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2005 Interim Monitoring of Yellowtail Flounder Stock Status on the Grand Bank, NAFO Divisions 3LNO

by

Stephen J. Walsh, Michael F. Veitch, Karen S. Dwyer and William B. Brodie

Northwest Atlantic Fisheries Center, Science Branch, Department of Fisheries and Oceans, Canada.
P. O. Box 5667, St. John's, Newfoundland Canada, AlC 5Xl.

Abstract

A full assessment of the Grand Bank yellowtail flounder (*Limanda ferruginea*), NAFO Divisions 3LNO stock, using the ASPIC production model, was completed within Scientific Council in 2004, and the TAC advice was provided for the years 2005 and 2006. This document updates some of the indices of stock size since that assessment. Estimated catches from the stock in 2004 were slightly lower than 2003, totalling about 13 354 tons. Canadian spring survey indices showed a modest decrease in 2004 from the peak value which occurred in 2003, while the fall indices showed a slight increase. 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 January 1, 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 2004, SC recommended a TAC of 15 000 tons for the years 2005 and 2006, up from the TAC of 14 500 tons in 2003 and 2004.

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. Since 2002 the catches have been below the TAC and in the 2004 catch estimate of 13 354 tons is below the TAC of 14 500 tons. In 2004, Canada caught 12 575 tons which was very close to the 2003 value.

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. 3L of 42 760 tons in 2004 was the highest in this Division since 1986 but the catches declined by about 1 000 tons in Div. 3N and 1 800 tons in Div. 3O from 2003 to 2004.

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-1990s. All 4 series in Table 4 peaked in 2001, then declined in 2002. The spring biomass of 386, 5000 tons in 2003 was the highest in the time series showing a 94% increase over the 2002 estimate while the 2004 estimates showed 20% decease to 308 000 tons, the fourth highest in the time series (Fig. 1). The biomass in fall surveys has shown a steady increase since 2002 and estimated to be 375 000 tons in 2004, the second highest in the series after the peak of 475 000 tons in 2001 (Table 4; Fig. 2). The spring surveys have shown an up and down pattern each year since 2000 while the fall surveys have shown a steady increase since 1994 with the exception of 2002.

In Div. 3L, the biomass index was very low between 1990 and 1998, but increased sharply in both series in 1999 (Table 4). Fall biomass remained high since then, while the spring biomass has shown no clear trend (Table 7). In Div. 3N, the spring biomass has shown an up and down pattern each year since 1998. The 2004 estimate is currently fourth highest in the time series showing a 23% decrease from 2003 (Table 5). The fall biomass has shown a steady increase since 1993 to the highest value in 2001 and then declined to 2003 (Table 8). In 2004, the biomass increased by 16% to become the second highest in the time series next to the 2001 estimate (Tables 4 and 6). In Div. 3O, the biomass has fluctuated without trend since 1997. In 2004 the biomass in the spring survey showed a slight increase of 5% (Table 6). The 2004 fall estimate showed a 38% decrease since 2003, which produced the highest estimate in the fall time series (Tables 4 and 7), but was similar to the 2002 level (Table 9).

Stock distribution

Analysis of the Canadian spring and fall surveys for 2003 and 2004 showed the stock in 2003 and 2004 was widely distributed in all three divisions (Fig. 3-6). The majority of the stock is consistently concentrated in Div. 3N in and around the area of the Southeast Shoal. In all survey years, almost 100% of the stock occupies depths less than 100 m. More yellowtail are found in both the spring and fall surveys of 3L in 2003 and 2004 than seen in 2002 (Walsh *et al*., 2004). In addition the DFO/FPI cooperative grid survey in July-August 2004 indicated yellowtail to be also widely distributed into Div 3L, and that survey also showed the highest overall CPUE relative to the other grid surveys since they started in 1996 (Maddock Parsons *et al*., 2004). The Spanish spring survey in the NRA in Div. 3NO showed an increase in yellowtail biomass of about 25% in 2004 (González Troncoso *et al*., 2005).

There is a definite seasonal pattern in recent years in the proportion of biomass north of 45°N (Fig. 7). In the Campelen surveys from 1996-2004, with the exception of 2002 and 2004 a higher proportion of yellowtail was found in the north in the spring compared to the fall. In 2004, this percentage was slightly lower in the spring when compared to the fall estimate. However, the proportion of fish north of 45°N in the fall survey was the second highest in that series, similar to the value seen in 2001.

Conclusions

Canadian spring and fall surveys in 2004 showed no major differences in biomass trends and stock distribution patterns since 2003 on which the last full assessment of stock status was conducted by Scientific Council (NAFO, 2004; Brodie *et al*., 2004). The DFO/FPI cooperative surveys and the Spanish surveys also indicate a small increase in the indices of stock biomass from 2003 to 2004.

Thus there is no requirement to revise the advice given by Scientific Council in 2004, which was for a TAC of 15 000 tons in 2005 and 2006

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

Year	Canada	France	USSR/ Russia	South 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		
l966	4,185	-	2,834	-	7	7,026		
l967	2,l22	-	6,736	-	20	8,878		
l968	4,l80	l4	9,l46	-	-	l3,340		
l969	l0,494	l	5,207	-	6	l5,708		
l970	22,8l4	l7	3,426	-	l69	26,426		
l97l	24,206	49	l3,087	-	-	37,342		
l972	26,939	358	ll,929	-	33	39,259		
l973	28,492	368	3,545	-	4l0	32,8l5	50,000	
l974	l7,053	60	6,952	-	248	24,3l3	40,000	
l975	l8,458	l5	4,076	-	345	22,894	35,000	
l976	7,9l0	3l	57	-	59	8,057	9,000	
1977	ll,295	245	97	-	l	ll,638	l2,000	
l978	l5,09l	375	-	-	-	l5,466	l5,000	
l979	l8,ll6	202	-	-	33	l8,35l	l8,000	
l980	l2,0ll	366	-	-	-	l2,377	l8,000	
l98l	l4,l22	558	-	-	-	l4,680	2l,000	
l982	ll,479	ll0	-	1,073	657	13,319	23,000	
l983	9,085	l65	-	1,223	-	10,473	l9,000	
l984	l2,437	89	-	2,373	1,836 [b]	16,735	l7,000	
l985	13,440	-	-	4,278	11,245 [b]	28,963	l5,000	
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	4,166b [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	6,697	-	-	-	6,868	13,565	7,000	
1994	-	-	-	-	2069	2069	7,000	[d]
1995	2	-	-	-	65	67	0	[d]
1996	55	-	-	-	232	287	0	[d]
1997	146	-	-	-	657	803	0	[d]
1998	3,701	-	-	-	647	4,348	4,000	
1999	5,413	-	96	-	1,052 [b]	6,561	6,000	
2000 [c]	9,423	-	212	-	1,486	11,121	10,000	
2001 [c]	12,238	-	148	-	1,759	14,145	13,000	
2002 [c]	9,959	-	103	-	636	10,698	13,000	
2003 [c]	12,708	-	184	-	914 [e]	13,806	14,500	
2004 [c]	12,575	-	158	-	621	13,354	14,500	
2005							15,000	
2006							15,000	

[a] see text for explanation of South Korean catches

[b] includes catches estimated from Canadian surveillance reports

[c] provisional

[d] no directed fishery permitted

[e] includes catches averaged from a range of estimates

Table 2. Canadian catches of yellowtail flounder by division, from 1973 to 2004. Data from 2000-2004 are from preliminary Canadian statistics and are slightly different from STATLANT data. Catches given for 1994-97 are by-catch totals for all gears from STATLANT 21 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	664	4,652	317
1991	798	2,943	2,281	6,025	564
1992	95	1,266	4,636	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
2003	27	8,187	4,477	12691	16
2004	2,760	7,204	2,602	12,566	10

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.

3LNO BIOMASS (000t)			3LNO Abundance (million)		
	SPRING	FALL		Spring	Fall
1984	217.7	.	1984	544.2	
1985	146.8	.	1985	374.1	
1986	138.2	.	1986	326.5	
1987	124.6	.	1987	394.2	
1988	81.0	.	1988	203.1	
1989	103.8	.	1989	532.9	
1990	103.1	65.8	1990	367.4	192.5
1991	93.4	82.4	1991	320.3	297.1
1992	61.4	64.5	1992	217.4	215.9
1993	93.3	112.8	1993	246.3	371.9
1994	55.6	106.4	1994	148.4	287.9
1995	70.6	129.8	1995	187.4	592.2
1996	175.6	134.3	1996	639.4	579.1
1997	174.9	222.9	1997	695.5	781.5
1998	202.2	231.6	1998	733.6	828.2
1999	365.7	249.9	1999	1289.9	937.1
2000	287.5	335.0	2000	922.5	1152.3
2001	366.0	475.8	2001	1328.5	1651.9
2002	199.5	339.7	2002	690.9	1174.8
2003	386.5	368.3	2003	1250.1	1262.6
2004	307.9	374.7	2004	966.7	1431.0

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

Depth Range (m)	Stratum	No. of trawlable Units	1984 *AN 28*	1985 *WT 28-30*	1986 *WT 48*	1987 *WT 58-60*	1988 *WT 70,71*	1989 *WT 82,83*	1990 *WT 96*	1991 *WT 106,107*	1992 *WT 120-122*	1993 *WT 137,138*	1994 *WT 152-154*	1995 *WT 169,170*	1996 *WT 189-191*	1997 *WT 205-208*
30-56	784	36866.37	.	.	.	.	.	.	.	.	.	.	.	.	.	.
57-92	350	284,889.0	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
	363	244,858.7	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
	371	154,206.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	372	338,400.3	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
	384	154,068.4		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
	785	63,965.9	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL			**21.6**	**21.0**	**12.2**	**5.7**	**3.7**	**4.0**	**2.2**	**1.0**	**0.2**	**0.1**	**0.0**	**0.0**	**1.1**	**0.4**
93-183	328	208,955.3	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
	341	216,521.2	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
	342	80,473.2	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
	343	72,219.6	.	0.0	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	291,629.5	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	349	290,804.1	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
	364	387,509.6	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
	365	143,201.1	.	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
	370	181,580.6	.	0.0	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	324,093.9	.	0.0	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	0.0
	786	11,555.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	787	84,325.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	794	29,713.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	797	13,481.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL			**0.3**	**0.1**	**0.3**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
184-274	344	205,516.3	.	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
	347	135,222.6	.	0.0	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	191,760.2	.	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
	369	132,196.2	.	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
	386	135,222.6	.	0.0	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	112,937.7	.	0.0	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	38,792.2	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	795	22,560.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	196,987.5	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	346	118,990.3	.	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0
	368	45,945.4	.	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	98,768.9	.	0.0	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	49,659.6	.	0.0	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	19,946.4	.	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	24,073.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	798	13,756.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	25,586.4	.	0.0	.	.	.	.	.	0.0	.	0.0	0.0	0.0	0.0	0.0
	731	29,713.2	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	733	64,378.6	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	735	37,416.6	.	0.0	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0
	792	6,878.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	23,385.4	.	0.0	.	.	.	.	.	0.0	.	0.0	0.0	0.0	0.0	0.0
	732	31,776.6	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	734	31,363.9	.	0.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	736	24,073.2	.	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**
732-914	737	31,226.4	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.
	741	30,676.1	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.
	745	47,871.3	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.
	748	21,872.2	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.
TOTAL			.	.	.	.	.	.	.	.	.	.	**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**
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**
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**

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

Depth Range (m)	Stratum	No. of trawlable Units	1984 *AN 27*	1985 *AN 43 WT 29*	1986 *WT 47*	1987 *WT 58,59*	1988 *WT 70*	1989 *WT 82*	1990 *WT 95,96*	1991 *WT 106*	1992 *WT 119,120*	1993 *WT 136,137*	1994 *WT 152,153*	1995 *WT 168,169*	1996 *WT 189*	1997 *WT 205,206*	1998 *WT221-24*	1999 *WT 239-40*	2000 WT316,317	2001 WT367-69	2002 *WT421-24*	2003 WT480-81	2004 WT 547-48
<=56	375	219,134.8	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
	376	206,204.1	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
TOTAL			**39.1**	**30.9**	**53.6**	**39.0**	**13.7**	**29.7**	**33.1**	**32.2**	**30.6**	**11.9**	**2.8**	**13.7**	**18.4**	**44.7**	**40.4**	**52.9**	**30.4**	**70.8**	**24.8**	**84.2**	**63.8**
57-92	360	411,582.8	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
	361	254,900.7	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	41.7	33.6
	362	346,653.9	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
	373	346,653.9	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	33.1	5.9
	374	128,069.4	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	13.2	12.7
	383	92,716.2	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	0.0	0.0
TOTAL			**128.6**	**57.3**	**41.6**	**38.6**	**37.7**	**48.6**	**42.6**	**36.9**	**19.1**	**38.8**	**43.6**	**44.2**	**85.6**	**76.6**	**103.2**	**185.5**	**166.9**	**227.1**	**122.4**	**196.0**	**152.9**
93-183	359	57,913.2	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	0.1	0.0	0.0	0.0	0.0
	377	13,756.1	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	0.0	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	0.0	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**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**
184-274	358	30,951.2	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	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	0.0	0.0	0.0
	381	25,036.1	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	0.0	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**	**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	0.0	0.0	0.0
	379	14,581.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	380	15,957.1	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	0.0	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**	**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	0.0	0.0	0.0
	725	14,443.9	.	.	.	.	.	.	.	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	727	22,009.8	.	.	.	.	.	.	.	0.0	0.0	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**	**0.0**
550-731	724	17,057.6	.	.	.	.	.	.	.	0.0	0.0	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	9,904.4	.	.	.	.	.	.	.	0.0	0.0	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	21,459.5	.	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
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**	**0.0**
732-914	752	18,433.2	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.		
	756	14,581.5	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.		
	760	21,184.4	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.		
TOTAL			**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**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**	**280.2**	**216.7**
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**	**332.2**	**276.3**
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**	**228.2**	**157.2**

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

Depth Range (m)	Stratum	No. of trawlable Units	1984 *AN 27*	1985 *AN 43*	1986 *WT 47*	1987 *WT 58*	1988 *WT 70*	1989 *WT 82*	1990 *WT 94,95*	1991 *WT 105*	1992 *WT 119,120*	1993 *WT 136*	1994 *WT 152*	1995 *WT 168*	1996 *WT 188,189*	1997 *WT 204,205*	1998 *WT221-24*	1999 *WT238-39*	2000 *WT315-317*	2001 *WT365-67*	2002 *WT419-21*	2003 *WT479*	2004 *WT546-47*
57-92	330	287,365.1	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	0.6	0.9
	331	62,727.9	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	2.4	0.8
	338	261,090.9	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
	340	236,054.8	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	4.8	0.5
	351	346,653.9	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
	352	354,907.6	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
	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	2.5	16.4
TOTAL			**28.1**	**37.4**	**29.3**	**40.4**	**25.7**	**19.5**	**25.0**	**23.0**	**11.5**	**40.9**	**9.2**	**12.5**	**69.7**	**52.1**	**57.7**	**98.3**	**71.9**	**62.9**	**49.6**	**71.4**	**75.7**
93-183	329	236,742.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	144,026.5	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	0.3	0.0
	337	130,407.9	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	0.0	0.0
	339	80,473.2	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	0.2	0.0
	354	65,204.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL			**0.1**	**0.1**	**1.2**	**0.8**	**0.1**	**1.9**	**0.2**	**0.3**	**0.1**	**1.5**	**0.0**	**0.2**	**0.8**	**0.9**	**0.4**	**0.4**	**0.3**	**1.3**	**2.0**	**0.6**	**0.0**
184-274	333	20,771.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	16,644.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	355	14,168.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
275-366	334	12,655.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	7,978.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	356	8,391.2	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	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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
367-549	717	12,793.2	.	.	.	.	.	.	.	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
	719	10,454.6	.	.	.	.	.	.	.	0.0	0.0	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	10,454.6	.	.	.	.	.	.	.	0.0	0.0	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**	**0.0**
550-731	718	15,269.3	.	.	.	.	.	.	.	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
	720	14,443.9	.	.	.	.	.	.	.	0.0	0.0	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	12,793.2	.	.	.	.	.	.	.	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
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**	**0.0**
732-914	764	14,443.9	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.	.	.
	772	18,570.8	.	.	.	.	.	.	.	.	.	.	0.0	.	.	.	.	.	.	.	.	.	.
TOTAL	.	.	.	.	.	.	.	.	.	.	.	.	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**	**72.0**	**75.8**
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**	**90.7**	**100.8**
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**	**53.2**	**50.8**

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

Depth Range (m)	Stratum	No. of trawlable Units	1990 *WT 101*	1991 *WT 114,115*	1992 *WT 128-130 GA 226*	1993 *WT 145,146*	1994 *WT 161,162*	1995 *WT 176-179,181 TEL 22,23*	1996 *WT 196-198 TEL 41*	1997 *WT 213-217 TEL 57,58*	1998 *WT 230-33 TEL 75,76*	1999 *WT246-48*	2000 *WT321-23 TEL339-343*	2001 *WT373-76 TEL 357-61 AN399*	2002 *WT428-31 TEL412-15*	2003 *WT487-89,511 TEL 513*	2004 *WT559 WT587-589*
30 - 56	784	36,866.4	.	.	.	.	.	.	0.0	0.0	0.0	.	0.1	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**	**0.0**	**0.0**
57 - 92	350	284,889.0	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	2.6	1.6
	363	244,858.7	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	8.6	8.8
	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	0.0	0.0	0.0
	372	338,400.3	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	7.4	11.7
	384	154,068.4	0.0	0.0	0.0	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	63,965.9	.	.	.	.	.	.	0.0	0.0	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**	**18.6**	**22.2**
93 - 183	328	208,955.3	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	0.0
	341	216,521.2	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
	342	80,473.2	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
	343	72,219.6	0.0	0.0	0.0	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	291,629.5	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	349	290,804.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	364	387,509.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	365	143,201.1	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	
	370	181,580.6	0.0	0.0	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	324,093.9	0.0	0.0	0.0	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	0.0	0.0	0.0
	786	11,555.1	.	.	.	.	.	.	0.0	0.0	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	0.0	0.0	0.0
	788	35,903.4	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	790	12,242.9	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	
	793	9,904.4	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	794	29,713.2	.	.	.	.	.	.	0.0	0.0	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	0.0	0.0	0.0
	799	9,904.4	.	.	.	.	.	.	0.0	0.0	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**	**0.0**	**0.1**
184 - 274	344	217,621.6	0.0	0.0	0.0	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	135,222.6	0.0	0.0	0.0	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	191,760.2	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	
	369	132,196.2	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	
	386	135,222.6	0.0	0.0	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	112,937.7	0.0	0.0	0.0	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	38,792.2	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
	795	22,560.0	.	.	.	.	.	.	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**	**0.0**	**0.0**
184 - 366	789	9,904.4	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	791	31,226.4	.	.	.	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0
	798	13,756.1	.	.	.	.	.	.	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**	**0.0**	**0.0**
275 - 366	345	196,987.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	346	118,990.3	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	0.0
	368	45,945.4	0.0	0.0	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	98,768.9	0.0	0.0	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	49,659.6	0.0	0.0	0.0	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	19,946.4	0.0	0.0	0.0	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	24,073.2	.	.	.	.	.	.	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**	**0.0**	**0.0**
367 - 549	729	25,586.4	0.0	0.0	0.0	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	29,713.2	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
	733	64,378.6	0.0	0.0	0.0	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	37,416.6	.	0.0	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	6,878.1	.	.	.	.	.	.	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**	**0.0**	**0.0**
550 - 731	730	23,385.4	.	0.0	0.0	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	31,776.6	0.0	0.0	0.0	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	31,363.9	0.0	0.0	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	24,073.2	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	
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**	**0.0**	**0.0**
732 - 914	737	31,226.4	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	741	30,676.1	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	745	47,871.3	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	748	21,872.2	.	.	.	.	.	.	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**	**0.0**	**.**
915 -1097	738	30,401.0	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	742	28,337.6	.	.	.	.	.	.	0.0	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	0.0	0.0	.
	749	17,332.7	.	.	.	.	.	.	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**	**0.0**	**.**
1098 -1280	739	34,940.5	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	743	29,025.4	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	747	99,594.2	.	.	.	.	.	.	0.0	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	0.0	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**	**0.0**	**.**
1281 -1463	740	36,316.1	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	744	38,517.1	.	.	.	.	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
	751	31,501.5	.	.	.	.	.	.	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**	**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**	**18.6**	**22.2**
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**	**34.2**	**35.5**
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**	**3.0**	**9.0**

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

Depth Range (m)	Stratum	No. of trawlable Units	1990 *WT 102*	1991 *WT 113,114*	1992 *WT 128,129*	1993 *WT 144,145*	1994 *WT 160,161*	1995 *WT 176,177*	1996 *TEL 41,42 AN 253*	1997 *WT 212-214*	1998 *WT 229,30,33 TEL 76*	1999 *WT 245-47*	2000 *WT320-323 TEL338,339*	2001 *WT372-73 TEL 357*	2002 *WT427-28 TEL411-12*	2003 *WT 486-87*	2004 *WT 557-558*
<=56	375	219,134.8	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
	376	206,204.1	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
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**	**88.6**	**126.1**
57 - 92	360	411,582.8	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	71.6	69.3
	361	254,900.7	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
	362	346,653.9	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
	373	346,653.9	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	17.8	24.4
	374	128,069.4	0.0	0.1	.	0.0	0.0	0.0	1.1	0.8	1.0	10.0	5.2	8.6	4.4	3.2	10.8
	383	92,716.2	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	0.1
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**	**163.3**	**162.0**
93 - 183	359	57,913.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
	377	13,756.1	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	0.2
	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
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**	**0.0**	**0.5**
184 - 274	358	30,951.2	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
	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	0.1
	381	25,036.1	.	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
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**	**0.0**	**0.1**
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
	379	14,581.5	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	380	15,957.1	.	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
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**	**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	0.0	0.0
	725	14,443.9	.	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	727	22,009.8	.	.	.	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**	**0.0**	**0.0**
550 - 731	724	17,057.6	.	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	9,904.4	.	.	.	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	21,459.5	.	.	.	.	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**	**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**	**252.0**	**291.6**
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**	**323.5**	**363.4**
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**	**180.5**	**219.7**

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

Depth Range (m)	Stratum	No. of trawlable Units	1990 *WT 102*	1991 *WT 114*	1992 *WT 128*	1993 *WT 144*	1994 *WT 160,161*	1995 *WT 176,177*	1996 *WT 200 AN 253, TEL 42*	1997 *WT 212,213*	1998 *WT 229-30,33 TEL76*	1999 *WT 244-46*	2000 *WT319-322 TEL338*	2001 *WT 372 TEL 357*	2002 *WT427 TEL411*	2003 *WT 485-86 TEL 469*	2004 *WT 557*
57 - 92	330	287,365.1	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	2.2	1.9
	331	62,727.9	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	0.1	1.3
	338	261,090.9	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	6.5	0.3
	340	236,054.8	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	2.1	6.7
	351	346,653.9	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
	352	354,907.6	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	38.6	26.8
	353	176,353.3	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	15.3	1.1
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**	**97.3**	**60.3**
93 - 183	329	236,742.6	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	0.0	0.0
	332	144,026.5	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	0.0	0.4
	337	130,407.9	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	0.0	0.2
	339	80,473.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.2	0.7	0.4	0.0
	354	65,204.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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**	**0.4**	**0.6**
184 - 274	355	14,168.8	.	0.0	0.0	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	20,221.5	0.0	0.0	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	336	16,644.9	0.0	0.0	0.0	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**	**0.0**	**0.0**
275 - 366	334	13,205.9	0.0	0.0	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	7,978.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	356	8,391.2	.	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
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**	**0.0**	**0.0**
367 - 549	717	22,835.1	0.0	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	719	10,454.6	0.0	0.0	.	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	10,454.6	.	0.0	.	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**	**0.0**	**0.0**
550 - 731	718	18,433.2	.	.	.	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	720	14,443.9	.	.	.	0.0	0.0	0.0	0.0	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	722	12,793.2	.	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
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**	**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**	**97.7**	**60.9**
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**	**145.6**	**92.7**
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**	**49.8**	**29.0**

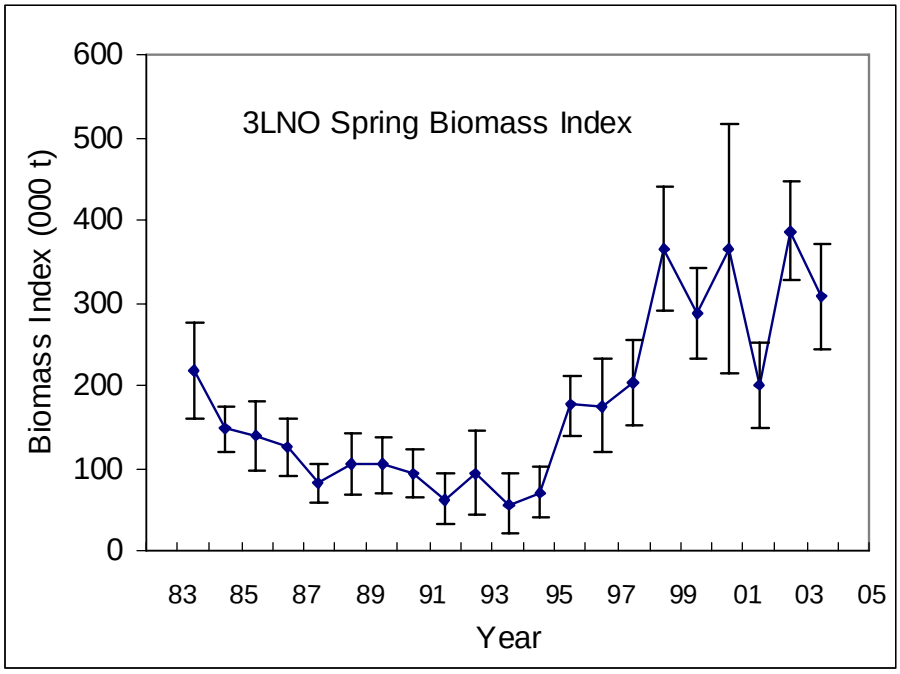

Fig 1. Biomass index, 3LNO yellowtail, Canadian spring surveys. Error bars are approx. 95% confidence intervals.

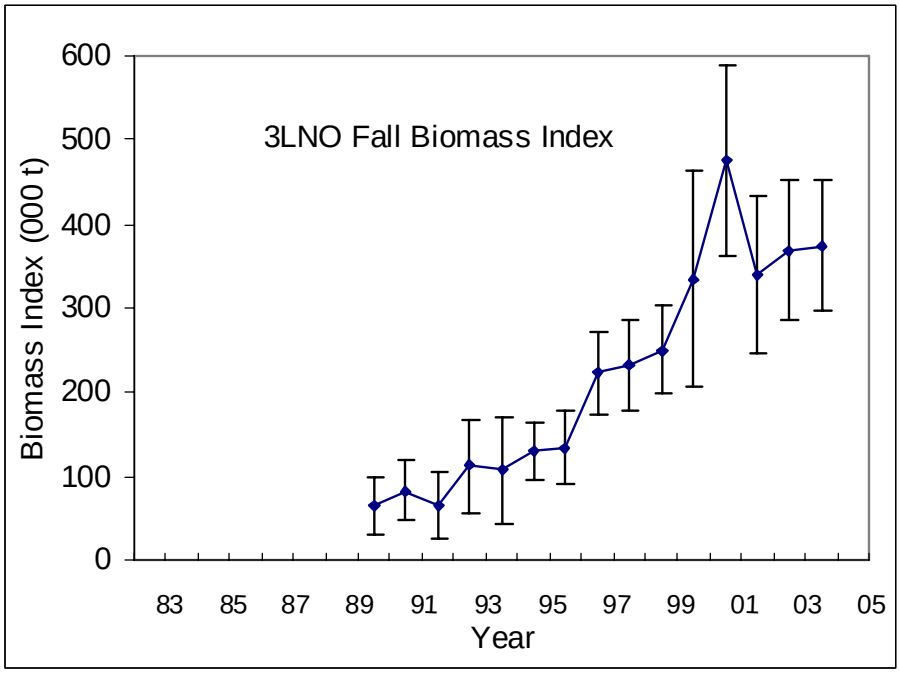

Fig. 2. Biomass index, 3LNO yellowtail, Canadian fall surveys. Error bars are approx. 95% confidence intervals.

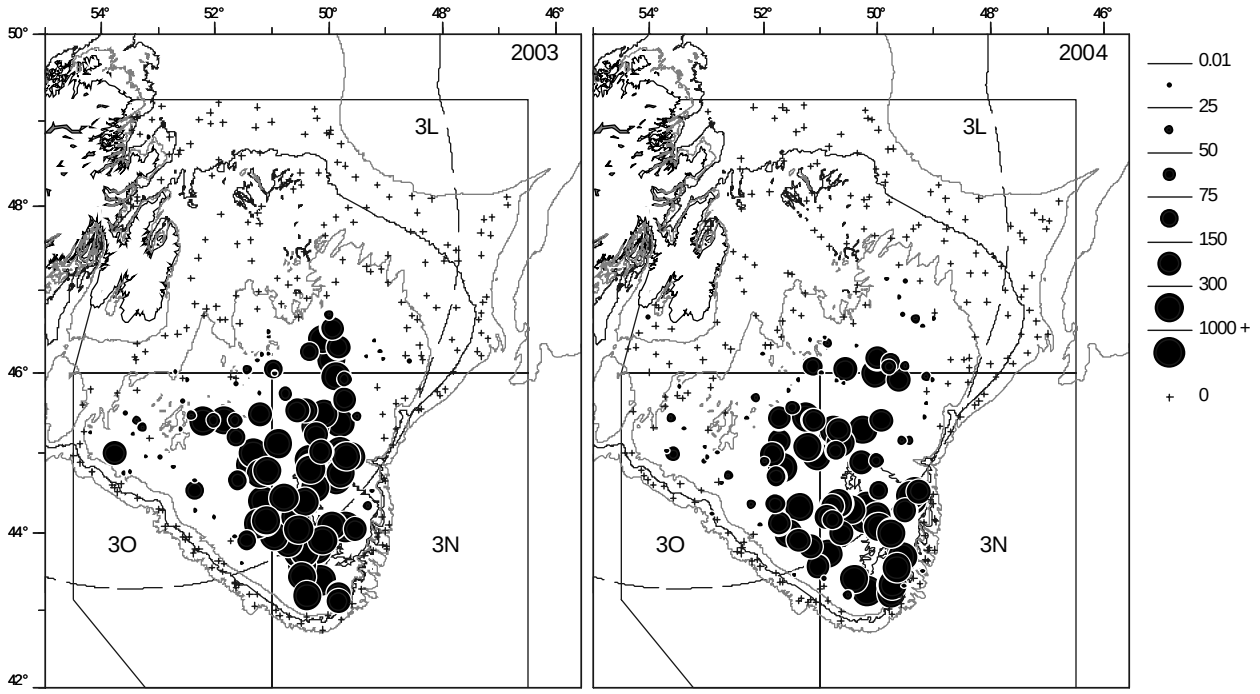

Fig. 3. Distribution of yellowtail flounder (number per tow) in spring RV surveys of 2003 and 2004.

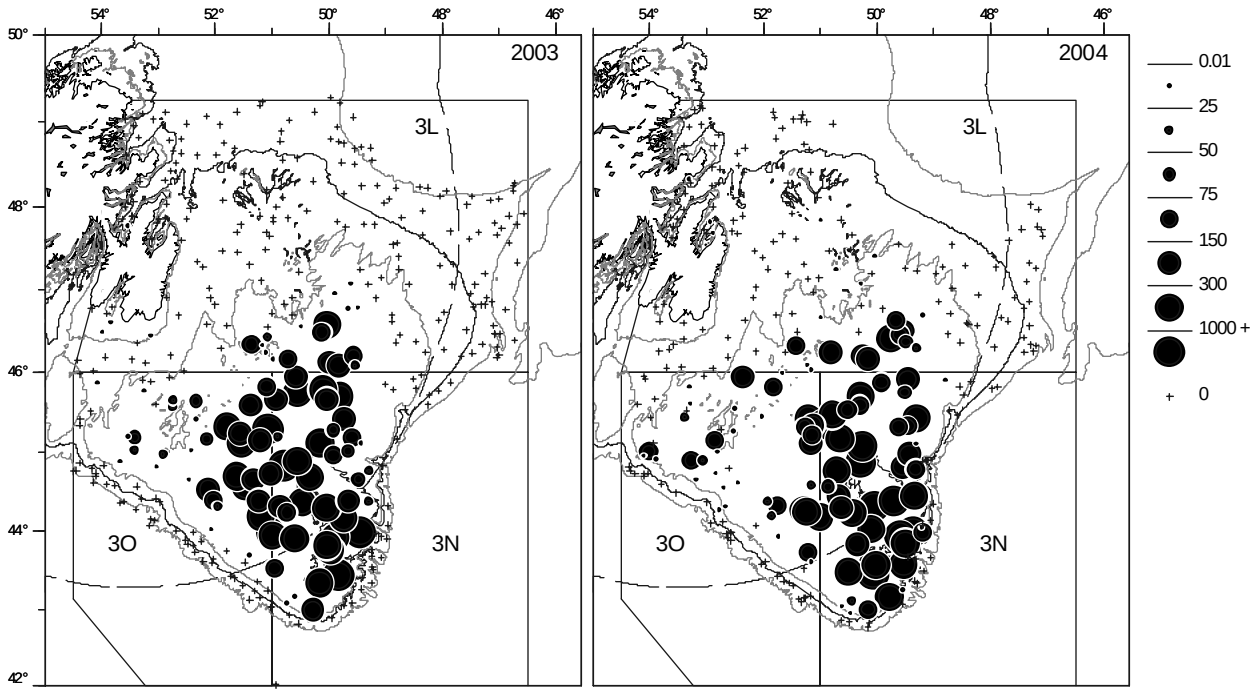

Fig. 4. Distribution of yellowtail flounder (number per tow) in fall RV surveys for 2003 and 2004.

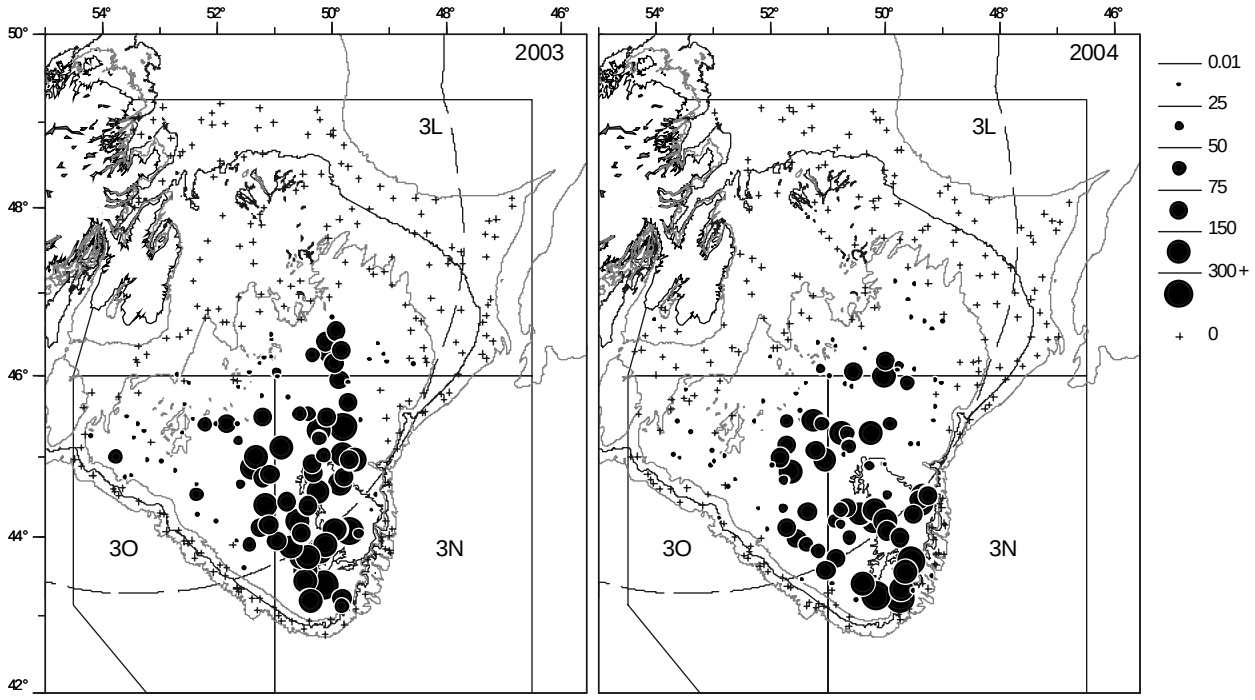

Fig. 5. Distribution of yellowtail flounder (weight per tow) in spring RV surveys of 2003 and 2004.

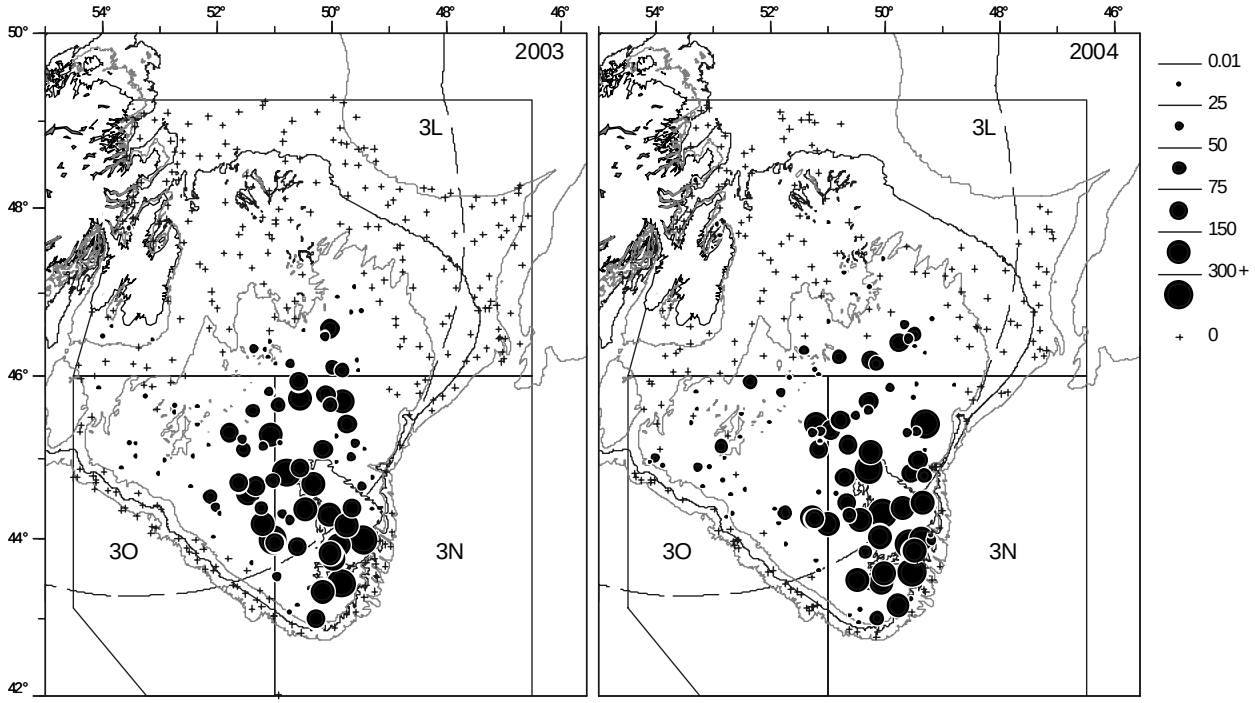

Fig. 6. Distribution of yellowtail flounder (weight per tow) in fall RV surveys of 2003 and 2004.

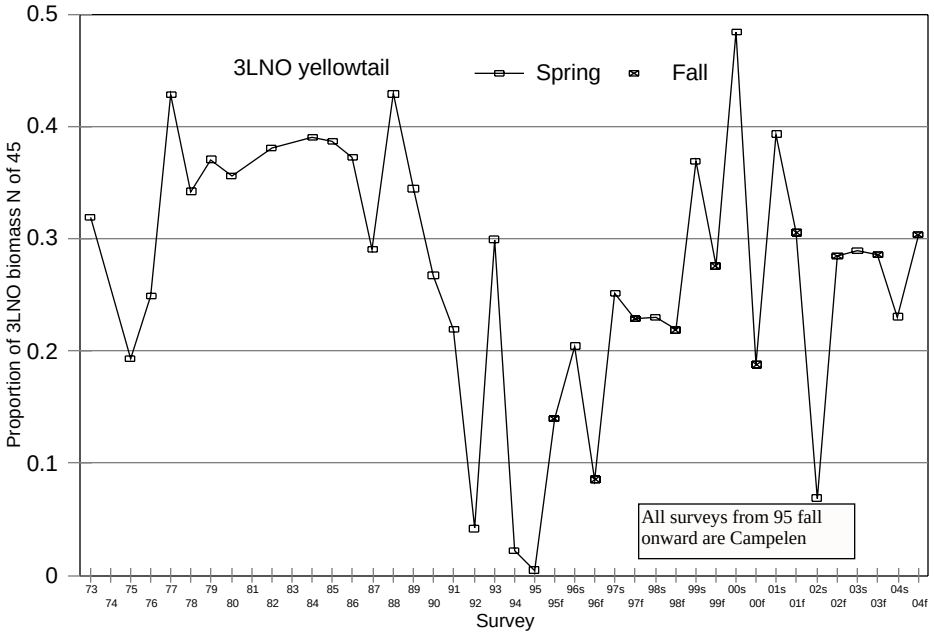

Fig. 7. The proportion of yellowtail biomass north of 45^0 N from spring and fall surveys, 1973 to 2004