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Divisions 3LNO Yellowtail Flounder (*Limanda ferruginea*) in the 2015-2017 Canadian Stratified Bottom Trawl Surveys

by

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Abstract

Abundance and biomass indices of Grand Bank yellowtail flounder in NAFO Divisions 3LNO were derived from annual multi-species, random-stratified bottom trawl surveys conducted by Canada during the spring of 1984-2017 and during the autumn from 1990 to 2017. The spring surveys of 2006 and 2015, and the autumn 2014 survey were incomplete due to survey vessel problems. The majority of the stock is found in depths less than 93 m and in Div. 3NO. Stock size and geographical range of yellowtail flounder declined from the mid-1980s to the mid-1990s, but since 1995 surveys show that the stock size increased dramatically and expanded its northward range in 3L to re-occupy habitats on the northern Grand Bank. Recent declines in the spring survey indices to 2016, coupled with declines in maturity at length, mean weight at length, and estimated SSB are of concern. Nonetheless, autumn survey estimates of abundance and biomass have remained stable at a high level in recent surveys, and there are higher than average numbers of small fish (<22cm) in the 2016 and 2017 surveys, indicating that recruitment has been higher than average.

Introduction

Annual multi-species, stratified-random bottom trawl surveys have been conducted by the Newfoundland region of the Canadian Department of Fisheries and Oceans on the Grand Bank, in NAFO Divs. 3LNO, during the spring (April-June) of each year since 1971. Since 1990, a second series of surveys has been carried out on the Grand Bank during the fall period, from October to December. However, since 1971 there have been two changes in survey gears and only one set of conversion factors has been developed for the 1984-1995 time series. This paper updates the stratum by stratum set information for the current Campelen time series (starting in the autumn of 1995), and the time series index plots give the converted Engel information (in Campelen equivalents) back to 1984 in the spring, and 1990 in the autumn. Stratum tables for surveys prior to the Campelen surveys are available in past documents (Maddock Parsons and Rideout, 2015, Maddock Parsons, 2013)

From both the spring and fall surveys, swept area abundance and biomass estimates are derived for yellowtail flounder (*Limanda ferruginea*) and serve as fishery-independent, relative indices of stock size.

Materials and Methods

Survey design

The stratification scheme is based on depth and shown in Fig. 1 (see Doubleday, 1981, for a review of procedures). The timing of the spring surveys, the frequency of fishing sets in the inshore strata (beginning in 1997) and the range of depths surveyed are shown in Table 1.

The 1984-1995 spring and the 1990-1994 fall surveys covered depths from 45 to 731m. Beginning in the fall of 1995 with the use of the new Campelen survey trawl, the coverage of the fall surveys extended to 1 500m. Fall surveys of Divisions 3NO have had poor coverage in deep water strata in several years (see Brodie and Stansbury, 2007; Healey and Brodie, 2009), but this is thought to have had negligible effect on the abundance and biomass estimates of yellowtail flounder in most years, because the stock is found almost exclusively in depths less than 93m. Nevertheless, the exclusion of these deepwater sets does slightly overestimate the overall mean catch per tow by NAFO division in affected years. In the 2006 spring survey, there were also fewer sets in some strata in 3N, and stratum 373 was not surveyed. In recent years, this stratum contributed significant biomass to the total index and missing this stratum, coupled with reduced coverage in other important strata, the 2006 estimates of abundance and biomass may not be comparable to estimates in other years. In addition, in years 1995, 2002-2005, some northern portions of the surveys have been surveyed in January of the following calendar year due to mechanical problems with the survey vessels. These delays are not expected to have affected yellowtail flounder estimates because of its shallow water distribution in the southern section of the survey area. Rideout and Ings (2018) describe coverage problems in the recent Canadian surveys. The 2014 fall survey and the 2015 spring survey did not cover the entire stock area of Divs. 3LNO and are not considered representative of the stock.

Survey gears and vessels

From 1971 to 1982 the surveys of the Grand Bank were conducted by the 54 m side trawler, the FRV A. T. Cameron (ATC) using a two bridle Yankee 41.5 otter trawl rigged with rubber disk footgear. In 1983, this trawl was replaced by the three bridle Engel 145 Hi-Lift otter trawl rigged with large steel bobbin footgear and, at the same time, the A.T. Cameron was replaced by the 50 m stern trawler, the CCGS Wilfred Templeman (WT). Occasionally the W. Templeman's sister ship, the CCGS Alfred Needler (AN) took part in the surveys. In 1995, the old standard Engel trawl was replaced by a three bridle Campelen 1800 shrimp trawl rigged with 35 cm diameter rockhopper footgear. The Yankee and the Engel trawls were both towed at 3.5 kts, while the Campelen is towed at 3.0 kts (McCallum and Walsh, 1996). The Campelen trawl surveys of the Grand Bank began in the fall of 1995 aboard the CCGS Wilfred Templeman. The Campelen trawl also replaced the Yankee 41 shrimp trawl used in the annual fall juvenile groundfish surveys from 1985-94 (McCallum and Walsh, 1996). Beginning in the fall of 1996, the 63 m stern trawler, CCGS Teleost, began fishing mostly the deepwater survey sets of the annual fall surveys beyond 731 m in Div. 3LNO; however, shallower sets have also been fished when necessary (Table 2). In addition, the CCGS Alfred Needler has taken part in the fall surveys in some years. The Campelen trawl onboard the 2 other survey vessels is identical in construction and rigging as the one on the Wilfred Templeman. Since 1993, the geometry and performance of all bottom trawl surveys have been monitored by Scanmar trawl mounted acoustic instrumentation (Walsh and McCallum, 1995; McCallum and Walsh, 2001).

Time series

Conversion factors have been derived from comparative fishing trials to convert the 1984-95 spring and 1990-94 fall Engel trawl survey data into Campelen trawl units and were presented in Walsh *et al.* (1998a, 1998b). Survey data from 1971-82 have not been converted to Campelen trawl units and the unconverted time series can be found in the 1997 assessment paper (see Walsh *et al*., 1997). Conversion factors to Campelen trawl units for yellowtail flounder have also been derived for the 1985-94 late summer-early fall juvenile groundfish series and the abundance and biomass data are found in a 2005 NAFO SCR paper (see Walsh, 2005). For the purpose of updating the Canadian survey time series available to the assessment, only the Campelen time series is included here in the stratum tables (Tables 3 to 10), although the converted Engel data (Campelen equivalents) is included on the plots of biomass and abundance estimated from the survey information (Figures 2 to 5).

Fishing and catch protocols

The Campelen trawl sets are 15 minute tows using a towing speed of 3.0 knots and covers an average tow distance of 0.75 nautical miles. The catches are standardized to distance towed. The average wingspread used in estimating swept area abundance indices is 16.84 m and the average swept area is estimated to be 24 950 m^2. After each set, all species in the catch are separated, counted and weighed. From each haul, the total catch or a sub-sample is taken to collect biological data on size, age, maturity and feeding for all commercial species.

Results

Canadian Spring Surveys 1984-2017

Abundance and biomass trends:

Tables 3 to 5 give the survey catch rates by stratum for each NAFO division in the form of stratified mean number and weight-per-tow, abundance and biomass indices (with confidence limits for the Divs 3LNO combined). The large majority of the biomass is found in shallow strata (< 93m), and for brevity, only data for strata shallower than 184m are shown. Totals in each table are calculated using all sampled strata in each division. Biomass > 183m was negligible in all years surveyed. Table 11 gives combined estimates for Div. 3LNO from 1984-2017. Figures 2 and 3 show plots of the abundance and biomass estimates, as well as mean number and weight per tow, of spring surveys from 1984-2017. The 1999 survey estimate was thought to be a 'year effect' (Walsh *et al*., 2000; STACFIS, 2000). Table 3 identifies large fishing sets that may contribute to variation seen around some of the estimates of stock size in a given year. In 2006, problems with the survey vessel resulted in reduced coverage. Although priority was given to surveying important yellowtail flounder habitat, several key strata (eg 373 and 338) that had significant catch in previous surveys, were not sampled. Estimates from this survey should not be compared with other surveys in the time series which covered the majority of the yellowtail flounder stock area. The 2015 spring survey did not cover the entire stock area due to vessel mechanical problems, and results are also not considered representative.

In Div. 3L, there was a continuous decline in abundance and biomass from 1985 to "0.0 t" in 1995 (Table 11; Fig. 2). From 1996 to 1998, the stock showed a marginal increase to stabilize at an average biomass level of 500 t and then increased (by 5550%) to a level of 28 kt in 1999. From 2000-2002 the abundance and biomass declined once more and by 2002 the biomass index was 600 t (1.6 million fish). From 2002 the abundance and biomass indices were variable but increased dramatically to 2006 at 251.5 million fish and 85.7 kt biomass, before declining again to 2009 (13kt; 47 million fish). From 2010-2012 estimates increased steadily to 89 Kt and 238 million fish, and were the highest biomass (and second highest abundance) estimate in the series. When the estimates are high most of the yellowtail flounder are generally found in stratum 363 and stratum 372. Indices again show a substantial decline from 2012 to 2016, and in 2017 there is a slight increase in both biomass and abundance indices. Some of these changes in the indices may be related to shifts in distribution between Divisions 3L and 3NO.

Most of the 3LNO yellowtail flounder stock is found in NAFO division 3N. Here, the majority of the stock was distributed in and around the Southeast Shoal area (strata 375, 376, 360 and 361 in Fig. 1), although in surveys since the moratorium (after 1997), the abundance and biomass increased in strata north of the Shoal, in particular strata 362 and 373 (Tables 3-6 and 11) and in several recent years, large sets were taken in the 93-183m depth range (strata 359 and 377). The biomass index declined gradually from 168 kt (435 million fish) in 1984 to 46 kt (135 million fish) by 1994, a decline of 73% (Fig. 2). For the same period, the high abundance estimate of 478 million fish in 1989, was mainly due to the strong 1985 and 1986 year-classes which was not reflected in the biomass estimate for that survey. After a slight increase from 1994 to 1995, the survey biomass in 1996 jumped by 80% to 104 kt (475 million fish) followed by a continued increase to a high of 238 500 t (965 million fish) in 1999. Estimates remained high, and although variable, generally increased to 2012, when the abundance estimate was the highest in the series (1.19 trillion fish) and biomass estimate (315 kt) was the second highest. The 2006 survey results may not be comparable to other years since several strata were not surveyed that have had large yellowtail catch in the past (eg. strata 373). Estimates declined in this division since 2012, and are no longer in the range of the highest observed indices (as seen in 2012 and 2006 for example). Large catches in several strata in some years have contributed to the high variability seen around some estimates in the time series.

In Div. 3O, the abundance and biomass estimates were somewhat stable but declined slightly from 1987 to 1994, excepting 1993, which has a higher value, but wide confidence limits (Tables 5, 6 and 11; Fig. 2). The biomass index showed moderate fluctuations around an average value of 26 kt (59 million fish) for the period 1984-95. In 1996, the survey biomass dramatically increased by 492 % from 12 kt (29 million fish) in 1995 to 71 kt (162 million fish). From 1996, estimates of biomass and abundance were variable but showed a general increase to 2011, with the exception of 2009, in which survey catches were low in 2 important strata (351 and 352). In Div. 3O most of the biomass is generally found in these two strata (Table 6; Fig.1) which border Div. 3N. In 2005, for example, 83% of the biomass estimate is due to catch in strata 351 and 352. Whether some of the annual fluctuations are related to movement between Div. 3N and 3O is unknown. The estimates of biomass and abundance declined from 2011 to 2016, then increased slightly, similar to the trend in 3N.

In the combined trends for the spring surveys of Div. 3LNO, the majority of the survey abundance and biomass was found in Div. 3N so total stock trends mimic that of Div. 3N (Tables 5, 6 and 11; Fig. 2). Total stock biomass estimates increased rapidly in the late 1990s from the lowest levels in the mid-1990s. Between 1999 and 2012, abundance and biomass estimates were variable but showed a general increasing trend. Estimates of biomass and abundance then declined substantially to 2016, but increased slightly in 2017. Large catches probably contributed to the high variability around the estimates in several years, although the 1999 estimates are considered a year effect (Walsh *et al*., 2000; STACFIS, 2000).

Canadian Fall Surveys, 1990-2017

Several recent surveys have had problems resulting in reduced coverage, particularly in deep water strata and also reduced sampling of some strata (see Table 2 and Healey and Brodie, 2009). Abundance and biomass indices of yellowtail flounder are generally unaffected by the reduced coverage, given that the majority of the stock is found in strata that have been sampled consistently, but mean number and mean weight per tow indices will be overestimated in years of poor survey coverage in deep water strata. In 2014, however, Divisions 3N and 3O were not surveyed due to problems with the research vessel (Rideout and Ings, 2018), and estimates for this year are not representative of the whole stock area.

Abundance and biomass trends:

Tables 7-10 show stratified mean number and weight per tow, and abundance and biomass indices by stratum and division for the fall surveys, 1990-2017. Again, for brevity, only data for strata less than 184m are tabled. Totals and approximate 95% confidence limits for the entire stock area are shown in each table. Figures 4 and 5 show plots of the abundance and biomass estimates, mean numbers and weights per tow by division, and for 3LNO combined, from 1990-2017. Overall estimates by division and for 3LNO combined are also summarized in Table 12. 2014 estimates are not considered representative, and are not shown in the plots.

In Div. 3L, abundance and biomass were very low and variable without trend from 1990-1995, reaching an estimate close to zero in 1994 (Figs. 4 and 5). Noteworthy is that a "0.0" t biomass was also estimated for the 1995 spring series. From 1990 to 95 the abundance varied around an average level of 2 million fish and then tripled to 6 million fish in 1996 and 1997. The biomass varied around an average level of 1 kt from 1990-1997 before increasing to about 26 kt in 2001 (Table 12). Abundance continued to increase from 1997 (6M) to 75 million fish in 2001. Estimates of biomass and abundance have generally increased (with wide confidence limits) since 2001 (Fig 4; Table 12) and variability may be linked to changes in distribution between 3L and 3NO. The increases in biomass in Div. 3L are thought to be the result of an extension of the range of yellowtail flounder with increasing stock size. There are obvious within year differences in the amount of yellowtail flounder caught in this Division and this is reflected in the high variability around the estimates for 1999-2001 and 2003-2017. The 2017 estimates of abundance and biomass remain high in the autumn survey, in contrast to the decline seen in the spring survey.

From 1990-92, the Div. 3N stock size fluctuated around an average value of 47 kt before doubling in size in 1993 to 94 kt (Table 12). The stock increased steadily to 369 kt in 2001 (Table 12; Fig. 4). Values have varied around 250 kt since, with the estimates in 2007 highest in the series at 378 kt. Similarly, the survey abundance from 1990-94 fluctuated around an average size of 222 million fish before showing a strong increasing in 1995 to 509 million fish and reaching 1.3 billion fish in 2001, representing an overall increase of 160% (Table 10; Fig 5). From 2001-2017, both the abundance and biomass estimates have varied around a level of 1.0 billion fish and 270 kt biomass, respectively (Fig. 5).

In Div. 3O, both the abundance and biomass index showed no obvious trend from 1990-96, with abundance fluctuating around an average value of 55 million fish and biomass fluctuating around an average level of 20 kt (Tables 7-10, and 12; Fig. 3). From 1996, biomass and abundance increased steadily and in 2001 were 81 kt and 262 million fish. Estimates were variable at about 200 million fish and 63 kt until 2012, when estimates increased to the highest observed level in the series (113 kt; 342 million fish). Although confidence limits were wide for these estimates, the increases were seen in several strata. The 2013 estimates were lower, but still in the range of the 2009-2011 levels. Division 3O was not surveyed in 2014, and from 2015 to 2017 there has been a slight increase in biomass and abundance. Similar to the spring surveys, most of the biomass in this division was found in strata 351 and 352 which border Div. 3N.

In the fall surveys of Div. 3LNO, similar to the spring surveys, the majority of the stock was found in Div. 3N. The abundance and biomass in this division has shown a general upward trend since the start of the surveys until 2001, and then have remained relatively stable (Table 12 and Fig. 4). The estimate of biomass in the Southeast Shoal's strata, 375 and 376, contribute significantly to the overall biomass: 25% on average in the last 3 years, and the large catches in these strata contribute to the high variability around these two survey estimates. Since 2001, indices have been variable but stable about 350kt and (1.2 billion fish). The recent declines in biomass and abundance estimated from spring surveys in Divs. 3LNO have not been observed in the fall series. 2015 to 2017 estimates have remained relatively high.

Distribution

Yellowtail flounder are concentrated mainly in Div. 3N, particularly in strata on the Southeast Shoal (375 & 376) and those immediately to the west (strata 360 & 361; bordering Div. 3O) and to a lesser extent the border of Div. 3LN. These strata straddle the Canadian 200 mile (360 km) limit and extend into the Regulatory Area (Fig. 1). Figures 6 and 7 show the weights (kg) from the catches of individual fishing sets from the spring and fall Campelen surveys for 2014-2017. The distribution of the stock contracted to preferred habitat at low stock size (Simpson and Walsh, 2004) and the expansion of range as stock size increases (Brodie *et al*, 1998; Walsh *et al*, 2001; Walsh *et al*., 2006) has been maintained in recent surveys.

Figure 8 shows the proportion of biomass north of 45° N from 1973 to 2017. The range of the stock has extended northward since 1995. From 1997 until 2014, in most years the proportion of biomass north of 45° N was higher in the spring than in the fall. In the 2015-2017 surveys, the autumn estimates have been higher.

Figure 9 shows the result of a regression of the biomass estimates from the spring and fall time series. A linear relationship is evident with 63% of the variation being explained by the model. Two time regimes are present: 1990-1995, when the stock was at its lowest and estimates were more in agreement, and 1996 onwards, when the stock was higher and the estimates were more variable. Catchability estimates from the stock production model indicate *q's* from the Campelen surveys are around 2, and therefore swept-area stock-size is likely being overestimated in the spring and fall surveys.

Size composition and growth

Figure 10 shows the length composition of survey catches from spring and fall surveys by year for Div. 3LNO (combined sexes) and Figure 11 shows only from 2003 to 2017 to allow a larger view. More small fish were present in the survey catches beginning in the fall of 1995 onward due to the increased efficiency of the new Campelen survey gear over the old gear. Annual shifts in modes could be evidence of year classes moving through the time series.

In the years when the spring survey indicated that the stock size was very low (1995-1996 for example), length distributions were bimodal, and the smaller size mode (in the range of 20-25cm) can be tracked from year to year, although growth appears slow (the mode is about the same for 2000 and 2001). As the stock size increased, the distribution becomes dominated by fish in one major mode (25 to 35 cm) and it is probably made up of a number of different age classes. Smaller peaks of fish less than 20cm are evident from about 2006 or 2007-2011 and then merge into the modal peak in following years. Shifts in this size mode from 1996-1998, 1999-2002, and 2010-2013 seem to track recruitment pulses (Fig 10s and 11). In 2017, a peak of small fish (about 10 cm) was observed and seems strong.

In the fall surveys, multi-modal peaks are more common and unlike the spring surveys, were evident in surveys from 2001-2010 (Figs. 10 and 11). From 2011-2013, frequencies were largely unimodal and peaked at about 35cm. After 30-32 cm, growth slows and becomes almost negligible between years. This is consistent with the growth curves constructed using ages from thin-sectioned otoliths (Dwyer *et al*., 2003). The 2015 autumn survey indicated smaller fish were present (about 8 and 12 cm cm) which tracked to larger sizes in 2016 and 2017. Another mode at about 8 cm was observed in 2017. These are indications that recruitment could be strong in recent years.

Biological Studies

Maturity

Maturity at size by year was estimated using Canadian spring research vessel data from 1984-2017. Estimates were produced using a probit model with a logit link function and a binomial error structure (McCullagh and Nelder, 1983). L50 has shown a general decline in males from the beginning of the time series to about 2000 after which it was relatively stable to 2015. It has declined precipitously from 2015 to 2017. Current L50 for males is around 21 cm compared to 30 cm in the mid 1980's. Female L50 generally declined from the mid 1990's to the late 2000s and has been relatively stable since. The current L50 is about 30 cm compared to 34 cm at the beginning of the time series (Fig. 13). There was significant inter-annual variation in the proportion mature at length for both males and females (generalized linear models: males $\chi2=491.32$, $df=30$, $p<0.0001$, females $\chi2=474.33$, $df=30$, $p<0.0001$). In general, for both males and females, proportion mature at length in the last 10 years (2007-2017) was less than that of the first 10 years.

Weight at length

Log length – log weight regressions were fit for females for each year from the Canadian spring survey data from 1990-2017. The specific length weight relationships are given in Table Y. Annual length weight relationships were unavailable prior to 1990 so for those years a relationship produced using data from 1990-1993 is given. There seems to have been a slight down ward trend in weight at length since 1996. This can be best seen in the largest size range plotted, the 50.5 cm grouping. For this size group weight has declined by about 0.13 Kg (10%) since 1996 (average 1990-96 compared to average 2015-17 Fig. 14).

Female SSB

Estimates of female proportion mature at length, population numbers at length, and annual length weight relationships were used to produce an index of female SSB from the spring survey. Female SSB declined from 1984 to 1992 (Fig. 15). It increased substantially from 1995 to 2009. Since then it has declined substantially.

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Table 1. Summary of the Canadian RV Spring surveys 1984-2017. Survey gear changed from Engel to Campelen in autumn of 1995. The 2006 and 2015 Spring surveys were incomplete.

		3L		3N		3O		3LNO		
Year	Research Vessel	Number of sets	Depth Range	Number of sets	Depth Range	Number of sets	Depth Range	Total sets	First Set	Last Set
1984	Alfred Needler	37	67 - 185 m	61	39 - 360 m	56	66 - 350 m	154	28-Apr	21-May
1985	Wilfred Templeman	221	63 - 705 m	36	52 - 310 m			257	17-Apr	26-May
	Alfred Needler			49	46 - 320 m	93	67 - 355 m	142	11-Apr	26-Apr
1986	Wilfred Templeman	211	64 - 339 m	101	41 - 354 m	102	66 - 326 m	414	18-Apr	25-May
1987	Wilfred Templeman	181	61 - 356 m	91	46 - 344 m	100	65 - 356 m	372	23-Apr	1-Jun
1988	Wilfred Templeman	160	65 - 558 m	77	41 - 330 m	84	66 - 335 m	321	21-Apr	24-May
1989	Wilfred Templeman	205	64 - 350 m	94	45 - 352 m	101	66 - 337 m	400	20-Apr	28-May
1990	Wilfred Templeman	156	63 - 346 m	85	42 - 320 m	93	65 - 340 m	334	22-Apr	4-Jun
1991	Wilfred Templeman	143	66 - 685 m	93	40 - 645 m	116	65 - 635 m	352	19-Apr	29-May
1992	Wilfred Templeman	178	64 - 710 m	94	44 - 625 m	91	66 - 630 m	363	22-Apr	7-Jun
1993	Wilfred Templeman	181	64 - 680 m	85	40 - 695 m	81	66 - 620 m	347	27-Apr	10-Jun
1994	Wilfred Templeman	160	64 - 911 m	76	44 - 895 m	81	66 - 862 m	317	30-Apr	10-Jun
1995	Wilfred Templeman	156	65 - 646 m	119	42 - 668 m	125	65 - 681 m	400	3-May	14-Jun
1996	Wilfred Templeman	194	66 - 664 m	86	42 - 665 m	88	65 - 685 m	368	7-May	27-Jun
1997	Wilfred Templeman	163	60 - 698 m	75	35 - 689 m	87	62 - 730 m	325	30-Apr	26-Jun
1998	Wilfred Templeman	171	53 - 721 m	92	38 - 682 m	97	64 - 657 m	360	12-May	30-Jun
1999	Wilfred Templeman	184	41 - 692 m	83	40 - 2200 m	89	62 - 679 m	356	11-May	29-Jun
2000	Wilfred Templeman	142	61 - 681 m	87	45 - 664 m	87	61 - 694 m	316	11-May	29-Jun
2001	Wilfred Templeman	166	34 - 695 m	81	40 - 650 m	81	64 - 699 m	328	29-Apr	24-Jun
2002	Wilfred Templeman	148	42 - 710 m	81	40 - 641 m	84	63 - 639 m	313	27-Apr	22-Jun
2003	Wilfred Templeman	162	62 - 698 m	83	39 - 681 m	79	63 - 726 m	324	8-May	26-Jun
2004	Wilfred Templeman	154	47 - 710 m	81	44 - 677 m	86	61 - 661 m	321	12-May	26-Jun
2005	Wilfred Templeman	135	64 - 672 m	79	45 - 691 m	81	66 - 719 m	295	9-May	29-Jun
2006	Wilfred Templeman	144	60 - 701 m	4	68 - 77 m	3	75 - 84 m	151	10-Jun	30-Jun
	Alfred Needler			19	46 - 68 m	30	64 - 103 m	49	25-Jun	29-Jun
2007	Wilfred Templeman	98	61 - 702 m	82	44 - 636 m	82	64 - 719 m	262	3-May	12-Jul
	Teleost	41	66 - 171 m					41	5-Jun	9-Jun
2008	Wilfred Templeman	84	60 - 684 m	72	40 - 623 m	81	64 - 704 m	237	23-May	30-Jun
	Teleost	44	97 - 641 m					44	4-Jun	9-Jun
2009	Alfred Needler	64	63 - 676 m	80	44 - 668 m	81	64 - 674 m	225	13-May	23-Jun
	Teleost	83	61 - 694 m					83	21-May	31-May
2010	Alfred Needler	137	59 - 715 m	79	39 - 714 m	85	60 - 745 m	301	8-May	25-Jun
2011	Alfred Needler	148	57 - 723 m	85	40 - 673 m	79	63 - 724 m	312	8-May	22-Jun
2012	Alfred Needler	150	60 - 723 m	81	38 - 724 m	79	63 - 656 m	310	118	19-Jun
2013	Alfred Needler	141	62 - 632 m	80	40 - 684 m	80	64 - 650 m	301	114	20-Jun
2014	Alfred Needler	80	65 - 702 m					80	159	19-Jun
	Teleost	89	64 - 321 m	95	47 - 662 m	91	61 - 662 m	275	150	22-Jun
2015	Alfred Needler	57	65 - 685 m	77	39 - 674 m	75	63 - 628 m	209	131	17-Jun
2016	Teleost	146	61 - 694 m	79	44 - 624 m	76	64 - 592 m	301	120	15-Jun
2017	Alfred Needler	32	60 - 158 m	73	44 - 658 m	74	63 - 702 m	179	133	17-Jun

Table 2. Summary of the Canadian RV Autumn surveys 1990-2017. Survey gear changed from Engel to Campelen in autumn of 1995. The 2014 Autumn survey was incomplete.

		3L		3N		3O		3LNO		
Year	Research Vessel	Number of sets	Depth Range	Number of sets	Depth Range	Number of sets	Depth Range	Total sets	First Set	Last Set
1990	Wilfred Templeman	161	65 - 695 m	80	47 - 310 m	91	63 - 495 m	332	18-Oct	9-Dec
1991	Wilfred Templeman	219	63 - 680 m	67	42 - 638 m	84	65 - 715 m	370	19-Oct	2-Dec
1992	Wilfred Templeman	215	63 - 693 m	34	40 - 437 m	54	66 - 450 m	303	20-Oct	29-Nov
1993	Wilfred Templeman	153	64 - 670 m	70	44 - 670 m	75	64 - 676 m	298	24-Oct	4-Dec
1994	Wilfred Templeman	200	65 - 715 m	73	42 - 641 m	75	65 - 696 m	348	25-Oct	7-Dec
1995	Wilfred Templeman	172	63 - 640 m	92	40 - 735 m	90	63 - 730 m	354	270	9-Dec
	Teleost	19	54 - 1210 m					19	3	25-Jan
1996	Wilfred Templeman	184	51 - 681 m			20	65 - 139 m	204	283	12-Dec
	Alfred Needler			58	37 - 309 m	16	63 - 304 m	74	329	5-Dec
	Teleost	33	775 - 1433 m	15	390 - 1147 m	26	68 - 690 m	74	331	17-Dec
1997	Wilfred Templeman	140	35 - 714 m	81	41 - 769 m	74	64 - 611 m	295	270	15-Dec
	Teleost	77	161 - 1436 m					77	334	20-Dec
1998	Wilfred Templeman	182	34 - 675 m	79	42 - 1079 m	89	61 - 1076 m	350	284	15-Dec
	Teleost	34	691 - 1437 m	12	834 - 1447 m			46	333	16-Dec
1999	Wilfred Templeman	176	63 - 1444 m	71	39 - 664 m	77	58 - 692 m	324	287	12-Dec
	Teleost	1	1366 - 1366 m					1	346	11-Dec
2000	Wilfred Templeman	110	42 - 447 m	76	46 - 642 m	81	62 - 668 m	267	285	14-Dec
	Teleost	76	152 - 1430 m	24	747 - 1419 m	25	752 - 1424 m	125	285	18-Dec
2001	Wilfred Templeman	180	38 - 702 m	73	45 - 660 m	75	67 - 703 m	328	280	6-Dec
	Alfred Needler	2	187 - 203 m					2	329	24-Nov
	Teleost	34	146 - 1457 m	25	739 - 1410 m	22	803 - 1391 m	81	266	20-Nov
2002	Wilfred Templeman	183	35 - 670 m	73	44 - 675 m	75	65 - 696 m	331	279	1-Dec
	Teleost	33	763 - 1431 m	24	811 - 1429 m	25	775 - 1504 m	82	285	2-Dec
2003	Wilfred Templeman	184	32 - 702 m	78	43 - 852 m	75	63 - 650 m	337	283	17-Dec
	Teleost	32	753 - 1506 m			8	761 - 1382 m	40	10	25-Sep
2004	Wilfred Templeman	149	44 - 653 m	73	40 - 659 m	79	63 - 634 m	301	305	19-Dec
	Teleost	4	151 - 522 m					4	342	7-Dec
2005	Wilfred Templeman	121	50 - 706 m	70	42 - 633 m	77	60 - 649 m	268	278	8-Dec
	Alfred Needler	60	121 - 667 m					60	303	16-Nov
	Teleost	7	803 - 1351 m	17	776 - 1445 m	24	754 - 1410 m	48	29	22-Oct
2006	Wilfred Templeman	156	61 - 641 m	72	46 - 650 m	74	63 - 674 m	302	274	19-Nov
	Teleost	35	111 - 1401 m					35	324	18-Dec
2007	Wilfred Templeman	123	61 - 694 m	72	48 - 652 m	77	64 - 699 m	272	292	20-Dec
	Teleost	48	81 - 1424 m	25	775 - 1419 m	24	753 - 1410 m	97	280	20-Dec
2008	Wilfred Templeman	86	62 - 664 m	65	38 - 643 m	71	60 - 661 m	222	277	13-Nov
	Alfred Needler	47	71 - 332 m					47	306	11-Nov
2009	Alfred Needler	140	62 - 682 m	65	42 - 708 m	78	60 - 696 m	283	276	14-Dec
	Teleost	30	784 - 1385 m	11	798 - 1409 m	24	768 - 1397 m	65	289	20-Dec
2010	Alfred Needler	150	58 - 657 m	73	40 - 614 m	78	61 - 667 m	301	274	25-Nov
	Teleost	59	100 - 1448 m	4	855 - 1219 m			63	341	20-Dec
2011	Alfred Needler	106	61 - 663 m	73	43 - 673 m	77	64 - 692 m	256	273	4-Dec
	Teleost	14	201 - 529 m					14	345	18-Dec
2012	Alfred Needler	145	65 - 725 m	76	39 - 641 m	77	62 - 631 m	298	274	3-Dec
2013	Alfred Needler	145	57 - 657 m	74	42 - 681 m	77	66 - 630 m	296	263	15-Nov
	Teleost	6	100 - 304 m					6	329	25-Nov
2014	Teleost	221	62 - 1388 m	3	313 - 692 m			224	7	20-Dec
2015	Alfred Needler	124	61 - 703 m	74	39 - 721 m	76	64 - 694 m	274	269	1-Dec
	Teleost	19	165 - 335 m					19	344	14-Dec
2016	Alfred Needler	147	60 - 673 m	73	36 - 668 m	79	60 - 678 m	299	260	9-Dec
2017	Alfred Needler	153	62 - 712 m	80	42 - 652 m	74	59 - 698 m		258	14-Nov

Table 3. Number of yellowtail flounder per set from Canadian Spring surveys of NAFO divs. 3LNO using Campelen trawl 1996-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	**55**	784			0.0	0.0		0.0	0.0		0.0													
	91	350	1.6	0.0	0.0	33.2	21.5	4.5	0.3	8.4	11.9	22.2	9.7	10.5	44.0	2.5	0.0	92.0	65.1	95.3	9.1		4.3	12.4
		363	4.4	1.0	0.0	94.8	97.9	13.7	0.7	207.7	55.7	209.8	390.7	386.3	177.8	82.0	41.1	218.5	614.6	257.8	120.8		2.3	10.7
		371	0.4	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.8	56.0	9.8	3.5	0.3	0.0	16.7	14.5	13.0	104.7	16.8		1.5	3.0
		372	2.5	2.4	4.5	47.3	28.2	19.1	3.8	113.8	63.1	142.5	394.3	162.6	126.1	77.1	284.0	223.8	152.1	223.6	125.6		17.5	190.9
		384	0.0	0.8	0.0	0.0	0.5	0.8	0.3	0.3	0.3	0.0	23.3	3.3	2.0	0.0	8.0	13.1	44.5	172.7	28.3	68.0	22.8	34.3
		785			0.5	0.0		0.0	1.0		1.5													
	183	328	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0		0.0	0.2	0.4	0.3	0.1	0.0		0.2	
		341	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.2	0.2	1.3	3.8	3.6	21.0	0.4	0.0	1.2	9.5	1.1	0.3		0.2	0.0
		342	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	
		349	0.1	0.0	0.0	18.0	2.6	0.0	0.0	0.4	0.0	0.3	16.9	78.3	1.7	0.0	0.2	0.6	6.3	5.2	64.6		0.0	
		364	0.0	0.0	0.0	2.9	0.5	0.0	0.0	0.0	0.0	1.9	22.3	0.3	28.0	0.0	0.6	0.1	12.9	0.3	1.2	0.0	0.0	
		365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	
		385	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	
		786			0.5	0.0		0.0			0.0							0.0						
		787			0.0	0.0		0.0			0.0							0.5						
		788				0.0																		
		790				0.0																		
		793				0.0																		
		794				0.0				0.0														
		797				0.0				0.0														
		799									0.0													
3N	**55**	375	603.3	487.2	411.6	476.4	359.0	301.6	213.4	395.0	286.2	240.0	302.3	463.9	420.3	523.8	185.2	334.6	510.7	408.4	441.4	224.2	140.4	233.0
		376	67.8	1029.8	524.8	911.0	349.5	1145.8	243.8	1092.6	768.7	830.8	753.7	851.7	878.0	996.4	1122.5	937.2	893.2	762.2	936.3	451.3	654.4	675.7
	91	360	364.7	126.2	374.4	680.3	215.7	549.4	730.8	600.1	470.3	465.8	975.2	522.9	1012.6	357.2	754.9	691.8	1043.8	797.5	286.2	312.0	136.0	362.9
		361	453.6	427.2	455.7	586.7	544.0	639.2	375.3	526.2	472.4	415.1	443.5	386.0	421.6	357.2	211.2	520.1	418.0	377.1	200.3	213.1	91.2	349.7
		362	169.3	210.5	300.0	507.9	519.1	522.6	55.6	263.2	307.9	456.0	773.8	406.8	350.7	174.3	262.2	363.6	397.5	277.7	570.8	116.4	178.2	153.7
		373	7.8	1.9	11.1	103.1	311.8	680.9	32.9	273.6	55.4	315.6		365.9	407.8	211.6	388.0	213.8	416.4	289.4	208.6	124.0	106.6	199.6
		374	15.3	10.7	5.8	248.7	225.5	88.3	31.3	279.7	225.3	254.0	240.0	679.1	346.5	463.3	650.3	595.5	199.7	476.0	331.0	148.4	28.7	8.5
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3		10.0	70.0	1.8	52.0	42.0	244.5	161.7	13.9	53.5	5.5	1.0
	183	359	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0		17.5	38.5	0.0	6.2	5.3	298.0	44.9	0.5	0.0	0.5	0.0
		377	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	4.0		423.9	84.5	0.5	22.5	195.7	334.0	556.1	72.5	0.0	0.5	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5		0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.5	17.5	0.0	0.0
3O	**91**	330	1.8	0.6	0.5	0.6	47.2	1.6	6.0	10.3	8.9	8.4	14.7	36.4	24.7	5.5	14.7	34.2	9.1	13.4	5.8	1.5	23.5	23.0
		331	1.5	5.3	1.0	69.8	43.5	30.0	17.0	86.5	36.5	45.5		25.5	83.5	39.0	199.0	136.5	69.0	22.1	68.0	75.5	95.5	13.5
		338	66.0	68.1	54.3	63.7	43.2	148.8	28.7	30.2	15.6	21.0	53.6	144.8	44.0	215.7	322.3	68.7	147.3	47.3	16.3	22.0	48.8	44.4
		340	0.0	9.0	1.6	8.8	44.0	11.4	13.6	82.2	7.8	39.4	131.5	97.0	133.3	26.8	37.2	109.1	113.2	121.4	101.7	149.2	14.8	19.5
		351	28.5	65.3	50.7	324.2	105.3	147.5	70.8	105.9	199.7	297.9	241.0	230.4	303.9	9.3	142.8	314.5	312.0	164.4	301.2	186.4	30.6	45.2
		352	312.6	177.4	246.3	279.7	268.4	217.9	294.0	458.8	331.0	247.6	379.2	388.9	188.1	129.8	184.4	299.9	116.4	202.5	150.2	263.9	143.8	144.7
		353	122.2	175.0	190.6	188.2	92.4	124.9	80.6	36.0	228.7	82.8	147.1	104.3	126.8	9.8	263.8	110.9	256.3	118.8	69.5	44.0	120.0	113.7
	183	329	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0		0.2	0.0	0.0	0.0	0.4	3.2	1.4	0.7	4.2	0.0	0.0
		332	6.5	1.3	7.5	4.8	0.0	4.3	22.0	5.7	0.0	1.7		1.0	3.0	0.7	1.7	4.7	1.0	0.3	0.5	0.0	12.7	2.7
		337	3.0	15.9	0.5	0.9	2.0	0.0	8.7	0.0	0.0	4.4		0.0	1.7	0.3	5.0	3.6	0.7	0.0	1.0	1.0	11.0	2.0
		339	0.0	0.0	0.0	0.9	2.0	27.0	1.0	11.0	0.0	6.5	32.0	2.9	1.5	1.0	1.5	0.4	16.0	1.5	2.5	0.0	0.0	1.0
		354	2.0	0.5	0.0	0.4	1.0	0.0	0.0	0.0	1.0	0.0		4.0	1.5	0.0	1.1	2.7	0.0	0.0	0.0	0.0	0.0	1.0
3LNO			62.2	67.7	69.9	120.4	89.6	126.6	66.5	120.2	92.0	113.2	183.0	140.0	147.5	89.0	130.8	137.9	167.8	132.4	104.9	82.2	46.3	117.0
UCL			76.4	94.9	89.7	143.8	106.2	171.4	84.1	141.5	110.1	134.4	222.9	164.6	183.9	108.2	156.4	160.8	200.6	160.0	125.5	100.0	57.8	145.1
LCL			48.0	40.6	50.2	97.1	73.1	81.8	48.9	98.8	73.9	91.9	143.1	115.4	111.2	69.9	105.2	115.0	135.0	104.8	84.2	64.4	34.8	88.9

Table 4. Weight (kg) of yellowtail flounder per set from Canadian Spring surveys of NAFO divs. 3LNO using Campelen trawl 1996-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	**55**	784			0.0	0.0		0.0	0.0		0.0													
	91	350	0.2	0.0	0.0	4.6	2.4	0.6	0.0	0.7	1.3	2.3	1.1	1.1	4.4	0.3	0.0	8.9	6.6	9.8	0.9		0.2	0.8
		363	0.5	0.1	0.0	12.6	10.7	1.3	0.0	19.0	5.8	20.6	35.3	33.1	17.4	5.5	4.0	18.5	58.0	18.7	10.0		0.1	0.6
		371	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.0	3.2	0.7	0.2	0.0	0.0	1.1	1.0	0.9	6.8	0.9		0.1	0.2
		372	0.4	0.2	0.5	8.2	4.1	2.4	0.5	14.5	8.0	17.2	41.2	18.9	15.5	7.5	22.9	26.2	16.3	21.6	15.8		0.8	15.0
		384	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.3	0.1	0.0	0.6	0.9	3.6	8.8	1.8	4.0	0.6	1.8
		785			0.0	0.0		0.0	0.0		0.0													
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	
		341	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.2	1.5	0.0	0.0	0.1	0.7	0.1	0.0		0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		349	0.0	0.0	0.0	2.3	0.3	0.0	0.0	0.0	0.0	0.0	1.5	7.0	0.2	0.0	0.0	0.1	0.5	0.5	4.9		0.0	
		364	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.3	3.7	0.1	4.1	0.0	0.1	0.0	1.9	0.0	0.1	0.0	0.0	
		365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		786			0.0	0.0		0.0			0.0							0.0						
		787			0.0	0.0		0.0			0.0							0.0						
		788				0.0																		
		790				0.0																		
		793				0.0																		
		794				0.0				0.0														
		797				0.0				0.0														
		799									0.0													
3N	**55**	375	17.3	19.2	19.9	21.9	15.4	18.5	14.4	29.3	20.6	17.8	21.6	31.9	22.3	30.2	12.2	22.9	29.1	27.7	35.3	16.5	11.4	17.1
		376	1.1	25.5	20.5	31.0	15.0	52.3	10.4	54.8	43.2	50.7	44.2	43.3	43.9	56.8	58.6	43.7	46.2	44.5	49.7	33.3	39.5	44.5
	91	360	28.0	16.1	32.0	76.5	26.2	60.2	87.9	78.7	73.4	62.6	125.0	52.2	135.3	40.3	85.1	89.8	112.4	90.2	32.1	46.2	17.4	48.7
		361	27.1	26.1	31.2	31.4	32.9	41.9	26.2	41.7	33.6	26.1	31.5	30.3	21.9	22.9	13.0	28.8	24.3	18.8	14.9	12.9	6.0	27.1
		362	28.9	33.7	38.8	57.6	56.3	42.9	4.3	29.2	27.2	47.9	85.2	45.0	35.4	17.7	27.0	34.3	35.1	31.6	57.1	10.8	17.1	15.1
		373	0.6	0.3	1.1	11.1	42.0	79.0	2.8	33.1	5.9	43.4		49.4	51.4	23.6	46.0	23.2	44.5	30.0	25.6	14.8	9.0	15.0
		374	0.9	0.4	0.1	8.8	9.5	3.1	1.3	13.2	12.7	14.7	11.5	37.7	16.3	22.0	33.0	22.1	9.7	22.6	16.9	7.6	0.8	0.4
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2		0.4	2.7	0.0	1.8	1.3	7.6	5.8	0.5	1.7	0.1	0.0
	183	359	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0		0.4	0.7	0.0	0.1	0.1	4.9	0.8	0.0	0.0	0.0	0.0
		377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		2.3	0.3	0.0	0.1	0.8	1.4	2.3	0.3	0.0	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.7	0.0	0.0
3O	**91**	330	0.3	0.1	0.0	0.1	6.8	0.2	0.5	0.6	0.9	0.9	1.9	3.4	2.9	0.7	1.2	5.0	1.2	1.4	0.6	0.2	1.5	0.9
		331	0.0	0.1	0.0	1.7	1.2	0.6	0.4	2.4	0.8	1.2		0.7	2.3	1.0	5.0	3.4	2.0	0.5	1.6	1.8	1.2	0.2
		338	8.0	6.5	5.5	7.2	4.7	14.1	3.3	3.0	1.6	2.4	5.0	13.0	4.6	26.4	27.9	7.4	16.9	4.2	1.6	2.1	3.3	5.0
		340	0.0	0.8	0.2	1.0	4.2	1.0	0.7	4.8	0.5	3.9	10.2	6.9	9.0	1.9	2.4	6.6	8.2	8.0	6.8	11.2	0.8	1.1
		351	4.7	9.2	6.2	31.1	12.1	15.4	4.8	9.7	21.1	35.0	27.7	20.5	34.6	0.8	14.7	32.9	27.2	13.5	30.8	26.2	2.5	3.2
		352	46.0	25.6	29.7	39.1	35.5	26.7	33.2	48.4	34.6	31.6	42.0	38.0	22.7	13.1	21.4	36.9	14.5	21.6	18.9	27.2	12.8	10.8
		353	10.7	9.9	16.0	18.2	7.4	4.4	6.6	2.5	16.4	6.0	11.5	6.5	6.9	0.5	16.1	7.5	14.8	6.8	4.6	2.7	6.9	6.4
	183	329	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.4	0.0	0.0
		332	0.5	0.1	0.3	0.3	0.0	0.3	1.4	0.3	0.0	0.1		0.1	0.2	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.8	0.1
		337	0.3	0.8	0.0	0.1	0.1	0.0	0.5	0.0	0.0	0.2		0.0	0.1	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.6	0.1
		339	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.2	0.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0
		354	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3LNO			17.1	17.0	19.3	34.1	27.9	34.9	19.2	37.2	29.3	37.8	58.3	43.0	45.5	26.3	38.7	40.9	48.5	38.6	32.3	27.5	13.0	33.8
UCL			20.5	22.5	24.3	41.1	33.3	49.1	24.3	42.8	35.4	45.1	69.0	49.9	57.1	32.5	46.6	48.7	57.3	46.3	39.0	33.3	16.6	42.4
LCL			13.7	11.6	14.3	27.2	22.5	20.6	14.1	31.6	23.2	30.5	47.5	36.2	34.0	20.2	30.8	33.1	39.8	30.9	25.6	21.7	9.4	25.3

Table 5. Abundance (million) of yellowtail flounder per set from Canadian Spring surveys of NAFO divs. 3LNO using Campelen trawl 1996-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	55	784			0.0	0.0		0.0	0.0		0.0													
	91	350	0.4	0.0	0.0	9.4	6.1	1.3	0.1	2.4	3.4	6.3	2.8	3.0	12.5	0.7	0.0	26.2	18.6	27.1	2.6		1.2	3.5
		363	1.1	0.2	0.0	23.2	24.0	3.3	0.2	50.8	13.6	51.4	95.7	94.6	43.5	20.1	10.1	53.5	150.5	63.1	29.6		0.6	2.6
		371	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1	8.6	1.5	0.5	0.0	0.0	2.6	2.2	2.0	16.1	2.6		0.2	0.5
		372	0.8	0.8	1.5	16.0	9.6	6.5	1.3	38.5	21.4	48.2	133.4	55.0	42.7	26.1	96.1	75.7	51.5	75.7	42.5		5.9	64.6
		384	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	3.6	0.5	0.3	0.0	1.2	2.0	6.9	26.6	4.4	10.5	3.5	5.3
		785			0.0	0.0		0.0	0.1		0.1													
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.1	0.0	0.0		0.0	
		341	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.8	0.8	4.5	0.1	0.0	0.3	2.0	0.2	0.1		0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	
		349	0.0	0.0	0.0	5.2	0.8	0.0	0.0	0.1	0.0	0.1	4.9	22.8	0.5	0.0	0.0	0.2	1.8	1.5	18.8		0.0	
		364	0.0	0.0	0.0	1.1	0.2	0.0	0.0	0.0	0.0	0.7	8.7	0.1	10.9	0.0	0.2	0.1	5.0	0.1	0.5	0.0	0.0	
		365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
		786			0.0	0.0		0.0			0.0							0.0						
		787			0.0	0.0		0.0			0.0							0.0						
		788				0.0																		
		790				0.0																		
		793				0.0																		
		794				0.0				0.0														
		797				0.0				0.0														
		799									0.0													
3N	55	375	132.2	106.8	90.2	104.4	78.7	66.1	46.8	86.6	62.7	52.6	66.3	101.7	92.1	114.8	40.6	73.3	111.9	89.5	96.7	49.1	30.8	51.1
		376	14.0	212.3	108.2	187.9	72.1	236.3	50.3	225.3	158.5	171.3	155.4	175.6	181.0	205.5	231.5	193.3	184.2	157.2	193.1	93.1	134.9	139.3
	91	360	150.1	51.9	154.1	280.0	88.8	226.1	300.8	247.0	193.6	191.7	401.4	215.2	416.8	147.0	310.7	284.7	429.6	328.2	117.8	128.4	56.0	149.4
		361	115.6	108.9	116.2	149.5	138.7	162.9	95.7	134.1	120.4	105.8	113.0	98.4	107.5	91.0	53.8	132.6	106.6	96.1	51.0	54.3	23.2	89.1
		362	58.7	73.0	104.0	176.1	180.0	181.1	19.3	91.2	106.7	158.1	268.2	141.0	121.6	60.4	90.9	126.0	137.8	96.3	197.9	40.4	61.8	53.3
		373	2.7	0.6	3.8	35.7	108.1	236.0	11.4	94.8	19.2	109.4		126.8	141.3	73.4	134.5	74.1	144.4	100.3	72.3	43.0	37.0	69.2
		374	2.0	1.4	0.7	31.8	28.9	11.3	4.0	35.8	28.9	32.5	30.7	87.0	44.4	59.3	83.3	76.3	25.6	61.0	42.4	19.0	3.7	1.1
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2		0.9	6.5	0.2	4.8	3.9	22.7	15.0	1.3	5.0	0.5	0.1
	183	359	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0		1.0	2.2	0.0	0.4	0.3	17.3	2.6	0.0	0.0	0.0	0.0
		377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1		5.8	1.2	0.0	0.3	2.7	4.6	7.7	1.0	0.0	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3		0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.6	0.0	0.0
3O	91	330	0.5	0.2	0.1	0.2	13.6	0.5	1.7	3.0	2.6	2.4	4.2	10.5	7.1	1.6	4.2	9.8	2.6	3.8	1.7	0.4	6.7	6.6
		331	0.1	0.3	0.1	4.4	2.7	1.9	1.1	5.4	2.3	2.9		1.6	5.2	2.4	12.5	8.6	4.3	1.4	4.3	4.7	6.0	0.8
		338	17.2	17.8	14.2	16.6	11.3	38.9	7.5	7.9	4.1	5.5	14.0	37.8	11.5	56.3	84.2	17.9	38.4	12.4	4.3	5.7	12.7	11.6
		340	0.0	2.1	0.4	2.1	10.4	2.7	3.2	19.4	1.8	9.3	31.0	22.9	31.5	6.3	8.8	25.7	26.7	28.7	24.0	35.2	3.5	4.6
		351	9.9	22.7	17.6	112.4	36.5	51.1	24.5	36.7	69.2	103.3	83.5	79.9	105.3	3.2	49.5	109.0	108.2	57.0	104.4	64.6	10.6	15.7
		352	110.9	63.0	87.4	99.3	95.3	77.3	104.3	162.8	117.5	87.9	134.6	138.0	66.8	46.1	65.4	106.4	41.3	71.9	53.3	93.7	51.0	51.3
		353	21.6	30.9	33.6	33.2	16.3	22.0	14.2	6.3	40.3	14.6	25.9	18.4	22.4	1.7	46.5	19.6	45.2	20.9	12.3	7.8	21.2	20.0
	183	329	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.1	0.8	0.3	0.2	1.0	0.0	0.0
		332	0.9	0.2	1.1	0.7	0.0	0.6	3.2	0.8	0.0	0.2		0.1	0.4	0.1	0.2	0.7	0.1	0.0	0.1	0.0	1.8	0.4
		337	0.4	2.1	0.1	0.1	0.3	0.0	1.1	0.0	0.0	0.6		0.0	0.2	0.0	0.7	0.5	0.1	0.0	0.1	0.1	1.4	0.3
		339	0.0	0.0	0.0	0.1	0.2	2.2	0.1	0.9	0.0	0.5	2.6	0.2	0.1	0.1	0.1	0.0	1.3	0.1	0.2	0.0	0.0	0.1
		354	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0		0.3	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1
3LNO			639.4	695.5	733.3	1289.9	922.5	1328.5	690.9	1250.1	966.7	1164.8	1582.4	1440.7	1480.4	916.4	1333.3	1426.1	1692.1	1362.6	1079.3	657.6	474.5	740.5
UCL			785.8	974.5	940.7	1539.8	1092.6	1798.6	873.6	1471.9	1156.8	1383.2	1927.4	1693.5	1845.5	1113.1	1594.7	1663.0	2022.6	1646.3	1292.0	800.3	592.5	918.6
LCL			493.1	416.6	526.0	1039.9	752.4	858.5	508.2	1028.2	776.5	946.3	1237.5	1187.9	1115.4	719.8	1071.9	1189.2	1361.6	1079.0	866.5	514.9	356.4	562.4

Table 6. Biomass (000 t) of yellowtail flounder per set from Canadian Spring surveys of NAFO divs. 3LNO using Campelen trawl 1996-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	55	784			0.0	0.0		0.0	0.0		0.0													
	91	350	0.2	0.0	0.0	4.6	2.4	0.6	0.0	0.7	1.3	2.3	1.1	1.1	4.4	0.3	0.0	8.9	6.6	9.8	0.9		0.2	0.8
		363	0.5	0.1	0.0	12.6	10.7	1.3	0.0	19.0	5.8	20.6	35.3	33.1	17.4	5.5	4.0	18.5	58.0	18.7	10.0		0.1	0.6
		371	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.0	3.2	0.7	0.2	0.0	0.0	1.1	1.0	0.9	6.8	0.9		0.1	0.2
		372	0.4	0.2	0.5	8.2	4.1	2.4	0.5	14.5	8.0	17.2	41.2	18.9	15.5	7.5	22.9	26.2	16.3	21.6	15.8		0.8	15.0
		384	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.3	0.1	0.0	0.6	0.9	3.6	8.8	1.8	4.0	0.6	1.8
		785			0.0	0.0		0.0	0.0		0.0													
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	
		341	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.2	1.5	0.0	0.0	0.1	0.7	0.1	0.0		0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		349	0.0	0.0	0.0	2.3	0.3	0.0	0.0	0.0	0.0	0.0	1.5	7.0	0.2	0.0	0.0	0.1	0.5	0.5	4.9		0.0	
		364	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.3	3.7	0.1	4.1	0.0	0.1	0.0	1.9	0.0	0.1	0.0	0.0	
		365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		786			0.0	0.0		0.0			0.0							0.0						
		787			0.0	0.0		0.0			0.0							0.0						
		788				0.0																		
		790				0.0																		
		793				0.0																		
		794				0.0				0.0														
		797				0.0				0.0														
		799									0.0													
3N	55	375	17.3	19.2	19.9	21.9	15.4	18.5	14.4	29.3	20.6	17.8	21.6	31.9	22.3	30.2	12.2	22.9	29.1	27.7	35.3	16.5	11.4	17.1
		376	1.1	25.5	20.5	31.0	15.0	52.3	10.4	54.8	43.2	50.7	44.2	43.3	43.9	56.8	58.6	43.7	46.2	44.5	49.7	33.3	39.5	44.5
	91	360	28.0	16.1	32.0	76.5	26.2	60.2	87.9	78.7	73.4	62.6	125.0	52.2	135.3	40.3	85.1	89.8	112.4	90.2	32.1	46.2	17.4	48.7
		361	27.1	26.1	31.2	31.4	32.9	41.9	26.2	41.7	33.6	26.1	31.5	30.3	21.9	22.9	13.0	28.8	24.3	18.8	14.9	12.9	6.0	27.1
		362	28.9	33.7	38.8	57.6	56.3	42.9	4.3	29.2	27.2	47.9	85.2	45.0	35.4	17.7	27.0	34.3	35.1	31.6	57.1	10.8	17.1	15.1
		373	0.6	0.3	1.1	11.1	42.0	79.0	2.8	33.1	5.9	43.4		49.4	51.4	23.6	46.0	23.2	44.5	30.0	25.6	14.8	9.0	15.0
		374	0.9	0.4	0.1	8.8	9.5	3.1	1.3	13.2	12.7	14.7	11.5	37.7	16.3	22.0	33.0	22.1	9.7	22.6	16.9	7.6	0.8	0.4
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2		0.4	2.7	0.0	1.8	1.3	7.6	5.8	0.5	1.7	0.1	0.0
	183	359	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0		0.4	0.7	0.0	0.1	0.1	4.9	0.8	0.0	0.0	0.0	0.0
		377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		2.3	0.3	0.0	0.1	0.8	1.4	2.3	0.3	0.0	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.7	0.0	0.0
3O	91	330	0.3	0.1	0.0	0.1	6.8	0.2	0.5	0.6	0.9	0.9	1.9	3.4	2.9	0.7	1.2	5.0	1.2	1.4	0.6	0.2	1.5	0.9
		331	0.0	0.1	0.0	1.7	1.2	0.6	0.4	2.4	0.8	1.2		0.7	2.3	1.0	5.0	3.4	2.0	0.5	1.6	1.8	1.2	0.2
		338	8.0	6.5	5.5	7.2	4.7	14.1	3.3	3.0	1.6	2.4	5.0	13.0	4.6	26.4	27.9	7.4	16.9	4.2	1.6	2.1	3.3	5.0
		340	0.0	0.8	0.2	1.0	4.2	1.0	0.7	4.8	0.5	3.9	10.2	6.9	9.0	1.9	2.4	6.6	8.2	8.0	6.8	11.2	0.8	1.1
		351	4.7	9.2	6.2	31.1	12.1	15.4	4.8	9.7	21.1	35.0	27.7	20.5	34.6	0.8	14.7	32.9	27.2	13.5	30.8	26.2	2.5	3.2
		352	46.0	25.6	29.7	39.1	35.5	26.7	33.2	48.4	34.6	31.6	42.0	38.0	22.7	13.1	21.4	36.9	14.5	21.6	18.9	27.2	12.8	10.8
		353	10.7	9.9	16.0	18.2	7.4	4.4	6.6	2.5	16.4	6.0	11.5	6.5	6.9	0.5	16.1	7.5	14.8	6.8	4.6	2.7	6.9	6.4
	183	329	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.4	0.0	0.0
		332	0.5	0.1	0.3	0.3	0.0	0.3	1.4	0.3	0.0	0.1		0.1	0.2	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.8	0.1
		337	0.3	0.8	0.0	0.1	0.1	0.0	0.5	0.0	0.0	0.2		0.0	0.1	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.6	0.1
		339	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.2	0.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0
		354	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3LNO			175.6	174.9	202.2	365.7	287.0	366.0	199.5	386.9	307.9	388.8	503.8	443.0	456.9	271.2	394.7	422.9	489.4	397.3	332.1	220.2	133.4	214.1
UCL			210.8	231.3	254.8	440.2	342.2	515.7	252.1	445.6	372.4	463.8	596.8	513.3	573.0	334.8	475.3	503.8	577.6	476.2	401.1	266.5	170.5	268.1
LCL			140.4	118.6	149.6	291.2	231.8	216.2	146.9	328.3	243.3	313.7	410.8	372.7	340.7	207.5	314.2	342.0	401.3	318.5	263.1	173.8	96.3	160.0

Table 7. Number of yellowtail flounder per set from Canadian Autumn surveys of NAFO divs. 3LNO using Campelen trawl 1995-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	55	784		0.5	0.0	0.0		41.5	1.0	0.0	0.5	0.0	1.5												
	91	350	0.4	0.3	0.0	0.4	1.3	3.1	12.4	18.4	29.3	17.3	2.9	3.3	0.5	35.8	0.4	10.0	49.3	85.7	6.5	25.0	7.0	72.9	7.1
		363	5.2	3.5	1.2	38.4	73.8	119.5	114.2	34.7	95.5	101.7	99.6	30.2	111.5	96.6	125.0	142.0	105.9	43.0	131.0	22.5	76.8	242.2	143.2
		371	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	0.3	0.3	0.3	0.8	0.0	14.7	0.0	3.8	22.7	25.0	7.8	11.8	44.8	8.3	25.5
		372	6.4	16.9	17.2	10.2	6.5	18.0	125.8	55.8	79.9	98.4	29.0	136.2	187.0	83.7	28.6	282.3	112.4	159.5	116.1	83.7	170.0	51.5	134.8
		384	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.0	22.0	10.5	0.0	112.3	30.3	10.0	133.7	0.8	179.2	93.3	73.8	57.0	96.0
		785		0.0	0.0	0.0		1.5	3.5	1.5	1.0	0.0	0.0												
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		341	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		349	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0	0.0	0.0	19.7	0.1	0.0	0.0	0.0	0.9	0.0	3.6	1.4	0.0	2.8	0.0
		364	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.6	0.0	0.2	0.4	0.0	0.8	1.6	1.0	0.4	0.8	0.1	1.5	0.2
		365	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.0	0.5	0.0	0.3	0.0
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		786		0.5	0.0	0.5		5.5	0.0	0.0	0.0	0.0	0.5												
		787		0.0	0.0	1.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0											
		788		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		790		0.0	0.0	0.0		0.0	0.0	0.0	1.0	0.0	0.0					0.0							
		793		0.0	0.0	0.0		0.0	0.0	0.0	0.0	1.1	0.0					0.0							
		794		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		797		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		799		0.0	0.0	0.0		0.0	0.0	0.0	0.0	1.5	0.0	0.0				0.0							
3N	55	375	398.5	248.3	233.2	140.0	372.8	460.5	643.3	545.5	488.5	1552.0	847.8	350.3	668.0	536.4	783.0	1378.3	281.5	653.6	435.2		524.8	586.5	678.8
		376	711.6	639.3	1062.4	544.8	722.5	2047.0	2539.0	1001.9	993.9	1099.3	3188.8	1443.8	1490.0	950.3	739.3	1844.8	476.7	771.3	1340.3		654.0	777.5	1015.3
	91	360	171.3	109.2	405.9	281.4	490.6	458.3	319.4	578.3	546.3	513.3	253.3	457.0	1112.3	463.6	284.9	550.8	531.9	300.0	263.2		668.0	405.4	505.1
		361	450.0	468.3	499.9	504.6	262.0	146.8	737.6	692.0	617.3	359.2	124.3	135.7	555.8	139.3	183.2	507.2	206.1	168.8	419.8		209.0	533.3	397.8
		362	245.0	75.6	307.3	139.4	572.0	202.7	571.4	434.7	339.1	536.3	250.3	279.0	231.1	288.2	331.8	210.4	332.6	320.0	348.0		286.3	255.3	167.1
		373	13.8	0.0	35.3	35.4	63.5	69.9	307.9	189.0	142.9	221.7	156.2	195.6	526.8	214.0	183.6	543.8	222.3	266.3	221.0		251.7	265.0	411.1
		374	0.0	30.0	18.0	15.7	182.3	130.3	202.3	108.3	64.7	192.3	155.0	362.3	493.8	436.5	321.0	171.5	799.3	826.3	794.5		94.0	146.0	141.9
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	1.5	178.2	150.0	0.0	147.0	293.5	331.0	44.5		465.0	34.0	21.0
	183	359	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.5	10.5	1.0	17.5	22.7	31.5	14.5	1.0	0.0	128.5	91.6		0.0	0.0	3.0
		377	0.0	0.0	3.0	2.0	3.5	4.5	0.0	0.0	0.0	38.0	467.7	355.0	660.0	74.5	48.5	28.4	338.0	830.0	3.5		93.0	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.9	6.0	6.7	0.0	10.9	0.0	71.0		0.5	0.0	0.0
3O	91	330	8.2	0.2	7.3	1.7	23.8	3.3	20.0	8.3	22.3	18.0	15.2	10.2	55.3	23.8	37.0	64.0	79.8	52.9	33.8		2.5	121.3	9.2
		331	2.0	0.0	1.0	3.5	14.0	3.5	29.1	41.0	3.0	50.5	41.0	28.0	48.5	11.5	5.1	15.4	13.5	79.5	3.0		26.5	84.0	53.3
		338	97.0	0.5	38.2	31.2	35.8	78.0	260.0	6.4	72.2	2.7	10.1	76.5	8.6	35.9	7.9	10.8	17.8	145.3	18.4		8.2	86.0	28.6
		340	4.8	0.0	28.2	23.2	37.3	4.8	47.6	94.6	31.0	74.1	107.2	36.6	176.3	196.8	131.3	7.7	24.8	160.7	112.4		85.1	96.4	167.4
		351	15.8	11.6	107.3	207.4	135.3	272.6	171.1	170.8	446.1	247.7	114.9	191.9	286.9	264.5	114.4	117.1	187.7	421.9	104.0		188.4	186.9	221.9
		352	121.9	144.8	181.5	234.6	255.0	369.7	288.0	192.3	283.3	255.5	296.9	177.0	232.0	384.8	125.6	286.9	164.3	256.7	276.4		119.3	83.7	277.1
		353	8.7	7.0	82.8	0.5	73.5	30.0	70.0	53.0	253.0	23.8	46.8	42.9	38.3	31.7	94.9	103.3	83.8	36.8	20.3		51.8	50.8	56.3
	183	329	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.2	3.4		0.0	0.0	0.2
		332	3.3	3.0	0.0	0.3	1.7	1.0	10.0	19.0	0.0	9.0	1.0	3.0	0.7	20.5	0.3	0.0	0.7	4.6	0.0		0.0	0.7	2.3
		337	0.0	19.0	1.3	5.3	0.3	0.9	0.0	0.0	0.0	3.4	16.0	7.3	0.0	0.0	0.0	0.0	9.0	0.7	0.7		16.0	5.0	3.7
		339	0.0	0.3	0.5	0.0		1.5	9.0	23.0	18.5	1.1	3.0	12.0	4.0	0.0	0.0	0.5	32.0	0.0	4.0		0.5	1.5	5.0
		354	0.0	1.8	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.5	0.5	22.0	0.5		0.0	0.0	0.5
3LNO			57.3	39.8	73.1	54.4	87.8	98.8	139.8	99.3	110.9	147.8	122.7	95.4	154.0	113.6	80.2	149.1	101.2	122.7	114.9	0.0	103.1	106.3	119.6
UCL			76.7	56.5	95.3	73.1	112.7	136.3	179.1	122.7	135.7	180.6	151.7	123.2	181.3	145.2	99.0	178.4	125.1	153.4	145.5	15.5	128.7	129.3	151.1
LCL			37.8	23.2	50.9	35.7	62.9	61.3	100.5	75.8	86.1	115.0	93.8	67.7	126.8	82.0	61.4	119.7	77.3	92.1	84.4	4.0	77.6	83.3	88.0

Table 8. Weight (kg) of yellowtail flounder per set from Canadian Autumn surveys of NAFO divs. 3LNO using Campelen trawl 1995-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	55	784		0.0	0.0	0.0		4.0	0.1	0.0	0.1	0.0	0.1												
	91	350	0.2	0.2	0.0	0.3	0.7	1.1	4.1	5.8	9.1	5.8	1.1	1.2	0.2	10.2	0.2	3.3	16.0	26.0	2.2	6.5	1.9	20.5	2.2
		363	2.3	1.5	0.6	15.9	36.3	41.8	41.1	12.7	35.1	35.9	32.3	10.8	35.0	30.2	42.9	44.0	29.6	12.6	44.9	6.7	23.7	78.2	47.9
		371	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.1	0.4	0.0	5.8	0.0	1.7	10.4	8.8	4.3	4.2	18.2	3.1	10.3
		372	1.9	5.4	3.3	3.6	1.4	5.3	41.9	25.5	21.8	34.6	12.0	46.3	57.1	29.0	10.6	67.9	40.2	40.7	40.2	28.4	48.3	15.5	38.8
		384	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	10.8	4.3	0.0	43.4	14.9	5.2	51.9	0.5	65.4	37.6	27.3	23.1	33.0
		785		0.0	0.0	0.0		0.4	0.2	0.2	0.4	0.0	0.0												
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		341	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		349	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.2	0.0	1.2	0.3	0.0	0.5	0.0
		364	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	0.1	0.0	0.2	0.5	0.3	0.2	0.2	0.0	0.3	0.1
		365	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.1	0.0	0.1	0.0
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		786		0.0	0.0	0.2		0.3	0.0	0.0	0.0	0.0	0.1												
		787		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0											
		788		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		790		0.0	0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0					0.0							
		793		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.9	0.0					0.0							
		794		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		797		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		799		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.4	0.0	0.0				0.0							
3N	55	375	67.7	75.3	71.4	53.6	112.2	115.8	177.8	149.1	142.0	347.5	195.8	95.5	190.5	145.2	190.7	302.2	92.7	159.9	144.4		140.2	138.9	173.1
		376	118.6	83.1	179.9	148.4	182.9	607.1	597.5	229.7	278.9	242.0	593.7	325.1	339.2	255.4	172.4	440.4	95.4	213.7	365.5		177.5	176.4	278.1
	91	360	39.6	40.6	137.9	72.3	147.5	148.2	102.6	203.7	174.0	168.3	91.8	171.9	298.3	113.3	84.0	153.5	132.9	76.3	70.3		223.5	121.4	144.9
		361	133.7	130.5	189.0	144.0	69.6	40.7	234.5	185.3	153.4	83.3	30.7	33.3	135.0	36.6	37.4	123.4	50.5	36.8	89.6		44.3	113.1	81.7
		362	35.0	23.0	79.7	54.1	101.3	50.6	157.9	97.8	91.5	104.4	63.7	68.2	54.7	70.8	64.7	48.1	87.7	76.3	86.1		63.7	51.4	38.4
		373	2.8	0.0	12.2	15.6	20.5	23.4	119.2	66.4	51.2	79.2	42.8	66.3	151.8	61.8	54.7	157.7	67.3	81.9	67.8		77.3	76.3	66.9
		374	0.0	8.2	6.2	7.9	78.1	40.6	67.4	34.1	24.6	84.2	84.4	121.1	186.0	170.1	133.8	59.0	343.0	218.0	263.8		32.2	49.5	43.9
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.7	82.0	58.8	0.0	61.0	116.8	121.4	16.5		190.4	11.2	8.0
	183	359	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.2	4.5	0.3	7.9	6.9	9.4	4.5	0.4	0.0	32.8	28.4		0.0	0.0	1.3
		377	0.0	0.0	1.4	0.4	1.0	1.1	0.0	0.0	0.0	14.7	196.8	176.1	228.3	28.6	16.9	8.9	89.9	207.5	1.2		37.3	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.6	3.0	2.7	0.0	4.0	0.0	30.9		0.2	0.0	0.0
3O	91	330	3.7	0.0	2.6	0.6	12.5	1.1	9.7	3.4	7.8	6.5	8.1	4.0	18.2	8.7	12.6	25.2	45.4	16.5	11.9		1.0	37.1	3.0
		331	0.6	0.0	0.3	1.2	1.9	1.1	6.9	12.7	1.5	20.0	14.9	12.3	17.3	4.8	1.7	6.5	4.9	18.9	1.0		10.1	9.8	13.8
		338	27.7	0.2	21.7	10.9	10.8	24.7	99.0	2.3	24.9	1.0	3.5	38.0	2.7	15.2	2.4	3.2	6.5	61.1	6.3		2.6	28.2	8.4
		340	2.0	0.0	10.9	9.2	11.0	2.1	13.8	38.8	9.0	28.5	33.7	11.0	68.6	60.3	35.8	2.5	7.0	55.9	29.6		26.1	23.8	50.3
		351	6.4	3.7	42.0	54.2	34.2	69.2	50.4	44.0	93.6	64.2	39.5	54.5	75.9	70.4	27.0	22.9	43.4	131.5	29.4		40.9	52.3	70.5
		352	38.6	46.0	64.0	65.2	66.1	102.8	76.4	62.6	108.8	75.4	107.3	43.4	69.3	88.0	34.1	61.2	54.7	82.8	95.7		30.0	24.7	76.0
		353	4.8	4.2	41.4	0.2	21.7	10.0	21.5	16.6	86.6	6.4	13.7	13.6	12.5	10.1	36.1	35.0	28.1	11.5	6.3		16.0	19.2	20.6
	183	329	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	1.3		0.0	0.0	0.1
		332	0.9	1.7	0.0	0.0	0.5	0.4	3.4	6.2	0.0	2.9	0.4	1.1	0.4	6.7	0.1	0.0	0.2	1.8	0.0		0.0	0.5	0.6
		337	0.0	10.2	0.9	1.6	0.1	0.2	0.0	0.0	0.0	1.2	5.1	3.0	0.0	0.0	0.0	0.0	2.6	0.2	0.2		3.9	1.5	1.6
		339	0.0	0.1	0.3	0.0		0.6	2.6	8.2	4.9	0.4	0.7	4.0	1.1	0.0	0.0	0.2	11.0	0.0	1.6		0.1	0.3	1.7
		354	0.0	0.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.2	0.2	7.6	0.2		0.0	0.0	0.2
3LNO			12.6	10.2	21.7	16.0	23.4	28.7	40.3	28.7	32.3	38.7	30.6	27.8	42.3	31.3	21.2	37.5	30.2	34.7	33.5	6.6	29.9	27.9	31.3
UCL			15.9	15.1	29.3	21.0	28.3	39.5	49.7	36.7	39.7	46.7	36.8	36.6	49.8	41.5	26.6	44.2	40.9	44.8	43.1	5.5	38.0	33.9	38.6
LCL			9.2	5.4	14.0	11.0	18.6	18.0	30.8	20.7	25.0	30.7	24.3	19.0	34.7	21.1	15.7	30.9	19.6	24.7	24.0	1.2	21.7	21.8	24.0

Table 9. Abundance (million) of yellowtail flounder from Canadian Autumn surveys of NAFO divs. 3LNO using Campelen trawl 1995-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	**55**	784		0.0	0.0	0.0		1.5	0.0	0.0	0.0	0.0	0.1												
	91	350	0.1	0.1	0.0	0.1	0.4	0.9	3.5	5.3	8.3	4.9	0.8	0.9	0.1	10.2	0.1	2.8	14.0	24.4	1.8	7.1	2.0	20.8	2.0
		363	1.3	0.9	0.3	9.4	18.1	29.3	28.0	8.5	23.4	24.9	24.4	7.4	27.3	23.7	30.6	34.8	25.9	10.5	32.1	5.5	18.8	59.3	35.1
		371	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	2.3	0.0	0.6	3.5	3.9	1.2	1.8	6.9	1.3	3.9
		372	2.2	5.7	5.8	3.4	2.2	6.1	42.6	18.9	27.0	33.3	9.8	46.1	63.3	28.3	9.7	95.5	38.0	54.0	39.3	28.3	57.5	17.4	45.6
		384	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.6	0.0	17.3	4.7	1.5	20.6	0.1	27.6	14.4	11.4	8.8	14.8
		785		0.0	0.0	0.0		0.1	0.2	0.1	0.1	0.0	0.0												
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		341	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		349	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.2	0.0	1.0	0.4	0.0	0.8	0.0
		364	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.1	0.0	0.3	0.6	0.4	0.2	0.3	0.0	0.6	0.1
		365	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		786		0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0	0.0												
		787		0.0	0.0	0.1		0.0	0.0	0.0	0.0	0.0	0.0	0.0											
		788		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		790		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0					0.0							
		793		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0					0.0							
		794		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		797		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		799		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
3N	**55**	375	87.3	54.4	51.1	30.7	81.7	100.9	141.0	119.5	107.1	340.1	185.8	76.8	146.4	117.5	171.6	302.0	61.7	143.2	95.4		115.0	128.5	148.7
		376	146.7	131.8	219.1	112.3	149.0	422.1	523.6	206.6	204.9	226.7	657.5	297.7	307.2	196.0	152.4	380.4	98.3	159.0	276.4		134.9	160.3	209.3
	91	360	70.5	44.9	167.1	115.8	201.9	188.6	131.4	238.0	224.9	211.2	104.2	188.1	457.8	190.8	117.2	226.7	218.9	123.5	108.3		274.9	166.8	207.9
		361	114.7	119.4	127.4	128.6	66.8	37.4	188.0	176.4	157.4	91.6	31.7	34.6	141.7	35.5	46.7	129.3	52.5	43.0	107.0		53.3	135.9	101.4
		362	84.9	26.2	106.5	48.3	198.3	70.3	198.1	150.7	117.6	185.9	86.8	96.7	80.1	99.9	115.0	72.9	115.3	110.9	120.6		99.2	88.5	57.9
		373	4.8	0.0	12.2	12.3	22.0	24.2	106.7	65.5	49.6	76.8	54.1	67.8	182.6	74.2	63.7	188.5	77.1	92.3	76.6		87.3	91.9	142.5
		374	0.0	3.8	2.3	2.0	23.4	16.7	25.9	13.9	8.3	24.6	19.9	46.4	63.2	55.9	41.1	22.0	102.4	105.8	101.8		12.0	18.7	18.2
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	16.5	13.9	0.0	13.6	27.2	30.7	4.1		43.1	3.2	1.9
	183	359	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.6	0.1	1.0	1.3	1.8	0.8	0.1	0.0	7.4	5.3		0.0	0.0	0.2
		377	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.5	6.4	4.9	9.1	1.0	0.7	0.4	4.6	11.4	0.0		1.3	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.5	0.6	0.0	1.0	0.0	6.3		0.0	0.0	0.0
3O	**91**	330	2.4	0.0	2.1	0.5	6.8	1.0	5.7	2.4	6.4	5.2	4.4	2.9	15.9	6.8	10.6	18.4	22.9	15.2	9.7		0.7	34.9	2.6
		331	0.1	0.0	0.1	0.2	0.9	0.2	1.8	2.6	0.2	3.2	2.6	1.8	3.0	0.7	0.3	1.0	0.8	5.0	0.2		1.7	5.3	3.3
		338	25.3	0.1	10.0	8.1	9.3	20.4	67.9	1.7	18.9	0.7	2.6	20.0	2.2	9.4	2.1	2.8	4.6	37.9	4.8		2.1	22.5	7.5
		340	1.1	0.0	6.7	5.5	8.8	1.1	11.2	22.3	7.3	17.5	25.3	8.6	41.6	46.5	31.0	1.8	5.9	37.9	26.5		20.1	22.8	39.5
		351	5.5	4.0	37.2	71.9	46.9	94.5	59.3	59.2	154.7	85.9	39.8	66.5	99.5	91.7	39.7	40.6	65.1	146.2	36.1		65.3	64.8	76.9
		352	43.3	51.4	64.4	83.3	90.5	131.2	102.2	68.2	100.5	90.7	105.4	62.8	82.3	136.6	44.6	101.8	58.3	91.1	98.1		42.4	29.7	98.4
		353	1.5	1.2	14.6	0.1	13.0	5.3	12.3	9.3	44.6	4.2	8.2	7.6	6.7	5.6	16.7	18.2	14.8	6.5	3.6		9.1	8.9	9.9
	183	329	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.8		0.0	0.0	0.0
		332	0.5	0.4	0.0	0.0	0.2	0.1	1.4	2.7	0.0	1.3	0.1	0.4	0.1	2.9	0.0	0.0	0.1	0.7	0.0		0.0	0.1	0.3
		337	0.0	2.5	0.2	0.7	0.0	0.1	0.0	0.0	0.0	0.4	2.1	1.0	0.0	0.0	0.0	0.0	1.2	0.1	0.1		2.1	0.7	0.5
		339	0.0	0.0	0.0	0.0		0.1	0.7	1.9	1.5	0.1	0.2	1.0	0.3	0.0	0.0	0.0	2.6	0.0	0.3		0.0	0.1	0.4
		354	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.4	0.0		0.0	0.0	0.0
3LNO			592.2	447.1	827.1	633.6	940.3	1152.3	1651.9	1174.8	1262.6	1431.0	1376.3	1048.5	1757.2	1169.2	900.0	1656.3	1038.7	1262.9	1185.4	0.0	1061.4	1092.5	1229.1
UCL			793.2	633.9	1078.2	851.7	1207.3	1589.8	2116.1	1452.3	1545.3	1748.8	1701.2	1353.2	2068.1	1494.6	1111.2	1982.2	1283.7	1578.3	1500.5	92.0	1324.6	1328.9	1553.2
LCL			391.1	260.4	576.0	415.5	673.2	714.8	1187.7	897.3	979.9	1113.2	1051.5	743.9	1446.2	843.7	688.8	1330.5	793.7	947.5	870.3	23.8	798.2	856.1	905.0

Table 10. Biomass (000t) of yellowtail flounder from Canadian Autumn surveys of NAFO divs. 3LNO using Campelen trawl 1995-2017. Only strata <184m are shown, 3LNO totals are for all strata (with approximate 95% confidence limits).

			1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3L	55	784		0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0	0.0												
	91	350	0.0	0.0	0.0	0.1	0.2	0.3	1.2	1.7	2.6	1.6	0.3	0.4	0.0	2.9	0.0	0.9	4.6	7.4	0.6	1.9	0.5	5.8	0.6
		363	0.6	0.4	0.2	3.9	8.9	10.2	10.1	3.1	8.6	8.8	7.9	2.7	8.6	7.4	10.5	10.8	7.3	3.1	11.0	1.6	5.8	19.2	11.7
		371	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.9	0.0	0.3	1.6	1.4	0.7	0.7	2.8	0.5	1.6
		372	0.6	1.8	1.1	1.2	0.5	1.8	14.2	8.6	7.4	11.7	4.1	15.7	19.3	9.8	3.6	23.0	13.6	13.8	13.6	9.6	16.3	5.3	13.1
		384	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.7	0.0	6.7	2.3	0.8	8.0	0.1	10.1	5.8	4.2	3.6	5.1
		785		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0												
	183	328	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		341	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		342	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		348	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		349	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.0	0.2	0.0
		364	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0
		365	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		385	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		390	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		786		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0												
		787		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0											
		788		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		790		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0					0.0							
		793		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0					0.0							
		794		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		797		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
		799		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0							
3N	55	375	14.8	16.5	15.6	11.7	24.6	25.4	39.0	32.7	31.1	76.2	42.9	20.9	41.7	31.8	41.8	66.2	20.3	35.0	31.6		30.7	30.4	37.9
		376	24.4	17.1	37.1	30.6	37.7	125.2	123.2	47.4	57.5	49.9	122.4	67.0	69.9	52.7	35.6	90.8	19.7	44.1	75.4		36.6	36.4	57.3
	91	360	16.3	16.7	56.7	29.8	60.7	61.0	42.2	83.8	71.6	69.3	37.8	70.8	122.8	46.6	34.6	63.2	54.7	31.4	28.9		92.0	50.0	59.7
		361	34.1	33.3	48.2	36.7	17.7	10.4	59.8	47.2	39.1	21.2	7.8	8.5	34.4	9.3	9.5	31.4	12.9	9.4	22.8		11.3	28.8	20.8
		362	12.1	8.0	27.6	18.8	35.1	17.5	54.8	33.9	31.7	36.2	22.1	23.6	19.0	24.5	22.4	16.7	30.4	26.5	29.9		22.1	17.8	13.3
		373	1.0	0.0	4.2	5.4	7.1	8.1	41.3	23.0	17.8	27.4	14.8	23.0	52.6	21.4	19.0	54.7	23.3	28.4	23.5		26.8	26.5	23.2
		374	0.0	1.1	0.8	1.0	10.0	5.2	8.6	4.4	3.2	10.8	10.8	15.5	23.8	21.8	17.1	7.6	43.9	27.9	33.8		4.1	6.3	5.6
		383	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	7.6	5.4	0.0	5.7	10.8	11.3	1.5		17.6	1.0	0.7
	183	359	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.5	0.4	0.5	0.3	0.0	0.0	1.9	1.6		0.0	0.0	0.1
		377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.7	2.4	3.1	0.4	0.2	0.1	1.2	2.9	0.0		0.5	0.0	0.0
		382	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.3	0.2	0.0	0.4	0.0	2.8		0.0	0.0	0.0
3O	91	330	1.1	0.0	0.8	0.2	3.6	0.3	2.8	1.0	2.2	1.9	2.3	1.2	5.2	2.5	3.6	7.2	13.0	4.7	3.4		0.3	10.6	0.9
		331	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.8	0.1	1.3	0.9	0.8	1.1	0.3	0.1	0.4	0.3	1.2	0.1		0.6	0.6	0.9
		338	7.2	0.0	5.7	2.8	2.8	6.4	25.9	0.6	6.5	0.3	0.9	9.9	0.7	4.0	0.6	0.8	1.7	15.9	1.6		0.7	7.4	2.2
		340	0.5	0.0	2.6	2.2	2.6	0.5	3.3	9.2	2.1	6.7	8.0	2.6	16.2	14.2	8.4	0.6	1.7	13.2	7.0		6.2	5.6	11.9
		351	2.2	1.3	14.5	18.8	11.9	24.0	17.5	15.2	32.5	22.3	13.7	18.9	26.3	24.4	9.4	7.9	15.0	45.6	10.2		14.2	18.1	24.4
		352	13.7	16.3	22.7	23.2	23.5	36.5	27.1	22.2	38.6	26.8	38.1	15.4	24.6	31.2	12.1	21.7	19.4	29.4	34.0		10.6	8.8	27.0
		353	0.8	0.7	7.3	0.0	3.8	1.8	3.8	2.9	15.3	1.1	2.4	2.4	2.2	1.8	6.4	6.2	5.0	2.0	1.1		2.8	3.4	3.6
	183	329	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3		0.0	0.0	0.0
		332	0.1	0.2	0.0	0.0	0.1	0.1	0.5	0.9	0.0	0.4	0.1	0.2	0.1	1.0	0.0	0.0	0.0	0.3	0.0		0.0	0.1	0.1
		337	0.0	1.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0		0.5	0.2	0.2
		339	0.0	0.0	0.0	0.0		0.0	0.2	0.7	0.4	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.9	0.0	0.1		0.0	0.0	0.1
		354	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.0		0.0	0.0	0.0
3LNO			129.8	114.9	245.3	186.7	250.9	335.0	475.8	339.7	368.3	374.7	342.7	305.5	482.4	322.0	237.8	417.2	310.4	357.4	346.1	0.0	307.4	286.7	322.2
UCL			164.3	169.4	331.7	245.1	302.8	460.6	587.2	434.0	452.0	452.2	413.2	401.8	568.5	427.0	298.9	490.9	419.2	460.6	444.4	32.4	391.4	348.8	397.2
LCL			95.3	60.3	158.9	128.4	199.0	209.4	364.4	245.5	284.7	297.2	272.2	209.3	396.3	217.0	176.8	343.5	201.6	254.1	247.7	7.1	223.4	224.5	247.2

Table 11. Abundance, biomass, mean number and weight (kg) per set, of yellowtail flounder from Canadian Spring surveys of NAFO Divs. 3LNO 1984 to 2017. Survey gear changed from Engel trawl to Campelen trawl in autumn 1995.

	Abundance (millions)				Mean number per tow				Biomass ('000t)				Mean weight (kg) per tow			
	3L	3N	3O	3LNO	3L	3N	3O	3LNO	3L	3N	3O	3LNO	3L	3N	3O	3LNO
1984	45.4	435.3	63.5	544.2	22.1	189.7	25.8	79.9	21.9	167.7	28.2	217.7	10.7	73.1	11.4	32.0
1985	49.9	240.1	84.1	374.1	9.4	104.6	34.2	37.1	21.1	88.2	37.5	146.8	4.0	38.4	15.2	14.6
1986	26.9	229.5	70.1	326.5	5.3	100.0	28.5	33.3	12.6	95.1	30.5	138.2	2.5	41.5	12.4	14.1
1987	12.3	291.0	90.9	394.2	2.4	128.1	36.9	40.2	5.8	77.5	41.2	124.6	1.1	34.1	16.7	12.7
1988	8.1	135.3	59.7	203.1	1.6	58.9	24.2	20.7	3.7	51.4	25.8	81.0	0.7	22.4	10.5	8.2
1989	7.9	478.3	46.7	532.9	1.6	208.4	18.9	54.3	4.0	78.3	21.5	103.8	0.8	34.1	8.7	10.6
1990	4.7	305.5	57.3	367.4	0.9	133.1	23.9	37.7	2.2	75.7	25.1	103.1	0.4	33.0	10.5	10.6
1991	2.2	268.1	50.0	320.3	0.4	111.7	19.7	32.5	1.1	69.1	23.3	93.4	0.2	28.8	9.2	9.5
1992	0.3	189.2	28.0	217.4	0.1	79.3	11.0	21.2	0.2	49.6	11.6	61.4	0.0	20.8	4.6	6.0
1993	0.2	145.0	101.1	246.3	0.0	60.4	39.8	24.0	0.1	50.8	42.4	93.3	0.0	21.1	16.7	9.1
1994	0.1	126.4	21.9	148.4	0.0	51.5	8.5	14.1	0.0	46.3	9.2	55.6	0.0	18.9	3.6	5.3
1995	0.0	158.8	28.5	187.4	0.0	66.1	11.2	18.2	0.0	57.9	12.7	70.6	0.0	24.1	5.0	6.9
1996	2.5	475.3	161.7	639.4	0.5	198.0	63.3	62.2	1.1	103.9	70.6	175.6	0.2	43.3	27.6	17.1
1997	1.2	554.9	139.4	695.5	0.2	233.2	54.6	67.7	0.5	121.3	53.2	174.9	0.1	51.0	20.8	17.0
1998	1.6	577.2	154.5	733.3	0.3	240.4	60.5	69.9	0.5	143.7	58.0	202.2	0.1	59.8	22.7	19.3
1999	55.4	965.4	269.1	1289.9	9.6	402.1	105.4	120.4	28.5	238.5	98.7	365.7	5.0	99.3	38.7	34.1
2000	40.7	695.3	186.5	922.5	7.6	289.6	73.1	89.6	17.5	197.3	72.1	287.0	3.3	82.2	28.3	27.9
2001	11.5	1119.9	197.2	1328.5	2.1	466.4	77.3	126.6	4.4	297.9	63.6	366.0	0.8	124.1	24.9	34.9
2002	1.6	528.3	161.0	690.9	0.3	220.0	63.1	66.5	0.6	147.3	51.6	199.5	0.1	61.4	20.2	19.2
2003	92.0	914.9	243.2	1250.1	16.9	381.0	95.3	120.2	34.7	280.2	72.0	386.9	6.4	116.7	28.2	37.2
2004	38.7	690.1	237.9	966.7	7.0	287.4	93.2	92.0	15.3	216.7	75.8	307.9	2.8	90.3	29.7	29.3
2005	115.6	822.0	227.1	1164.8	21.7	342.4	89.0	113.2	43.6	263.7	81.5	388.8	8.2	109.8	31.9	37.8
2006	251.5	1035.0	295.9	1582.4	47.1	660.7	169.8	183.0	85.7	319.1	99.1	503.8	16.0	203.7	56.9	58.3
2007	177.5	953.5	309.7	1440.7	33.3	397.1	121.4	140.0	60.9	292.8	89.3	443.0	11.4	121.9	35.0	43.0
2008	115.3	1114.6	250.6	1480.4	22.6	467.5	98.2	147.5	43.2	330.4	83.3	456.9	8.5	138.6	32.6	45.5
2009	47.0	751.6	117.9	916.4	8.8	313.0	46.2	89.0	13.2	213.5	44.4	271.2	2.5	88.9	17.4	26.3
2010	110.3	950.9	272.2	1333.3	21.0	396.0	106.7	130.8	28.6	276.9	89.2	394.7	5.5	115.3	35.0	38.7
2011	160.3	967.3	298.6	1426.1	29.7	402.9	117.7	137.9	55.8	266.9	100.2	422.9	10.3	111.1	39.5	40.9
2012	238.5	1184.6	269.1	1692.1	46.3	496.9	105.4	167.8	88.6	315.3	85.6	489.4	17.2	132.2	33.6	48.5
2013	210.6	955.5	196.5	1362.6	39.5	397.9	77.0	132.4	66.3	274.9	56.2	397.3	12.4	114.5	22.0	38.6
2014	101.0	773.6	204.7	1079.3	18.9	322.2	80.2	104.9	34.5	232.4	65.2	332.1	6.5	96.8	25.5	32.3
2015	10.5	433.8	213.3	657.6	3.4	180.7	83.6	82.2	4.0	144.3	71.8	220.2	1.3	60.1	28.1	27.5
2016	11.6	347.9	115.0	474.5	2.2	144.9	45.8	46.3	1.8	101.3	30.4	133.4	0.3	42.2	12.1	13.0
2017	76.5	552.5	111.5	740.5	54.9	231.8	43.7	117.0	18.3	167.9	27.9	214.1	13.1	70.4	10.9	33.8

Table 12. Abundance, biomass, mean number and weight (kg) per set, of yellowtail flounder from Canadian Autumn surveys of NAFO divs. 3LNO 1990 to 2017. Survey gear changed from Engel trawl to Campelen trawl in autumn 1995.

	Abundance (millions)				Mean number per tow				Biomass ('000t)				Mean weight (kg) per tow			
	3L	3N	3O	3LNO	3L	3N	3O	3LNO	3L	3N	3O	3LNO	3L	3N	3O	3LNO
1990	4.4	148.5	39.5	192.5	0.8	65.9	16.1	19.3	2.1	46.5	17.3	65.8	0.4	20.6	7.0	6.6
1991	2.1	212.3	82.7	297.1	0.4	92.1	33.1	29.3	1.0	50.9	30.5	82.4	0.2	22.1	12.2	8.1
1992	2.0	158.0	55.8	215.9	0.4	86.4	22.7	22.4	0.9	44.1	19.4	64.5	0.2	24.1	7.9	6.7
1993	2.6	327.7	41.6	371.9	0.5	137.7	16.4	37.4	1.1	94.2	17.5	112.8	0.2	39.6	6.9	11.3
1994	0.1	259.3	28.5	287.9	0.0	108.0	11.2	28.0	0.0	95.5	10.9	106.4	0.0	39.8	4.3	10.4
1995	3.6	509.0	79.6	592.2	0.7	212.0	31.2	57.3	1.2	102.8	25.7	129.8	0.2	42.8	10.1	12.6
1996	6.7	380.6	59.9	447.1	1.1	158.5	24.2	39.8	2.2	92.6	20.0	114.9	0.4	38.6	8.1	10.2
1997	6.1	685.8	135.2	827.1	1.0	285.6	53.3	73.1	1.3	190.3	53.7	245.3	0.2	79.3	21.2	21.7
1998	13.1	450.1	170.4	633.6	2.1	171.8	64.2	54.4	5.2	134.0	47.5	186.7	0.8	51.1	17.9	16.0
1999	20.6	743.1	176.5	940.3	3.5	312.4	71.4	87.8	9.6	193.0	48.4	250.9	1.6	81.1	19.6	23.4
2000	37.9	860.3	254.1	1152.3	6.1	320.3	91.5	98.8	12.5	252.8	69.7	335.0	2.0	94.1	25.1	28.7
2001	74.5	1314.7	262.7	1651.9	11.7	489.5	95.3	139.8	25.5	368.9	81.4	475.8	4.0	137.3	29.5	40.3
2002	33.1	971.3	170.4	1174.8	5.2	361.7	61.4	99.3	13.6	272.7	53.5	339.7	2.1	101.5	19.3	28.7
2003	58.9	869.6	334.1	1262.6	9.2	364.8	127.1	110.9	18.6	252.0	97.7	368.3	2.9	105.7	37.2	32.3
2004	63.4	1158.6	209.1	1431.0	13.4	485.5	81.9	147.8	22.2	291.6	60.9	374.7	4.7	122.2	23.9	38.7
2005	38.8	1146.7	190.8	1376.3	6.6	446.1	68.7	122.7	14.1	261.5	67.1	342.7	2.4	101.7	24.2	30.6
2006	61.9	814.1	172.5	1048.5	10.2	339.1	68.1	95.4	21.2	232.3	52.0	305.5	3.5	96.7	20.5	27.8
2007	91.0	1414.2	252.0	1757.2	15.3	526.6	90.8	154.0	28.0	377.8	76.5	482.4	4.7	140.7	27.6	42.3
2008	81.9	787.1	300.2	1169.2	15.3	327.8	117.6	113.6	27.8	214.8	79.4	322.0	5.2	89.5	31.1	31.3
2009	45.1	709.9	145.0	900.0	7.6	282.7	52.6	80.2	16.5	180.7	40.7	237.8	2.8	72.0	14.7	21.2
2010	135.7	1335.9	184.7	1656.3	22.0	558.4	72.4	149.1	35.9	336.4	44.9	417.2	5.8	140.6	17.6	37.5
2011	103.0	759.2	176.5	1038.7	19.4	316.2	69.2	101.2	35.3	217.7	57.4	310.4	6.7	90.7	22.5	30.2
2012	93.4	827.5	342.1	1262.9	17.5	344.6	134.1	122.7	25.8	218.7	112.9	357.4	4.8	91.1	44.2	34.7
2013	103.2	901.9	180.2	1185.4	19.2	375.7	70.6	114.9	36.4	251.9	57.8	346.1	6.8	104.9	22.7	33.5
2014	57.9	0.0	0.0	57.9	9.7	0.0	0.0	9.7	19.8	0.0	0.0	19.8	3.3	0.0	0.0	3.3
2015	96.7	821.1	143.6	1061.4	18.1	342.0	56.2	103.1	29.7	241.8	35.9	307.4	5.6	100.7	14.1	29.9
2016	109.0	793.8	189.6	1092.5	20.4	330.6	74.8	106.3	34.6	197.3	54.8	286.7	6.5	82.2	21.6	27.9
2017	101.5	888.1	239.5	1229.1	19.0	369.9	94.3	119.6	32.2	218.7	71.3	322.2	6.0	91.1	28.1	31.3

Table 13. Length weight relationships used to produce an index of female SSB from the spring survey. The relationships are of the form log(weight)=(*a**log(length))+*b*)

Year	*a*	*b*
prior to 1990	3.10	-5.19
1990	3.19	-5.33
1991	3.05	-5.12
1992	3.02	-5.06
1993	3.11	-5.20
1994	3.09	-5.19
1995	3.10	-5.20
1996	3.09	-5.15
1997	3.09	-5.17
1998	3.05	-5.11
1999	3.15	-5.27
2000	3.17	-5.32
2001	3.09	-5.20
2002	3.08	-5.20
2003	3.09	-5.22
2004	3.12	-5.24
2005	3.17	-5.32
2006	3.09	-5.21
2007	3.25	-5.46
2008	3.22	-5.42
2009	3.14	-5.30
2010	3.10	-5.23
2011	3.14	-5.30
2012	3.23	-5.43
2013	3.16	-5.34
2014	3.16	-5.32
2015	3.13	-5.27
2016	3.11	-5.26
2017	3.07	-5.20

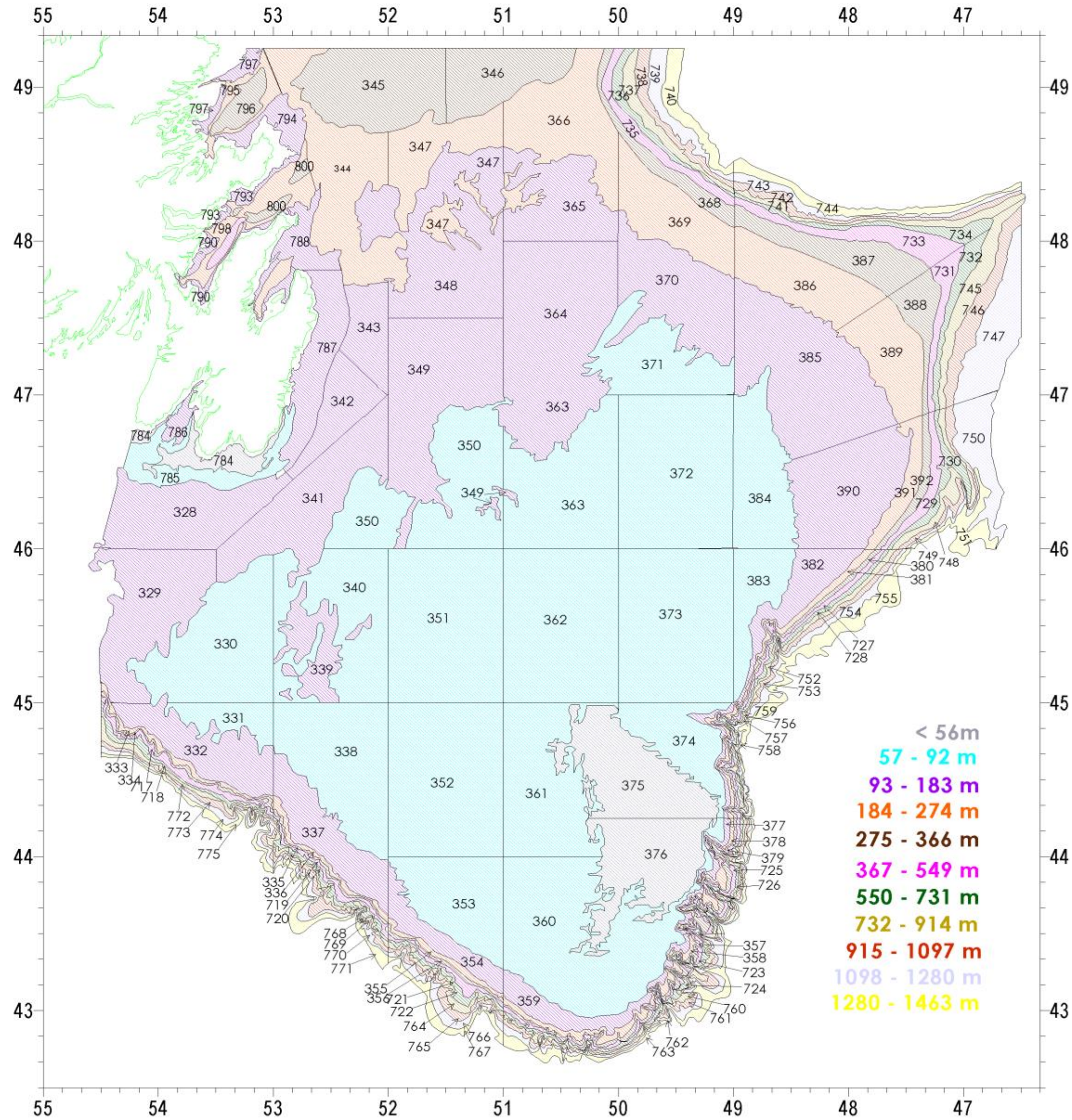

Fig. 1. Designation of strata in NAFO Divisions 3LNO.

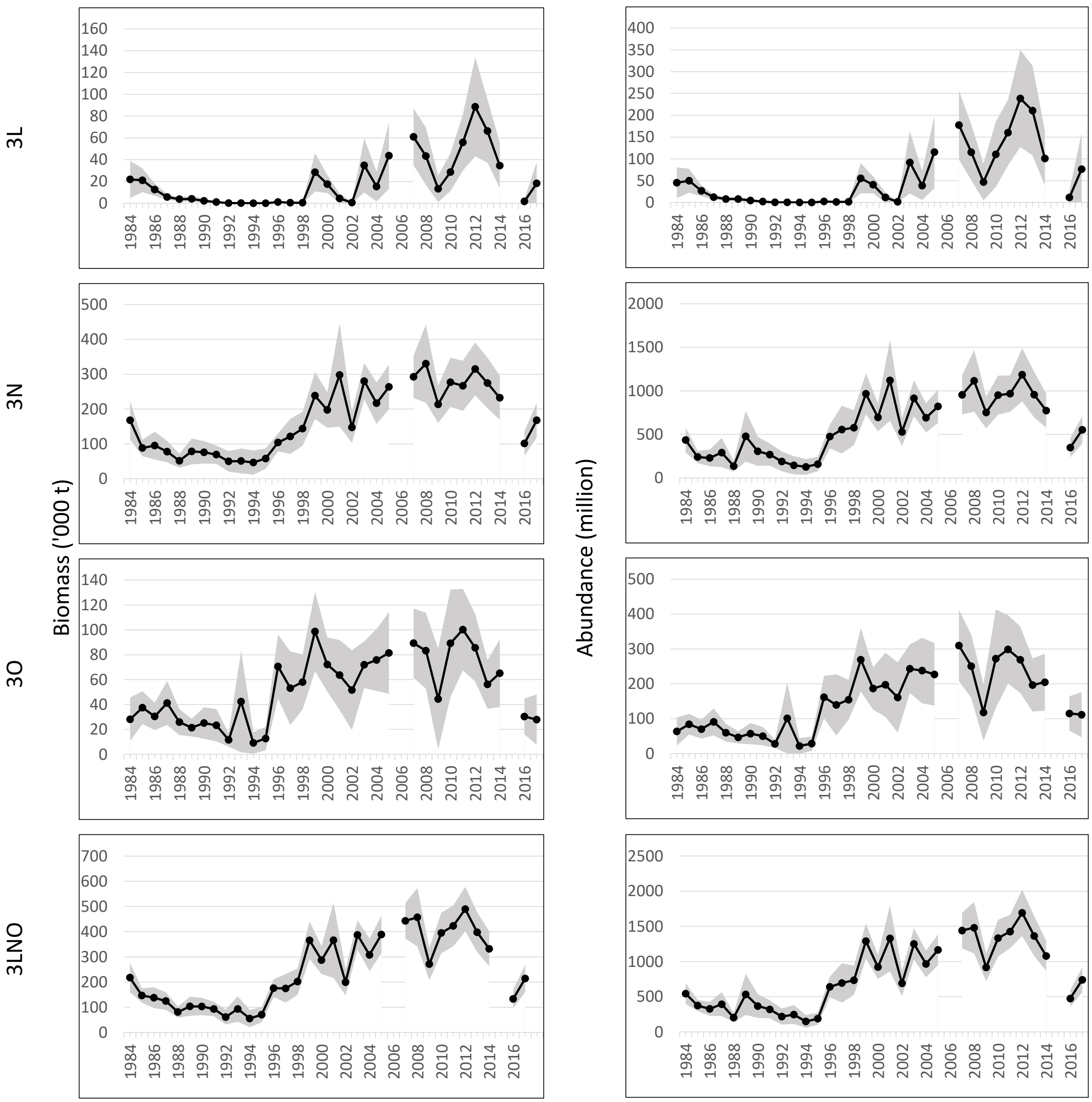

Fig. 2. Estimates of Biomass (000t) and abundance (000s) of yellowtail flounder from the Canadian Spring surveys 1984-2017. Spring 2006 and 2015 estimates are not considered representative, as the entire stock area was not covered.

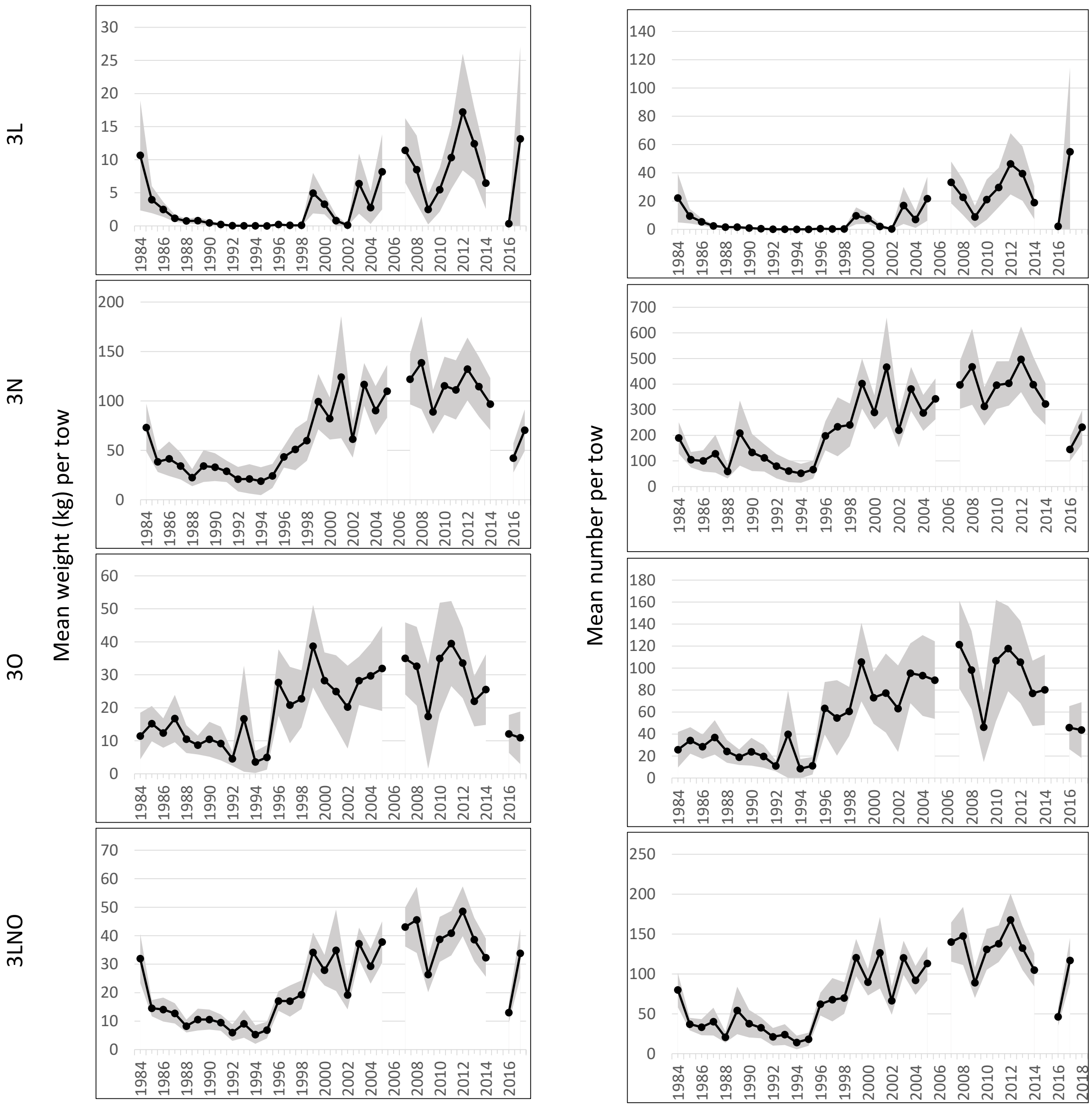

Fig. 3. Estimates of mean weight (kg) and mean number per tow of yellowtail flounder from the Canadian Spring surveys 1984-2017. Spring 2006 and 2015 estimates are not considered representative, as the entire stock area was not covered.

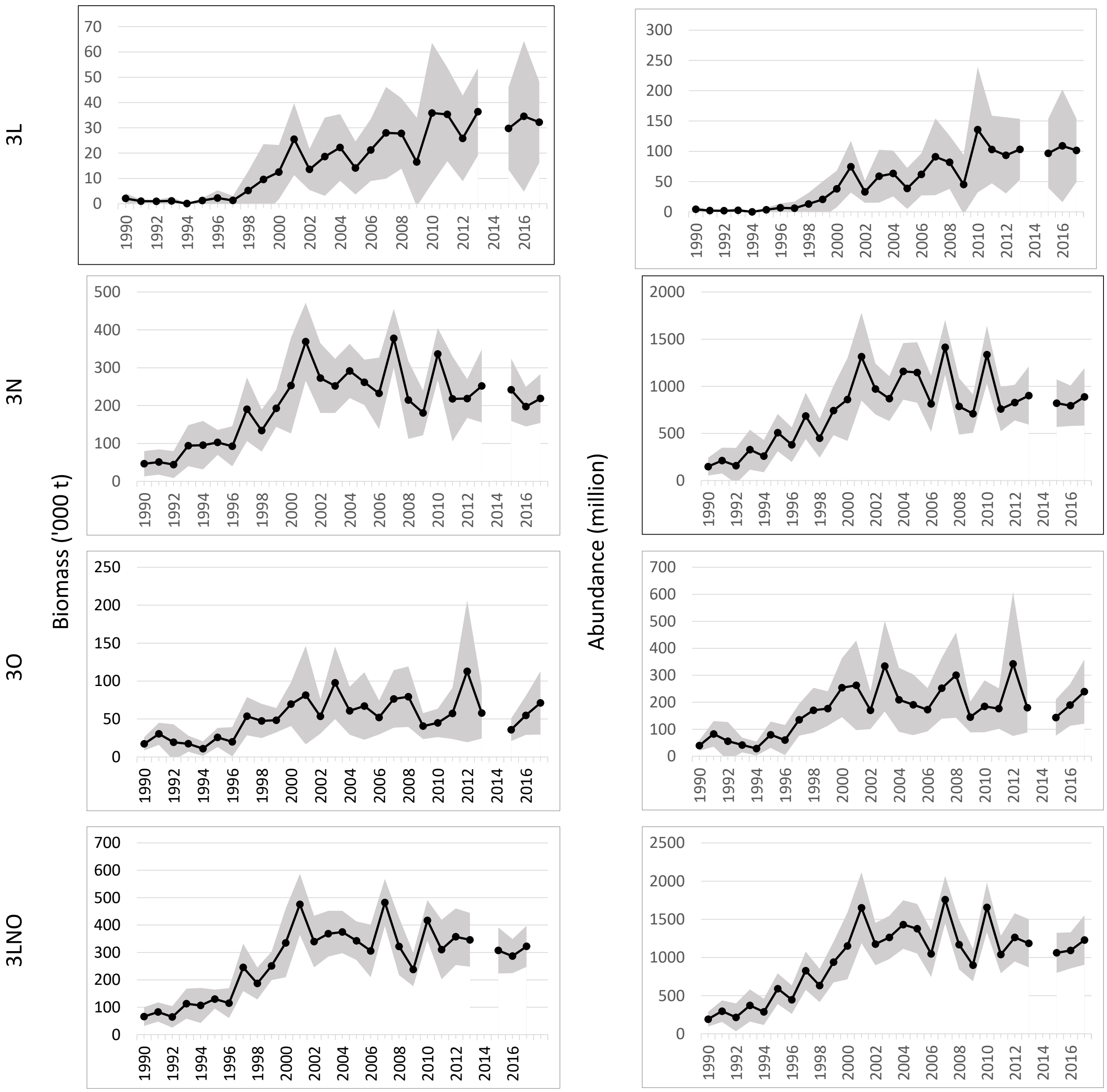

Fig. 4. Estimates of biomass and abundance (with 95 percent confidence intervals) of yellowtail flounder from the Canadian Autumn surveys, 1990-2017. 2014 estimates are not considered representative, as the entire stock area was not covered.

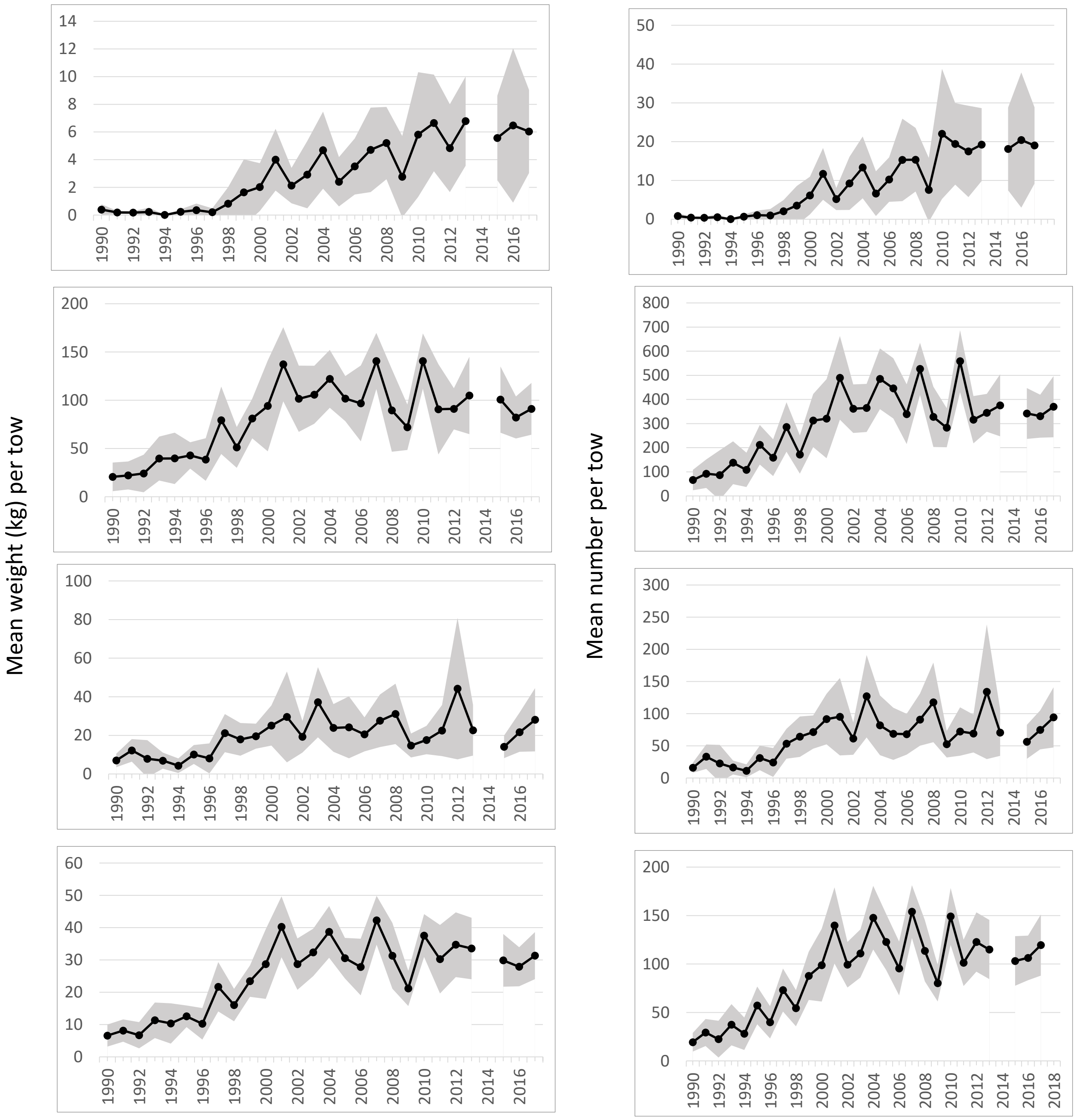

Fig. 5. Estimates of mean weight (kg) and mean number per tow of yellowtail flounder from the Canadian Autumn surveys 1990-2017. 2014 estimates are not considered representative, as the entire stock area was not covered.

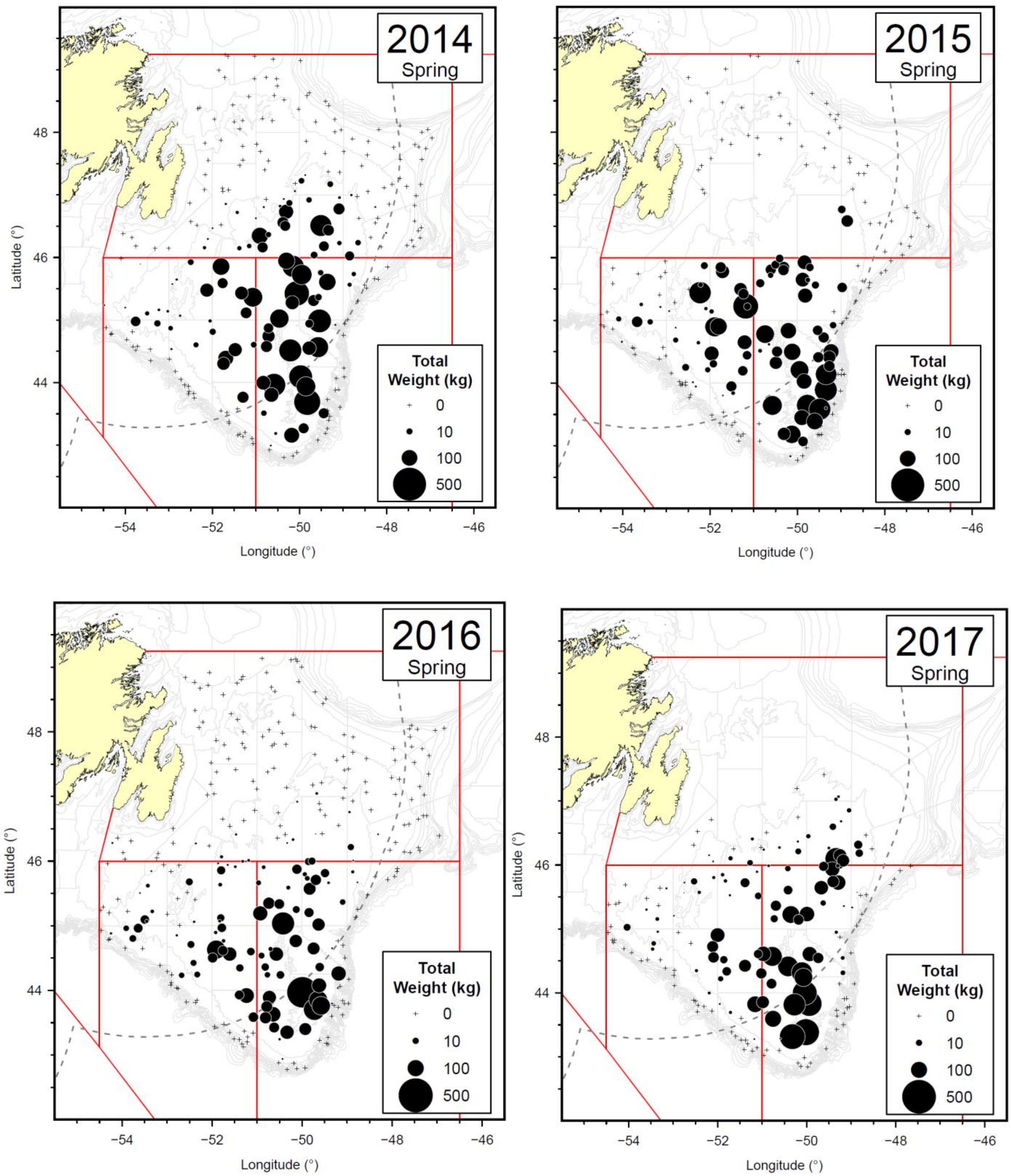

Fig. 6. Distribution of yellowtail flounder in NAFO Divs. 3LNO: weight (kg) per tow for 2014 -2017 spring Canadian surveys.

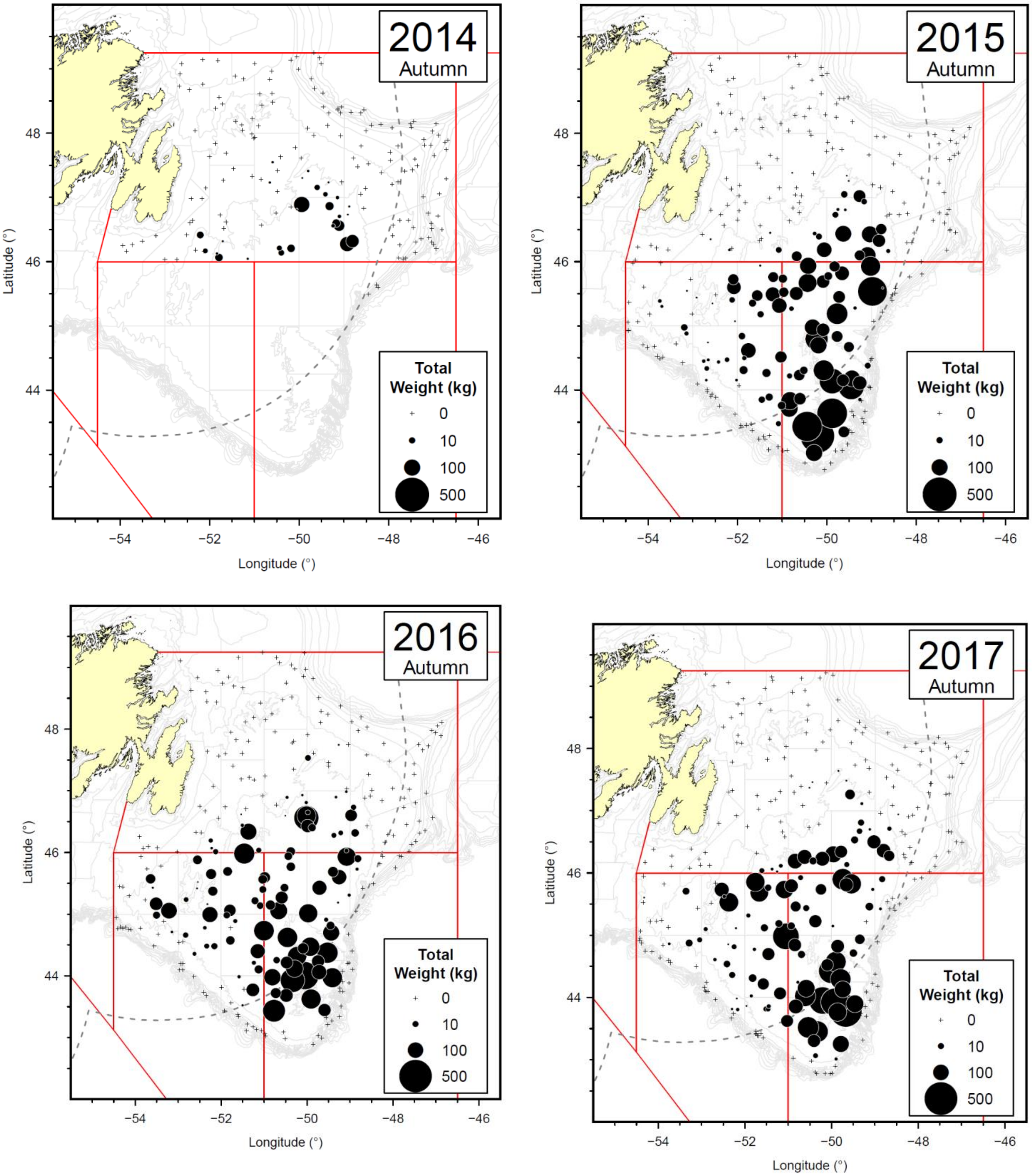

Fig. 7. Distribution of yellowtail flounder in NAFO Divs. 3LNO: weight (kg) per tow for 2014 -2017 spring Canadian surveys.

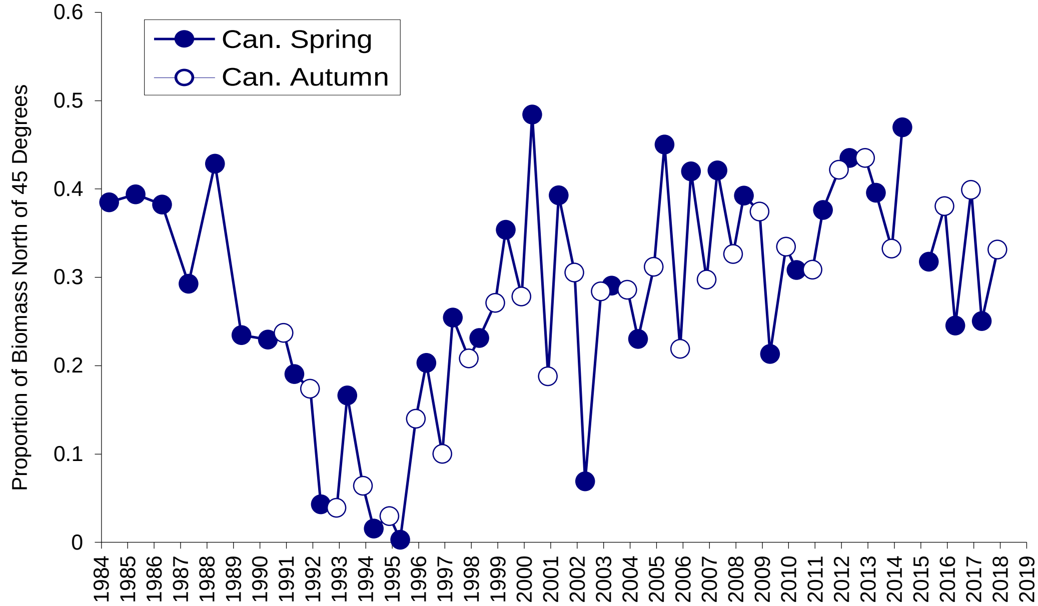

Fig. 8. Proportion of yelllowtail flounder biomass caught north of 45°N in NAFO Divs. 3LNO in the Canadian surveys. Data prior to 1990 are from Spring surveys only.

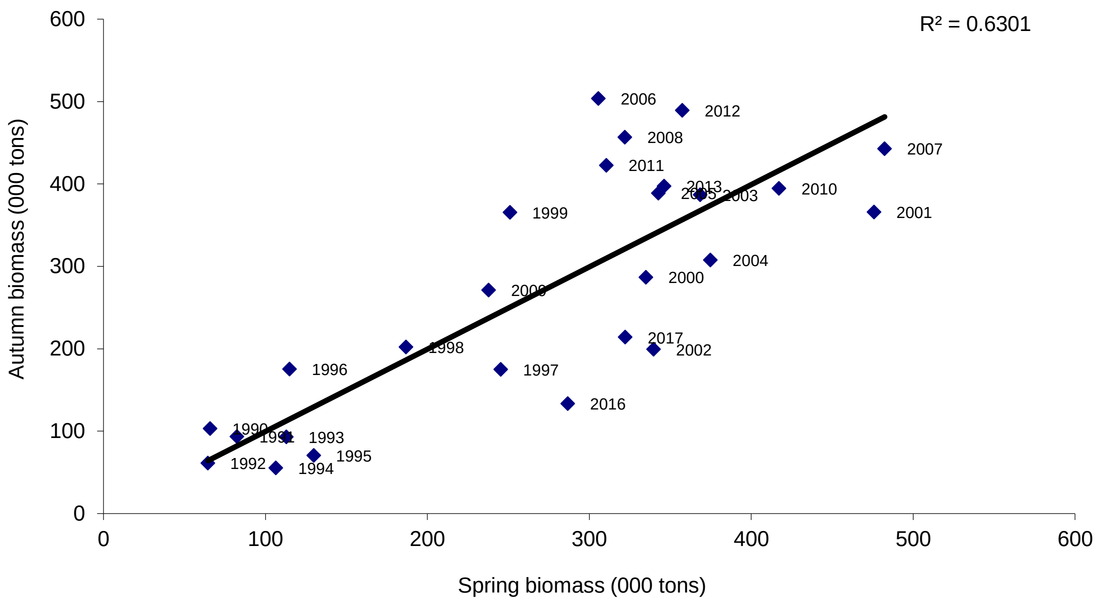

Fig. 9. Regression of Canadian spring and autumn estimates of yellowtail flounder biomass in Divs. 3LNO, 1990-2017 (2006 and 2015 spring; 2014 autumn surveys were incomplete).

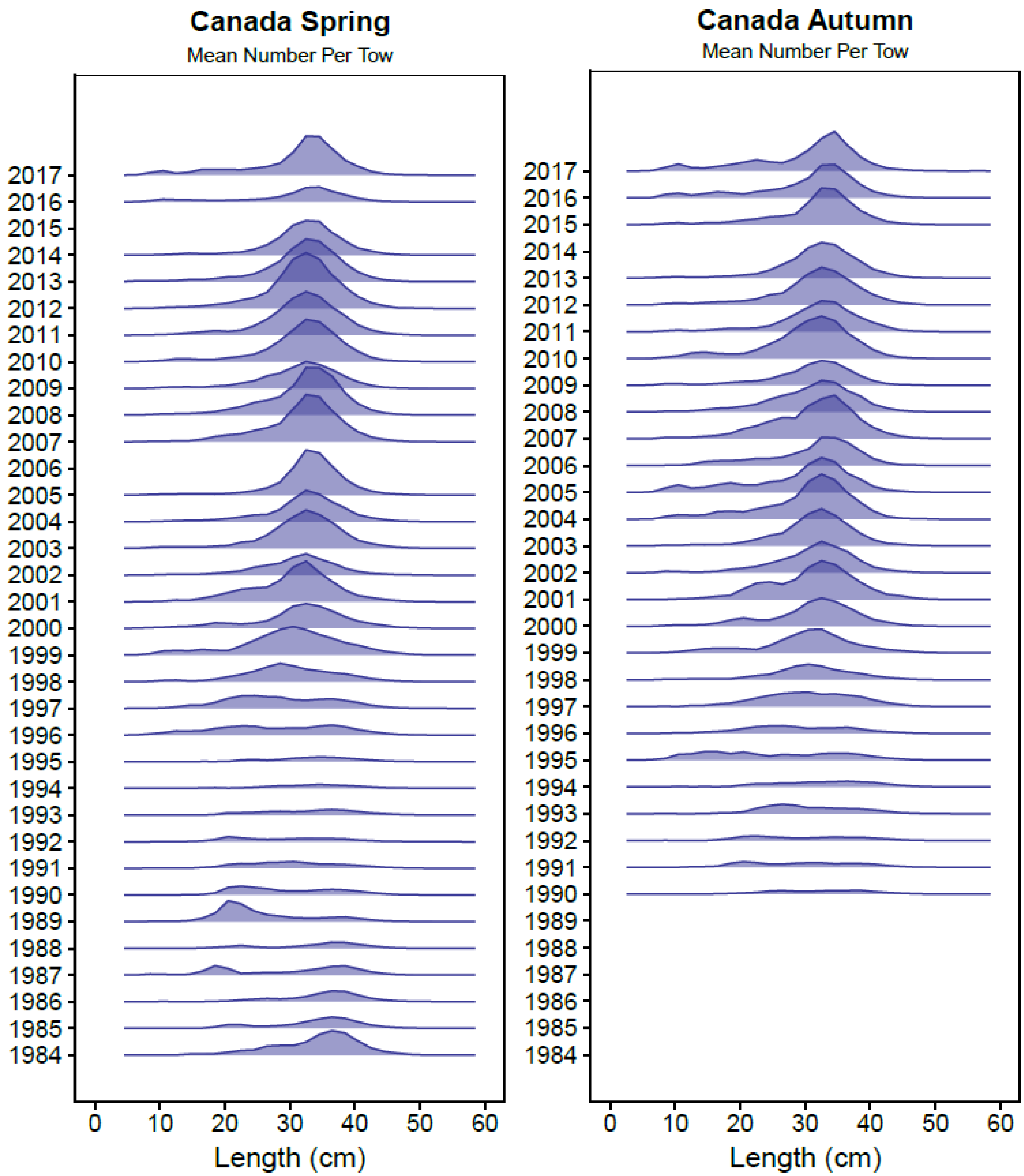

Fig. 10. Length frequencies of yellowtail flounder in the Canadian Spring and Autumn surveys in NAFO Divs. 3LNO from 1985 to 2017. Surveys in 2014 Autumn, 2006 and 2015 Spring were incomplete, and are not considered representative.

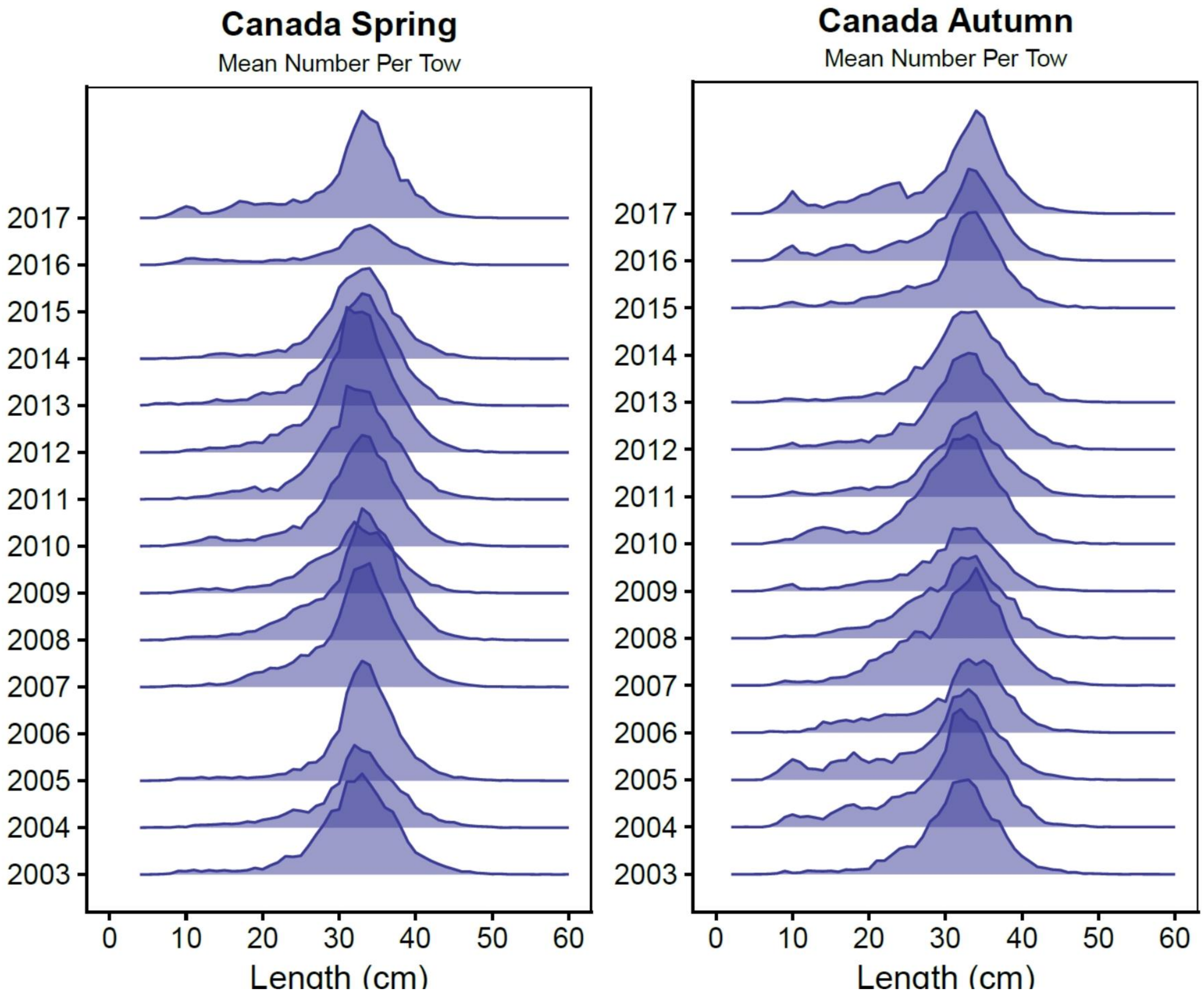

Fig. 11. Length frequencies of yellowtail flounder in the Canadian Spring and Autumn surveys in NAFO Divs. 3LNO from 2003 to 2017. Surveys in 2014 Autumn and 2015 Spring were incomplete, and are not considered representative.

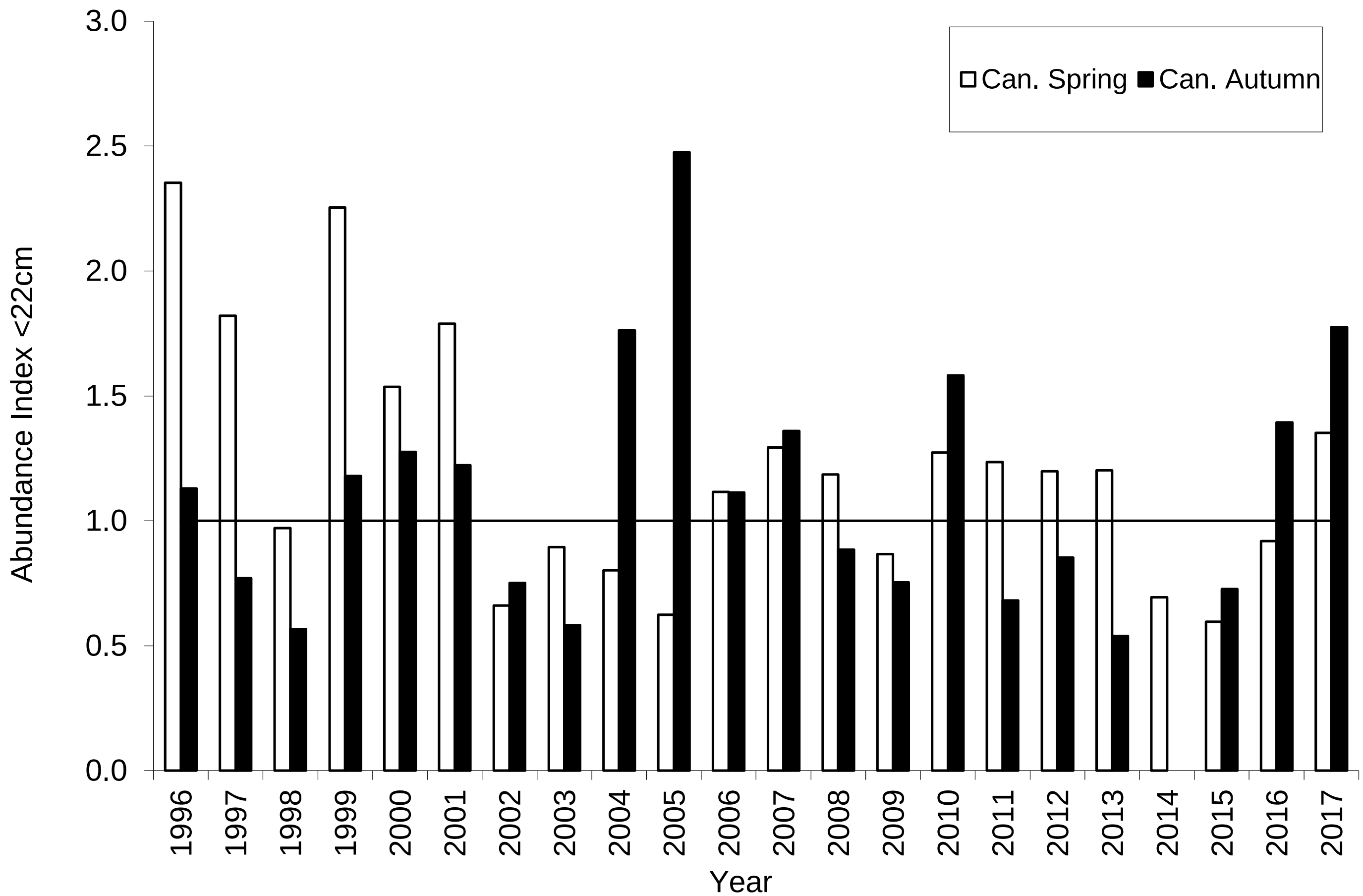

Fig. 12. Abundance Index of yellowtail flounder <22cm in Canadian Spring and Autumn surveys of NAFO Divs. 3LNO 1996-2017.

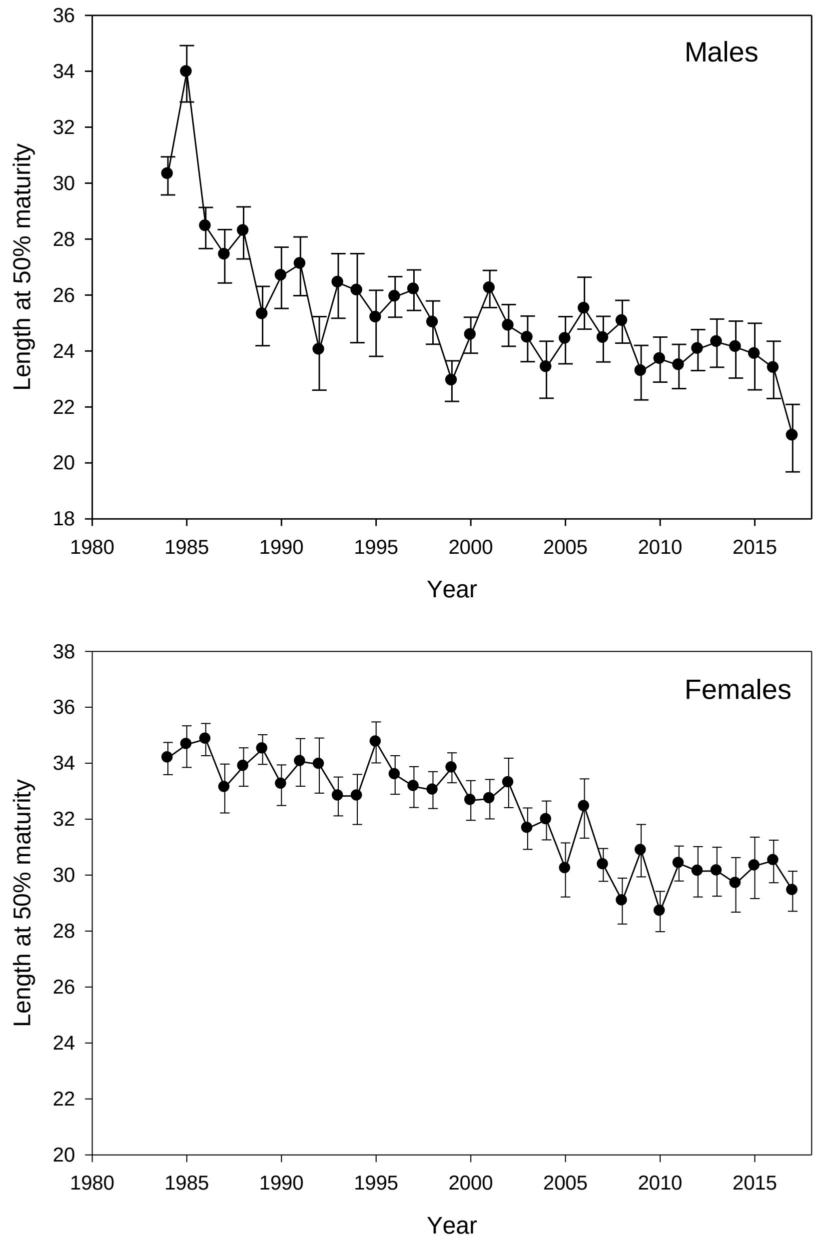

Fig. 13. Length at 50% maturity of male and female yellowtail flounder from annual Canadian research vessel surveys of Div. 3LNO from 1984 to 2017.

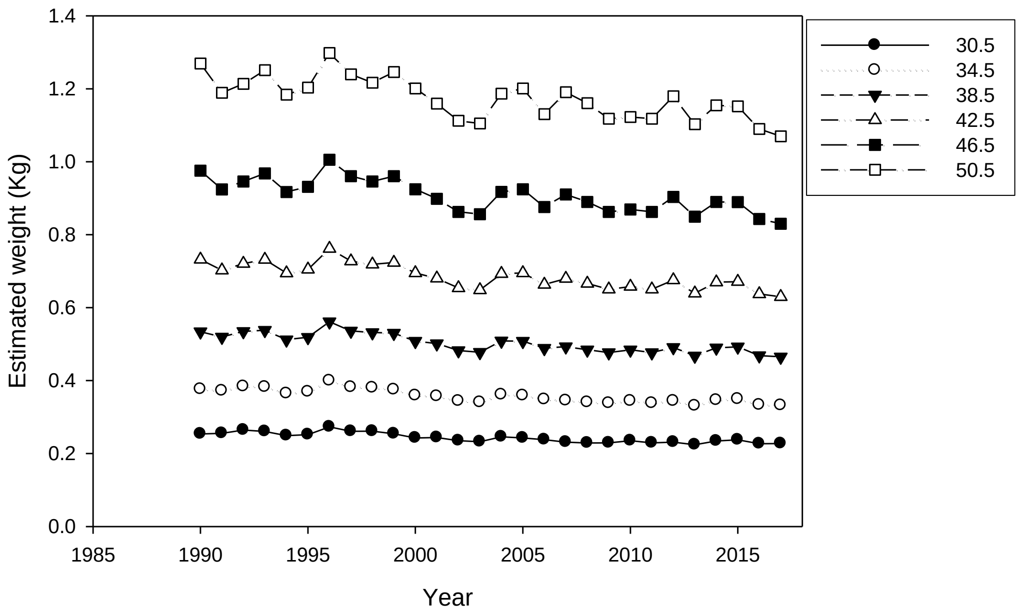

Fig. 14. Estimated weight (Kg) at length (cm) for selected length groups for female yellowtail flounder in Div. 3LNO from Canadian spring surveys from 1990-2017.

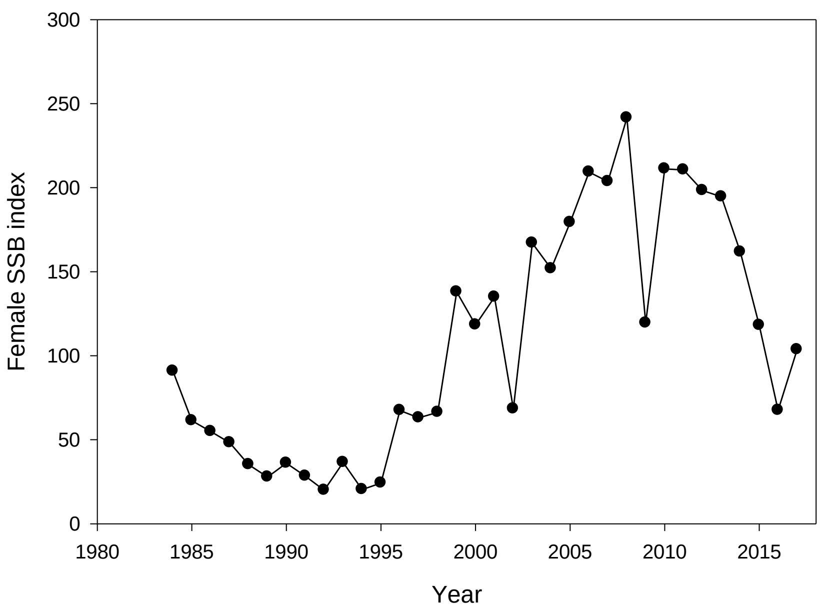

Fig. 15. Index of female spawning stock biomass for Div. 3LNO yellowtail flounder as calculated from Canadian spring research vessel surveys from 1984-2017 (the surveys in 2006 and 2015 are not considered representative).