - | - | 4795 | 2663 | 4795 | 7458 |
| 1991 | - | 48 | 1462 | 479 | 679 | - | - | - | 2882 | 2668 | 2882 | 5550 |
| 1992 | - | 19 | 1139 | 78 | 345 | - | - | - | 2367 | 1581 | 2367 | 3948 |
| 1993 | - | - | 604 | 136 | 169 | - | - | - | 836 | 909 | 836 | 1745 |
| 1994 | - | - | 6 | - | 23 | 19 | - | - | 8 | 48 | 8 | 56 |
| 1995 | - | - | 20 | - | 6 | 88 | - | - | 0 | 113 | 0 | 113 |

| Year | NAFO 4S | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixed | Total mobil | Total |
| 1996 | - | - | 150 | 0 | 7 | 6 | - | - | 1 | 163 | 1 | 165 |
| 1997 | - | - | 300 | - | 176 | 7 | - | - | 5 | 483 | 5 | 487 |
| 1998 | - | - | 497 | - | 148 | 6 | 0 | - | 4 | 651 | 4 | 655 |
| 1999 | - | - | 598 | 29 | 214 | - | 1 | - | 2 | 841 | 3 | 844 |
| 2000 | - | - | 813 | 9 | 234 | - | - | - | 0 | 1056 | 0 | 1057 |
| 2001 | - | 5 | 335 | 128 | 434 | - | - | - | 1 | 902 | 1 | 903 |
| 2002 | - | 5 | 733 | 12 | 127 | - | 1 | - | 2 | 876 | 3 | 879 |
| 2003 | - | 0 | 81 | - | 11 | - | - | - | 1 | 92 | 1 | 93 |
| 2004 | - | - | 525 | 11 | 71 | - | - | - | 0 | 607 | 0 | 607 |
| 2005 | - | 5 | 613 | 8 | 26 | - | 0 | - | 3 | 652 | 3 | 655 |
| 2006 | - | - | 712 | 9 | 46 | - | - | - | 5 | 767 | 5 | 772 |
| 2007 | - | - | 789 | 21 | 48 | - | - | - | 0 | 858 | 0 | 858 |
| 2008 | - | - | 739 | 8 | 106 | - | - | - | 0 | 854 | 0 | 854 |
| 2009 | - | 1 | 429 | 35 | 140 | - | - | - | 0 | 605 | 0 | 605 |
| 2010 | - | 0 | 439 | 13 | 218 | - | - | - | 1 | 670 | 1 | 671 |
| 2011 | - | - | 316 | 4 | 217 | - | - | - | 0 | 537 | 0 | 537 |
| 2012 | - | - | 252 | 5 | 126 | - | - | - | 1 | 383 | 1 | 384 |
| 2013 | - | 0 | 206 | 6 | 61 | - | - | - | 2 | 273 | 2 | 275 |
| 2014 | - | - | 210 | 5 | 110 | - | - | - | 0 | 325 | 0 | 325 |
| 2015 | - | - | 300 | 5 | 100 | - | - | - | 1 | 405 | 1 | 406* |
| 2016 | - | 0 | 252 | 4 | 139 | - | - | - | 1 | 395 | 1 | 396* |

*Table 3. (continued)*

D)

| Year | NAFO 3Pn, 4RS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixef | Total mobil | Total |
| 1964 | 558 | - | - | - | 4025 | 29830 | 185 | 178 | 49458 | 34413 | 49821 | 84234 |
| 1965 | 113 | 3950 | 24 | - | 3174 | 21581 | 146 | 142 | 39799 | 28842 | 40087 | 68929 |
| 1966 | 16 | 1656 | 973 | - | 3141 | 19184 | 53 | 597 | 39465 | 24970 | 40115 | 65085 |
| 1967 | - | 2470 | 1618 | 710 | 1169 | 24478 | 74 | 33 | 48760 | 30445 | 48867 | 79312 |
| 1968 | 33 | 3070 | 1416 | 623 | 1556 | 31161 | 72 | 814 | 50926 | 37859 | 51812 | 89671 |
| 1969 | - | 6255 | 13309 | 2499 | 8297 | 2685 | 208 | 29 | 37858 | 33045 | 38095 | 71140 |
| 1970 | 205 | 4175 | 5808 | 3119 | 9118 | 1962 | 244 | 287 | 80547 | 24387 | 81078 | 105465 |
| 1971 | - | 6196 | 5045 | 2015 | 9215 | 570 | 247 | 53 | 60469 | 23041 | 60769 | 83810 |
| 1972 | 17 | 3656 | 4434 | 1716 | 7219 | 2871 | 561 | 200 | 37563 | 19913 | 38324 | 58237 |
| 1973 | 1405 | 2892 | 5103 | 1587 | 8397 | 5395 | 294 | 440 | 40292 | 24779 | 41026 | 65805 |
| 1974 | 128 | 1989 | 7805 | 2168 | 4794 | 3645 | 281 | 1507 | 44119 | 20529 | 45907 | 66436 |
| 1975 | - | 2611 | 8595 | 3902 | 3532 | 1927 | 227 | - | 39439 | 20567 | 39666 | 60233 |
| 1976 | - | 2573 | 10734 | 2023 | 5040 | 6259 | 318 | - | 50034 | 26629 | 50352 | 76981 |
| 1977 | - | 3312 | 12028 | 2057 | 7144 | 147 | 268 | - | 48610 | 24688 | 48878 | 73566 |
| 1978 | - | 6288 | 16895 | 2046 | 7813 | - | 252 | - | 45212 | 33042 | 45464 | 78506 |
| 1979 | - | 4139 | 18097 | 3721 | 12517 | - | 492 | - | 43811 | 38474 | 44303 | 82777 |
| 1980 | - | 8354 | 12996 | 2463 | 16007 | 11658 | 485 | - | 45616 | 51478 | 46101 | 97579 |
| 1981 | - | 5415 | 6163 | 2168 | 19174 | 12881 | 412 | 51 | 51647 | 45801 | 52110 | 97911 |
| 1982 | - | 7487 | 9500 | 2213 | 18566 | 11629 | 352 | 340 | 54852 | 49395 | 55544 | 104939 |
| 1983 | - | 3416 | 12517 | 5146 | 17293 | 11245 | 667 | 8 | 55788 | 49617 | 56463 | 106080 |
| 1984 | 8 | 3576 | 15677 | 3821 | 18701 | - | 2193 | - | 59667 | 41783 | 61860 | 103643 |
| 1985 | - | 4530 | 10691 | 3093 | 17201 | - | 518 | - | 52256 | 35515 | 52774 | 88289 |
| 1986 | - | 2990 | 9815 | 1429 | 13045 | - | 872 | - | 54665 | 27279 | 55537 | 82816 |
| 1987 | - | 1300 | 8037 | 976 | 13424 | - | 1021 | - | 41789 | 23737 | 42810 | 66547 |
| 1988 | - | 1323 | 8904 | 848 | 7208 | - | 849 | - | 28820 | 18283 | 29669 | 47952 |
| 1989 | - | 739 | 7050 | 1146 | 4352 | - | 915 | - | 32717 | 13287 | 33632 | 46919 |
| 1990 | - | 392 | 3802 | 1000 | 3508 | 0 | 815 | - | 27946 | 8702 | 28761 | 37463 |
| 1991 | - | 2356 | 4273 | 1687 | 4171 | - | 681 | - | 18849 | 12487 | 19530 | 32017 |
| 1992 | - | 1698 | 3008 | 1390 | 3320 | - | 537 | - | 18062 | 9416 | 18599 | 28015 |
| 1993 | - | 2458 | 2507 | 1041 | 2119 | - | 189 | - | 10126 | 8125 | 10315 | 18440 |
| 1994 | - | 0 | 19 | 148 | 89 | 19 | 9 | - | 103 | 275 | 112 | 387 |
| 1995 | - | 0 | 34 | 1 | 21 | 88 | 4 | - | 0 | 143 | 5 | 148 |

| Year | NAFO 3Pn, 4RS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DV | T | GN | HL | LL | IN | DS | PT | OT | Total Fixef | Total mobil | Total |
| 1996 | - | 4 | 193 | 0 | 98 | 6 | 11 | - | 4 | 301 | 15 | 317 |
| 1997 | - | 57 | 538 | 265 | 3857 | 7 | 8 | - | 60 | 4724 | 68 | 4792 |
| 1998 | - | 2 | 660 | 299 | 2295 | 6 | 29 | - | 5 | 3262 | 34 | 3296 |
| 1999 | - | 0 | 3401 | 968 | 2475 | - | 35 | - | 11 | 6844 | 46 | 6891 |
| 2000 | - | 26 | 3046 | 557 | 3111 | - | 36 | - | 24 | 6740 | 60 | 6800 |
| 2001 | - | 13 | 2020 | 864 | 3963 | - | 65 | - | 25 | 6860 | 90 | 6950 |
| 2002 | - | 5 | 2672 | 634 | 3155 | - | 30 | - | 34 | 6465 | 64 | 6529 |
| 2003 | - | 1 | 161 | 1 | 191 | - | 25 | - | 10 | 354 | 35 | 389 |
| 2004 | - | 0 | 1483 | 309 | 1397 | - | 44 | - | 29 | 3189 | 73 | 3262 |
| 2005 | - | 6 | 2288 | 230 | 1874 | - | 50 | - | 35 | 4398 | 85 | 4483 |
| 2006 | - | 1 | 2690 | 190 | 2649 | - | 38 | - | 84 | 5529 | 122 | 5651 |
| 2007 | - | - | 3427 | 158 | 2862 | - | 31 | - | 0 | 6447 | 31 | 6478 |
| 2008 | - | 0 | 3027 | 215 | 2889 | - | 25 | - | 2 | 6131 | 27 | 6158 |
| 2009 | - | 2 | 1852 | 207 | 2615 | - | 23 | - | 2 | 4676 | 25 | 4700 |
| 2010 | - | 0 | 1710 | 263 | 1563 | - | 13 | - | 3 | 3536 | 16 | 3552 |
| 2011 | - | 1 | 1004 | 84 | 671 | - | 12 | - | 5 | 1759 | 17 | 1776 |
| 2012 | - | 0 | 820 | 74 | 403 | - | 4 | - | 2 | 1297 | 6 | 1303 |
| 2013 | - | 1 | 670 | 131 | 415 | - | 2 | - | 2 | 1217 | 5 | 1222 |
| 2014 | - | 0 | 785 | 129 | 342 | - | 3 | - | 2 | 1256 | 5 | 1262 |
| 2015 | - | 0 | 872 | 48 | 342 | - | 4 | - | 1 | 1262 | 4 | 1267* |
| 2016 | - | 1 | 856 | 64 | 397 | - | 5 | - | 2 | 1317 | 8 | 1324* |

*Table 4. 2016 cod landing (t) statistics (preliminary) in NAFO Subdivision A) 3Pn, B) 4R, C) 4S and D) 3Pn, 4RS.*

A)

| Region-Gear | NAFO 3Pn | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Jan.** | **Feb.** | **Mar.** | **Apr.** | **May** | **June** | **July** | **Aug.** | **Sept.** | **Oct.** | **Nov.** | **Dec.** | **Total** |
| Newfoundland | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Danish seines | 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 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| Longlines | 0.0 | 0.0 | 0.0 | 7.9 | 3.6 | 9.2 | 13.2 | 1.0 | 10.0 | 1.6 | 94.6 | 2.3 | 143.3 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 2.4 |
| Traps | 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 |
| Total | 0.0 | 0.0 | 0.0 | 7.9 | 3.8 | 9.2 | 15.0 | 1.0 | 10.7 | 1.6 | 94.6 | 2.3 | 146.0 |
| Maritimes | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Danish seines | 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 |
| Longlines | 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 | 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 |
| Quebec | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Longlines | 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 | 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 | 0.0 | 0.0 | 0.0 | 7.9 | 3.8 | 9.2 | 15.0 | 1.0 | 10.7 | 1.6 | 94.6 | 2.3 | 146.0 |

*Table 4. (continued)*

B)

| Region-Gear | NAFO 4R | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Jan.** | **Feb.** | **Mar.** | **Apr.** | **May** | **June** | **July** | **Aug.** | **Sept.** | **Oct.** | **Nov.** | **Dec.** | **Total** |
| Newfoundland | | | | | | | | | | | | | |
| Otter trawl | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.8 |
| Danish seines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 2.3 | 1.4 | 0.0 | 0.3 | 0.0 | 5.5 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.5 | 514.3 | 15.7 | 55.0 | 3.4 | 4.7 | 0.2 | 596.7 |
| Longlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 29.5 | 8.7 | 24.8 | 2.9 | 43.9 | 1.2 | 113.1 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 34.3 | 0.1 | 20.8 | 0.0 | 1.4 | 0.0 | 56.5 |
| Traps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.9 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.6 | 579.7 | 26.7 | 102.8 | 7.0 | 50.3 | 1.4 | 773.5 |
| Maritimes | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Danish seines | 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 |
| Longlines | 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 | 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 |
| Quebec | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.0 |
| Longlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 9.0 |
| TOTAL | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **5.6** | **588.4** | **26.9** | **102.8** | **7.0** | **50.3** | **1.4** | **782.5** |

*Table 4. (continued)*

C)

| Region-Gear | NAFO 4S | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Jan.** | **Feb.** | **Mar.** | **Apr.** | **May** | **June** | **July** | **Aug.** | **Sept.** | **Oct.** | **Nov.** | **Dec.** | **Total** |
| Terre-Neuve | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Gillnets | 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 |
| Longlines | 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 |
| Handlines | 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 | 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 |
| Maritimes | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Danish seines | 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 |
| Gillnets | 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 |
| Longlines | 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 | 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 |
| Québec | | | | | | | | | | | | | |
| Otter trawl | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| Danish seines | 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 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 7.6 | 192.4 | 48.3 | 2.3 | 0.0 | 0.0 | 0.0 | 251.7 |
| Longlines | 0.0 | 0.0 | 0.0 | 2.0 | 2.6 | 0.6 | 34.0 | 51.8 | 28.6 | 19.0 | 0.0 | 0.0 | 138.6 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 |
| Traps | 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 | 0.0 | 0.0 | 0.0 | 2.1 | 3.5 | 8.2 | 232.0 | 100.3 | 30.9 | 19.0 | 0.0 | 0.0 | 396.1 |
| TOTAL | **0.0** | **0.0** | **0.0** | **2.1** | **3.5** | **8.2** | **232.0** | **100.4** | **30.9** | **19.0** | **0.0** | **0.0** | **396.1** |

*Table 4 (continued)*

D)

| Region-Gear | NAFO 3Pn, 4RS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Jan.** | **Feb.** | **Mar.** | **Apr.** | **May** | **June** | **July** | **Aug.** | **Sept.** | **Oct.** | **Nov.** | **Dec.** | **Total** |
| Terre-Neuve | | | | | | | | | | | | | |
| Otter trawl | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.8 |
| Danish seines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 2.3 | 1.4 | 0.0 | 0.3 | 0.0 | 5.5 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 3.5 | 514.3 | 15.7 | 55.0 | 3.4 | 4.7 | 0.2 | 597.0 |
| Longlines | 0.0 | 0.0 | 0.0 | 7.9 | 3.6 | 11.4 | 42.7 | 9.7 | 34.8 | 4.5 | 138.5 | 3.5 | 256.5 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.0 | 0.1 | 21.5 | 0.0 | 1.4 | 0.0 | 58.9 |
| Traps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.9 |
| Total | 0.0 | 0.0 | 0.0 | 7.9 | 3.8 | 14.9 | 594.6 | 27.7 | 113.4 | 8.6 | 144.8 | 3.7 | 919.5 |
| Maritimes | | | | | | | | | | | | | |
| Otter trawl | 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 |
| Danish seines | 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 |
| Gillnets | 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 |
| Longlines | 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 | 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 |
| Québec | | | | | | | | | | | | | |
| Otter trawl | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| Danish seines | 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 |
| Gillnets | 0.0 | 0.0 | 0.0 | 0.1 | 0.9 | 7.6 | 199.4 | 48.3 | 2.3 | 0.0 | 0.0 | 0.0 | 258.7 |
| Longlines | 0.0 | 0.0 | 0.0 | 2.0 | 2.6 | 0.6 | 35.3 | 52.0 | 28.6 | 19.0 | 0.0 | 0.0 | 140.1 |
| Handlines | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 |
| Traps | 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 | 0.0 | 0.0 | 0.0 | 2.1 | 3.5 | 8.2 | 240.8 | 100.5 | 30.9 | 19.0 | 0.0 | 0.0 | 405.0 |
| TOTAL | **0.0** | **0.0** | **0.0** | **10.0** | **7.3** | **23.1** | **835.4** | **128.3** | **144.3** | **27.6** | **144.8** | **3.7** | **1324.5** |

*Table 5. Commercial Fisheries, catch-at-age ('000).*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 741 | 4069 | 9607 | 13498 | 5303 | 6658 | 2794 | 1509 | 413 | 173 | 82 |
| 1975 | 35 | 4313 | 7707 | 5091 | 7185 | 2930 | 2757 | 1719 | 740 | 316 | 135 |
| 1976 | 217 | 5210 | 12535 | 6323 | 4244 | 5750 | 1991 | 2561 | 993 | 395 | 147 |
| 1977 | 14 | 2672 | 10124 | 12756 | 7943 | 2628 | 3274 | 1098 | 894 | 394 | 291 |
| 1978 | 61 | 2678 | 10794 | 17616 | 9292 | 2163 | 1064 | 1261 | 538 | 441 | 235 |
| 1979 | 70 | 3404 | 13995 | 12871 | 12592 | 4822 | 1429 | 721 | 543 | 300 | 141 |
| 1980 | 605 | 3390 | 17515 | 20196 | 11624 | 7064 | 1531 | 483 | 289 | 324 | 77 |
| 1981 | 316 | 6689 | 8999 | 20054 | 13971 | 4730 | 2154 | 939 | 294 | 172 | 163 |
| 1982 | 229 | 3231 | 18782 | 12747 | 13768 | 8673 | 3372 | 2109 | 618 | 145 | 74 |
| 1983 | 840 | 4901 | 15255 | 18451 | 10206 | 6002 | 3061 | 1161 | 817 | 211 | 214 |
| 1984 | 47 | 2947 | 7733 | 13493 | 20246 | 7394 | 5688 | 2095 | 821 | 406 | 145 |
| 1985 | 175 | 2518 | 15909 | 13820 | 10688 | 9818 | 3179 | 2317 | 828 | 200 | 81 |
| 1986 | 215 | 2415 | 8534 | 15635 | 11847 | 6024 | 6189 | 2284 | 1748 | 461 | 185 |
| 1987 | 15 | 1194 | 8426 | 12310 | 11864 | 7210 | 3650 | 1843 | 1470 | 575 | 261 |
| 1988 | 117 | 1274 | 6037 | 11452 | 6078 | 5145 | 1515 | 656 | 826 | 277 | 142 |
| 1989 | 370 | 1882 | 5059 | 8190 | 8576 | 4101 | 2703 | 1085 | 480 | 380 | 145 |
| 1990 | 362 | 3083 | 7677 | 5916 | 5435 | 3984 | 1665 | 913 | 273 | 112 | 61 |
| 1991 | 109 | 3004 | 6928 | 6896 | 3344 | 2587 | 1996 | 487 | 433 | 115 | 57 |
| 1992 | 309 | 4276 | 9148 | 6080 | 3414 | 1661 | 1132 | 679 | 210 | 104 | 51 |
| 1993 | 169 | 1949 | 3807 | 5985 | 2863 | 888 | 343 | 215 | 130 | 22 | 20 |
| 1994 | 1 | 2 | 41 | 65 | 89 | 47 | 7 | 7 | 2 | 2 | 1 |
| 1995 | 2 | 10 | 23 | 52 | 40 | 33 | 17 | 5 | 2 | 1 | 1 |
| 1996 | 2 | 22 | 60 | 107 | 90 | 57 | 41 | 13 | 2 | 1 | 1 |
| 1997 | 18 | 296 | 386 | 764 | 475 | 517 | 220 | 248 | 31 | 10 | 3 |
| 1998 | 1 | 30 | 350 | 349 | 460 | 222 | 136 | 123 | 40 | 17 | 4 |
| 1999 | 1 | 45 | 200 | 953 | 454 | 776 | 375 | 178 | 136 | 54 | 7 |
| 2000 | 1 | 48 | 400 | 675 | 1269 | 375 | 429 | 159 | 50 | 14 | 11 |
| 2001 | 1 | 161 | 298 | 638 | 642 | 1016 | 333 | 188 | 50 | 30 | 24 |
| 2002 | 1 | 63 | 283 | 874 | 748 | 823 | 658 | 168 | 46 | 7 | 26 |
| 2003 | 0 | 8 | 21 | 52 | 61 | 43 | 15 | 16 | 11 | 1 | 0 |
| 2004 | 0 | 4 | 98 | 272 | 387 | 334 | 233 | 100 | 67 | 7 | 6 |
| 2005 | 0 | 12 | 81 | 256 | 641 | 433 | 316 | 146 | 143 | 55 | 11 |
| 2006 | 0 | 30 | 218 | 538 | 536 | 823 | 329 | 154 | 116 | 59 | 25 |
| 2007 | 2 | 80 | 246 | 450 | 395 | 638 | 506 | 228 | 125 | 40 | 28 |
| 2008 | 1 | 171 | 266 | 543 | 627 | 414 | 449 | 187 | 97 | 33 | 17 |
| 2009 | 3 | 116 | 593 | 629 | 431 | 302 | 226 | 88 | 50 | 20 | 15 |
| 2010 | 0 | 87 | 248 | 519 | 403 | 281 | 193 | 71 | 26 | 21 | 0 |
| 2011 | 2 | 32 | 176 | 254 | 298 | 134 | 60 | 33 | 14 | 5 | 5 |
| 2012 | 1 | 4 | 30 | 110 | 206 | 185 | 65 | 35 | 15 | 12 | 0 |
| 2013 | 0 | 10 | 37 | 119 | 173 | 131 | 95 | 23 | 10 | 1 | 0 |
| 2014 | 1 | 21 | 36 | 82 | 98 | 144 | 109 | 58 | 14 | 4 | 2 |
| 2015 | 0 | 18 | 48 | 99 | 84 | 147 | 99 | 30 | 15 | 2 | 2 |
| 2016 | 1 | 14 | 63 | 117 | 131 | 54 | 79 | 41 | 27 | 9 | 3 |

*Table 6. Commercial Fisheries, mean weight at age January 1 (kg).*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 0.46 | 0.64 | 0.99 | 1.31 | 1.67 | 1.98 | 2.51 | 2.89 | 4.46 | 5.59 | 5.57 |
| 1975 | 0.40 | 0.72 | 1.00 | 1.52 | 1.89 | 2.34 | 2.61 | 3.08 | 4.16 | 4.50 | 4.30 |
| 1976 | 0.44 | 0.76 | 1.13 | 1.68 | 2.15 | 2.60 | 2.90 | 3.11 | 3.91 | 4.83 | 6.90 |
| 1977 | 0.46 | 0.65 | 1.02 | 1.48 | 2.02 | 2.52 | 2.77 | 3.17 | 3.35 | 4.23 | 4.13 |
| 1978 | 0.57 | 0.75 | 0.96 | 1.44 | 1.98 | 2.63 | 3.22 | 3.32 | 3.22 | 3.86 | 5.12 |
| 1979 | 0.35 | 0.65 | 0.93 | 1.42 | 1.87 | 2.58 | 3.40 | 3.84 | 3.96 | 5.23 | 5.38 |
| 1980 | 0.51 | 0.62 | 0.93 | 1.43 | 1.91 | 2.41 | 3.41 | 4.15 | 4.41 | 3.87 | 5.42 |
| 1981 | 0.57 | 0.79 | 0.98 | 1.32 | 1.85 | 2.49 | 3.34 | 4.55 | 6.04 | 7.43 | 5.93 |
| 1982 | 0.45 | 0.85 | 1.11 | 1.44 | 1.76 | 2.12 | 2.66 | 3.13 | 3.88 | 5.70 | 6.02 |
| 1983 | 0.38 | 0.93 | 1.30 | 1.60 | 1.90 | 2.18 | 2.45 | 3.47 | 4.52 | 4.37 | 6.66 |
| 1984 | 0.42 | 0.79 | 1.03 | 1.45 | 1.77 | 2.03 | 2.30 | 2.70 | 3.48 | 3.75 | 4.70 |
| 1985 | 0.63 | 0.79 | 0.98 | 1.22 | 1.62 | 1.93 | 2.15 | 2.32 | 2.60 | 3.71 | 4.60 |
| 1986 | 0.64 | 0.73 | 0.98 | 1.19 | 1.47 | 1.92 | 2.22 | 2.46 | 2.62 | 3.07 | 3.19 |
| 1987 | 0.45 | 0.60 | 0.77 | 1.01 | 1.31 | 1.58 | 2.09 | 2.65 | 2.73 | 3.05 | 3.28 |
| 1988 | 0.51 | 0.73 | 0.88 | 1.20 | 1.49 | 1.81 | 2.27 | 2.74 | 2.92 | 3.05 | 3.90 |
| 1989 | 0.40 | 0.69 | 0.93 | 1.12 | 1.42 | 1.67 | 2.02 | 2.33 | 2.84 | 3.11 | 3.98 |
| 1990 | 0.59 | 0.75 | 0.93 | 1.18 | 1.39 | 1.64 | 1.86 | 2.16 | 2.67 | 3.91 | 4.13 |
| 1991 | 0.43 | 0.61 | 0.83 | 1.09 | 1.38 | 1.59 | 1.83 | 2.01 | 2.29 | 2.40 | 3.15 |
| 1992 | 0.46 | 0.61 | 0.79 | 1.01 | 1.29 | 1.50 | 1.75 | 1.98 | 2.27 | 2.23 | 2.92 |
| 1993 | 0.42 | 0.59 | 0.80 | 1.06 | 1.30 | 1.73 | 2.07 | 2.50 | 3.04 | 4.38 | 5.27 |
| 1994 | 0.42 | 0.55 | 0.88 | 1.09 | 1.29 | 1.66 | 3.67 | 2.17 | 2.61 | 3.35 | 5.08 |
| 1995 | 0.42 | 0.83 | 0.88 | 1.36 | 1.35 | 1.64 | 2.01 | 2.66 | 1.27 | 3.58 | 4.16 |
| 1996 | 0.45 | 0.74 | 0.96 | 1.21 | 1.50 | 1.72 | 2.31 | 3.00 | 3.66 | 3.58 | 4.16 |
| 1997 | 0.92 | 0.83 | 1.08 | 1.40 | 1.66 | 1.98 | 2.26 | 2.51 | 3.92 | 4.19 | 4.76 |
| 1998 | 0.90 | 0.70 | 1.10 | 1.31 | 1.56 | 1.83 | 1.92 | 2.46 | 2.83 | 3.09 | 5.41 |
| 1999 | 0.90 | 0.99 | 1.31 | 1.75 | 2.04 | 2.30 | 2.36 | 2.86 | 3.33 | 3.82 | 5.22 |
| 2000 | 0.56 | 0.81 | 1.27 | 1.64 | 2.03 | 2.26 | 2.48 | 2.54 | 2.83 | 5.61 | 3.32 |
| 2001 | 0.57 | 0.82 | 1.16 | 1.59 | 1.87 | 2.39 | 2.63 | 3.18 | 3.69 | 3.57 | 4.17 |
| 2002 | 0.35 | 0.71 | 1.20 | 1.52 | 1.81 | 2.01 | 2.37 | 2.61 | 3.28 | 4.56 | 3.03 |
| 2003 | 0.44 | 0.60 | 1.04 | 1.32 | 1.59 | 1.87 | 1.95 | 2.49 | 2.49 | 3.39 | 5.72 |
| 2004 | 0.58 | 0.87 | 1.13 | 1.62 | 2.11 | 2.19 | 2.58 | 2.65 | 3.28 | 3.80 | 3.57 |
| 2005 | 0.46 | 1.04 | 1.32 | 1.61 | 1.85 | 2.28 | 2.53 | 3.21 | 2.81 | 3.98 | 4.33 |
| 2006 | 0.49 | 0.85 | 1.17 | 1.43 | 1.76 | 1.95 | 2.27 | 2.74 | 2.83 | 3.00 | 3.43 |
| 2007 | 0.59 | 0.96 | 1.34 | 1.80 | 2.04 | 2.50 | 2.66 | 3.20 | 3.52 | 4.09 | 3.58 |
| 2008 | 0.44 | 0.85 | 1.22 | 1.80 | 2.17 | 2.40 | 2.66 | 2.85 | 3.69 | 4.07 | 5.66 |
| 2009 | 0.50 | 0.86 | 1.16 | 1.53 | 2.00 | 2.59 | 2.63 | 3.44 | 3.83 | 5.08 | 5.45 |
| 2010 | 0.47 | 0.88 | 1.17 | 1.55 | 1.95 | 2.46 | 2.61 | 3.02 | 3.30 | 4.20 | 5.56 |
| 2011 | 0.64 | 0.81 | 1.04 | 1.32 | 1.89 | 2.32 | 2.81 | 2.96 | 3.11 | 3.85 | 4.32 |
| 2012 | 0.54 | 0.65 | 1.12 | 1.44 | 1.72 | 2.18 | 2.48 | 2.85 | 3.55 | 2.94 | 4.94 |
| 2013 | 0.59 | 0.80 | 1.20 | 1.59 | 1.88 | 2.10 | 2.71 | 3.20 | 3.86 | 4.50 | 5.27 |
| 2014 | 0.48 | 0.76 | 1.03 | 1.52 | 1.97 | 2.30 | 2.63 | 3.14 | 3.89 | 5.38 | 6.42 |
| 2015 | 0.68 | 0.93 | 1.36 | 1.94 | 2.05 | 2.51 | 2.64 | 3.25 | 3.77 | 5.23 | 4.35 |
| 2016 | 0.52 | 0.88 | 1.38 | 1.92 | 2.44 | 2.78 | 2.87 | 3.52 | 3.60 | 4.42 | 5.97 |

*Table 7. Commercial Fisheries, lengths at age (cm).*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 36.78 | 41.06 | 47.59 | 52.40 | 56.69 | 59.95 | 64.72 | 67.16 | 78.00 | 84.78 | 83.13 |
| 1975 | 35.17 | 42.76 | 47.91 | 54.96 | 59.15 | 63.23 | 65.57 | 68.98 | 76.55 | 78.01 | 76.17 |
| 1976 | 36.11 | 43.64 | 49.82 | 56.85 | 61.83 | 65.85 | 68.24 | 69.83 | 75.00 | 80.20 | 90.65 |
| 1977 | 37.00 | 41.35 | 48.08 | 54.45 | 60.53 | 65.14 | 67.22 | 70.09 | 71.23 | 76.82 | 76.70 |
| 1978 | 39.24 | 43.30 | 47.21 | 53.91 | 60.03 | 66.13 | 70.50 | 70.97 | 69.68 | 74.89 | 81.29 |
| 1979 | 33.25 | 41.14 | 46.62 | 53.67 | 58.85 | 65.27 | 71.65 | 74.13 | 75.19 | 81.82 | 83.78 |
| 1980 | 38.17 | 40.67 | 46.49 | 53.79 | 59.20 | 63.91 | 71.62 | 76.39 | 77.99 | 74.40 | 84.17 |
| 1981 | 39.26 | 44.01 | 47.47 | 52.49 | 58.30 | 63.96 | 69.95 | 77.75 | 86.78 | 93.17 | 86.79 |
| 1982 | 36.49 | 44.94 | 49.50 | 53.95 | 57.79 | 61.32 | 65.82 | 69.06 | 74.47 | 85.27 | 87.26 |
| 1983 | 33.44 | 46.37 | 52.06 | 55.96 | 59.08 | 61.48 | 63.81 | 70.99 | 77.97 | 76.01 | 88.68 |
| 1984 | 35.88 | 44.05 | 48.23 | 54.20 | 57.91 | 60.42 | 62.75 | 65.90 | 71.57 | 73.09 | 77.64 |
| 1985 | 40.65 | 44.06 | 47.40 | 51.03 | 56.04 | 59.36 | 61.28 | 62.88 | 64.79 | 72.74 | 77.76 |
| 1986 | 41.36 | 42.93 | 47.33 | 50.58 | 54.10 | 59.02 | 61.94 | 64.00 | 65.17 | 68.41 | 69.37 |
| 1987 | 36.65 | 40.18 | 43.83 | 47.80 | 52.21 | 55.24 | 60.53 | 65.25 | 65.82 | 68.30 | 69.55 |
| 1988 | 37.97 | 42.83 | 45.69 | 50.65 | 54.35 | 58.01 | 62.09 | 66.01 | 67.42 | 68.23 | 73.75 |
| 1989 | 34.24 | 42.13 | 46.65 | 49.58 | 53.59 | 56.46 | 59.99 | 62.43 | 65.91 | 68.29 | 73.77 |
| 1990 | 40.08 | 43.56 | 46.74 | 50.23 | 52.99 | 55.81 | 57.78 | 60.30 | 63.71 | 72.10 | 73.77 |
| 1991 | 36.77 | 41.33 | 45.65 | 50.02 | 53.93 | 56.58 | 59.12 | 60.78 | 62.85 | 63.33 | 68.29 |
| 1992 | 37.84 | 41.23 | 45.08 | 48.68 | 52.78 | 55.24 | 58.13 | 60.33 | 62.94 | 61.38 | 67.93 |
| 1993 | 36.31 | 40.59 | 44.77 | 49.12 | 52.39 | 57.09 | 59.95 | 63.94 | 67.54 | 76.80 | 81.80 |
| 1994 | 36.31 | 40.00 | 46.50 | 49.83 | 52.79 | 56.82 | 73.84 | 61.42 | 66.79 | 72.45 | 83.77 |
| 1995 | 36.31 | 44.32 | 45.69 | 52.53 | 52.44 | 55.69 | 59.82 | 65.27 | 52.00 | 73.00 | 76.51 |
| 1996 | 37.00 | 43.60 | 47.40 | 51.01 | 54.22 | 56.87 | 62.26 | 67.59 | 72.51 | 73.00 | 76.51 |
| 1997 | 44.79 | 44.99 | 48.94 | 53.32 | 56.36 | 59.40 | 61.63 | 63.89 | 74.11 | 75.72 | 80.40 |
| 1998 | 37.00 | 44.80 | 50.60 | 53.49 | 56.28 | 59.01 | 59.06 | 61.08 | 65.90 | 66.17 | 75.86 |
| 1999 | 37.00 | 46.60 | 51.14 | 56.23 | 59.98 | 62.87 | 63.86 | 67.19 | 71.85 | 76.52 | 82.97 |
| 2000 | 40.00 | 44.57 | 51.58 | 56.04 | 60.48 | 62.73 | 64.84 | 65.34 | 67.45 | 83.94 | 70.26 |
| 2001 | 40.00 | 44.29 | 49.71 | 54.67 | 58.00 | 63.02 | 64.61 | 69.42 | 72.39 | 71.36 | 74.73 |
| 2002 | 34.00 | 42.17 | 50.14 | 54.08 | 57.11 | 59.15 | 62.17 | 64.10 | 68.87 | 75.89 | 67.12 |
| 2003 | 36.37 | 40.15 | 47.62 | 51.69 | 55.08 | 58.20 | 58.64 | 63.67 | 64.03 | 70.19 | 83.36 |
| 2004 | 40.00 | 45.54 | 51.24 | 55.56 | 60.44 | 61.18 | 64.08 | 64.52 | 69.08 | 72.89 | 71.86 |
| 2005 | 36.79 | 48.12 | 51.87 | 55.37 | 57.81 | 61.70 | 63.61 | 68.42 | 65.69 | 73.07 | 74.20 |
| 2006 | 37.72 | 45.75 | 50.90 | 54.17 | 57.79 | 59.80 | 62.53 | 66.39 | 66.38 | 68.46 | 70.70 |
| 2007 | 40.90 | 47.64 | 53.09 | 58.21 | 60.51 | 64.61 | 65.76 | 69.86 | 71.94 | 75.08 | 72.20 |
| 2008 | 37.00 | 45.40 | 50.83 | 57.54 | 60.87 | 62.71 | 65.09 | 66.20 | 71.70 | 73.72 | 83.44 |
| 2009 | 38.59 | 45.66 | 50.01 | 54.78 | 59.42 | 64.40 | 64.35 | 70.35 | 72.34 | 79.09 | 81.94 |
| 2010 | 37.79 | 46.03 | 50.24 | 54.94 | 59.16 | 63.52 | 64.18 | 67.45 | 69.83 | 75.50 | 82.69 |
| 2011 | 41.77 | 44.80 | 48.52 | 52.19 | 58.56 | 62.20 | 65.70 | 66.96 | 68.79 | 73.93 | 75.33 |
| 2012 | 40.00 | 42.27 | 50.40 | 54.57 | 57.63 | 62.05 | 64.91 | 66.93 | 72.51 | 67.40 | 79.01 |
| 2013 | 40.89 | 44.71 | 50.60 | 55.56 | 58.45 | 60.23 | 65.49 | 69.07 | 73.80 | 77.13 | 82.35 |
| 2014 | 38.10 | 44.05 | 48.61 | 54.89 | 59.67 | 62.78 | 65.61 | 69.56 | 73.93 | 83.16 | 88.32 |
| 2015 | 43.00 | 47.25 | 53.23 | 59.71 | 60.75 | 64.65 | 65.73 | 69.68 | 74.14 | 83.08 | 77.88 |
| 2016 | 39.48 | 46.50 | 53.61 | 59.86 | 64.68 | 67.35 | 68.03 | 72.60 | 72.87 | 77.76 | 84.98 |

*Table 8a. DFO Survey, NAFO Division 4R, average weight of cod caught per tow per stratum.*

| | 4R / strata | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | **801** | **802** | **809** | **810** | **811** | **812** | **813** | **820** | **821** | **822** | **823** | **824** | **835** | **836** | **837** | **838** | **840** |
| 1990 | 0.6 | 0.0 | 0.0 | 0.0 | 1.9 | 6.0 | 41.0 | 83.0 | 86.9 | 60.5 | 116.0 | 956.1 | 49.9 | 43.0 | 63.6 | 232.0 | 4.5 |
| 1991 | 0.1 | 1.1 | 0.4 | 0.0 | 22.1 | 31.4 | 18.2 | 23.4 | 128.5 | 60.7 | 36.8 | 162.6 | 41.8 | 98.8 | 83.3 | 531.9 | 14.4 |
| 1992 | 0.0 | 0.0 | 0.7 | 0.0 | 0.1 | 15.6 | 60.3 | 93.4 | 22.4 | 23.2 | 65.5 | 52.7 | 72.0 | 55.7 | 30.9 | 127.9 | 52.4 |
| 1993 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 6.2 | 3.1 | 10.3 | 20.4 | 3.9 | 21.8 | 6.4 | 2.2 | 15.5 | 28.6 | 0.3 |
| 1994 | 3.0 | 0.0 | 0.2 | 0.0 | 5.6 | 6.4 | 6.8 | 14.8 | 5.3 | 62.7 | 151.3 | 62.7 | 11.8 | 27.5 | 64.0 | 69.0 | 0.7 |
| 1995 | 0.0 | 0.0 | 0.0 | 0.0 | 3.3 | 3.9 | 60.4 | 226.5 | 19.7 | 58.6 | 82.0 | 45.7 | 21.1 | 11.3 | 16.5 | 9.0 | 0.8 |
| 1996 | 0.0 | 0.0 | 0.0 | 1.9 | 3.5 | 0.0 | 12.7 | 49.1 | 87.6 | 44.1 | 15.4 | 60.7 | 17.7 | 7.4 | 22.6 | 37.2 | 1.3 |
| 1997 | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 9.0 | 8.9 | 54.7 | 56.4 | 169.9 | 63.8 | 50.6 | 223.2 | 34.0 | 69.9 | 33.2 | 1.7 |
| 1998 | 0.0 | 0.0 | 0.0 | 0.0 | 558.2 | 66.2 | 9.0 | 90.5 | 28.8 | 48.7 | 178.1 | 53.2 | 170.9 | 2.4 | 34.6 | 9.1 | 0.8 |
| 1999 | 0.7 | 0.0 | 0.8 | 0.0 | 9.0 | 4.0 | 27.7 | 113.3 | 74.5 | 77.3 | 49.0 | 38.2 | 46.7 | 162.7 | 170.9 | 150.6 | 2.3 |
| 2000 | 0.0 | 0.0 | 0.0 | 0.0 | 27.0 | 1.8 | 39.6 | 160.8 | 85.6 | 69.7 | 702.6 | 22.0 | 27.0 | 38.4 | 52.4 | 83.5 | 1.4 |
| 2001 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 12.9 | 35.6 | 112.9 | 45.7 | 226.0 | 68.1 | 25.5 | 70.1 | 118.2 | 168.7 | 8.4 |
| 2002 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 5.3 | 31.6 | 0.0 | 8.0 | 10.0 | 62.3 | 17.4 | 2.0 | 2.4 | 35.1 | 123.0 | 0.5 |
| 2003 | 0.0 | 0.0 | 0.0 | 0.4 | 5.7 | 91.4 | 4.9 | 55.3 | 61.2 | 191.5 | 497.1 | 168.3 | 60.0 | 72.8 | 65.0 | 712.6 | 2.1 |
| 2004 | 0.0 | 0.4 | 0.0 | 0.0 | 1.6 | 7.8 | 27.4 | 22.8 | 77.7 | 29.9 | 155.3 | 277.9 | 86.6 | 71.8 | 62.2 | 120.3 | 2.9 |
| 2005 | 1.4 | 0.0 | 0.0 | 0.0 | 98.0 | 78.2 | 0.4 | 80.3 | 83.9 | 75.8 | 102.7 | 141.6 | 40.8 | 44.4 | 48.9 | 10.9 | 12.6 |
| 2006 | 0.0 | 0.0 | 0.7 | 0.0 | 24.6 | 25.9 | 61.1 | 65.4 | 46.5 | 101.9 | 587.3 | 225.9 | 39.3 | 69.4 | 51.7 | 20.5 | 0.0 |
| 2007 | 0.1 | 0.0 | 3.6 | 0.1 | 11.9 | 5.5 | 8.3 | 60.9 | 24.7 | 31.0 | 114.6 | 111.3 | 61.8 | 36.0 | 144.1 | 15.8 | 2.5 |
| 2008 | 0.9 | 0.0 | 0.0 | 0.1 | 25.2 | 0.0 | 8.2 | 10.7 | 43.1 | 60.0 | 73.3 | 33.2 | 57.1 | 66.4 | 105.0 | 45.1 | 10.3 |
| 2009 | 0.2 | 0.0 | 0.0 | 0.0 | 17.0 | 10.6 | 1.1 | 14.6 | 35.8 | 71.0 | 36.6 | 95.0 | 100.5 | 36.2 | 115.1 | 15.6 | 1.7 |
| 2010 | 0.0 | 0.0 | 0.2 | 0.1 | 16.2 | 11.7 | 8.4 | 33.0 | 81.9 | 48.6 | 58.4 | 183.0 | 109.9 | 35.6 | 46.5 | 35.7 | 3.7 |
| 2011 | 0.4 | 0.0 | 0.7 | 0.0 | 1.2 | 1.1 | 2.5 | 4.1 | 56.4 | 46.3 | 28.9 | 35.9 | 68.2 | 44.9 | 75.5 | 55.1 | 2.2 |
| 2012 | 0.0 | 0.0 | 0.5 | 0.0 | 4.5 | 3.4 | 23.9 | 25.3 | 16.6 | 33.9 | 30.9 | 20.0 | 19.9 | 30.7 | 384.1 | 9.2 | 6.3 |
| 2013 | 0.7 | 0.0 | 0.0 | 0.2 | 9.4 | 3.8 | 2.3 | 25.5 | 10.9 | 65.3 | 39.2 | 31.5 | 38.0 | 27.3 | 24.2 | 22.6 | 2.7 |
| 2014 | 4.7 | 0.0 | 2.2 | 0.0 | 0.6 | 5.1 | 13.2 | 22.2 | 112.4 | 30.5 | 68.1 | 28.5 | 51.7 | 67.6 | 330.9 | 344.5 | 14.5 |
| 2015 | 6.1 | 0.0 | 0.6 | 0.0 | 6.3 | 4.7 | 15.1 | 14.4 | 18.2 | 9.3 | 52.1 | 54.4 | 31.7 | 52.2 | 117.2 | 122.1 | 38.3 |
| 2016 | 13.8 | 0.0 | 0.5 | 0.0 | 0.6 | 6.5 | 10.9 | 33.8 | 6.2 | 38.4 | 51.3 | 46.8 | 93.4 | 56.5 | 711.7 | 107.7 | 10.4 |

*Table 8b. DFO Survey, NAFO Division 4S, average weight of cod caught per tow per stratum.*

| | 4S / strata | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | **803** | **804** | **805** | **806** | **807** | **808** | **814** | **815** | **816** | **817** | **818** | **819** | **827** | **828** | **829** | **830** | **831** | **832** | **833** | **839** | **841** |
| 1990 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.5 | 0.5 | 12.2 | 80.3 | 3.1 | 7.2 | 1.9 | 42.1 | 129.4 | 45.0 | 114.5 | 97.5 | 94.6 | 4.0 | 0.2 |
| 1991 | 1.8 | 0.0 | 0.0 | 0.5 | 1.0 | 0.4 | 63.4 | 5.4 | 14.2 | 273.5 | 160.6 | 96.6 | 17.6 | 39.1 | 46.9 | 15.9 | 538.5 | 306.8 | 28.9 | 31.1 | 0.6 |
| 1992 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.2 | 8.7 | 2.3 | 0.9 | 3.5 | 24.5 | 0.4 | 9.4 | 6.3 | 51.2 | 122.5 | 41.6 | 0.4 | 0.1 | 0.0 |
| 1993 | 0.0 | 0.0 | 0.0 | 1.2 | 0.3 | 0.0 | 0.4 | 0.0 | 11.9 | 7.5 | 0.3 | 0.0 | 2.0 | 1.4 | 1.3 | 1.3 | 35.6 | 12.5 | 3.3 | 2.7 | 0.3 |
| 1994 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.7 | 7.8 | 3.8 | 27.2 | 1.9 | 29.3 | 14.8 | 5.4 | 0.5 | 20.5 | 24.7 | 1.0 | 3.7 | 5.2 |
| 1995 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 4.0 | 0.5 | 2.5 | 2.3 | 8.6 | 0.0 | 0.4 | 17.6 | 5.9 | 6.1 | 0.5 | 0.0 | 0.0 |
| 1996 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 0.0 | 3.2 | 1.0 | 22.0 | 74.5 | 15.3 | 10.1 | 14.0 | 6.2 | 4.6 | 15.9 | 3.3 | 19.7 | 0.0 | 0.7 | 0.0 |
| 1997 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 33.6 | 1.7 | 7.5 | 3.3 | 9.4 | 2.2 | 8.3 | 0.3 | 2.7 | 0.5 | 2.2 | 3.1 | 8.3 | 2.8 | 0.1 |
| 1998 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.0 | 0.0 | 0.0 | 8.2 | 1.0 | 3.0 | 26.3 | 27.8 | 0.0 | 7.6 | 2.0 | 5.4 | 2.3 | 0.0 | 0.0 | 0.0 |
| 1999 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.7 | 6.1 | 0.1 | 0.9 | 4.0 | 23.9 | 18.5 | 20.6 | 0.1 | 24.0 | 8.0 | 3.5 | 4.1 | 14.1 | 3.0 | 0.0 |
| 2000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 28.5 | 8.5 | 0.2 | 1.0 | 205.0 | 2.4 | 17.9 | 0.0 | 0.0 | 29.2 | 12.4 | 1.6 | 8.2 | 0.0 | 2.9 |
| 2001 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 | 0.0 | 0.5 | 0.7 | 13.7 | 0.5 | 7.9 | 0.0 | 0.5 | 0.7 | 4.5 | 1.5 | 0.4 | 0.0 | 0.0 |
| 2002 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.1 | 0.0 | 1.2 | 1.5 | 18.2 | 0.0 | 14.6 | 0.0 | 4.2 | 3.0 | 0.2 | 1.3 | 1.7 | 0.0 | 2.9 |
| 2003 | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 5.5 | 8.8 | 20.8 | 7.4 | 83.9 | 15.5 | 1.2 | 0.0 | 0.1 | 5.5 | 1.2 | 2.2 | 62.7 | 11.1 | 10.2 |
| 2004 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 47.3 | 2.0 | 0.9 | 1.5 | 44.2 | 0.3 | 36.2 | 5.7 | 0.5 | 4.7 | 12.4 | 4.3 | 12.8 | 11.6 | 2.2 |
| 2005 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 5.6 | 0.0 | 1.3 | 0.2 | 19.8 | 16.1 | 2.1 | 13.9 | 8.6 | 7.6 | 5.7 | 5.5 | 4.7 | 3.5 |
| 2006 | 0.0 | 0.0 | 0.0 | 3.4 | 0.0 | 0.0 | 0.6 | 0.3 | 5.0 | 0.0 | 16.5 | 1.7 | 44.7 | 7.9 | 8.4 | 94.6 | 4.4 | 8.4 | 18.3 | 6.6 | 5.0 |
| 2007 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 33.1 | 2.8 | 0.1 | 1.5 | 21.8 | 19.1 | 25.5 | 2.9 | 18.6 | 11.1 | 7.9 | 9.3 | 6.9 | 3.6 | 6.9 |
| 2008 | 0.2 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 46.4 | 1.8 | 35.0 | 0.0 | 6.6 | 0.9 | 88.9 | 9.3 | 69.2 | 55.8 | 49.0 | 74.7 | 6.8 | 54.6 | 13.1 |
| 2009 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.8 | 0.3 | 0.0 | 4.9 | 76.6 | 1.7 | 6.9 | 19.3 | 4.9 | 7.5 | 19.8 | 6.3 | 20.7 | 6.5 | 3.5 |
| 2010 | 0.0 | 0.2 | 0.0 | 0.0 | 0.9 | 0.0 | 54.5 | 16.3 | 6.7 | 3.5 | 11.1 | 5.4 | 27.0 | 80.5 | 12.2 | 9.2 | 2.4 | 13.4 | 14.7 | 16.1 | 2.9 |
| 2011 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 | 0.4 | 20.5 | 49.4 | 46.3 | 14.0 | 2.5 | 38.4 | 12.5 | 12.0 | 17.4 | 15.7 | 39.7 | 23.1 | 14.7 | 3.8 |
| 2012 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.8 | 0.1 | 21.9 | 15.1 | 9.0 | 1.2 | 21.4 | 79.0 | 26.2 | 24.7 | 16.0 | 15.0 | 19.7 | 9.7 | 9.8 |
| 2013 | 0.0 | 0.0 | 0.0 | 2.1 | 0.7 | 0.1 | 5.1 | 0.0 | 0.4 | 14.3 | 33.4 | 1.2 | 110.1 | 9.5 | 11.2 | 24.1 | 71.1 | 9.2 | 17.8 | 20.4 | 11.0 |
| 2014 | 0.0 | 0.4 | 0.0 | 1.1 | 3.7 | 9.4 | 13.5 | 8.6 | 19.6 | 15.1 | 21.6 | 2.1 | 4.3 | 2.7 | 88.8 | 54.5 | 67.4 | 50.3 | 20.2 | 10.9 | 12.0 |
| 2015 | 0.1 | 1.3 | 1.7 | 3.7 | 0.0 | 0.1 | 4.6 | 6.4 | 54.0 | 27.4 | 35.2 | 29.4 | 69.2 | 136.2 | 142.9 | 42.0 | 110.5 | 45.7 | 2.0 | 38.3 | 21.1 |
| 2016 | 0.0 | 1.3 | 0.1 | 0.7 | 0.3 | 0.2 | 17.3 | 3.7 | 2.9 | 35.8 | 88.1 | 0.7 | 20.1 | 149.1 | 88.6 | 42.0 | 398.0 | 107.4 | 21.8 | 22.5 | 12.3 |

*Table 8c. DFO Survey, NAFO Divisions 4RS, average weight per tow and average number per set.*

| Year | Mean weight/Set with multiplicative model | Mean weight/Set without multiplicative model | Mean number/Set with multiplicative model |
|---|---|---|---|
| 1990 | 43.8 | 39.5 | 87.2 |
| 1991 | 76.0 | 73.5 | 145.3 |
| 1992 | 21.8 | 22.7 | 39.8 |
| 1993 | 5.3 | 5.3 | 11.3 |
| 1994 | 14.5 | 14.6 | 38.2 |
| 1995 | 12.1 | 12.3 | 16.3 |
| 1996 | 13.8 | 13.0 | 23.2 |
| 1997 | 21.2 | 22.6 | 28.8 |
| 1998 | 25.4 | 25.3 | 32.0 |
| 1999 | 27.1 | 28.6 | 42.4 |
| 2000 | 26.6 | 25.4 | 47.6 |
| 2001 | 19.1 | 23.6 | 30.4 |
| 2002 | 9.4 | 10.7 | 12.9 |
| 2003 | 53.5 | 32.1 | 86.4 |
| 2004 | 22.3 | 27.3 | 29.4 |
| 2005 | 18.7 | 19.1 | 24.1 |
| 2006 | 25.4 | 25.4 | 45.6 |
| 2007 | 16.0 | 16.1 | 30.0 |
| 2008 | 27.6 | 27.6 | 65.1 |
| 2009 | 17.0 | 17.2 | 34.6 |
| 2010 | 20.1 | 17.2 | 34.1 |
| 2011 | 21.0 | 21.2 | 37.6 |
| 2012 | 23.2 | 23.2 | 46.5 |
| 2013 | 15.8 | 15.4 | 50.0 |
| 2014 | 39.8 | 39.8 | 87.4 |
| 2015 | 34.5 | 34.5 | 76.4 |
| 2016 | 54.2 | 54.3 | 78.2 |

*Table 9. DFO Survey, average numbers at age.*

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1990** | 3.96 | 7.07 | 30.58 | 18.90 | 8.24 | 2.83 | 2.73 | 2.53 | 0.53 | 0.16 | 0.05 | 0.02 | 0.04 |
| **1991** | 22.68 | 12.04 | 40.72 | 67.20 | 30.56 | 13.07 | 3.50 | 1.99 | 2.09 | 0.48 | 0.32 | 0.07 | 0.08 |
| **1992** | 7.25 | 7.35 | 10.45 | 14.92 | 12.81 | 4.57 | 1.42 | 0.67 | 0.50 | 0.21 | 0.09 | 0.07 | 0.03 |
| **1993** | 0.00 | 2.61 | 2.49 | 1.85 | 1.94 | 1.63 | 0.29 | 0.15 | 0.03 | 0.02 | 0.00 | 0.02 | 0.00 |
| **1994** | 5.67 | 6.55 | 12.38 | 4.76 | 2.23 | 2.35 | 1.69 | 0.63 | 0.12 | 0.02 | 0.02 | 0.02 | 0.00 |
| **1995** | 0.00 | 1.83 | 1.50 | 5.13 | 3.51 | 1.96 | 0.87 | 0.86 | 0.14 | 0.10 | 0.03 | 0.00 | 0.00 |
| **1996** | 0.14 | 3.05 | 9.14 | 3.40 | 3.96 | 1.96 | 0.89 | 0.28 | 0.23 | 0.04 | 0.00 | 0.01 | 0.00 |
| **1997** | 0.66 | 4.29 | 4.47 | 9.48 | 3.01 | 4.24 | 1.99 | 0.95 | 0.43 | 0.29 | 0.02 | 0.00 | 0.00 |
| **1998** | 0.53 | 2.31 | 7.62 | 7.58 | 7.34 | 3.15 | 2.36 | 0.70 | 0.47 | 0.15 | 0.00 | 0.00 | 0.00 |
| **1999** | 0.98 | 8.37 | 12.27 | 9.41 | 3.86 | 4.31 | 1.02 | 0.87 | 0.28 | 0.08 | 0.14 | 0.03 | 0.02 |
| **2000** | 7.89 | 5.49 | 13.73 | 9.17 | 4.87 | 2.02 | 2.42 | 0.61 | 0.47 | 0.13 | 0.06 | 0.07 | 0.01 |
| **2001** | 1.72 | 4.90 | 9.45 | 4.46 | 3.44 | 2.65 | 1.32 | 1.72 | 0.23 | 0.45 | 0.06 | 0.07 | 0.02 |
| **2002** | 0.00 | 2.10 | 2.49 | 4.30 | 1.54 | 1.13 | 0.62 | 0.50 | 0.18 | 0.10 | 0.01 | 0.00 | 0.00 |
| **2003** | 0.67 | 17.10 | 20.26 | 15.58 | 9.88 | 5.32 | 3.40 | 1.41 | 0.70 | 0.77 | 0.14 | 0.07 | 0.00 |
| **2004** | 0.82 | 6.16 | 5.64 | 6.08 | 3.80 | 4.00 | 2.12 | 1.25 | 0.89 | 0.33 | 0.21 | 0.02 | 0.01 |
| **2005** | 3.09 | 2.89 | 3.64 | 4.16 | 3.56 | 2.50 | 2.33 | 0.78 | 0.56 | 0.29 | 0.19 | 0.07 | 0.00 |
| **2006** | 5.32 | 14.28 | 7.82 | 6.58 | 4.18 | 3.21 | 1.80 | 1.23 | 0.61 | 0.23 | 0.23 | 0.05 | 0.00 |
| **2007** | 4.53 | 4.99 | 7.92 | 6.01 | 2.78 | 1.56 | 0.93 | 0.60 | 0.42 | 0.14 | 0.08 | 0.04 | 0.01 |
| **2008** | 1.84 | 24.73 | 12.68 | 15.62 | 5.63 | 2.69 | 1.04 | 0.51 | 0.19 | 0.11 | 0.01 | 0.02 | 0.02 |
| **2009** | 0.44 | 10.93 | 6.66 | 6.61 | 5.53 | 2.38 | 1.39 | 0.43 | 0.06 | 0.11 | 0.00 | 0.01 | 0.01 |
| **2010** | 3.39 | 1.73 | 8.50 | 8.58 | 6.13 | 2.95 | 0.86 | 0.31 | 0.18 | 0.02 | 0.01 | 0.00 | 0.01 |
| **2011** | 1.54 | 10.17 | 6.67 | 6.72 | 5.67 | 3.54 | 2.16 | 0.67 | 0.26 | 0.06 | 0.03 | 0.00 | 0.01 |
| **2012** | 6.82 | 8.94 | 10.78 | 6.42 | 5.42 | 5.00 | 1.61 | 0.81 | 0.34 | 0.17 | 0.02 | 0.08 | 0.00 |
| **2013** | 7.10 | 17.79 | 12.49 | 6.33 | 1.95 | 1.37 | 1.05 | 0.48 | 0.18 | 0.07 | 0.00 | 0.02 | 0.00 |
| **2014** | 2.94 | 29.28 | 25.29 | 16.03 | 6.34 | 3.61 | 2.18 | 0.86 | 0.61 | 0.27 | 0.03 | 0.00 | 0.00 |
| **2015** | 10.09 | 17.75 | 19.37 | 15.54 | 8.31 | 2.74 | 1.07 | 0.69 | 0.39 | 0.16 | 0.05 | 0.02 | 0.01 |
| **2016** | 2.27 | 9.33 | 21.78 | 18.62 | 13.89 | 7.23 | 2.72 | 1.11 | 0.91 | 0.27 | 0.19 | 0.19 | 0.15 |

*Table 10. Mobile gear sentinel surveys, average weight (kg) of cod per tow per unit area and per stratum.*

| 3Pn / strata | | | | NAFO 4R / strata | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **302** | **303** | **304** | **305** | **101** | **102** | **103** | **801** | **802** | **809** | **810** | **811** | **812** | **813** | **820** | **821** | **822** |
| 37.8 | 9.1 | 0.0 | 0.1 | - | - | - | 0.6 | 0.0 | 0.0 | 0.0 | 9.8 | 1.7 | 67.3 | 38.7 | 74.8 | 28.7 |
| 31.6 | 8.7 | 0.3 | 0.0 | - | - | - | 1.6 | 0.0 | 0.0 | 0.0 | 5.0 | 8.3 | 19.1 | 30.8 | 175.1 | 71.5 |
| 69.6 | 3.9 | 0.4 | 0.0 | - | - | - | 0.4 | 0.0 | 0.0 | 0.0 | 5.6 | 1.3 | 34.6 | 80.9 | 79.5 | 177.5 |
| 45.4 | 3.7 | 0.3 | 0.0 | - | - | - | 0.4 | 0.0 | 0.2 | 0.8 | 8.5 | 6.2 | 26.8 | 46.3 | 69.0 | 56.6 |
| 10.3 | 2.1 | 0.5 | 0.0 | - | - | - | 0.0 | 0.0 | 0.8 | 0.0 | 4.7 | 3.1 | 12.7 | 137.7 | 129.7 | 37.1 |
| 17.3 | 0.8 | 0.4 | 0.0 | - | - | - | 0.4 | 0.0 | 0.0 | 0.3 | 0.1 | 1.5 | 16.6 | 23.8 | 56.4 | 77.2 |
| 121.2 | 5.1 | 0.0 | 0.1 | - | - | - | 0.0 | 0.0 | 0.2 | 0.0 | 9.2 | 3.7 | 82.5 | 21.8 | 76.2 | 53.4 |
| 191.3 | 10.2 | 0.0 | 0.0 | - | - | - | 2.2 | 0.0 | 0.1 | 0.0 | 9.9 | 18.1 | 14.2 | 33.0 | 27.3 | 29.5 |
| 28.0 | 5.1 | 0.0 | 0.0 | 38.3 | 580.7 | 11.0 | 0.7 | 0.0 | 2.1 | 0.5 | 7.8 | 1.8 | 28.8 | 32.7 | 36.5 | 96.8 |
| 26.4 | 9.4 | 0.8 | 0.1 | 37.3 | 240.4 | 174.6 | 0.0 | 0.1 | 0.0 | 1.1 | 6.8 | 3.7 | 35.4 | 54.1 | 28.6 | 114.8 |
| 26.5 | 14.9 | 0.0 | 0.0 | 37.2 | 117.0 | 144.9 | 0.0 | 0.4 | 0.0 | 0.6 | 34.6 | 8.1 | 5.9 | 87.1 | 194.3 | 86.4 |
| 20.9 | 3.7 | 0.0 | 0.0 | 61.2 | 126.9 | 1.5 | 0.9 | 0.0 | 0.5 | 0.0 | 46.0 | 13.0 | 7.8 | 34.3 | 83.3 | 64.5 |
| 11.6 | 16.1 | 0.1 | 0.0 | 54.6 | 336.1 | 15.6 | 1.2 | 0.0 | 0.1 | 0.0 | 7.7 | 9.4 | 31.7 | 55.2 | 34.6 | 51.3 |
| 1.6 | 0.0 | 0.0 | 0.0 | 23.4 | 612.6 | 839.4 | 2.0 | 0.0 | 0.4 | 0.0 | 2.0 | 3.6 | 17.2 | 4.2 | 27.5 | 24.0 |
| 1.5 | 1.6 | 0.2 | 0.0 | 23.9 | 62.7 | 1.5 | 2.9 | 0.0 | 0.0 | 0.0 | 2.3 | 3.4 | 87.4 | 18.9 | 10.5 | 55.9 |
| 1.2 | 0.1 | 0.0 | 0.0 | 53.5 | 12.6 | 359.1 | 0.3 | 0.0 | 0.0 | 0.0 | 4.6 | 3.6 | 37.5 | 25.1 | 9.8 | 30.5 |
| 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 11.7 | 462.8 | 0.0 | 0.0 | 0.0 | 0.0 | 6.9 | 2.6 | 1.5 | 22.1 | 38.1 | 28.0 |
| 2.4 | 0.1 | 0.0 | 0.0 | 35.3 | 6.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.8 | 9.2 | 9.6 | 12.3 |
| 2.5 | 1.8 | 0.0 | 0.0 | 0.6 | 21.7 | 24.9 | 0.3 | 0.0 | 0.9 | 0.0 | 1.1 | 0.3 | 7.2 | 2.1 | 0.6 | 1.3 |
| 1.3 | 0.1 | 0.0 | 0.0 | 18.2 | 26.0 | 9.6 | 4.2 | 0.1 | 0.5 | 0.0 | 1.9 | 26.4 | 22.0 | 4.5 | 15.9 | 19.5 |
| 2.4 | 0.0 | 0.0 | 0.0 | 676.7 | 1.6 | 46.2 | 3.8 | 0.0 | 0.1 | 0.0 | 1.9 | 8.5 | 4.9 | 23.8 | 4.6 | 14.4 |
| 1.7 | 0.2 | 0.0 | 0.0 | 12.2 | 39.0 | - | 0.7 | 0.0 | 0.0 | 0.2 | 5.4 | 8.3 | 7.7 | 11.0 | 11.5 | 13.2 |

*Table 10 (continued). Mobile gear sentinel surveys, average weight (kg) of cod per tow per unit area and per stratum.*

| | NAFO 4R | | | | | | | NAFO 4S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | **823** | **824** | **835** | **836** | **837** | **838** | **840** | **803** | **804** | **805** | **806** | **807** | **808** | **814** | **815** | **816** | **817** |
| **1995** | 164.6 | 41.1 | 48.8 | 32.8 | 18.2 | 30.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.5 | 5.4 | 13.6 |
| **1996** | 128.9 | 126.4 | 69.9 | 39.4 | 18.5 | 9.0 | 2.6 | 0.1 | 0.0 | 0.0 | | 0.2 | 0.4 | 8.5 | 39.1 | 10.6 | 5.9 |
| **1997** | 259.4 | 169.5 | 81.9 | 124.4 | 93.7 | 61.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.7 | 0.9 | 0.3 |
| **1998** | 288.1 | 592.5 | 64.4 | 107.7 | 219.6 | 43.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.6 | 1.1 | 0.0 |
| **1999** | 39.8 | 77.2 | 77.8 | 147.0 | 27.2 | 11.0 | 15.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 0.0 | 4.3 | 2.1 | 4.2 | 0.0 |
| **2000** | 74.8 | 44.0 | 114.5 | 195.8 | 295.7 | 179.5 | 7.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 6.7 | 0.0 |
| **2001** | 149.6 | 241.4 | 105.4 | 66.1 | 516.8 | 58.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.2 | 0.4 |
| **2002** | 55.5 | 66.3 | 79.2 | 147.3 | 192.2 | 98.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 1.0 | 0.0 | 0.0 | 0.3 |
| **2003** | 1240.9 | 108.8 | 190.2 | 57.1 | 107.9 | 18.1 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.5 | 5.8 | 0.6 |
| **2004** | 316.0 | 281.5 | 89.1 | 121.3 | 543.5 | 9.7 | 7.3 | 0.0 | 0.2 | | 0.3 | 0.0 | 0.0 | 0.5 | 0.7 | 1.1 | 0.7 |
| **2005** | 63.3 | 107.9 | 59.3 | 72.1 | 187.6 | 213.7 | 4.9 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **2006** | 83.6 | 8.5 | 139.1 | 176.2 | 278.7 | 328.1 | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 |
| **2007** | 31.0 | 53.1 | 56.7 | 38.9 | 129.3 | 3.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.5 | 0.5 | 33.8 | 0.2 |
| **2008** | 69.3 | 36.3 | 11.1 | 71.9 | 196.7 | 12.8 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 4.2 | 0.4 | 0.0 |
| **2009** | 46.5 | 45.8 | 21.8 | 65.4 | 460.7 | 77.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 | 0.0 | 1.6 | 0.3 | 1.2 | 0.3 |
| **2010** | 18.0 | 4.1 | 12.6 | 22.3 | 141.0 | 74.2 | 7.4 | 0.0 | 0.0 | 0.1 | 0.3 | 0.0 | 0.5 | 9.5 | 0.5 | 7.7 | 0.3 |
| **2011** | 153.3 | 99.6 | 13.2 | 73.0 | 1079.2 | 22.8 | 7.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 53.2 | 0.2 | 0.1 | 3.2 |
| **2012** | 4.6 | 18.3 | 6.8 | 18.1 | 88.4 | 26.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 1.0 | 0.9 | 0.1 | 0.9 |
| **2013** | 16.9 | 3.4 | 0.7 | 137.3 | 135.8 | 198.0 | 200.6 | 0.0 | 0.2 | 0.1 | 0.0 | 0.8 | 0.0 | 4.8 | 6.3 | 2.2 | 0.5 |
| **2014** | 34.9 | 49.0 | 19.4 | 51.7 | 633.7 | 61.8 | 3.1 | 0.2 | 0.4 | 0.1 | 1.2 | 1.3 | 0.5 | 5.8 | 6.7 | 7.1 | 0.3 |
| **2015** | 86.1 | 71.0 | 35.8 | 74.7 | 511.0 | 146.1 | 4.5 | 0.0 | 0.0 | 0.1 | 1.5 | 0.0 | 0.0 | 4.0 | 3.1 | 5.9 | 3.3 |
| **2016** | 30.9 | 32.4 | 19.3 | 77.3 | 58.6 | 26.1 | 0.0 | 0.0 | 0.9 | 0.4 | 0.4 | 0.0 | 0.0 | 3.6 | 8.1 | 15.1 | 6.1 |

*Table 10 (continued). Mobile gear sentinel surveys, average weight (kg) of cod per tow per unit area and per stratum.*

| | NAFO 4S | | | | | | | | | | | **Mean weight / set** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | **818** | **819** | **827** | **828** | **829** | **830** | **831** | **832** | **833** | **839** | **841** | |
| **1995** | 0.3 | 1.0 | 1.3 | 3.0 | 1.8 | 8.0 | 6.9 | 12.1 | 0.0 | - | - | **13.0** |
| **1996** | 3.0 | 0.9 | 0.0 | 0.0 | 28.8 | - | 13.1 | 15.6 | 0.0 | 0.0 | 5.6 | **16.9** |
| **1997** | 0.0 | 0.7 | 11.7 | - | 7.3 | 22.2 | - | 4.2 | 3.2 | 0.8 | 1.7 | **25.4** |
| **1998** | 0.2 | 12.0 | 0.3 | 3.3 | 23.2 | 30.0 | 3.8 | 8.9 | 0.7 | 1.0 | 0.6 | **26.3** |
| **1999** | 0.5 | 0.0 | 5.4 | 2.4 | 44.0 | 32.2 | 8.0 | 5.6 | 5.0 | 2.3 | 0.0 | **16.9** |
| **2000** | 0.5 | 0.0 | 0.6 | 34.5 | 12.1 | 4.3 | 0.0 | 5.8 | 0.0 | 0.0 | 1.7 | **29.7** |
| **2001** | 1.5 | 0.0 | 0.0 | 0.0 | 6.3 | 0.0 | 8.4 | 3.9 | 0.3 | 0.0 | 2.4 | **33.1** |
| **2002** | 3.0 | 3.0 | - | 0.5 | 25.0 | 4.1 | 0.0 | 1.8 | 0.0 | 0.5 | 1.2 | **22.7** |
| **2003** | 3.3 | 30.5 | 2.4 | 0.0 | 0.0 | 6.1 | 0.0 | 1.8 | 0.0 | 0.3 | 2.8 | **30.6** |
| **2004** | 3.1 | 0.3 | 0.0 | 0.5 | 9.8 | 1.8 | 5.9 | 4.8 | 0.0 | 0.0 | 0.0 | **37.5** |
| **2005** | 2.4 | - | 2.0 | 3.7 | 24.5 | 11.4 | 12.0 | 3.8 | 0.0 | 2.2 | 4.3 | **28.7** |
| **2006** | 0.7 | 0.7 | 0.5 | 3.9 | 13.9 | 3.1 | 13.6 | 3.3 | 5.4 | 1.6 | 6.4 | **35.3** |
| **2007** | 0.2 | 0.7 | 7.4 | - | 0.7 | 3.8 | 119.8 | 14.0 | 2.7 | 2.7 | 11.7 | **20.3** |
| **2008** | 0.7 | 0.3 | 1.0 | - | 3.6 | 12.2 | 18.3 | 19.0 | 1.1 | 0.8 | 1.0 | **25.1** |
| **2009** | 8.6 | 0.0 | 5.0 | 3.3 | - | 22.5 | 6.0 | 23.3 | 0.0 | 1.7 | 1.7 | **26.6** |
| **2010** | 1.8 | 0.0 | 4.1 | - | 22.2 | 8.9 | - | 30.9 | 4.3 | 10.4 | 2.2 | **17.0** |
| **2011** | 5.1 | - | 0.0 | 3.9 | 0.0 | 51.1 | 27.7 | 6.2 | 0.0 | 13.7 | 1.0 | **40.9** |
| **2012** | 5.0 | 0.6 | 6.7 | 0.0 | 0.2 | 8.4 | - | 10.7 | 4.2 | 3.7 | - | **6.5** |
| **2013** | 4.3 | 3.7 | 17.6 | 3.0 | 4.3 | 11.4 | 26.4 | 23.6 | 5.3 | 1.5 | 4.2 | **19.2** |
| **2014** | 3.3 | 5.7 | 27.1 | - | 2.4 | 38.6 | 9.8 | 37.5 | 2.9 | 8.1 | - | **29.5** |
| **2015** | 17.0 | 4.2 | 30.7 | 5.1 | 35.1 | 9.7 | 9.7 | 46.2 | 4.1 | 17.2 | 1.3 | **37.6** |
| **2016** | 5.0 | 12.1 | 27.1 | - | 54.7 | 10.8 | 33.9 | 105.1 | 7.9 | 185.5 | 0.9 | **24.5** |

*Table 11. Mobile gear sentinel surveys, average numbers at age.*

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995** | 1.078 | 2.010 | 2.273 | 4.677 | 3.101 | 1.861 | 1.303 | 1.143 | 0.230 | 0.055 | 0.024 | 0.008 | 0.000 |
| **1996** | 0.118 | 1.692 | 7.259 | 6.180 | 4.951 | 2.392 | 1.216 | 0.819 | 0.644 | 0.145 | 0.025 | 0.011 | 0.000 |
| **1997** | 0.000 | 2.924 | 6.145 | 13.872 | 4.956 | 4.423 | 1.715 | 0.687 | 0.512 | 0.164 | 0.044 | 0.003 | 0.000 |
| **1998** | 0.038 | 2.059 | 8.547 | 6.780 | 7.260 | 3.062 | 2.971 | 0.970 | 0.663 | 0.253 | 0.157 | 0.039 | 0.000 |
| **1999** | 0.093 | 2.043 | 5.091 | 5.832 | 3.415 | 2.943 | 1.089 | 0.935 | 0.190 | 0.085 | 0.047 | 0.013 | 0.000 |
| **2000** | 0.359 | 1.220 | 7.433 | 10.218 | 5.743 | 3.892 | 3.485 | 0.800 | 0.792 | 0.281 | 0.047 | 0.012 | 0.007 |
| **2001** | 1.207 | 5.632 | 11.254 | 9.884 | 5.021 | 3.111 | 1.809 | 1.373 | 0.480 | 0.320 | 0.099 | 0.044 | 0.010 |
| **2002** | 0.023 | 0.600 | 3.035 | 8.159 | 4.663 | 3.783 | 2.055 | 1.655 | 0.880 | 0.264 | 0.074 | 0.005 | 0.007 |
| **2003** | 0.051 | 1.104 | 4.227 | 7.383 | 6.368 | 3.220 | 2.400 | 1.171 | 0.944 | 0.728 | 0.268 | 0.054 | 0.023 |
| **2004** | 0.016 | 0.709 | 3.620 | 6.718 | 5.831 | 5.489 | 3.401 | 2.218 | 1.352 | 0.664 | 0.488 | 0.127 | 0.025 |
| **2005** | 0.025 | 1.865 | 4.837 | 6.209 | 4.895 | 3.321 | 2.650 | 1.066 | 0.707 | 0.388 | 0.159 | 0.163 | 0.013 |
| **2006** | 0.962 | 3.672 | 4.644 | 7.686 | 5.155 | 3.851 | 2.423 | 2.382 | 1.075 | 0.531 | 0.149 | 0.116 | 0.094 |
| **2007** | 9.826 | 2.724 | 7.722 | 6.301 | 2.871 | 1.667 | 1.080 | 0.664 | 0.560 | 0.345 | 0.224 | 0.093 | 0.043 |
| **2008** | 0.023 | 4.637 | 5.882 | 10.553 | 4.089 | 3.034 | 1.707 | 1.168 | 0.813 | 0.359 | 0.107 | 0.065 | 0.031 |
| **2009** | 0.056 | 4.158 | 6.508 | 10.432 | 10.428 | 2.237 | 1.694 | 0.940 | 0.291 | 0.163 | 0.018 | 0.009 | 0.006 |
| **2010** | 0.037 | 0.395 | 6.087 | 6.337 | 5.382 | 2.512 | 0.858 | 0.562 | 0.166 | 0.065 | 0.021 | 0.000 | 0.000 |
| **2011** | 0.073 | 1.317 | 3.315 | 12.867 | 8.555 | 9.565 | 3.745 | 2.031 | 1.032 | 0.303 | 0.176 | 0.035 | 0.003 |
| **2012** | 0.908 | 0.619 | 1.134 | 1.145 | 1.560 | 1.321 | 0.926 | 0.328 | 0.183 | 0.036 | 0.016 | 0.002 | 0.000 |
| **2013** | 2.368 | 6.081 | 5.508 | 6.050 | 3.065 | 2.190 | 1.848 | 0.995 | 0.497 | 0.165 | 0.104 | 0.097 | 0.000 |
| **2014** | 0.325 | 7.063 | 11.675 | 10.518 | 6.560 | 4.384 | 1.721 | 1.237 | 0.642 | 0.134 | 0.130 | 0.065 | 0.012 |
| **2015** | 0.431 | 9.501 | 22.538 | 17.732 | 7.026 | 3.403 | 1.584 | 0.999 | 0.404 | 0.290 | 0.029 | 0.020 | 0.005 |
| **2016** | 0.202 | 4.501 | 7.586 | 9.636 | 7.818 | 4.356 | 1.311 | 0.610 | 0.427 | 0.080 | 0.082 | 0.012 | 0.003 |

*Table 12a. Longline sentinel surveys, numbers at age.*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 3 | 62 | 408 | 794 | 352 | 298 | 73 | 53 | 8 | 2 | 5 | 1 | - | - | - | - |
| 1995 | 41 | 712 | 4822 | 5532 | 8102 | 10707 | 10346 | 3076 | 710 | 206 | 158 | 108 | 20 | 26 | 3 | 5 |
| 1996 | 42 | 1458 | 5126 | 8606 | 9975 | 11882 | 7101 | 6178 | 1501 | 207 | 57 | 49 | 36 | - | - | - |
| -1997 | 105 | 902 | 3991 | 4662 | 8831 | 5850 | 4144 | 3042 | 2058 | 324 | 104 | 32 | - | 14 | - | - |
| -1998 | 35 | 2540 | 7087 | 13038 | 12387 | 9393 | 4552 | 3369 | 1539 | 664 | 193 | 72 | 19 | - | - | - |
| -1999 | 25 | 1804 | 10052 | 7727 | 13937 | 6264 | 7572 | 2084 | 1357 | 762 | 353 | 74 | 30 | - | - | - |
| 2000 | 167 | 2124 | 13016 | 19204 | 18587 | 19666 | 6187 | 3439 | 610 | 202 | 233 | 77 | 13 | - | - | - |
| 2001 | 328 | 1122 | 12498 | 19947 | 19561 | 16901 | 17335 | 5517 | 2240 | 813 | 311 | 112 | 34 | - | - | - |
| 2002 | 5 | 1071 | 8214 | 13357 | 17461 | 13936 | 8969 | 8876 | 1843 | 982 | 150 | 94 | - | - | - | - |
| 2003 | - | 253 | 3460 | 10274 | 12596 | 11737 | 6128 | 4062 | 4286 | 820 | 338 | 80 | 45 | - | - | - |
| 2004 | - | 316 | 2188 | 10263 | 19406 | 16276 | 11338 | 6298 | 2811 | 3330 | 397 | 189 | 117 | 14 | - | - |
| 2005 | - | 294 | 2932 | 6668 | 7949 | 17481 | 9143 | 7766 | 3437 | 1945 | 1168 | 263 | 58 | 23 | - | 3 |
| 2006 | - | 561 | 4582 | 10228 | 15548 | 14816 | 13372 | 8719 | 4969 | 2696 | 1099 | 396 | 163 | 35 | - | - |
| 2007 | - | 372 | 4719 | 7941 | 10922 | 9574 | 8147 | 5366 | 3481 | 1145 | 870 | 395 | 159 | 35 | 5 | - |
| 2008 | - | 203 | 6056 | 9046 | 10308 | 9054 | 4369 | 3425 | 1823 | 547 | 516 | 129 | 51 | 8 | - | - |
| 2009 | - | 678 | 3829 | 10221 | 8803 | 6967 | 3960 | 2273 | 606 | 262 | 57 | 36 | 13 | 24 | - | - |
| 2010 | - | 142 | 5307 | 9389 | 10739 | 5860 | 1839 | 1257 | 440 | 121 | 13 | - | - | - | - | - |
| 2011 | - | 562 | 2989 | 11871 | 9963 | 10124 | 3472 | 1511 | 559 | 88 | - | 28 | - | - | - | - |
| 2012 | - | 747 | 2098 | 6458 | 9832 | 8305 | 5987 | 1795 | 708 | 181 | 37 | 10 | - | - | - | - |
| 2013 | - | 106 | 3041 | 6130 | 7253 | 7645 | 6001 | 3086 | 1003 | 369 | 174 | 32 | - | - | - | - |
| 2014 | - | 168 | 1220 | 4954 | 6009 | 6025 | 5304 | 3541 | 984 | 423 | 53 | - | 58 | 14 | - | - |
| 2015 | - | 153 | 4089 | 4881 | 6796 | 5028 | 3122 | 3040 | 1198 | 849 | 251 | - | - | - | - | - |
| 2016 | - | 43 | 2317 | 9099 | 8521 | 6515 | 3552 | 2674 | 1750 | 945 | 385 | 97 | 74 | - | - | - |

*Table 12b. Longline sentinel surveys, numbers at age (%).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 0.00 | 0.03 | 0.20 | 0.39 | 0.17 | 0.14 | 0.04 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1995 | 0.00 | 0.02 | 0.11 | 0.12 | 0.18 | 0.24 | 0.23 | 0.07 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1996 | 0.00 | 0.03 | 0.10 | 0.16 | 0.19 | 0.23 | 0.14 | 0.12 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1997 | 0.00 | 0.03 | 0.12 | 0.14 | 0.26 | 0.17 | 0.12 | 0.09 | 0.06 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1998 | 0.00 | 0.05 | 0.13 | 0.24 | 0.23 | 0.17 | 0.08 | 0.06 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1999 | 0.00 | 0.03 | 0.19 | 0.15 | 0.27 | 0.12 | 0.15 | 0.04 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2000 | 0.00 | 0.03 | 0.16 | 0.23 | 0.22 | 0.24 | 0.07 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2001 | 0.00 | 0.01 | 0.13 | 0.21 | 0.20 | 0.17 | 0.18 | 0.06 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2002 | 0.00 | 0.01 | 0.11 | 0.18 | 0.23 | 0.19 | 0.12 | 0.12 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | 0.00 | 0.00 | 0.06 | 0.19 | 0.23 | 0.22 | 0.11 | 0.08 | 0.08 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | 0.00 | 0.00 | 0.03 | 0.14 | 0.27 | 0.22 | 0.16 | 0.09 | 0.04 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2005 | 0.00 | 0.00 | 0.05 | 0.11 | 0.13 | 0.30 | 0.15 | 0.13 | 0.06 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | 0.00 | 0.01 | 0.06 | 0.13 | 0.20 | 0.19 | 0.17 | 0.11 | 0.06 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2007 | 0.00 | 0.01 | 0.09 | 0.15 | 0.21 | 0.18 | 0.15 | 0.10 | 0.07 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2008 | 0.00 | 0.00 | 0.13 | 0.20 | 0.23 | 0.20 | 0.10 | 0.08 | 0.04 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2009 | 0.00 | 0.02 | 0.10 | 0.27 | 0.23 | 0.18 | 0.10 | 0.06 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2010 | 0.00 | 0.00 | 0.15 | 0.27 | 0.31 | 0.17 | 0.05 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2011 | 0.00 | 0.01 | 0.07 | 0.29 | 0.24 | 0.25 | 0.08 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2012 | 0.00 | 0.02 | 0.05 | 0.16 | 0.24 | 0.20 | 0.15 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2013 | 0.00 | 0.00 | 0.07 | 0.15 | 0.18 | 0.19 | 0.15 | 0.07 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2014 | 0.00 | 0.00 | 0.03 | 0.12 | 0.15 | 0.15 | 0.13 | 0.09 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2015 | 0.00 | 0.00 | 0.10 | 0.12 | 0.17 | 0.12 | 0.08 | 0.07 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2016 | 0.00 | 0.00 | 0.06 | 0.22 | 0.21 | 0.16 | 0.09 | 0.06 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

*Table 12c. Longline sentinel surveys, Catch rates at age (number / standardized effort).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1995 | 1 | 17 | 113 | 130 | 190 | 251 | 243 | 72 | 17 | 5 | 4 | 3 | 0 | 1 | 0 | 0 |
| 1996 | 1 | 30 | 107 | 179 | 208 | 248 | 148 | 129 | 31 | 4 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1997 | 3 | 24 | 106 | 124 | 234 | 155 | 110 | 81 | 55 | 9 | 3 | 1 | 0 | 0 | 0 | 0 |
| 1998 | 1 | 90 | 250 | 460 | 437 | 332 | 161 | 119 | 54 | 23 | 7 | 3 | 1 | 0 | 0 | 0 |
| 1999 | 1 | 82 | 456 | 351 | 633 | 284 | 344 | 95 | 62 | 35 | 16 | 3 | 1 | 0 | 0 | 0 |
| 2000 | 5 | 68 | 419 | 618 | 598 | 633 | 199 | 111 | 20 | 7 | 8 | 2 | 0 | 0 | 0 | 0 |
| 2001 | 11 | 36 | 402 | 641 | 629 | 543 | 557 | 177 | 72 | 26 | 10 | 4 | 1 | 0 | 0 | 0 |
| 2002 | 0 | 30 | 232 | 377 | 493 | 394 | 253 | 251 | 52 | 28 | 4 | 3 | 0 | 0 | 0 | 0 |
| 2003 | 0 | 10 | 131 | 390 | 478 | 445 | 232 | 154 | 163 | 31 | 13 | 3 | 2 | 0 | 0 | 0 |
| 2004 | 0 | 16 | 108 | 507 | 959 | 804 | 560 | 311 | 139 | 165 | 20 | 9 | 6 | 1 | 0 | 0 |
| 2005 | 0 | 14 | 143 | 324 | 386 | 850 | 445 | 378 | 167 | 95 | 57 | 13 | 3 | 1 | 0 | 0 |
| 2006 | 0 | 28 | 229 | 512 | 779 | 742 | 670 | 437 | 249 | 135 | 55 | 20 | 8 | 2 | 0 | 0 |
| 2007 | 0 | 21 | 273 | 459 | 631 | 553 | 471 | 310 | 201 | 66 | 50 | 23 | 9 | 2 | 0 | 0 |
| 2008 | 0 | 11 | 314 | 470 | 535 | 470 | 227 | 178 | 95 | 28 | 27 | 7 | 3 | 0 | 0 | 0 |
| 2009 | 0 | 41 | 230 | 613 | 528 | 418 | 238 | 136 | 36 | 16 | 3 | 2 | 1 | 1 | 0 | 0 |
| 2010 | 0 | 9 | 329 | 581 | 665 | 363 | 114 | 78 | 27 | 7 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 39 | 208 | 827 | 694 | 705 | 242 | 105 | 39 | 6 | 0 | 2 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 71 | 199 | 614 | 934 | 789 | 569 | 171 | 67 | 17 | 3 | 1 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 11 | 318 | 642 | 759 | 800 | 628 | 323 | 105 | 39 | 18 | 3 | 0 | 0 | 0 | 0 |
| 2014 | 0 | 16 | 116 | 470 | 570 | 571 | 503 | 336 | 93 | 40 | 5 | 0 | 6 | 1 | 0 | 0 |
| 2015 | 0 | 15 | 391 | 467 | 650 | 481 | 299 | 291 | 115 | 81 | 24 | 0 | 0 | 0 | 0 | 0 |
| 2016 | 0 | 5 | 263 | 1031 | 966 | 738 | 402 | 303 | 198 | 107 | 44 | 11 | 8 | 0 | 0 | 0 |

*Table 12d. Longline sentinel surveys, lengths at age (cm).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 29.4 | 37.9 | 44.0 | 50.8 | 54.7 | 56.7 | 59.2 | 60.5 | 68.9 | 64.0 | 74.4 | 85.0 | - | - | - | - |
| 1995 | 26.9 | 34.7 | 42.6 | 48.1 | 53.2 | 56.3 | 59.3 | 64.5 | 69.2 | 77.0 | 74.1 | 77.7 | 91.1 | 86.8 | 88.0 | 89.0 |
| 1996 | 28.8 | 38.8 | 45.2 | 51.6 | 55.2 | 60.6 | 63.7 | 66.2 | 70.6 | 84.0 | 76.8 | 86.2 | 80.1 | - | - | - |
| 1997 | 30.9 | 37.7 | 45.0 | 49.8 | 55.0 | 57.5 | 63.1 | 63.9 | 66.8 | 67.5 | 62.0 | 80.9 | - | 88.8 | - | - |
| 1998 | 25.0 | 36.3 | 43.2 | 50.0 | 54.0 | 58.0 | 60.2 | 63.6 | 65.8 | 73.3 | 75.9 | 78.3 | 79.0 | - | - | - |
| 1999 | 31.0 | 38.6 | 45.1 | 49.7 | 54.5 | 57.8 | 59.4 | 63.2 | 63.5 | 66.3 | 75.2 | 80.3 | 90.1 | - | - | - |
| 2000 | 30.3 | 37.3 | 44.8 | 50.5 | 54.2 | 58.5 | 61.7 | 63.1 | 68.3 | 72.4 | 77.7 | 68.4 | 70.0 | - | - | - |
| 2001 | 30.2 | 36.5 | 43.4 | 49.9 | 54.5 | 57.2 | 61.6 | 63.9 | 65.8 | 65.4 | 69.2 | 87.4 | 74.4 | - | - | - |
| 2002 | 28.0 | 36.4 | 42.4 | 48.5 | 53.5 | 56.4 | 60.0 | 64.2 | 68.7 | 72.4 | 75.1 | 76.8 | - | - | - | - |
| 2003 | - | 36.5 | 43.5 | 49.4 | 54.1 | 57.5 | 61.5 | 63.1 | 65.8 | 73.5 | 72.5 | 83.2 | 77.7 | - | - | - |
| 2004 | - | 37.1 | 43.7 | 49.7 | 53.3 | 58.3 | 61.9 | 64.4 | 66.4 | 69.2 | 76.1 | 69.8 | 74.4 | 88.0 | - | - |
| 2005 | - | 38.3 | 44.9 | 50.6 | 54.8 | 56.5 | 60.8 | 65.0 | 67.5 | 67.9 | 74.0 | 72.9 | 80.4 | 85.9 | - | 94.0 |
| 2006 | - | 38.0 | 43.6 | 50.3 | 54.1 | 57.9 | 60.6 | 63.3 | 66.9 | 68.9 | 73.3 | 76.7 | 76.6 | 82.3 | - | - |
| 2007 | - | 36.0 | 43.3 | 50.6 | 55.0 | 57.5 | 60.5 | 63.5 | 68.2 | 74.7 | 75.2 | 73.8 | 79.6 | 79.9 | 100.2 | - |
| 2008 | - | 36.8 | 43.7 | 49.4 | 53.6 | 57.5 | 61.5 | 63.1 | 66.3 | 71.2 | 70.3 | 71.5 | 83.7 | 87.3 | - | - |
| 2009 | - | 36.3 | 42.9 | 47.8 | 52.7 | 57.6 | 60.1 | 62.5 | 67.6 | 72.6 | 74.3 | 78.4 | 76.0 | 95.5 | - | - |
| 2010 | - | 38.2 | 43.6 | 47.3 | 51.4 | 54.6 | 59.1 | 62.5 | 63.5 | 68.2 | 73.0 | - | - | - | - | - |
| 2011 | - | 37.8 | 43.7 | 48.6 | 51.3 | 54.3 | 59.5 | 59.6 | 70.1 | 65.8 | - | 73.0 | - | - | - | - |
| 2012 | - | 38.5 | 43.8 | 47.7 | 52.3 | 55.4 | 57.9 | 61.3 | 66.7 | 71.4 | 74.6 | 76.0 | - | - | - | - |
| 2013 | - | 36.9 | 44.7 | 49.5 | 53.5 | 56.3 | 56.0 | 63.3 | 67.0 | 69.8 | 71.4 | 70.0 | - | - | - | - |
| 2014 | - | 37.1 | 43.0 | 47.4 | 51.9 | 55.6 | 59.5 | 61.0 | 67.0 | 71.4 | 71.9 | - | 81.6 | 82.0 | - | - |
| 2015 | - | 37.5 | 46.0 | 50.6 | 54.6 | 57.0 | 60.4 | 61.6 | 65.4 | 67.6 | 75.1 | - | - | - | - | - |
| 2016 | - | 38.9 | 46.7 | 51.3 | 55.3 | 59.4 | 62.5 | 64.5 | 66.7 | 70.1 | 76.8 | 87.5 | 67.0 | - | - | - |

*Table 12e. Longline sentinel surveys, weights at age (kg).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 0.23 | 0.52 | 0.78 | 1.22 | 1.54 | 1.71 | 1.94 | 2.12 | 3.13 | 2.39 | 4.67 | 5.59 | - | - | - | - |
| 1995 | 0.18 | 0.38 | 0.71 | 1.03 | 1.41 | 1.69 | 1.97 | 2.62 | 3.28 | 4.44 | 4.01 | 4.74 | 7.18 | 6.14 | 6.32 | 6.60 |
| 1996 | 0.21 | 0.53 | 0.84 | 1.25 | 1.54 | 2.08 | 2.43 | 2.74 | 3.39 | 5.53 | 4.13 | 6.00 | 4.64 | - | - | - |
| 1997 | 0.28 | 0.51 | 0.85 | 1.14 | 1.54 | 1.77 | 2.38 | 2.50 | 2.84 | 3.02 | 2.40 | 4.78 | - | 6.31 | - | - |
| 1998 | 0.14 | 0.43 | 0.73 | 1.13 | 1.43 | 1.78 | 2.03 | 2.40 | 2.67 | 3.62 | 4.10 | 4.39 | 4.32 | - | - | - |
| 1999 | 0.26 | 0.51 | 0.81 | 1.08 | 1.43 | 1.72 | 1.88 | 2.30 | 2.33 | 2.69 | 3.76 | 4.55 | 6.37 | - | - | - |
| 2000 | 0.24 | 0.45 | 0.80 | 1.15 | 1.43 | 1.83 | 2.16 | 2.36 | 2.96 | 3.66 | 4.41 | 2.98 | 3.06 | - | - | - |
| 2001 | 0.25 | 0.44 | 0.73 | 1.09 | 1.42 | 1.64 | 2.04 | 2.31 | 2.50 | 2.40 | 2.88 | 5.43 | 3.55 | - | - | - |
| 2002 | 0.19 | 0.44 | 0.72 | 1.08 | 1.48 | 1.76 | 2.13 | 2.65 | 3.28 | 3.81 | 4.35 | 4.82 | - | - | - | - |
| 2003 | - | 0.45 | 0.76 | 1.13 | 1.51 | 1.82 | 2.26 | 2.48 | 2.82 | 3.95 | 3.77 | 5.69 | 4.52 | - | - | - |
| 2004 | - | 0.46 | 0.77 | 1.16 | 1.44 | 1.91 | 2.30 | 2.62 | 2.91 | 3.27 | 4.38 | 3.31 | 4.05 | 6.51 | - | - |
| 2005 | - | 0.50 | 0.84 | 1.21 | 1.58 | 1.74 | 2.21 | 2.73 | 3.14 | 3.15 | 4.07 | 3.93 | 5.13 | 6.31 | - | 8.30 |
| 2006 | - | 0.47 | 0.74 | 1.14 | 1.43 | 1.77 | 2.06 | 2.40 | 2.84 | 3.16 | 3.80 | 4.31 | 4.21 | 5.13 | - | - |
| 2007 | - | 0.40 | 0.72 | 1.17 | 1.51 | 1.76 | 2.06 | 2.42 | 3.03 | 4.03 | 4.07 | 3.88 | 4.80 | 4.74 | 9.54 | - |
| 2008 | - | 0.43 | 0.75 | 1.10 | 1.43 | 1.78 | 2.23 | 2.39 | 2.86 | 3.54 | 3.47 | 3.52 | 5.67 | 6.37 | - | - |
| 2009 | - | 0.42 | 0.71 | 0.99 | 1.35 | 1.80 | 2.06 | 2.35 | 2.98 | 3.73 | 3.94 | 4.59 | 4.10 | 8.40 | - | - |
| 2010 | - | 0.48 | 0.75 | 0.95 | 1.25 | 1.51 | 1.95 | 2.33 | 2.41 | 2.94 | 3.57 | - | - | - | - | - |
| 2011 | - | 0.48 | 0.74 | 1.04 | 1.23 | 1.48 | 1.99 | 1.98 | 3.31 | 2.60 | - | 3.57 | - | - | - | - |
| 2012 | - | 0.49 | 0.73 | 0.96 | 1.29 | 1.54 | 1.77 | 2.10 | 2.86 | 3.33 | 3.71 | 3.92 | - | - | - | - |
| 2013 | - | 0.44 | 0.81 | 1.11 | 1.43 | 1.69 | 1.65 | 2.43 | 2.84 | 3.33 | 3.40 | 3.15 | - | - | - | - |
| 2014 | - | 0.44 | 0.71 | 0.96 | 1.28 | 1.60 | 1.98 | 2.16 | 2.86 | 3.41 | 3.36 | - | 5.39 | 5.03- | - | - |
| 2015 | - | 0.46 | 0.86 | 1.15 | 1.52 | 1.71 | 2.08 | 2.22 | 2.64 | 2.96 | 4.15 | - | - | - | - | - |
| 2016 | - | 0.50 | 0.89 | 1.19 | 1.51 | 1.90 | 2.24 | 2.46 | 2.78 | 3.21 | 4.27 | 6.01 | 2.64 | - | - | - |

*Table 12f. Longline sentinel surveys, total numbers at age, effort, catch and catch per unit effort (CPUE).*

| Year | Total | Effort | Catch | CPUE |
|---|---|---|---|---|
| 1994 | 2059 | - | - | - |
| 1995 | 44574 | 4262 | 71066 | 16.68 |
| 1996 | 52218 | 4798 | 96426 | 20.10 |
| 1997 | 34059 | 3767 | 65578 | 17.41 |
| 1998 | 54888 | 2832 | 88842 | 31.37 |
| 1999 | 52041 | 2203 | 85046 | 38.61 |
| 2000 | 83525 | 3106 | 136546 | 43.96 |
| 2001 | 96719 | 3112 | 160687 | 51.64 |
| 2002 | 74958 | 3540 | 130858 | 36.96 |
| 2003 | 54079 | 2636 | 105677 | 40.09 |
| 2004 | 72943 | 2024 | 136703 | 67.55 |
| 2005 | 59130 | 2057 | 122924 | 59.76 |
| 2006 | 77184 | 1997 | 142227 | 71.22 |
| 2007 | 53131 | 1731 | 100440 | 58.03 |
| 2008 | 45535 | 1927 | 75463 | 39.17 |
| 2009 | 37729 | 1667 | 55377 | 33.23 |
| 2010 | 35107 | 1615 | 45497 | 28.18 |
| 2011 | 41167 | 1435 | 53710 | 37 |
| 2012 | 36158 | 1052 | 50742 | 48 |
| 2013 | 34841 | 956 | 51569 | 53.97 |
| 2014 | 28754 | 1055 | 42915 | 40.68 |
| 2015 | 29408 | 1045 | 47857 | 45.78 |
| 2016 | 35972 | 882 | 60335 | 68.37 |

*Table 12g. Gillnet sentinel surveys, numbers at age.*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 7 | 82 | 585 | 1765 | 5407 | 8729 | 10614 | 2653 | 716 | 104 | 122 | 98 | 17 | 5 | 4 | 6 |
| 1996 | 3 | 156 | 1298 | 19590 | 38993 | 35306 | 22594 | 16257 | 4911 | 195 | 42 | 48 | 39 | - | - | - |
| 1997 | 3 | 138 | 1901 | 6299 | 23046 | 17150 | 12442 | 8878 | 5145 | 737 | 216 | 29 | - | 11 | - | - |
| 1998 | - | 1504 | 6450 | 32715 | 21488 | 25843 | 12707 | 7773 | 6904 | 1820 | 700 | 54 | 116 | - | - | 98 |
| 1999 | - | 123 | 1052 | 6520 | 22375 | 14816 | 19043 | 5775 | 2971 | 1634 | 669 | 102 | 21 | - | - | - |
| 2000 | 18 | 105 | 1541 | 15221 | 35346 | 49826 | 18546 | 13028 | 3723 | 1349 | 821 | 734 | 130 | - | - | - |
| 2001 | 0 | 14 | 765 | 4582 | 10723 | 13862 | 20905 | 7715 | 3129 | 665 | 616 | 56 | 20 | - | - | - |
| 2002 | - | 29 | 469 | 4907 | 19084 | 17590 | 15598 | 14302 | 2901 | 1694 | 171 | 260 |  | - | - | - |
| 2003 | - | 44 | 401 | 5354 | 15105 | 20342 | 11406 | 7123 | 8487 | 1265 | 616 | 44 | 47 | - | - | - |
| 2004 | - | 50 | 201 | 2660 | 18655 | 27204 | 22857 | 8457 | 3673 | 3526 | 261 | 296 | 364 | - | - | - |
| 2005 | - | 6 | 520 | 3976 | 8701 | 30211 | 24737 | 16737 | 7043 | 3082 | 1712 | 629 | 55 | 4 | - | 2 |
| 2006 | - | 25 | 475 | 5912 | 17674 | 25550 | 25152 | 16236 | 9631 | 4922 | 1863 | 582 | 215 | 38 | - | - |
| 2007 | - | 10 | 238 | 4915 | 14824 | 16591 | 17022 | 12313 | 8708 | 2307 | 1870 | 908 | 320 | 56 | 14 | - |
| 2008 | - | 17 | 403 | 5490 | 17821 | 20599 | 11586 | 10219 | 5222 | 1615 | 1332 | 448 | 109 | 35 | - | - |
| 2009 | - | 11 | 316 | 4410 | 11288 | 15298 | 9642 | 6005 | 1624 | 684 | 117 | 73 | 21 | 33 | - | - |
| 2010 | - | - | 509 | 2170 | 18577 | 12664 | 7622 | 2848 | 2063 | 332 | 145 | 74 | - | - | - | - |
| 2011 | - | 8 | 461 | 5256 | 17157 | 37445 | 16081 | 8268 | 3903 | 112 | - | - | - | - | - | - |
| 2012 | - | - | 148 | 4394 | 19903 | 25881 | 22907 | 10197 | 2894 | 368 | 417 | - | - | - | - | - |
| 2013 | - | - | 510 | 2526 | 13400 | 14232 | 12275 | 10206 | 1200 | 1108 | 41 | 35 | - | - | - | - |
| 2014 | - | 101 | 152 | 2395 | 9854 | 11940 | 16132 | 12592 | 4259 | 1304 | 330 | 67 | 52 | - | - | - |
| 2015 | - | 42 | 1633 | 7977 | 22236 | 24311 | 22202 | 14608 | 6823 | 4961 | 258 | 256 | 49 | - | - | - |
| 2016 | - | 19 | 140 | 5989 | 25380 | 30786 | 9574 | 8307 | 4032 | 1667 | 1240 | 111 | - | - | - | - |

*Table 12h. Gillnet sentinel surveys, numbers at age (%).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 0.00 | 0.00 | 0.02 | 0.06 | 0.17 | 0.28 | 0.34 | 0.09 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1996 | 0.00 | 0.00 | 0.01 | 0.14 | 0.28 | 0.25 | 0.16 | 0.12 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1997 | 0.00 | 0.00 | 0.03 | 0.08 | 0.30 | 0.23 | 0.16 | 0.12 | 0.07 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1998 | 0.00 | 0.01 | 0.05 | 0.28 | 0.18 | 0.22 | 0.11 | 0.07 | 0.06 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1999 | 0.00 | 0.00 | 0.01 | 0.09 | 0.30 | 0.20 | 0.25 | 0.08 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2000 | 0.00 | 0.00 | 0.01 | 0.11 | 0.25 | 0.35 | 0.13 | 0.09 | 0.03 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2001 | 0.00 | 0.00 | 0.01 | 0.07 | 0.17 | 0.22 | 0.33 | 0.12 | 0.05 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2002 | 0.00 | 0.00 | 0.01 | 0.06 | 0.25 | 0.23 | 0.20 | 0.19 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2003 | 0.00 | 0.00 | 0.01 | 0.08 | 0.22 | 0.29 | 0.16 | 0.10 | 0.12 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2004 | 0.00 | 0.00 | 0.00 | 0.03 | 0.21 | 0.31 | 0.26 | 0.10 | 0.04 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2005 | 0.00 | 0.00 | 0.01 | 0.04 | 0.09 | 0.31 | 0.25 | 0.17 | 0.07 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006 | 0.00 | 0.00 | 0.00 | 0.05 | 0.16 | 0.24 | 0.23 | 0.15 | 0.09 | 0.05 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2007 | 0.00 | 0.00 | 0.00 | 0.06 | 0.19 | 0.21 | 0.21 | 0.15 | 0.11 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2008 | 0.00 | 0.00 | 0.01 | 0.07 | 0.24 | 0.28 | 0.15 | 0.14 | 0.07 | 0.02 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2009 | 0.00 | 0.00 | 0.01 | 0.09 | 0.23 | 0.31 | 0.19 | 0.12 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2010 | 0.00 | 0.00 | 0.01 | 0.05 | 0.40 | 0.27 | 0.16 | 0.06 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2011 | 0.00 | 0.00 | 0.01 | 0.06 | 0.19 | 0.42 | 0.18 | 0.09 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2012 | 0.00 | 0.00 | 0.00 | 0.05 | 0.22 | 0.29 | 0.26 | 0.11 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2013 | 0.00 | 0.00 | 0.01 | 0.03 | 0.15 | 0.16 | 0.14 | 0.12 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2014 | 0.00 | 0.00 | 0.00 | 0.03 | 0.11 | 0.13 | 0.18 | 0.14 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2015 | 0.00 | 0.00 | 0.02 | 0.09 | 0.25 | 0.27 | 0.25 | 0.16 | 0.08 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2016 | 0.00 | 0.00 | 0.00 | 0.07 | 0.29 | 0.35 | 0.11 | 0.09 | 0.05 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

*Table 12i. Gillnet sentinel surveys, catch rates at age.*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 0 | 3 | 19 | 58 | 178 | 288 | 350 | 88 | 24 | 3 | 4 | 3 | 1 | 0 | 0 | 0 |
| 1996 | 0 | 2 | 15 | 223 | 444 | 402 | 258 | 185 | 56 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1997 | 0 | 2 | 24 | 80 | 294 | 219 | 159 | 113 | 66 | 9 | 3 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 14 | 59 | 301 | 198 | 238 | 117 | 72 | 64 | 17 | 6 | 0 | 1 | 0 | 0 | 1 |
| 1999 | 0 | 1 | 12 | 75 | 258 | 171 | 220 | 67 | 34 | 19 | 8 | 1 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 1 | 12 | 117 | 272 | 383 | 143 | 100 | 29 | 10 | 6 | 6 | 1 | 0 | 0 | 0 |
| 2001 | 0 | 0 | 7 | 41 | 96 | 125 | 188 | 69 | 28 | 6 | 6 | 1 | 0 | 0 | 0 | 0 |
| 2002 | 0 | 0 | 5 | 48 | 188 | 174 | 154 | 141 | 29 | 17 | 2 | 3 | 0 | 0 | 0 | 0 |
| 2003 | 0 | 1 | 11 | 142 | 401 | 540 | 303 | 189 | 225 | 34 | 16 | 1 | 1 | 0 | 0 | 0 |
| 2004 | 0 | 1 | 5 | 60 | 419 | 611 | 513 | 190 | 82 | 79 | 6 | 7 | 8 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 9 | 73 | 159 | 552 | 452 | 306 | 129 | 56 | 31 | 11 | 1 | 0 | 0 | 0 |
| 2006 | 0 | 1 | 11 | 137 | 408 | 590 | 581 | 375 | 222 | 114 | 43 | 13 | 5 | 1 | 0 | 0 |
| 2007 | 0 | 0 | 6 | 116 | 350 | 392 | 402 | 291 | 206 | 54 | 44 | 21 | 8 | 1 | 0 | 0 |
| 2008 | 0 | 0 | 10 | 132 | 428 | 494 | 278 | 245 | 125 | 39 | 32 | 11 | 3 | 1 | 0 | 0 |
| 2009 | 0 | 0 | 8 | 108 | 277 | 376 | 237 | 148 | 40 | 17 | 3 | 2 | 1 | 1 | 0 | 0 |
| 2010 | 0 | 0 | 14 | 58 | 499 | 340 | 205 | 76 | 55 | 9 | 4 | 2 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 14 | 162 | 530 | 1157 | 497 | 255 | 121 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 0 | 5 | 139 | 629 | 817 | 723 | 322 | 91 | 12 | 13 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 17 | 85 | 449 | 476 | 411 | 342 | 40 | 37 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2014 | 0 | 3 | 4 | 66 | 271 | 328 | 444 | 346 | 117 | 36 | 9 | 2 | 1 | 0 | 0 | 0 |
| 2015 | 0 | 2 | 58 | 285 | 794 | 868 | 793 | 522 | 244 | 177 | 9 | 9 | 2 | 0 | 0 | 0 |
| 2016 | 0 | 1 | 5 | 214 | 908 | 1102 | 343 | 297 | 144 | 60 | 44 | 4 | 0 | 0 | 0 | 0 |

*Table 12j. Gillnet sentinel surveys, lengths at age (cm).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 27.51 | 34.28 | 43.16 | 51.18 | 55.16 | 57.63 | 59.41 | 64.21 | 67.19 | 80.77 | 72.77 | 74.85 | 88.26 | 90.24 | 88.00 | 86.22 |
| 1996 | 25.60 | 36.59 | 43.93 | 53.05 | 56.59 | 58.34 | 60.83 | 62.23 | 62.03 | 81.50 | 78.92 | 85.99 | 80.67 | - | - | - |
| 1997 | 32.53 | 40.49 | 47.97 | 53.52 | 57.24 | 58.74 | 61.36 | 61.68 | 63.61 | 63.56 | 60.91 | 81.29 | - | 88.08 | - | - |
| 1998 | - | 35.94 | 41.41 | 50.58 | 54.63 | 58.67 | 60.81 | 64.33 | 65.18 | 74.42 | 71.12 | 78.35 | 79.00 | - | - | 85.00 |
| 1999 | - | 36.56 | 45.02 | 54.27 | 57.19 | 60.55 | 62.28 | 63.71 | 63.62 | 70.91 | 74.47 | 72.86 | 88.98 | - | - | - |
| 2000 | 29.71 | 36.78 | 46.83 | 53.79 | 56.76 | 60.22 | 62.19 | 62.46 | 66.12 | 64.86 | 71.19 | 64.69 | 70.00 | - | - | - |
| 2001 | - | 35.89 | 45.19 | 53.40 | 58.16 | 60.40 | 63.07 | 65.00 | 64.44 | 67.06 | 67.27 | 88.23 | 70.00 | - | - | - |
| 2002 | - | 37.76 | 46.69 | 52.69 | 57.08 | 58.97 | 60.99 | 63.52 | 66.71 | 68.74 | 77.04 | 66.35 | - | - | - | - |
| 2003 | - | 35.35 | 45.48 | 54.35 | 57.88 | 59.53 | 62.52 | 62.40 | 63.77 | 68.80 | 69.02 | 89.00 | 77.30 | - | - | - |
| 2004 | - | 37.05 | 42.88 | 52.19 | 56.27 | 59.79 | 61.98 | 64.35 | 66.99 | 66.77 | 83.88 | 69.09 | 71.96 | - | - | - |
| 2005 | - | 34.80 | 45.29 | 51.92 | 56.38 | 58.71 | 61.10 | 63.23 | 63.55 | 66.11 | 71.49 | 68.38 | 80.33 | 85.12 | - | 94.00 |
| 2006 | - | 38.46 | 46.50 | 54.47 | 57.75 | 60.22 | 61.81 | 63.52 | 65.17 | 66.40 | 70.34 | 72.82 | 75.49 | 82.86 | - | - |
| 2007 | - | 36.17 | 45.78 | 56.35 | 59.41 | 61.16 | 62.96 | 64.46 | 67.08 | 73.58 | 72.97 | 71.05 | 78.51 | 80.01 | 97.33 | - |
| 2008 | - | 37.15 | 46.29 | 54.05 | 57.63 | 59.83 | 63.62 | 63.15 | 65.97 | 69.62 | 69.34 | 68.30 | 85.78 | 89.69 | - | - |
| 2009 | - | 36.80 | 47.22 | 53.31 | 56.26 | 60.18 | 60.89 | 62.86 | 66.67 | 70.19 | 73.58 | 79.40 | 76.00 | 96.33 | - | - |
| 2010 | - | - | 47.56 | 54.33 | 56.72 | 57.96 | 62.97 | 63.69 | 63.62 | 69.35 | 74.46 | 77.40 | - | - | - | - |
| 2011 | - | 40.00 | 47.28 | 53.76 | 56.09 | 57.48 | 59.96 | 62.05 | 63.81 | 77.06 | - | - | - | - | - | - |
| 2012 | - | - | 40.95 | 56.40 | 57.05 | 58.95 | 60.76 | 61.84 | 67.47 | 78.53 | 70.67 | - | - | - | - | - |
| 2013 | - | - | 49.57 | 56.62 | 58.76 | 59.13 | 60.80 | 63.76 | 67.77 | 65.78 | 79.42 | 79.00 | - | - | - | - |
| 2014 | - | 39.47 | 46.48 | 55.57 | 59.25 | 60.50 | 61.51 | 64.05 | 67.07 | 68.74 | 80.07 | 76.84 | 76.45 | - | - | - |
| 2015 | - | 37.75 | 53.62 | 56.12 | 59.75 | 61.43 | 62.40 | 64.20 | 64.45 | 67.71 | 84.11 | 80.93 | 85.00 | - | - | - |
| 2016 | - | 37.92 | 46.00 | 57.91 | 60.44 | 62.78 | 65.81 | 65.64 | 66.99 | 69.97 | 67.33 | 90.21 | - | - | - | - |

*Table 12k. Gillnet sentinel surveys, Weights at age (kg).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1995 | 0.19 | 0.37 | 0.74 | 1.24 | 1.56 | 1.78 | 1.96 | 2.54 | 3.00 | 5.12 | 3.82 | 4.20 | 6.48 | 6.92 | 6.32 | 6.66 |
| 1996 | 0.15 | 0.44 | 0.77 | 1.35 | 1.64 | 1.81 | 2.06 | 2.22 | 2.27 | 5.04 | 4.54 | 5.91 | 4.75 | - | - | - |
| 1997 | 0.32 | 0.62 | 1.02 | 1.41 | 1.72 | 1.86 | 2.14 | 2.18 | 2.41 | 2.43 | 2.17 | 4.86 | - | 6.16 | - | - |
| 1998 | - | 0.42 | 0.65 | 1.16 | 1.47 | 1.82 | 2.07 | 2.51 | 2.59 | 3.78 | 3.38 | 4.33 | 4.32 | - | - | 5.38 |
| 1999 | - | 0.44 | 0.81 | 1.41 | 1.64 | 1.96 | 2.13 | 2.33 | 2.29 | 3.16 | 3.68 | 3.39 | 6.14 | - | - | - |
| 2000 | 0.22 | 0.43 | 0.91 | 1.39 | 1.63 | 1.97 | 2.19 | 2.23 | 2.66 | 2.58 | 3.39 | 2.49 | 3.06 | - | - | - |
| 2001 | - | 0.42 | 0.82 | 1.33 | 1.70 | 1.90 | 2.15 | 2.37 | 2.31 | 2.55 | 2.66 | 5.58 | 2.85 | - | - | - |
| 2002 | - | 0.49 | 0.97 | 1.39 | 1.78 | 1.99 | 2.20 | 2.54 | 2.97 | 3.26 | 4.65 | 2.91 | - | - | - | - |
| 2003 | - | 0.41 | 0.89 | 1.50 | 1.83 | 1.99 | 2.33 | 2.35 | 2.50 | 3.23 | 3.21 | 6.75 | 4.45 | - | - | - |
| 2004 | - | 0.46 | 0.74 | 1.33 | 1.68 | 2.02 | 2.28 | 2.58 | 2.95 | 2.91 | 5.79 | 3.16 | 3.65 | - | - | - |
| 2005 | - | 0.38 | 0.86 | 1.31 | 1.69 | 1.93 | 2.20 | 2.49 | 2.57 | 2.87 | 3.68 | 3.19 | 5.13 | 6.13 | - | 8.30 |
| 2006 | - | 0.49 | 0.89 | 1.44 | 1.73 | 1.97 | 2.15 | 2.36 | 2.58 | 2.77 | 3.32 | 3.69 | 4.03 | 5.25 | - | - |
| 2007 | - | 0.41 | 0.85 | 1.62 | 1.90 | 2.09 | 2.29 | 2.48 | 2.84 | 3.83 | 3.73 | 3.44 | 4.63 | 4.76 | 8.63 | - |
| 2008 | - | 0.45 | 0.91 | 1.44 | 1.76 | 2.00 | 2.42 | 2.37 | 2.79 | 3.26 | 3.34 | 3.02 | 6.15 | 6.99 | - | - |
| 2009 | - | 0.43 | 0.94 | 1.38 | 1.64 | 2.02 | 2.13 | 2.38 | 2.84 | 3.37 | 3.81 | 4.77 | 4.10 | 8.62 | - | - |
| 2010 | - | - | 0.97 | 1.46 | 1.66 | 1.78 | 2.32 | 2.45 | 2.42 | 3.15 | 3.86 | 4.53 | - | - | - | - |
| 2011 | - | 0.55 | 0.97 | 1.42 | 1.61 | 1.74 | 1.99 | 2.25 | 2.43 | 4.41 | - | - | - | - | - | - |
| 2012 | - | - | 0.59 | 1.60 | 1.65 | 1.83 | 2.03 | 2.14 | 2.82 | 4.42 | 3.19 | - | - | - | - | - |
| 2013 | - | - | 1.12 | 1.67 | 1.87 | 1.93 | 2.09 | 2.44 | 3.03 | 2.83 | 4.90 | 4.59 | - | - | - | - |
| 2014 | - | 0.54 | 0.88 | 1.55 | 1.88 | 2.03 | 2.14 | 2.41 | 2.88 | 3.03 | 4.84 | 4.19 | 4.28 | - | - | - |
| 2015 | - | 0.46 | 1.40 | 1.58 | 1.92 | 2.08 | 2.23 | 2.42 | 2.46 | 2.90 | 5.61 | 4.87 | 5.53 | - | - | - |
| 2016 | - | 0.46 | 0.83 | 1.71 | 1.94 | 2.19 | 2.55 | 2.60 | 2.74 | 3.07 | 2.82 | 6.54 | - | - | - | - |

*Table 12l. Gillnet sentinel surveys, total numbers at age, effort, catch and catch per unit effort (CPUE).*

| Year | Total | Effort | Catch | CPUE |
|---|---|---|---|---|
| 1995 | 30914 | 3032 | 57210 | 18.87 |
| 1996 | 139432 | 8774 | 251247 | 28.64 |
| 1997 | 75995 | 7844 | 144425 | 18.41 |
| 1998 | 118172 | 10866 | 255026 | 23.47 |
| 1999 | 75101 | 8668 | 185249 | 21.37 |
| 2000 | 140388 | 13012 | 310878 | 23.89 |
| 2001 | 63052 | 11119 | 153284 | 13.79 |
| 2002 | 77005 | 10128 | 182517 | 18.02 |
| 2003 | 70234 | 3767 | 165454 | 43.93 |
| 2004 | 88204 | 4456 | 207039 | 46.47 |
| 2005 | 97415 | 5475 | 236486 | 43.19 |
| 2006 | 108275 | 4331 | 255338 | 58.96 |
| 2007 | 80096 | 4237 | 192087 | 45.33 |
| 2008 | 74896 | 4167 | 169919 | 40.78 |
| 2009 | 49522 | 4069 | 108880 | 26.76 |
| 2010 | 47004 | 3723 | 96322 | 25.87 |
| 2011 | 88691 | 3237 | 177301 | 54.78 |
| 2012 | 87110 | 3166 | 186909 | 59.03 |
| 2013 | 55534 | 2987 | 120241 | 40.25 |
| 2014 | 59176 | 3636 | 136699 | 37.60 |
| 2015 | 105357 | 2800 | 240563 | 85.91 |
| 2016 | 87245 | 2794 | 202752 | 72.57 |

*Table 13. Proportion mature at age.*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1975 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1976 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1977 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1978 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1979 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1980 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1981 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1982 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1983 | 0.01 | 0.06 | 0.49 | 0.81 | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1984 | 0.00 | 0.02 | 0.29 | 0.88 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1985 | 0.00 | 0.02 | 0.22 | 0.80 | 0.97 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1986 | 0.00 | 0.06 | 0.38 | 0.70 | 0.90 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1987 | 0.00 | 0.05 | 0.24 | 0.74 | 0.93 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1988 | 0.00 | 0.02 | 0.13 | 0.58 | 0.83 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1989 | 0.00 | 0.04 | 0.31 | 0.72 | 0.92 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1990 | 0.00 | 0.04 | 0.18 | 0.47 | 0.69 | 0.85 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1991 | 0.00 | 0.03 | 0.25 | 0.73 | 0.94 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1992 | 0.01 | 0.10 | 0.34 | 0.59 | 0.86 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1993 | 0.00 | 0.04 | 0.54 | 0.91 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1994 | 0.02 | 0.10 | 0.32 | 0.70 | 0.89 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1995 | 0.07 | 0.49 | 0.88 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1996 | 0.13 | 0.39 | 0.77 | 0.92 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1997 | 0.24 | 0.56 | 0.82 | 0.92 | 0.96 | 0.98 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 |
| 1998 | 0.04 | 0.26 | 0.75 | 0.93 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1999 | 0.03 | 0.41 | 0.77 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2000 | 0.02 | 0.20 | 0.67 | 0.89 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2001 | 0.03 | 0.23 | 0.70 | 0.94 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2002 | 0.04 | 0.20 | 0.60 | 0.83 | 0.96 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 |
| 2003 | 0.07 | 0.30 | 0.66 | 0.89 | 0.96 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2004 | 0.05 | 0.27 | 0.75 | 0.92 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2005 | 0.03 | 0.20 | 0.63 | 0.96 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2006 | 0.04 | 0.21 | 0.64 | 0.87 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2007 | 0.03 | 0.17 | 0.64 | 0.89 | 0.97 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2008 | 0.02 | 0.14 | 0.49 | 0.88 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2009 | 0.10 | 0.40 | 0.78 | 0.95 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2010 | 0.02 | 0.15 | 0.41 | 0.86 | 0.95 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2011 | 0.22 | 0.45 | 0.72 | 0.85 | 0.94 | 0.97 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 |
| 2012 | 0.07 | 0.24 | 0.70 | 0.90 | 0.94 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2013 | 0.02 | 0.18 | 0.34 | 0.81 | 0.95 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2014 | 0.04 | 0.24 | 0.69 | 0.90 | 0.98 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2015 | 0.10 | 0.41 | 0.75 | 0.92 | 0.99 | 0.99 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2016 | 0.17 | 0.27 | 0.59 | 0.82 | 0.94 | 0.94 | 0.97 | 0.95 | 1.00 | 1.00 | 1.00 |

*Table 14. Fecundity at age ('000).*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1975 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1976 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1977 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1978 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1979 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1980 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1981 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1982 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1983 | 54 | 172 | 349 | 582 | 783 | 954 | 1 178 | 1 411 | 1 965 | 2 751 | 2 943 |
| 1984 | 75 | 184 | 380 | 673 | 816 | 1 007 | 1 211 | 1 523 | 2 360 | 3 775 | 2 908 |
| 1985 | 51 | 178 | 331 | 573 | 826 | 917 | 1 146 | 1 198 | 1 952 | 2 260 | 2 754 |
| 1986 | 36 | 153 | 337 | 500 | 706 | 937 | 1 176 | 1 512 | 1 584 | 2 219 | 3 166 |
| 1987 | 57 | 155 | 271 | 485 | 692 | 968 | 1 588 | 1 671 | 1 866 | 2 523 | 1 947 |
| 1988 | 50 | 102 | 225 | 460 | 651 | 933 | 1 192 | 1 386 | 1 790 | 2 180 | 1 800 |
| 1989 | 49 | 129 | 298 | 489 | 707 | 857 | 1 122 | 1 665 | 1 992 | 2 643 | 2 234 |
| 1990 | 47 | 141 | 270 | 421 | 551 | 719 | 996 | 1 204 | 1 738 | 2 454 | 4 152 |
| 1991 | 42 | 131 | 239 | 393 | 573 | 657 | 765 | 1 164 | 1 260 | 6 716 | 1 380 |
| 1992 | 40 | 126 | 227 | 322 | 500 | 614 | 815 | 1 036 | 1 424 | 1 510 | 1 970 |
| 1993 | 43 | 111 | 226 | 338 | 479 | 615 | 853 | 723 | 1 137 | 1 053 | 1 598 |
| 1994 | 53 | 114 | 191 | 316 | 449 | 547 | 959 | 927 | 1 068 | 1 886 | 1 828 |
| 1995 | 68 | 159 | 286 | 475 | 685 | 884 | 1 294 | 1 905 | 1 596 | 3 461 | 2 683 |
| 1996 | 74 | 151 | 293 | 452 | 705 | 874 | 1 103 | 1 493 | 1 415 | 1 519 | 2 683 |
| 1997 | 82 | 191 | 359 | 523 | 668 | 848 | 952 | 1 180 | 1 420 | 1 564 | 2 683 |
| 1998 | 93 | 202 | 368 | 541 | 852 | 1 085 | 1 197 | 1 610 | 2 447 | 2 652 | 2 683 |
| 1999 | 71 | 236 | 382 | 806 | 1 313 | 1 363 | 1 888 | 1 261 | 1 774 | 4 917 | 2 683 |
| 2000 | 99 | 218 | 388 | 539 | 862 | 1 151 | 1 143 | 1 159 | 1 879 | 1 334 | 2 440 |
| 2001 | 77 | 188 | 367 | 615 | 821 | 1 111 | 1 470 | 1 399 | 1 520 | 1 283 | 5 554 |
| 2002 | 74 | 176 | 347 | 501 | 829 | 927 | 1 443 | 1 887 | 1 555 | 1 380 | 1 097 |
| 2003 | 81 | 191 | 345 | 552 | 757 | 1 188 | 1 031 | 1 791 | 2 655 | 2 212 | 1 644 |
| 2004 | 92 | 192 | 379 | 550 | 825 | 1 176 | 1 457 | 2 055 | 3 087 | 3 212 | 2 885 |
| 2005 | 107 | 224 | 399 | 754 | 1 011 | 1 388 | 1 429 | 1 862 | 2 153 | 2 664 | 1 467 |
| 2006 | 93 | 188 | 340 | 494 | 793 | 1 019 | 1 233 | 2 319 | 2 174 | 2 642 | 2 472 |
| 2007 | 90 | 191 | 378 | 565 | 779 | 907 | 1 266 | 1 386 | 2 090 | 2 380 | 2 348 |
| 2008 | 103 | 207 | 360 | 615 | 830 | 987 | 1 396 | 1 391 | 2 206 | 2 197 | 2 206 |
| 2009 | 105 | 208 | 357 | 550 | 914 | 1 278 | 1 233 | 1 217 | 1 572 | 1 793 | 4 083 |
| 2010 | 99 | 234 | 350 | 620 | 791 | 1 093 | 1 408 | 1 376 | 1 662 | 2 633 | 2 683 |
| 2011 | 87 | 183 | 348 | 500 | 760 | 1 013 | 1 385 | 1 532 | 2 202 | 1 638 | 5 403 |
| 2012 | 129 | 205 | 353 | 483 | 533 | 909 | 772 | 1 100 | 1 144 | 1 257 | 2 683 |
| 2013 | 86 | 215 | 283 | 527 | 767 | 969 | 1 123 | 1 454 | 1 955 | 1 267 | 2 683 |
| 2014 | 92 | 201 | 375 | 571 | 866 | 984 | 1 218 | 2 325 | 2 395 | 3 457 | 3 237 |
| 2015 | 87 | 210 | 380 | 604 | 1 059 | 1 083 | 1 032 | 1 531 | 1 908 | 2 204 | 1 996 |
| 2016 | 108 | 164 | 374 | 665 | 1 117 | 1 102 | 1 414 | 1 231 | 3 560 | 3 063 | 3 817 |
| 2017 | 96 | 191 | 376 | 613 | 1 014 | 1 056 | 1 221 | 1 695 | 2 621 | 2 908 | 3 017 |

*Table 15. Parameter estimates based on NFT ADAPT sequential population analysis.*

| | Age | Parameter | Estimate | Standard Error | Bias | Corrected |
|---|---|---|---|---|---|---|
| Effectifs | 2 | N[2017 2] | 36378 | 22883 | 24720 | 11658 |
| | 3 | N[2017 3] | 50232 | 22388 | 7992 | 42240 |
| | 4 | N[2017 4] | 20254 | 6833 | 1601 | 18653 |
| | 5 | N[2017 5] | 18386 | 4956 | 767 | 17619 |
| | 6 | N[2017 6] | 12561 | 2912 | 343 | 12218 |
| | 7 | N[2017 7] | 3449 | 729 | 59 | 3390 |
| | 8 | N[2017 8] | 2037 | 406 | 35 | 2002 |
| | 9 | N[2017 9] | 758 | 146 | 13 | 745 |
| | 10 | N[2017 10] | 558 | 113 | 7 | 551 |
| | 11 | N[2017 11] | 441 | 86 | 6 | 436 |
| | 12 | N[2017 12] | 308 | 36 | 1 | 307 |
| | 13 | N[2017 13] | 108 | n/a | n/a | n/a |
| Mature biomass t | - | [2016] | 29360 | 87 | 708 | 28652 |
| Natural mortality | [3-12] | M[2002-04] | 0.3 | n/a | n/a | n/a |
| | - | M[2005-08] | 0.42 | n/a | n/a | n/a |
| | - | M[2009-12] | 0.52 | n/a | n/a | n/a |
| | - | M[2013-16] | 0.46 | n/a | n/a | n/a |
| DFO Survey | 1 | q ID#[1] | 0.0000658 | 0.0000145 | 0.0000014 | 0.0000644 |
| | 2 | q ID#[2] | 0.0002933 | 0.0000375 | 0.0000018 | 0.0002915 |
| | 3 | q ID#[3] | 0.0005890 | 0.0000699 | 0.0000001 | 0.0005889 |
| | 4 | q ID#[4] | 0.0007606 | 0.0000711 | 0.0000011 | 0.0007595 |
| | 5 | q ID#[5] | 0.0006929 | 0.0000532 | 0.0000020 | 0.0006909 |
| | 6 | q ID#[6] | 0.0006992 | 0.0000681 | -0.0000011 | 0.0007003 |
| | 7 | q ID#[7] | 0.0006094 | 0.0000542 | 0.0000005 | 0.0006090 |
| | 8 | q ID#[8] | 0.0005915 | 0.0000544 | -0.0000007 | 0.0005922 |
| | 9 | q ID#[9] | 0.0005570 | 0.0000588 | 0.0000032 | 0.0005538 |
| | 10 | q ID#[10] | 0.0005540 | 0.0000760 | 0.0000075 | 0.0005465 |
| | 11 | q ID#[11] | 0.0005961 | 0.0001065 | 0.0000108 | 0.0005853 |
| Sentinel mobile over 20 fathoms (1995-2002) | 2 | q ID#[13] | 0.0001371 | 0.0000352 | 0.0000041 | 0.0001330 |
| | 3 | q ID#[14] | 0.0005542 | 0.0001002 | 0.0000072 | 0.0005470 |
| | 4 | q ID#[15] | 0.0009997 | 0.0001186 | 0.0000070 | 0.0009927 |
| | 5 | q ID#[16] | 0.0009062 | 0.0000785 | 0.0000040 | 0.0009022 |
| | 6 | q ID#[17] | 0.0008749 | 0.0000867 | 0.0000081 | 0.0008668 |
| | 7 | q ID#[18] | 0.0008514 | 0.0000747 | 0.0000041 | 0.0008473 |
| | 8 | q ID#[19] | 0.0008440 | 0.0000613 | 0.0000020 | 0.0008420 |
| | 9 | q ID#[20] | 0.0009661 | 0.0001324 | 0.0000069 | 0.0009592 |
| | 10 | q ID#[21] | 0.0009099 | 0.0002124 | 0.0000308 | 0.0008790 |
| | 11 | q ID#[22] | 0.0007634 | 0.0001765 | 0.0000227 | 0.0007407 |

| | Age | Parameter | Estimate | Standard Error | Bias | Corrected |
|---|---|---|---|---|---|---|
| Sentinel mobile over 10 fathoms (2003+) | 1 | q ID#[23] | 0.0000033 | 0.0000015 | 0.0000004 | 0.0000029 |
| | 2 | q ID#[24] | 0.0000694 | 0.0000132 | 0.0000011 | 0.0000683 |
| | 3 | q ID#[25] | 0.0002806 | 0.0000375 | 0.0000014 | 0.0002792 |
| | 4 | q ID#[26] | 0.0006172 | 0.0000803 | 0.0000044 | 0.0006128 |
| | 5 | q ID#[27] | 0.0007001 | 0.0000757 | -0.0000016 | 0.0007017 |
| | 6 | q ID#[28] | 0.0007622 | 0.0000992 | 0.0000132 | 0.0007490 |
| | 7 | q ID#[29] | 0.0007380 | 0.0000835 | 0.0000060 | 0.0007320 |
| | 8 | q ID#[30] | 0.0008043 | 0.0001208 | 0.0000083 | 0.0007960 |
| | 9 | q ID#[31] | 0.0008770 | 0.0001429 | 0.0000152 | 0.0008618 |
| | 10 | q ID#[32] | 0.0008246 | 0.0001956 | 0.0000190 | 0.0008056 |
| | 11 | q ID#[33] | 0.0010556 | 0.0003899 | 0.0000675 | 0.0009881 |
| Sentinel longlines | 3 | q ID#[34] | 0.0015223 | 0.0003559 | 0.0000202 | 0.0015020 |
| | 4 | q ID#[35] | 0.0215830 | 0.0025234 | 0.0002395 | 0.0213400 |
| | 5 | q ID#[36] | 0.0688075 | 0.0056753 | 0.0000660 | 0.0687400 |
| | 6 | q ID#[37] | 0.1403750 | 0.0107650 | 0.0001553 | 0.1402000 |
| | 7 | q ID#[38] | 0.2127600 | 0.0133140 | 0.0003375 | 0.2124000 |
| | 8 | q ID#[39] | 0.2478770 | 0.0191572 | 0.0010790 | 0.2468000 |
| | 9 | q ID#[40] | 0.3146920 | 0.0266859 | 0.0007108 | 0.3140000 |
| | 10 | q ID#[41] | 0.3144480 | 0.0317694 | 0.0015900 | 0.3129000 |
| | 11 | q ID#[42] | 0.3336030 | 0.0546205 | 0.0023890 | 0.3312000 |
| | 12 | q ID#[43] | 0.3557540 | 0.1171490 | 0.0236600 | 0.3321000 |
| | 13 | q ID#[44] | 0.4717940 | 0.2553800 | 0.0677300 | 0.4041000 |
| Sentinel gillnets | 4 | q ID#[45] | 0.0010460 | 0.0001870 | 0.0000107 | 0.0010350 |
| | 5 | q ID#[46] | 0.0159911 | 0.0018631 | 0.0001251 | 0.0158700 |
| | 6 | q ID#[47] | 0.0839059 | 0.0093944 | 0.0005259 | 0.0833800 |
| | 7 | q ID#[48] | 0.1751660 | 0.0213820 | 0.0010590 | 0.1741000 |
| | 8 | q ID#[49] | 0.2440800 | 0.0266493 | -0.0001622 | 0.2442000 |
| | 9 | q ID#[50] | 0.3064510 | 0.0362678 | 0.0034960 | 0.3030000 |
| | 10 | q ID#[51] | 0.3195600 | 0.0439770 | 0.0047470 | 0.3148000 |
| | 11 | q ID#[52] | 0.2524390 | 0.0464756 | 0.0035540 | 0.2489000 |
| | 12 | q ID#[53] | 0.2664860 | 0.0998860 | 0.0209700 | 0.2455000 |
| | 13 | q ID#[54] | 0.2948450 | 0.1843230 | 0.0696600 | 0.2252000 |

*Table 16. Population numbers at age ('000).*

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 173136 | 166964 | 106306 | 57417 | 37143 | 48645 | 18187 | 19159 | 9023 | 4658 | 1477 | 705 | 305 | 303 025 |
| 1975 | 238274 | 141738 | 136685 | 86366 | 43338 | 21779 | 27707 | 10130 | 9719 | 4881 | 2460 | 838 | 422 | 344 325 |
| 1976 | 261263 | 195063 | 116034 | 111876 | 66818 | 28546 | 13255 | 16230 | 5664 | 5482 | 2456 | 1350 | 403 | 368 114 |
| 1977 | 196629 | 213882 | 159688 | 94804 | 86894 | 43426 | 17686 | 7046 | 8136 | 2853 | 2202 | 1122 | 751 | 424 608 |
| 1978 | 307380 | 160970 | 175095 | 130728 | 75207 | 62019 | 24106 | 7384 | 3415 | 3732 | 1353 | 1003 | 566 | 484 608 |
| 1979 | 199342 | 251637 | 131778 | 143300 | 104613 | 51851 | 34962 | 11418 | 4104 | 1842 | 1925 | 626 | 427 | 486 846 |
| 1980 | 198949 | 163191 | 206002 | 107827 | 114251 | 73041 | 30887 | 17343 | 5037 | 2079 | 863 | 1088 | 245 | 558 663 |
| 1981 | 250842 | 162869 | 133597 | 168114 | 85221 | 77767 | 41666 | 14879 | 7880 | 2750 | 1268 | 447 | 600 | 534 189 |
| 1982 | 188312 | 205351 | 133333 | 109094 | 131602 | 61661 | 45655 | 21588 | 7940 | 4517 | 1410 | 774 | 212 | 517 786 |
| 1983 | 247164 | 154161 | 168111 | 108957 | 86402 | 90828 | 39018 | 25024 | 9915 | 3485 | 1816 | 602 | 503 | 534 661 |
| 1984 | 187610 | 202340 | 126204 | 136879 | 84783 | 57009 | 57766 | 22777 | 15094 | 5371 | 1813 | 757 | 304 | 508 757 |
| 1985 | 142593 | 153587 | 165646 | 103284 | 109406 | 62441 | 34547 | 29152 | 12018 | 7265 | 2523 | 751 | 258 | 527 291 |
| 1986 | 177759 | 116734 | 125734 | 135461 | 82289 | 75244 | 38696 | 18696 | 15066 | 6984 | 3870 | 1323 | 435 | 503 798 |
| 1987 | 149935 | 119144 | 78241 | 84107 | 88840 | 48250 | 37842 | 16447 | 7711 | 5175 | 2854 | 1207 | 518 | 371 192 |
| 1988 | 139931 | 100495 | 79856 | 52434 | 55408 | 52726 | 22451 | 15866 | 5300 | 2278 | 1997 | 753 | 354 | 289 423 |
| 1989 | 61171 | 93789 | 67357 | 53434 | 34113 | 32254 | 26122 | 10170 | 6518 | 2337 | 1001 | 681 | 284 | 234 271 |
| 1990 | 33306 | 41000 | 62863 | 44850 | 34290 | 18779 | 15039 | 10649 | 3552 | 2219 | 707 | 291 | 158 | 193 397 |
| 1991 | 22778 | 22324 | 27481 | 41844 | 27564 | 16806 | 7851 | 5742 | 3960 | 1062 | 761 | 256 | 106 | 133 433 |
| 1992 | 32346 | 15267 | 14962 | 18332 | 25613 | 12908 | 5778 | 2605 | 1797 | 1078 | 326 | 170 | 81 | 83 650 |
| 1993 | 20067 | 21680 | 10233 | 9779 | 8848 | 9863 | 3837 | 1199 | 452 | 322 | 193 | 55 | 33 | 44 814 |
| 1994 | 36540 | 13450 | 14531 | 6722 | 4984 | 2906 | 1932 | 377 | 122 | 41 | 49 | 29 | 19 | 31 712 |
| 1995 | 21193 | 24491 | 9015 | 9739 | 4504 | 3308 | 1895 | 1223 | 215 | 76 | 22 | 31 | 18 | 30 046 |
| 1996 | 15634 | 14205 | 16415 | 6041 | 6520 | 3001 | 2175 | 1238 | 793 | 130 | 47 | 13 | 20 | 36393 |
| 1997 | 15168 | 10479 | 9521 | 11002 | 4032 | 4322 | 1924 | 1385 | 784 | 498 | 77 | 30 | 8 | 33583 |
| 1998 | 14724 | 12417 | 8578 | 7779 | 8740 | 2953 | 2851 | 1149 | 671 | 444 | 187 | 35 | 16 | 33403 |
| 1999 | 25179 | 12053 | 10165 | 7022 | 6342 | 6840 | 2103 | 1920 | 741 | 427 | 253 | 117 | 14 | 35944 |
| 2000 | 22348 | 20613 | 9867 | 8322 | 5709 | 5012 | 4742 | 1314 | 878 | 272 | 190 | 86 | 48 | 36440 |
| 2001 | 20493 | 18295 | 16875 | 8078 | 6770 | 4313 | 3495 | 2742 | 739 | 336 | 82 | 111 | 58 | 43599 |
| 2002 | 29547 | 16776 | 14977 | 13814 | 6468 | 5274 | 2957 | 2284 | 1335 | 307 | 108 | 22 | 64 | 47610 |
| 2003 | 32529 | 21669 | 12303 | 10984 | 10078 | 4503 | 3127 | 1536 | 982 | 430 | 86 | 40 | 11 | 44080 |
| 2004 | 37745 | 23856 | 15891 | 9023 | 8049 | 7374 | 3258 | 2241 | 1090 | 708 | 302 | 53 | 29 | 48018 |
| 2005 | 65587 | 27681 | 17495 | 11654 | 6614 | 5820 | 5177 | 2061 | 1360 | 602 | 434 | 164 | 33 | 51414 |
| 2006 | 81910 | 43090 | 18186 | 11494 | 7648 | 4281 | 3619 | 2888 | 1009 | 642 | 280 | 172 | 65 | 50284 |
| 2007 | 73754 | 53814 | 28309 | 11948 | 7528 | 4850 | 2382 | 1949 | 1245 | 403 | 300 | 93 | 67 | 59074 |
| 2008 | 57773 | 48455 | 35354 | 18599 | 7786 | 4749 | 2826 | 1250 | 776 | 420 | 88 | 99 | 29 | 71976 |
| 2009 | 44168 | 37956 | 31834 | 23227 | 12083 | 4902 | 2685 | 1358 | 494 | 162 | 130 | 0 | 39 | 76914 |
| 2010 | 66002 | 26256 | 22563 | 18924 | 13721 | 6732 | 2438 | 1271 | 580 | 127 | 32 | 40 | 0 | 66428 |
| 2011 | 63646 | 39236 | 15608 | 13413 | 11184 | 7968 | 3609 | 1146 | 544 | 201 | 24 | 1 | 8 | 53706 |
| 2012 | 133698 | 37835 | 23324 | 9278 | 7950 | 6515 | 4544 | 1919 | 580 | 278 | 95 | 4 | 0 | 54487 |
| 2013 | 115872 | 79478 | 22491 | 13865 | 5513 | 4704 | 3790 | 2545 | 1001 | 295 | 139 | 45 | 0 | 54388 |
| 2014 | 80532 | 73141 | 50168 | 14197 | 8745 | 3451 | 2876 | 2256 | 1504 | 557 | 168 | 80 | 28 | 84030 |
| 2015 | 126071 | 50833 | 46168 | 31667 | 8946 | 5492 | 2114 | 1738 | 1311 | 864 | 306 | 95 | 47 | 98748 |
| 2016 | 57631 | 79579 | 32087 | 29142 | 19977 | 5610 | 3389 | 1269 | 982 | 750 | 522 | 182 | 59 | 93969 |
| 2017 | 90741 | 36378 | 50232 | 20254 | 18386 | 12561 | 3449 | 2037 | 758 | 558 | 441 | 308 | 108 | 109092 |

*Table 17. Mature population at age ('000).*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 0 | 1063 | 3445 | 18200 | 39402 | 16914 | 18201 | 8843 | 4658 | 1477 | 705 | 305 | 113213 |
| 1975 | 0 | 1367 | 5182 | 21236 | 17641 | 25768 | 9624 | 9525 | 4881 | 2460 | 838 | 422 | 98942 |
| 1976 | 0 | 1160 | 6713 | 32741 | 23122 | 12327 | 15419 | 5551 | 5482 | 2456 | 1350 | 403 | 106723 |
| 1977 | 0 | 1597 | 5688 | 42578 | 35175 | 16448 | 6694 | 7973 | 2853 | 2202 | 1122 | 751 | 123081 |
| 1978 | 0 | 1751 | 7844 | 36851 | 50235 | 22419 | 7015 | 3347 | 3732 | 1353 | 1003 | 566 | 136116 |
| 1979 | 0 | 1318 | 8598 | 51260 | 41999 | 32515 | 10847 | 4022 | 1842 | 1925 | 626 | 427 | 155379 |
| 1980 | 0 | 2060 | 6470 | 55983 | 59163 | 28725 | 16476 | 4936 | 2079 | 863 | 1088 | 245 | 178088 |
| 1981 | 0 | 1336 | 10087 | 41758 | 62991 | 38749 | 14135 | 7722 | 2750 | 1268 | 447 | 600 | 181844 |
| 1982 | 0 | 1333 | 6546 | 64485 | 49945 | 42459 | 20509 | 7781 | 4517 | 1410 | 774 | 212 | 199971 |
| 1983 | 0 | 1681 | 6537 | 42337 | 73571 | 36287 | 23773 | 9717 | 3485 | 1816 | 602 | 503 | 200308 |
| 1984 | 6 | 0 | 2738 | 28826 | 51878 | 56033 | 22549 | 15094 | 5371 | 1813 | 757 | 304 | 185363 |
| 1985 | 4 | 0 | 2066 | 24069 | 49953 | 33511 | 28569 | 11898 | 7265 | 2523 | 751 | 258 | 160862 |
| 1986 | 30 | 0 | 8128 | 31270 | 52671 | 34826 | 17948 | 14915 | 6984 | 3870 | 1323 | 435 | 172370 |
| 1987 | 21 | 0 | 4205 | 21322 | 35705 | 35193 | 16118 | 7711 | 5175 | 2854 | 1207 | 518 | 130008 |
| 1988 | 100 | 0 | 1049 | 7203 | 30581 | 18634 | 15073 | 5194 | 2255 | 1997 | 753 | 354 | 83093 |
| 1989 | 40 | 0 | 2137 | 10575 | 23223 | 24032 | 9763 | 6453 | 2337 | 1001 | 681 | 284 | 80487 |
| 1990 | 24 | 0 | 1794 | 6172 | 8826 | 10377 | 9052 | 3410 | 2175 | 707 | 291 | 158 | 42961 |
| 1991 | 2 | 0 | 1255 | 6891 | 12268 | 7380 | 5570 | 3920 | 1062 | 761 | 256 | 106 | 39470 |
| 1992 | 23 | 150 | 1833 | 8708 | 7616 | 4969 | 2423 | 1743 | 1067 | 326 | 170 | 81 | 29086 |
| 1993 | 1 | 0 | 391 | 4778 | 8975 | 3799 | 1199 | 452 | 322 | 193 | 55 | 33 | 20197 |
| 1994 | 11 | 291 | 672 | 1595 | 2034 | 1719 | 358 | 121 | 41 | 49 | 29 | 19 | 6928 |
| 1995 | 232 | 631 | 4772 | 3964 | 3242 | 1895 | 1223 | 215 | 76 | 22 | 31 | 18 | 16089 |
| 1996 | 380 | 2134 | 2356 | 5020 | 2761 | 2132 | 1226 | 793 | 130 | 47 | 13 | 20 | 16631 |
| 1997 | 1067 | 2285 | 6161 | 3306 | 3976 | 1847 | 1357 | 768 | 493 | 77 | 30 | 8 | 20309 |
| 1998 | 30 | 343 | 2023 | 6555 | 2746 | 2822 | 1149 | 671 | 444 | 187 | 35 | 16 | 16991 |
| 1999 | 64 | 305 | 2879 | 4883 | 6703 | 2103 | 1920 | 741 | 427 | 253 | 117 | 14 | 20346 |
| 2000 | 60 | 197 | 1664 | 3825 | 4461 | 4695 | 1314 | 878 | 272 | 190 | 86 | 48 | 17630 |
| 2001 | 85 | 506 | 1858 | 4739 | 4054 | 3425 | 2742 | 739 | 336 | 82 | 111 | 58 | 18651 |
| 2002 | 174 | 599 | 2763 | 3881 | 4377 | 2839 | 2238 | 1335 | 307 | 108 | 22 | 63 | 18533 |
| 2003 | 364 | 861 | 3295 | 6651 | 4008 | 3002 | 1521 | 972 | 430 | 86 | 40 | 11 | 20877 |
| 2004 | 160 | 795 | 2436 | 6037 | 6784 | 3193 | 2241 | 1090 | 708 | 302 | 53 | 29 | 23667 |
| 2005 | 47 | 525 | 2331 | 4167 | 5587 | 5125 | 2061 | 1360 | 602 | 434 | 164 | 33 | 22389 |
| 2006 | 149 | 727 | 2414 | 4895 | 3724 | 3547 | 2859 | 1009 | 642 | 280 | 172 | 65 | 20334 |
| 2007 | 267 | 849 | 2031 | 4818 | 4317 | 2311 | 1910 | 1245 | 403 | 300 | 93 | 67 | 18343 |
| 2008 | 208 | 707 | 2604 | 3815 | 4179 | 2741 | 1238 | 776 | 420 | 88 | 99 | 29 | 16696 |
| 2009 | 1082 | 3183 | 9291 | 9425 | 4657 | 2658 | 1358 | 494 | 162 | 130 | 0 | 39 | 31397 |
| 2010 | 95 | 451 | 2839 | 5626 | 5790 | 2316 | 1258 | 580 | 127 | 32 | 40 | 0 | 19058 |
| 2011 | 3934 | 3468 | 6087 | 8059 | 6747 | 3379 | 1111 | 537 | 199 | 24 | 1 | 8 | 29619 |
| 2012 | 274 | 1642 | 2269 | 5551 | 5862 | 4277 | 1910 | 575 | 278 | 95 | 4 | 0 | 22463 |
| 2013 | 308 | 448 | 2448 | 1861 | 3833 | 3608 | 2500 | 992 | 294 | 139 | 45 | 0 | 16169 |
| 2014 | 333 | 2095 | 3468 | 6011 | 3119 | 2817 | 2226 | 1496 | 557 | 168 | 80 | 28 | 22064 |
| 2015 | 1139 | 4546 | 12888 | 6726 | 5050 | 2086 | 1715 | 1290 | 861 | 306 | 95 | 47 | 35608 |
| 2016 | 3347 | 5429 | 7808 | 11883 | 4626 | 3189 | 1191 | 949 | 714 | 521 | 181 | 59 | 36551 |
| 2017 | 837 | 5181 | 6206 | 12466 | 11087 | 3342 | 1977 | 744 | 548 | 440 | 308 | 108 | 42407 |

*Table 18. Biomass (t) at age.*

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 4675 | 8849 | 17540 | 21876 | 27820 | 59201 | 30791 | 43606 | 30056 | 21501 | 8813 | 3147 | 1836 | 266187 |
| 1975 | 6433 | 7512 | 22553 | 32905 | 32460 | 26505 | 46908 | 23056 | 32374 | 22531 | 14679 | 3741 | 2540 | 260252 |
| 1976 | 7054 | 10338 | 19146 | 42625 | 50047 | 34740 | 22441 | 36939 | 18867 | 25305 | 14655 | 6026 | 2426 | 273216 |
| 1977 | 5309 | 11336 | 26349 | 36120 | 65084 | 52849 | 29942 | 16037 | 27101 | 13169 | 13139 | 5009 | 4520 | 289320 |
| 1978 | 8299 | 8531 | 28891 | 49807 | 56330 | 75477 | 40811 | 16806 | 11375 | 17227 | 8073 | 4477 | 3407 | 312682 |
| 1979 | 10366 | 11072 | 16999 | 51588 | 80866 | 64192 | 60379 | 26570 | 13798 | 6537 | 6052 | 3024 | 2021 | 332025 |
| 1980 | 5372 | 8812 | 33784 | 36553 | 83517 | 84216 | 52384 | 40756 | 15474 | 10414 | 4132 | 5750 | 1179 | 368160 |
| 1981 | 2007 | 9609 | 26853 | 74811 | 63234 | 97986 | 68999 | 31990 | 28045 | 14545 | 12641 | 1465 | 5108 | 425676 |
| 1982 | 5084 | 16223 | 24267 | 45274 | 100544 | 73130 | 73778 | 39333 | 17127 | 12160 | 4835 | 3752 | 1223 | 395423 |
| 1983 | 17549 | 11408 | 36480 | 50447 | 81477 | 119257 | 64224 | 44543 | 21337 | 12257 | 7389 | 4231 | 4036 | 445678 |
| 1984 | 5065 | 17806 | 19309 | 37368 | 45528 | 54729 | 87400 | 40247 | 32045 | 12257 | 5154 | 3001 | 1495 | 338533 |
| 1985 | 3850 | 11519 | 29154 | 52468 | 88838 | 80299 | 58315 | 55914 | 26392 | 16542 | 8510 | 2668 | 1125 | 420225 |
| 1986 | 4799 | 3852 | 12573 | 48360 | 63692 | 84198 | 59785 | 39262 | 39413 | 23955 | 14919 | 6774 | 3058 | 395988 |
| 1987 | 1199 | 5838 | 11032 | 30867 | 58812 | 53027 | 57141 | 34193 | 22023 | 16627 | 10700 | 5734 | 2192 | 302348 |
| 1988 | 3358 | 6331 | 11739 | 15153 | 29255 | 56364 | 32352 | 29178 | 12307 | 6141 | 6574 | 3104 | 1670 | 203837 |
| 1989 | 428 | 6659 | 13067 | 21320 | 28109 | 39027 | 41691 | 18123 | 14346 | 6595 | 3308 | 2612 | 1006 | 189205 |
| 1990 | 899 | 2665 | 9869 | 16639 | 23626 | 18817 | 18799 | 15995 | 6983 | 4797 | 2121 | 1280 | 945 | 119872 |
| 1991 | 342 | 1250 | 4150 | 15273 | 17476 | 16117 | 10151 | 8188 | 6209 | 2480 | 1677 | 1054 | 245 | 83020 |
| 1992 | 873 | 901 | 2140 | 6856 | 16213 | 10869 | 6812 | 3611 | 3085 | 2118 | 876 | 460 | 295 | 53334 |
| 1993 | 542 | 1214 | 1433 | 3305 | 5309 | 8255 | 4286 | 1572 | 754 | 500 | 421 | 115 | 111 | 26062 |
| 1994 | 987 | 525 | 2383 | 1943 | 2382 | 2229 | 2021 | 464 | 212 | 79 | 117 | 161 | 70 | 12062 |
| 1995 | 464 | 2373 | 1729 | 4894 | 3065 | 3345 | 1892 | 1765 | 300 | 213 | 21 | 109 | 64 | 17396 |
| 1996 | 603 | 1142 | 3416 | 2434 | 4749 | 2801 | 2684 | 1810 | 1403 | 276 | 138 | 32 | 71 | 19813 |
| 1997 | 322 | 945 | 2169 | 4943 | 3039 | 4404 | 2349 | 2049 | 1298 | 1036 | 191 | 98 | 30 | 21607 |
| 1998 | 537 | 936 | 1915 | 3532 | 7076 | 3229 | 3557 | 1740 | 1129 | 719 | 483 | 101 | 56 | 23538 |
| 1999 | 1251 | 1227 | 2217 | 3412 | 4815 | 7834 | 3016 | 2933 | 1383 | 842 | 568 | 382 | 49 | 27453 |
| 2000 | 881 | 1975 | 2458 | 3697 | 4455 | 5187 | 6670 | 2348 | 1511 | 612 | 523 | 227 | 179 | 27867 |
| 2001 | 238 | 1614 | 2965 | 3789 | 4910 | 4511 | 4549 | 4492 | 1516 | 649 | 285 | 408 | 167 | 28241 |
| 2002 | 691 | 904 | 2849 | 4979 | 4885 | 5588 | 3906 | 3816 | 2577 | 831 | 353 | 92 | 239 | 30114 |
| 2003 | 1399 | 1632 | 2206 | 4550 | 7312 | 4924 | 4533 | 2487 | 1890 | 926 | 259 | 164 | 39 | 29290 |
| 2004 | 887 | 1930 | 3297 | 3666 | 6285 | 7743 | 4504 | 3911 | 2079 | 1520 | 728 | 184 | 100 | 34017 |
| 2005 | 780 | 1788 | 3303 | 5115 | 4932 | 6258 | 6895 | 3426 | 2575 | 1367 | 1085 | 462 | 143 | 35560 |
| 2006 | 2834 | 2456 | 3381 | 5107 | 5598 | 4571 | 4852 | 4851 | 1871 | 1155 | 714 | 435 | 214 | 32748 |
| 2007 | 2456 | 4364 | 5314 | 4788 | 5591 | 5041 | 3231 | 3217 | 2695 | 872 | 776 | 332 | 248 | 32104 |
| 2008 | 1167 | 3939 | 6657 | 7278 | 4974 | 4756 | 3781 | 2018 | 1566 | 964 | 184 | 432 | 145 | 32755 |
| 2009 | 1630 | 2718 | 6255 | 8810 | 7978 | 4426 | 3155 | 2171 | 915 | 367 | 337 | 0 | 141 | 34557 |
| 2010 | 1881 | 2150 | 4594 | 7738 | 8845 | 6263 | 2799 | 1893 | 1133 | 334 | 75 | 135 | 0 | 33808 |
| 2011 | 1419 | 3170 | 2681 | 5431 | 7556 | 7574 | 4025 | 1564 | 1044 | 441 | 82 | 3 | 25 | 30427 |
| 2012 | 2447 | 2577 | 4774 | 3099 | 5081 | 5767 | 5377 | 2655 | 1064 | 642 | 230 | 14 | 0 | 28703 |
| 2013 | 2874 | 5643 | 4039 | 5665 | 3261 | 4180 | 3992 | 3342 | 1613 | 898 | 382 | 143 | 0 | 27515 |
| 2014 | 1844 | 5193 | 10550 | 5589 | 6298 | 3308 | 3410 | 3333 | 2700 | 1122 | 506 | 259 | 102 | 37178 |
| 2015 | 2408 | 3726 | 9049 | 13405 | 6201 | 5944 | 2851 | 2794 | 2413 | 2041 | 644 | 237 | 167 | 45747 |
| 2016 | 1101 | 5706 | 6263 | 11785 | 13860 | 5530 | 4835 | 2222 | 1937 | 1646 | 1331 | 540 | 229 | 50178 |
| 2017 | 1851 | 2619 | 10072 | 8245 | 12914 | 12674 | 4554 | 3284 | 1417 | 1222 | 1127 | 894 | 399 | 56802 |

*Table 19. Mature biomass (t) at age.*

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 0 | 0 | 175 | 1313 | 13632 | 47953 | 28635 | 41426 | 29455 | 21501 | 8813 | 3147 | 1836 | 197885 |
| 1975 | 0 | 0 | 226 | 1974 | 15905 | 21469 | 43624 | 21903 | 31727 | 22531 | 14679 | 3741 | 2540 | 180319 |
| 1976 | 0 | 0 | 191 | 2557 | 24523 | 28140 | 20870 | 35093 | 18489 | 25305 | 14655 | 6026 | 2426 | 178275 |
| 1977 | 0 | 0 | 263 | 2167 | 31891 | 42808 | 27846 | 15235 | 26559 | 13169 | 13139 | 5009 | 4520 | 182608 |
| 1978 | 0 | 0 | 289 | 2988 | 27602 | 61136 | 37955 | 15966 | 11148 | 17227 | 8073 | 4477 | 3407 | 190268 |
| 1979 | 0 | 0 | 170 | 3095 | 39624 | 51995 | 56153 | 25241 | 13522 | 6537 | 6052 | 3024 | 2021 | 207434 |
| 1980 | 0 | 0 | 338 | 2193 | 40924 | 68215 | 48717 | 38718 | 15164 | 10414 | 4132 | 5750 | 1179 | 235744 |
| 1981 | 0 | 0 | 269 | 4489 | 30985 | 79369 | 64169 | 30390 | 27484 | 14545 | 12641 | 1465 | 5108 | 270913 |
| 1982 | 0 | 0 | 243 | 2716 | 49267 | 59235 | 68614 | 37367 | 16784 | 12160 | 4835 | 3752 | 1223 | 256195 |
| 1983 | 0 | 0 | 365 | 3027 | 39924 | 96598 | 59728 | 42316 | 20910 | 12257 | 7389 | 4231 | 4036 | 290781 |
| 1984 | 0 | 1 | 0 | 747 | 15480 | 49803 | 84778 | 39844 | 32045 | 12257 | 5154 | 3001 | 1495 | 244604 |
| 1985 | 0 | 0 | 0 | 1049 | 19544 | 64239 | 56566 | 54795 | 26128 | 16542 | 8510 | 2668 | 1125 | 251167 |
| 1986 | 0 | 1 | 0 | 2902 | 24203 | 58939 | 53807 | 37691 | 39019 | 23955 | 14919 | 6774 | 3058 | 265266 |
| 1987 | 0 | 1 | 0 | 1543 | 14115 | 39240 | 53142 | 33509 | 22023 | 16627 | 10700 | 5734 | 2192 | 198826 |
| 1988 | 0 | 6 | 0 | 303 | 3803 | 32691 | 26852 | 27719 | 12060 | 6080 | 6574 | 3104 | 1670 | 120863 |
| 1989 | 0 | 3 | 0 | 853 | 8714 | 28100 | 38355 | 17398 | 14203 | 6595 | 3308 | 2612 | 1006 | 121147 |
| 1990 | 0 | 2 | 0 | 666 | 4253 | 8844 | 12971 | 13596 | 6704 | 4702 | 2121 | 1280 | 945 | 56082 |
| 1991 | 0 | 0 | 0 | 458 | 4369 | 11765 | 9542 | 7942 | 6147 | 2480 | 1677 | 1054 | 245 | 45681 |
| 1992 | 0 | 1 | 21 | 686 | 5512 | 6412 | 5859 | 3358 | 2993 | 2097 | 876 | 460 | 295 | 28570 |
| 1993 | 0 | 0 | 0 | 132 | 2867 | 7512 | 4243 | 1572 | 754 | 500 | 421 | 115 | 111 | 18228 |
| 1994 | 0 | 0 | 48 | 194 | 762 | 1560 | 1799 | 441 | 210 | 78 | 117 | 161 | 70 | 5441 |
| 1995 | 0 | 23 | 121 | 2398 | 2698 | 3278 | 1892 | 1765 | 300 | 213 | 21 | 109 | 64 | 12880 |
| 1996 | 0 | 31 | 444 | 949 | 3657 | 2577 | 2630 | 1792 | 1403 | 276 | 138 | 32 | 71 | 13999 |
| 1997 | 0 | 96 | 521 | 2768 | 2492 | 4052 | 2255 | 2008 | 1272 | 1026 | 191 | 98 | 30 | 16809 |
| 1998 | 0 | 2 | 77 | 918 | 5307 | 3003 | 3522 | 1740 | 1129 | 719 | 483 | 101 | 56 | 17057 |
| 1999 | 0 | 6 | 67 | 1399 | 3708 | 7677 | 3016 | 2933 | 1383 | 842 | 568 | 382 | 49 | 22032 |
| 2000 | 0 | 6 | 49 | 739 | 2985 | 4616 | 6603 | 2348 | 1511 | 612 | 523 | 227 | 179 | 20399 |
| 2001 | 0 | 8 | 89 | 872 | 3437 | 4240 | 4458 | 4492 | 1516 | 649 | 285 | 408 | 167 | 20620 |
| 2002 | 0 | 9 | 114 | 996 | 2931 | 4638 | 3750 | 3739 | 2577 | 831 | 353 | 92 | 236 | 20267 |
| 2003 | 0 | 27 | 154 | 1365 | 4826 | 4382 | 4352 | 2462 | 1871 | 926 | 259 | 164 | 39 | 20828 |
| 2004 | 0 | 13 | 165 | 990 | 4713 | 7124 | 4414 | 3911 | 2079 | 1520 | 728 | 184 | 100 | 25941 |
| 2005 | 0 | 3 | 99 | 1023 | 3107 | 6007 | 6826 | 3426 | 2575 | 1367 | 1085 | 462 | 143 | 26123 |
| 2006 | 0 | 8 | 135 | 1072 | 3582 | 3977 | 4755 | 4802 | 1871 | 1155 | 714 | 435 | 214 | 22722 |
| 2007 | 0 | 22 | 159 | 814 | 3578 | 4487 | 3134 | 3152 | 2695 | 872 | 776 | 332 | 248 | 20269 |
| 2008 | 0 | 17 | 133 | 1019 | 2437 | 4185 | 3668 | 1997 | 1566 | 964 | 184 | 432 | 145 | 16748 |
| 2009 | 0 | 77 | 626 | 3524 | 6223 | 4205 | 3123 | 2171 | 915 | 367 | 337 | 0 | 141 | 21710 |
| 2010 | 0 | 8 | 92 | 1161 | 3626 | 5387 | 2659 | 1874 | 1133 | 334 | 75 | 135 | 0 | 16482 |
| 2011 | 0 | 318 | 596 | 2465 | 5444 | 6414 | 3769 | 1516 | 1030 | 438 | 82 | 3 | 25 | 22098 |
| 2012 | 0 | 19 | 336 | 758 | 3548 | 5189 | 5061 | 2642 | 1054 | 641 | 229 | 14 | 0 | 19492 |
| 2013 | 0 | 22 | 80 | 1000 | 1101 | 3406 | 3800 | 3283 | 1599 | 896 | 382 | 143 | 0 | 15712 |
| 2014 | 0 | 24 | 441 | 1365 | 4329 | 2990 | 3339 | 3289 | 2686 | 1122 | 506 | 259 | 102 | 20451 |
| 2015 | 0 | 83 | 891 | 5455 | 4662 | 5465 | 2813 | 2758 | 2373 | 2034 | 643 | 237 | 167 | 27583 |
| 2016 | 0 | 240 | 1060 | 3158 | 8244 | 4561 | 4550 | 2085 | 1872 | 1566 | 1328 | 539 | 229 | 29430 |
| 2017 | 0 | 60 | 1039 | 2526 | 8756 | 11187 | 4413 | 3188 | 1391 | 1201 | 1125 | 893 | 398 | 36176 |

*Table 20. Population's egg production (billions) at age.*

| Age | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 3+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 28 | 315 | 3041 | 11573 | 6434 | 7849 | 5951 | 2212 | 1272 | 1777 | 406 | 40857 |
| 1975 | 35 | 473 | 3548 | 5181 | 9802 | 4150 | 6410 | 2317 | 2119 | 2112 | 562 | 36711 |
| 1976 | 30 | 613 | 5471 | 6791 | 4689 | 6649 | 3736 | 2603 | 2115 | 3402 | 537 | 36636 |
| 1977 | 41 | 519 | 7114 | 10331 | 6257 | 2887 | 5366 | 1355 | 1896 | 2828 | 1000 | 39595 |
| 1978 | 45 | 716 | 6158 | 14755 | 8528 | 3025 | 2252 | 1772 | 1165 | 2528 | 754 | 41698 |
| 1979 | 34 | 785 | 8565 | 12336 | 12368 | 4678 | 2707 | 875 | 1658 | 1578 | 569 | 46151 |
| 1980 | 53 | 591 | 9354 | 17377 | 10926 | 7105 | 3322 | 987 | 743 | 2742 | 326 | 53526 |
| 1981 | 35 | 921 | 6977 | 18500 | 14739 | 6096 | 5198 | 1306 | 1092 | 1127 | 799 | 56789 |
| 1982 | 35 | 598 | 10773 | 14668 | 16149 | 8844 | 5236 | 2145 | 1214 | 1951 | 282 | 61895 |
| 1983 | 44 | 597 | 7072 | 21605 | 13801 | 10251 | 6539 | 1655 | 1563 | 1517 | 670 | 65314 |
| 1984 | 5 | 262 | 4046 | 12722 | 20996 | 11250 | 12807 | 3678 | 1994 | 2225 | 584 | 70569 |
| 1985 | 2 | 198 | 3779 | 13285 | 12249 | 13063 | 8620 | 3993 | 1953 | 1403 | 242 | 58788 |
| 1986 | 11 | 470 | 3104 | 12537 | 11898 | 7866 | 10705 | 3190 | 3065 | 2404 | 436 | 55687 |
| 1987 | 6 | 253 | 3422 | 9186 | 12869 | 8494 | 6606 | 3415 | 3352 | 2498 | 938 | 51039 |
| 1988 | 10 | 116 | 968 | 4770 | 5399 | 6004 | 3534 | 1183 | 1602 | 1357 | 475 | 25417 |
| 1989 | 8 | 140 | 961 | 3845 | 9106 | 4016 | 4314 | 1657 | 1068 | 634 | 364 | 26111 |
| 1990 | 8 | 67 | 429 | 1069 | 2499 | 4018 | 1508 | 1649 | 292 | 277 | 306 | 12121 |
| 1991 | 1 | 69 | 822 | 1886 | 1879 | 2109 | 1901 | 534 | 643 | 241 | 35 | 10121 |
| 1992 | 4 | 73 | 739 | 1398 | 1180 | 675 | 647 | 626 | 209 | 123 | 49 | 5726 |
| 1993 | 0 | 29 | 464 | 1472 | 919 | 236 | 70 | 158 | 120 | 29 | 28 | 3524 |
| 1994 | 3 | 23 | 147 | 312 | 431 | 148 | 49 | 22 | 28 | 33 | 14 | 1209 |
| 1995 | 34 | 385 | 551 | 927 | 539 | 677 | 74 | 51 | 25 | 45 | 32 | 3341 |
| 1996 | 88 | 266 | 951 | 862 | 865 | 550 | 390 | 83 | 35 | 11 | 18 | 4118 |
| 1997 | 130 | 625 | 580 | 1185 | 565 | 472 | 348 | 216 | 53 | 23 | 7 | 4202 |
| 1998 | 14 | 212 | 1038 | 947 | 1132 | 906 | 509 | 163 | 203 | 45 | 24 | 5194 |
| 1999 | 25 | 302 | 1348 | 2379 | 1265 | 1283 | 636 | 647 | 327 | 180 | 25 | 8417 |
| 2000 | 20 | 315 | 1075 | 1256 | 1343 | 721 | 339 | 167 | 204 | 77 | 41 | 5559 |
| 2001 | 41 | 315 | 983 | 1060 | 1314 | 1185 | 348 | 79 | 71 | 89 | 49 | 5534 |
| 2002 | 47 | 372 | 879 | 1484 | 786 | 773 | 1378 | 316 | 87 | 20 | 62 | 6205 |
| 2003 | 44 | 332 | 1126 | 1217 | 1337 | 992 | 656 | 115 | 137 | 50 | 16 | 6022 |
| 2004 | 35 | 207 | 910 | 1877 | 1258 | 1291 | 962 | 620 | 380 | 47 | 68 | 7654 |
| 2005 | 24 | 337 | 1127 | 1874 | 1945 | 1361 | 868 | 560 | 484 | 198 | 52 | 8830 |
| 2006 | 26 | 238 | 708 | 1107 | 1325 | 2047 | 709 | 366 | 169 | 125 | 56 | 6876 |
| 2007 | 49 | 206 | 554 | 1101 | 633 | 1093 | 891 | 223 | 224 | 82 | 68 | 5125 |
| 2008 | 43 | 321 | 787 | 1219 | 1101 | 550 | 547 | 341 | 107 | 140 | 47 | 5202 |
| 2009 | 253 | 1509 | 1836 | 1460 | 925 | 487 | 158 | 100 | 91 | 0 | 33 | 6852 |
| 2010 | 33 | 287 | 1773 | 1764 | 1236 | 396 | 384 | 100 | 29 | 41 | 0 | 6042 |
| 2011 | 176 | 721 | 1642 | 1965 | 1516 | 711 | 296 | 133 | 19 | 1 | 8 | 7187 |
| 2012 | 96 | 291 | 851 | 1523 | 1660 | 670 | 261 | 119 | 46 | 2 | 0 | 5518 |
| 2013 | 29 | 176 | 509 | 1007 | 1195 | 916 | 750 | 200 | 112 | 42 | 0 | 4937 |
| 2014 | 85 | 351 | 802 | 810 | 884 | 2134 | 1497 | 449 | 166 | 95 | 39 | 7311 |
| 2015 | 259 | 1451 | 1387 | 1619 | 817 | 1057 | 816 | 781 | 286 | 100 | 55 | 8628 |
| 2016 | 196 | 1128 | 2656 | 1776 | 1913 | 1227 | 447 | 321 | 608 | 246 | 90 | 10608 |

*Table 21. Fishing mortality at age, natural mortality (M), fishing mortality at ages 7 to 9 (F 7-9) and exploitation rate (Expl. %).*

| Age | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 13.00 | M | F 7-9 | Expl. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 0.00 | 0.00 | 0.01 | 0.08 | 0.33 | 0.36 | 0.39 | 0.48 | 0.41 | 0.44 | 0.37 | 0.31 | 0.35 | 0.20 | 0.43 | 0.32 |
| 1975 | 0.00 | 0.00 | 0.00 | 0.06 | 0.22 | 0.30 | 0.33 | 0.38 | 0.37 | 0.49 | 0.40 | 0.53 | 0.43 | 0.20 | 0.36 | 0.28 |
| 1976 | 0.00 | 0.00 | 0.00 | 0.05 | 0.23 | 0.28 | 0.43 | 0.49 | 0.49 | 0.71 | 0.58 | 0.39 | 0.51 | 0.20 | 0.47 | 0.34 |
| 1977 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.39 | 0.67 | 0.52 | 0.58 | 0.55 | 0.59 | 0.49 | 0.55 | 0.20 | 0.59 | 0.41 |
| 1978 | 0.00 | 0.00 | 0.00 | 0.02 | 0.17 | 0.37 | 0.55 | 0.39 | 0.42 | 0.46 | 0.57 | 0.65 | 0.60 | 0.20 | 0.45 | 0.33 |
| 1979 | 0.00 | 0.00 | 0.00 | 0.03 | 0.16 | 0.32 | 0.50 | 0.62 | 0.48 | 0.56 | 0.37 | 0.74 | 0.45 | 0.20 | 0.53 | 0.38 |
| 1980 | 0.00 | 0.00 | 0.00 | 0.04 | 0.18 | 0.36 | 0.53 | 0.59 | 0.41 | 0.29 | 0.46 | 0.39 | 0.42 | 0.20 | 0.51 | 0.36 |
| 1981 | 0.00 | 0.00 | 0.00 | 0.04 | 0.12 | 0.33 | 0.46 | 0.43 | 0.36 | 0.47 | 0.29 | 0.55 | 0.35 | 0.20 | 0.41 | 0.31 |
| 1982 | 0.00 | 0.00 | 0.00 | 0.03 | 0.17 | 0.26 | 0.40 | 0.58 | 0.62 | 0.71 | 0.65 | 0.23 | 0.48 | 0.20 | 0.53 | 0.38 |
| 1983 | 0.00 | 0.00 | 0.01 | 0.05 | 0.22 | 0.25 | 0.34 | 0.31 | 0.41 | 0.45 | 0.68 | 0.48 | 0.62 | 0.20 | 0.35 | 0.27 |
| 1984 | 0.00 | 0.00 | 0.00 | 0.02 | 0.11 | 0.30 | 0.48 | 0.44 | 0.53 | 0.56 | 0.68 | 0.88 | 0.74 | 0.20 | 0.48 | 0.35 |
| 1985 | 0.00 | 0.00 | 0.00 | 0.03 | 0.17 | 0.28 | 0.41 | 0.46 | 0.34 | 0.43 | 0.45 | 0.35 | 0.42 | 0.20 | 0.41 | 0.30 |
| 1986 | 0.00 | 0.00 | 0.00 | 0.02 | 0.13 | 0.29 | 0.46 | 0.49 | 0.67 | 0.49 | 0.76 | 0.54 | 0.70 | 0.40 | 0.54 | 0.35 |
| 1987 | 0.00 | 0.00 | 0.00 | 0.02 | 0.12 | 0.37 | 0.47 | 0.73 | 0.82 | 0.55 | 0.93 | 0.83 | 0.90 | 0.40 | 0.67 | 0.41 |
| 1988 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.30 | 0.39 | 0.49 | 0.42 | 0.42 | 0.68 | 0.58 | 0.65 | 0.40 | 0.43 | 0.29 |
| 1989 | 0.00 | 0.00 | 0.01 | 0.04 | 0.20 | 0.36 | 0.50 | 0.65 | 0.68 | 0.80 | 0.84 | 1.06 | 0.92 | 0.40 | 0.61 | 0.38 |
| 1990 | 0.00 | 0.00 | 0.01 | 0.09 | 0.31 | 0.47 | 0.56 | 0.59 | 0.81 | 0.67 | 0.61 | 0.61 | 0.61 | 0.40 | 0.65 | 0.40 |
| 1991 | 0.00 | 0.00 | 0.00 | 0.09 | 0.36 | 0.67 | 0.70 | 0.76 | 0.90 | 0.78 | 1.10 | 0.76 | 1.00 | 0.40 | 0.79 | 0.46 |
| 1992 | 0.00 | 0.00 | 0.03 | 0.33 | 0.55 | 0.81 | 1.17 | 1.35 | 1.32 | 1.32 | 1.38 | 1.25 | 1.33 | 0.40 | 1.28 | 0.62 |
| 1993 | 0.00 | 0.00 | 0.02 | 0.27 | 0.71 | 1.23 | 1.92 | 1.88 | 2.01 | 1.49 | 1.51 | 0.64 | 1.24 | 0.40 | 1.94 | 0.75 |
| 1994 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.06 | 0.16 | 0.07 | 0.23 | 0.05 | 0.09 | 0.06 | 0.40 | 0.10 | 0.08 |
| 1995 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.03 | 0.10 | 0.08 | 0.12 | 0.04 | 0.07 | 0.40 | 0.05 | 0.04 |
| 1996 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.05 | 0.06 | 0.06 | 0.13 | 0.05 | 0.10 | 0.06 | 0.40 | 0.06 | 0.05 |
| 1997 | 0.00 | 0.00 | 0.00 | 0.03 | 0.11 | 0.22 | 0.32 | 0.52 | 0.37 | 0.78 | 0.58 | 0.45 | 0.54 | 0.20 | 0.40 | 0.30 |
| 1998 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.14 | 0.20 | 0.24 | 0.25 | 0.36 | 0.27 | 0.75 | 0.33 | 0.20 | 0.23 | 0.19 |
| 1999 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.17 | 0.27 | 0.58 | 0.80 | 0.61 | 0.88 | 0.70 | 0.82 | 0.20 | 0.55 | 0.39 |
| 2000 | 0.00 | 0.00 | 0.00 | 0.01 | 0.08 | 0.16 | 0.35 | 0.38 | 0.76 | 1.01 | 0.34 | 0.20 | 0.29 | 0.20 | 0.49 | 0.36 |
| 2001 | 0.00 | 0.00 | 0.00 | 0.02 | 0.05 | 0.18 | 0.23 | 0.52 | 0.68 | 0.94 | 1.09 | 0.35 | 0.60 | 0.20 | 0.47 | 0.34 |
| 2002 | 0.00 | 0.00 | 0.00 | 0.01 | 0.05 | 0.21 | 0.34 | 0.53 | 0.82 | 0.97 | 0.67 | 0.45 | 0.63 | 0.31 | 0.57 | 0.38 |
| 2003 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.02 | 0.04 | 0.16 | 0.03 | 0.12 | 0.31 | 0.02 | 0.02 |
| 2004 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.15 | 0.19 | 0.28 | 0.18 | 0.30 | 0.16 | 0.28 | 0.31 | 0.21 | 0.16 |

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | M | F 7-9 | Expl. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.06 | 0.16 | 0.29 | 0.33 | 0.35 | 0.50 | 0.51 | 0.51 | 0.42 | 0.26 | 0.19 |
| 2006 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.17 | 0.20 | 0.42 | 0.50 | 0.34 | 0.69 | 0.53 | 0.62 | 0.42 | 0.37 | 0.26 |
| 2007 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.12 | 0.23 | 0.50 | 0.67 | 1.10 | 0.69 | 0.73 | 0.70 | 0.42 | 0.46 | 0.31 |
| 2008 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.15 | 0.31 | 0.51 | 1.14 | 0.76 | 5.00 | 0.52 | 1.14 | 0.42 | 0.66 | 0.40 |
| 2009 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.18 | 0.23 | 0.33 | 0.84 | 1.09 | 0.66 | 5.00 | 0.66 | 0.52 | 0.46 | 0.30 |
| 2010 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.10 | 0.24 | 0.33 | 0.54 | 1.15 | 2.66 | 1.04 | 1.48 | 0.52 | 0.37 | 0.24 |
| 2011 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.11 | 0.16 | 0.15 | 0.23 | 1.23 | 5.00 | 1.29 | 0.52 | 0.14 | 0.10 |
| 2012 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.06 | 0.13 | 0.15 | 0.17 | 0.22 | 5.00 | 0.27 | 0.52 | 0.12 | 0.09 |
| 2013 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.06 | 0.07 | 0.13 | 0.10 | 0.09 | 0.03 | 0.08 | 0.46 | 0.08 | 0.06 |
| 2014 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.04 | 0.08 | 0.09 | 0.14 | 0.11 | 0.06 | 0.09 | 0.46 | 0.07 | 0.06 |
| 2015 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.05 | 0.11 | 0.10 | 0.04 | 0.06 | 0.03 | 0.05 | 0.46 | 0.09 | 0.07 |
| 2016 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.05 | 0.11 | 0.07 | 0.07 | 0.06 | 0.07 | 0.46 | 0.07 | 0.05 |

# 9. FIGURES

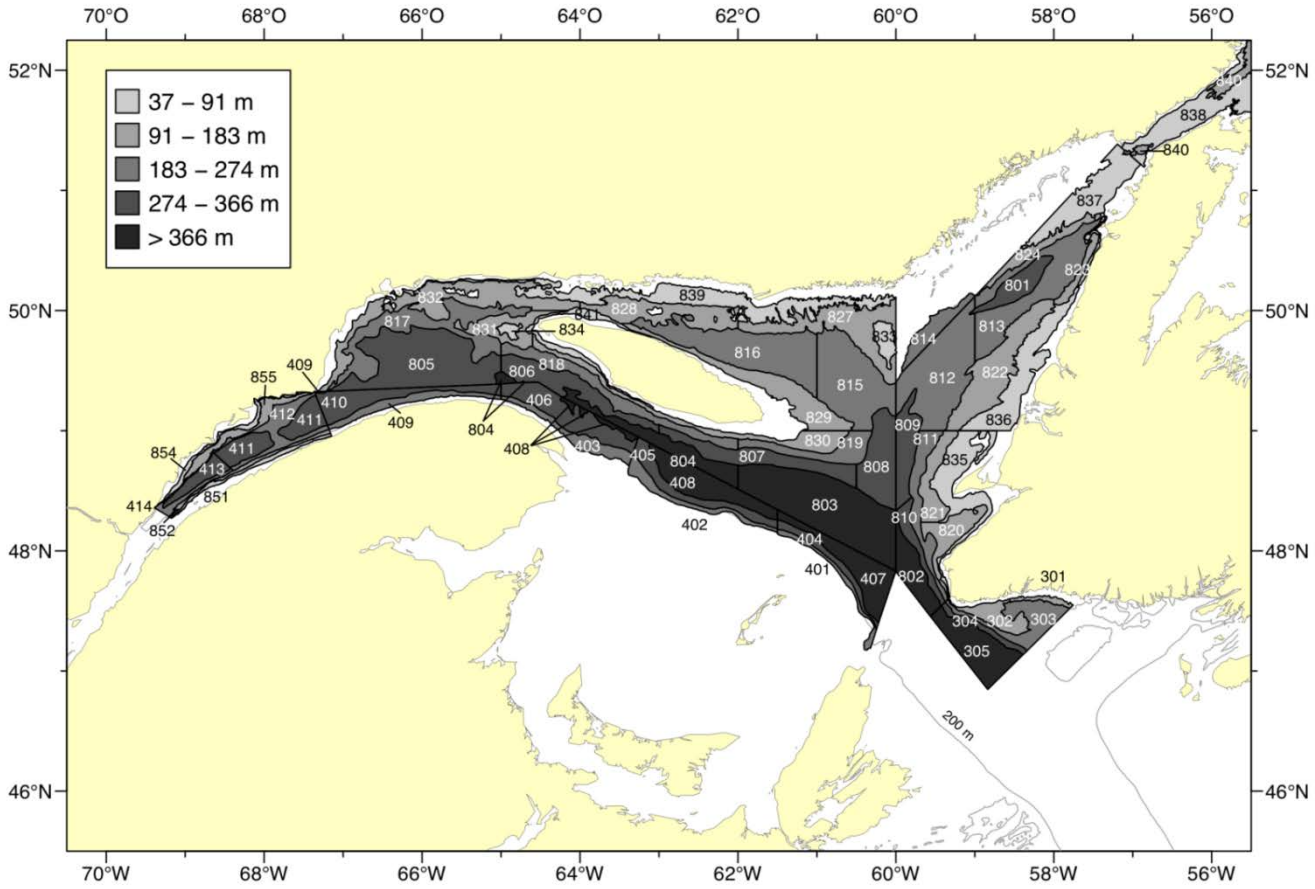



*Figure 1. Stratification scheme used for multispecies research surveys (non-illustrated 10-20 fathom strata) and mobile gear sentinel surveys.*

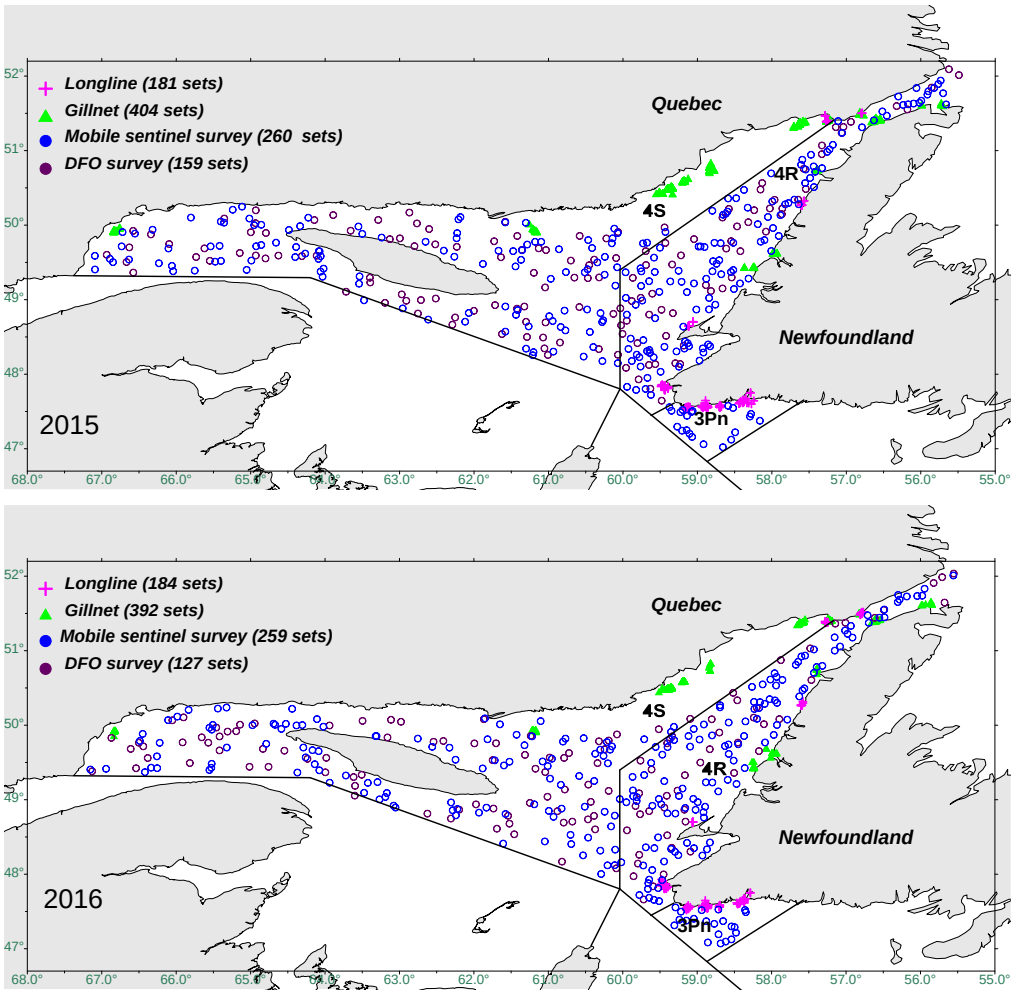



*Figure 2a. Spatial distribution of sampling effort for cod abundance indices (NAFO 3Pn, 4RS) in 2016.*

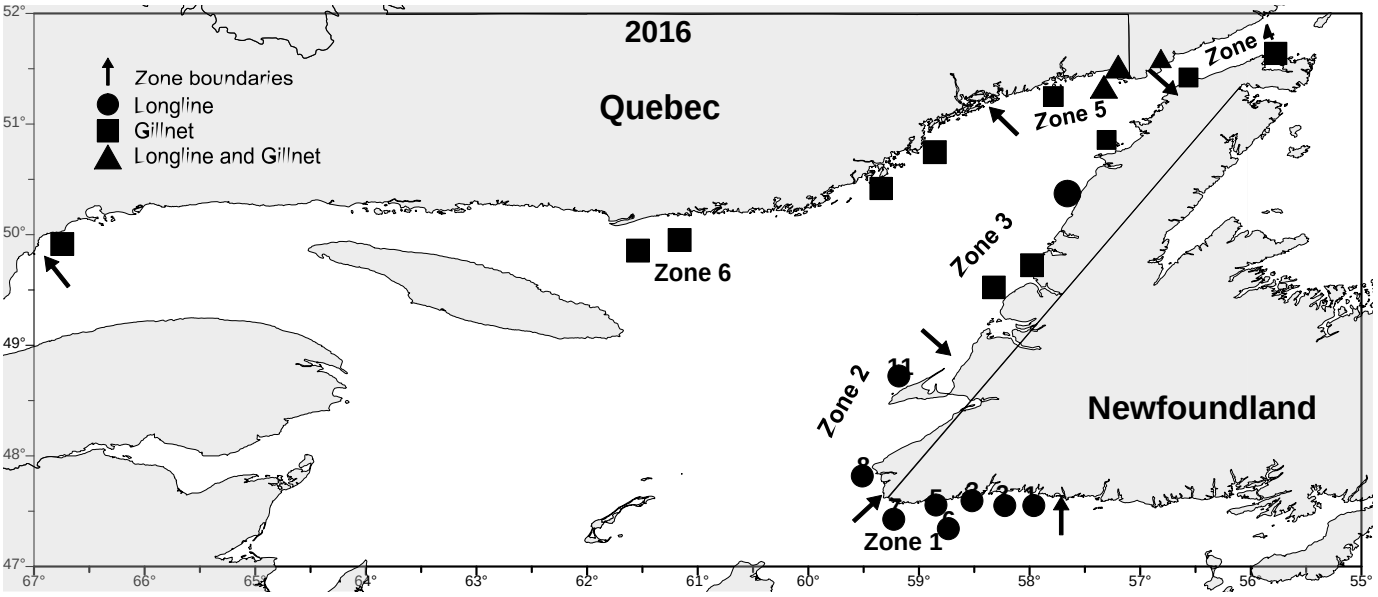



*Figure 2b. Spatial distribution of sampling effort for fixed gear sentinel survey indices in 2016.*

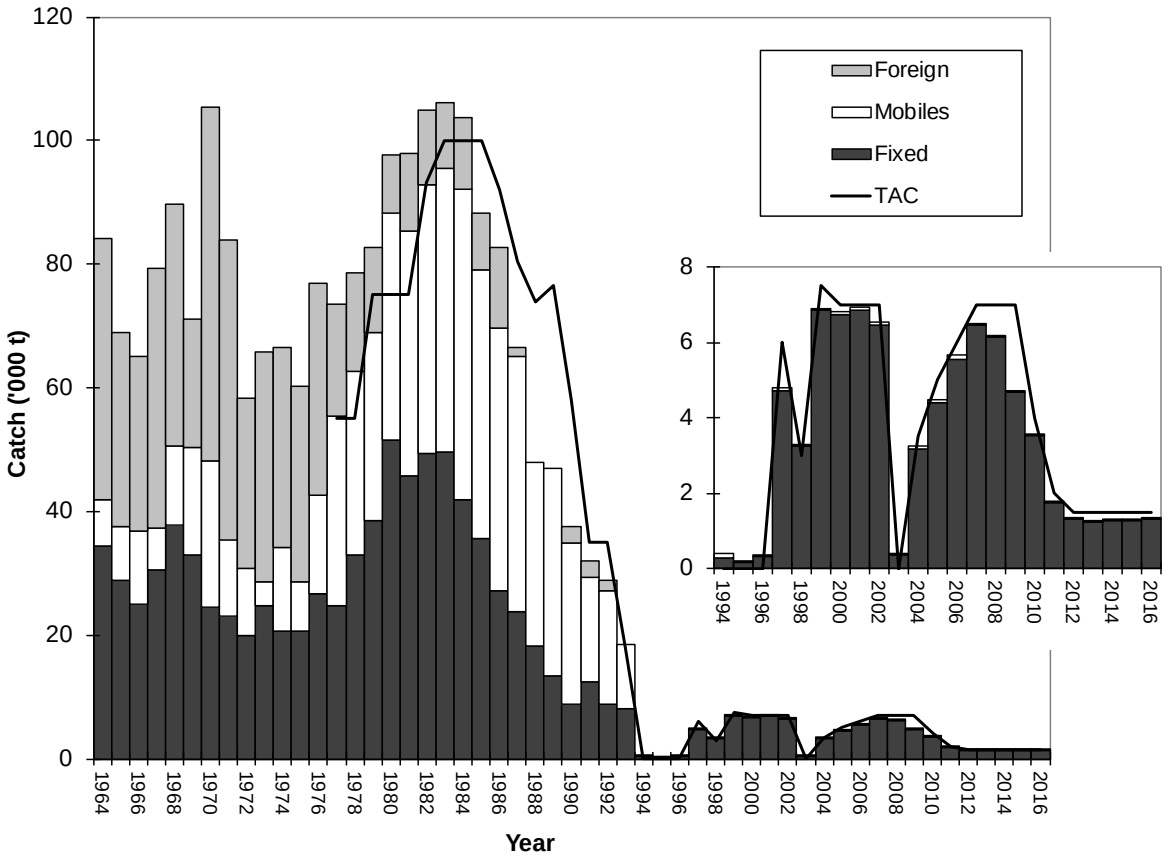



*Figure 3. Annual landings and total allowable catch (TAC) by management year (1999: TAC from 1999/01/01 to 2000/05/14; 2000 and+: TAC from May 15 to May 14 of the following year).*

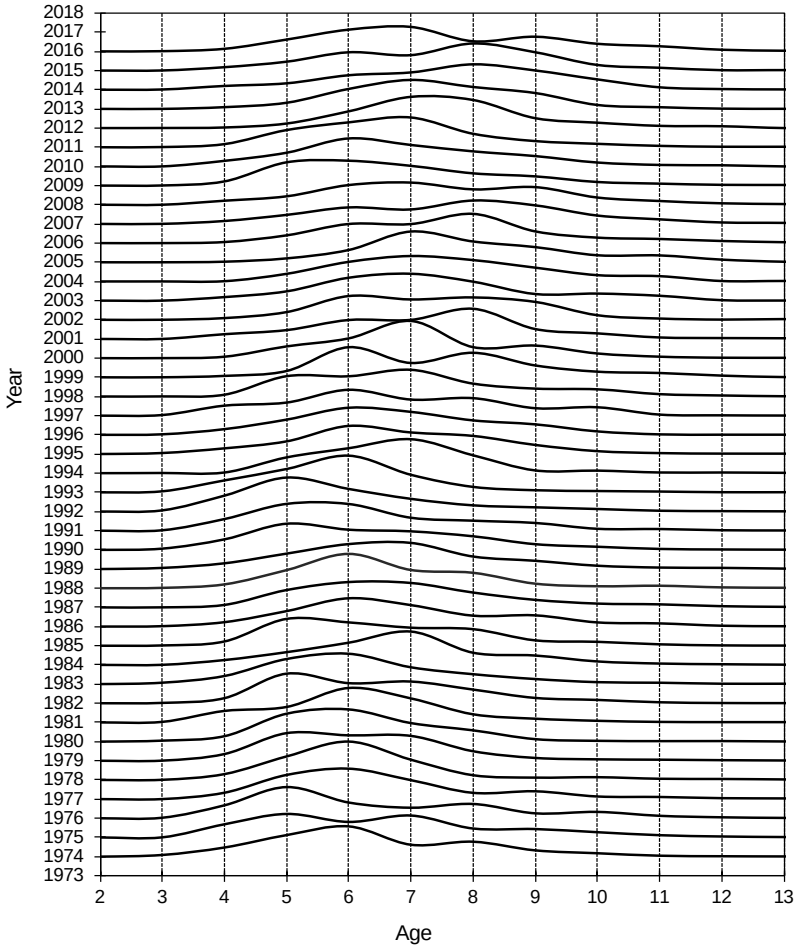



*Figure 4. Catch-at-age (%) of cod in the commercial fishery.*

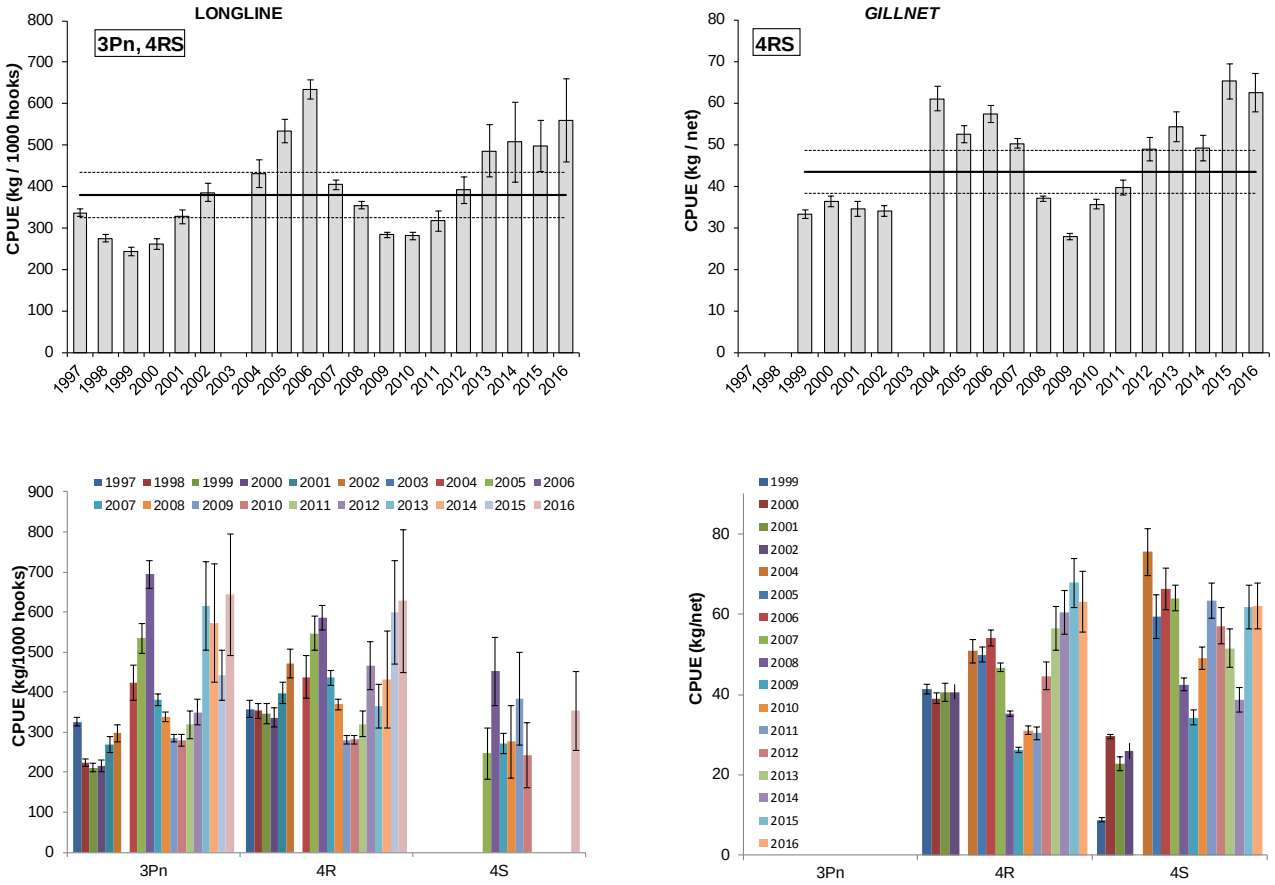



*Figure 5. Commercial fishery logbooks for Quebec vessels (< 45 feet) and Newfoundland vessels (< 35 feet) from 1997 to 2016. Catch per unit effort ± 95% CI. The solid line represents the series average (1997-2014), and the dotted lines ± ½ standard deviation around the average.*

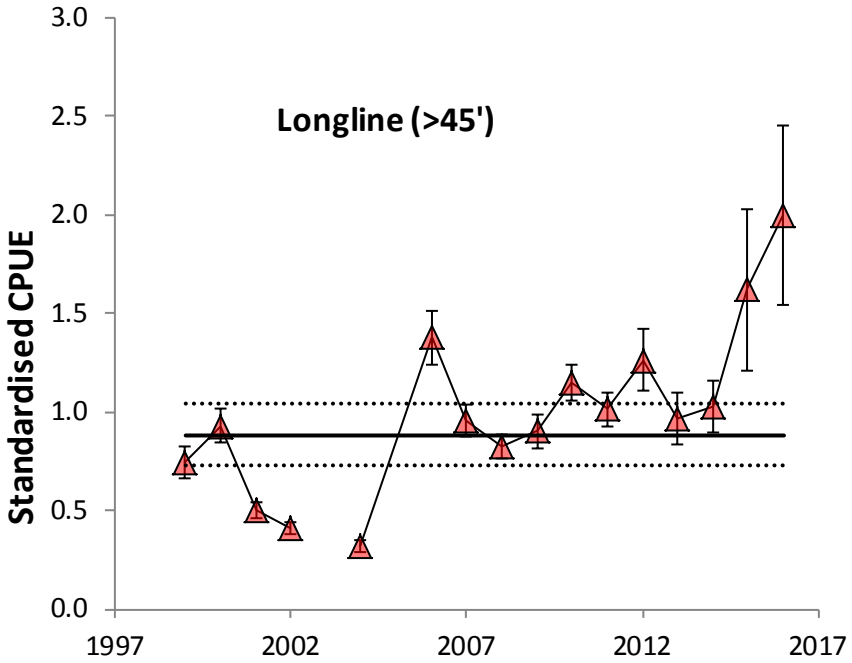



*Figure 6. Quebec commercial longline fishery logbook data. Standardized catch per unit effort (CPUE) (average ± 95% CI).*

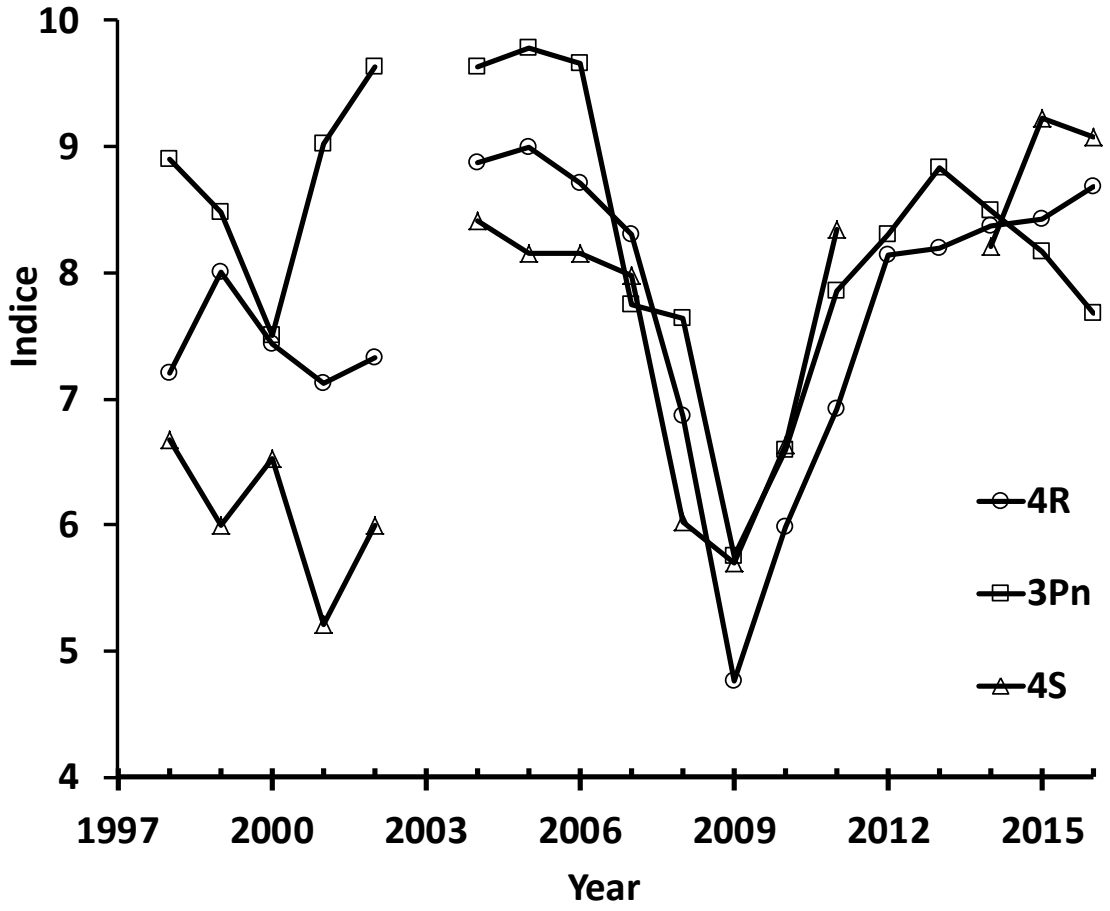
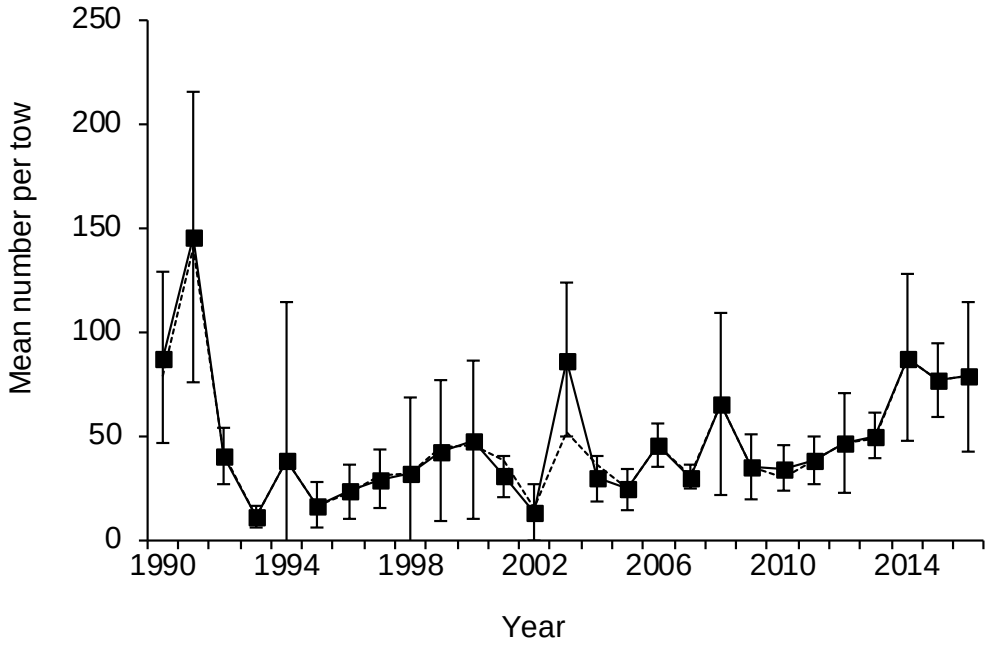



*Figure 7. Fishery performance index by NAFO Division from the industry telephone survey of fixed gear fishers (dotted lines = years with no survey).*

A)




B)

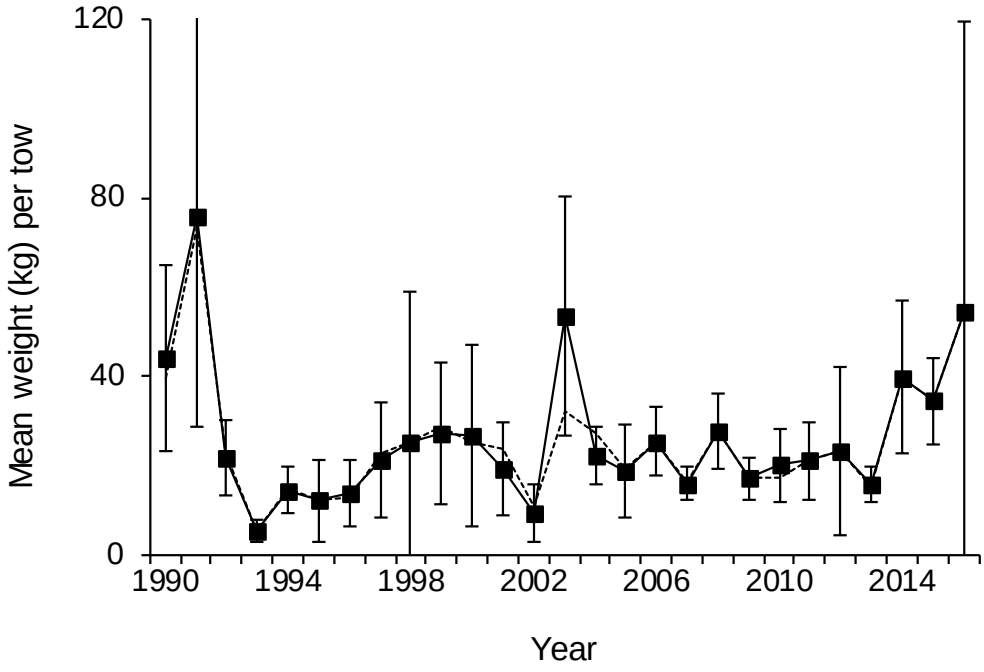



*Figure 8. Mean numbers (A) and mean weights (B) per tow observed during the DFO survey. Data corrected by a multiplicative model to consider strata not sampled (solid line) and data without correction (dotted line). Error bars indicate 95% confidence intervals.*

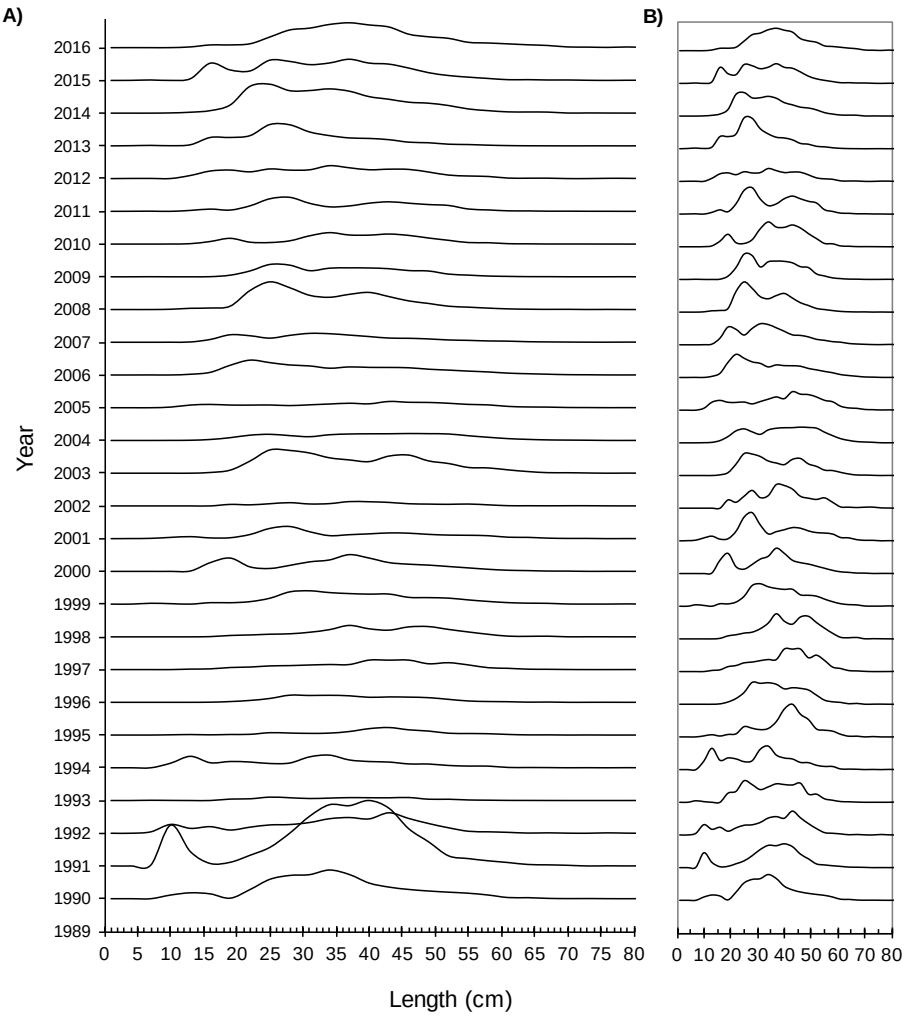



*Figure 9. Length frequency distributions during DFO research surveys. (Numbers (A), percentage (B)).*

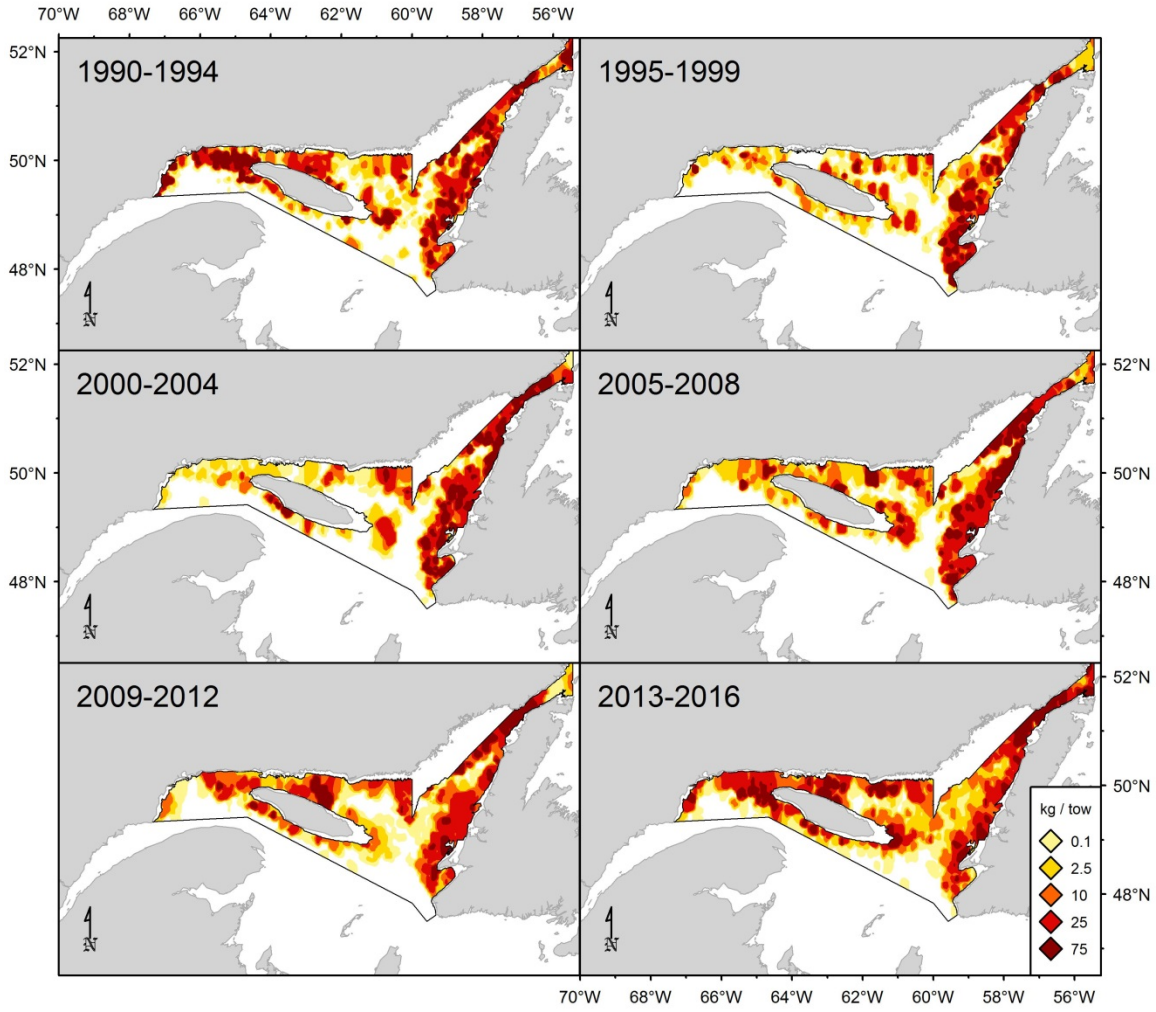



*Figure 10. Distribution of cod catch rates (kg/15-minute tow) in the (August) DFO survey in NAFO Divisions 4RS.*

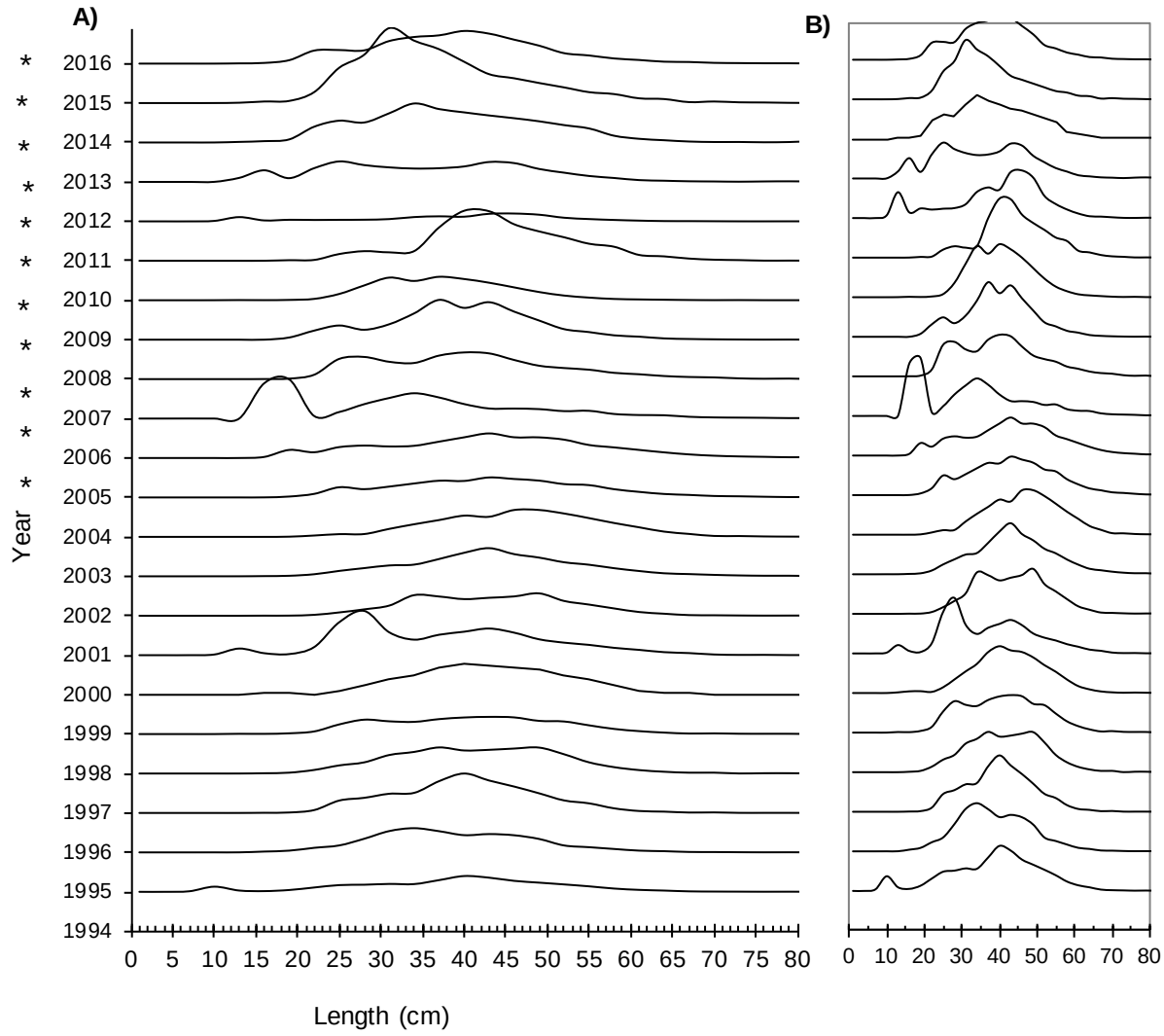
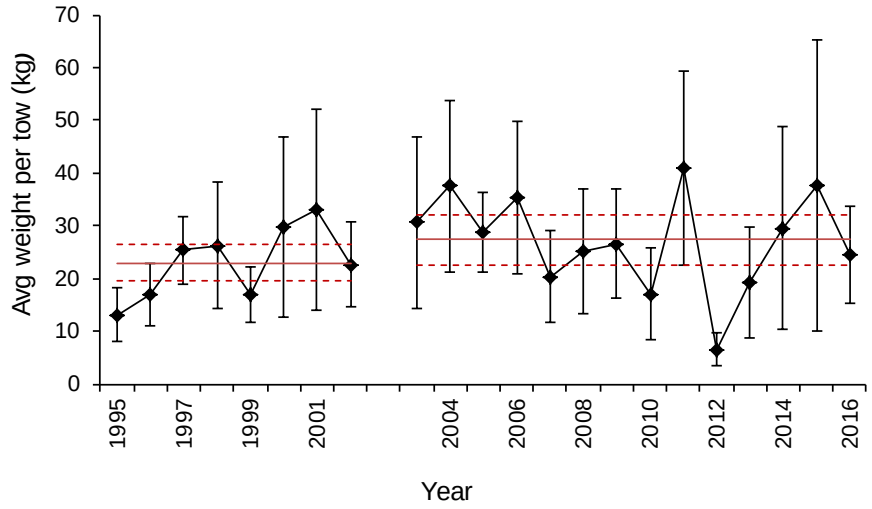



*Figure 11. Length frequencies distribution in number (A) and in percentage (B) during the July mobile gear sentinel survey. (* Includes 10-20 fathom strata).*

A)




B)

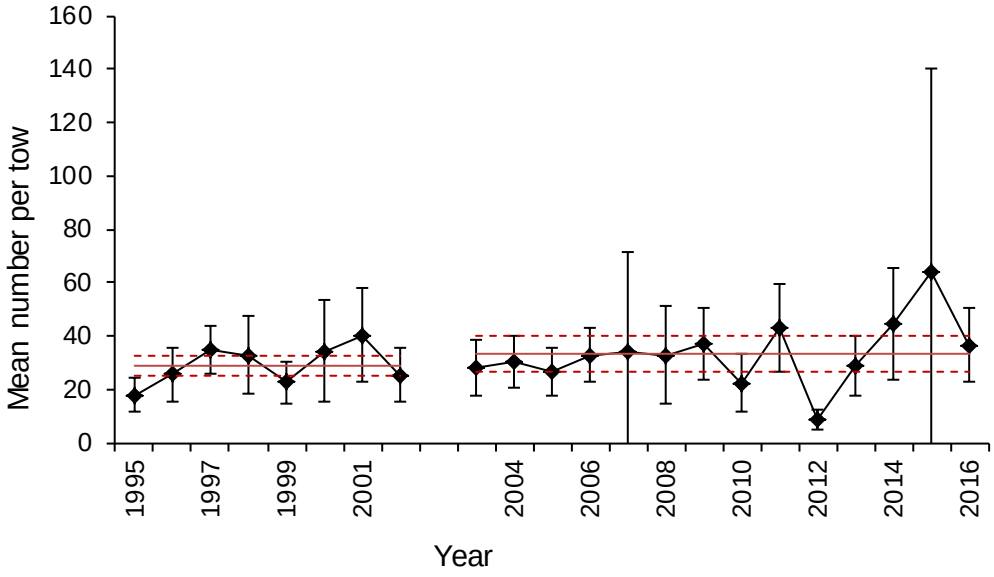



*Figure 12. Mean weights (A) and mean numbers (B) per tow during the July mobile gear sentinel survey. (2003-2011 includes 10-20 fathom strata). The solid line represents the series average, and the dotted lines ± ½ standard deviation around the average.*

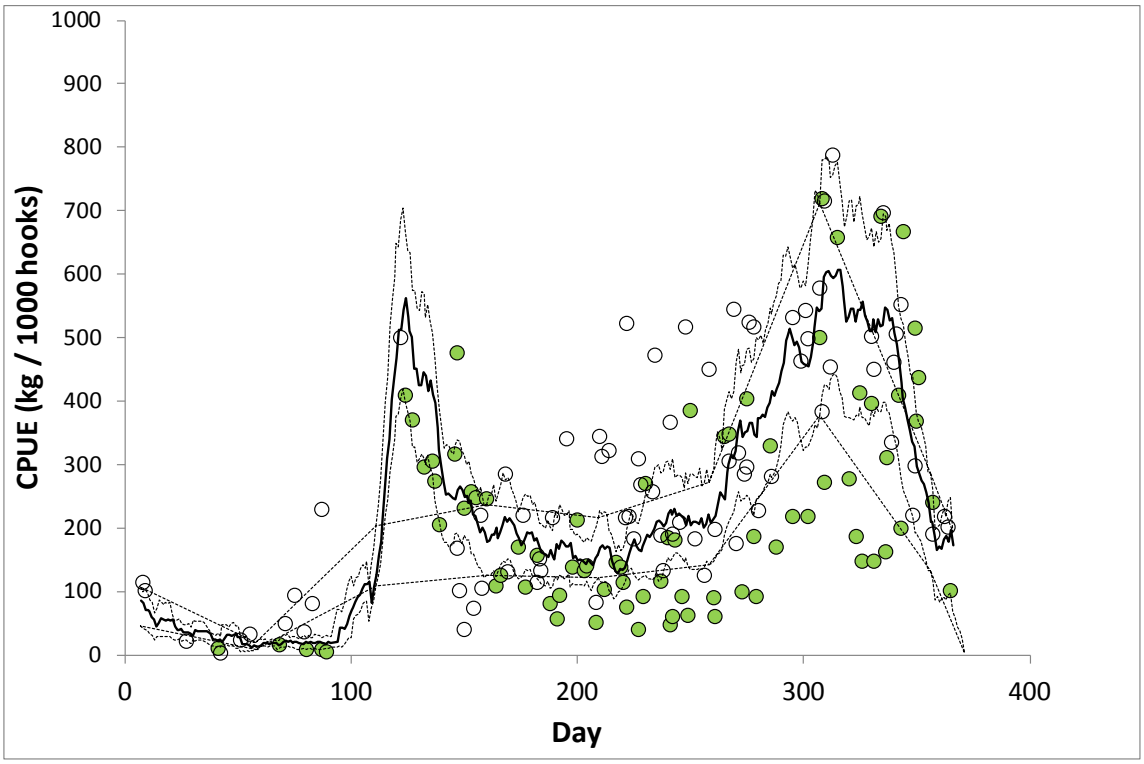
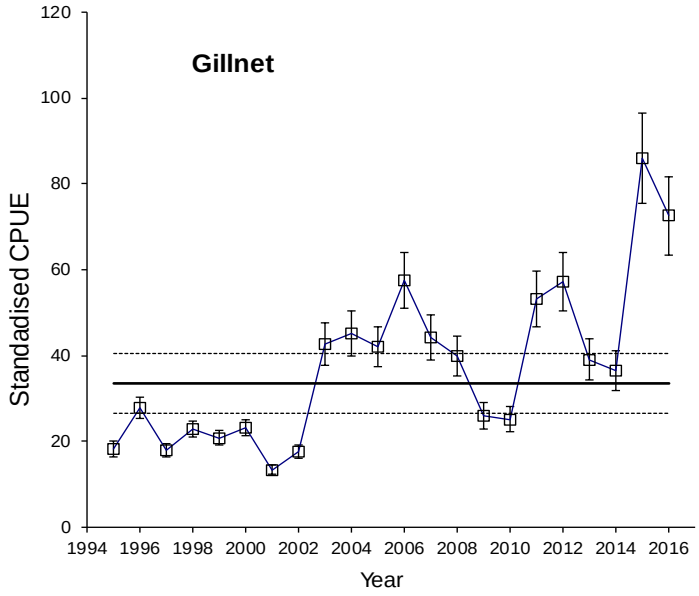



*Figure 13. Average daily longline CPUE (kg / 1000 hooks) for the sentinel survey program in zone 1 (3Pn). The dots represent the 2016 data; the solid line is a 7-day running average of the daily averages for the 1995-2013 series; and the dotted lines ± ½ standard deviation around this average.*

A)




B)

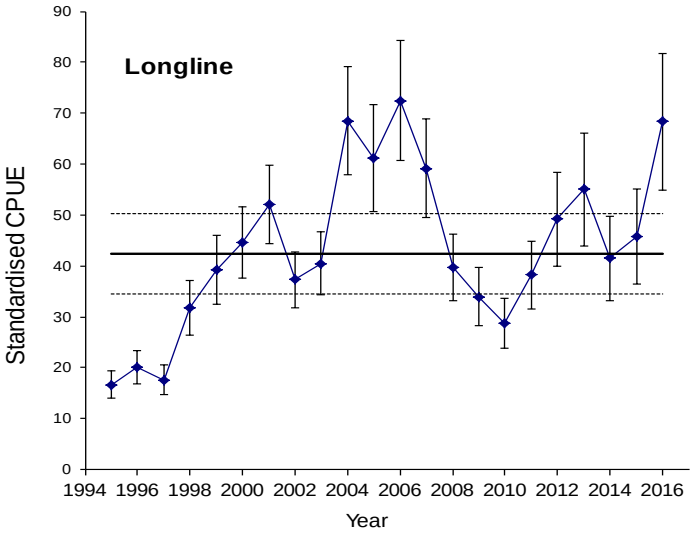



*Figure 14. Standardized catch per unit effort (CPUE) (average ± 95% CI) in the sentinel survey program A) Longline B) Gillnet. The solid line represents the 1995-2014 series average, and the dotted lines ± ½ standard deviation around the average.*

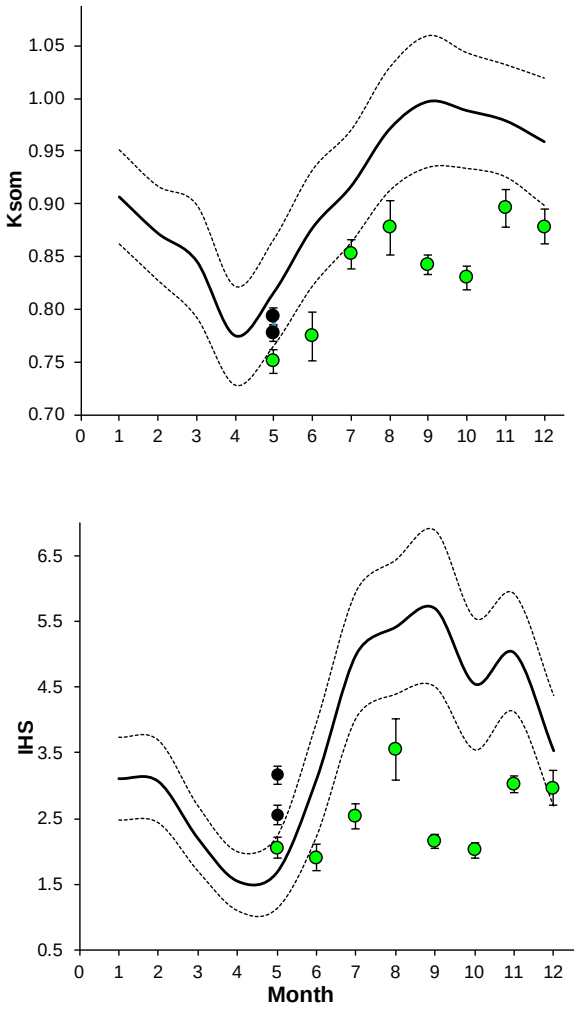



*Figure 15. Seasonal changes in condition of cod sampled in the 2016 fixed gear sentinel survey program. Monthly average ± 95% CI of Fulton's somatic index (K som) and the hepato-somatic index (HSI). The solid line represents the 1998–2015 series monthly average, and the dotted lines ±½ the standard deviation around the average.*

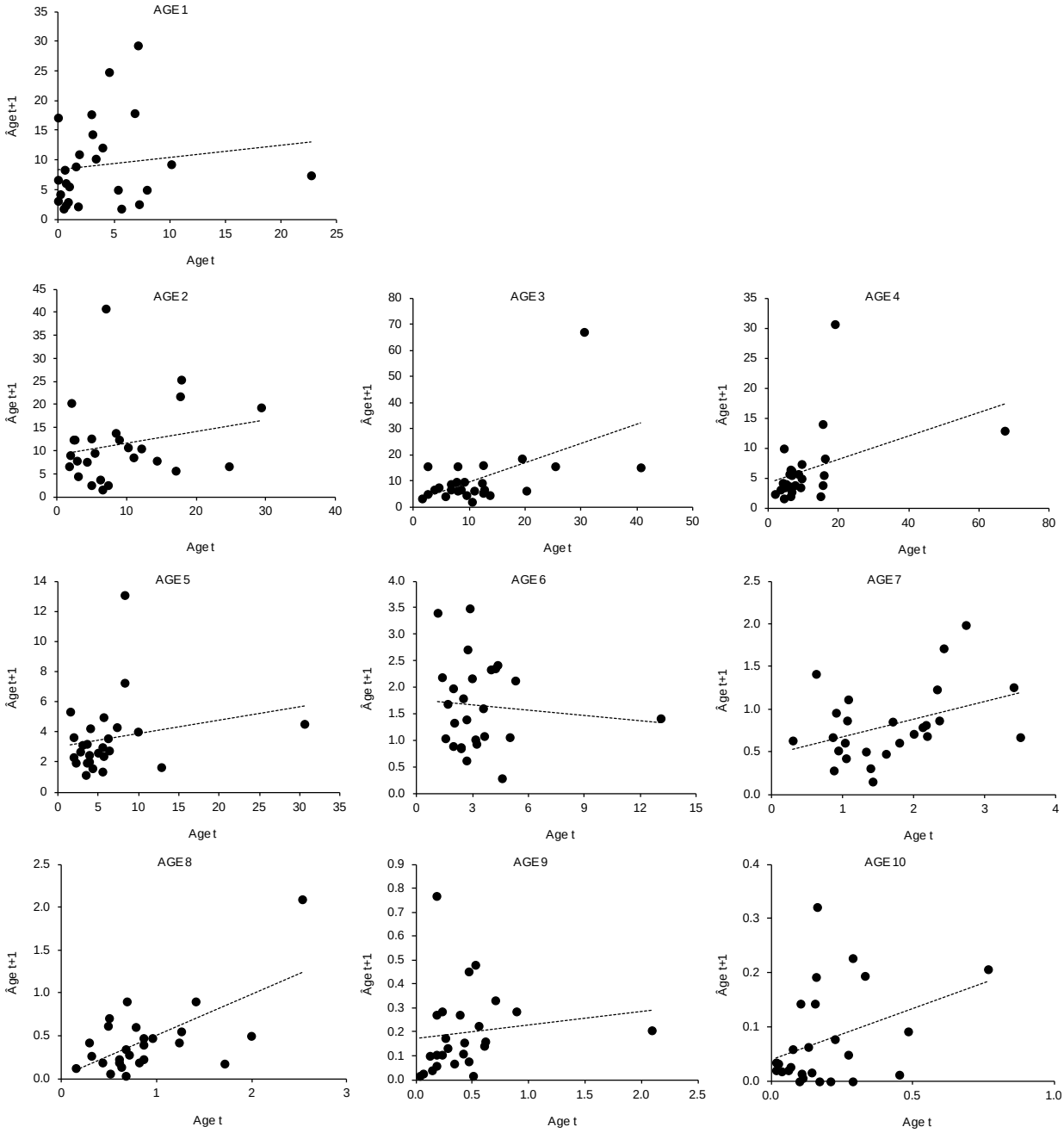



*Figure 16a. Coherence at age for the DFO survey.*

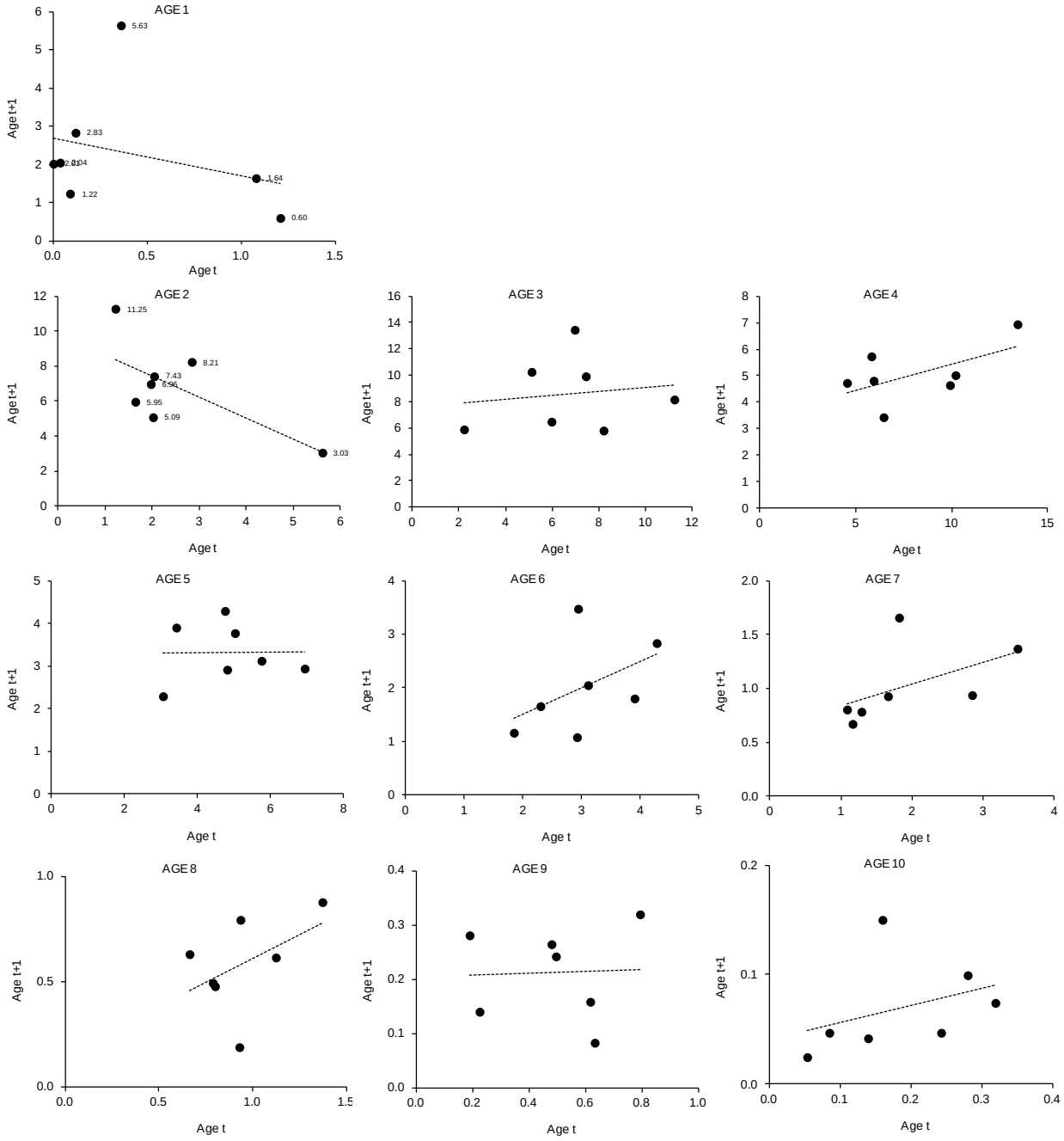



*Figure 16b. Coherence at age for the mobile gear sentinel survey > 20 fathoms (1995 to 2002).*

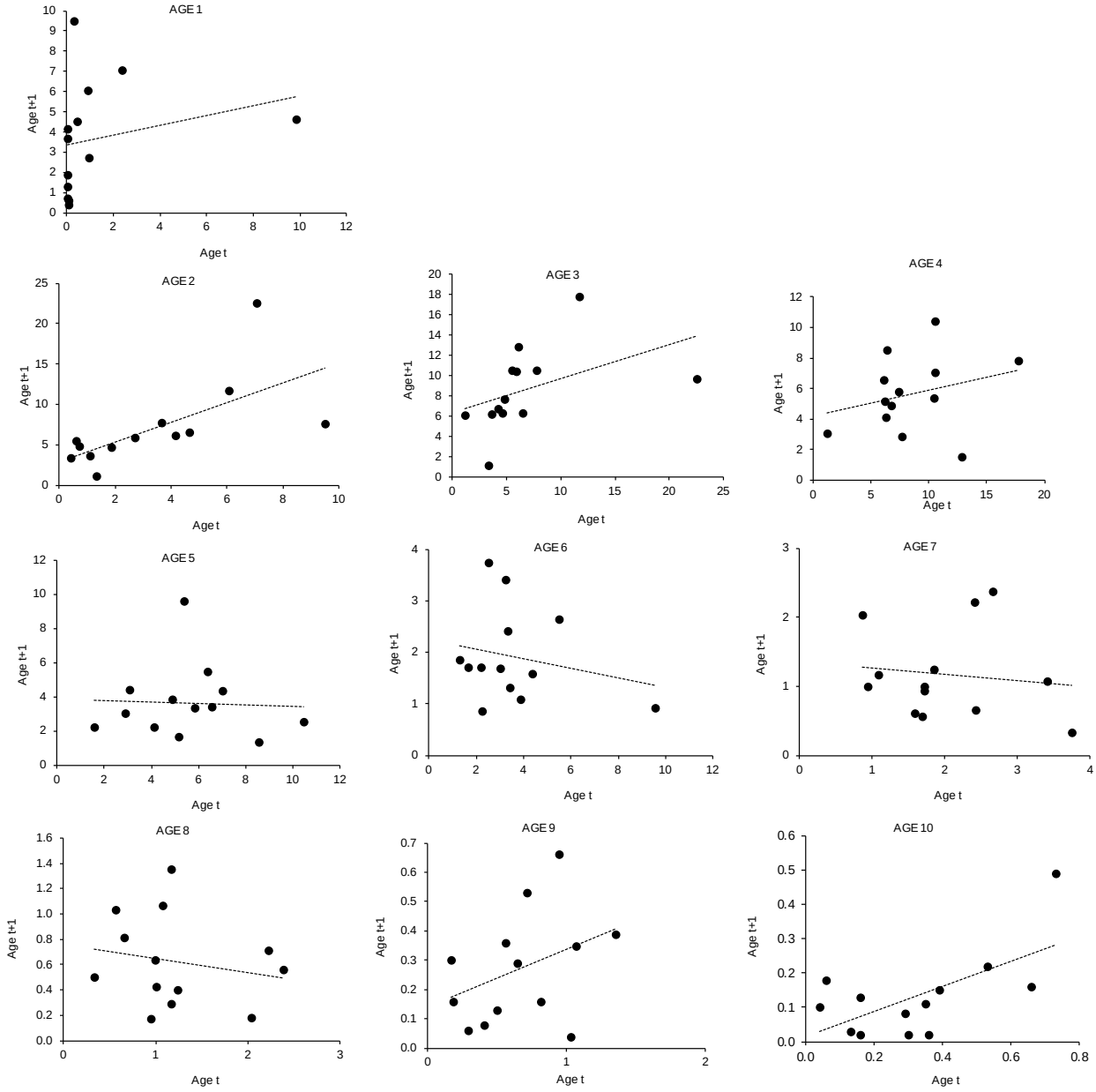



*Figure 16c. Coherence at age for the mobile gear sentinel survey > 10 fathoms (2003 to 2016).*

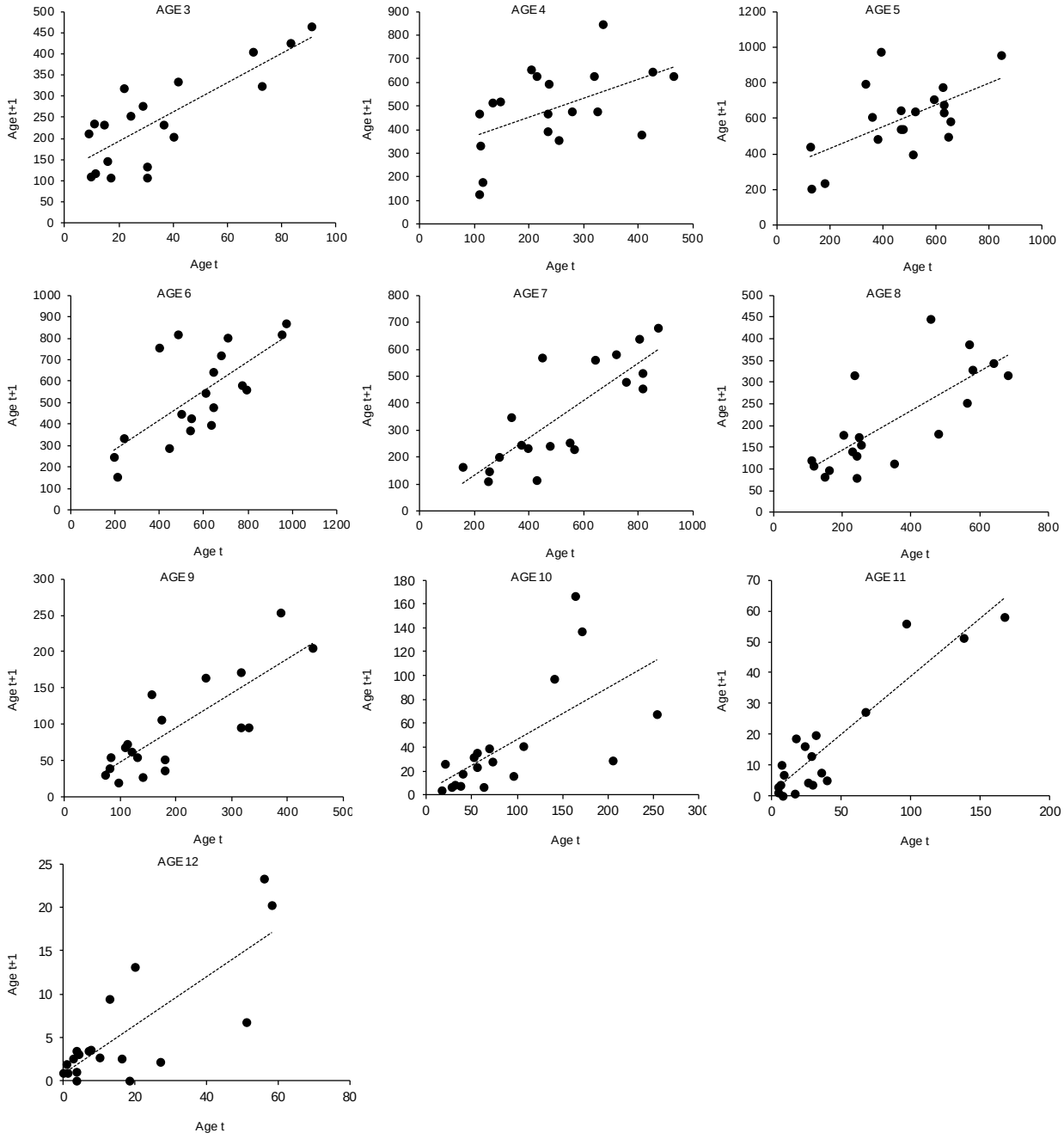



*Figure 16d. Coherence at age for longline sentinel survey.*

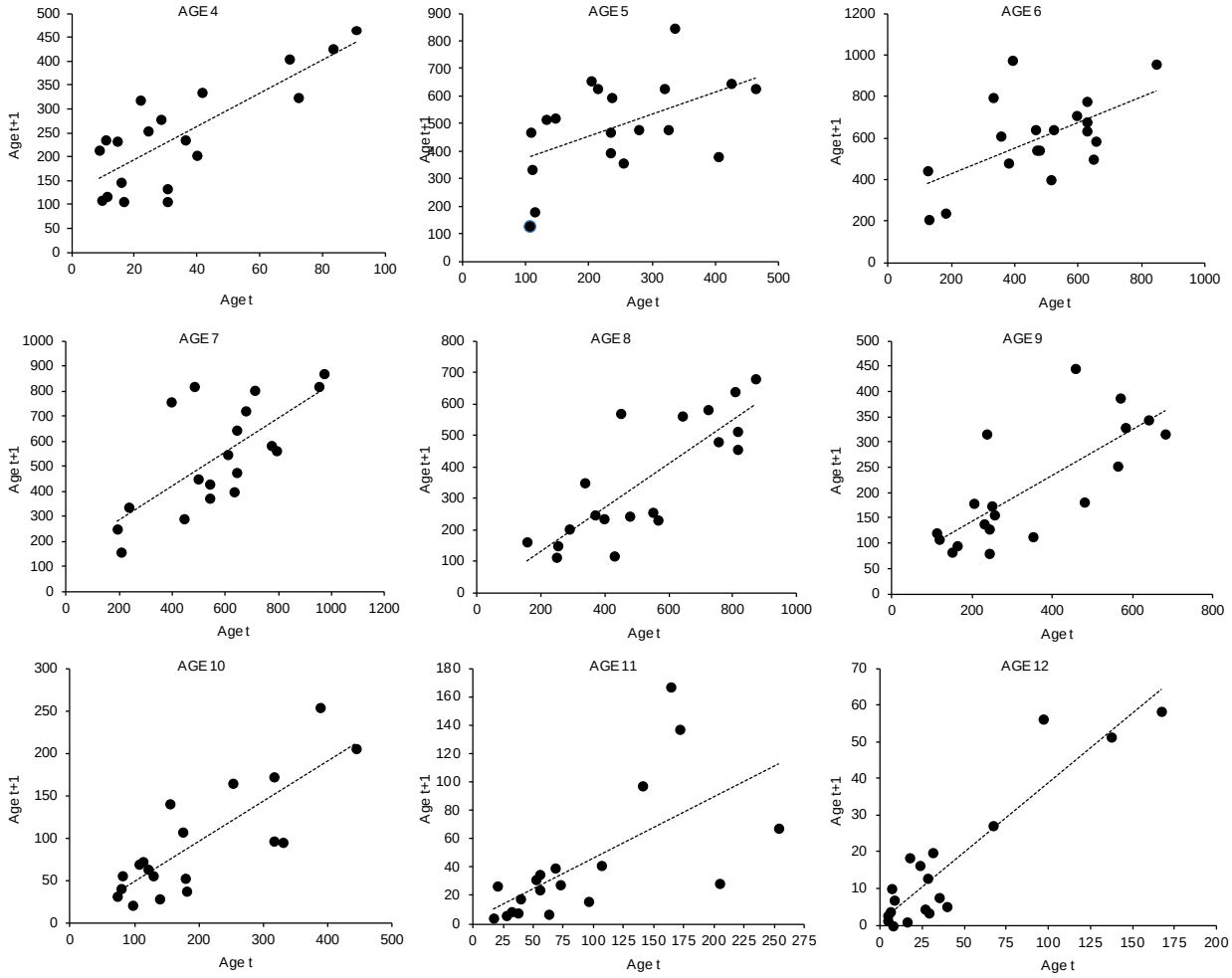



*Figure 16e. Coherence at age for gillnet sentinel survey.*

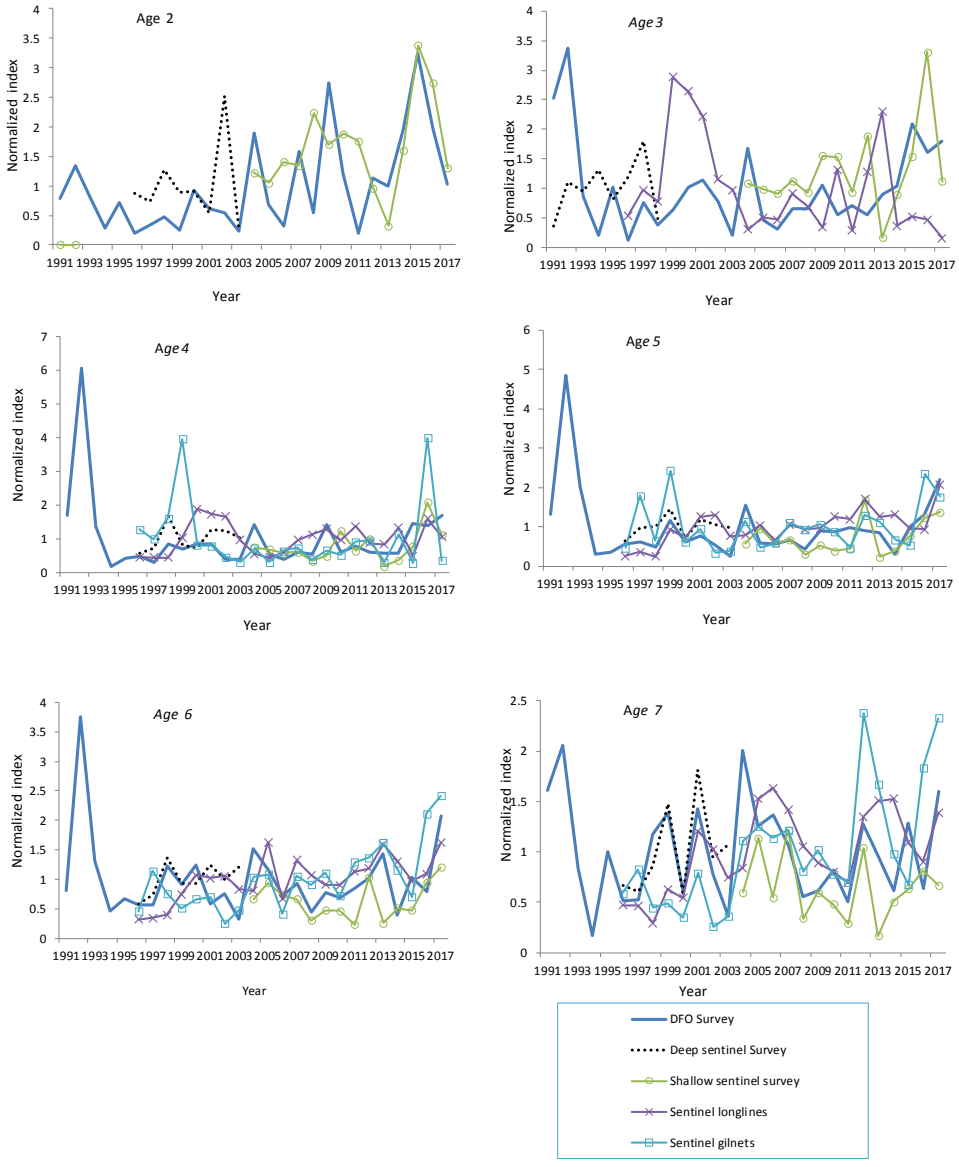



*Figure 17. Coherence at age between the five abundance indices.*

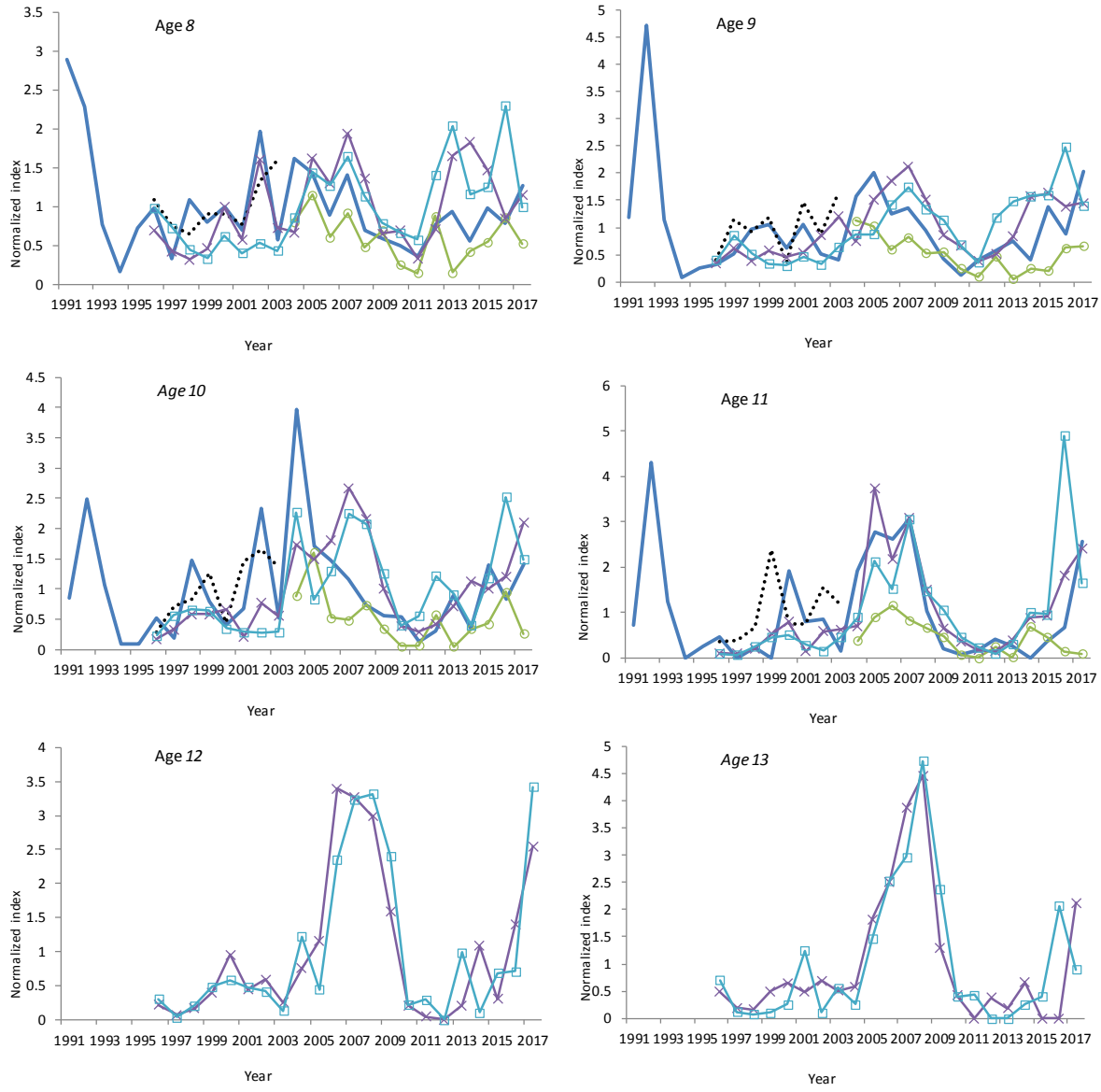
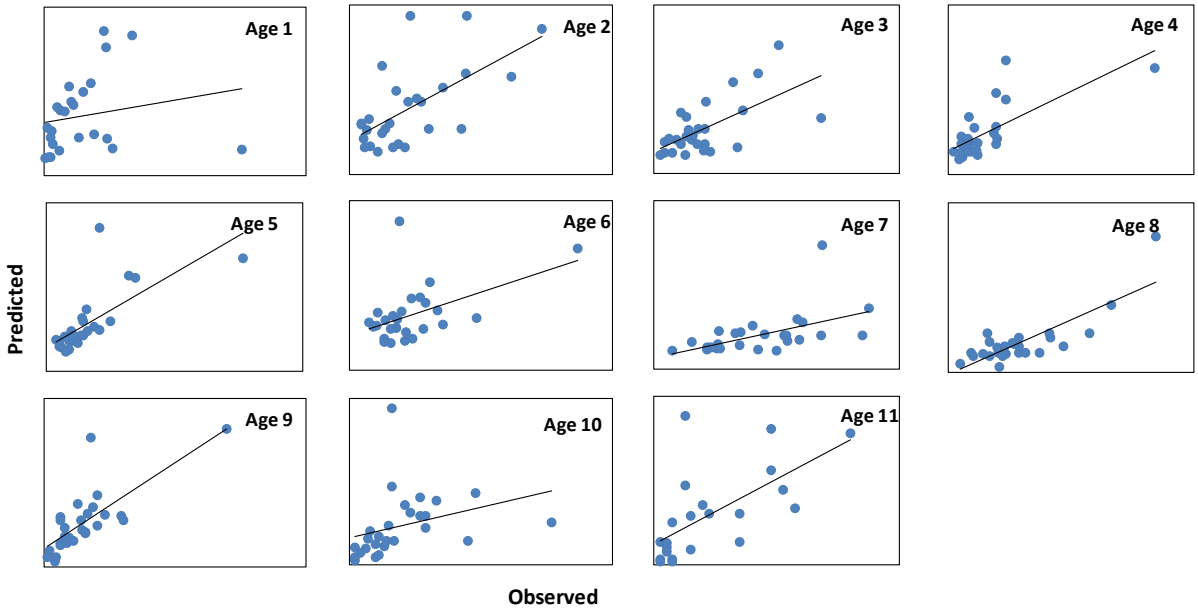



*Figure 17. (continued)*

A)




B)

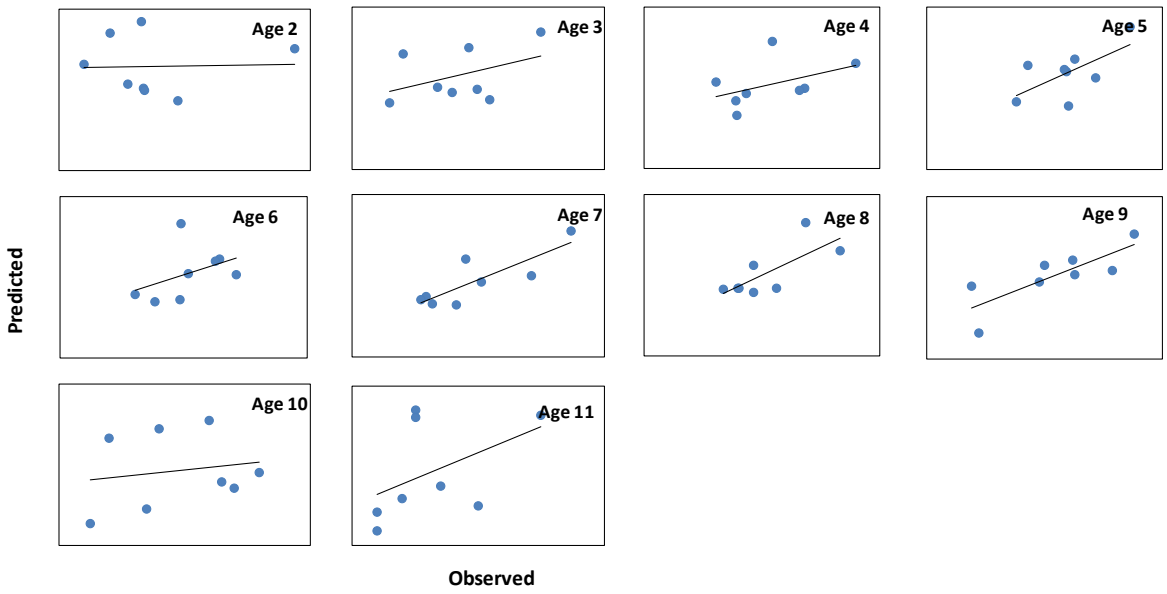
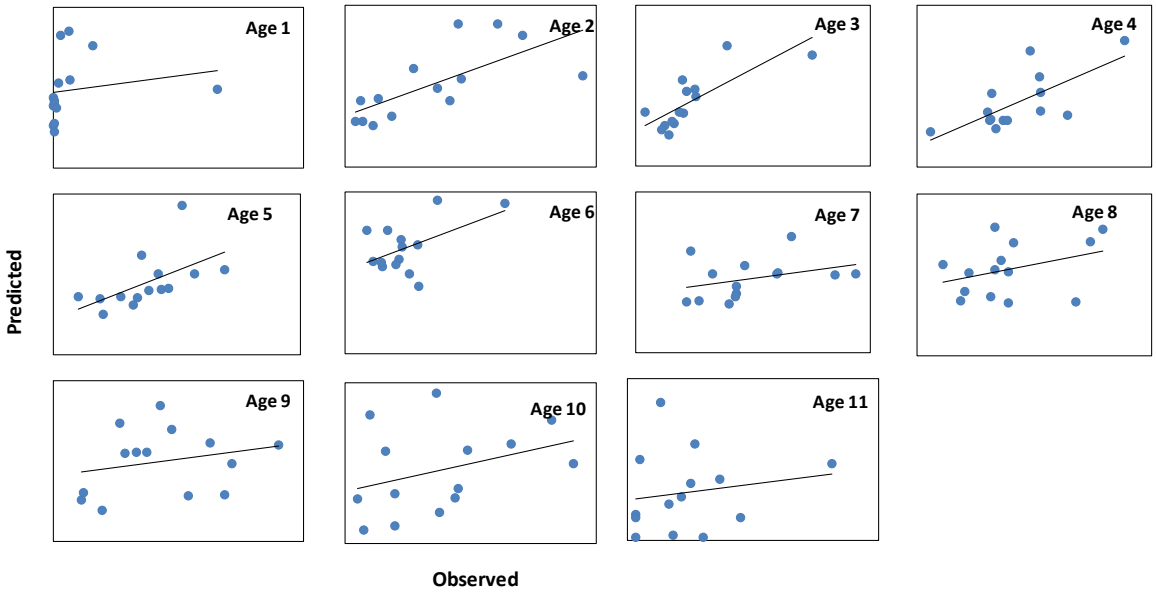



*Figure18. ADAPT adjustment between observed and predicted values at age. A) DFO Survey, B) Mobile gear sentinel survey > 20 fathoms, C) Mobile gear sentinel survey > 10 fathoms, D) Longline sentinel survey, E) Gillnet sentinel survey.*

C)




D)

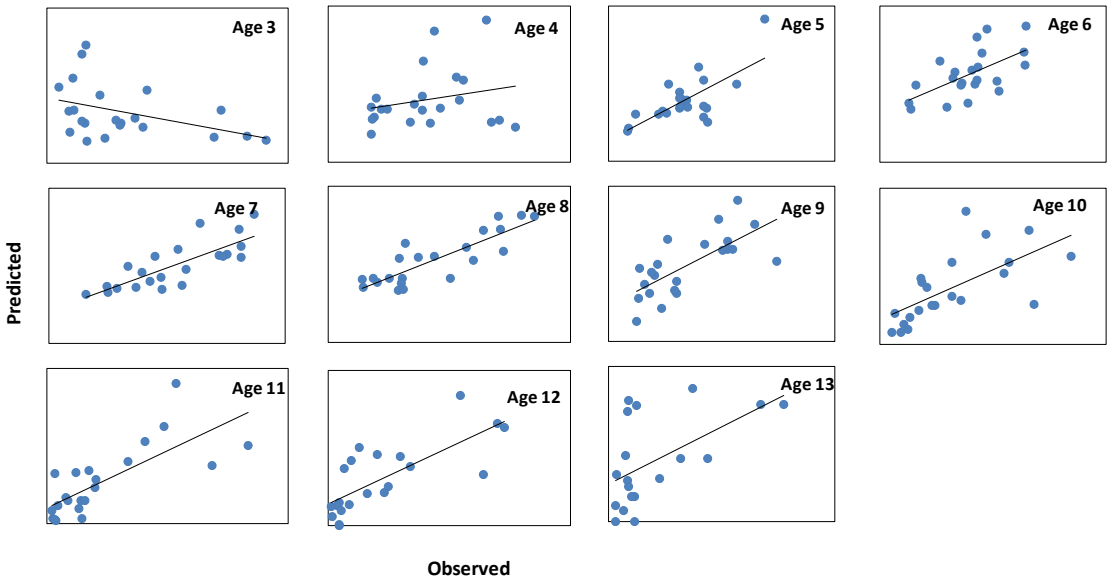



*Figure 18.(continued)*

E)

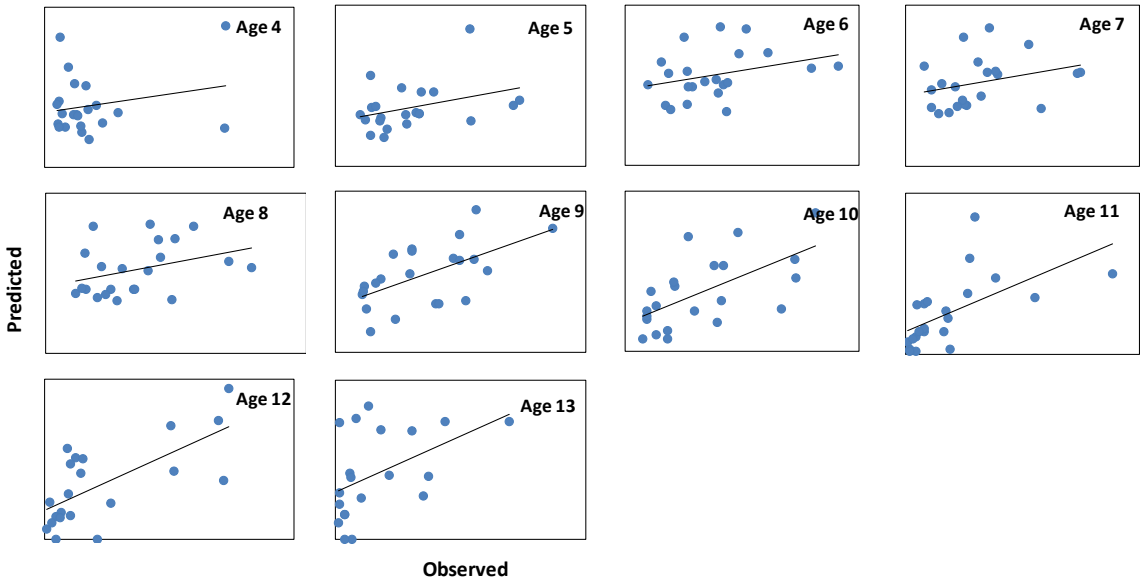



*Figure 18.(continued)*

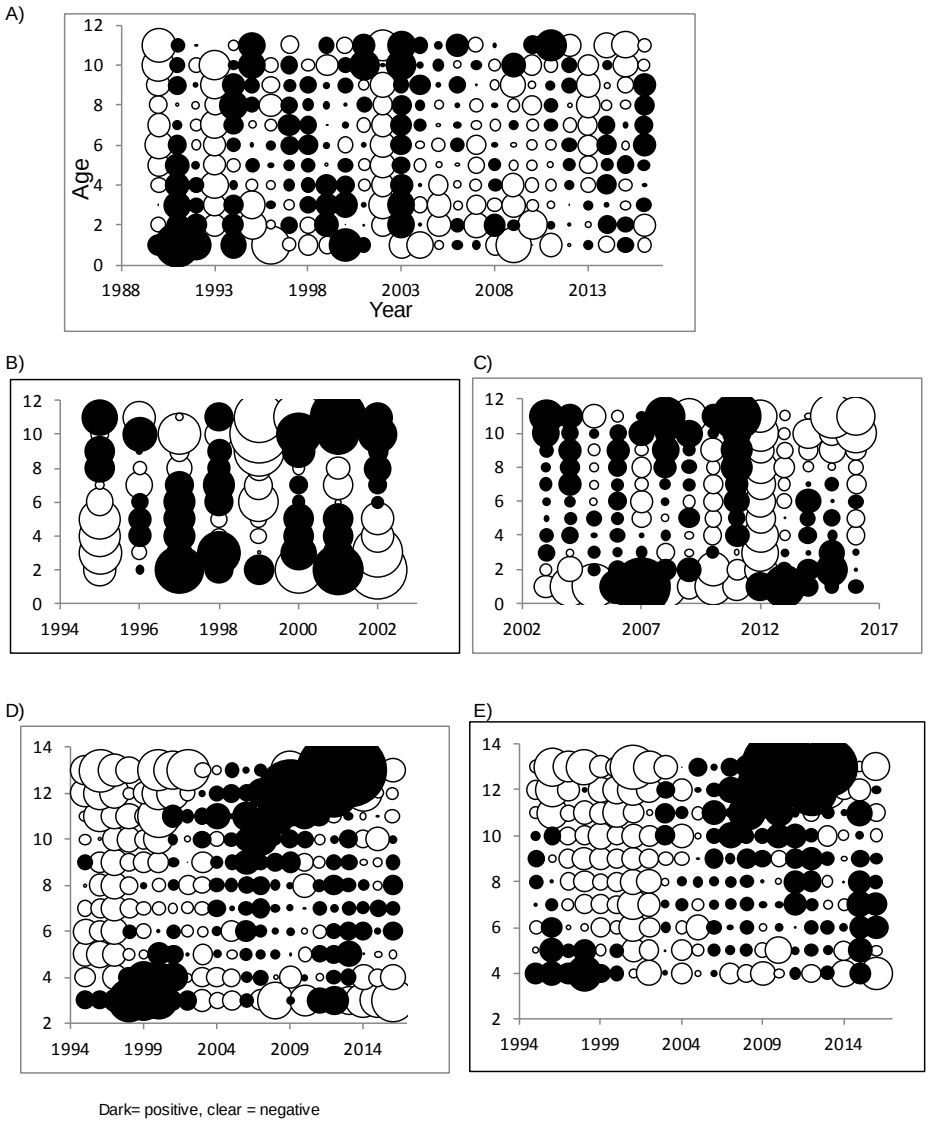



*Figure 19. Distribution of residuals from the ADAPT model. A = DFO Survey, B = Mobile gear sentinel survey > 20 f., C = Mobile gear sentinel survey > 10 f., D = Longline sentinel survey, E) Gillnet sentinel survey.*

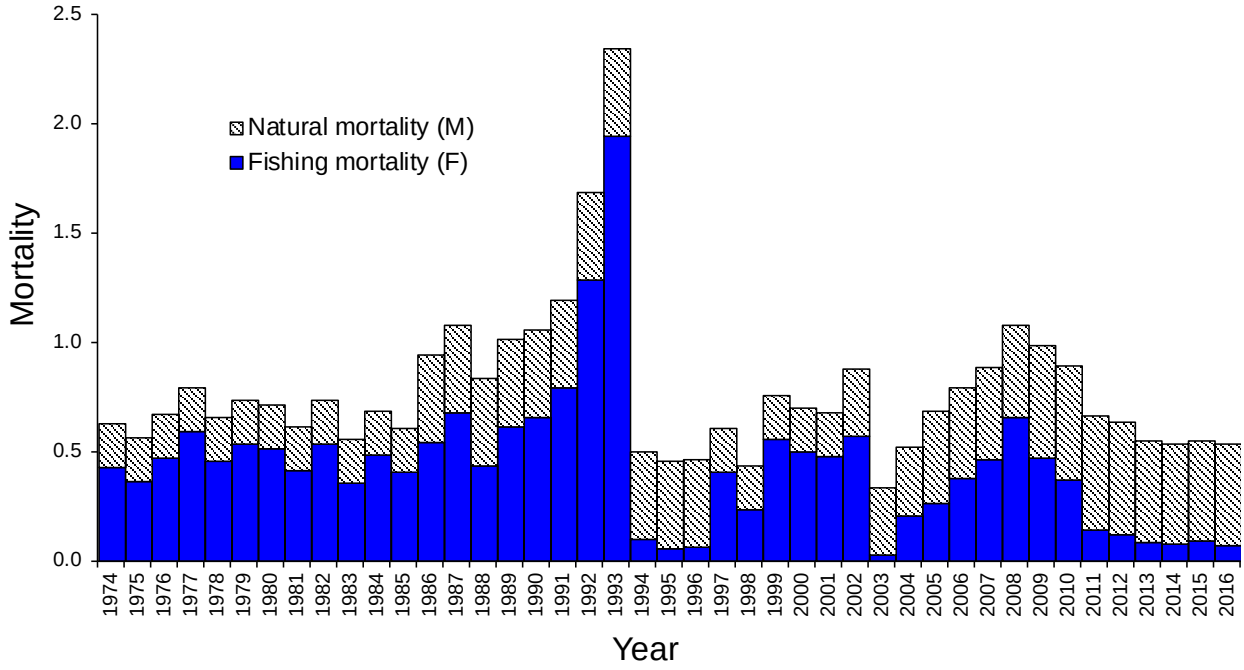
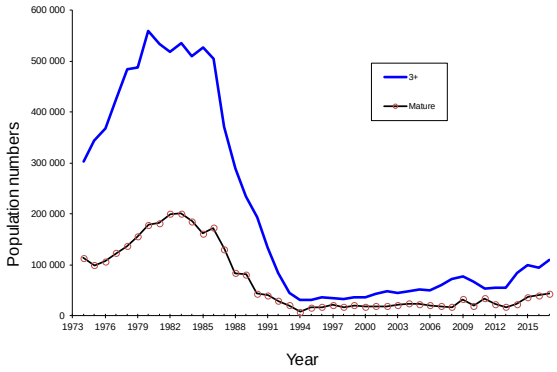
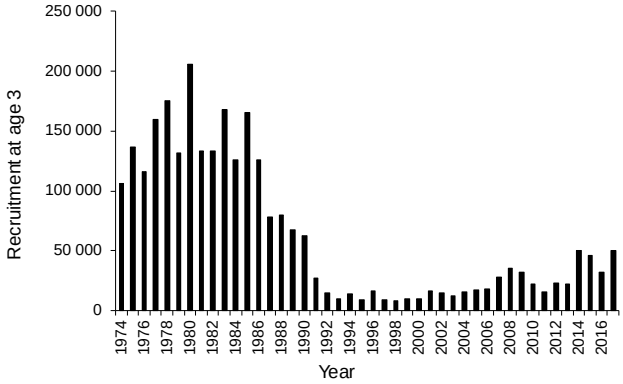



*Figure 20. Natural mortality set values from 1974 to 2001. Estimated values from 2002 to 2014 (three four-year blocks) and Fishing mortality estimate by VPA.*

A)




B)




C)

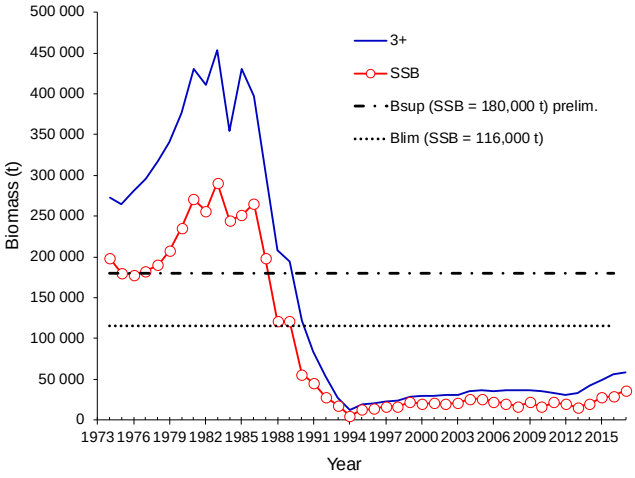



*Figure 21. Main assessment findings A = Population, B = Recruitment, C = Biomass.*

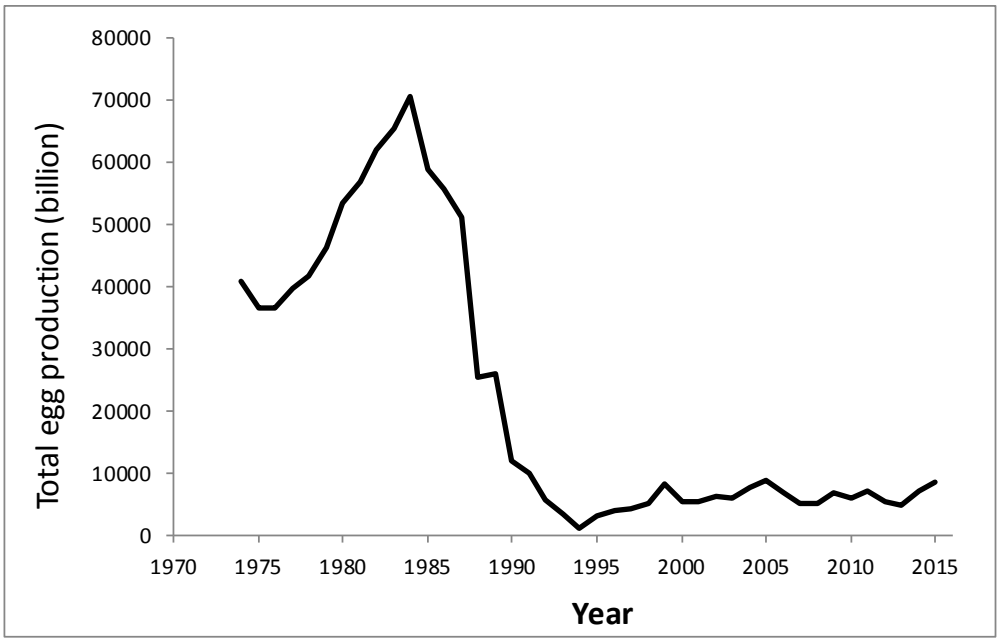



*Figure 22. Estimated egg production per year.*

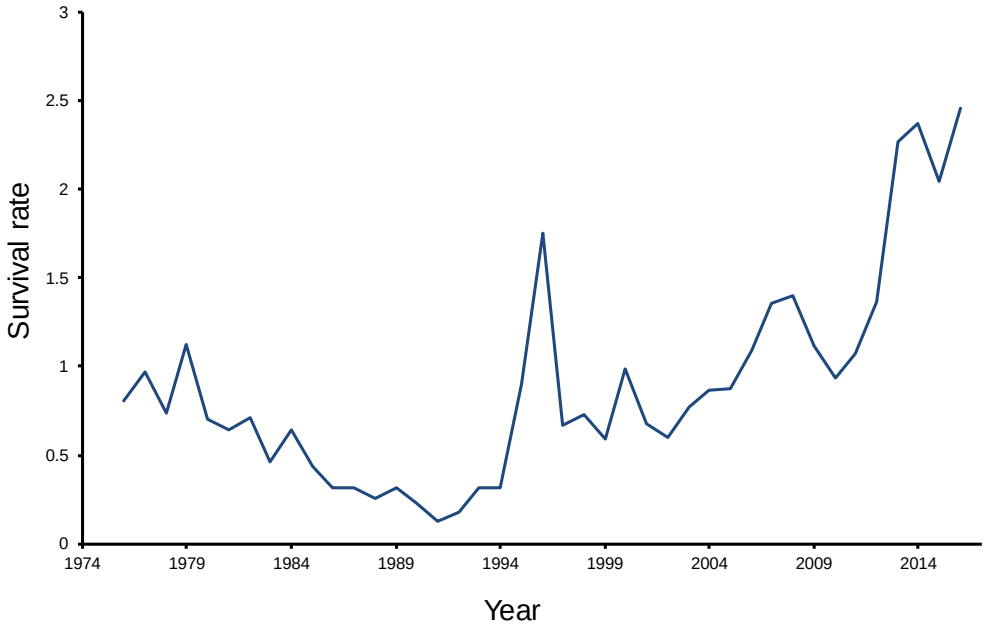



*Figure 23. Estimated survival rate by the number of recruits at 3 years divided by mature biomass in the year of birth of these recruits.*

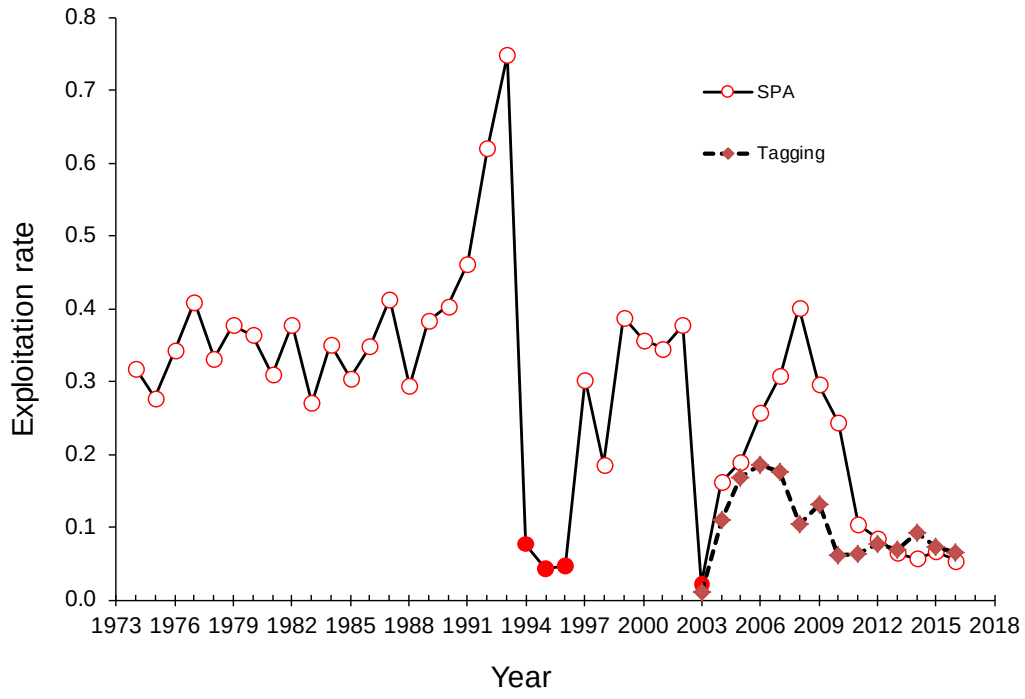



*Figure 24. Exploitation rates estimated from tagging data and sequential population analysis (SPA).*

# 9. APPENDICES

## Appendix 1. Questionnaire from the industry telephone survey on Cod fishery.

Questions for Industry Telephone Survey of Fixed Gear Cod Fishers (3Pn, 4R) - 2016.

**Questions on Biology**

1. What zone did you primarily fish in this year 2014(3Pn, 4Ra, b, c, d)?

2. How would you compare the size (overall length) of fish this year (2016) with last year (2015)?

(1 - much smaller, 2 - smaller, 3 - same, 4 - larger, 5 - much larger)

3. How would you compare the condition (fatness, health) of fish captured in late summer / fall season this year (2016) with last year (2015)?

(1 - much lower, 2 - lower, 3 - same, 4 - higher, 5 - much higher)

**Questions on Catch Rates**

4. Using a scale of 1-10 (poor to excellent), how would you rate your catch rates during July-September (4R), and October-November (3Pn) this year (2016)?

5. Using a scale of 1-10 (poor to excellent), how would you rate your catch rates during July-September (4R), and October-November (3Pn) last year (2015)?

*Use the following as a general number index!

In other words, for the amount of gear you fished, would you describe the fishing as;

Poor (1-3), average (4-6), good (7-8), excellent (9-10).

**Additional Questions on Cod Tagging**

6. Did you recapture a cod(s) with tag(s) in 2016?

(1- Yes or 2 – No)

7. Did you report (i.e. send into FFAW or DFO) yet?

(1- Yes or 2 – No)

If No to question 7, please inform them that we receive the tags and request that they send in ASAP – try to ensure that they record our address. (FFAW – P.O. Box 548, Corner Brook, NL, A2H 6E6). If possible, provide recovery date, location of recapture, depth of water, length, weight, gear used.

**Questions on Atlantic Halibut Fishing / Tagging**

8. Did you fish Atlantic Halibut in 2014? (1- Yes or 2 – No)

9. Did you recapture Atlantic Halibut(s) with tag(s) in 2016?

(1- Yes or 2 – No)

10. Did you report Atlantic Halibut Tag(s) (i.e. send into FFAW or DFO) in 2016?

(1- Yes or 2 – No)

If No to question 10, please inform them that we receive the tags and request that they send in ASAP – try to ensure that they record our address. (FFAW – P.O. Box 548, Corner Brook, NL, A2H 6E6). If possible, provide recovery date, location of recapture, depth of water, length, weight, gear used.

## Appendix 2. List of Collaborators for 2012-2014 Sentinel Fisheries.

Fisheries and Oceans Canada

Philippe Schwab, Brigitte Desrosiers, Johanne Gauthier, Sylvain Hurtubise, Jean-François Lussier, Denis Bernier, Claude Brassard, Sylvie St-Pierre, Marie-Hélène Soucy,Marie-Claude Marquis

F.F.A.W (TNL):

David Decker,Jason Spingle, Myra Swyers, Gerald MacDonald, Monty Way, Loomis Way, Brent Hedderson, Trevor Chaulk, Wade Saunders

Association de Pêcheurs de la Basse-Côte-Nord (QC):

Paul Nadeau, Frank Collier, Monica Green

Association des Capitaines Propriétaires de la Gaspésie (QC)

Jean-Pierre Couillard

Fishers (Capitain, crew ; locality)

Québec mobil gear

Jean-Pierre Élement, Rémy Élément, Martin Élément; Sept-Îles

Clément Samuel, Normand Samuel, Michel Campion; Rivière-au-Renard

Marcel Roy, Pierre Fortin,Yan Cotton Réal Vallée Jocelyn Bond; Rivière-au-Renard / Cloridorme

Québec fixed gear

Keith Anderson, Rodney Jones; Harrington Harbour

Marty Etheridge,Garry Etheridge; Bradore Bay

Ian Anderson, Daren Anderson ; Chevery

Dennis Keats, Donald Keats; St. Paul's River

Norman Keats, Edward Keats; St. Paul's River

Jean-Yves Mercier, André Mercier; Port-Cartier

Michel Mercier, Irené Marcoux, Francis Marcoux;Tête-à-la-Baleine

Victor Monger, Jerry Mansbridge, Marius Marcoux; Tête-à-la-Baleine

Newfoundland mobil gear

Martin Caines, Jamie Rumbolt; Port Aux Choix

Stacy Caines, Martin J Caines, Leslie Dredge, Rodney Dredge, Chesley Dredge, Logan Dredge, Chad Genge; Black Duck Cove

Leonard Warren, Enos Gaulton, Curtis Dredge, Jamie Warren; Cook's harbour

Murray Lavers, Philip Ryan Port, Barry Ryan, Thomas Lavers, Gerald Ryan; Saunders

Dan Genge Jr., Kevin Genge, Hank Poole, Clayton Genge, Gregory Genge; Flower's Cove

Newfoundland fixed gear

Peter Francis, Selena Francis; Lapoile

Wilfred Munden, Harry Munden; Rose Blanche

Albert Munden, Kevin Hardy, Milton Keeping; Burnt Islands

Melvin Bateman,Jeff Francis; Port aux Basques

Carl Bennett, Judy Mauger; Codroy

Bernard Barter, Kevin Duffney; Lourdes

John C. Hardy, Kelly Francis; Burnt Islands

Terry Decker, No Crewmember; Rocky Harbour

Alvin House, Shawn Perry, Bruce Pieroway; Daniels Harbour

Joseph Brake, Shawn White, Lori Ann Brake; Trout River

Colby Cullihall, Dwight Macey, Randy Woodward, Roger Woodward,,Paul Woodward, Enos Woodward; Green Island Cove

Clayton Taylor, John Taylor; St. Anthony

Cecil Ryland, Douglas Ryland; L'Anse au Loup

Randy Gould, No Crew Member; Port au Choix

Harry Vautier, Dolores Vautier; Lapoile

Biorex

France Henry, Gabrielle Chapados

## Appendix 3. Fixed gear sentinel survey program, number of activities by zone, site, gear, and month in 2016.

| Zone | Site | Gillnet | | | | | | Longline | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Month | | | | | | Month | | | | | | | | | | | | |
| | | 6 | 7 | 8 | 9 | 10 | Total | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total | |
| 1 | 1 | - | - | - | - | - | - | - | - | 2 | 1 | 3 | - | - | - | - | 2 | - | 8 | 8 |
| | 2 | - | - | - | - | - | - | - | - | - | - | - | 2 | 5 | 5 | - | - | 3 | 15 | 15 |
| | 4 | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 4 | 2 | 2 | 14 | 14 |
| | 5 | - | - | - | - | - | - | 2 | 1 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 22 | 22 |
| | 6 | - | - | - | - | - | - | 1 | 2 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 1 | 19 | 19 |
| | 7 | - | - | - | - | - | - | - | - | - | - | 2 | - | 3 | 4 | 3 | 4 | 4 | 20 | 20 |
| 2 | 8 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | 2 | 4 | 8 | 2 | 19 | 19 |
| | 11 | - | - | - | - | - | - | - | - | - | - | - | 5 | 7 | 1 | 4 | - | - | 17 | 17 |
| 3 | 14 | - | 2 | 8 | 4 | 6 | 20 | - | - | - | - | - | - | - | - | - | - | - | - | 20 |
| | 15 | 2 | 6 | 4 | 3 | 6 | 21 | - | - | - | - | - | - | - | - | - | - | - | - | 21 |
| | 17 | - | - | - | - | - | - | - | - | - | - | 3 | 10 | 1 | 3 | - | - | - | 17 | 17 |
| | 21 | - | 8 | 6 | 4 | - | 18 | - | - | - | - | - | - | - | - | - | - | - | - | 18 |
| 4 | 23 | - | 10 | 7 | 1 | 4 | 22 | - | - | - | - | - | - | - | - | - | - | - | - | 22 |
| | 24 | 2 | 2 | 4 | - | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | 8 |
| | 28 | - | 4 | 2 | - | - | 6 | - | - | - | - | - | - | 6 | 6 | - | - | - | 12 | 18 |
| 5 | 34 | 4 | 17 | 3 | - | - | 24 | - | - | - | - | - | - | 13 | 2 | - | - | - | 15 | 39 |
| | 36 | 4 | 18 | 16 | 1 | - | 39 | - | - | - | - | - | - | - | - | - | - | - | - | 39 |
| | 37 | 6 | 16 | 15 | 2 | - | 39 | - | - | - | - | - | - | - | - | - | - | - | - | 39 |
| 6 | 42 | 8 | 13 | 17 | - | - | 38 | - | - | - | - | - | - | - | - | - | - | - | - | 38 |
| | 44 | 8 | 16 | 15 | - | - | 39 | - | - | - | - | - | - | - | - | - | - | - | - | 39 |
| | 46 | 8 | 15 | 15 | - | - | 38 | - | - | - | - | - | - | - | - | - | - | - | - | 38 |
| | 46.5 | 7 | 13 | 18 | - | - | 38 | - | - | - | - | - | - | - | - | - | - | - | - | 38 |
| | 48 | 1 | 16 | 19 | 3 | - | 39 | - | - | - | - | - | - | - | - | - | - | - | - | 39 |
| Total | | 50 | 156 | 149 | 18 | 16 | 389 | 3 | 3 | 6 | 4 | 12 | 24 | 44 | 29 | 19 | 21 | 13 | 178 | 567 |

## Appendix 4. Standardized catch per unit effort (CPUE) for the gillnet sentinel survey program from 1995 to 2016.

Frequency tables of the categories affecting catch rates
The FREQ Procedure

| Year | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1995 | 792 | 5.61 | 792 | 5.61 |
| 1996 | 916 | 6.48 | 1708 | 12.09 |
| 1997 | 934 | 6.61 | 2642 | 18.7 |
| 1998 | 1087 | 7.69 | 3729 | 26.39 |
| 1999 | 1237 | 8.76 | 4966 | 35.15 |
| 2000 | 1169 | 8.27 | 6135 | 43.42 |
| 2001 | 1040 | 7.36 | 7175 | 50.78 |
| 2002 | 956 | 6.77 | 8131 | 57.55 |
| 2003 | 454 | 3.21 | 8585 | 60.76 |
| 2004 | 455 | 3.22 | 9040 | 63.98 |
| 2005 | 524 | 3.71 | 9564 | 67.69 |
| 2006 | 489 | 3.46 | 10053 | 71.15 |
| 2007 | 431 | 3.05 | 10484 | 74.2 |
| 2008 | 423 | 2.99 | 10907 | 77.2 |
| 2009 | 413 | 2.92 | 11320 | 80.12 |
| 2010 | 422 | 2.99 | 11742 | 83.11 |
| 2011 | 411 | 2.91 | 12153 | 86.01 |
| 2012 | 417 | 2.95 | 12570 | 88.97 |
| 2013 | 403 | 2.85 | 12973 | 91.82 |
| 2014 | 376 | 2.66 | 13349 | 94.48 |
| 2015 | 394 | 2.79 | 13743 | 97.27 |
| 2016 | 386 | 2.73 | 14129 | 100 |

| Month | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 6 | 1459 | 10.33 | 1459 | 10.33 |
| 7 | 4785 | 33.87 | 6244 | 44.19 |
| 8 | 5264 | 37.26 | 11508 | 81.45 |
| 9 | 2103 | 14.88 | 13611 | 96.33 |
| 10 | 518 | 3.67 | 14129 | 100 |

| Zone | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 2 | 760 | 5.38 | 760 | 5.38 |
| 3 | 3102 | 21.95 | 3862 | 27.33 |
| 4 | 2040 | 14.44 | 5902 | 41.77 |
| 5 | 3533 | 25.01 | 9435 | 66.78 |
| 6 | 4694 | 33.22 | 14129 | 100 |

| hrs_cod2 | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1 | 1311 | 9.29 | 1311 | 9.29 |
| 2 | 11293 | 80.02 | 12604 | 89.31 |
| 3 | 428 | 3.03 | 13032 | 92.34 |
| 4 | 1081 | 7.66 | 14113 | 100 |

Frequency missing=16

Regression of the log catch rates with the categories

The GLM Procedure

Class Level Information

| Class | Level | Values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | 22 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| | | 2006 | 2007 | 208 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| MONTH | 5 | 6 | 7 | 8 | 9 | 10 | | | | | | |
| zonen | 5 | 2 | 3 | 4 | 5 | 6 | | | | | | |
| hrs_cod2 | 4 | 1 | 2 | 3 | 4 | | | | | | | |

Number of observations read 14152

Number of observations used 14113

Regression of the log catch rates with the categories

GLM Procedure

Dependent Variable: logcpue Log of catch rate

| Source | DL | Sum of square | Mean square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 32 | 6633.7793 | 207.3056 | 158.41 | <.0001 |
| Error | 14080 | 18426.4839 | 1.3087 | | |
| Total corrected | 14112 | 25060.2632 | | | |

| R-square | Coeff Var | Root MSE | logcpue Mean |
|---|---|---|---|
| 0.264713 | 48.9553 | 1.1440 | 2.3368 |

| Source | DL | Type III SS | Mean square | F Value | Pr > F |
|---|---|---|---|---|---|
| Month | 4 | 1380.3806 | 345.0952 | 263.6900 | <.0001 |
| zonen | 4 | 2016.5396 | 504.1349 | 385.2200 | <.0001 |
| hrs_cod2 | 3 | 44.2166 | 14.7389 | 11.2600 | <.0001 |
| Year | 21 | 3122.4333 | 148.6873 | 113.6100 | <.0001 |

| Parameter | | Estimate | | Standard error | t Value | Pr > \|t\| |
|---|---|---|---|---|---|---|
| Intercept | | 2.7287 | B | 0.0854 | 31.95 | <.0001 |
| Month | 6 | 0.2382 | B | 0.0611 | 3.9 | <.0001 |
| Month | 7 | 0.8818 | B | 0.0555 | 15.87 | <.0001 |
| Month | 8 | 0.3093 | B | 0.0546 | 5.67 | <.0001 |
| Month | 9 | 0.0540 | B | 0.0574 | 0.94 | 0.3465 |
| Month | 10 | 0.0000 | B | - | - | - |
| zonen | 2 | 0.6940 | B | 0.0464 | 14.97 | <.0001 |
| zonen | 3 | 0.8066 | B | 0.0278 | 29.03 | <.0001 |
| zonen | 4 | -0.2563 | B | 0.0311 | -8.23 | <.0001 |
| zonen | 5 | 0.4972 | B | 0.0257 | 19.37 | <.0001 |
| zonen | 6 | 0.0000 | B | - | - | - |
| hrs_cod2 | 1 | -0.1727 | B | 0.0493 | -3.5 | 0.0005 |
| hrs_cod2 | 2 | -0.2123 | B | 0.0372 | -5.71 | <.0001 |
| hrs_cod2 | 3 | -0.2350 | B | 0.0658 | -3.57 | 0.0004 |
| hrs_cod2 | 4 | 0.0000 | B | - | - | - |
| Year | 1995 | -1.3798 | B | 0.0722 | -19.12 | <.0001 |
| Year | 1996 | -0.9614 | B | 0.0700 | -13.74 | <.0001 |
| Year | 1997 | -1.4021 | B | 0.0696 | -20.13 | <.0001 |
| Year | 1998 | -1.1537 | B | 0.0683 | -16.88 | <.0001 |
| Year | 1999 | -1.2492 | B | 0.0672 | -18.6 | <.0001 |
| Year | 2000 | -1.1375 | B | 0.0675 | -16.84 | <.0001 |
| Year | 2001 | -1.6863 | B | 0.0686 | -24.57 | <.0001 |
| Year | 2002 | -1.4191 | B | 0.0694 | -20.43 | <.0001 |
| Year | 2003 | -0.5315 | B | 0.0797 | -6.67 | <.0001 |
| Year | 2004 | -0.4764 | B | 0.0794 | -6 | <.0001 |
| Year | 2005 | -0.5464 | B | 0.0770 | -7.1 | <.0001 |
| Year | 2006 | -0.2323 | B | 0.0781 | -2.98 | 0.0029 |
| Year | 2007 | -0.4960 | B | 0.0804 | -6.17 | <.0001 |
| Year | 2008 | -0.5995 | B | 0.0807 | -7.43 | <.0001 |
| Year | 2009 | -1.0240 | B | 0.0812 | -12.61 | <.0001 |
| Year | 2010 | -1.0589 | B | 0.0807 | -13.12 | <.0001 |
| Year | 2011 | -0.3095 | B | 0.0812 | -3.81 | 0.0001 |
| Year | 2012 | -0.2372 | B | 0.0809 | -2.93 | 0.0034 |
| Year | 2013 | -0.6188 | B | 0.0816 | -7.58 | <.0001 |
| Year | 2014 | -0.6860 | B | 0.0829 | -8.27 | <.0001 |
| Year | 2015 | 0.1688 | B | 0.0821 | 2.06 | 0.0397 |

NOTE: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The standard category is defined by:

Month = 8

Zonen = 3

Hrs_cod2 = 2

| Year | Predicted catch rate | Standard error |
|---|---|---|
| 1995 | 18.276 | 0.876 |
| 1996 | 27.773 | 1.274 |
| 1997 | 17.876 | 0.801 |
| 1998 | 22.920 | 0.973 |
| 1999 | 20.832 | 0.838 |
| 2000 | 23.296 | 0.955 |
| 2001 | 13.455 | 0.581 |
| 2002 | 17.576 | 0.778 |
| 2003 | 42.661 | 2.529 |
| 2004 | 45.079 | 2.661 |
| 2005 | 42.042 | 2.327 |
| 2006 | 57.548 | 3.260 |
| 2007 | 44.203 | 2.637 |
| 2008 | 39.854 | 2.409 |
| 2009 | 26.069 | 1.583 |
| 2010 | 25.174 | 1.527 |
| 2011 | 53.261 | 3.265 |
| 2012 | 57.254 | 3.510 |
| 2013 | 39.089 | 2.441 |
| 2014 | 36.544 | 2.342 |
| 2015 | 85.915 | 5.397 |
| 2016 | 72.570 | 4.607 |

## Appendix 5. Standardized catch per unit effort (CPUE) for the longline sentinel fisheries program from 1995 to 2016.

Frequency tables of the categories affecting catch rates

The Freq Procedure

| YEAR | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1995 | 812 | 9.7 | 812 | 9.7 |
| 1996 | 749 | 8.95 | 1561 | 18.64 |
| 1997 | 586 | 7 | 2147 | 25.64 |
| 1998 | 470 | 5.61 | 2617 | 31.26 |
| 1999 | 441 | 5.27 | 3058 | 36.52 |
| 2000 | 495 | 5.91 | 3553 | 42.43 |
| 2001 | 587 | 7.01 | 4140 | 49.44 |
| 2002 | 596 | 7.12 | 4736 | 56.56 |
| 2003 | 394 | 4.71 | 5130 | 61.27 |
| 2004 | 379 | 4.53 | 5509 | 65.79 |
| 2005 | 271 | 3.24 | 5780 | 69.03 |
| 2006 | 320 | 3.82 | 6100 | 72.85 |
| 2007 | 312 | 3.73 | 6412 | 76.58 |
| 2008 | 313 | 3.74 | 6725 | 80.32 |
| 2009 | 277 | 3.31 | 7002 | 83.63 |
| 2010 | 258 | 3.08 | 7260 | 86.71 |
| 2011 | 248 | 2.96 | 7508 | 89.67 |
| 2012 | 198 | 2.36 | 7706 | 92.03 |
| 2013 | 169 | 2.02 | 7875 | 94.05 |
| 2014 | 169 | 2.02 | 8044 | 96.07 |
| 2015 | 157 | 1.88 | 8201 | 97.95 |
| 2016 | 172 | 2.05 | 8373 | 100 |

| Month | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1 | 228 | 2.72 | 228 | 2.72 |
| 2 | 154 | 1.84 | 382 | 4.56 |
| 4 | 192 | 2.29 | 574 | 6.86 |
| 5 | 381 | 4.55 | 955 | 11.41 |
| 6 | 620 | 7.4 | 1575 | 18.81 |
| 7 | 1125 | 13.44 | 2700 | 32.25 |
| 8 | 1726 | 20.61 | 4426 | 52.86 |
| 9 | 1614 | 19.28 | 6040 | 72.14 |
| 10 | 1068 | 12.76 | 7108 | 84.89 |
| 11 | 801 | 9.57 | 7909 | 94.46 |
| 12 | 464 | 5.54 | 8373 | 100 |

| Gear | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 51 | 4318 | 51.57 | 4318 | 51.57 |
| 52 | 4055 | 48.43 | 8373 | 100 |

| Zonen | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1 | 4044 | 48.3 | 4044 | 48.3 |
| 2 | 1596 | 19.06 | 5640 | 67.36 |
| 3 | 1002 | 11.97 | 6642 | 79.33 |
| 4 | 936 | 11.18 | 7578 | 90.51 |
| 5 | 795 | 9.49 | 8373 | 100 |

Frequency tables of the categories affecting catch rates

The Freq Procedure

| hrs_cod2 | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 1 | 1754 | 20.97 | 1754 | 20.97 |
| 2 | 4228 | 50.56 | 5982 | 71.53 |
| 3 | 1257 | 15.03 | 7239 | 86.56 |
| 4 | 1124 | 13.44 | 8363 | 100 |

Frequency Missing=10

Regression of the log catch rates with categories

The GLM Procedure

Class Level Information

| Class | Level | Values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 22 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| | | 2006 | 2007 | 208 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Month | 11 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| zonen | 5 | 1 | 2 | 3 | 4 | 5 | | | | | | |
| hrs_cod2 | 4 | 1 | 2 | 3 | 4 | | | | | | | |

Number of observations Read 8396

Number of observations used 8363

Regression of the log catch rates with categories

The GLM Procedure

Dependent Variable: logcpue Log of catch rate

| Source | DL | Sum of square | Mean square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 39 | 9886.02592 | 253.48784 | 192.71 | <.0001 |
| Error | 8323 | 10948.17098 | 1.31541 | | |
| Corrected | 8362 | 20834.19689 | | | |

| R-square | Coeff Var | Root MSE | logcpue Mean |
|---|---|---|---|
| 0.47451 | 24.59636 | 1.146914 | 4.662941 |

| Source | DL | Type III SS | Mean square | F Value | Pr > F |
|---|---|---|---|---|---|
| Gear | 1 | 6.21991 | 6.21991 | 4.73 | 0.0297 |
| Month | 10 | 2623.492859 | 262.34929 | 199.44 | <.0001 |
| zonen | 4 | 3036.734122 | 759.18353 | 577.15 | <.0001 |
| hrs_cod2 | 3 | 96.942937 | 32.314312 | 24.57 | <.0001 |
| Year | 21 | 1047.088622 | 49.861363 | 37.91 | <.0001 |

| Parameter | | Estimate | | Standard error | t Value | Pr > \|t\| |
|---|---|---|---|---|---|---|
| Intercept | | 4.6228 | B | 0.1238 | 37.33 | <.0001 |
| Gear | 51 | -0.0992 | B | 0.0456 | -2.17 | 0.0297 |
| Gear | 52 | 0.0000 | B | - | - | - |
| Month | 1 | -1.8835 | B | 0.0935 | -20.14 | <.0001 |
| Month | 2 | -2.6557 | B | 0.1077 | -24.66 | <.0001 |
| Month | 4 | -1.0925 | B | 0.0995 | -10.97 | <.0001 |
| Month | 5 | 0.1389 | B | 0.0799 | 1.74 | 0.082 |
| Month | 6 | -0.0085 | B | 0.0720 | -0.12 | 0.906 |
| Month | 7 | -0.1816 | B | 0.0660 | -2.75 | 0.0059 |
| Month | 8 | 0.2044 | B | 0.0644 | 3.17 | 0.0015 |
| Month | 9 | 0.0901 | B | 0.0648 | 1.39 | 0.1642 |
| Month | 10 | 0.2123 | B | 0.0654 | 3.25 | 0.0012 |
| Month | 11 | 0.7449 | B | 0.0672 | 11.08 | <.0001 |
| Month | 12 | 0.0000 | B | - | - | - |
| zonen | 1 | 1.0454 | B | 0.0531 | 19.68 | <.0001 |
| zonen | 2 | 0.8131 | B | 0.0569 | 14.28 | <.0001 |
| zonen | 3 | 0.1941 | B | 0.0639 | 3.04 | 0.0024 |
| zonen | 4 | -1.2916 | B | 0.0568 | -22.73 | <.0001 |
| zonen | 5 | 0.0000 | B | - | - | - |
| hrs_cod2 | 1 | 0.3845 | B | 0.0493 | 7.81 | <.0001 |
| hrs_cod2 | 2 | 0.1510 | B | 0.0440 | 3.43 | 0.0006 |
| hrs_cod2 | 3 | 0.2155 | B | 0.0487 | 4.43 | <.0001 |
| hrs_cod2 | 4 | 0.0000 | B | - | - | - |
| Year | 1995 | -1.4104 | B | 0.1051 | -13.42 | <.0001 |
| Year | 1996 | -1.2218 | B | 0.1057 | -11.56 | <.0001 |
| Year | 1997 | -1.3565 | B | 0.1084 | -12.52 | <.0001 |
| Year | 1998 | -0.7673 | B | 0.1101 | -6.97 | <.0001 |
| Year | 1999 | -0.5562 | B | 0.1101 | -5.05 | <.0001 |
| Year | 2000 | -0.4278 | B | 0.1047 | -4.09 | <.0001 |
| Year | 2001 | -0.2751 | B | 0.1017 | -2.71 | 0.0068 |
| Year | 2002 | -0.6089 | B | 0.1011 | -6.02 | <.0001 |
| Year | 2003 | -0.5268 | B | 0.1055 | -4.99 | <.0001 |
| Year | 2004 | 0.0000 | B | 0.1061 | 0 | 0.9998 |
| Year | 2005 | -0.1114 | B | 0.1123 | -0.99 | 0.3214 |
| Year | 2006 | 0.0569 | B | 0.1089 | 0.52 | 0.6009 |
| Year | 2007 | -0.1472 | B | 0.1094 | -1.35 | 0.1783 |
| Year | 2008 | -0.5449 | B | 0.1093 | -4.98 | <.0001 |
| Year | 2009 | -0.7008 | B | 0.1117 | -6.27 | <.0001 |
| Year | 2010 | -0.8684 | B | 0.1131 | -7.68 | <.0001 |
| Year | 2011 | -0.5826 | B | 0.1140 | -5.11 | <.0001 |
| Year | 2012 | -0.3298 | B | 0.1197 | -2.75 | 0.0059 |
| Year | 2013 | -0.2167 | B | 0.1244 | -1.74 | 0.0815 |
| Year | 2014 | -0.4980 | B | 0.1244 | -4 | <.0001 |
| Year | 2015 | -0.4007 | B | 0.1267 | -3.16 | 0.0016 |
| Year | 2016 | 0.0000 | B | - | - | - |

NOTE: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The standard category is defined by:

Gear=52

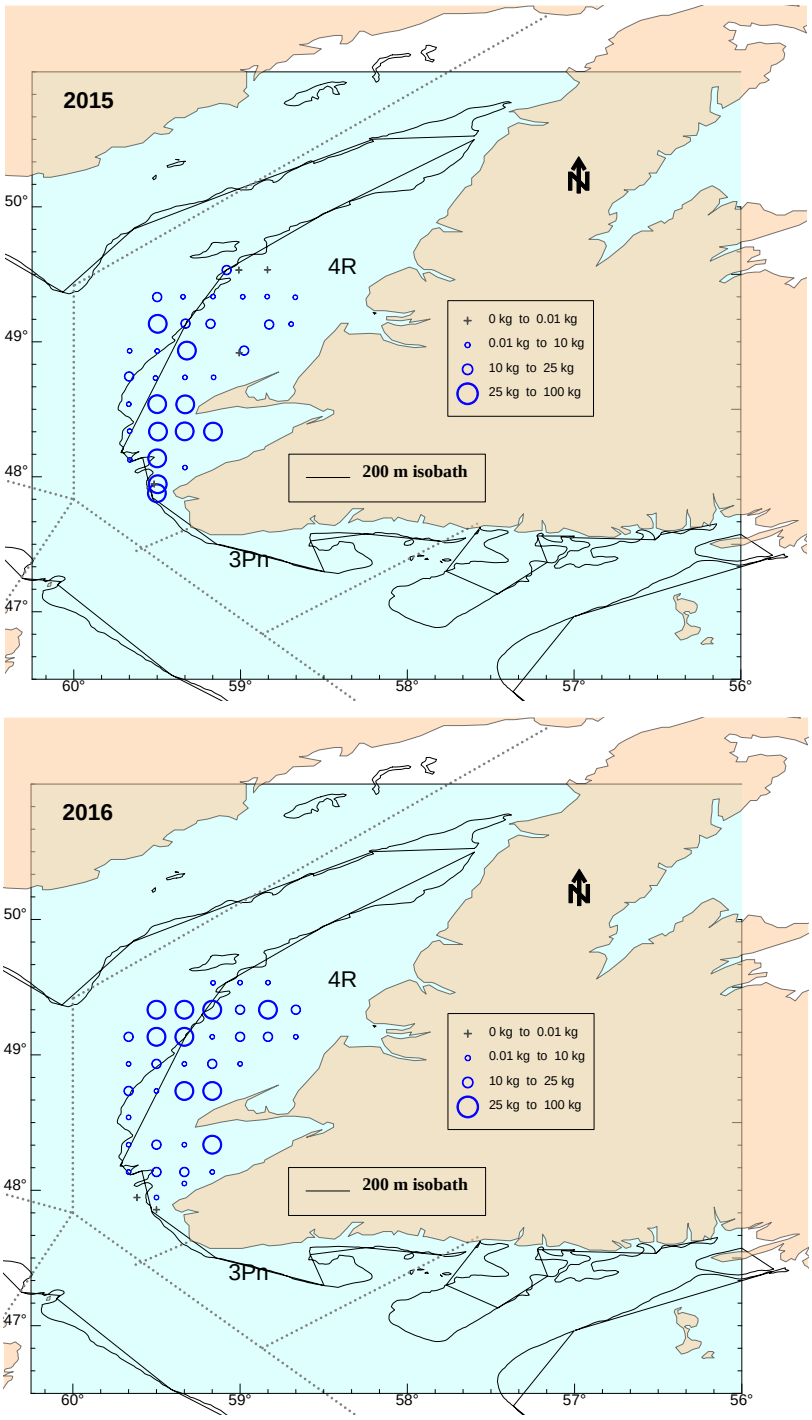
month = 9

zonen = 4

hrs_cod2 = 2

| Year | Predicted catch rate | Standard error |
|---|---|---|
| 1995 | 0.382 | 0.030 |
| 1996 | 0.462 | 0.038 |
| 1997 | 0.403 | 0.035 |
| 1998 | 0.727 | 0.064 |
| 1999 | 0.898 | 0.080 |
| 2000 | 1.021 | 0.081 |
| 2001 | 1.190 | 0.090 |
| 2002 | 0.853 | 0.063 |
| 2003 | 0.925 | 0.072 |
| 2004 | 1.567 | 0.123 |
| 2005 | 1.401 | 0.123 |
| 2006 | 1.658 | 0.138 |
| 2007 | 1.352 | 0.113 |
| 2008 | 0.908 | 0.075 |
| 2009 | 0.777 | 0.066 |
| 2010 | 0.657 | 0.058 |
| 2011 | 0.874 | 0.078 |
| 2012 | 1.125 | 0.108 |
| 2013 | 1.259 | 0.129 |
| 2014 | 0.950 | 0.097 |
| 2015 | 1.047 | 0.109 |
| 2016 | 1.564 | 0.157 |

## Appendix 6. Distribution of catch rates (kg/tow) and bottom temperatures during the May 2015 and 2016 reproductive potential survey.



## Appendix 7. Parameters of the Sequential Population Analysis (PSA) performed using the model ADAPT/NFT (VPA/ADAPT, version 3.4.5, NOAA Fisheries Toolbox, 2014).

1. Catch at age (landing): $C_{i,t}$ { (i=1,13);(t=1974,2016)}
   The model assumes that the landed values contain no errors.

2. Abundance index:
   $(\text{DFO survey})_{i,t}$ { (i=1,13);(t=1990,2016)}
   $(\text{Mobile sentinel, more than 20 fathoms})_{i,t}$ { (i=1,13);(t=1995,2002)}
   $(\text{Mobile sentinel, more than 10 fathoms})_{i,t}$ { (i=1,13);(t=2003,2016)}
   $(\text{Fixed sentinel – longline})_{i,t}$ { (i=3,13);(t=1995,2016)}
   $(\text{Fixed sentinel – Gillnet})_{i,t}$ { (i=4,13);(t=1995,2016)}

3. Weight at age (commercial catches): $CW_{i,t}$ { (i=1,13);(t=1974,2016)}

4. Weight at age (as of January 1, Rivard methodology) : $SW_{i,t}$ { (i=1,13);(t=1974,2016)}

5. Maturity at age : $Mat_{i,t}$ { (i=1,13);(t=1974,2016)}

6. Natural mortality:
   $M_{i,t}$ { (i=1,13);(t=1974,1985)} =0.2
   $M_{i,t}$ { (i=1,13);(t=1986,1996)} =0.4
   $M_{i,t}$ { (i=1,13);(t=1997,2016)} =0.2
   Note: The M values were subsequently estimated in four-year blocks (ages 3 to 12) by means of a sensitivity analysis (VPA/ADAPT/NFT).

7. Starting population estimate:
   Age 2=160000; Age 3=140000; Age 4=120000, Age 5=120000; Age 6=100000; Age 7=90000; Age 8=3000; Age 9=2000; Age10=1000; Age 11=300; Age 12=200;

8. Estimate of abundance at age for 2015:
   Geometric mean of abundance estimates from 2011 to 2014.

9. Partial recruitment for 2016 :
   Age 2=.0006; Age 3=.0006; Age 4=.0126, Age5=.0493; Age 6=.2260; Age 7=3427; Age 8=.5485; Age 9=.7989; Age10=.81680; Age 11=1; Age 12=.956; Age 13=.9018.

10. Fishing mortality (Full-F) for the final year: Conventional method

11. Fishing mortality (F) for the final year and last age group: Heincke's method

12. Fishing mortality (F) for the last age group: Heincke's method applied to ages 11 and 12.

## Appendix 8. Northern Gulf of St. Lawrence Cod Recovery Strategy (Gadus morhua) NAFO Divisions 3Pn, 4RS May 2013 – May 2018, harvest control rules in the event of an increase or decrease in spawning stock biomass (SSB).

| SSB (t) | Harvest control rules (TAC (t) or F) | Corresponding mesure TAC (t) or F or other mesure |
|---|---|---|
| < 12 000 | - | Moratorium |
| 12 000 à < 15 000 | F[1] = 0,075 | Stewardship / by-catch |
| 15 000 à < 18 000 | F = 0,075 | Variable (1200 < 1500 t) |
| 18 000 < 25 000 | TAC = 1 500 t | 1 500 t |
| 25 000 < 30 000 | 1 800 t | ~F[1] = 0,067 |
| 30 000 < 40 000 | 3 185 t | ~F[1] = 0,101 |

1. For fish aged 7 to 9, the F value is based on 2012 stock assessment data.

## Appendix 9. Input parameters for the projection (2018-2019) based on 1500 t/year landings (AGEPRO-NFT).

| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weight at age [1] | 0.02 | 0.072 | 0.201 | 0.407 | 0.702 | 1.009 | 1.32 | 1.612 | 1.869 | 2.191 | 2.555 | 2.903 | 3.69 |
| Weight at age (Fishery)[2] | 0.02 | 0.07 | 0.52 | 0.88 | 1.38 | 1.92 | 2.44 | 2.78 | 2.87 | 3.52 | 3.6 | 4.42 | 5.97 |
| Maturity [3] | 0 | 0.02 | 0.1 | 0.31 | 0.68 | 0.88 | 0.97 | 0.97 | 0.98 | 0.98 | 1 | 1 | 1 |
| Partail recrutment[4] | 0.001 | 0.001 | 0.0097 | 0.0522 | 0.2614 | 0.482 | 0.8232 | 1 | 0.8042 | 0.7733 | 0.5091 | 0.6984 | 0.91143 |
| **Natural Motality[5]** | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 |

1 = Estimated values as of January 1, 2017 (Rivard method) based on DFO research survey.

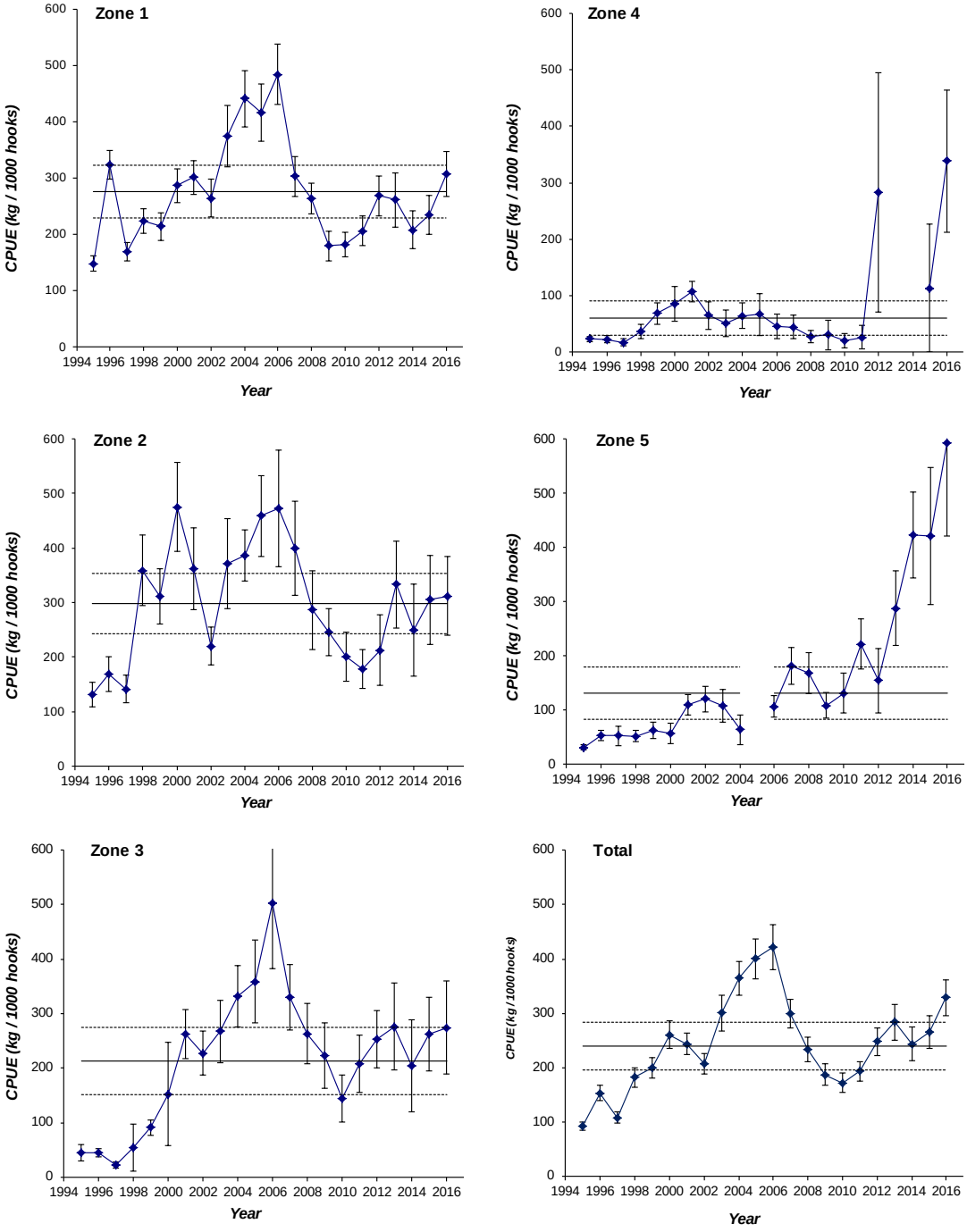
2 = Average commercial fishery from 2016 to 2016.

3 = 2014 to 2016 average.

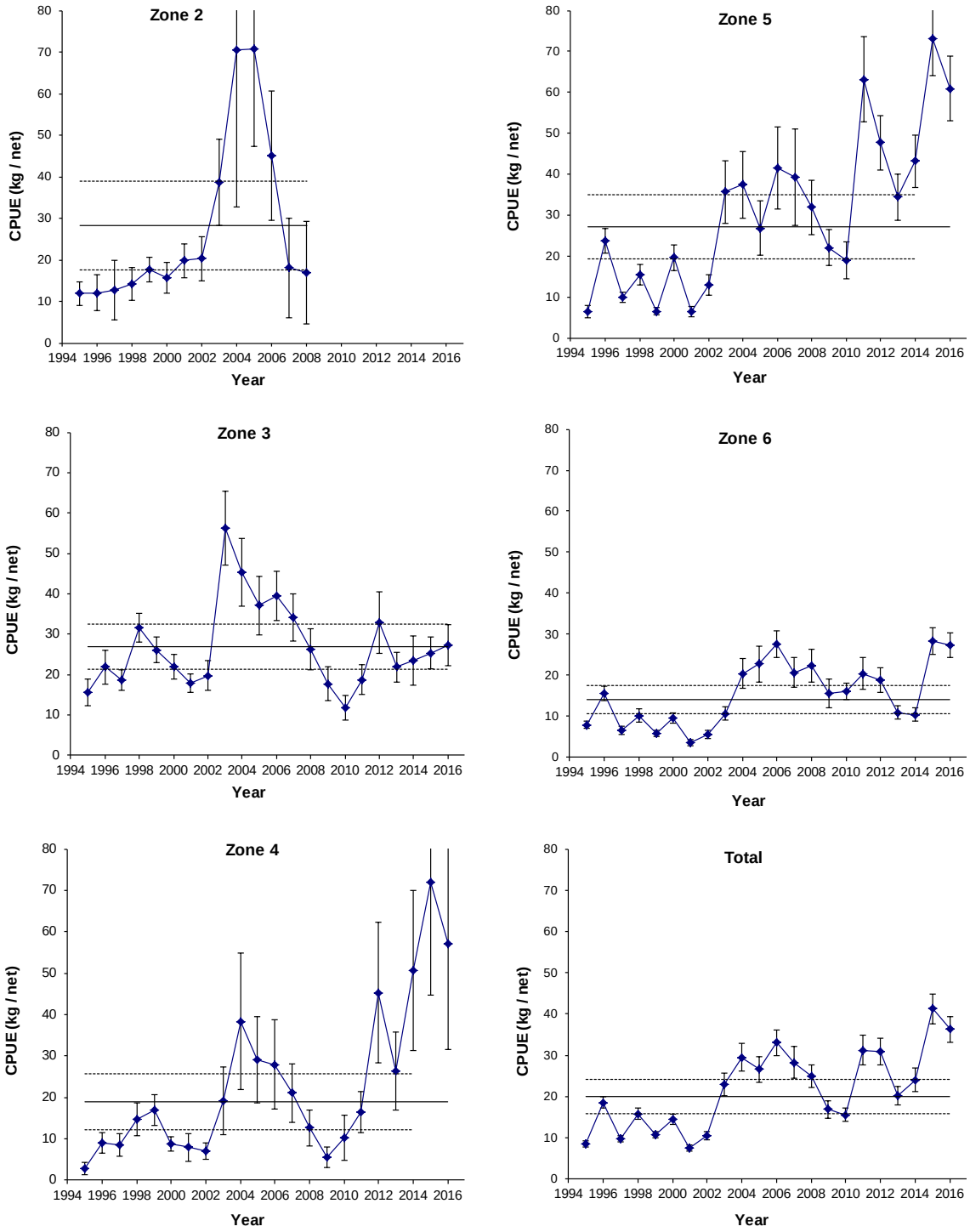
4 = Average fishing mortality from 2014 to 2016 (weighted by population).

5 = Values calculated using NFT-ADAPT (2013 to 2016 block).

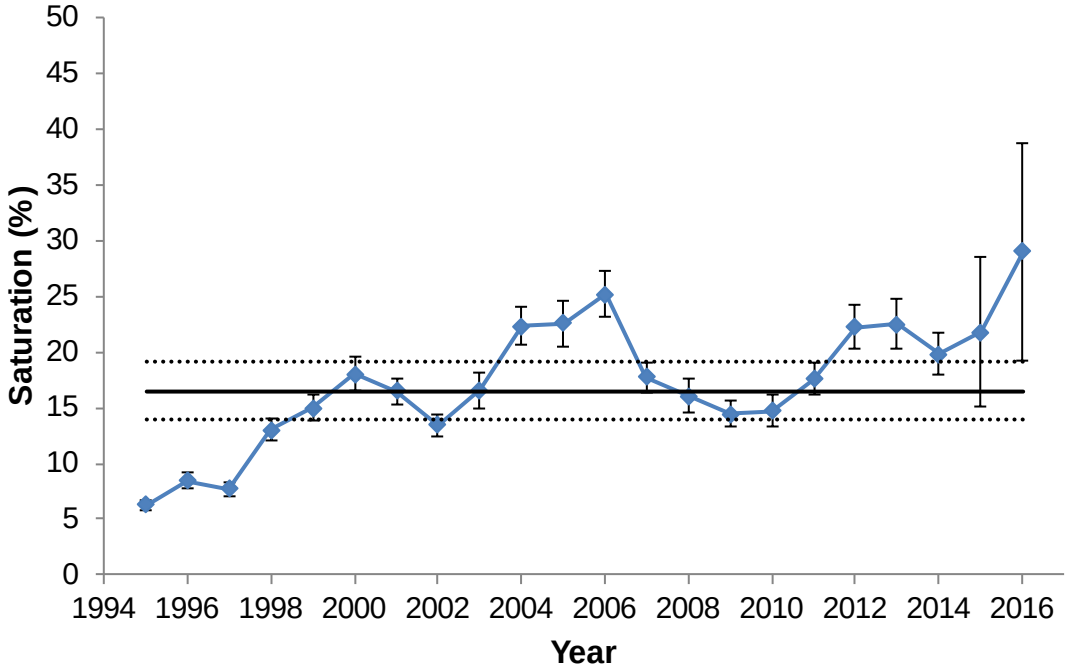
**Appendix 10a. Fixed gear sentinel survey program, longline operations from 1995 to 2016. Total catch over total effort (kg / 1000 hooks) per sentinel fishing area. Annual value with a 95% confidence interval. The solid line represents the 1995-2015 average. The dotted lines represent ± ½ standard deviation around the average.**



**Appendix 10b. Cod 3Pn, 4RS fixed gear sentinel survey program, gillnet operations from 1995 to 2014. Total catch over total effort (kg / net) per sentinel fishing area. Annual value with a 95% confidence interval. The solid line represents the 1995-2015 average. The dotted lines represent ± ½ standard deviation around the average.**



**Appendix 11. Average annual longline saturation during sentinel survey program operations.**



## Appendix 12a. Number of tagged cod (NTC) and number of tag returns.

| | | Number of tag returns | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | NTC | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total | % |
| 1995 | 1137 | 15 | 15 | 3 | 6 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 44 | 3.9 |
| 1996 | 10638 | 20 | 96 | 61 | 56 | 24 | 19 | 31 | 6 | 4 | 1 | 0 | 34 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 356 | 3.3 |
| 1997 | 5600 | | 33 | 36 | 39 | 22 | 15 | 19 | 1 | 6 | 3 | 1 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 186 | 3.3 |
| 1998 | 5240 | | | 22 | 63 | 41 | 40 | 25 | 0 | 6 | 1 | 0 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 206 | 3.9 |
| 1999 | 6423 | | | | 93 | 102 | 64 | 49 | 2 | 9 | 9 | 2 | 11 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 347 | 5.4 |
| 2000 | 7206 | | | | | 99 | 147 | 116 | 7 | 22 | 11 | 10 | 14 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 430 | 6.0 |
| 2001 | 6929 | | | | | | 131 | 211 | 16 | 27 | 27 | 18 | 13 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 453 | 6.5 |
| 2002 | 5433 | | | | | | | 210 | 25 | 65 | 28 | 28 | 18 | 8 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 386 | 7.1 |
| 2003 | 2444 | | | | | | | | 6 | 94 | 74 | 39 | 19 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 237 | 9.7 |
| 2004 | 1661 | | | | | | | | | 120 | 78 | 55 | 19 | 5 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 284 | 17.1 |
| 2005 | 3850 | | | | | | | | | | 353 | 225 | 84 | 30 | 7 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 703 | 18.3 |
| 2006 | 3137 | | | | | | | | | | | 317 | 166 | 45 | 13 | 5 | 2 | 0 | 0 | 0 | 0 | 1 | 549 | 17.5 |
| 2007 | 4320 | | | | | | | | | | | | 423 | 149 | 50 | 7 | 7 | 0 | 0 | 0 | 2 | 0 | 638 | 14.8 |
| 2008 | 2021 | | | | | | | | | | | | | 109 | 87 | 26 | 13 | 1 | 1 | 0 | 2 | 0 | 239 | 11.8 |
| 2009 | 1464 | | | | | | | | | | | | | | 115 | 17 | 6 | 3 | 0 | 1 | 1 | 0 | 143 | 9.8 |
| 2010 | 1482 | | | | | | | | | | | | | | | 36 | 20 | 6 | 2 | 0 | 0 | 0 | 64 | 4.3 |
| 2011 | 2112 | | | | | | | | | | | | | | | | 87 | 53 | 16 | 1 | 2 | 0 | 159 | 7.5 |
| 2012 | 2363 | | | | | | | | | | | | | | | | | 80 | 40 | 18 | 4 | 2 | 144 | 6.1 |
| 2013 | 1300 | | | | | | | | | | | | | | | | | | 36 | 48 | 17 | 4 | 105 | 8.1 |
| 2014 | 2080 | | | | | | | | | | | | | | | | | | | 46 | 56 | 30 | 132 | 6.3 |
| 2015 | 1969 | | | | | | | | | | | | | | | | | | | | 18 | 17 | 35 | 1.8 |
| 2016 | 2069 | | | | | | | | | | | | | | | | | | | | | 50 | 50 | 2.4 |
| Total | 80878 | 35 | 144 | 122 | 257 | 289 | 417 | 661 | 63 | 353 | 585 | 696 | 814 | 364 | 284 | 97 | 141 | 143 | 96 | 117 | 108 | 104 | 5890 | |

## Appendix 12b. Number of tag returns by NAFO Division.

| Year | Tag return numbers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2J | 3K | 3L | 4T | 4Vn | 3Ps | 3Pn | 4R | 4S | NA | Total |
| 1996 | - | - | - | - | - | 4 | 20 | 30 | - | - | 54 |
| 1997 | - | - | - | - | - | 37 | 114 | 86 | 13 | - | 250 |
| 1998 | - | - | 1 | - | 1 | 49 | 109 | 99 | 18 | - | 277 |
| 1999 | 1 | 2 | 5 | 1 | - | 80 | 98 | 200 | 23 | - | 410 |
| 2000 | - | 2 | 1 | 2 | - | 55 | 106 | 243 | 34 | - | 443 |
| 2001 | - | 1 | - | - | - | 46 | 210 | 290 | 32 | 2 | 581 |
| 2002 | - | - | - | - | - | 36 | 371 | 278 | 38 | 11 | 734 |
| 2003 | - | - | - | - | - | 30 | 33 | 26 | 4 | 11 | 104 |
| 2004 | - | - | 3 | 1 | - | 70 | 231 | 115 | 17 | 5 | 442 |
| 2005 | - | - | - | 2 | - | 76 | 372 | 217 | 8 | 29 | 704 |
| 2006 | - | - | 3 | - | - | 57 | 355 | 344 | 7 | 25 | 791 |
| 2007 | - | - | - | - | - | 28 | 227 | 598 | 8 | 14 | 875 |
| 2008 | - | - | - | - | 2 | 20 | 126 | 231 | 12 | 6 | 397 |
| 2009 | - | - | - | - | - | 12 | 138 | 147 | 4 | 11 | 312 |
| 2010 | - | - | 1 | - | - | 9 | 51 | 46 | - | 5 | 112 |
| 2011 | - | - | - | - | - | 13 | 120 | 20 | 2 | 1 | 156 |
| 2012 | - | - | - | - | - | 11 | 133 | 10 | - | 2 | 156 |
| 2013 | - | - | - | - | - | 6 | 81 | 16 | - | 3 | 106 |
| 2014 | - | - | - | - | - | 8 | 105 | 13 | - | 4 | 130 |
| 2015 | - | 1 | 2 | - | - | 2 | 94 | 14 | - | 1 | 114 |
| 2016 | - | - | 1 | - | - | 2 | 96 | 7 | 1 | - | 107 |
| Total | 1 | 6 | 17 | 6 | 3 | 651 | 3190 | 3030 | 221 | 130 | 7255 |
| % | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 9.0 | 44.0 | 41.8 | 3.0 | 1.8 | |