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Divisions 3LNO Yellowtail Flounder – Interim Monitoring Update

by

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Abstract

A full assessment of the Divisions 3LNO yellowtail flounder stock, using the ASPIC production model, was completed within Scientific Council in 2002, and TAC advice was provided for the years 2003 and 2004. This document updates some of the indices of stock size since that assessment. Estimated catches from the stock in 2002 were lower than 2001, totalling about 10 800 tons. Survey indices declined somewhat in 2002 from the peak values which occurred in 2001, but there is no major change indicated in stock status.

Fishery and Management

A. TAC regulation

The stock has been under TAC regulation since 1973 (Table 1). Beginning on 1 January 1994, no directed fishing was permitted, and from 1995 to 1997, the TAC was set at zero and a fishery moratorium was imposed. Following an increase in survey biomass, the fishery reopened on 1 August 1998, with a TAC of 4 000 tons. Since then, the TAC has increased steadily, and in 2002, SC recommended a TAC of 14 500 tons for the years 2003 and 2004, up from the TAC of 13 000 tons in 2002.

B. Catch trends

During the moratorium (1994-97), catches decreased from approximately 2 000 tons in 1994 to around 300-800 tons per year, as by-catch in other fisheries (Table 1). Since the fishery re-opened in 1998, catches have increased from 4 400 tons to 14 100 tons in 2001. Overall, catches exceeded the TACs during 1985 to 1993 and again from 1998-2001, by about 10% in the latter period. However, the 2002 catch estimate of 10 800 tons is below the TAC of 13 000 tons. In 2002, Canada caught 9 958 tons, followed by Portugal at 461 tons. The reduction from 2001 was caused primarily by Canada not catching its quota, due mainly to problems with by-catch, although the combined catch of all other nations declined from about 1 900 tons in 2001 to about 840 tons in 2002. The Spanish catch of 161 tons was about 1 200 tons lower than in 2001.

Table 2 shows a breakdown of the Canadian catches by year, division and gear. With the exception of the 1991-1993 period, when Canadian vessels pursued a mixed fishery for plaice and yellowtail flounder in Div 3O, the majority of catches have been taken in Div. 3N. The most important gear is otter trawl. The Canadian otter trawl catch in Div. 3O of 3 206 tons in 2001 was the highest in this Division since 1993 and the third highest since the start of the time series in 1973. Canadian catches declined by about 1 000 tons in both Div. 3N and 3O in 2002.

C. Commercial CPUE Data

A multiplicative model was used to analyze the Canadian catch and effort data for this stock, as in recent assessments of this stock (Walsh *et al*., 2002a). Figure 1 shows the standardized series from 1965 to 2002, including a breakdown by Div. 3N and 3O. In 2002, catch rates declined slightly from 2001 levels, but are not statistically different from the peak observed in 2000. The estimated CPUE is the lowest since the fishery began in 1998, but remains much higher than CPUE estimated in the 1970s, 1980s and early-1990s.

Once again, caution should be exercised in comparing post-moratorium catch rates with other fishery periods, given the changes in the fishery in the pre and post-moratorium eras. Nevertheless, the recent catch rates, under the constraint of 5% by-catch limitations, suggest that the stock size is at a relatively high level. Data from the Canadian fleet indicate that by-catch of American plaice continued to be problematic in 2002, and is the major factor influencing fleet behaviour. No attempt has been made to quantify this effect on the CPUE estimates.

Canadian stratified-random research survey data

Abundance and biomass trends

Table 3 compares indices of population abundance and biomass of yellowtail flounder from the Canadian spring and fall Campelen trawl surveys in Div. 3LNO combined. Survey estimates of abundance and biomass show similar trends in both seasonal series, indicating rapid increases in biomass after the mid-990s. All 4 series in Table 3 peaked in 2001 then declined in 2002. The spring biomass in 2002 was below the estimates in 1999-2001, and was about equal to the 1998 value (Fig. 2). The biomass in fall 2002 was still the second highest in the series, about the same as in 2000 (Fig. 3). Preliminary data from the spring survey in 2003 indicate that the biomass in Div. 3NO is close to the 2001 estimate.

In Div. 3L, the biomass index was very low between 1990 and 1998, but increased sharply in both series in 1999 (Tables 4 and 7). Fall biomass remained high since then, but has declined in the spring series. In Div. 3N, biomass in spring 2002 declined from the highest value in 2001, to about the level estimated in 1998 (Table 5). Almost 60% of the spring 2002 biomass estimate in Div. 3N came from stratum 361 (Fig 4), and much of the decline occurred in the northern area, strata 362 and 373. Fall biomass also declined from the peak level in 2001, but was still the second highest level in the series (Table 8). In Div. 3O, 2002 biomass in spring and fall was lower than in 2001 (Tables 6 and 9), but was similar to levels seen in recent surveys.

Numbers at age from the 2002 surveys were not available for inclusion in this document, so the cohort strength model (Walsh *et al*., 2002) was not updated at this time. As noted in recent assessments, there is still uncertainty with the age determination of older fish. However, considerable progress is being made with respect to the ageing of yellowtail (Dwyer *et al*., 2003). All yellowtail otoliths from spring and fall surveys in 1998 have been re-aged, and, based on these, an analysis is underway to determine what a reasonable sample size might be for re-ageing otoliths from other years.

Stock distribution

Analysis of the Canadian spring and fall surveys in 1999-2001 (Walsh *et al*., 2002b) showed the stock was more widely distributed in all three divisions, compared to previous years. In all years, almost 100% of the stock occupies depths less than 100 m. The majority of the stock is consistently concentrated in Div. 3N in and around the area immediately west of the Southeast Shoal. In the 1999-2001 surveys, expansion of the range into Div. 3L was evident, in accordance with the population increase.

The 2002 spring survey showed few yellowtail flounder outside the Southeast Shoal and surrounding area (Fig. 6). In particular, few fish were found in Div. 3L and northern 3N, as noted in the previous discussion on biomass. This was in contrast to the expanded distribution seen in the 2000 and 2001 (Fig. 5) spring surveys. The largest catches in 2002 came from the southern part of Div. 3N, in the NRA. However, the fall survey in 2002 showed a return to a distribution pattern (and biomass level) similar to those observed in 2000 and 2001 (Fig. 5), and the spring 2003 survey found yellowtail in northern Div. 3N, similar to 2001. In addition, the cooperative grid survey in July-August

2002 indicated yellowtail to be widely distributed, and showed a high overall CPUE relative to the other grid surveys since 1996 (Maddock Parsons *et al*., 2003). The Spanish spring survey in the NRA in Div. 3NO showed a decline in yellowtail biomass of about 20% in 2002 (Paz *et al*., 2003).

There is a definite seasonal pattern in recent years in the proportion of biomass north of 45^0N (Fig. 7). In all Campelen surveys (since 1995), with the exception of 2002, a higher proportion of yellowtail was found in the north in the spring compared to the fall. In 2002, this percentage was very low in the spring, by far the lowest in the Campelen series. However, the proportion of fish north of 45^0N in the fall survey was the second highest in that series, similar to the values seen in 1999 and 2001. Combined with the preliminary results from the 2003 spring survey and the data from the 2002 grid survey, this suggests that the distribution of yellowtail in the spring 2002 survey was unusual.

Conclusions

Canadian spring and fall surveys in 2002 showed major differences in biomass trends and stock distribution patterns. Most indices of abundance showed a decline in 2002, although many were at or close to peak levels in 2001. This is consistent with the ASPIC model results accepted in 2002, which indicated that stock size had increased and was projected to stabilize in the medium term. Although there were concerns about the decline in some survey results in 2002, Scientific Council did not consider the declines to be of sufficient concern to alter the perception of stock status (NAFO, 2003). Thus there was no requirement to revise the advice given by Scientific Council in 2002, which was for a TAC of 14 500 tons in 2004.

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Table 1. Nominal catches by country and TACs (tons) of yellowtail in NAFO Div. 3LNO.

Year	Canada	France	USSR/Rus	S.Korea	Other [b]	Total	TAC
1960	7	-	-	-	-	7	
1961	100	-	-	-	-	100	
1962	67	-	-	-	-	67	
1963	138	-	380	-	-	518	
1964	126	-	21	-	-	147	
1965	3,075	-	55	-	-	3,130	
1966	4,185	-	2,834	-	7	7,026	
1967	2,122	-	6,736	-	20	8,878	
1968	4,180	14	9,146	-	-	13,340	
1969	10,494	1	5,207	-	6	15,708	
1970	22,814	17	3,426	-	169	26,426	
1971	24,206	49	13,087	-	-	37,342	
1972	26,939	358	11,929	-	33	39,259	
1973	28,492	368	3,545	-	410	32,815	50,000
1974	17,053	60	6,952	-	248	24,313	40,000
1975	18,458	15	4,076	-	345	22,894	35,000
1976	7,910	31	57	-	59	8,057	9,000
1977	11,295	245	97	-	1	11,638	12,000
1978	15,091	375	-	-	-	15,466	15,000
1979	18,116	202	-	-	33	18,351	18,000
1980	12,011	366	-	-	-	12,377	18,000
1981	14,122	558	-	-	-	14,680	21,000
1982	11,479	110	-	1,073	657	13,319	23,000
1983	9,085	165	-	1,223	-	10,473	19,000
1984	12,437	89	-	2,373	1,836 [b]	16,735	17,000
1985	13,440	-	-	4,278	11,245 [b]	28,963	15,000
1986	14,168	77	-	2,049	13,882 [b]	30,176	15,000
1987	13,420	51	-	125	2,718	16,314	15,000
1988	10,607	-	-	1,383	4,166 [b]	16,158	15,000
1989	5,009	139	-	3,508	1,551	10,207	5,000
1990	4,966	-	-	5,903	3,117	13,986	5,000
1991	6,589	-	-	4,156	5,458	16,203	7,000
1992	6,814	-	-	3,825	123	10,762	7,000
1993	6,747	-	-	-	6,868	13,615	7,000
1994	-	-	-	-	2,069	2,069	7,000 [d]
1995	2	-	-	-	65	67	0 [d]
1996	-	-	-	-	232	232	0 [d]
1997	1	-	-	-	657	658	0 [d]
1998	3,739	-	-	-	647	4,386	4,000
1999	5,746		96	-	1,052 [b]	6,894	6,000
2000 [c]	9,423		212	-	1,486	11,121	10,000
2001 [c]	12,240		148	-	1,759	14,147	13,000
2002	9,958		103	-	739	10,800	13,000
2003							14,500
2004							14,500

[b] includes catches estimated from Canadian surveillance reports

[c] provisional

[d] no directed fishery permitted

Table 2. Canadian catches of yellowtail flounder by division, from 1973 to 2002. Data from 2000-2002 are from preliminary Canadian statistics and are slightly different from STATLANT data.

	OTTER TRAWL				
YEAR	**3L**	**3N**	**30**	**3LNO**	**OTHER GEARS**
1973	4,188	21,470	2,827	28,475	17
1974	1,107	14,757	1,119	16,983	70
1975	2,315	13,289	2,852	18,456	2
1976	448	4,978	2,478	7,904	6
1977	2,546	7,166	1,583	11,295	0
1978	2,537	10,705	1,793	15,035	56
1979	2,575	14,359	1,100	18,034	82
1980	1,892	9,501	578	11,971	40
1981	2,345	11,245	515	14,105	17
1982	2,305	7,554	1,607	11,466	13
1983	2,552	5,737	770	9,059	26
1984	5,264	6,847	318	12,429	8
1985	3,404	9,098	829	13,331	9
1986	2,933	10,196	1,004	14,133	35
1987	1,584	10,248	1,529	13,361	59
1988	1,813	7,146	1,475	10,434	173
1989	844	2,407	1,506	4,757	252
1990	1,263	2,725	668	4,656	310
1991	798	2,943	2,284	6,025	564
1992	95	1,266	4,633	5,994	820
1993	0	2,062	3,903	5,965	782
1994	0	0	0	0	0
1995	0	0	0	0	2
1996	0	0	0	0	0
1997	0	0	0	0	1
1998	0	2,968	742	3,710	26
1999	0	5,636	107	5,743	3
2000	1,407	7,724	278	9,409	5
2001	182	8,711	3,206	12,099	141
2002	22	7,705	2,016	9,743	215

Table 3. A comparison of spring and fall abundance and biomass estimates derived from Canadian bottom trawl surveys in Div. 3LNO. All data are in Campelen trawl equivalents.

	Biomass (000t)		**Abundance (million)**	
	SPRING	*FALL*	*SPRING*	*FALL*
1984	217.7	.	544.2	.
1985	146.8	.	374.1	.
1986	138.2	.	326.5	.
1987	124.6	.	394.2	.
1988	81.0	.	203.1	.
1989	103.8	.	532.9	.
1990	103.1	65.8	367.4	192.5
1991	93.4	82.4	320.3	297.1
1992	61.4	64.5	217.4	215.9
1993	93.3	112.8	246.3	371.9
1994	55.6	106.4	148.4	287.9
1995	70.6	129.8	187.4	592.2
1996	175.6	134.3	639.4	579.1
1997	174.9	222.9	695.5	781.5
1998	202.2	231.6	733.6	828.2
1999	365.7	249.9	1289.9	937.1
2000	287.5	335.0	922.5	1152.3
2001	366.0	475.8	1328.5	1651.9
2002	199.5	339.7	690.9	1174.8

Table 4. Biomass estimates ('000t) of Yellowtail Flounder by stratum, Div 3L - Spring

Depth Range (m)	Stratum	No. of trawlable Units	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
30-56	784	36866	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		0.0	0.0
57-92	350	284889	0.4	1.0	0.6	0.2	0.4	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	4.6	2.4	0.6	0.0
	363	244859	5.4	3.1	1.7	1.6	1.1	0.4	0.8	0.1	0.0	0.0	0.0	0.0	0.5	0.1	0.0	12.6	10.7	1.3	0.0
	371	154206	.	0.1	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	0.2	0.0	0.0	0.0
	372	338400	15.7	16.3	9.7	3.8	2.1	3.4	1.3	0.7	0.1	0.1	0.0	0.0	0.4	0.2	0.5	8.2	4.1	2.4	0.5
	384	154068		0.6	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	785	63966	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.0	0.0
93-183	328	208955	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	216521	0.0	0.0	0.0	0.0	0.0	0.0	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
	342	80473	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	72220	.	0.0	0.0	0.0	0.0	0.0	0.0	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	291630	.	0.0	0.0	0.0	0.0	0.0	0.0	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	290804	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.3	0.0	0.0
	364	387510	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0
	365	143201	.	0.0	0.0	0.0	0.0	0.0	0.0	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	181581	.	0.0	0.0	0.0	0.0	0.0	0.0	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	324094	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	390	203728	.	0.0	0.0	0.0	0.0	0.0	0.0	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	11555	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.0	0.0
	787	84325	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.0	0.0
184-274	344	205516	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	347	135223	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	366	191760	.	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	369	132196	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	386	135223	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	389	112938	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	391	38792	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275-366	345	196987	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	346	118990	.	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	368	45945	.	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	387	98769	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	388	49660	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	392	19946	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
367-549	729	25586	.	0.0	.	.	.	.	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	731	29713	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	733	64379	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	735	37417	.	0.0	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	792	6878	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.0	0.0
550-731	730	23385	.	0.0	.	.	.	.	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	732	31777	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	734	31364	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	736	24073	.	0.0	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
732-914	737	31226	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	741	30676	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	745	47871	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	748	21872	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
Biomass ('000t)			**21.9**	**21.1**	**12.6**	**5.8**	**3.7**	**4.0**	**2.2**	**1.1**	**0.2**	**0.1**	**0.0**	**0.0**	**1.1**	**0.5**	**0.5**	**28.5**	**17.5**	**4.4**	**0.6**
Upper C.I.			**38.9**	**32.0**	**18.3**	**8.5**	**5.4**	**6.8**	**4.0**	**1.8**	**0.4**	**0.3**	**0.1**	**0.0**	**1.7**	**0.8**	**1.3**	**46.2**	**25.8**	**8.9**	**1.2**
Lower C.I.			**4.8**	**10.2**	**6.8**	**3.1**	**2.1**	**1.2**	**0.5**	**0.4**	**-0.1**	**-0.1**	**0.0**	**0.0**	**0.5**	**0.1**	**-0.3**	**10.8**	**9.3**	**0.0**	**-0.1**

Table 5. Biomass estimates ('000t) of Yellowtail Flounder by stratum, Div 3N - Spring

Depth Range (m)	Stratum	No. of trawlable Units	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<=56	375	219,135	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
	376	206,204	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
57-92	360	411,583	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
	361	254,901	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	26.1
	362	346,654	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
	373	346,654	18.3	9.1	4.8	6.2	6.3	3.8	0.3	2.5	0.0	0.0	0.3	0.0	0.6	0.3	1.1	11.1	42.0	79.0	2.8
	374	128,069	3.9	2.7	1.1	0.6	0.3	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.9	0.4	0.1	8.8	9.5	3.1	1.3
	383	92,716	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93-183	359	57,913	0.0	0.0	0.0	0.0	0.0	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
	377	13,756	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	382	89,002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
184-274	358	30,951	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	378	19,121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	381	25,036	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275-366	357	22,560	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	379	14,581	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	380	15,957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
367-549	723	21,322	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	725	14,444	.	.	.	.	.	.	.	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	727	22,010	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
550-731	724	17,058	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	726	9,904	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	728	21,460	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
732-914	752	18,433	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	756	14,581	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	760	21,184	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
Biomass ('000t)			**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**
Upper C.I.			**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**
Lower C.I.			**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**

Table 6. Biomass estimates ('000t) of Yellowtail Flounder by stratum, Div 30 - Spring

Depth Range (m)	Stratum	No. of trawlable Units	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
57-92	330	287,365	0.2	1.9	0.7	0.2	0.2	0.3	0.2	1.1	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.1	6.8	0.7	0.5
	331	62,728	1.4	1.9	0.2	0.8	0.3	0.9	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.0	1.7	1.2	0.6	0.4
	338	261,091	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
	340	236,055	0.7	1.5	1.8	4.3	1.1	0.8	2.0	0.6	0.4	0.4	0.0	0.0	0.0	0.8	0.2	1.0	4.2	1.0	0.7
	351	346,654	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
	352	354,908	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
	353	17.6353.31	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
93-183	329	236,743	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	144,026	0.0	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	0.3	1.4
	337	130,408	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.1	0.6	0.0	0.0	0.3	0.8	0.0	0.1	0.1	0.0	0.5
	339	80,473	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	0.0	0.1	0.9	0.0
	354	65,204	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
184-274	355	14,169	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	333	20,772	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	336	16,645	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275-366	334	12,656	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	335	7,979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	356	8,391	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
367-549	717	12,793	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	719	10,455	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	721	10,455	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
550-731	718	15,269	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	720	14,444	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	722	12,793	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
732-914	764	14,444	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
	772	18,571	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.
Biomass ('000t)			**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**
Upper C.I.			**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**
Lower C.I.			**10.1**	**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**

Table 7. Biomass ('000t) of yellowtail by stratum, Div 3L - Fall

Depth Range (m)	Stratum	No. of trawlable Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
30 - 56	784	36,866	.	.	.	.	.	.	0.0	0.0	0.0	.	0.1	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
57 - 92	350	284,889	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	1.2	1.7
	363	244,859	0.7	0.1	0.2	0.0	0.0	0.6	0.4	0.2	3.9	8.9	10.2	10.1	3.1
	371	154,206	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	372	338,400	0.6	0.8	0.6	1.1	0.0	0.6	1.8	1.1	1.2	0.5	1.8	14.2	8.6
	384	154,068	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	785	63,966	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**2.1**	**1.0**	**0.9**	**1.1**	**0.0**	**1.2**	**2.2**	**1.3**	**5.2**	**9.6**	**12.4**	**25.5**	**13.5**
93 - 183	328	208,955	0.0	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	216,521	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	342	80,473	0.0	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	72,220	0.0	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	291,630	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	290,804	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	364	387,510	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
	365	143,201	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	181,581	0.0	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	324,094	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	390	203,728	0.0	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	11,555	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	787	84,325	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	788	35,903	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	790	12,243	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	793	9,904	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	794	29,713	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	797	13,481	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	799	9,904	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**
184 - 274	344	217,622	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	347	135,223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	366	191,760	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	369	132,196	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	386	135,223	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	389	112,938	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	391	38,792	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	795	22,560	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
184 - 366	789	9,904	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	791	31,226	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
	798	13,756	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
275 - 366	345	196,987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	346	118,990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	368	45,945	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	387	98,769	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	388	49,660	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	392	19,946	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	796	24,073	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
367 - 549	729	25,586	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	731	29,713	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	733	64,379	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	735	37,417	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	792	6,878	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
550 - 731	730	23,385	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	732	31,777	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	734	31,364	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	736	24,073	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Table 26. Cont'd

Depth Range (m)	Stratum	No. of trawlable Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
732 - 914	737	31,226	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	741	30,676	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	745	47,871	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	748	21,872	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
915 -1097	738	30,401	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	742	28,338	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	746	53,924	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	749	17,333	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1098 -1280	739	34,941	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	743	29,025	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	747	99,594	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	750	76,484	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1281 -1463	740	36,316	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	744	38,517	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	751	31,501	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Biomass ('000t)			**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**
Upper C.I.			**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**
Lower C.I.			**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**

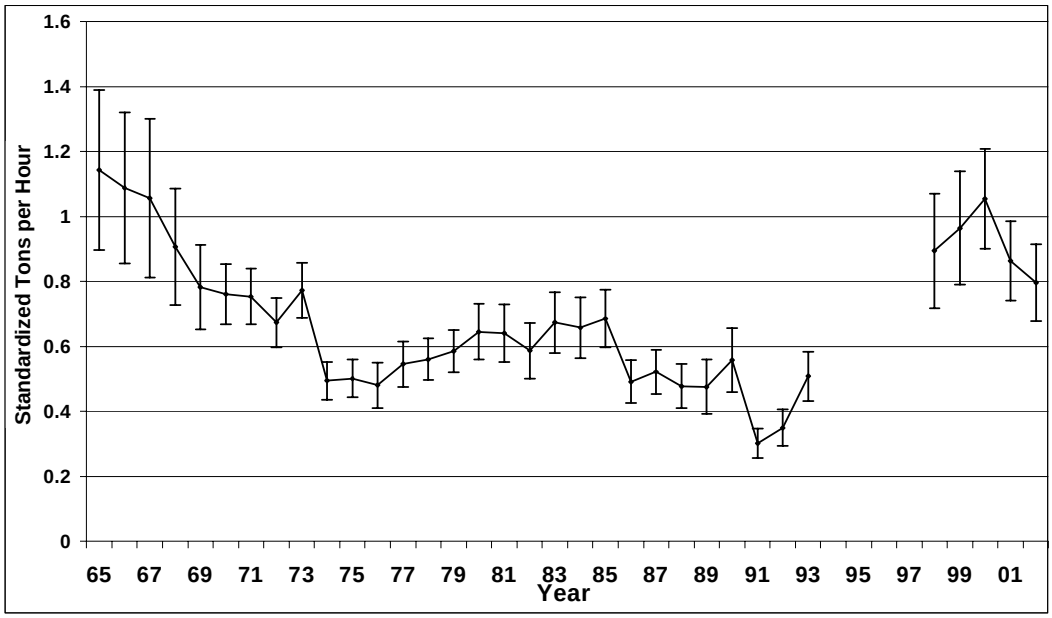
Table 8. Biomass ('000t) of yellowtail by stratum, Div 3N - Fall

Depth Range (m)	Stratum	No. of trawlable Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<=56	375	219,135	3.2	5.1	.	8.0	31.1	14.8	12.0	15.4	19.1	24.6	25.4	39.0	32.7
	376	206,204	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
TOTAL			**23.3**	**16.0**	**10.8**	**39.3**	**41.3**	**39.2**	**36.2**	**47.9**	**55.0**	**62.3**	**150.6**	**162.2**	**80.0**
57 - 92	360	411,583	6.7	8.3	8.0	24.8	11.2	16.3	36.8	47.2	56.1	60.6	61.0	42.2	83.8
	361	254,901	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
	362	346,654	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
	373	346,654	0.2	0.5	0.0	0.0	0.9	1.0	0.0	4.2	5.4	6.1	8.1	41.3	23.0
	374	128,069	0.0	0.1	.	0.0	0.0	0.0	1.1	0.8	1.0	10.0	5.2	8.6	4.4
	383	92,716	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**23.2**	**34.9**	**33.3**	**54.9**	**54.1**	**63.5**	**77.1**	**116.2**	**118.6**	**129.5**	**102.2**	**206.7**	**192.3**
93 - 183	359	57,913	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	377	13,756	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	382	89,002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**
184 - 274	358	30,951	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	378	19,121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	381	25,036	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
275 - 366	357	22,560	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	379	14,581	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	380	15,957	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
367 - 549	723	21,322	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	725	14,444	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	727	22,010	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
550 - 731	724	17,058	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	726	9,904	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	728	21,460	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Biomass ('000t)			**46.5**	**50.9**	**44.1**	**94.2**	**95.5**	**102.8**	**113.2**	**164.2**	**173.6**	**191.9**	**252.8**	**368.9**	**272.7**
Upper C.I.			**80.3**	**84.4**	**79.9**	**148.9**	**159.5**	**135.7**	**156.1**	**209.2**	**222.7**	**240.9**	**386.5**	**475.3**	**365.1**
Lower C.I.			**12.6**	**17.4**	**8.4**	**39.5**	**31.5**	**69.9**	**70.3**	**119.1**	**124.5**	**143.0**	**119.1**	**262.5**	**180.2**

Table 9. Biomass ('000t) of yellowtail by stratum, Div 30 - Fall

Depth Range (m)	Stratum	No. of trawlable Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
57 - 92	330	287,365	0.2	0.0	0.3	0.5	0.0	1.1	0.0	0.8	0.2	3.6	0.3	2.8	1.0
	331	62,728	0.2	0.9	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.8
	338	261,091	1.0	2.0	0.3	1.1	0.1	7.2	0.0	5.7	2.8	2.8	6.4	25.9	0.6
	340	236,055	0.6	4.0	0.2	0.3	0.2	0.5	0.0	2.6	2.2	2.6	0.5	3.3	9.2
	351	346,654	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
	352	354,908	7.0	21.0	0.4	8.3	9.3	13.7	15.2	26.5	28.5	23.5	36.5	27.1	22.2
	353	176,353	2.4	0.0	0.2	0.6	0.0	0.8	0.7	7.3	0.0	3.8	1.8	3.8	2.9
TOTAL			**16.9**	**30.2**	**1.8**	**16.3**	**10.6**	**25.5**	**17.2**	**57.4**	**52.6**	**48.3**	**69.5**	**80.7**	**51.9**
93 - 183	329	236,743	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	332	144,026	0.1	0.0	0.1	1.0	0.4	0.1	0.2	0.0	0.0	0.1	0.1	0.5	0.9
	337	130,408	0.0	0.1	0.1	0.0	0.0	0.0	1.3	0.1	0.2	0.0	0.0	0.0	0.0
	339	80,473	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.2	0.7
	354	65,204	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
TOTAL			**0.2**	**0.2**	**0.6**	**1.0**	**0.4**	**0.1**	**1.5**	**0.1**	**0.3**	**0.1**	**0.1**	**0.7**	**1.6**
184 - 274	355	14,169	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	333	20,221	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	336	16,645	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
275 - 366	334	13,206	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	335	7,979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	356	8,391	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
367 - 549	717	22,835	0.0	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	719	10,455	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	721	10,455	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
550 - 731	718	18,433	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	720	14,444	.	.	.	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	722	12,793	.	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Biomass ('000t)			**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**
Upper C.I.			**25.9**	**45.2**	**43.1**	**28.1**	**20.7**	**38.4**	**31.5**	**80.5**	**74.8**	**64.4**	**98.6**	**150.9**	**76.4**
Lower C.I.			**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**

A) Div. 3LNO from 1965-1993,1998-2002



B) Div 3N and 3O separately from 1965-1993,1998-2002

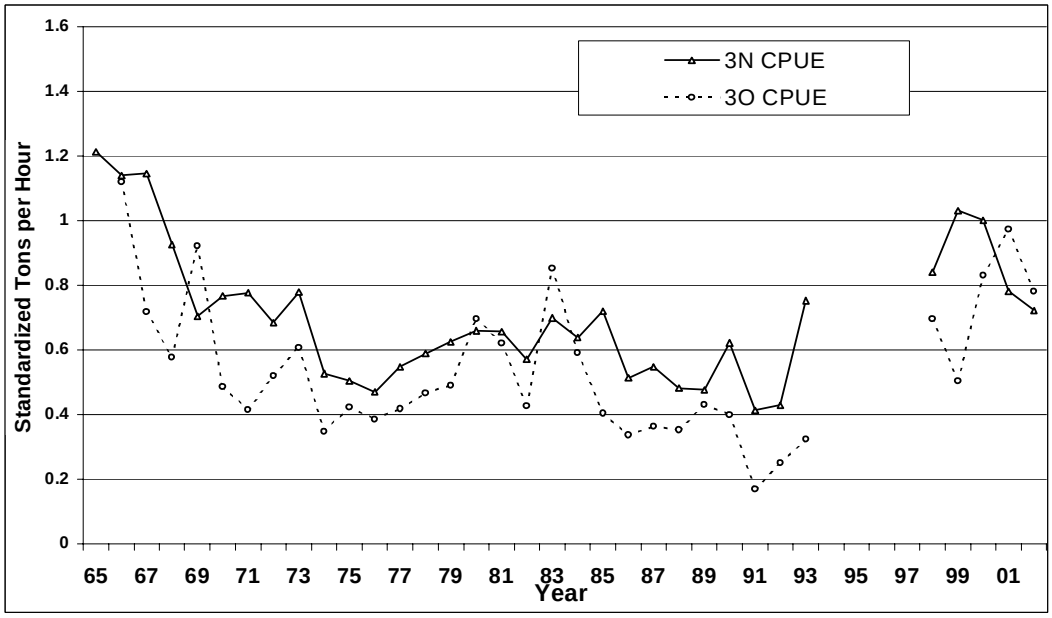


Fig 1. CPUE for 3LNO yellowtail from the Canadian fishery in Div. 3LNO.

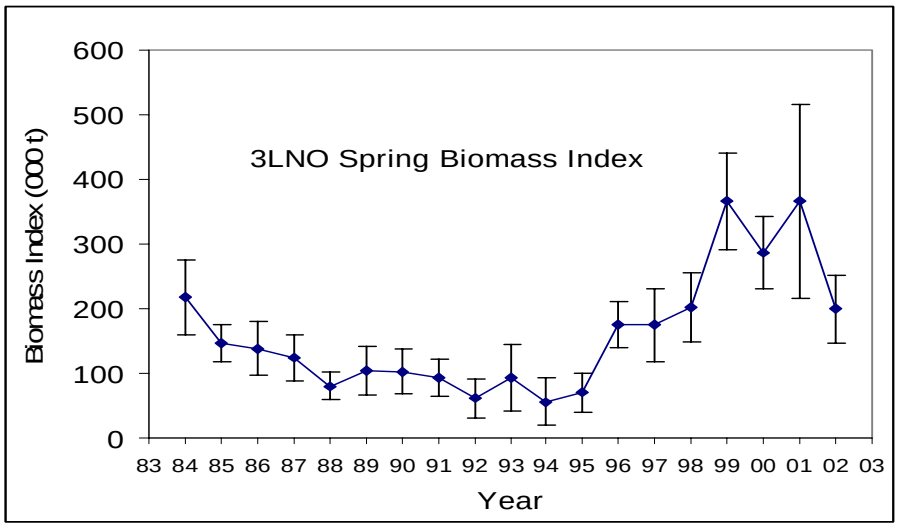


Fig. 2. Biomass index, 3LNO yellowtail, Canadian spring surveys. Error bars are approx. 95% confidence intervals.

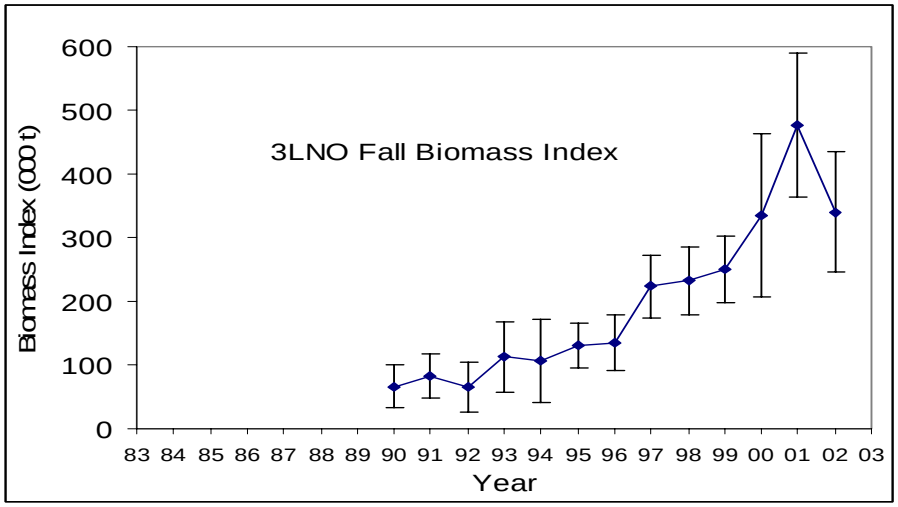


Fig. 3. Biomass index, 3LNO yellowtail, Canadian fall surveys. Error bars are approx. 95% confidence intervals.

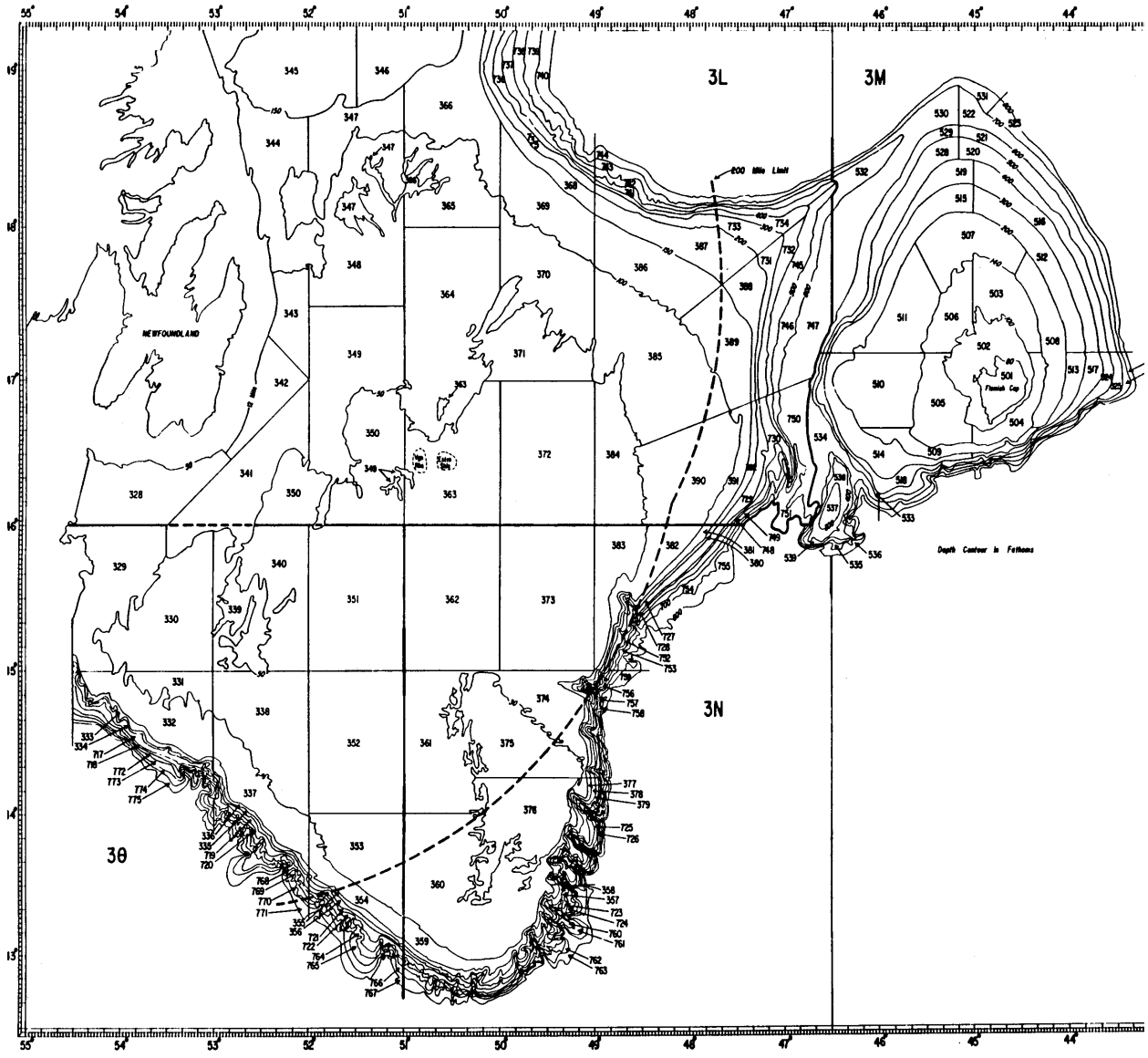


Fig 4. Stratification scheme used in Canadian surveys in Div. 3LMNO.

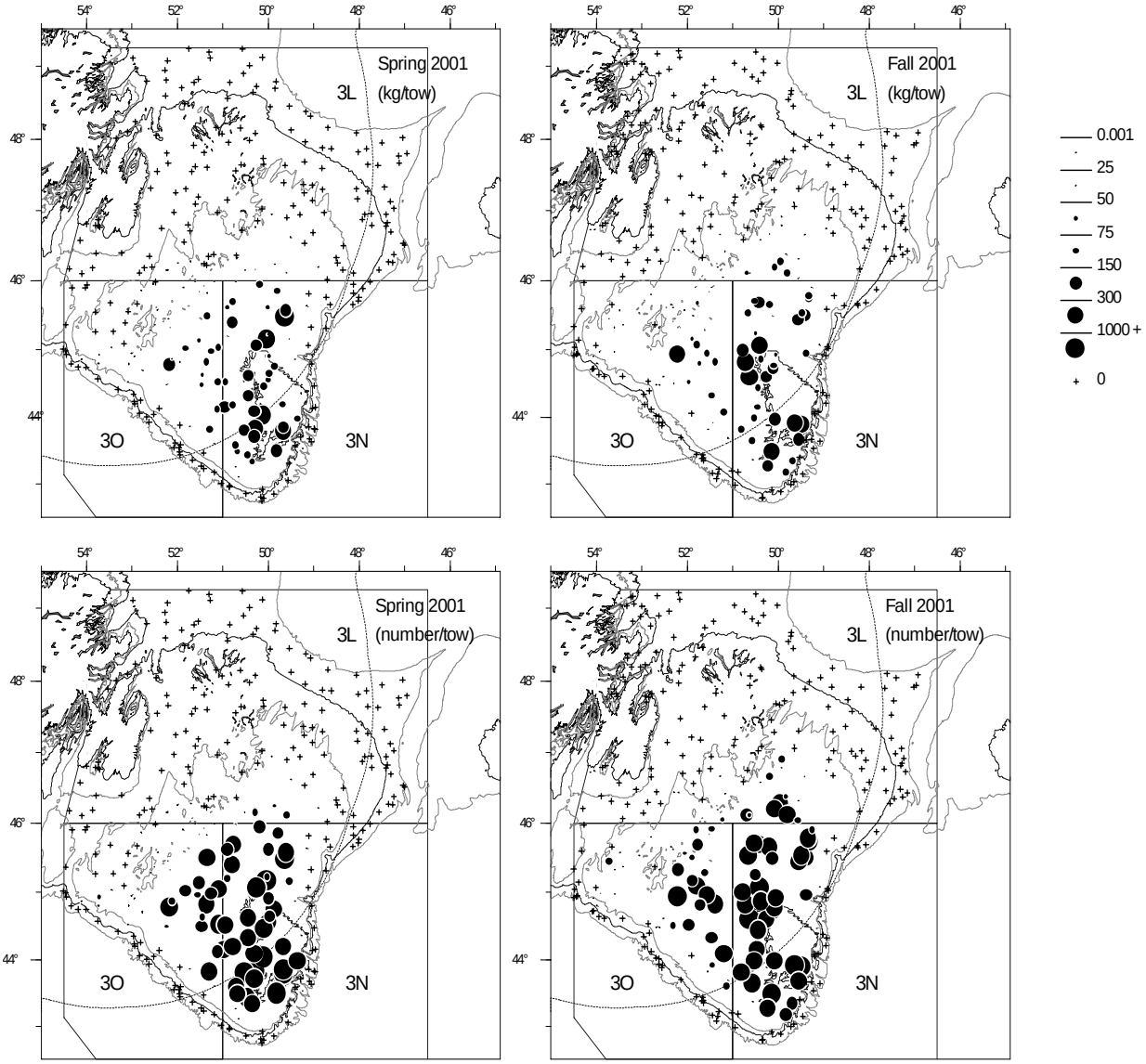


Fig. 5. Distribution of yellowtail flounder catches (kg/tow and number/tow) from Canadian stratified random spring and fall surveys conducted in 2001 with a Campelen 1800 trawl in Div. 3LNO.

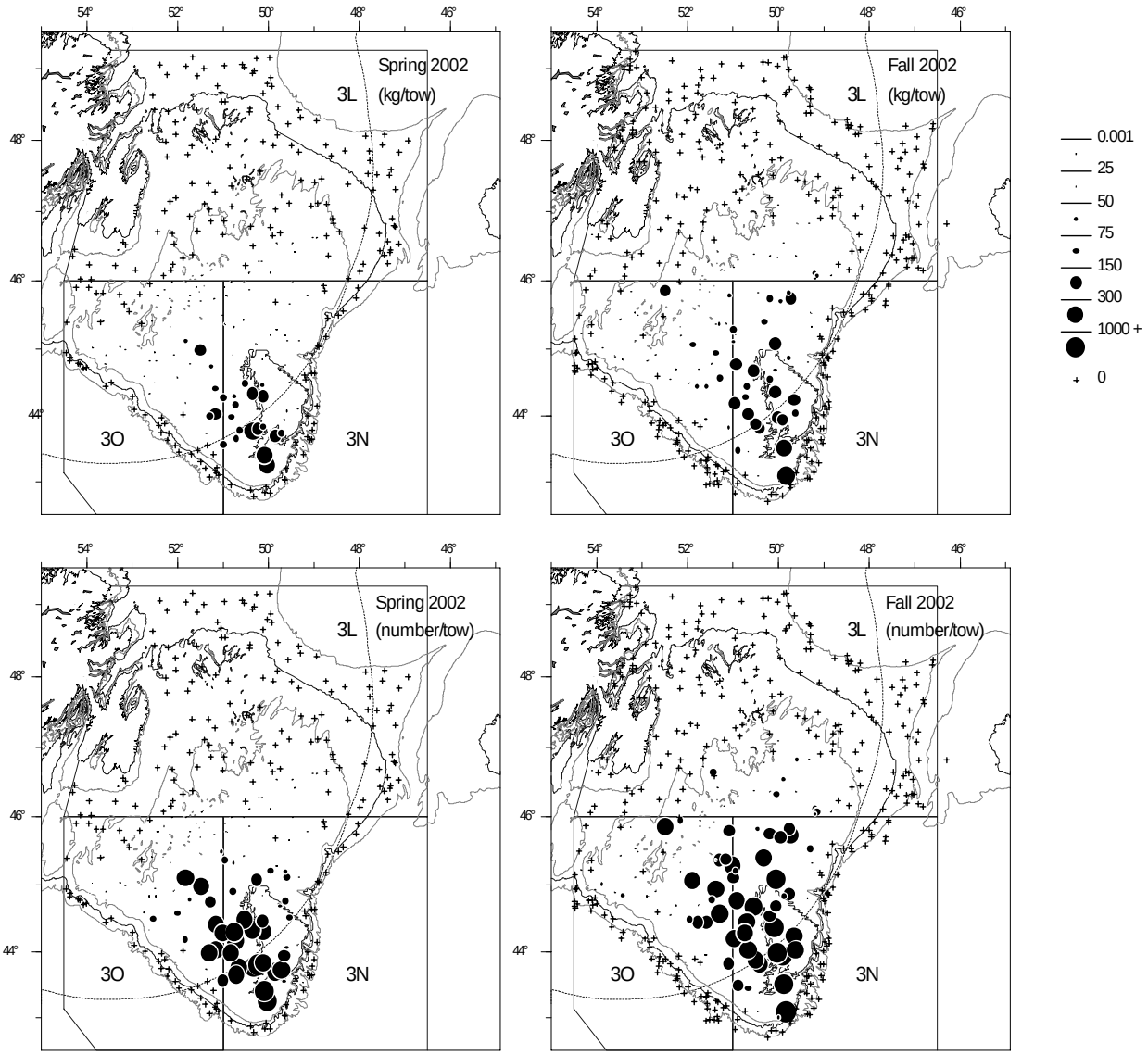


Fig. 6. Distribution of yellowtail flounder catches (kg/tow and number/tow) from Canadian stratified random spring and fall surveys conducted in 2002 with a Campelen 1800 trawl in Div. 3LNO.

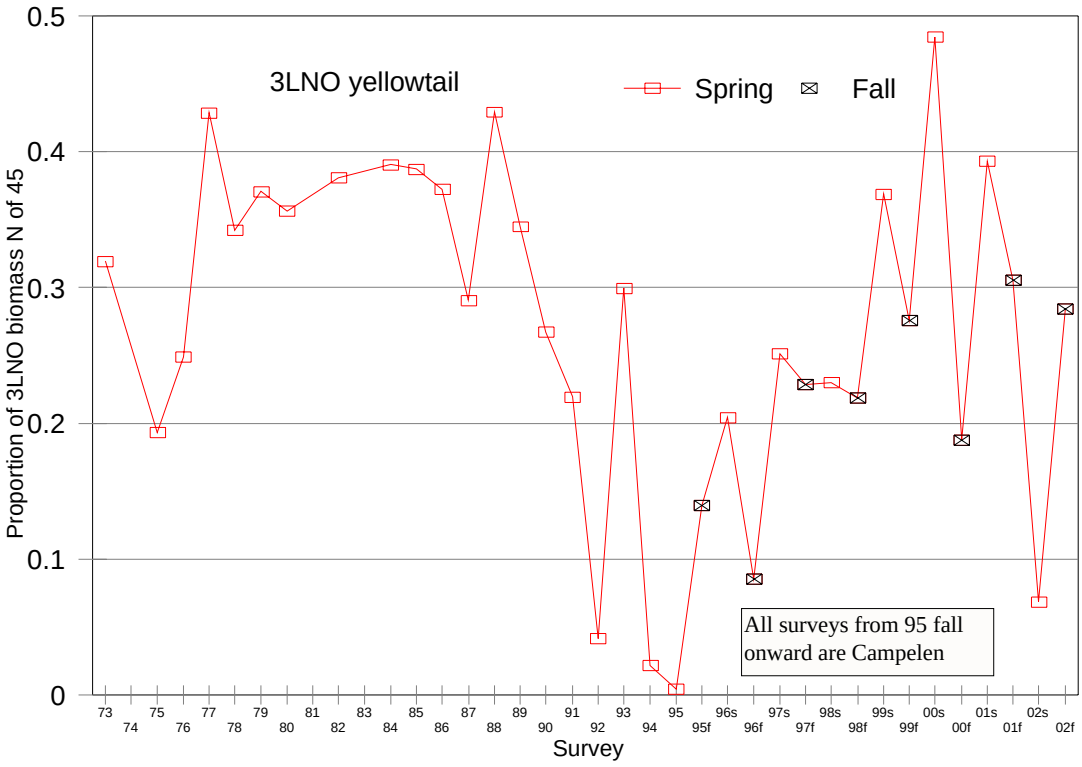


Fig. 7. Proportion of yellowtail biomass located north of 45°N in Div. 3LNO.