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Divisions 3LNO Yellowtail Flounder (*Limanda ferruginea*) in the 2008 Canadian Stratified Bottom Trawl Survey

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 1984-2008 and during the fall from 1990 to 2008. 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 has increased dramatically and has again expanded its northward range in 3L to re-occupy habitats on the northern Grand Bank. Biomass estimates in the spring surveys are the second and third highest in 2007 and 2008, respectively. In the fall of 2007, the biomass index was the highest in the series at 482 kt, but in 2008 estimates declined to just above the 2006 values.

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 Div. 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. Consequently only data from 1984 to 2008 will be presented here.

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 indices of stock size. Because catchability of the standard survey trawl is unknown and assumed to be <=1.0 (Walsh, 1996), the indices are considered to be relative estimates 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 1984-2008 spring and the 1990-1994 fall surveys both covered depths from 45 to 731 m. 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. Due to mechanical problems with the CCG *Teleost* survey vessel, only sets in the deepwater strata of Div. 3L were fished in 1995 (Table 2). Fall surveys of Divisions 3NO have had poor coverage in deep water strata in several years (see

Brodie and Stansbury, 2007 and Healey and Brodie, 2009), but this is thought to have 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, and 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 overlapped into January of the following calendar year due to mechanical problems with the survey vessels. These delays are not expected to affect yellowtail flounder estimates because of its shallow water distribution in the southern section of the survey area.

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 1996 and 2001. 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 into 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). However, additional conversions of the database will be needed and consequently only annual spring and fall survey data from 1984 onward will be reported here.

Fishing and catch protocols

The Campelen carries out 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 1984-2008

Abundance and biomass trends:

Tables 4 to 15 give the survey catch rates by NAFO division in the form of stratified mean number and weight-per-tow, abundance and biomass indices with confidence limits. The large majority of the biomass is found in shallow strata (< 93m), and for brevity, only data for strata less than 184m are shown. Totals in each table are calculated using all sampled strata in each division, and percent of biomass in strata deeper than 183m are included in the biomass table for each division. Biomass > 183m was negligible in all years surveyed. Table 28 gives combined estimates for Div. 3LNO from 1984-2008. Figure 2 show plots of the abundance and biomass estimates, as well as mean number and weight per tow, of surveys from 1984-2008. The high 1999 survey estimates point to 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.

In Div. 3L, there was a continuous decline in abundance and biomass from 1985 to "0.0 t" in 1995 (Tables 6, 7, and 28; 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 28 000 t in 1999 (Table 7; Fig. 2). From 2000-2002 the abundance and biomass declined dramatically and by 2002 the biomass index was 600 t (1.6 million fish). From 2002-2008 the abundance and biomass indices have been variable but showed an overall increase to the highest estimates in the time series in 2006 at 251.5 million fish and 85.7 t biomass. Since then, biomass and abundance estimates declined marginally. When the estimates are high most of the yellowtail flounder are generally found in stratum 363 and stratum 372.

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 recent surveys, the abundance and biomass increased in strata north of the Shoal, in particular strata 362 and 373 (Tables 10 and 11) and in 2007 and 2008, large sets were taken in the 93-183m depth range (strata 359 and 377). The biomass index declined gradually from 168 000 t (435 million fish) in 1984 to 46 000 t (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 104 000 t (475 million fish) followed by a continued increase to a high of 238 500 t (965 million fish) in 1999 (Fig. 2). Since 1999, the survey abundance and biomass estimates have been variable, but have increased and in 2008 the biomass index (330 kt) was the highest in the series while abundance was second highest (1 115 million). Estimates from the 2006 survey 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).

Large catches in several strata in some years have contributed to the high variability seen around some estimates in the time series. Table 3 outlines large sets (> 400kg or >900 fish) in surveys since 1999.

In Div. 3O, the abundance and biomass have shown a somewhat stable but slightly declining trend from 1984 to 1992 with an increase in 1993 before again declining (Tables 14 and 15; Fig. 2). The biomass index showed moderate fluctuations around an average value of 27 000 t (675 million fish) for the period 1984-92, increasing to 42 000 t (101 million fish) in 1993 and then declining to an average of 11 000 t during the 1994-95 period. The anomalous high estimate in 1993 may have been produced by the high catch rates in stratum 352 and is reflected in the high variability around the estimate. In 1996, the survey biomass dramatically increased by 492 % from 12 000 t (29 million fish) in 1995 to 71 000 t (162 million fish). Since 1996, estimates of biomass and abundance have been variable, but have shown an increasing trend and reach the series highs in 2006 (99 000 t) and 2007 (310 million fish) respectively. The discrepancy in trends between the two series is due to a shift in length frequency toward smaller fish in 2007 (Fig. 4). Indices in division 3O have declined in 2008 but were still among the highest in the

series. In this Division, most of the biomass is generally found in the two strata, 351 and 352 (see Fig.1 for location) which borders 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.

In 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. From 1989-1998 there have been negligible amounts in Div. 3L until the 1999 survey (Tables 10, 11 and 28; Fig. 2) and in the most recent 2 years, there has been a substantial increase in the biomass estimate compared to the first two years of the survey. Biomass in Div. 3LNO increased rapidly in the late 1990s from the lowest levels in the mid-1990s (Table 28). Between 1999 and 2007, abundance and biomass estimates have been variable but have continued an upward trend (Fig. 2). The 2001 survey estimate of abundance and biomass were the most variable, and like the 1999 estimate it had many sets with large catches, including one with 1.6 t (4 824 fish) in Div. 3N. These large catches probably contributed to the high variability around the estimate, and it is unlikely that this is a year effect as was seen in 1999 because the 2001 biomass was very low in Div. 3L and even showed a small decline in Div. 3O.

In 2006, abundance and biomass reached the highest estimates in the time series at 1.6 billion fish (504 000 t) (Table 28). The upward trend was seen in all three divisions, in particular Div. 3L where the highest estimate in the time series was seen. Since 2005, the majority of the biomass was located in and around strata 351 and 352 of Div. 3O and in strata 360, 361, 375 and 376, the Southeast Shoal area in Div. 3N and large catches (>400 kg) were taken in strata 360, 362, 373 and 376 (Table 3). It is more probable to say that 2002 was a negative anomaly as reflected in the lack of fish in the northern areas.

Canadian Fall Surveys, 1990-2007

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 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. Based on the sporadic coverage of deep water sets in spring surveys, it may be valuable to calculate indices for yellowtail flounder using index strata. Since survey coverage has been consistent for depths less than 184m, and the great majority of yellowtail flounder are found in strata less than 184m, strata in depths less than 184m are good candidates for index strata in future assessments.

Abundance and biomass trends:

Tables 16-27 show stratified mean number and weight per tow, and abundance and biomass indices with 95% confidence limits, by stratum and division for the fall surveys, 1990-2008. Again, only data for strata less than 184m are shown. Totals for the entire division are given in each table, and percent of biomass in strata deeper than 183m are included in the biomass table for each division, and those amounts were negligible in all years surveyed. Figure 3 shows plots of the abundance and biomass estimates, mean numbers and weights per tow by division from 1990-2008. Overall estimates by division and for 3LNO combined are given in Table 29.

In Div. 3L, abundance and biomass were very low and variable without trend from 1990-1995, reaching an estimate close to zero in 1994 (Fig. 3). 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 1995 and 1996. The biomass varied around an average level of 1 000 t from 1990-1997 before increasing to about 26 000 t in 2001 (Table 28). Similarly, the abundance increased from 6 million fish in 1996 to 75 million fish in 2001. A drop in both the abundance and biomass indices (of 56% and 46% respectively) in 2002 was followed by a general increase to the series high in 2007 (28 000 t; 91 million fish) and in 2008, estimates remained high. Estimates have wide confidence limits since 2001, and may be due in part to most of the biomass occurring in 2 strata (363 and 372, which border 3N, account for upwards of 90% of biomass estimates in some years). These 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 2003-2007.

In Div. 3N, the stock size, from 1990-92, fluctuated around an average value of 47 000 t before doubling in size in 1993 to 94 000 t (Table 29). Since then the stock increased to 369 000 t in 2001 followed by a decrease to 252 000 t in 2003 (Table 29; Fig. 3). Values have fluctuated around 250 000 t since then, and in 2007 increased to the series high at 378 000 t but subsequently declined in 2008 to 215 000 t. Similarly, the survey abundance from 1990-94 fluctuated around an average size of 222 million fish before showing a strong upward trend in 1995 to 509 million fish and reaching 1.3 billion fish in 2001, representing an overall increase of 160% (Table 28; Fig 3). From 2001 the abundance decreased to a level of 900 million fish in 2003. The large jump in stock biomass seen in the 2003 spring survey was not evident in the fall survey (81% *vs.* 10%, respectively) because the fall 2002 survey did not show a decline as was seen in the spring 2002. From 2001-2008, both the abundance and biomass estimates have varied around a level of 1.0 billion fish and 270 000 t biomass, respectively (Fig. 3).

Much of the large increases seen in the 2001 survey was attributed to large catches in stratum 376 ranging with 5 sets from 420 to 1150 kg (2 000 to 4 000 fish; 2 sets >800 kg) contributing 33%, to the divisional total estimate and to the large confidence interval around both estimates of abundance and biomass for 2001 (Table 3). In 2004 and 2005 several sets on the Southeast Shoal, (strata 375 and 376) were above 400 kg (1 515-4 473 fish). In 2006 large sets were taken in strata 360 and 376, and in 2007 and 2008, 12 sets and 4 sets, respectively, met the criteria for large sets (>900 fish or >400 kg). Similar to the spring surveys strata 360, 361, 362, 373 and 376 account for most of the biomass in this Division.

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 20 000 t (Tables 27 and 28: Fig. 3). Then in 1997, the biomass level jumped by 205% to 26 000 t (159 million fish). Since then estimates have been stable but variable at about 600 million fish and 60 kt with an increasing trend from 2006-2008.

A large catch of 1200 fish (463 kg) in the western stratum, 338, may have contributed to the large variability around the 2001 fall estimate. Even though the estimate of stock size was low in 2002 there were 3 large catches taken on the Southeast shoal strata. In 2003-2008, there were catches (>1 000 fish) (Table 3) taken in the surveys (weight range of 200-400 kg). Similar to the spring surveys, most of the biomass in this division was found in strata 351 and 352 which borders 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 (Table 29 and Fig. 3). Since 1993, when the survey biomass was estimated to be 113 000 t (372 million fish), there has been an increasing upward trend to a high of 476 000 t (1.2 billion fish) in 2001, representing a 321% increase in stock biomass. The 2001 survey biomass estimate of 476 000 t showed a 42% increase in size over the 2000 estimate. The biomass in the Southeast Shoal's strata, 375 and 376, contribute significantly to the overall biomass: 22% 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 the biomass has decreased to 368 000 t (1.3 billion fish) in 2003 putting the 2002 and 2003 more in line with the 2000 estimates. The annual up and down pattern in the biomass and abundance from 1998 to 2003 evident in the spring surveys was not apparent in the fall surveys, although recent estimates have been more variable than those in the past. From 2002 to 2006, the abundance and biomass were stable around an average level of 1.3 billion fish and 369 000 t, respectively. In 2007, estimates were the highest in the series for 3LNO combined (482 000 t; 1.8 million fish), but in 2008 declined slightly to 2006 levels.

Distribution

Yellowtail flounder is concentrated mainly in Div. 3N and the bordering areas of Div. 3O and to a lesser extent the border of Div. 3LN, similar to most years in the time series. Figures 5 to 8 show the standard number and weight from the catches of individual fishing sets from the spring and fall Campelen surveys for 2005-2008.

In the 2005-2008 surveys, yellowtail flounder were most abundant in Division 3N, particularly in strata on the Southeast Shoal (375 & 376) and those immediately to the west (strata 360 & 361). These strata straddle the Canadian 200 mile (360 km) limit and extend into the Regulatory Area (Fig. 5 to 8). Observed distributions were comparable with earlier descriptions of the distribution of this stock (Walsh, 1992; Brodie *et al*., 1998; Walsh *et al*., 1999; 2000; 2001a, c; Simpson and Walsh, 2004; Walsh *et al*., 2004, Maddock Parsons and Brodie, 2008).

Yellowtail flounder also appear to be more abundant in the Regulatory Area of Division 3N in recent surveys than years previous to 1999 and the northward distribution of the stock has extended to Div. 3L, similar to mid-1980s when the stock size was high (Simpson and Walsh 2004). Brodie *et al.* (1998) noted that the northward range extension of yellowtail flounder on the Grand Bank contracted with decreasing stock size during the mid to late 1980s and early 1990s so that the bulk of the stock was south of 45°N. Simpson and Walsh (2004) have shown that the observed range contraction of yellowtail flounder at low population levels represents selection for preferred habitats in the southern area of the Bank where depth and temperature are important covariates affecting the spatial pattern. During periods of large increases in stock size, the range of yellowtail flounder expanded into less favourable habitats to north and to a lesser extent, westward in support of MacCall's Basin hypothesis. Depth, but not temperature, played an influential role. Recent tag returns from the 1998-2000 fisheries also confirmed the northward extension of the stock in recent years (Walsh *et al*., 2001b; Walsh *et al*., 2006).

Figure 9 shows a plot of the proportion of biomass north of 45^{o} N from 1973 to 2008. The range of the stock has extended northward since 1995. From 1996-2001, in 2003, and 2005-08, the proportion of biomass north of 45^{o} N is higher in the spring than in the fall. The one obvious exception is the spring of 2002, when the proportion of biomass is much lower than in fall 2002, and is close to the low values in the early 1990s. The surrounding data suggest that the 2002 spring point is anomalous. There is a difference in trend between spring and fall surveys, with recent spring surveys indicating a decline in the percentage of biomass above 45°N and fall surveys showing the opposite trend. Both surveys in 2008 showed 40% of the biomass above 45°N, substantially higher than values in the early 90s and about the same as levels at the start of the time series.

Colbourne and Walsh (2006) noted that in 1990-2005 surveys the centroid of the biomass of yellowtail flounder located within Div. 3NO was found over the Southeast Shoal of the Grand Bank. This area corresponds to some of the warmest bottom temperatures found anywhere on the Grand Banks. The authors reported that spring bottom temperatures in this region range from a minimum of 1-2°C during cold years (1990) to 3-4°C during warm years (1998 and 1999). Fall bottom temperatures are in general warmer than spring values ranging from $2\text{-}3^{o}$C in most years to maximum values of between 7-8°C during extreme years (1999). Since 1999, with the exception of 2002, survey catch rates of yellowtail have remained significantly higher than those before 1995. With the exception of 2003 spring bottom temperatures have also been higher than they were in the early 1990s. The cold temperature values observed in the spring of 2003 were anomalous and lasted from April to June and were above average during the remainder of the year (Colbourne *et al*., 2004). However there is no indication that the temperature had a limiting factor in the northward distribution of yellowtail flounder in the 2002 spring survey (See Fig. 12); and 2004 fall survey (Fig. 12 and 13; Colbourne and Walsh, 2006a). Temperature correlations have not been examined since 2006.

There was a steady increase in the abundance of yellowtail flounder coinciding with a northward expansion of the stock from 1995 up to 2007 that also coincided with an increasing trend in bottom temperatures (until 2006, at least). Colbourne and Walsh (2006) noted that these results indicate a temperature preference for yellowtail towards the warm water habitat of the Grand Banks. The 2004-2005 surveys showed increasing frequency of catches in the northern areas, especially Div. 3L in the spring (which continued in 2006 and 2007) with some catches being taken in less than 0°C in the fall of 2004. Temperature data has not been examined for the 2006 -2008 survey data in relation to yellowtail distribution. Vessel problems resulted in reduced coverage in the 2006 spring survey and estimates from that survey may not be comparable to those in other years.

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Table 1. Summary of Canadian RV Spring (Campelen time series) surveys from 1996-2008.

		3L			3N		3O		3LNO	3LNO Survey timing	
Year	Vessel	# sets	# inshore sets	Depth range (m)	# sets	Depth range (m)	# sets	Depth range (m)	Total sets	Earliest set	Latest set
1996	W. Templeman	188		66-664	82	42-665	86	65-685	356	7-May	27-Jun
1997	W. Templeman	158		60-681	71	35-689	81	62-669	310	30-Apr	26-Jun
1998	W. Templeman	163		53-721	88	38-682	93	64-657	344	12-May	30-Jun
1999	W. Templeman	177		41-692	82	40-659	86	62-679	345	11-May	29-Jun
2000	W. Templeman	134		61-681	81	45-664	83	61-694	298	11-May	29-Jun
2001	W. Templeman	154		34-695	79	40-650	79	64-699	312	29-Apr	24-Jun
2002	W. Templeman	146		42-710	79	40-641	79	63-628	304	27-Apr	22-Jun
2003	W. Templeman	155		62-698	79	39-681	79	63-726	313	8-May	26-Jun
2004	W. Templeman	151		47-710	79	44-675	79	61-636	309	12-May	26-Jun
2005	W. Templeman	133		64-672	78	45-691	79	66-719	290	9-May	29-Jun
2006	W. Templeman	141		60-701	4	68-77	3	75-84	148	10-Jun	30-Jun
	A. Needler				18	46-68	29	64-103	47	25-Jun	29-Jun
2007	Teleost	40		66-171					40	5-Jun	9-Jun
	W. Templeman	97		61-702	79	44-636	79	64-719	255	3-May	12-Jul
2008	Teleost	43		97-641					43	4-Jun	9-Jun
	W. Templeman	79		60-684	71	40-623	80	64-704	230	23-May	30-Jun

Table 2. Summary of Canadian RV Fall (Campelen time series) surveys from 1995-2008.

		3L			3N		3O		3LNO	3LNO Survey timing	
Year	Vessel	# sets	# inshore sets	Depth range (m)	# sets	Depth range (m)	# sets	Depth range (m)	Total sets	Earliest set	Latest set
1995	Teleost	5		733-1210						25-Jan	25-Jan
	W. Templeman	165		63-640	90	40-650	81	63-730	341	26-Sep	9-Dec
1996	Teleost	31		805-1433	12	390-1147	24	68-690		26-Nov	17-Dec
	W. Templeman	180		51-671			19	65-139		9-Oct	12-Dec
	A. Needler				54	37-309	15	63-304	335	24-Nov	5-Dec
1997	Teleost	71		161-1436						29-Nov	20-Dec
	W. Templeman	134		35-714	74	41-769	73	64-611	352	26-Sep	15-Dec
1998	Teleost	32		691-1437	12	834-1447				28-Nov	16-Dec
	W. Templeman	172		34-675	78	42-1079	87	61-1076	381	10-Oct	15-Dec
1999	W. Templeman	169		63-1407	68	39-664	75	58-692	312	13-Oct	12-Dec
2000	Teleost	74		152-1430	23	747-1419	24	752-1424		11-Oct	18-Dec
	W. Templeman	102		42-447	70	46-642	75	62-654	368	11-Oct	14-Dec
2001	Teleost	34		146-1457	24	739-1410	22	803-1391		22-Sep	20-Nov
	W. Templeman	169		38-702	70	45-660	75	67-703		6-Oct	6-Dec
	A. Needler	2		187-203					396	24-Nov	24-Nov
2002	Teleost	30		763-1431	24	811-1429	24	775-1504		11-Oct	2-Dec
	W. Templeman	176		35-670	68	44-675	75	65-696	397	5-Oct	1-Dec
2003	Teleost	30		753-1446			8	761-1382		23-Sep	20-Jan
	W. Templeman	175		32-702	70	43-727	75	63-650	358	9-Oct	17-Dec
2004	Teleost	4		151-522						7-Dec	7-Dec
	W. Templeman	143		44-653	69	40-659	76	63-634	292	31-Oct	19-Dec
2005	Teleost	7		803-1351	17	776-1445	24	754-1410		7-Oct	29-Jan
	W. Templeman	120		50-706	69	42-633	75	60-649		4-Oct	8-Dec
	A. Needler	57		121-667					369	29-Oct	16-Nov
2006	Teleost	34		111-1401						19-Nov	18-Dec
	W. Templeman	151		61-641	69	46-650	74	63-674	328	30-Sep	19-Nov
2007	Teleost	48		81-1424	25	775-1419	24	753-1410		6-Oct	20-Dec
	W. Templeman	120		61-694	69	48-652	75	64-632	361	18-Oct	20-Dec
2008	Teleost	83		62-664	64	38-643	66	60-661		3-Oct	13-Nov
	W. Templeman	43		71-332					256	1-Nov	11-Nov

Table 3. yellowtail flounder catches >900 fish or >400kg per survey set for Spring and Fall surveys from 1999-2008.

		Spring		Fall			
		3N		3N		3O	
Year	Strata	Number	Weight	Number	Weight	Number	Weight
1999	360	2131	666.5	972	252.7		
		1621	452.7				
	361	1140	145.8				
	362	1169	217.2	938	197.7		
		929	509.5	1772	240.5		
	375	1029	130.4				
	376	1540	267.0	1753	359.8		
		1023	182.4				
		1295	148.5				
2000	352					924	235.2
	360			1060	238.0		
	362	1274	400.0				
	373	1147	450.6				
	375			1020	232.5		
	376			1392	682.4		
				2193	419.6		
				3994	1149.5		
2001	338					1192	463.4
	360	1404	303.5				
		1043	225.8				
		1008	280.4				
	361	998	243.5	1275	376.0		
	362	1657	345.6	1433	424.2		
		1388	242.4				
	373	4824	1653.8				
	376	1080	305.9	4243	889.1		
		1370	293.2	2081	516.6		
		2384	493.5	3178	831.1		
2002	360	979	233.7	1642	742.0		
		1474	432.5	1190	315.2		
		1096	268.8				
		1200	376.4				
		1118	332.4				
	361			990	284.5		
				987	249.0		
	362			1289	295.7		
	375			1103	295.5		
	376			1365	297.7		
				1367	258.6		
2003	351					1345	255
	353					993	340.31
	360	922	288.5	1360	492.5		
		1105	290.7				
	361			1355	338.5		
				972	240.1		
	373	906	319.1				
	376	1976	393.6	1627	475.0		
		1004	305.1				
		1677	377.3				

		Spring		Fall			
		3N		3N		3O	
Year	Strata	Number	Weight	Number	Weight	Number	Weight
2004	351					929	233.0
	360	1088	321.2	1151	286.4		
		952	480.8	901	396.8		
	361	990	219.7				
	362			1492	224.6		
	373			943	384.9		
	375			2118	444.8		
				2151	518.5		
				1452	240.6		
	376	1227	315.9	1170	348.1		
				1764	254.9		
2005	352					1001	388.3
	360	1193	419.1				
	361	1014	266.5				
	362	964	328.4				
	373	934	376.1				
	375			1515	292.8		
	376	1669	481.3	2218	494.9		
				2450	432.6		
				4473	844.4		
				3614	602.9		
2006	360	954	317.3	1759	771.4		
		1527	351.5				
		1584	546.7				
	362	1366	396.1				
	376	1624	410.7	1149	321.7		
				1569	315.3		
				2529	505.3		
2007	360	2069	423.5	2140	649.0		
		1175	234.5	1409	390.0		
				1145	329.8		
				1410	357.5		
				915	195.7		
	361			946	166.9		
	362	982.4	302.4				
	373	922	395.0	1292	364.8		
		921	374.9				
	375			1201	302.2		
	376	957	249.8	1770	408.9		
		1350	262.4	2216	341.9		
				1331	414.2		
	377			816	242.8		
2008	352					1084	211.65
	360	1531	472.5	955	219.98		
		3093	1032.02				
	361	944	132.1				
	362	1063	357.13	1107	252.88		
	373	1028	405.6				
	375			1070	316		
	376	1477	306.63	1789	558.54		
		1278	328.13				

Table 4. Mean number per tow of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784															0	0		0	0		0				
57 - 92	350	3.2	7.4	4.4	1.3	2.8	1.4	0.3	1.5	0.1	0	0.1	0	1.6	0	0	33.2	21.5	4.5	0.3	8.4	11.9	22.2	9.7	10.5	44.0
	363	45.6	27.6	14.5	13.1	9.9	3.4	7.6	1.3	0.2	0	0	0	4.4	1.0	0	94.8	97.9	13.7	0.7	207.7	55.7	209.8	390.7	386.3	177.8
	371		0.7	0.7	0	0.8	0.2	0	0.4	0	0	0	0	0.4	0	0	2.5	0	0	0	0	0.8	56.0	9.8	3.5	0.3
	372	96.6	117.1	62.0	24.4	13.9	19.5	8.0	4.0	0.6	0.7	0.1	0	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
	384		7.7	2.5	1.9	0.4	0.2	0	0	0	0	0	0	0	0.8	0	0	0.5	0.8	0.3	0.3	0.3	0	23.3	3.3	2.0
	785															0.5	0		0	1.0		1.5				
93 - 183	328	0	0	0	0.1	0	0	0.1	0.2	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0.2	0	
	341	0	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	0	0.2	0.2	1.3	3.8	3.6	21.0
	342	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0
	343		0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	348		0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0.2
	349	0.2	0.1	2.3	0.2	0.1	0	0	0	0	0	0.1	0	0.1	0	0	18.0	2.6	0	0	0.4	0	0.3	16.9	78.3	1.7
	364	1.6	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	2.9	0.5	0	0	0	0	1.9	22.3	0.3	28.0
	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
	370		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8
	385		0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.3	0.1	0
	390		0.2	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
	786															0.5	0		0			0				
	787															0	0		0			0				
	788																0									
	790																0									
	793																0									
	794																0				0					
	797																0				0					
	799																					0				
3L (all strata)		22.1	9.4	5.3	2.4	1.6	1.6	0.9	0.4	0.1	0.0	0.0	0.0	0.5	0.2	0.3	9.6	7.6	2.1	0.3	16.9	7.0	21.7	47.1	33.3	21.59
Upper CI		39.3	14.6	7.8	3.6	2.4	2.6	1.6	0.7	0.1	0.1	0.0	0.0	0.7	0.4	0.8	15.6	11.3	4.2	0.6	30.2	13.0	37.5	64.2	48.1	28.9
Lower CI		5.0	4.2	2.8	1.2	0.9	0.5	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.1	-0.2	3.6	3.9	0.0	0.0	3.6	1.0	5.8	30.1	18.4	14.2

Table 5. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784															0	0		0	0		0				
57 - 92	350	1.4	3.5	2.0	0.6	1.4	0.6	0.2	0.7	0.1	0	0.1	0	0.7	0	0	16.3	8.4	2.1	0.0	2.6	4.6	7.9	3.7	3.9	15.4
	363	22.2	12.6	6.9	6.3	4.5	1.6	3.4	0.6	0.1	0	0	0	2.2	0.5	0	51.6	43.6	5.3	0.1	77.6	23.7	84.0	144.1	135.2	71.0
	371		0.4	0.3	0	0.4	0.1	0	0.1	0	0	0	0	0.1	0	0	1.4	0	0	0	0	0.3	20.9	4.4	1.2	0.1
	372	46.5	48.2	28.7	11.2	6.2	9.9	4.0	2.0	0.3	0.3	0.1	0	1.1	0.7	1.4	24.2	12.0	7.0	1.5	43.0	23.8	50.9	121.9	55.8	45.9
	384		3.7	1.5	1.2	0.2	0.1	0	0	0	0	0	0	0	0.5	0	0	0.2	0.3	0.3	0.0	0.2	0	11.8	1.8	0.6
	785															0.0	0		0	0.2		0.8				
93 - 183	328	0	0	0	0.0	0	0	0.1	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0	
	341	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0.0	0.1	0.3	1.2	1.1	7.1
	342	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
	343		0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	348		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
	349	0.1	0.0	1.0	0.1	0.1	0	0	0	0	0	0.0	0	0.1	0	0	7.9	1.0	0	0	0.1	0	0.1	5.3	24.0	0.5
	364	0.7	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	1.4	0.2	0	0	0	0	0.7	9.5	0.1	10.5
	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
	370		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
	385		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
	390		0.1	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
	786															0.2	0		0			0				
	787															0	0		0			0				
	788																0									
	790																0									
	793																0									
	794																0				0					
	797																0				0					
	799																					0				
3L (all strata)		10.7	4.0	2.5	1.1	0.7	0.8	0.4	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.1	5.0	3.3	0.8	0.1	6.3	2.8	8.2	16.0	11.4	8.1
Upper CI		19.0	6.0	3.6	1.7	1.1	1.3	0.8	0.4	0.1	0.1	0.0	0.0	0.3	0.1	0.2	8.0	4.8	1.6	0.2	10.9	5.2	13.9	21.9	16.3	11.1
Lower CI		2.3	1.9	1.4	0.6	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	-0.1	1.9	1.7	0.0	0.0	1.7	0.3	2.4	10.2	6.5	5.1

Table 6. Abundance (millions) of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784															0	0		0	0		0				
57 - 92	350	0.9	2.1	1.2	0.4	0.8	0.4	0.1	0.4	0.0	0	0.0	0	0.4	0	0	9.4	6.1	1.3	0.1	2.4	3.4	6.3	2.8	3.0	12.5
	363	11.2	6.8	3.6	3.2	2.4	0.8	1.9	0.3	0.1	0	0	0	1.1	0.2	0	23.2	24.0	3.3	0.2	50.8	13.6	51.4	95.7	94.6	43.5
	371		0.1	0.1	0	0.1	0.0	0	0.1	0	0	0	0	0.1	0	0	0.4	0	0	0	0	0.1	8.6	1.5	0.5	0.0
	372	32.7	39.6	21.0	8.3	4.7	6.6	2.7	1.4	0.2	0.2	0.0	0	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
	384		1.2	0.4	0.3	0.1	0.0	0	0	0	0	0	0	0	0.1	0	0	0.1	0.1	0.0	0.0	0.0	0	3.6	0.5	0.3
	785															0.0	0		0	0.1		0.1				
93 - 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	
	341	0	0.0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.0	0.0	0.3	0.8	0.8	4.5
	342	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
	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
	348		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
	349	0.0	0.0	0.7	0.1	0.0	0	0	0	0	0	0.0	0	0.0	0	0	5.2	0.8	0	0	0.1	0	0.1	4.9	22.8	0.5
	364	0.6	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	1.1	0.2	0	0	0	0	0.7	8.7	0.1	10.9
	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
	370		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
	385		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
	390		0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1
	786															0.0	0		0			0				
	787															0	0		0			0				
	788																0									
	790																0									
	793																0									
	794																0				0					
	797																0				0					
	799																					0				
3L (all strata)		45.4	49.9	26.9	12.3	8.1	7.9	4.7	2.2	0.3	0.2	0.1	0	2.5	1.2	1.6	55.4	40.7	11.5	1.6	92.0	38.7	115.6	251.5	177.5	115.3
Upper CI		80.7	77.5	39.7	18.4	11.9	13.2	8.3	3.6	0.7	0.7	0.3	0	3.8	2.0	4.3	89.9	60.3	23.1	3.1	164.3	72.0	200.1	342.6	256.8	154.5
Lower CI		10.2	22.3	14.2	6.2	4.3	2.7	1.1	0.8	-0.1	-0.2	0.0	0	1.2	0.4	-1.1	20.9	21.0	-0.1	0.1	19.6	5.4	31.2	160.5	98.3	76.0

Table 7. Biomass (kt) of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784															0	0		0	0		0				
57 - 92	350	0.4	1.0	0.6	0.2	0.4	0.2	0.0	0.2	0.0	0	0.0	0	0.2	0	0	4.6	2.4	0.6	0.0	0.7	1.3	2.3	1.1	1.1	4.4
	363	5.4	3.1	1.7	1.6	1.1	0.4	0.8	0.1	0.0	0	0	0	0.5	0.1	0	12.6	10.7	1.3	0.0	19.0	5.8	20.6	35.3	33.1	17.4
	371		0.1	0.0	0	0.1	0.0	0	0.0	0	0	0	0	0.0	0	0	0.2	0	0	0	0	0.0	3.2	0.7	0.2	0.0
	372	15.7	16.3	9.7	3.8	2.1	3.4	1.3	0.7	0.1	0.1	0.0	0	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
	384		0.6	0.2	0.2	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	1.8	0.3	0.1
	785															0.0	0		0	0.0		0.0				
93 - 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	
	341	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	0.1	0.3	0.2	1.5
	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
	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
	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
	349	0.0	0.0	0.3	0.0	0.0	0	0	0	0	0	0.0	0	0.0	0	0	2.3	0.3	0	0	0.0	0	0.0	1.5	7.0	0.2
	364	0.3	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0.5	0.1	0	0	0	0	0.3	3.7	0.1	4.1
	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
	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
	385		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
	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
	786															0.0	0		0			0				
	787															0	0		0			0				
	788																0									
	790																0									
	793																0									
	794																0				0					
	797																0				0					
	799																					0				
3L (all strata)		21.9	21.1	12.6	5.8	3.7	4.0	2.2	1.1	0.2	0.1	0.0	0	1.1	0.5	0.5	28.5	17.5	4.4	0.6	34.3	15.3	43.6	85.7	60.9	43.2
Upper CI		38.9	32.0	18.3	8.5	5.4	6.8	4.0	1.8	0.4	0.3	0.1	0	1.7	0.8	1.3	46.2	25.8	8.9	1.2	59.2	29.1	74.3	116.7	87.0	59.1
Lower CI		4.8	10.2	6.8	3.1	2.1	1.2	0.5	0.4	-0.1	-0.1	0.0	0	0.5	0.1	-0.3	10.8	9.3	0.0	-0.1	9.5	1.5	12.9	54.6	34.9	27.4
% biomass >183m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00

Table 8. Mean number per tow of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	373.6	165.6	409.6	208.3	118.5	82.3	259.5	21.5	340.3	135.7	29.0	139.7	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
	376	91.5	220.3	162.3	719.6	125.7	977.0	521.3	764.1	183.7	35.0	2.3	10.8	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
57 - 92	360	289.7	155.3	32.3	33.0	7.0	480.3	91.7	50.1	140.2	41.9	6.8	133.2	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
	361	338.6	171.0	101.4	130.1	166.6	142.3	293.3	242.9	63.6	237.9	451.0	276.7	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
	362	227.1	74.4	159.9	103.3	73.3	50.9	79.4	53.7	7.5	86.8	2.3	0.6	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
	373	122.0	58.1	28.2	38.7	34.6	20.8	2.5	13.4	0.1	0.1	3.0	0	7.8	1.9	11.1	103.1	311.8	680.9	32.9	273.6	55.4	315.6		365.9	407.8
	374	59.7	38.5	14.8	7.6	4.2	0.2	1.8	0.4	1.0	0	0	3.3	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
	383	3.7	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3		10.0	70.0
93 - 183	359	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	2.5	0	0	0	0	0		17.5	38.5
	377	0	0	0	0	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	4.0		423.9	84.5
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5		0	0
3N (all strata)		189.7	104.6	100.0	128.1	58.9	208.4	133.1	111.7	79.3	60.4	51.5	66.1	198.0	233.2	240.4	402.1	289.6	466.4	220.0	381.0	287.4	342.4	660.7	397.1	464.2
Upper CI		251.2	135.1	141.7	202.2	86.3	335.7	206.4	165.4	127.0	103.6	89.1	101.0	254.8	349.9	324.1	499.8	356.3	660.0	287.5	467.6	357.7	421.9	872.1	490.9	559.3
Lower CI		128.2	74.1	58.3	53.9	31.6	81.2	59.9	57.9	31.6	17.1	13.8	31.3	141.1	116.5	156.7	304.4	222.8	272.8	152.6	294.5	217.2	262.9	449.3	303.4	369.1

note: 2006 survey coverage was poor in important yellowtail flounder strata and results are likely not comaparable to other survey years.

Table 9. Mean weight (kg) per tow of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	150.0	78.2	181.6	103.8	50.6	21.2	84.3	11.7	118.4	49.5	12.1	59.7	78.7	87.5	90.8	100.2	70.1	84.6	65.6	133.9	94.2	81.4	98.7	145.4	101.8
	376	30.0	66.8	66.8	78.7	12.6	121.7	70.9	143.7	22.4	5.1	0.6	2.8	5.4	123.6	99.6	150.2	72.8	253.5	50.4	266.0	209.3	245.6	214.2	210.1	212.8
57 - 92	360	106.6	46.3	11.2	7.4	2.5	61.0	12.1	12.1	25.3	8.8	2.5	39.6	68.1	39.1	77.8	186.0	63.5	146.3	213.5	191.2	178.4	152.2	303.8	126.8	328.7
	361	126.7	59.9	38.3	58.1	70.2	43.5	105.0	82.3	29.6	82.5	163.9	108.5	106.1	102.5	122.4	123.3	129.2	164.5	102.8	163.7	131.9	102.6	123.4	118.9	85.7
	362	86.8	32.1	61.2	40.3	35.1	24.6	30.3	24.4	2.9	40.9	1.3	0.3	83.5	97.1	111.8	166.3	162.4	123.6	12.5	84.3	78.5	138.3	245.8	129.8	102.3
	373	52.9	26.4	13.9	17.8	18.2	11.1	0.9	7.1	0.0	0.0	0.9	0	1.9	1.0	3.2	31.9	121.1	228.0	8.1	95.6	17.1	125.2		142.5	148.4
	374	30.1	21.1	8.9	4.3	2.3	0.1	0.5	0.2	0.6	0	0	1.1	7.1	3.0	1.2	69.0	74.3	23.9	10.3	103.4	99.2	115.1	90.1	294.1	127.6
	383	2.0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7		4.1	29.6
93 - 183	359	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	1.1	0	0	0	0	0		6.3	12.3
	377	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	1.7		165.9	25.2
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1		0	0
3N (all strata)		73.1	38.4	41.5	34.1	22.4	34.1	33.0	28.8	20.8	21.1	18.9	24.1	43.3	51.0	59.8	99.3	82.2	124.1	61.4	116.7	90.3	109.8	203.7	121.9	137.6
Upper CI		97.3	48.7	58.9	47.8	31.1	50.3	47.1	39.7	33.2	36.0	33.2	36.3	54.0	72.2	80.2	127.4	103.5	186.4	80.0	138.4	115.1	136.4	258.0	147.4	167.5
Lower CI		48.9	28.1	24.0	20.5	13.7	18.0	18.9	17.9	8.4	6.2	4.6	11.9	32.6	29.8	39.5	71.3	60.9	61.8	42.7	95.0	65.5	83.2	149.3	96.5	107.7

Table 10. Abundance (millions) of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	81.9	36.3	89.8	45.6	26.0	18.0	56.9	4.7	74.6	29.7	6.4	30.6	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
	376	18.9	45.4	33.5	148.4	25.9	201.5	107.5	157.6	37.9	7.2	0.5	2.2	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
57 - 92	360	119.2	63.9	13.3	13.6	2.9	197.7	37.7	20.6	57.7	17.2	2.8	54.8	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
	361	86.3	43.6	25.8	33.2	42.5	36.3	74.8	61.9	16.2	60.6	115.0	70.5	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
	362	78.7	25.8	55.4	35.8	25.4	17.7	27.5	18.6	2.6	30.1	0.8	0.2	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
	373	42.3	20.1	9.8	13.4	12.0	7.2	0.9	4.6	0.0	0.0	1.0	0	2.7	0.6	3.8	35.7	108.1	236.0	11.4	94.8	19.2	109.4		126.8	141.3
	374	7.6	4.9	1.9	1.0	0.5	0.0	0.2	0.1	0.1	0	0	0.4	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
	383	0.3	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2		0.9	6.5
93 - 183	359	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	2.2
	377	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0.1		5.8	1.2
	382	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
3N (all strata)		435.3	240.1	229.5	291.0	135.3	478.3	305.5	268.1	189.2	145.0	126.4	158.8	475.3	554.9	577.2	965.4	695.3	1119.9	528.3	914.9	690.1	822.0	1035.0	953.5	1114.6
Upper CI		576.5	310.0	325.1	459.6	198.0	770.4	473.6	397.2	303.0	248.8	218.8	242.5	611.8	832.5	778.1	1200.0	855.6	1584.8	690.4	1122.6	858.8	1012.9	1366.1	1178.6	1343.0
Lower CI		294.1	170.1	133.9	122.5	72.5	186.2	137.4	139.0	75.3	41.1	34.0	75.1	338.8	277.3	376.4	730.9	535.0	655.1	366.3	707.1	521.4	631.1	703.9	728.4	886.1

Table 11. Biomass (kt) of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	32.9	17.1	39.8	22.8	11.1	4.6	18.5	2.6	25.9	10.8	2.7	13.1	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
	376	6.2	13.8	13.8	16.2	2.6	25.1	14.6	29.6	4.6	1.1	0.1	0.6	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
57 - 92	360	43.9	19.0	4.6	3.1	1.0	25.1	5.0	5.0	10.4	3.6	1.0	16.3	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
	361	32.3	15.3	9.8	14.8	17.9	11.1	26.8	21.0	7.5	21.0	41.8	27.7	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
	362	30.1	11.1	21.2	14.0	12.2	8.5	10.5	8.5	1.0	14.2	0.5	0.1	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
	373	18.3	9.1	4.8	6.2	6.3	3.8	0.3	2.5	0.0	0.0	0.3	0	0.6	0.3	1.1	11.1	42.0	79.0	2.8	33.1	5.9	43.4		49.4	51.4
	374	3.9	2.7	1.1	0.6	0.3	0.0	0.1	0.0	0.1	0	0	0.1	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
	383	0.2	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2		0.4	2.7
93 - 183	359	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.1	0	0	0	0	0		0.4	0.7
	377	0	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
	382	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
3N (all strata)		167.7	88.2	95.1	77.5	51.4	78.3	75.7	69.1	49.6	50.8	46.3	57.9	103.9	121.3	143.7	238.5	197.3	297.9	147.3	280.2	216.7	263.7	319.1	292.8	330.4
Upper CI		223.2	111.9	135.2	108.5	71.4	115.4	108.1	95.3	79.1	86.5	81.5	87.2	129.7	171.7	192.6	305.8	248.4	447.6	192.1	332.2	276.3	327.5	404.2	353.8	402.2
Lower CI		112.1	64.5	55.1	46.6	31.4	41.2	43.3	42.9	20.1	15.0	11.2	28.6	78.2	70.9	94.8	171.1	146.2	148.3	102.5	228.2	157.2	199.8	234.0	231.7	258.5
% biomass >183m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0

Table 12. Mean number per tow of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	1.0	14.8	5.0	1.5	1.1	2.0	1.2	9.2	0	0.1	0	0	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
	331	50.0	62.3	5.3	26.5	9.0	25.0		1.0	0	2.0	5.5	0.5	1.5	5.3	1.0	69.8	43.5	30.0	17.0	86.5	36.5	45.5		25.5	83.5
	338	30.0	22.2	10.6	4.1	48.9	13.2	11.3	17.1	18.0	13.0	5.0	10.0	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
	340	6.0	13.6	16.3	40.8	10.0	6.4	17.7	5.4	3.2	2.8	0	0.2	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
	351	80.0	85.6	80.7	39.5	75.2	43.5	52.4	24.5	7.2	5.8	0.3	0.8	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
	352	63.7	55.6	73.0	103.4	47.2	50.7	77.9	78.4	50.8	226.1	55.6	36.0	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
	353	2.0	98.5	32.1	148.5	3.0	9.6	20.7	26.7	10.0	66.5	1.8	70.2	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
93 - 183	329	0	0	0	0.1	0	0	0	0.4	0	0.2	0	0	0	0	0	0.3	0.2	0	0	0	0	0		0.2	0
	332	0	0.6	14.2	9.2	0.3	30.4	1.8	1.3	1.0	13.3	0.3	1.5	6.5	1.3	7.5	4.8	0	4.3	22.0	5.7	0	1.7		1.0	3.0
	337	0	0	1.0	1.2	2.3	2.8	0	0	1.0	7.0	0.3	0.5	3.0	15.9	0.5	0.9	2.0	0	8.7	0	0	4.4		0	1.7
	339	1.0	0.3	0.3	0.3	0	0	1.0	0	0	0	0	0	0	0	0	0.9	2.0	27.0	1.0	11.0	0	6.5	32.0	2.9	1.5
	354	0	1.0	0	0	0	0.5	0	3.0	0	0	0	0.7	2.0	0.5	0	0.4	1.0	0	0	0	1.0	0		4.0	1.5
3O mean # per tow		25.8	34.2	28.5	36.9	24.2	18.9	23.9	19.7	11.0	39.8	8.5	11.2	63.3	54.6	60.5	105.4	73.1	77.3	63.1	95.3	93.2	89.0	169.8	121.4	98.2
Upper CI		42.0	46.2	39.5	52.6	34.6	26.1	36.5	30.0	15.9	80.5	17.3	19.3	87.3	89.1	83.0	141.2	96.8	113.3	102.9	122.6	130.1	124.3	238.8	161.3	121.5
Lower CI		9.6	22.1	17.5	21.2	13.9	11.8	11.2	9.3	6.1	-0.9	-0.4	3.2	39.4	20.1	38.1	69.7	49.4	41.2	23.3	68.0	56.3	53.7	100.8	81.4	74.9

note: 2006 survey coverage was poor in important yellowtail flounder strata and results are likely not comaparable to other survey years.

Table 13. Mean weight (kg) per tow of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.6	6.7	2.6	0.7	0.6	1.1	0.7	4.0	0	0.1	0	0	0.9	0.2	0.2	0.3	23.7	0.7	1.9	2.0	3.0	3.0	6.7	11.9	10.0
	331	21.7	29.5	2.8	13.2	4.6	14.8		0.6	0	1.4	2.8	0.2	0.5	1.6	0.0	27.3	19.1	10.0	6.5	38.7	12.3	19.5		10.9	37.3
	338	12.7	10.6	5.4	1.9	19.6	6.4	5.6	5.1	8.1	5.3	2.7	4.9	30.8	24.8	21.2	27.6	18.1	53.9	12.6	11.5	5.9	9.1	19.0	49.8	17.7
	340	2.9	6.6	7.5	18.3	4.7	3.2	8.5	2.7	1.6	1.5	0	0.0	0	3.4	0.8	4.2	17.8	4.4	3.1	20.3	2.3	16.4	43.2	29.2	38.2
	351	35.8	37.5	33.8	17.3	32.4	20.0	24.2	11.6	3.2	2.4	0.1	0.3	13.6	26.6	18.0	89.7	34.9	44.3	13.7	28.1	60.8	100.9	79.9	59.1	99.7
	352	28.1	24.5	30.0	42.9	21.3	22.7	31.5	38.3	19.9	93.0	22.7	15.4	129.7	72.0	83.5	110.1	100.0	75.3	93.6	136.5	97.5	89.1	118.3	107.1	63.9
	353	1.1	43.2	15.9	75.7	1.6	4.9	9.9	13.0	4.6	29.8	1.1	31.8	60.5	56.3	90.8	103.2	41.8	24.9	37.7	14.0	92.7	33.9	65.2	36.8	39.1
93 - 183	329	0	0	0	0.0	0	0	0	0.2	0	0.1	0	0	0	0	0	0.1	0.1	0	0	0	0	0		0.1	0
	332	0	0.3	7.7	5.0	0.1	11.9	0.8	0.7	0.5	6.1	0.2	0.9	3.5	0.5	2.3	1.8	0	2.2	10.0	2.4	0	0.8		0.7	1.1
	337	0	0	0.6	0.6	1.0	1.7	0	0	0.4	4.4	0.2	0.2	2.0	6.4	0.2	0.5	1.0	0	4.2	0	0	1.9		0	0.4
	339	0.6	0.2	0.1	0.2	0	0	0.4	0	0	0	0	0	0	0	0	0.5	0.7	11.7	0.4	2.9	0	2.6	10.4	0.9	0.6
	354	0	0.6	0	0	0	0.1	0	1.6	0	0	0	0.3	0.9	0.4	0	0.1	0.6	0	0	0	0.7	0		1.9	0.4
3O mean wt (kg) p		11.4	15.2	12.4	16.7	10.5	8.7	10.5	9.2	4.6	16.7	3.6	5.0	27.6	20.8	22.7	38.7	28.3	24.9	20.2	28.2	29.7	31.9	56.9	35.0	32.6
Upper CI		18.5	20.6	16.8	23.9	14.7	11.6	15.8	14.3	6.7	33.3	7.0	8.7	37.7	32.5	31.4	51.3	36.8	36.0	32.8	35.6	39.5	44.8	81.1	45.9	40.5
Lower CI		4.4	9.9	7.9	9.5	6.3	5.9	5.2	4.1	2.4	0.1	0.2	1.3	17.6	9.2	14.1	26.1	19.7	13.9	7.7	20.9	19.9	19.0	32.6	24.0	24.8

Table 14. Abundance (millions) of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.3	4.3	1.4	0.4	0.3	0.6	0.3	2.6	0	0.0	0	0	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
	331	3.1	3.9	0.3	1.7	0.6	1.6		0.1	0	0.1	0.3	0.0	0.1	0.3	0.1	4.4	2.7	1.9	1.1	5.4	2.3	2.9		1.6	5.2
	338	7.8	5.8	2.8	1.1	12.8	3.4	2.9	4.5	4.7	3.4	1.3	2.6	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
	340	1.4	3.2	3.8	9.6	2.4	1.5	4.2	1.3	0.8	0.7	0	0.0	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
	351	27.7	29.7	28.0	13.7	26.1	15.1	18.2	8.5	2.5	2.0	0.1	0.3	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
	352	22.6	19.7	25.9	36.7	16.7	18.0	27.7	27.8	18.0	80.3	19.7	12.8	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
	353	0.4	17.4	5.7	26.2	0.5	1.7	3.6	4.7	1.8	11.7	0.3	12.4	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
93 - 183	329	0	0	0	0.0	0	0	0	0.1	0	0.0	0	0	0	0	0	0.1	0.0	0	0	0	0	0		0.0	0
	332	0	0.1	2.0	1.3	0.0	4.4	0.3	0.2	0.1	1.9	0.0	0.2	0.9	0.2	1.1	0.7	0	0.6	3.2	0.8	0	0.2		0.1	0.4
	337	0	0	0.1	0.2	0.3	0.4	0	0	0.1	0.9	0.0	0.1	0.4	2.1	0.1	0.1	0.3	0	1.1	0	0	0.6		0	0.2
	339	0.1	0.0	0.0	0.0	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0.2	2.2	0.1	0.9	0	0.5	2.6	0.2	0.1
	354	0	0.1	0	0	0	0.0	0	0.2	0	0	0	0.0	0.1	0.0	0	0.0	0.1	0	0	0	0.1	0		0.3	0.1
3O Total		63.5	84.1	70.1	90.9	59.7	46.7	57.3	50.0	28.0	101.1	21.9	28.5	161.7	139.4	154.5	269.1	186.5	197.2	161.0	243.2	237.9	227.1	295.9	309.7	250.6
Upper CI		103.4	113.8	97.2	129.5	85.2	64.2	87.6	76.3	40.4	204.4	44.7	49.1	222.7	227.5	211.7	360.3	247.1	289.1	262.5	312.8	332.0	317.1	416.1	411.6	310.1
Lower CI		23.5	54.5	43.0	52.3	34.2	29.2	26.9	23.6	15.6	-2.2	-1.0	8.0	100.6	51.4	97.3	177.9	126.0	105.2	59.4	173.6	143.8	137.1	175.6	207.8	191.2

Table 15. Biomass (kt) of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2008.

Range	Str	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.2	1.9	0.7	0.2	0.2	0.3	0.2	1.1	0	0.0	0	0	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
	331	1.4	1.9	0.2	0.8	0.3	0.9		0.0	0	0.1	0.2	0.0	0.0	0.1	0.0	1.7	1.2	0.6	0.4	2.4	0.8	1.2		0.7	2.3
	338	3.3	2.8	1.4	0.5	5.1	1.7	1.4	1.3	2.1	1.4	0.7	1.3	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
	340	0.7	1.5	1.8	4.3	1.1	0.8	2.0	0.6	0.4	0.4	0	0.0	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
	351	12.4	13.0	11.7	6.0	11.2	6.9	8.4	4.0	1.1	0.8	0.0	0.1	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
	352	10.0	8.7	10.7	15.2	7.5	8.0	11.2	13.6	7.1	33.0	8.1	5.5	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
	353	0.2	7.6	2.8	13.4	0.3	0.9	1.7	2.3	0.8	5.3	0.2	5.6	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
93 - 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
	332	0	0.0	1.1	0.7	0.0	1.7	0.1	0.1	0.1	0.9	0.0	0.1	0.5	0.1	0.3	0.3	0	0.3	1.4	0.3	0	0.1		0.1	0.2
	337	0	0	0.1	0.1	0.1	0.2	0	0	0.1	0.6	0.0	0.0	0.3	0.8	0.0	0.1	0.1	0	0.5	0	0	0.2		0	0.1
	339	0.1	0.0	0.0	0.0	0	0	0.0	0	0	0	0	0	0	0	0	0.0	0.1	0.9	0.0	0.2	0	0.2	0.8	0.1	0.0
	354	0	0.0	0	0	0	0.0	0	0.1	0	0	0	0.0	0.1	0.0	0	0.0	0.0	0	0	0	0.0	0		0.1	0.0
3O Total		28.2	37.5	30.5	41.2	25.8	21.5	25.1	23.3	11.6	42.4	9.2	12.7	70.6	53.2	58.0	98.7	72.1	63.6	51.6	72.0	75.8	81.5	99.1	89.3	83.3
Upper CI		45.6	50.7	41.4	59.0	36.2	28.5	37.8	36.3	17.0	84.5	18.0	22.2	96.3	82.9	80.2	130.8	93.9	91.9	83.7	90.7	100.8	114.4	141.4	117.3	103.3
Lower CI		10.8	24.3	19.5	23.5	15.5	14.4	12.4	10.3	6.2	0.3	0.5	3.3	44.9	23.5	35.9	66.6	50.4	35.4	19.5	53.2	50.8	48.5	56.9	61.4	63.2
% biomass >183m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.09	0.54	0.01	0.22	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0

Table 16. Mean number per tow of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall Surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784							0.5	0	0		41.5	1.0	0	0.5	0	1.5			
57 - 92	350	5.9	0.7	0.5	0	0.1	0.4	0.3	0	0.4	1.3	3.1	12.4	18.4	29.3	17.3	2.9	3.3	0.5	35.8
	363	5.5	1.1	2.0	0	0.3	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
	371	0.2	0	0	0	0	0	0	0	0	0	0	0.3	1.3	0.3	0.3	0.3	0.8	0	14.7
	372	3.9	4.8	3.8	7.7	0	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
	384	0	0.2	0	0.1	0	0	0	0	0.3	0	0	0.3	0.3	0	0	22.0	10.5	0	112.3
	785							0	0	0		1.5	3.5	1.5	1.0	0	0			
93 - 183	328	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	0.2	0	0	0
	342	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
	348	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
	349	0	0	0	0	0	0	0	0	0	0	0	0.1	0.7	0	0	0	19.7	0.1	0
	364	0	0	0.2	0	0	0	0	0	0	0	0	0.1	0	0	0.5	0.6	0	0.2	0.4
	365	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
	385	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
	786							0.5	0	0.5		5.5	0	0	0	0	0.5			
	787							0	0	1.0		0	0	0	0	0	0	0		
	788							0	0	0		0	0	0	0	0	0	0		
	790							0	0	0		0	0	0	1.0	0	0			
	793							0	0	0		0	0	0	0	1.1	0			
	794							0	0	0			0	0	0	0	0	0		
	797							0	0	0		0	0	0	0	0	0	0		
	799							0	0	0		0	0	0	0	1.5	0	0		
3L mean # per tow		0.8	0.4	0.4	0.5	0.0	0.7	1.1	1.0	2.1	3.5	6.1	11.7	5.2	9.2	13.4	6.6	10.2	15.3	15.3
Upper CI		1.6	0.6	0.6	1.3	0.1	1.3	2.2	2.7	5.0	8.6	11.2	18.4	8.0	16.2	21.3	12.4	16.0	26.0	23.6
Lower CI		0.0	0.2	0.2	-0.3	0.0	0.1	-0.1	-0.7	-0.8	-1.6	1.0	5.0	2.4	2.3	5.4	0.8	4.5	4.6	7.1

Table 17. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall Surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784							0.0	0	0		4.0	0.1	0	0.1	0	0.1			
57 - 92	350	2.6	0.3	0.3	0	0.0	0.2	0.2	0	0.3	0.7	1.1	4.1	5.8	9.1	5.8	1.1	1.2	0.2	10.2
	363	2.7	0.5	0.9	0	0.1	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
	371	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0.3	0.1	0.1	0.1	0.4	0	5.8
	372	1.9	2.3	1.7	3.3	0	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
	384	0	0.1	0	0.1	0	0	0	0	0.0	0	0	0.1	0.1	0	0	10.8	4.3	0	43.4
	785							0	0	0		0.4	0.2	0.2	0.4	0	0			
93 - 183	328	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	0.1	0	0	0
	342	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
	348	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	349	0	0	0	0	0	0	0	0	0	0	0	0.1	0.3	0	0	0	6.4	0.0	0
	364	0	0	0.2	0	0	0	0	0	0	0	0	0.0	0	0	0.2	0.3	0	0.1	0.1
	365	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
	385	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
	786							0.0	0	0.2		0.3	0	0	0	0	0.1			
	787							0	0	0.0		0	0	0	0	0	0	0		
	788							0	0	0		0	0	0	0	0	0	0		
	790							0	0	0		0	0	0	0.1	0	0			
	793							0	0	0		0	0	0	0	0.9	0			
	794							0	0	0			0	0	0	0	0	0		
	797							0	0	0		0	0	0	0	0	0	0		
	799							0	0	0		0	0	0	0	0.4	0	0		
3L mean wt (kg) pe		0.4	0.2	0.2	0.2	0.0	0.2	0.4	0.2	0.8	1.6	2.0	4.0	2.1	2.9	4.7	2.4	3.5	4.7	5.2
Upper CI		0.8	0.3	0.3	0.5	0.0	0.4	0.8	0.5	2.0	4.0	3.8	6.2	3.4	5.4	7.5	4.2	5.5	7.8	7.8
Lower CI		0.0	0.1	0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.4	-0.8	0.3	1.8	0.8	0.5	1.9	0.6	1.5	1.6	2.6

Table 18. Abundance (millions) of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784							0.0	0	0		1.5	0.0	0	0.0	0	0.1			
57 - 92	350	1.7	0.2	0.1	0	0.0	0.1	0.1	0	0.1	0.4	0.9	3.5	5.3	8.3	4.9	0.8	0.9	0.1	10.2
	363	1.3	0.3	0.5	0	0.1	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
	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	2.3
	372	1.3	1.6	1.3	2.6	0	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
	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	17.3
	785							0	0	0		0.1	0.2	0.1	0.1	0	0			
93 - 183	328	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
	342	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
	348	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	349	0	0	0	0	0	0	0	0	0	0	0	0.0	0.2	0	0	0	5.7	0.0	0
	364	0	0	0.1	0	0	0	0	0	0	0	0	0.0	0	0	0.2	0.2	0	0.1	0.1
	365	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
	385	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
	786							0.0	0	0.0		0.1	0	0	0	0	0.0			
	787							0	0	0.1		0	0	0	0	0	0	0		
	788							0	0	0		0	0	0	0	0	0	0		
	790							0	0	0		0	0	0	0.0	0	0			
	793							0	0	0		0	0	0	0	0.0	0			
	794							0	0	0			0	0	0	0	0	0		
	797							0	0	0		0	0	0	0	0	0	0		
	799							0	0	0		0	0	0	0	0.0	0	0		
3L Total		4.4	2.1	2.0	2.6	0.1	3.6	6.7	6.1	13.1	20.6	37.9	74.5	33.1	58.9	63.4	38.8	61.9	91.0	81.9
Upper CI		8.7	3.3	3.1	6.6	0.3	6.8	14.1	16.9	31.6	50.5	69.4	117.2	51.2	103.0	101.2	72.8	96.9	154.5	125.9
Lower CI		0.1	1.0	0.9	-1.4	-0.1	0.3	-0.7	-4.7	-5.4	-9.2	6.5	31.8	15.0	14.8	25.6	4.7	26.9	27.4	37.9

Table 19. Biomass (kt) of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
30 - 56	784							0.0	0	0		0.1	0.0	0	0.0	0	0.0			
57 - 92	350	0.8	0.1	0.1	0	0.0	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
	363	0.7	0.1	0.2	0	0.0	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
	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	0.9
	372	0.6	0.8	0.6	1.1	0	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
	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	6.7
	785							0	0	0		0.0	0.0	0.0	0.0	0	0			
93 - 183	328	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
	342	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
	348	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	0.1	0	0	0	1.9	0.0	0
	364	0	0	0.1	0	0	0	0	0	0	0	0	0.0	0	0	0.1	0.1	0	0.0	0.0
	365	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
	385	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
	786							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		
	788							0	0	0		0	0	0	0	0	0	0		
	790							0	0	0		0	0	0	0.0	0	0			
	793							0	0	0		0	0	0	0	0.0	0			
	794							0	0	0			0	0	0	0	0	0		
	797							0	0	0		0	0	0	0	0	0	0		
	799							0	0	0		0	0	0	0	0.0	0	0		
3L Total		2.1	1.0	0.9	1.1	0.0	1.2	2.2	1.3	5.2	9.6	12.5	25.5	13.6	18.6	22.2	14.1	21.2	28.0	27.8
Upper CI		4.1	1.6	1.5	2.7	0.1	2.2	5.3	3.1	12.8	23.6	23.4	39.7	21.7	34.2	35.5	24.7	33.6	46.2	41.8
Lower CI		0.0	0.4	0.4	-0.5	0.0	0.3	-0.8	-0.5	-2.4	-4.4	1.6	11.3	5.4	3.0	9.0	3.5	8.9	9.8	13.7
% biomass >183m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.02	0.00	0.00

Table 20. Mean number per tow of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall Surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	40.7	58.0		76.5	329.8	398.5	216.7	212.6	310.9	372.8	460.5	643.3	545.5	488.5	1552.0	847.8	350.3	668.0	536.4
	376	323.3	342.8	323.0	674.8	206.3	711.6	831.3	873.3	782.2	722.5	2047.0	2539.0	1001.9	993.9	1099.3	3188.8	1443.8	1490.0	950.3
57 - 92	360	83.3	92.8	49.5	219.7	100.9	171.3	392.1	406.2	498.8	490.6	458.3	319.4	578.3	546.3	513.3	253.3	457.0	1112.3	463.6
	361	85.4	269.5	269.8	316.6	385.2	450.0	415.8	397.3	528.5	262.0	146.8	737.6	692.0	617.3	359.2	124.3	135.7	555.8	139.3
	362	47.6	60.7	6.7	1.9	6.8	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
	373	1.2	2.5	0	0	7.1	13.8	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
	374	0	1.0		0	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
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	3.5	0	1.5	178.2	150.0
93 - 183	359	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
	377	0		0	0	0	0	0	3.0	2.0	3.5	4.5	0	0	0	38.0	467.7	355.0	660.0	74.5
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88.9	6.0
3N mean # per tow		65.9	92.1	86.4	137.7	108.0	212.0	215.0	256.7	241.2	312.4	320.3	489.5	361.7	364.8	485.5	446.1	339.1	526.6	327.8
Upper CI		108.2	151.7	198.7	227.0	179.3	294.2	302.9	321.4	313.7	423.2	494.3	673.2	462.3	464.7	611.3	575.2	463.4	634.8	452.9
Lower CI		23.6	32.5	-25.8	48.4	36.7	129.8	127.2	191.9	168.7	201.7	146.4	305.9	261.1	264.9	359.6	317.0	214.7	418.4	202.8

Table 21. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall Surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	14.6	23.1		36.4	142.0	67.7	54.8	70.1	87.1	112.2	115.8	177.8	149.1	142.0	347.5	195.8	95.5	190.5	145.2
	376	97.2	53.0	52.3	151.7	49.4	118.6	117.2	157.4	174.3	182.9	607.1	597.5	229.7	278.9	242.0	593.7	325.1	339.2	255.4
57 - 92	360	16.4	20.1	19.5	60.3	27.3	39.6	89.4	114.8	136.4	147.5	148.2	102.6	203.7	174.0	168.3	91.8	171.9	298.3	113.3
	361	37.3	77.0	95.3	116.9	161.0	133.7	122.5	142.9	146.3	69.6	40.7	234.5	185.3	153.4	83.3	30.7	33.3	135.0	36.6
	362	19.5	18.6	3.0	1.0	3.0	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
	373	0.6	1.4	0	0	2.5	2.8	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
	374	0	0.9		0	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
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0.9	0	0.7	82.0	58.8
93 - 183	359	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
	377	0		0	0	0	0	0	1.4	0.4	1.0	1.1	0	0	0	14.7	196.8	176.1	228.3	28.6
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.6	3.0
3N mean wt (kg) per		20.6	22.1	24.1	39.6	39.8	42.8	47.1	68.4	66.3	81.1	94.1	137.3	101.5	105.7	122.2	101.7	96.7	140.7	89.5
Upper CI		35.6	36.6	43.7	62.6	66.4	56.5	65.0	87.1	85.0	101.8	143.9	177.0	136.0	135.7	152.3	125.5	136.3	169.8	133.9
Lower CI		5.6	7.6	4.6	16.6	13.1	29.1	29.3	49.6	47.5	60.5	44.4	97.7	67.1	75.7	92.1	77.9	57.2	111.6	45.0

Table 22. Abundance (millions) of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	8.9	12.7		16.8	72.3	87.3	47.5	46.6	68.1	81.7	100.9	141.0	119.5	107.1	340.1	185.8	76.8	146.4	117.5
	376	66.7	70.7	66.6	139.1	42.5	146.7	171.4	180.1	161.3	149.0	422.1	523.6	206.6	204.9	226.7	657.5	297.7	307.2	196.0
57 - 92	360	34.3	38.2	20.4	90.4	41.5	70.5	161.4	167.2	205.3	201.9	188.6	131.4	238.0	224.9	211.2	104.2	188.1	457.8	190.8
	361	21.8	68.7	68.8	80.7	98.2	114.7	106.0	101.3	134.7	66.8	37.4	188.0	176.4	157.4	91.6	31.7	34.6	141.7	35.5
	362	16.5	21.0	2.3	0.6	2.3	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
	373	0.4	0.9	0	0	2.5	4.8	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
	374	0	0.1		0	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
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.1	16.5	13.9
93 - 183	359	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
	377	0		0	0	0	0	0	0.0	0.0	0.0	0.1	0	0	0	0.5	6.4	4.9	9.1	1.0
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.9	0.5
3N Total		148.5	212.3	158.0	327.7	259.3	509.0	516.3	616.2	632.1	743.1	860.3	1314.7	971.3	869.6	1158.6	1146.7	814.1	1414.2	787.1
Upper CI		243.8	349.7	363.3	540.0	430.5	706.4	727.2	771.6	822.2	1006.5	1327.5	1808.0	1241.5	1107.7	1458.9	1478.6	1112.6	1704.9	1087.3
Lower CI		53.3	74.9	-47.2	115.3	88.2	311.5	305.4	460.8	442.0	479.7	393.1	821.4	701.1	631.5	858.3	814.9	515.6	1123.6	486.9

Table 23. Biomass (kt) of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
<=56	375	3.2	5.1		8.0	31.1	14.8	12.0	15.4	19.1	24.6	25.4	39.0	32.7	31.1	76.2	42.9	20.9	41.7	31.8
	376	20.1	10.9	10.8	31.3	10.2	24.4	24.2	32.5	35.9	37.7	125.2	123.2	47.4	57.5	49.9	122.4	67.0	69.9	52.7
57 - 92	360	6.7	8.3	8.0	24.8	11.2	16.3	36.8	47.2	56.1	60.7	61.0	42.2	83.8	71.6	69.3	37.8	70.8	122.8	46.6
	361	9.5	19.6	24.3	29.8	41.0	34.1	31.2	36.4	37.3	17.7	10.4	59.8	47.2	39.1	21.2	7.8	8.5	34.4	9.3
	362	6.8	6.4	1.0	0.3	1.0	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
	373	0.2	0.5	0	0	0.9	1.0	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
	374	0	0.1		0	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
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	7.6	5.4
93 - 183	359	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
	377	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
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	0.3
3N Total		46.5	50.9	44.1	94.2	95.5	102.8	113.2	164.2	173.6	193.0	252.8	368.9	272.7	252.0	291.6	261.5	232.3	377.8	214.8
Upper CI		80.3	84.4	79.9	148.9	159.5	135.7	80.3	209.2	222.7	242.1	386.5	475.3	365.1	323.5	363.4	322.6	327.2	456.0	321.6
Lower CI		12.6	17.4	8.4	39.5	31.5	69.9	12.6	119.1	124.5	143.8	119.1	262.5	180.2	180.5	219.7	200.3	137.3	299.7	108.1
% Biomass > 183 m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.03	0.00

Table 24. Mean number per tow of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall Surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	1.3	0.1	1.3	3.3	0.1	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
	331	6.7	29.0	8.0	16.0	0	2.0	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
	338	8.5	20.0	2.0	8.8	0.3	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
	340	5.6	36.0	0.3	5.0	1.6	4.8	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
	351	36.9	15.9	1.8	35.3	7.0	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
	352	47.9	172.4	150.5	56.7	69.7	121.9	134.3	249.0	269.9	255.0	369.7	288.0	192.3	283.3	255.5	296.9	177.0	232.0	384.8
	353	28.0	0	0	8.7	0	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
93 - 183	329	1.0	0.1	0	0	0	0	0	0	0.4	0	0	0	0.2	0.2	0	0.2	0	0	0
	332	0.8	0.3	2.3	15.7	5.0	3.3	3.0	0	0.3	1.7	1.0	10.0	19.0	0	9.0	1.0	3.0	0.7	20.5
	337	0	1.0	0	0	0	0	19.0	1.3	5.3	0.3	0.9	0	0	0	3.4	16.0	7.3	0	0
	339	1.0	2.5	0	0	1.0	0	0.3	0.5	0		1.5	9.0	23.0	18.5	1.1	3.0	12.0	4.0	0
	354	1.0	0	0	0	0	0	1.8	0	0	0	0.5	0	0	0	0	0	0	2.9	0
3O mean # per tow		16.1	33.1	22.7	16.4	11.2	31.2	22.7	62.7	69.0	71.4	91.5	95.3	61.4	127.1	81.9	68.7	68.1	90.8	117.6
Upper CI		24.0	52.3	51.5	27.3	21.4	50.5	37.7	84.4	98.8	97.2	131.3	156.2	86.7	191.9	128.8	109.8	99.9	131.4	179.8
Lower CI		8.1	14.0	-6.2	5.5	1.0	11.9	7.6	41.0	39.2	45.6	51.8	34.4	36.1	62.3	35.1	27.7	36.3	50.1	55.4

Table 25. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall Surveys 1990-2007.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.7	0.0	0.7	1.6	0.1	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
	331	3.8	14.9	4.6	8.8	0	0.6	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
	338	3.7	7.8	0.9	4.3	0.2	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
	340	2.7	16.8	0.2	1.3	0.8	2.0	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
	351	16.0	6.6	0.8	14.4	2.8	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
	352	19.6	59.2	51.3	23.5	26.1	38.6	42.8	74.6	80.2	66.1	102.8	76.4	62.6	108.8	75.4	107.3	43.4	69.3	88.0
	353	13.9	0	0	3.6	0	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
93 - 183	329	0.6	0.1	0	0	0	0	0	0	0.2	0	0	0	0.1	0.1	0	0.1	0	0	0
	332	0.4	0.2	1.0	7.3	2.6	0.9	1.7	0	0.0	0.5	0.4	3.4	6.2	0	2.9	0.4	1.1	0.4	6.7
	337	0	0.6	0	0	0	0	10.2	0.9	1.6	0.1	0.2	0	0	0	1.2	5.1	3.0	0	0
	339	0.5	1.1	0	0	0.5	0	0.1	0.3	0		0.6	2.6	8.2	4.9	0.4	0.7	4.0	1.1	0
	354	0.3	0	0	0	0	0	0.7	0	0	0	0.2	0	0	0	0	0	0	1.1	0
3O mean wt (kg) per tow		7.0	12.2	7.9	6.9	4.3	10.1	7.6	22.7	19.9	19.6	25.1	29.5	19.3	37.2	23.9	24.2	20.5	27.6	31.1
Upper CI		10.5	18.1	17.5	11.1	8.1	15.0	12.7	31.7	28.2	26.1	35.5	54.7	27.5	55.4	36.3	40.3	29.4	41.3	46.8
Lower CI		3.5	6.3	-1.7	2.7	0.5	5.1	2.5	13.6	11.6	13.1	14.7	4.4	11.0	19.0	11.4	8.1	11.6	13.8	15.4

Table 26. Abundance (millions) of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.4	0.0	0.4	1.0	0.0	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
	331	0.4	1.8	0.5	1.0	0	0.1	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
	338	2.2	5.2	0.5	2.3	0.1	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
	340	1.3	8.5	0.1	1.2	0.4	1.1	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
	351	12.8	5.5	0.6	12.2	2.4	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
	352	17.0	61.2	53.4	20.1	24.7	43.3	47.7	88.4	95.8	90.5	131.2	102.2	68.2	100.5	90.7	105.4	62.8	82.3	136.6
	353	4.9	0	0	1.5	0	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
93 - 183	329	0.2	0.0	0	0	0	0	0	0	0.1	0	0	0	0.0	0.0	0	0.0	0	0	0
	332	0.1	0.0	0.3	2.3	0.7	0.5	0.4	0	0.0	0.2	0.1	1.4	2.7	0	1.3	0.1	0.4	0.1	2.9
	337	0	0.1	0	0	0	0	2.5	0.2	0.7	0.0	0.1	0	0	0	0.4	2.1	1.0	0	0
	339	0.1	0.2	0	0	0.1	0	0.0	0.0	0		0.1	0.7	1.9	1.5	0.1	0.2	1.0	0.3	0
	354	0.1	0	0	0	0	0	0.1	0	0	0	0.0	0	0	0	0	0	0	0.2	0
3O Total		39.5	82.7	55.8	41.6	28.5	79.6	56.2	159.2	183.0	176.5	254.1	262.7	170.4	334.1	209.1	190.8	172.5	252.0	300.2
Upper CI		59.0	130.4	126.9	69.3	54.5	128.9	93.5	214.2	262.0	240.3	364.3	430.5	240.6	504.4	328.6	304.7	253.2	364.8	459.0
Lower CI		20.1	34.9	-15.3	13.9	2.5	30.4	18.8	104.1	103.9	112.8	143.8	95.0	100.2	163.8	89.6	76.9	91.9	139.1	0.0

Table 27. Biomass (kt) of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall surveys 1990-2008.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08
57 - 92	330	0.2	0.0	0.2	0.5	0.0	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
	331	0.2	0.9	0.3	0.5	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
	338	1.0	2.0	0.2	1.1	0.1	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
	340	0.6	4.0	0.0	0.3	0.2	0.5	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
	351	5.5	2.3	0.3	5.0	1.0	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
	352	7.0	21.0	18.2	8.3	9.3	13.7	15.2	26.5	28.5	23.5	36.5	27.1	22.2	38.6	26.8	38.1	15.4	24.6	31.2
	353	2.4	0	0	0.6	0	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
93 - 183	329	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
	332	0.1	0.0	0.1	1.0	0.4	0.1	0.2	0	0.0	0.1	0.1	0.5	0.9	0	0.4	0.1	0.2	0.1	1.0
	337	0	0.1	0	0	0	0	1.3	0.1	0.2	0.0	0.0	0	0	0	0.2	0.7	0.4	0	0
	339	0.0	0.1	0	0	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
	354	0.0	0	0	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0	0.1	0
3O Total		17.3	30.5	19.4	17.5	10.9	25.7	17.3	57.5	52.8	48.4	69.7	81.4	53.5	97.7	60.9	67.1	52.0	76.5	79.4
Upper CI		25.9	45.2	43.1	28.1	20.7	38.4	25.9	80.5	74.8	64.5	98.6	150.9	76.4	145.6	92.7	111.8	74.6	114.6	119.4
Lower CI		8.6	15.8	-4.3	6.8	1.2	13.1	8.6	34.5	30.8	32.3	40.8	12.0	30.6	49.8	29.0	22.4	29.4	38.4	39.4
% Biomass > 183 m		0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 28. Estimates of abundance (millions), biomass ('000 tons), mean number and weight (kg) per tow for Spring surveys in NAFO Divisions 3LNO from 1984-2008.

	Spring Abundance (millions)				Spring Biomass ('000 tons)				Spring mean # per tow				Spring mean wt (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	21.9	167.7	28.2	217.7	22.1	189.7	25.8	79.9	10.7	73.1	11.4	32.0
1985	49.9	240.1	84.1	374.1	21.1	88.2	37.5	146.8	9.4	104.6	34.2	37.1	4.0	38.4	15.2	14.6
1986	26.9	229.5	70.1	326.5	12.6	95.1	30.5	138.2	5.3	100.0	28.5	33.3	2.5	41.5	12.4	14.1
1987	12.3	291.0	90.9	394.2	5.8	77.5	41.2	124.6	2.4	128.1	36.9	40.2	1.1	34.1	16.7	12.7
1988	8.1	135.3	59.7	203.1	3.7	51.4	25.8	81.0	1.6	58.9	24.2	20.7	0.7	22.4	10.5	8.2
1989	7.9	478.3	46.7	532.9	4.0	78.3	21.5	103.8	1.6	208.4	18.9	54.3	0.8	34.1	8.7	10.6
1990	4.7	305.5	57.3	367.4	2.2	75.7	25.1	103.1	0.9	133.1	23.9	37.7	0.4	33.0	10.5	10.6
1991	2.2	268.1	50.0	320.3	1.1	69.1	23.3	93.4	0.4	111.7	19.7	32.5	0.2	28.8	9.2	9.5
1992	0.3	189.2	28.0	217.4	0.2	49.6	11.6	61.4	0.1	79.3	11.0	21.2	0.0	20.8	4.6	6.0
1993	0.2	145.0	101.1	246.3	0.1	50.8	42.4	93.3	0.0	60.4	39.8	24.0	0.0	21.1	16.7	9.1
1994	0.1	126.4	21.9	148.4	0.0	46.3	9.2	55.6	0.0	51.5	8.5	14.1	0.0	18.9	3.6	5.3
1995	0.0	158.8	28.5	187.4	0.0	57.9	12.7	70.6	0.0	66.1	11.2	18.2	0.0	24.1	5.0	6.9
1996	2.5	475.3	161.7	639.4	1.1	103.9	70.6	175.6	0.5	198.0	63.3	62.1	0.2	43.3	27.6	17.1
1997	1.2	554.9	139.4	695.5	0.5	121.3	53.2	174.9	0.2	233.2	54.6	67.7	0.1	51.0	20.8	17.0
1998	1.6	577.2	154.5	733.3	0.5	143.7	58.0	202.2	0.3	240.4	60.5	69.9	0.1	59.8	22.7	19.3
1999	55.4	965.4	269.1	1289.9	28.5	238.5	98.7	365.7	9.6	402.1	105.4	120.4	5.0	99.3	38.7	34.1
2000	40.7	695.3	186.5	922.5	17.5	197.3	72.1	287.0	7.6	289.6	73.1	89.6	3.3	82.2	28.3	27.9
2001	11.5	1119.9	197.2	1328.5	4.4	297.9	63.6	366.0	2.1	466.4	77.3	126.6	0.8	124.1	24.9	34.9
2002	1.6	528.3	161.0	690.9	0.6	147.3	51.6	199.5	0.3	220.0	63.1	66.5	0.1	61.4	20.2	19.2
2003	92.0	914.9	243.2	1250.1	34.3	280.2	72.0	386.5	16.9	381.0	95.3	120.2	6.3	116.7	28.2	37.2
2004	38.7	690.1	237.9	966.7	15.3	216.7	75.8	307.9	7.0	287.4	93.2	92.0	2.8	90.3	29.7	29.3
2005	115.6	822.0	227.1	1164.8	43.6	263.7	81.5	388.8	21.7	342.4	89.0	113.2	8.2	109.8	31.9	37.8
2006	251.5	1035.0	295.9	1582.4	85.7	319.1	99.1	503.8	47.1	660.7	169.8	183.0	16.0	203.7	56.9	58.3
2007	177.5	953.5	309.7	1440.7	60.9	292.8	89.3	443.0	33.3	397.1	121.4	140.0	11.4	121.9	35.0	43.0
2008	115.3	1114.6	250.6	1480.4	43.2	330.4	83.3	456.9	21.6	464.2	98.2	143.8	8.1	137.6	32.6	44.4

Table 29. Estimates of abundance (millions), biomass ('000 tons), mean number and weight (kg) per tow for Fall surveys in NAFO Divisions 3LNO from 1990-2008.

	Fall Abundance (millions)				Fall Biomass ('000 tons)				Fall mean # per tow				Fall mean wt (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	2.1	46.5	17.3	65.8	0.8	65.9	16.1	19.3	0.4	20.6	7.0	6.6
1991	2.1	212.3	82.7	297.1	1.0	50.9	30.5	82.4	0.4	92.1	33.1	29.3	0.2	22.1	12.2	8.1
1992	2.0	158.0	55.8	215.9	0.9	44.1	19.4	64.5	0.4	86.4	22.7	22.4	0.2	24.1	7.9	6.7
1993	2.6	327.7	41.6	371.9	1.1	94.2	17.5	112.8	0.5	137.7	16.4	37.4	0.2	39.6	6.9	11.3
1994	0.1	259.3	28.5	287.9	0.0	95.5	10.9	106.4	0.0	108.0	11.2	28.0	0.0	39.8	4.3	10.3
1995	3.6	509.0	79.6	592.2	1.2	102.8	25.7	129.8	0.7	212.0	31.2	57.2	0.2	42.8	10.1	12.5
1996	6.7	516.3	56.2	579.1	2.2	113.2	18.9	134.3	1.1	215.0	22.7	51.6	0.4	47.1	7.6	12.0
1997	6.1	616.2	159.2	781.5	1.3	164.2	57.5	222.9	1.0	256.7	62.7	69.1	0.2	68.4	22.7	19.7
1998	13.1	632.1	183.0	828.2	5.2	173.6	52.8	231.6	2.1	241.2	69.0	71.1	0.8	66.3	19.9	19.9
1999	20.6	743.1	176.5	940.3	9.6	193.0	48.4	250.9	3.5	312.4	71.4	87.8	1.6	81.1	19.6	23.4
2000	37.9	860.3	254.1	1152.3	12.5	252.8	69.7	335.0	6.1	320.3	91.5	98.8	2.0	94.1	25.1	28.7
2001	74.5	1314.7	262.7	1651.9	25.5	368.9	81.4	475.8	11.7	489.5	95.3	139.8	4.0	137.3	29.5	40.3
2002	33.1	971.3	170.4	1174.8	13.6	272.7	53.5	339.7	5.2	361.7	61.4	99.3	2.1	101.5	19.3	28.7
2003	58.9	869.6	334.1	1262.6	18.6	252.0	97.7	368.3	9.2	364.8	127.1	110.9	2.9	105.7	37.2	32.3
2004	63.4	1158.6	209.1	1431.0	22.2	291.6	60.9	374.7	13.4	485.5	81.9	147.8	4.7	122.2	23.9	38.7
2005	38.8	1146.7	190.8	1376.3	14.1	261.5	67.1	342.7	6.6	446.1	68.7	122.7	2.4	101.7	24.2	30.6
2006	61.9	814.1	172.5	1048.5	21.2	232.3	52.0	305.5	10.2	339.1	68.1	95.4	3.5	96.7	20.5	27.8
2007	91.0	1414.2	252.0	1757.2	28.0	377.8	76.5	482.4	15.3	526.6	90.8	154.0	4.7	140.7	27.6	42.3
2008	81.9	787.1	300.2	1169.2	27.8	214.8	79.4	322.0	15.3	327.8	117.6	113.6	5.2	89.5	31.1	31.3

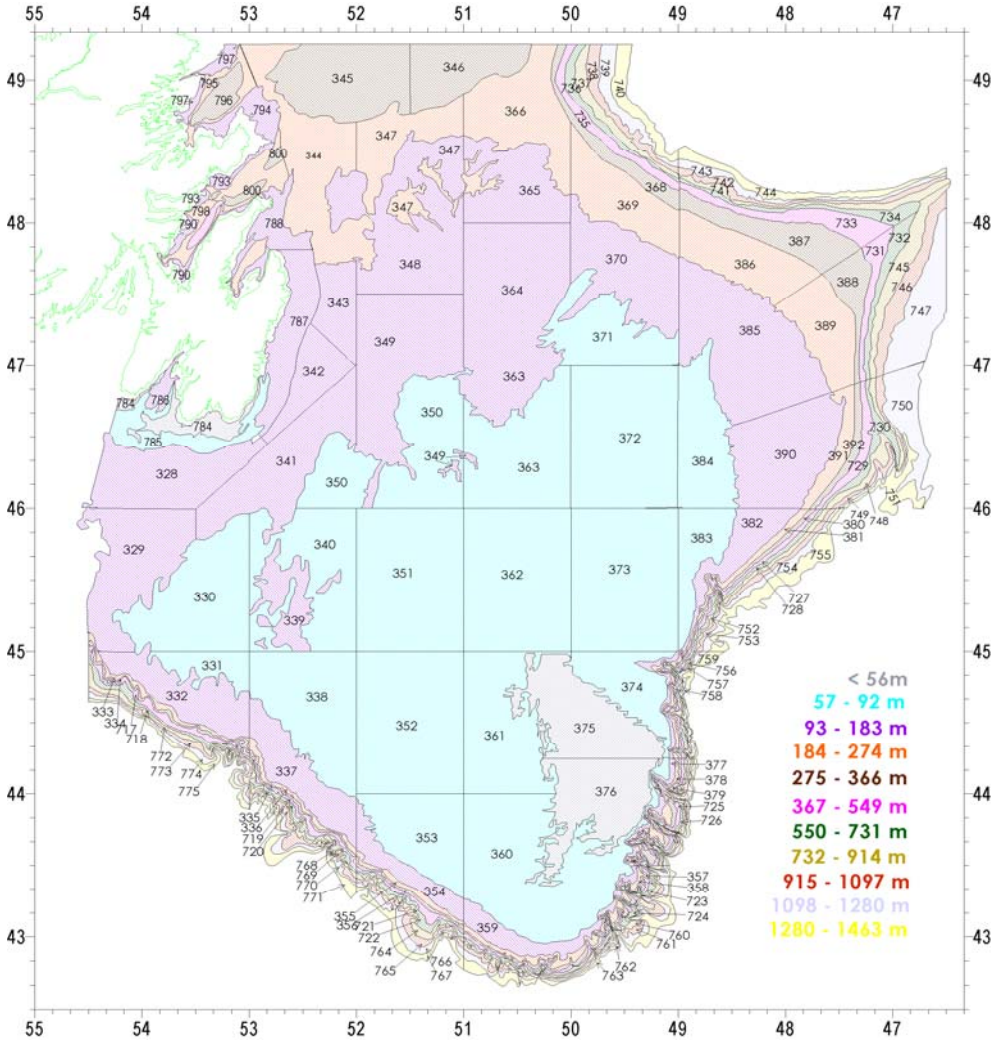

Figure 1. Designation of strata in NAFO divisions 3LNO.

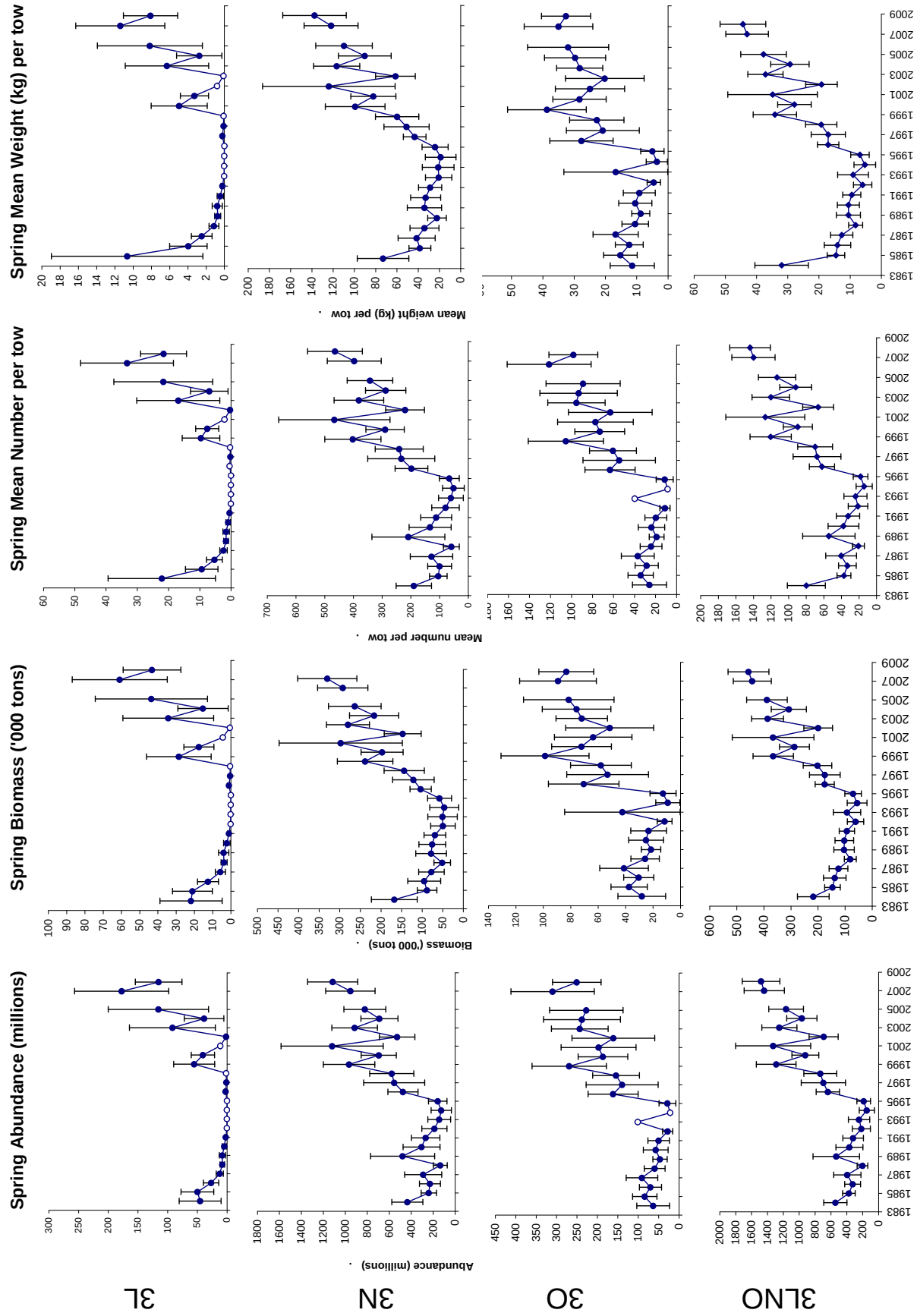

Figure 2. Abundance (millions), Biomass ('000 tons), Mean number and weight (kg) per tow for yellowtail flounder in spring surveys by NAFO division and for 3LNO combined from 1984-2008. Where lower 95% confidence limit is less than 0, error bars are omitted (hollow symbol)

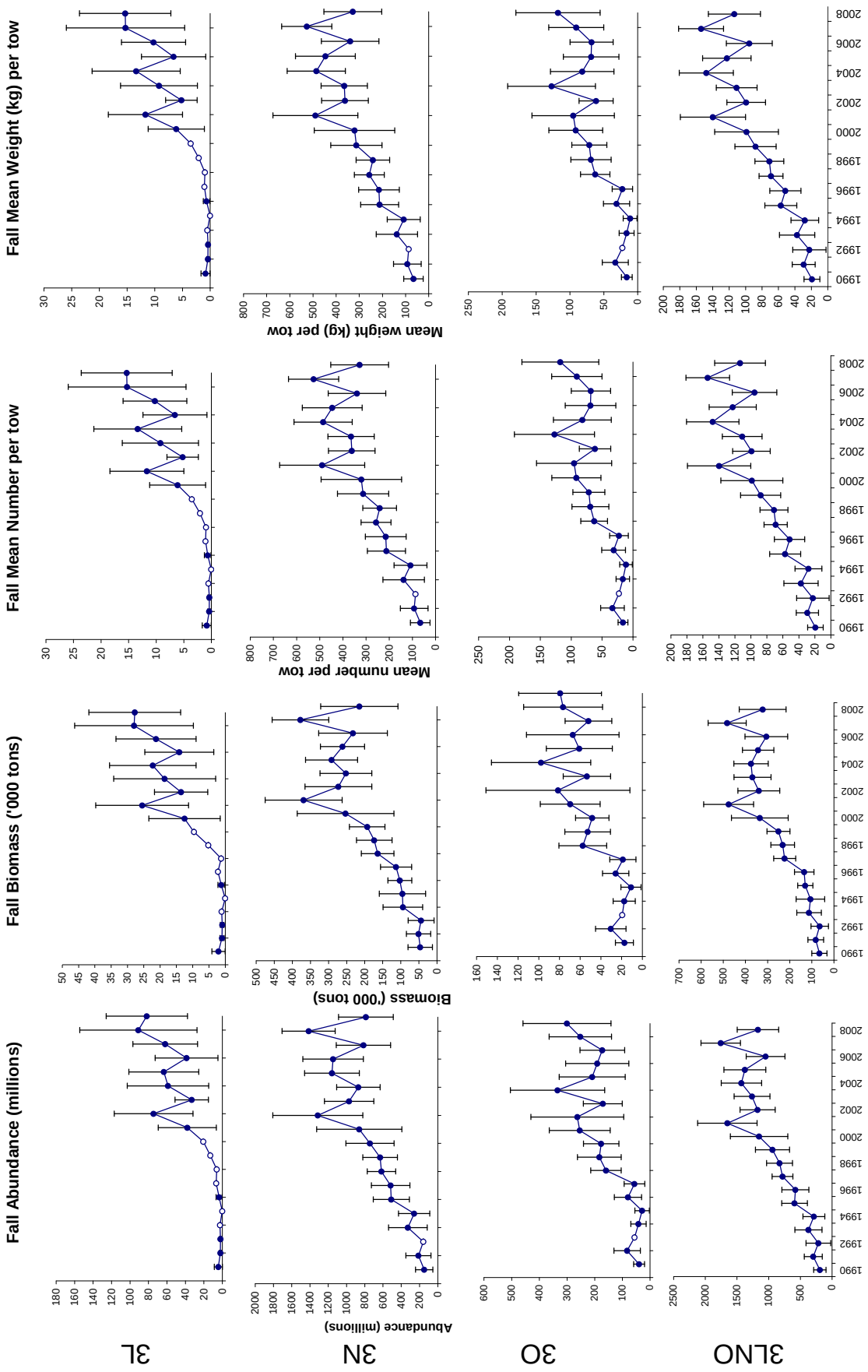

Figure 3. Abundance (millions), Biomass ('000 tons), Mean number and weight (kg) per tow for yellowtail flounder in fall surveys in NAFO divisions 3LNO from 1990-2008. Where lower 95% confidence limit is less than 0, error bars are omitted (hollow symbol)

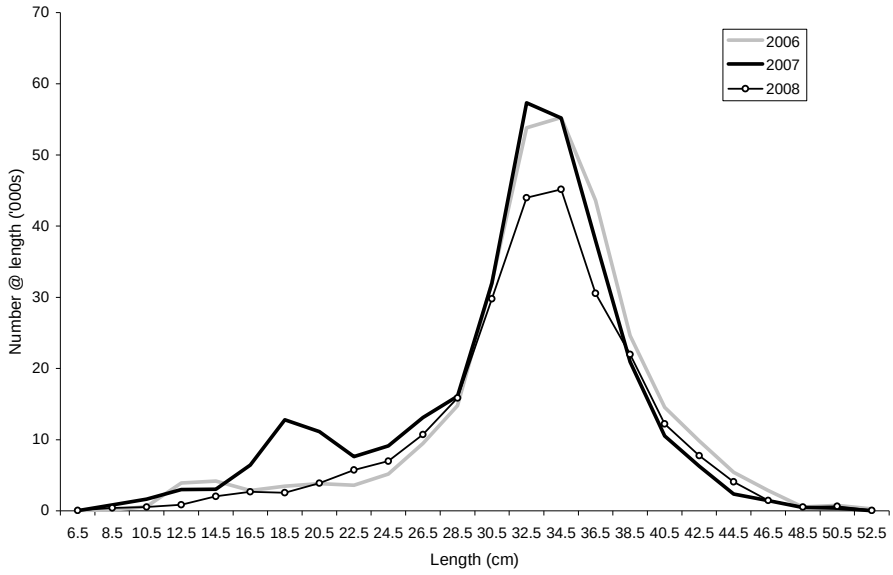

Figure 4. Length distributions of yellowtail flounder from the 2006, 2007, and 2008 Canadian Spring survey in NAFO division 3O.

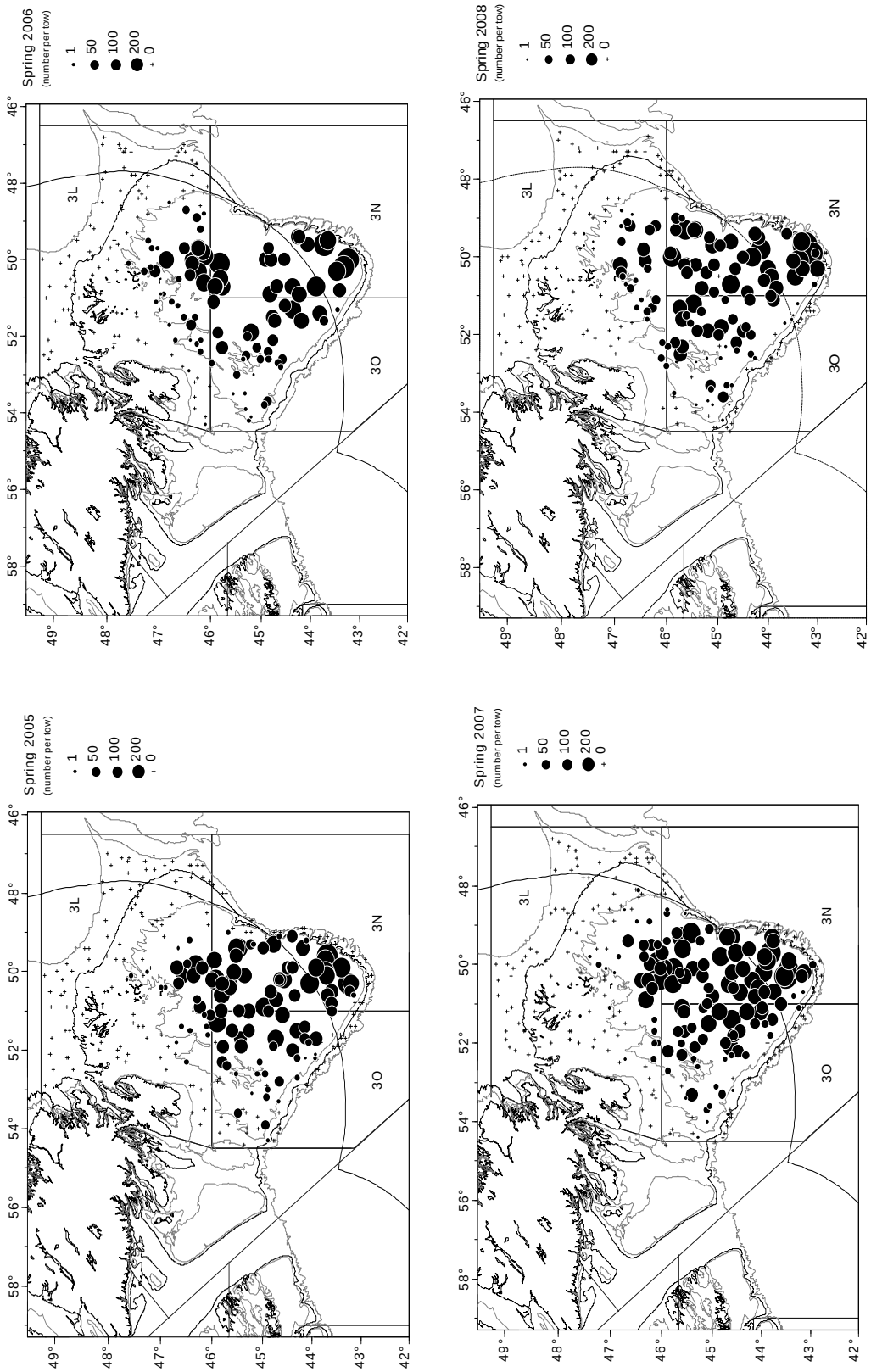

Figure 5. Distribution of yellowtail flounder (number per tow) in Canadian spring surveys of NAFO divisions 3LNO from 2005-2008.

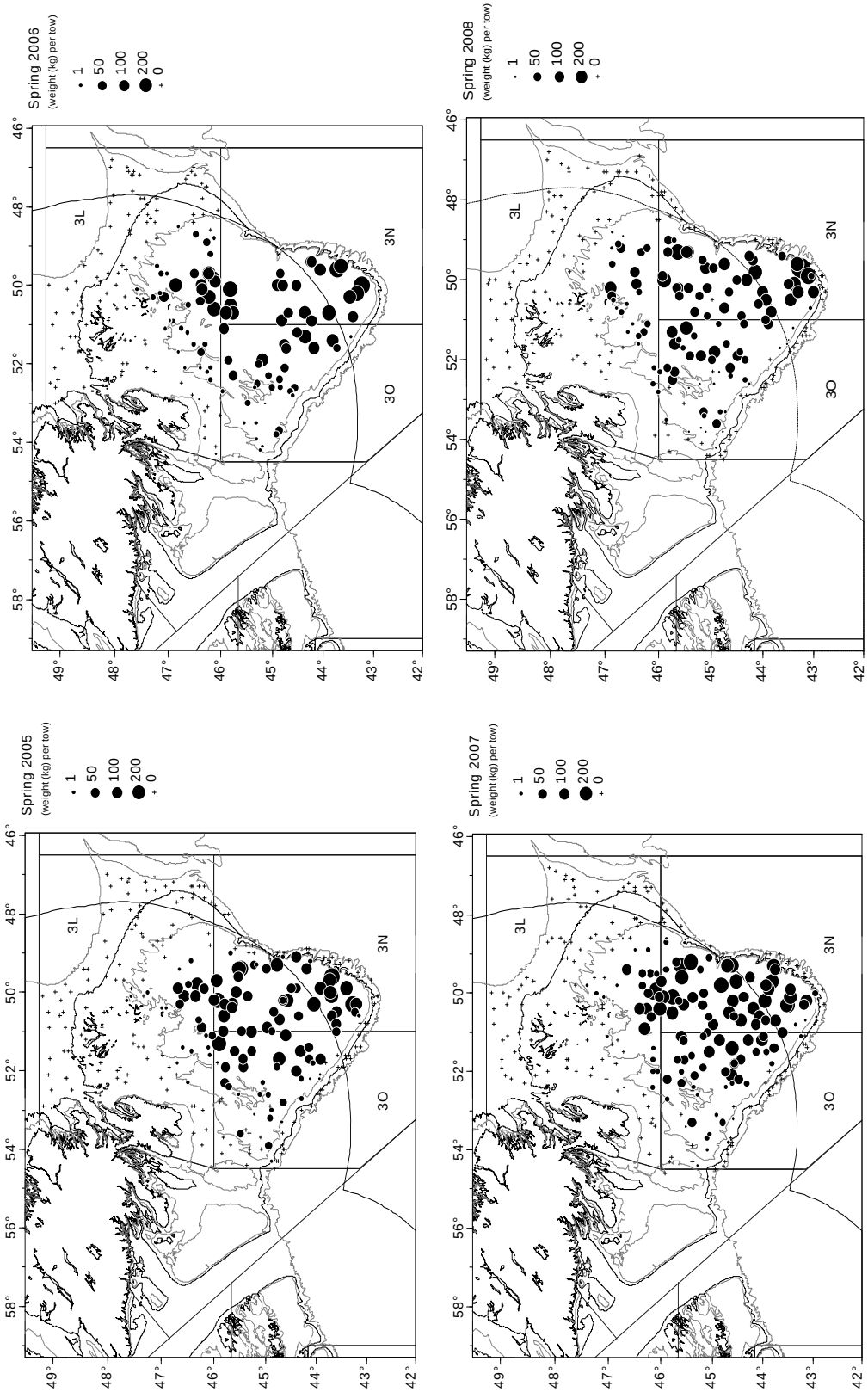

Figure 6. Distribution of yellowtail flounder (weight (kg) per tow) in Canadian spring surveys of NAFO divisions 3LNO from 2005-2008.

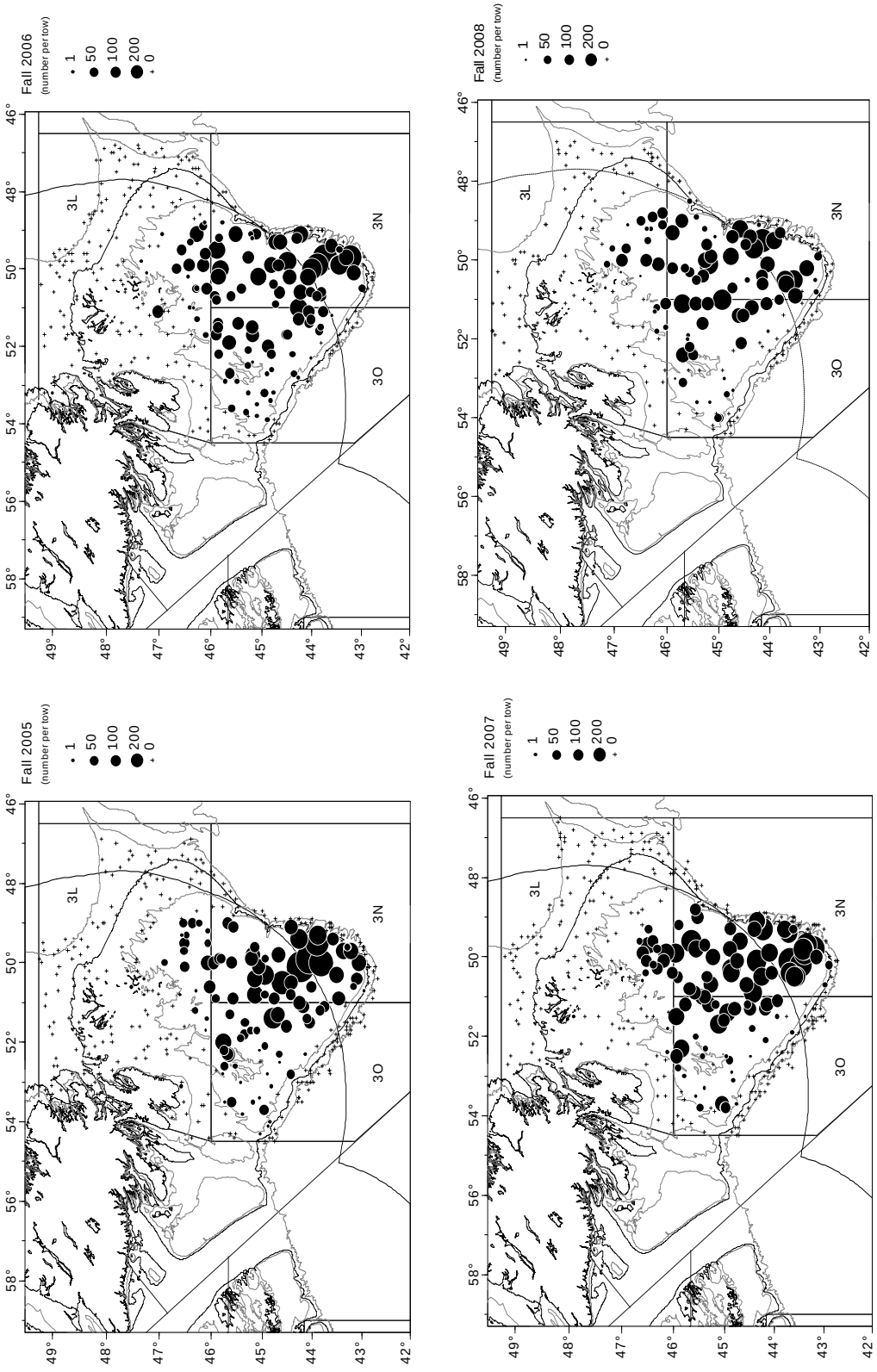

Figure 7. Distribution of yellowtail flounder (number per tow) in Canadian fall surveys of NAFO divisions 3LNO from 2005-2008.

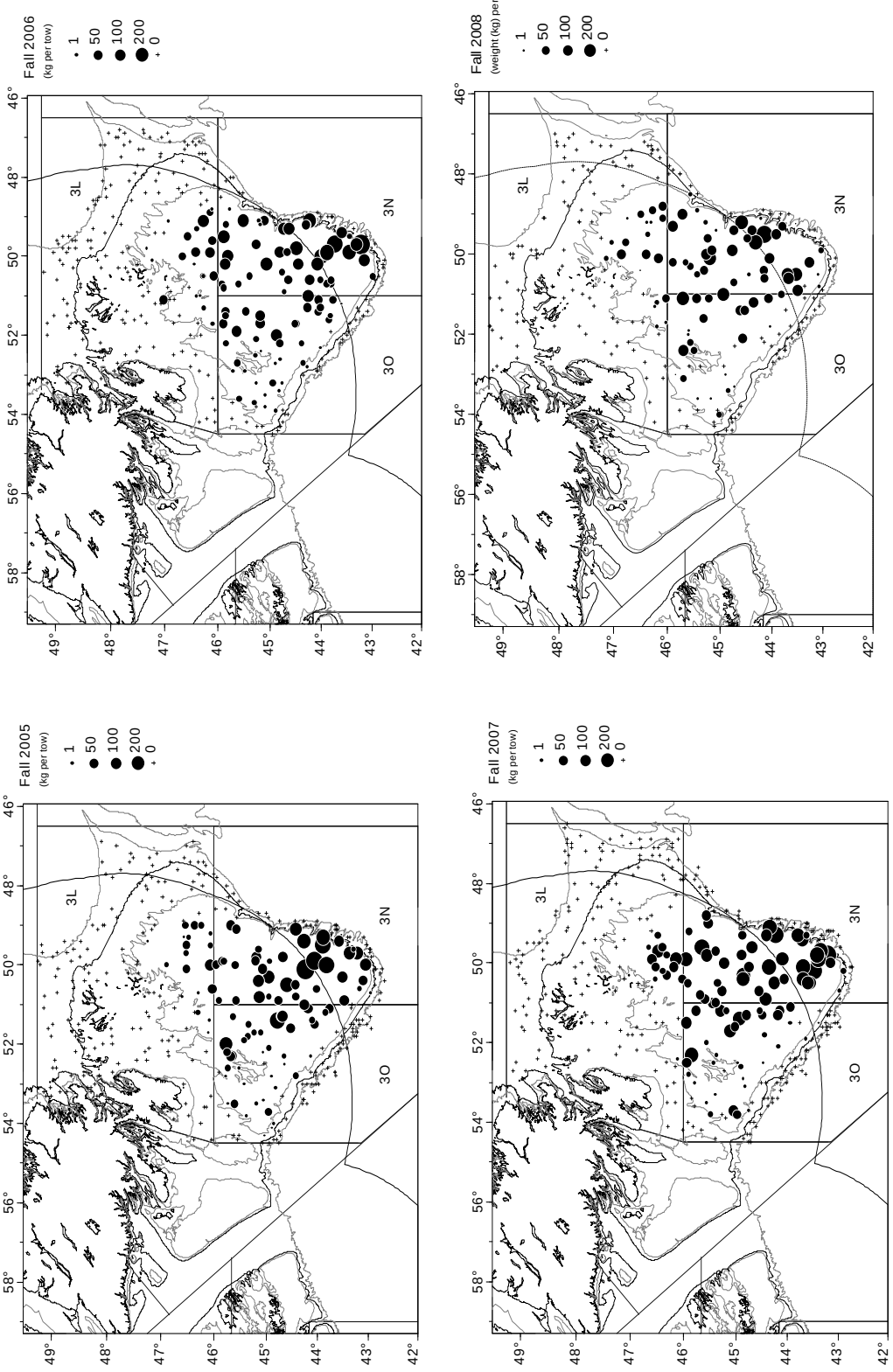

Figure 8. Distribution of yellowtail flounder (weight (kg) per tow) in Canadian fall surveys of NAFO divisions 3LNO from 2005-2008.

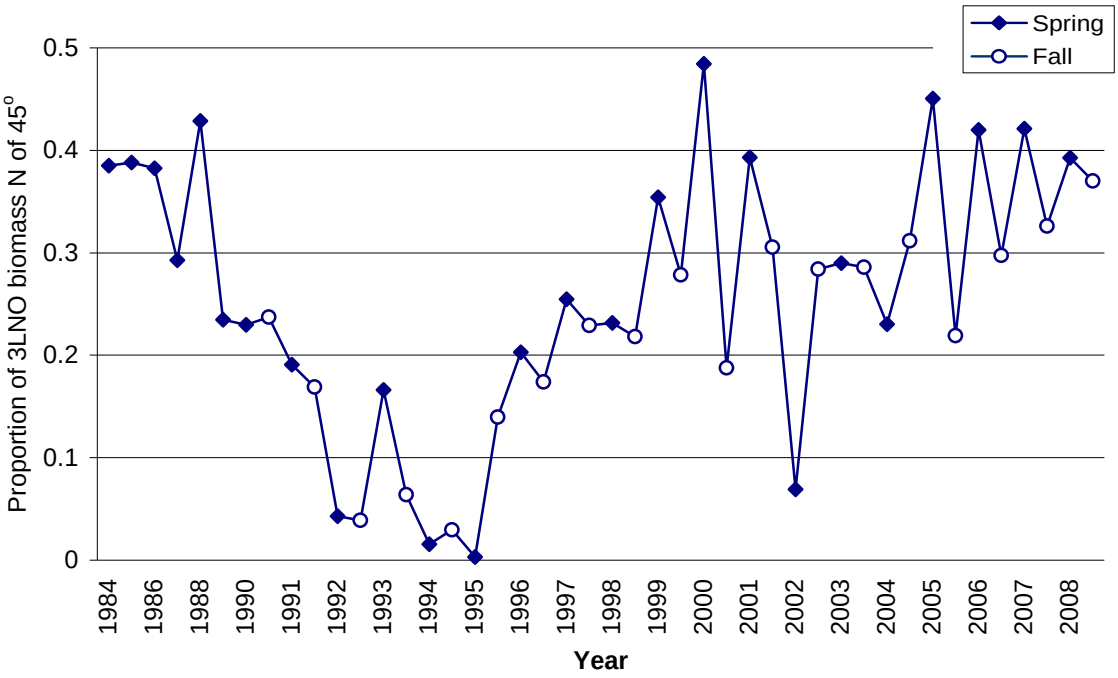

Figure 9. Proportion of yellowtail flounder caught north of 45° N in Divs. 3LNO. All data up to 1990 are from spring surveys only.