Northwest Atlantic Fisheries Organization

Serial No. N5919 **NAFO SCR Doc. 11/034**

SCIENTIFIC COUNCIL MEETING – JUNE 2011

Divisions 3LNO Yellowtail Flounder (*Limanda ferruginea*) in the 2009 and 2010 Canadian Stratified Bottom Trawl Surveys

by

D. Maddock Parsons

Northwest Atlantic Fisheries Centre, Science Branch
Department of Fisheries and Oceans, 80 East White Hills Road
St. John's, Newfoundland AlC 5Xl

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 1984-2010 and during the autumn from 1990 to 2010. 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. Abundance and biomass estimates from the spring and autumn surveys remained high, increasing from the decline observed in the 2009 surveys.

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 2010 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 1984-2010 spring and the 1990-1994 fall surveys 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 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 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 and 1990 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 1984-2010

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 1984-2010. 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). Tables 3a and 3b identify 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 Kt biomass. Biomass and abundance estimates then declined in 3L and in 2009 were 13.2 Kt and 47 million fish. In 2010 estimates increased once more to 29 Kt and 110 million fish. 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 were variable, but increased and in 2008 the biomass index (330 kt) was the highest in the series while abundance was second highest (1 115 million). The estimates from the 2009 survey were lower at 213 Kt and 752 million fish, but 2010 values increased again to about the level of those in 2007. 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. Tables 3a and 3b outlines large sets (> 400kg or >900 fish) in surveys since 1996.

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 was due to a shift in length frequency toward smaller fish in 2007. Indices in division 3O remained high in 2008 but declined substantially in 2009. In 2010, estimates of biomass and abundance were again 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 (Tables 3a and 3b). It is more probable to say that 2002 was a negative anomaly as reflected in the lack of fish in the northern areas. Most of the decline in the 2009 survey estimate can be attributed to two strata in 3N (361 and 373) although 3L and 3O also had lower abundance and biomass estimates in 2009.

Canadian Fall Surveys, 1990-2010

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 29). 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. 2009 estimates dropped to 17 Kt and 45 million fish, the lowest since 1999, but increased in the 2010 survey to 36 Kt and 136 million fish. 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 2003-2010.

From 1990-92, the Div. 3N stock size 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 29; 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 2001-2010, both the abundance and biomass estimates have varied around a level of 1.0 billion fish and 270 000 t biomass, respectively (Fig. 3). In 2010, estimates are near the highest in the time series.

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 (Tables 3a and 3b). 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 26 and 27: 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.

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 2003-2010, there were catches (>1 000 fish) (Tables 3a and 3b) 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 declined in 2008 and again in 2009 to near the levels of 1998 or 1999. Several large sets in the 2010 survey in 5 strata brought estimates back to near the highest in the series.

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 4 and 5 show the standard number and weight from the catches of individual fishing sets from the spring and fall Campelen surveys for 2009 and 2010. A complete time series of distribution plots are presented in Maddock Parsons (2011).

In the 2005-2010 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. 1). Observed distributions were comparable with earlier descriptions of the distribution of this stock (see Maddock Parsons, 2011). 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 6 shows a plot of the proportion of biomass north of 45^{o} N from 1973 to 2010. The range of the stock has extended northward since 1995. From 1996-2001, in 2003, and 2005-09, 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 from 2005 to 2008 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. With the exception of the 2009 spring survey, which only estimated 21% of the biomass north of 45°N, the other surveys in 2009 and 2010 surveys showed about 30% in the northern part of the stock area.

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 -2010 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.

References

BRODIE, W. B., S. J. WALSH, and D. B. ATKINSON. 1998. The effect of stock abundance on range contraction of yellowtail flounder (*Pleuronectes ferruginea*) on the Grand Bank of Newfoundland in the Northwest Atlantic from 1975 to 1995. *J. Sea Res*., **39**: 139-152

BRODIE, W.B., AND D.E. STANSBURY. 2007. A brief description of the fall multispecies surveys in SA2 + Divisions 3KLMNO from 1995-2006. NAFO SCR Doc. 07/18, Ser. No. N5366, 24p.

DOUBLEDAY, W. B. 1981 Manual on groundfish surveys in the Northwest Atlantic. *NAFO Sci. Coun. Studies*, **2**: 55 p.

COLBOURNE, E. B., and S. J. WALSH. 2006. The distribution and abundance of yellowtail flounder (*Limanda ferruginea*) in relation to bottom temperatures in NAFGO Divisions 3LNO based on multi-species surveys from 1990-2005. *NAFO SCR Doc*., No. 23, Serial No. N5241, 16 p.

COLBOURNE, E. B., C. FITZPATRICK, D. SENCIALL, P. STEAD, W. BAILEY, J. CRAIG, and C. BROMLEY. 2004. An assessment of physical oceanographic conditions in NAFO Sub-areas 2 and 3 for 2003. *NAFO SCR Doc*., No. 15, Serial No. 4962, 26 p.

HEALEY, B.P., AND W.B. BRODIE. 2009. Brief notes on the execution of Canadian multi-species surveys in 2007 and 2008. *NAFO SCR Doc*., No. 12, Serial No. N5639, 26 p.

MADDOCK PARSONS, D. 2011. Witch Flounder, American Plaice, and Yellowtail Flounder in Canadian Spring and Autumn Surveys: Time Series Stock Distribution Maps. *NAFO SCR Doc*., No. 37, Serial No. N5922 , 91 p

MADDOCK PARSONS, D., and W.B. BRODIE. 2008. Distribution and Abundance of Yellowtail Flounder (*Limanda ferruginea*) on the Grand Bank, NAFO Divisions 3LNO, from Canadian Bottom Trawl Survey Estimates from 1984-2007. *NAFO SCR Doc*., No. 44, Serial No. N5546, 36 p.

MCCALLUM, B. R., and S. J. WALSH. 1996. Groundfish survey trawls used at the Northwest Atlantic Fisheries Centre, 1971-present. *NAFO SCR Doc*., No. 50, Serial No. N27256, 18 p.

MCCALLUM, B. R., and S. J. WALSH. 2001. Evaluating the success of the survey trawl standardization program at the Northwest Atlantic Fisheries Centre. *NAFO SCR Doc*., No. 26, Serial No. N4399, 18 p.

SIMPSON, M., and S. J. WALSH. 2004. Changes in the Spatial Structure of Grand Bank Yellowtail Flounder: Testing MacCall,s Basin Hypothesis. *J. Sea Res*., **51**: 199 to 210

STACFIS. 2000. Appendix IV, Report of Standing Committee on Fisheries Science (STACFIS). Pp 122-134 *In*: Northwest Atlantic Fisheries Organization Scientific Council Reports 2000 ISSN-0250-6416, 303 p.

WALSH, S. J. 1992. Factors influencing distribution of juvenile yellowtail flounder (*Limanda ferruginea*) on the Grand Bank of Newfoundland. *Neth. J. Sea Res*., **29**: 193-203.

WALSH, S. J., and B. R. MCCALLUM. 1995. Survey trawl mensuration using acoustic trawl instrumentation. *ICES C.M. Doc*., No. 1995/B:26, 20 p.

WALSH, S. J, W. B. BRODIE, M. J. MORGAN, W. R. BOWERING, D. ORR, and M. VEITCH. 1997. An Assessment of the Grand Bank Yellowtail Flounder Stock in NAFO Divisions 3LNO. *NAFO SCR Doc*., No. 72, Serial No. N2906, 54 p.

WALSH, S. J, D. ORR, and W. B. BRODIE. 1998a. Conversion factors for yellowtail flounder survey indices derived from comparative fishing trials between the Engel 145 otter trawl and the Campelen 1800 shrimp trawl. *NAFO SCR Doc*., No. 60, Serial No. N3052, 10 p.

WALSH, S .J, W. B. BRODIE, M. VEITCH, D. ORR, C. MCFADDEN, and D. MADDOCK PARSONS. 1998b. An assessment of the Grand Bank yellowtail flounder stock in NAFO Divisions 3LNO. *NAFO SCR Doc*., No. 72, Serial No. N3064, 78 p.

WALSH, S. J., K. S. WHALEN and M. SIMPSON. 1999. Preliminary analysis of spatial and temporal variation in the distribution of juvenile yellowtail flounder on the Grand Bank: Investigating the methodology. *NAFO SCR Doc*., No. 59, Serial No. N4118, 57 p.

WALSH, S. J., M. F. VEITCH, M. J. MORGAN, W. R. BOWERING, and B. BRODIE. 2000. Distribution and abundance of yellowtail flounder (*Limanda ferruginea*) on the Grand Bank, NAFO Divisions 3LNO, as derived from annual Canadian bottom trawl surveys. *NAFO SCR Doc*., No. 35, Serial No. N4264, 54 p.

WALSH, S. J, M. SIMPSON, M. J. MORGAN, and D. STANSBURY. 2001a. Distribution of juvenile yellowtail flounder, American plaice and Atlantic cod on the southern Grand Bank, NAFO Div. 3NO. *NAFO SCR Doc*., No. 78, Serial No. N4457, 49 p.

WALSH, S. J, M. J. MORGAN, W. B. BRODIE, K. S. DWYER, and L. MANSFIELD. 2001b A new tagging program for yellowtail flounder on the Grand Bank, NAFO Divs. 3LNO. *NAFO SCR Doc*., No. 53, Serial No. N4431, 14 p.

WALSH, S. J, M. F. VEITCH, W. B. BRODIE, and K. S. DWYER. 2004. The distribution and abundance of yellowtail flounder (*Limanda ferruginea*) on the Grand Bank, in NAFO Divisions 3LNO, from the Canadian annual bottom trawl surveys, from 1984-2003. *NAFO SCR Doc*., No. 36, Serial No. N4986, 50 p.

WALSH, S. J., and M. J. MORGAN. 2004. Observations of natural behaviour of yellowtail flounder derived from data storage tags. *ICES J. Mar. Sci*., **61**: 1151-1156.

WALSH, S. J. 2005. Conversion of the Canadian juvenile (Yankee trawl) groundfish survey time series for yellowtail flounder on the Grand Bank, NAFO Div. 3LNO, into Campelen trawl units. *NAFO SCR Doc*., No. 48, Serial No. N5134, 11 p.

WALSH, S. J., M. J. MORGAN, G. HAN, and J. CRAIG. 2006a. Progress toward modeling tagging data to investigate spatial and temporal changes in habitat utilization of yellowtail flounder on the Grand Bank. *NAFO SCR Doc*., No. 29, Serial No. N5248, 30 p.

WALSH, S. J, W. B. BRODIE, and M. J. MORGAN. 2006. The 2006 Assessment of the Grand Bank Yellowtail Flounder Stock, NAFO Divisions 3LNO. *NAFO SCR Doc*., No. 48, Serial No. N5274, 31p.

Table 1. Summary of the Canadian RV Spring surveys 1984-2010. Survey gear changed from Engel to Campelen in autumn of 1995.

		3L		3N		3O		3LNO	
Year	Ship	Nsets	Depth Range	Nsets	Depth Range	Nsets	Depth Range	1st set	Last set
1984	A. Needler	37	67 - 185 m	61	39 - 360 m	56	66 - 350 m	28-Apr	21-May
1985	W. Templeman	221	63 - 705 m	36	52 - 310 m			11-Apr	26-May
	A. Needler			49	46 - 320 m	93	67 - 355 m		
1986	W. Templeman	211	64 - 339 m	101	41 - 354 m	102	66 - 326 m	18-Apr	25-May
1987	W. Templeman	181	61 - 356 m	91	46 - 344 m	100	65 - 356 m	23-Apr	01-Jun
1988	W. Templeman	160	65 - 558 m	77	41 - 330 m	84	66 - 335 m	21-Apr	24-May
1989	W. Templeman	205	64 - 350 m	94	45 - 352 m	101	66 - 337 m	20-Apr	28-May
1990	W. Templeman	156	63 - 346 m	85	42 - 320 m	93	65 - 340 m	22-Apr	04-Jun
1991	W. Templeman	143	66 - 685 m	93	40 - 645 m	116	65 - 635 m	19-Apr	29-May
1992	W. Templeman	178	64 - 710 m	94	44 - 625 m	91	66 - 630 m	22-Apr	07-Jun
1993	W. Templeman	181	64 - 680 m	85	40 - 695 m	81	66 - 620 m	27-Apr	10-Jun
1994	W. Templeman	160	64 - 911 m	76	44 - 895 m	81	66 - 862 m	30-Apr	10-Jun
1995	W. Templeman	151	65 - 646 m	89	42 - 668 m	85	65 - 640 m	03-May	14-Jun
1996	W. Templeman	188	66 - 664 m	82	42 - 665 m	86	65 - 685 m	07-May	27-Jun
1997	W. Templeman	158	60 - 681 m	71	35 - 689 m	81	62 - 669 m	30-Apr	26-Jun
1998	W. Templeman	163	53 - 721 m	88	38 - 682 m	93	64 - 657 m	12-May	30-Jun
1999	W. Templeman	177	41 - 692 m	82	40 - 659 m	86	62 - 679 m	11-May	29-Jun
2000	W. Templeman	134	61 - 681 m	81	45 - 664 m	83	61 - 694 m	11-May	29-Jun
2001	W. Templeman	154	34 - 695 m	79	40 - 650 m	79	64 - 699 m	29-Apr	24-Jun
2002	W. Templeman	146	42 - 710 m	79	40 - 641 m	79	63 - 628 m	27-Apr	22-Jun
2003	W. Templeman	156	62 - 698 m	79	39 - 681 m	79	63 - 726 m	08-May	26-Jun
2004	W. Templeman	151	47 - 710 m	79	44 - 675 m	79	61 - 636 m	12-May	26-Jun
2005	W. Templeman	133	64 - 672 m	78	45 - 691 m	79	66 - 719 m	09-May	29-Jun
2006	W. Templeman	141	60 - 701 m	4	68 - 77 m	3	75 - 84 m	10-Jun	30-Jun
	A. Needler			18	46 - 68 m	29	64 - 103 m		
2007	W. Templeman	97	61 - 702 m	79	44 - 636 m	79	64 - 719 m	03-May	12-Jul
	Teleost	40	66 - 171 m						
2008	W. Templeman	79	60 - 684 m	71	40 - 623 m	80	64 - 704 m	23-May	30-Jun
	Teleost	43	97 - 641 m						
2009	A. Needler	61	63 - 676 m	78	44 - 668 m	79	64 - 674 m	13-May	23-Jun
	Teleost	81	61 - 694 m						
2010	A. Needler	130	59 - 715 m	78	39 - 714 m	80	60 - 673 m	08-May	25-Jun

Table 2. Summary of the Canadian RV Autumn surveys 1990-2010. Survey gear changed from Engel to Campelen in autumn of 1995.

		3L		3N		3O		3LNO	
Year	Ship	Nsets	Depth Range	Nsets	Depth Range	Nsets	Depth Range	1st set	Last set
1990	G. Atlantica							18-Oct	09-Dec
	W. Templeman	161	65 - 695 m	80	47 - 310 m	91	63 - 495 m		
1991	G. Atlantica							19-Oct	02-Dec
	W. Templeman	219	63 - 680 m	67	42 - 638 m	84	65 - 715 m		
1992	G. Atlantica							20-Oct	29-Nov
	W. Templeman	215	63 - 693 m	34	40 - 437 m	54	66 - 450 m		
1993	G. Atlantica							24-Oct	04-Dec
	W. Templeman	153	64 - 670 m	70	44 - 670 m	75	64 - 676 m		
1994	G. Atlantica							25-Oct	07-Dec
	W. Templeman	200	65 - 715 m	73	42 - 641 m	75	65 - 696 m		
1995	W. Templeman	161	63 - 640 m	90	40 - 650 m	81	63 - 730 m	26-Sep	25-Jan
	Teleost	5	733 - 1210 m						
1996	W. Templeman	180	51 - 671 m			19	65 - 139 m		
	A. Needler			54	37 - 309 m	15	63 - 304 m	09-Oct	12-Dec
	Teleost	31	805 - 1433 m	13	390 - 1147 m	24	68 - 690 m		
1997	W. Templeman	134	35 - 714 m	74	41 - 769 m	73	64 - 611 m	26-Sep	20-Dec
	Teleost	71	161 - 1436 m						
1998	W. Templeman	172	34 - 675 m	78	42 - 1079 m	87	61 - 1076 m	10-Oct	16-Dec
	Teleost	32	691 - 1437 m	12	834 - 1447 m				
1999	W. Templeman	169	63 - 1407 m	68	39 - 664 m	75	58 - 692 m	13-Oct	12-Dec
	Teleost	1	1366 - 1366 m						
2000	W. Templeman	102	42 - 447 m	70	46 - 642 m	76	62 - 654 m	11-Oct	18-Dec
	Teleost	74	152 - 1430 m	24	747 - 1419 m	24	752 - 1424 m		
2001	W. Templeman	169	38 - 702 m	70	45 - 660 m	75	67 - 703 m	22-Sep	06-Dec
	A. Needler	2	187 - 203 m						
	Teleost	34	146 - 1457 m	24	739 - 1410 m	22	803 - 1391 m		
2002	W. Templeman	176	35 - 670 m	70	44 - 675 m	75	65 - 696 m	05-Oct	02-Dec
	Teleost	30	763 - 1431 m	24	811 - 1429 m	24	775 - 1504 m		
2003	W. Templeman	175	32 - 702 m	70	43 - 727 m	75	63 - 650 m	23-Sep	20-Jan
	Teleost	30	753 - 1446 m			8	761 - 1382 m		
2004	W. Templeman	143	44 - 653 m	69	40 - 659 m	76	63 - 634 m	31-Oct	19-Dec
	Teleost	4	151 - 522 m						
2005	W. Templeman	120	50 - 706 m	69	42 - 633 m	75	60 - 649 m	04-Oct	29-Jan
	A. Needler	57	121 - 667 m						
	Teleost	7	803 - 1351 m	17	776 - 1445 m	24	754 - 1410 m		
2006	W. Templeman	151	61 - 641 m	70	46 - 650 m	74	63 - 674 m	30-Sep	18-Dec
	Teleost	34	111 - 1401 m						
2007	W. Templeman	120	61 - 694 m	69	48 - 652 m	75	64 - 632 m	06-Oct	20-Dec
	Teleost	48	81 - 1424 m	25	775 - 1419 m	24	753 - 1410 m		
2008	W. Templeman	83	62 - 664 m	64	38 - 643 m	66	60 - 661 m	03-Oct	13-Nov
	A. Needler	43	71 - 332 m						
	Teleost								
2009	A. Needler	130	62 - 682 m	64	42 - 708 m	76	60 - 696 m	02-Oct	20-Dec
	Teleost	30	784 - 1385 m	11	798 - 1409 m	24	768 - 1397 m		
2010	A. Needler	141	58 - 657 m	68	40 - 614 m	75	61 - 667 m	30-Sep	20-Dec
	Teleost	55	100 - 1448 m	4	855 - 1219 m				

Table 3a. Large sets (>900 fish or >400kg) from Canadian spring and autumn surveys by strata for 1996-2003.

		Spring				Autumn					
		3N		3O		3L		3N		3O	
YEAR	STRATA	number	weight (kg)	number	weight (kg)	number	weight (kg)	number	weight (kg)	number	weight (kg)
1996	360	1340	191								
	361	977	148					950	307		
	375	1150	119								
	376							1116	124		
								964	146		
1997	360							2130	759		
	361							1033	452		
	375	1261	221								
	376	980	179					1156	135		
		2293	238					1325	217		
								1800	317		
1998	63									5	2000
	360	1685	310					1006	211		
	361	1164	251					1489	429		
	362	1416	446								
	375	1226	292								
	376	1007	188					1281	307		
1999	360	2131	667					972	253		
		1621	453								
	361	1140	146								
	362	1169	217					938	198		
		929	509					1772	241		
	375	1029	130								
	376	1540	267					1753	360		
		1023	182								
2000	352									924	235
	360							1060	238		
	362	1274	400								
	373	1147	451								
	375							1020	232		
	376							1392	682		
								2193	420		
								3994	1150		
2001	338									1192	463
	360	1404	304								
		1043	226								
		1008	280								
	361	998	243					1275	376		
	362	1657	346					1433	424		
		1388	242								
	373	4824	1654								
	376	1080	306					4243	889		
		1370	293					2081	517		
		2384	494					3178	831		
2002	360	979	234					1642	742		
		1474	432					1190	315		
		1096	269								
		1200	376								
		1118	332								
	361							990	285		
								987	249		
	362							1289	296		
	375							1103	296		
	376							1365	298		
								1367	259		
2003	351									1345	255
	353									993	340
	360	922	288					1360	493		
		1105	291								
	361							1355	339		
								972	240		
	373	906	319								
	376	1976	394					1627	475		
		1004	305								
		1677	377								

Table 3b. Large sets (>900 fish or >400kg) from Canadian spring and autumn surveys by strata for 2004-2010.

		Spring				Autumn					
		3N		3O		3L		3N		3O	
YEAR	STRATA	number	weight (kg)	number	weight (kg)	number	weight (kg)	number	weight (kg)	number	weight (kg)
2004	351									929	233
	360	1088	321					1151	286		
		952	481					901	397		
	361	990	220								
	362							1492	225		
	373							943	385		
	375							2118	445		
								2151	519		
								1452	241		
	376	1227	316					1170	348		
								1764	255		
2005	352									1001	388
	360	1193	419								
	361	1014	266								
	362	964	328								
	373	934	376								
	375							1515	293		
	376	1669	481					2218	495		
								2450	433		
								4473	844		
								3614	603		
2006	360	954	317					1759	771		
		1527	352								
		1584	547								
	362	1366	396								
	376	1624	411					1149	322		
								1569	315		
								2529	505		
2007	360	2069	424					2140	649		
		1175	234					1409	390		
								1145	330		
								1410	358		
								915	196		
	361							946	167		
	362	982	302								
	373	922	395					1292	365		
		921	375								
	375							1201	302		
	376	957	250					1770	409		
		1350	262					2216	342		
								1331	414		
2008	352									1084	212
	360	1531	473					955	220		
		3093	1032								
	361	944	132								
	362	1063	357					1107	253		
	373	1028	406								
	375							1070	316		
	376	1477	307								
		1278	328					1789	559		
2009	373	1275	413								
	375	1128	302					990	243		
								1405	302		
	376	1323	401					1081	243		
		1334	260								
2010	338			1302	391						
	360	908	236					1033	233		
		1921	492								
	372					948	207				
	373	1446	495								
								1622	449		
	374	1317	537								
	375							1463	264		
								2429	431		
	376	1650	359					1747	397		
								1336	362		
		1130	266					2867	700		
		1469	442					1429	301		
		1134	273								

Table 4. Mean number per tow of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2010.

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	09	10
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	2.5	0.0
	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	82.0	41.1
	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	0.0	16.7
	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	77.1	284.0
	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	0.0	8.0
	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		0	0.2
	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	0.4	0.0
	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	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	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	0.0	0.0
	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	0.0	0.2
	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	0.0	0.6
	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
	370		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
	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	0.0	0.0	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	0.0	0.0
	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	21.6	22.6	23.6
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	16.7	35.4
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	0.8	6.7

Table 5. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2010.

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	09	10
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	0.9	0.0
	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	22.4	16.1
	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	0.0	7.1
	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	22.0	67.5
	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	0.0	3.6
	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		0	0.2
	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	0.1	0.0
	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	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	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	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	0.0	0.1
	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	0.0	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
	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
	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	0.0	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	0.0	0.0
	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	2.5	5.5
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	4.8	8.8
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	0.2	2.1

Table 6. Abundance (millions) of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2010.

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	09	10
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	0.7	0.0
	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	20.1	10.1
	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	0.0	2.6
	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	26.1	96.1
	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	0.0	1.2
	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		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	0.1	0.0
	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	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	
	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	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	0.0	0.0
	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	0.0	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
	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
	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	0.0	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	0.1	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)		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	47.0	110.3
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	89.4	185.4
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	4.5	35.1

Table 7. Biomass (kt) of yellowtail flounder by stratum for Division 3L (strata <184m only) from Spring surveys 1984-2010.

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	09	10
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	0.3	0.0
	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	5.5	4.0
	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	0.0	1.1
	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	7.5	22.9
	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	0.0	0.6
	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		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	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
	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	
	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
	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	0.0	0.0
	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	0.0	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
	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
	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	0.0	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
	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	13.2	28.6
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	25.5	46.1
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	0.9	11.1
% 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	0.00	0.00

Table 8. Mean number per tow of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2010.

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	09	10
<=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	523.8	185.2
	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	996.4	1122.5
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	357.2	754.9
	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	357.2	211.2
	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	174.3	262.2
	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	211.6	388.0
	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	463.3	650.3
	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	1.8	52.0
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	0.0	6.2
	377	0	0	0	6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	0	0	4.0		423.9	84.5	0.5	22.5
	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	0.0	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	313.0	396.0
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	388.4	489.3
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	237.7	302.8

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 1984-2010.

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	09	10
<=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	137.8	55.5
	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	275.5	284.1
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	97.9	206.8
	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	89.7	50.9
	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	51.1	77.8
	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	68.0	132.8
	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	172.2	257.4
	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	0.3	19.7
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	0.0	1.8
	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	0.2	8.2
	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	0.0	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	88.9	115.3
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	111.2	144.7
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	66.6	85.9

Table 10. Abundance (millions) of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2010.

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	09	10
<=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	114.8	40.6
	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	205.5	231.5
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	147.0	310.7
	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	91.0	53.8
	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	60.4	90.9
	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	73.4	134.5
	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	59.3	83.3
	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	0.2	4.8
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	0.0	0.4
	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	0.0	0.3
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3		0	0.0	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	751.6	950.9
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	932.5	1174.8
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	570.7	726.9

Table 11. Biomass (kt) of yellowtail flounder by stratum (< 184 m only) for Division 3N from Spring surveys 1984-2010.

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	09	10
<=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	30.2	12.2
	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	56.8	58.6
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	40.3	85.1
	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	22.9	13.0
	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	17.7	27.0
	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	23.6	46.0
	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	22.0	33.0
	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	0.0	1.8
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	0.0	0.1
	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	0.0	0.1
	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	0.0	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	213.5	276.9
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	267.1	347.5
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	160.0	206.3
% 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	0.00	0.00	0.00

Table 12. Mean number per tow of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2010.

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	09	10
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	5.5	14.7
	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	39.0	199.0
	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	215.7	322.3
	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	26.8	37.2
	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	9.3	142.8
	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	129.8	184.4
	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	9.8	263.8
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	0.0	0.0	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	0.7	1.7
	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	0	5.0
	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	1.0	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	0.0	1.1
3O (all strata)		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	46.2	106.7
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	78.2	162.6
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	14.2	50.7

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 1984-2010.

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	09	10
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	2.3	4.0
	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	16.1	80.3
	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	101.3	106.9
	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	7.9	10.0
	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	2.2	42.5
	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	36.9	60.2
	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	2.9	91.3
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	0.0	0.0	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	0.2	1.3
	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	0	2.5
	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	0.3	0.4
	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	0.0	0.4
3O (all strata)		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	17.4	35.0
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	34.0	51.9
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	0.8	18.1

Table 14. Abundance (millions) of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2010.

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	09	10
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	1.6	4.2
	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	2.4	12.5
	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	56.3	84.2
	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	6.3	8.8
	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	3.2	49.5
	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	46.1	65.4
	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	1.7	46.5
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	0.0	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	0.1	0.2
	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	0	0.7
	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	0.1	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	0.0	0.1
3O (all strata)		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	117.9	272.2
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	199.6	414.9
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	36.2	129.5

Table 15. Biomass (kt) of yellowtail flounder by stratum (< 184 m only) for Division 3O from Spring surveys 1984-2010.

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	09	10
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	0.7	1.2
	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	1.0	5.0
	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	26.4	27.9
	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	1.9	2.4
	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	0.8	14.7
	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	13.1	21.4
	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	0.5	16.1
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	0.0	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	0.0	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	0	0.3
	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	0.0	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	0.0	0.0
3O (all strata)		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	44.4	89.2
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	86.9	132.3
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	2.0	46.1
% 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	0.00	0.00	0.00

Table 16. Mean number per tow of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall Surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	0.4	10.0
	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	125.0	142.0
	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	0	3.8
	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	28.6	282.3
	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	30	10.0
	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	0	0
	341	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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
	343	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	0.3	0	0.0	0
	349	0	0	0	0	0	0	0	0	0	0	0	0.1	0.7	0	0	0	19.7	0.1	0.0	0.0	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	0.0	0.8
	365	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	1
	385	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
	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				0.0
	790							0	0	0		0	0	0	1.0	0	0					0.0
	793							0	0	0		0	0	0	0	1.1	0					0.0
	794							0	0	0			0	0	0	0	0	0				0.0
	797							0	0	0		0	0	0	0	0	0	0				0.0
	799							0	0	0		0	0	0	0	1.5	0	0				0.0
3L (all strata)		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	7.6	22.0
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	16.1	39.1
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	-1.0	4.9

Table 17. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall Surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	0.2	3.3
	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	42.9	44.0
	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	0	1.7
	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	10.6	67.9
	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	15	5.2
	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	0	0
	341	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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
	343	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	0.1	0	0.0	0
	349	0	0	0	0	0	0	0	0	0	0	0	0.1	0.3	0	0	0	6.4	0.0	0.0	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	0.0	0.2
	365	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
	385	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
	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				0.0
	790							0	0	0		0	0	0	0.1	0	0					0.0
	793							0	0	0		0	0	0	0	0.9	0					0.0
	794							0	0	0			0	0	0	0	0	0				0.0
	797							0	0	0		0	0	0	0	0	0	0				0.0
	799							0	0	0		0	0	0	0	0.4	0	0				0.0
3L (all strata)		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	2.8	5.8
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	5.9	10.4
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	-0.3	1.2

Table 18. Abundance (millions) of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	0.1	2.8
	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	30.6	34.8
	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	0	0.6
	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	9.7	95.5
	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	5	1.5
	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	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
	342	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
	348	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	0	0	0	0	0	0	0.0	0.2	0	0	0	5.7	0.0	0.0	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	0.0	0.3
	365	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
	385	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
	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				0.0
	790							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
	794							0	0	0			0	0	0	0	0	0				0.0
	797							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
3L (all strata)		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	45.1	135.7
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	95.9	241.4
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	-5.7	30.0

Table 19. Biomass (kt) of yellowtail flounder by stratum for Division 3L (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	0.0	0.9
	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	10.5	10.8
	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	0	0.3
	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	3.6	23.0
	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	2	0.8
	785							0	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	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
	342	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
	348	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	0.1	0	0	0	1.9	0.0	0.0	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	0.0	0.1
	365	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
	385	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
	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				0.0
	790							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
	794							0	0	0			0	0	0	0	0	0				0.0
	797							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
3L (all strata)		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	16.5	35.9
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	35.0	64.1
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	-2.0	7.6
% 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	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 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
<=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	783.0	1378.3
	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	739.3	1844.8
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	284.9	550.8
	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	183.2	507.2
	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	331.8	210.4
	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	183.6	543.8
	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	321.0	171.5
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	3.5	0	1.5	178.2	150.0	0.0	147.0
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	14.5	1.0
	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	48.5	28.4
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88.9	6	6.7	0.0
3N (all strata)		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	282.7	558.4
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	363.8	687.3
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	201.6	429.6

Table 21. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall Surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
<=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	190.7	302.2
	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	172.4	440.4
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	84.0	153.5
	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	37.4	123.4
	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	64.7	48.1
	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	54.7	157.7
	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	133.8	59.1
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0.9	0	0.7	82.0	58.8	0.0	61.0
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	4.5	0.4
	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	16.9	8.9
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.6	3	2.7	0.0
3N (all strata)		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	72.0	140.6
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	96.0	169.4
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	48.0	111.9

Table 22. Abundance (millions) of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
<=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	171.6	302.0
	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	152.4	380.4
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	117.2	226.7
	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	46.7	129.3
	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	115.0	72.9
	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	63.7	188.5
	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	41.1	22.0
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.1	16.5	13.9	0.0	13.6
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	0.8	0.1
	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	0.7	0.4
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.9	1	0.6	0.0
3N (all strata)		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	709.9	1335.9
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	913.5	1644.1
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	506.2	1027.7

Table 23. Biomass (kt) of yellowtail flounder by stratum for Division 3N (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
<=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	41.8	66.2
	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	35.6	90.8
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	34.6	63.2
	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	9.5	31.4
	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	22.4	16.7
	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	19.0	54.7
	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	17.1	7.6
	383	0	0		0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	7.6	5.4	0.0	5.7
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	0.3	0.0
	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	0.2	0.1
	382	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	0	0.2	0.0
3N (all strata)		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	180.7	336.4
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	241.0	405.2
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	120.5	267.6
% 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	0.00	0.00

Table 24. Mean number per tow of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall Surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	37.0	64.0
	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	5.1	15.4
	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	7.9	10.8
	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	131.3	7.7
	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	114.4	117.1
	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	125.6	286.9
	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	94.9	103.3
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	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	0.3	0.0
	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	0.0	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	0.0	0.0	1
	354	1.0	0	0	0	0	0	1.8	0	0	0	0.5	0	0	0	0	0	0	2.9	0	0.0	1
3O (all strata)		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	52.6	72.4
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	73.2	110.2
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	31.9	34.5

Table 25. Mean weight (kg) per tow of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall Surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	12.6	25.2
	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	1.7	6.5
	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	2.4	3.2
	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	35.8	2.5
	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	27.0	22.9
	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	34.1	61.2
	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	36.1	35.0
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	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	0.1	0.0
	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	0.0	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	0.0	0.0	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	0.0	0
3O (all strata)		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	14.7	17.6
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	20.9	25.0
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	8.6	10.2

Table 26. Abundance (millions) of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	10.6	18.4
	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	0.3	1.0
	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	2.1	2.8
	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	31.0	1.8
	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	39.7	40.6
	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	44.6	101.8
	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	16.7	18.2
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	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	0.0	0.0
	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	0.0	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	0.0	0.0	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	0.0	0
3O (all strata)		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	145.0	184.7
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	201.9	281.4
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	0.0	0.0

Table 27. Biomass (kt) of yellowtail flounder by stratum for Division 3O (strata < 184 m only) from Fall surveys 1990-2010.

Range	Str	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
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	3.6	7.2
	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	0.1	0.4
	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	0.6	0.8
	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	8.4	0.6
	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	9.4	7.9
	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	12.1	21.7
	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	6.4	6.2
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	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	0.0	0.0
	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	0.0	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	0.0	0.0	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	0.0	0
3O (all strata)		17.3	30.5	19.4	17.5	10.9	25.7	18.9	57.5	52.8	48.4	69.7	81.4	53.5	97.7	60.9	67.1	52.0	76.5	79.4	40.7	44.9
Upper CI		25.9	45.2	43.1	28.1	20.7	38.4	31.5	80.5	74.8	64.5	98.6	150.9	76.4	145.6	92.7	111.8	74.6	114.6	119.4	57.7	63.9
Lower CI		8.6	15.8	-4.3	6.8	1.2	13.1	6.2	34.5	30.8	32.3	40.8	12.0	30.6	49.8	29.0	22.4	29.4	38.4	39.4	23.6	26.0
% 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	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 1984-2010.

	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
2009	47.0	751.6	117.9	916.4	13.2	213.5	44.4	271.2	8.8	313.0	46.2	89.0	2.5	88.9	17.4	26.3
2010	110.3	950.9	272.2	1333.3	28.6	276.9	89.2	394.7	21.0	396.0	106.7	130.8	5.5	115.3	35.0	38.7

Table 29. Estimates of abundance (millions), biomass ('000 tons), mean number and weight (kg) per tow for Fall surveys in NAFO Divisions 3LNO from 1990-2010.

	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
2009	45.1	709.9	145.0	900.0	16.5	180.7	40.7	237.8	7.6	282.7	52.6	80.2	2.8	72.0	14.7	21.2
2010	135.7	1335.9	184.7	1656.3	35.9	336.4	44.9	417.2	22.0	558.5	72.4	149.1	5.8	140.6	17.6	37.5

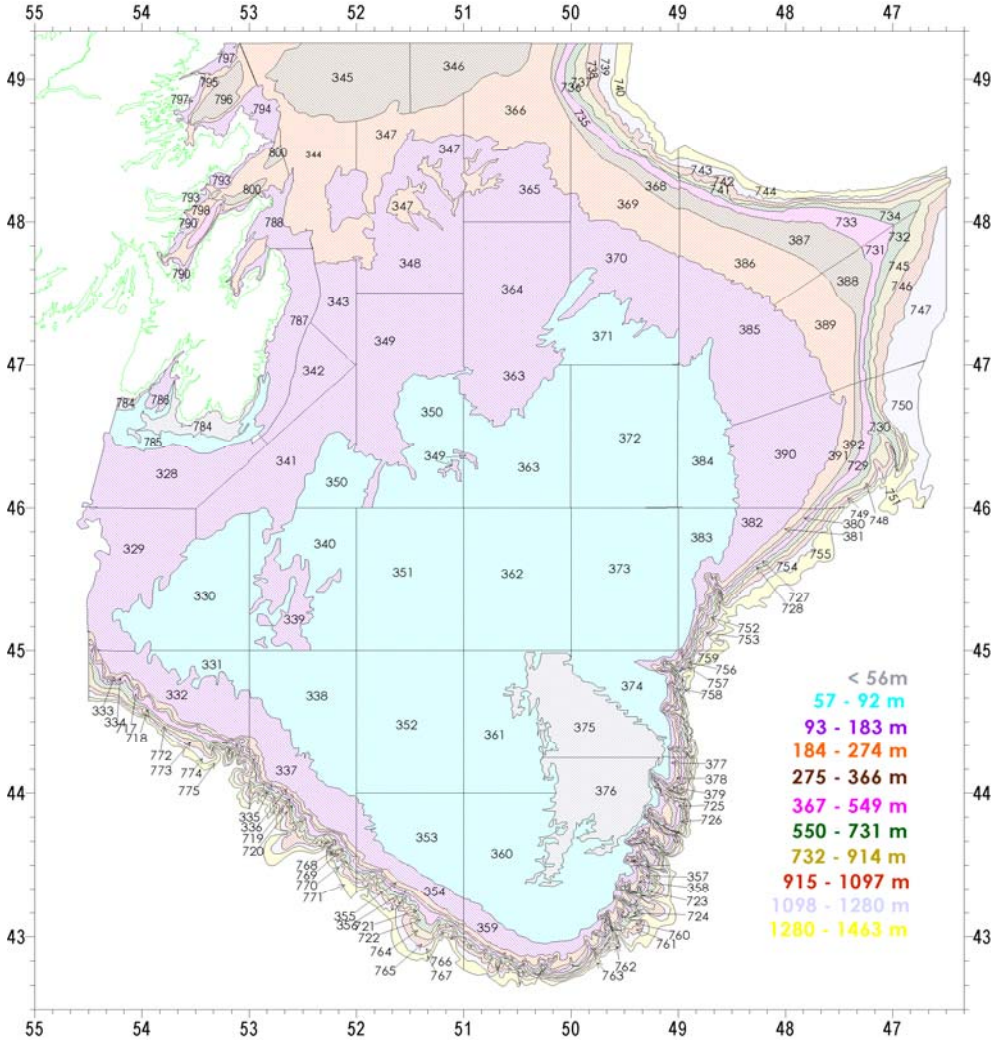

Figure 1. Designation of strata in NAFO divisions 3LNO.

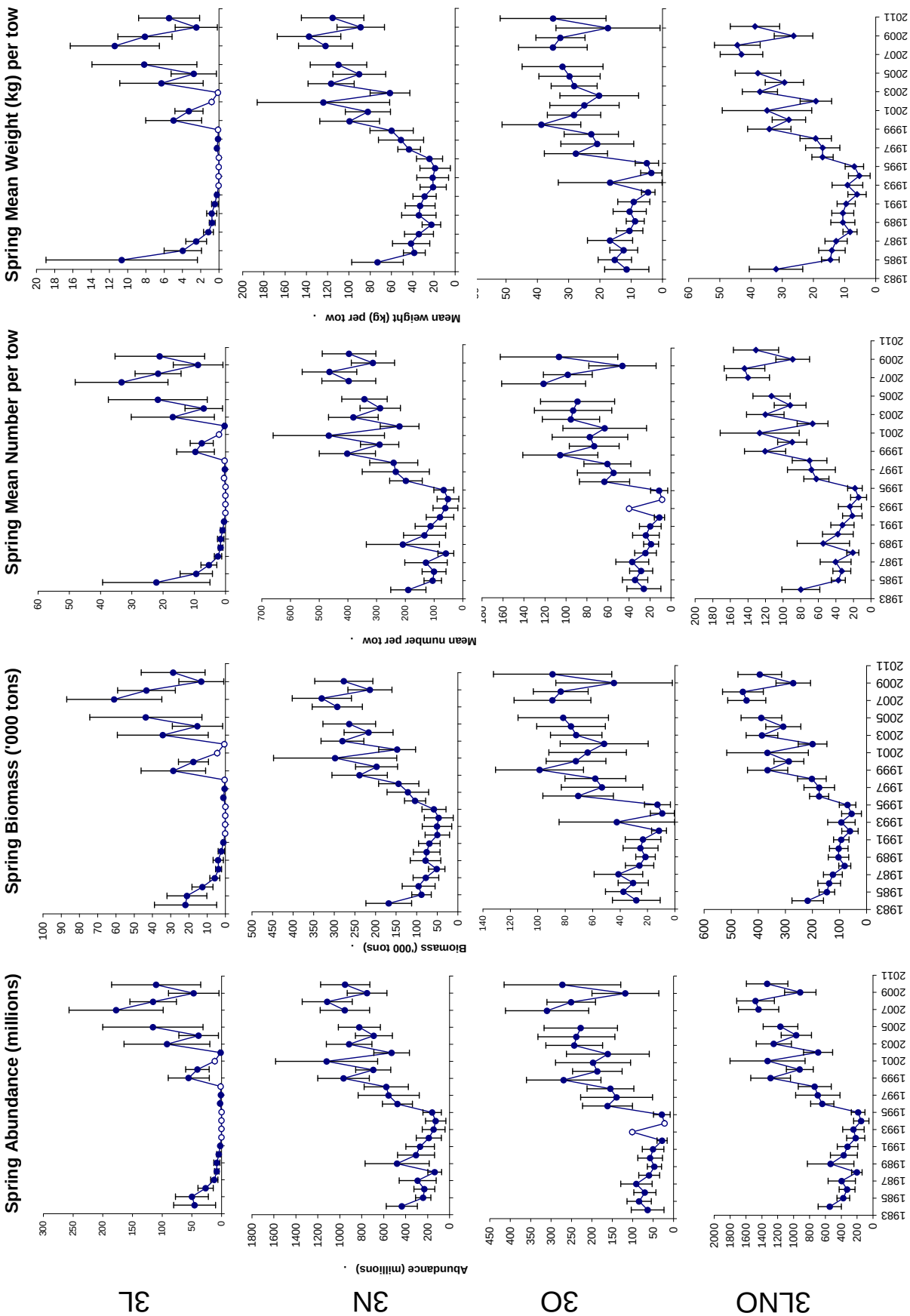

Figure 2. Abundance (millions), Biomass ('000 tons), Mean number and weight (kg) per tow for yellowtail flounder in spring surveys by NAFO division and for 3LNO combined from 1984-2010. Where lower 95% confidence limit is less than 0, error bars are omitted (hollow symbol)

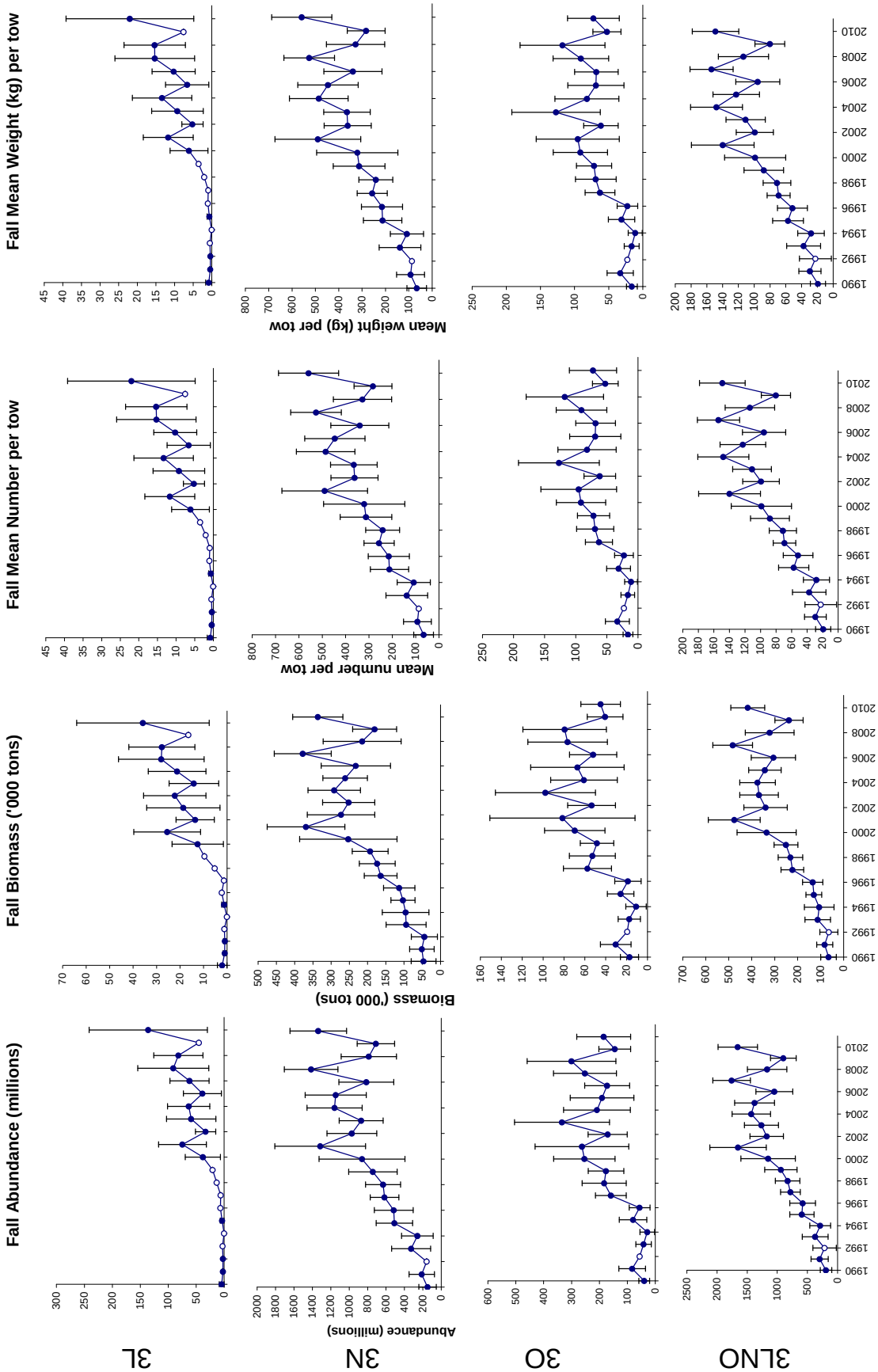

Figure 3. Abundance (millions), Biomass ('000 tons), Mean number and weight (kg) per tow for yellowtail flounder in fall surveys in NAFO divisions 3LNO from 1990-2010. Where lower 95% confidence limit is less than 0, error bars are omitted (hollow symbol)

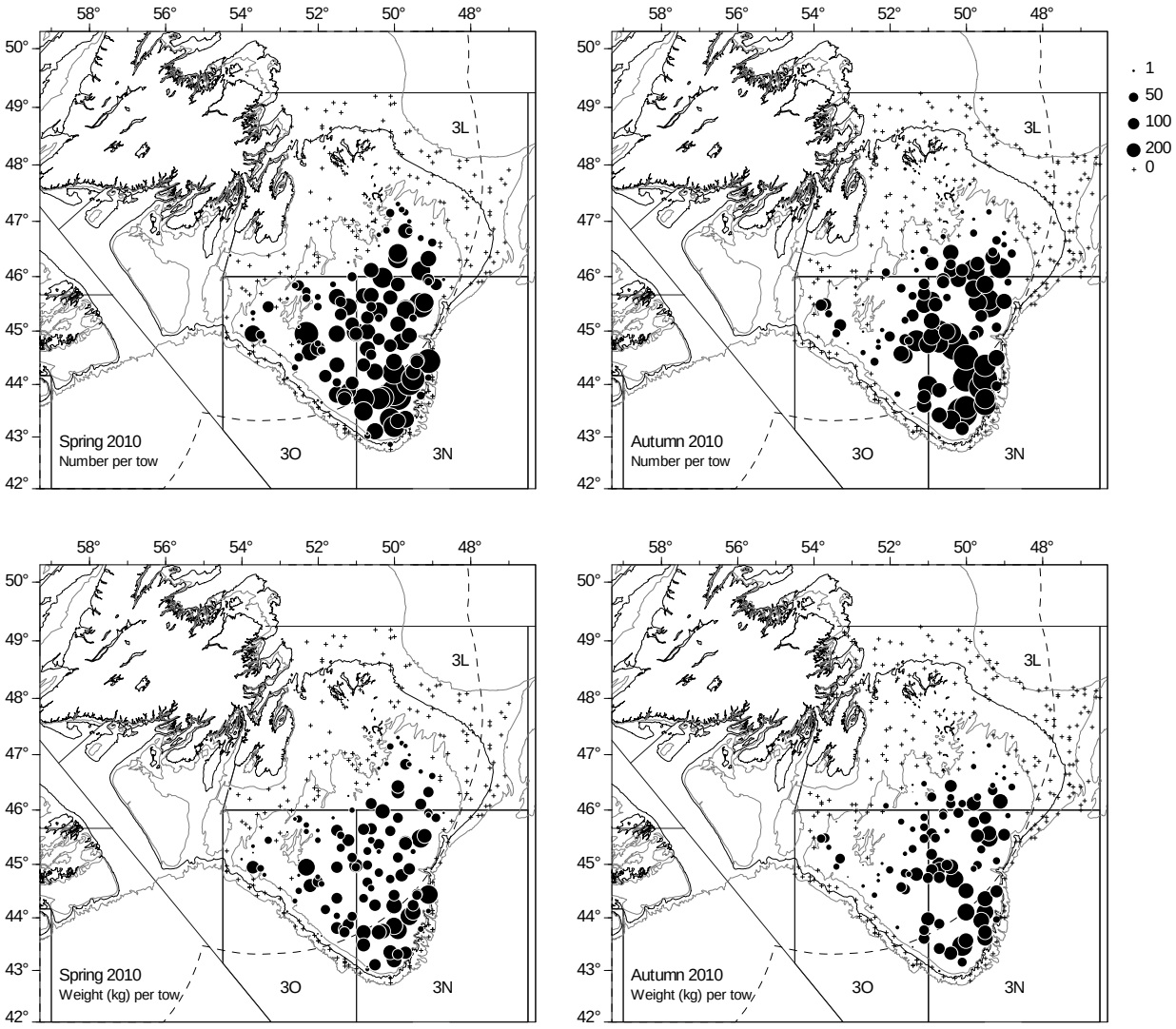

Figure 4. Yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow for 2010 spring and autumn Canadian surveys.

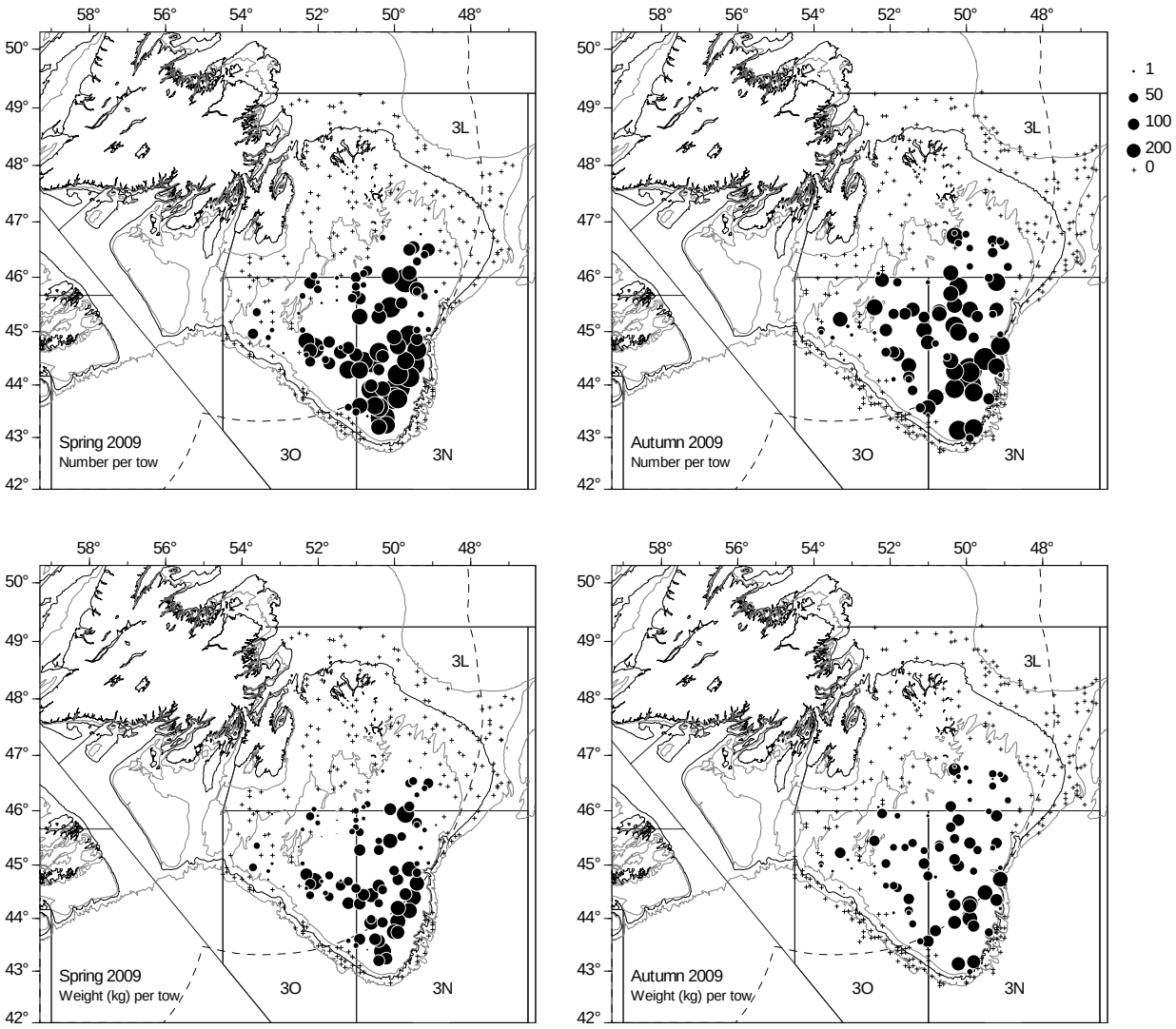

Figure 5. Yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow for 2009 spring and autumn Canadian surveys.

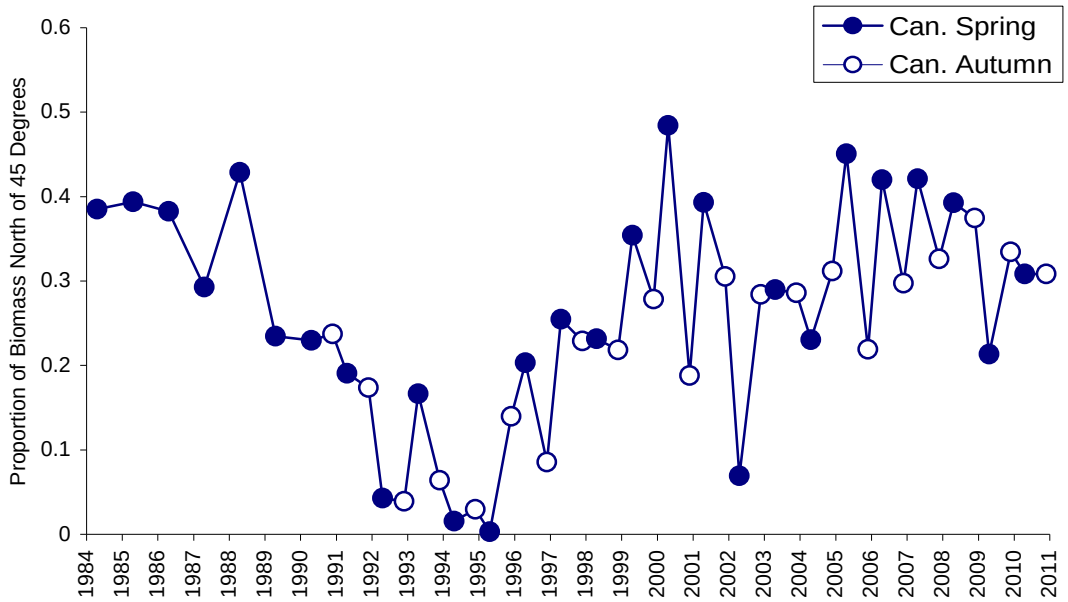

Figure 6. Proportion of yellowtail flounder caught north of 45^{o} N in Divs. 3LNO. All data up to 1990 are from spring surveys only.