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Atlantic cod and Yellowtail flounder indices from the Spanish Survey conducted in Divisions 3NO of the NAFO Regulatory Area

by

D. González-Troncoso, F. González and X. Paz

Instituto Español de Oceanografía,
P.O. Box 1552. Vigo, Spain.
e-mail: diana.gonzalez@vi.ieo.es

Abstract

Since 1995, Spain carries out a stratified random spring bottom trawl survey in Div. 3NO of the NAFO Regulatory Area. In 2001, the trawl vessel and gear were replaced; so, the time series indices were transformed. The transformed entire series of mean catches, biomass and length distribution for Atlantic cod (*Gadus morhua*) are presented for the period 1997-2000 and for Yellowtail flounder (*Limanda ferruginea*) for the period 1995-2000, and the both species no-transformed data for the years 2002-2006. For 2001, there are data from the two vessels. For Atlantic cod we can see a general decreasing of the biomass since the year 2002, although this year the biomass is much higher because above all the catch of a simple town of almost 2 tons. For this species, a good recruitment can be seen in 2004 and 2005. For Yellowtail flounder, there is no a clear trend since 1998; its indices are almost constant along this period.

Material and methods

The survey in Div. 3NO of NAFO Regulatory Area was initiated by Spain in 1995. Until 2001, the survey was carried out in spring (May), on board the Spanish vessel C/V *Playa de Menduiña* (338 GT and 800 HP) using bottom trawl net type *Pedreira*. Since 2001, the R/V *Vizconde de Eza* replaced the C/V *Playa de Menduíña* as the research vessel for the survey, and *Campelen* net replaced *Pedreira* net as survey gear. The main specifications and geometry of these gears, as the rigging profile and the net plan, and a sheet with the resume of the main technical data of the survey are described in a previous paper (Walsh *et. al.*, 2001). Table 1 presents the number of valid tows, the depth strata covered and the dates of the survey series. The survey area was stratified following the standard stratification schemes (Bishop, 1994). Set number was allocated to strata proportionally to their size, with a minimum of two planned hauls per stratum and the trawl positions were chosen at random (Doubleday, 1981). Biomass indices were calculated by the swept area method (Cochran, 1997), assuming catchability factor of 1.

For Atlantic cod, the series are presented since 1997 because in years 1995 and 1996 the surveyed depth strata were only until 1000 meters, so they are not representative. As the strata where the Yellowtail flounder is presented were well surveyed, the series for this species are presented since 1995.

The catch from each haul was sorted by species and weighted. Random samples of each species catches were measured to total length to the nearest lower cm. Length distribution scaled from catches was estimated for the period 1997-2006 (Atlantic cod) and 1995-2006 (Yellowtail flounder) in two cm range. Data were grouping beginning with the pair number.

For each species, the haul mean catch, with its variance, and the stratified mean catches by stratum and year, with the annual variance, are presented, transformed until 2000 and no-transformed in the period 2002-2006. In the year 2001, there are data transformed from the former vessel with original data from the new vessel. Besides this, the biomass per stratum and year, with the annual variance, are presented, as the stratified mean catches per haul length distribution. To more information about the calculation of these indices, see González Troncoso *et al.*, 2004 and Paz *et al.*, 2004.

Results

Atlantic cod

Introduction

Atlantic cod in Divisions 3NO has been under moratorium to directed fishing since 1994. According to the NAFO Scientific Council, the stock of Atlantic cod in Divisions 3NO declined dramatically during the mid-1980s, and the total biomass and the spawning biomass are currently at an extremely low level. Moreover, all recent year-classes have been weak (NAFO, 2006).

Mean Catches and Biomass

The Atlantic cod haul mean catches by stratum are presented in Table 2, included swept area, number of hauls and SD. Atlantic cod stratified mean catches per tow by stratum and year and their SD are presented in Table 3.

The entire time series (1997-2006) of biomass and their SD estimates for Atlantic cod are presented in Table 4. Estimated parameters *a* and *b* values of length-weight relationship are presented in Table 5.

We can see a great variation in the cod indices since 1997, but this is due to a few hauls in which the presence of cod was very high. For example, in 1998 and 2001, the C/V *Playa de Menduíña* made a more than seven tons cod catch in a single haul. Besides this, in 2001, the R/V *Vizconde de Eza* made two hauls with more than a ton of cod catches. But before year 2006, and apart from those hauls, the catches of cod were very poor. Since 2002, a decreasing in the biomass can be seen. In 2006, we can see a great increase in the biomass of this species. Although this increase is above all for a single catch of almost 2 tons, in general the catches of Atlantic cod in the survey of 2006 were over the mean. The great value of the variance in some years is due to the tows with a large catch (Fig. 1 and 2).

Length Distribution

Table 6 and Figures 3 and 4 show the stratified mean catches per haul length distribution by year, besides the sampled size and its catch, for the period 1997-2006. The data have been grouped two by two**,** so we present the data every two cm. Except in 2001 and 2006, the modal values are very low. All lengths presence is very low, even it is very difficult to follow the modal values. In 2001 we have a good presence of individuals between 36 and 58 cm, probably due to the three hauls with great catches of this year, and in 2006 there is two modes in the length distribution, one around 30 cm and another one around 40 cm. There is no good recruitment until 2004, in which the individuals between 12 and 16 cm correspond to the greatest presence in the series, and in 2005 between 24 and 32, with a new mode between 12 and 16 cm, as in last year. In 2006 there is no almost presence of individuals below 24 cm.

Yellowtail flounder

Introduction

After a moratorium between 1994 and 1997, the Yellowtail flounder fishery is under TAC. According to the Report of NAFO Scientific Council Meeting, the stock size had a minimum in the mid 1990´s, but since 1994 has steadily increased and now it is estimated to be at a level well above that of the mid-1980s (NAFO, 2006).

Mean Catches and Biomass

In Table 7 we present the haul mean catches by stratum for Yellowtail flounder, included swept area, number of hauls and SD. The stratified mean catches per tow by stratum and year and their SD are presented in Table 8 for this species.

The entire time series (1995-2006) of biomass by the swept area method and their SD estimates of Yellowtail flounder are presented in Table 9. The parameters *a* and *b* for the calculation of the length-weight relationship are presented in Table 10.

The Yellowtail flounder indices show no clear trend along the time (in the entire series). There was an increasing between 1995 and 1999 and since 2001 the indices are stabilised at a high level (Figures 5 and 6).

Length Distribution

The stratified mean catches per haul length distribution by sex and year, besides the sampled size and its catch, are presented in Table 11 and Figure 7 the period 1995-2006. The data have been grouped two by two**,** so we present the data every two cm. There is no presence of good recruitment last years. In Figure 8, we can see the evolution of a modal value since the beginning of the series, but, although there is a presence of juveniles in the lengths, this presence is very low.

References

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TABLE 1.- Spanish spring bottom trawl surveys on NAFO Div. 3NO: 1995-2006

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1995	C/V *Playa de Menduíña*	77	42-684	May 18-May 29
1996	C/V *Playa de Menduíña*	112	41-1135	May 07-May 24
1997	C/V *Playa de Menduíña*	128	42-1263	April 26-May 18
1998	C/V *Playa de Menduíña*	124	42-1390	May 06-May 26
1999	C/V *Playa de Menduíña*	114	41-1381	May 07-May 26
2000	C/V *Playa de Menduíña*	118	42-1401	May 07-May 28
2001(*)	R/V *Vizconde de Eza*	83	36-1156	May 03-May 24
	C/V *Playa de Menduíña*	121	40-1500	May 05-May 23
2002	R/V *Vizconde de Eza*	125	38-1540	April 29-May 19
2003	R/V *Vizconde de Eza*	118	38-1666	May 11-June 02
2004	R/V *Vizconde de Eza*	120	43-1539	June 06–June 24
2005	R/V *Vizconde de Eza*	119	47-1485	June 10–June 29
2006	R/V *Vizconde de Eza*	120	45-1480	June 7–June 27

(*) We took, for the calculation of the series, 83 hauls from the R/V *Vizconde de Eza* and 40 hauls from the C/V *Playa de Menduíña* (123 hauls in total)

TABLE 2.- Swept area, number of hauls and Atlantic cod mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2006. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	1997				1998				1999				2000			
Stratum	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD
353	0.0480	4	0.00	0.000	0.0465	4	0.00	0.004	0.0360	3	6.26	8.593	0.0356	3	8.59	9.984
354	0.0233	2	0.00	0.000	0.0356	3	17.67	29.046	0.0218	2	4.92	3.192	0.0356	3	18.44	27.099
355	0.0233	2	4.29	5.711	0.0221	2	27.05	3.662	0.0229	2	6.39	2.549	0.0233	2	94.83	76.209
356	0.0225	2	7.80	0.495	0.0221	2	6.23	0.247	0.0229	2	41.19	0.346	0.0225	2	16.34	17.172
357	0.0443	4	91.55	174.202	0.0240	2	7.45	0.742	0.0236	2	10.12	11.461	0.0124	1	9.15	-
358	0.0563	5	1.77	1.655	0.0236	3	4.46	4.030	0.0349	3	9.98	4.006	0.0341	3	184.88	194.829
359	0.0690	6	1.13	2.385	0.0698	6	0.39	0.858	0.0364	3	7.25	11.394	0.0469	4	18.26	17.367
360	0.3754	32	0.11	0.226	0.2561	25	0.22	0.700	0.2325	19	2.33	3.801	0.2396	20	2.16	3.561
374	0.0353	3	0.06	0.099	0.0353	3	0.00	0.000	0.0244	2	0.58	0.594	0.0240	2	0.00	0.000
375	0.0116	1	0.00	-	0.0345	3	0.78	0.403	0.0236	2	0.97	0.579	0.0244	2	0.00	0.000
376	0.1583	14	0.00	0.000	0.0930	10	0.20	0.187	0.1219	10	0.62	0.545	0.1200	10	0.90	1.852
377	0.0116	1	0.27	-	0.0229	2	1.89	2.375	0.0240	2	0.21	0.302	0.0229	2	0.02	0.027
378	0.0210	2	2.34	3.316	0.0120	2	3.46	0.940	0.0229	2	7.76	5.951	0.0233	2	10.65	11.169
379	0.0206	2	3.68	0.307	0.0356	3	8.30	5.847	0.0236	2	5.22	4.147	0.0225	2	41.12	54.683
380	0.0210	2	0.36	0.515	0.0113	2	2.33	1.361	0.0236	2	38.58	48.720	0.0236	2	8.21	3.236
381	0.0221	2	0.07	0.099	0.0229	2	0.21	0.187	0.0229	2	0.87	0.388	0.0236	2	1.74	0.730
382	0.0461	4	0.00	0.000	0.0229	3	0.32	0.336	0.0484	4	0.05	0.036	0.0499	4	0.71	0.561
721	0.0221	2	20.98	7.052	0.0203	2	0.61	0.866	0.0244	2	88.29	106.743	0.0236	2	28.34	17.122
722	0.0214	2	0.31	0.139	0.0101	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.90	1.277
723	0.0210	2	9.90	2.425	0.0233	2	4.39	3.736	0.0229	2	16.87	20.735	0.0248	2	22.02	12.010
724	0.0225	2	1.30	1.269	0.0206	2	1488.84	2101.820	0.0225	2	0.02	0.032	0.0233	2	0.70	0.341
725	0.0206	2	23.50	17.734	0.0086	1	30.86	-	0.0229	2	13.65	19.102	0.0210	2	4.34	3.857
726	n.s.	n.s.	n.s.	n.s.	0.0094	2	4.74	5.617	0.0225	2	0.81	0.492	0.0221	2	8.85	12.221
727	0.0094	1	0.12	-	0.0233	2	2.66	2.821	0.0236	2	9.20	4.701	0.0210	2	9.16	10.803
728	0.0214	2	1.17	0.569	0.0206	2	1.54	2.177	0.0233	2	0.00	0.000	0.0210	2	0.90	1.267
752	0.0218	2	0.00	0.000	0.0229	2	0.00	0.000	0.0233	2	0.00	0.000	0.0206	2	0.00	0.000
753	0.0214	2	0.00	0.000	0.0218	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000
754	0.0330	3	0.00	0.000	0.0210	2	0.00	0.000	0.0206	2	0.00	0.000	0.0195	2	0.00	0.000
755	n.s.	n.s.	n.s.	n.s.	0.0206	2	0.00	0.000	0.0311	3	0.00	0.000	0.0431	4	0.00	0.000
756	0.0109	1	0.00	-	0.0225	2	0.32	0.449	0.0225	2	0.24	0.334	0.0203	2	0.36	0.257
757	0.0304	3	0.00	0.000	0.0206	2	0.00	0.000	0.0233	2	0.00	0.000	0.0214	2	0.00	0.000
758	0.0214	2	0.00	0.000	0.0105	2	0.00	0.000	0.0214	2	0.00	0.000	0.0210	2	0.00	0.000
759	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000	0.0218	2	0.00	0.000	0.0210	2	0.00	0.000
760	0.0105	1	0.00	-	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000	0.0210	2	0.00	0.000
761	0.0315	3	0.00	0.000	0.0206	2	0.00	0.000	0.0210	2	0.00	0.000	0.0221	2	0.00	0.000
762	0.0308	3	0.00	0.000	0.0094	2	0.00	0.000	0.0210	2	0.00	0.000	0.0203	2	0.00	0.000
763	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.000	0.0311	3	0.00	0.000	0.0416	4	1.08	2.170
764	0.0206	2	0.00	0.000	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000
765	0.0206	2	0.00	0.000	0.0098	2	0.00	0.000	0.0221	2	0.00	0.000	0.0203	2	0.00	0.000
766	0.0308	3	0.00	0.000	0.0191	2	0.00	0.000	0.0218	2	0.00	0.000	0.0214	2	0.00	0.000
767	n.s.	n.s.	n.s.	n.s.	0.0109	2	0.00	0.000	0.0214	2	0.00	0.000	0.0210	2	0.00	0.000

$$SD = \frac{\sum \left(x_i - \bar{x} \right)^2}{n-1}$$

TABLE 2 (cont.).- Swept area, number of hauls and Atlantic cod mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2006. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2001				2002				2003			
Stratum	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD
353	0.0341	3	7.33	8.145	0.0476	4	0.00	0.003	0.0334	3	0.00	0.000
354	0.0338	3	16.07	3.315	0.0356	3	0.01	0.012	0.0338	3	7.63	13.221
355	0.0240	2	56.11	64.898	0.0236	2	0.96	0.370	0.0229	2	3.02	2.390
356	0.0240	2	149.60	76.650	0.0233	2	15.20	10.889	0.0225	2	15.61	1.605
357	0.0244	2	27.20	36.062	0.0240	2	6.65	1.909	0.0229	2	5.28	7.460
358	0.0345	3	3.42	2.592	0.0345	3	2.63	1.429	0.0338	3	207.22	260.186
359	0.0803	7	176.35	433.935	0.0686	6	2.72	3.436	0.0791	7	1.03	1.522
360	0.2423	20	11.36	27.470	0.2865	25	0.82	2.887	0.2254	20	1.14	2.952
374	0.0240	2	0.00	0.000	0.0345	3	0.00	0.000	0.0225	2	0.00	0.000
375	0.0338	3	0.00	0.000	0.0353	3	0.47	0.503	0.0330	3	0.48	0.826
376	0.1155	10	0.04	0.119	0.1140	10	0.00	0.000	0.1125	10	0.65	1.987
377	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	1.25	1.768
378	0.0236	2	11.98	15.726	0.0233	2	1.45	2.051	0.0225	2	19.18	19.141
379	0.0229	2	9.54	9.001	0.0229	2	24.83	32.492	0.0229	2	4.35	0.481
380	0.0206	2	6.00	2.895	0.0225	2	0.31	0.035	0.0229	2	1.09	0.976
381	0.0236	2	0.66	0.891	0.0229	2	0.04	0.057	0.0229	2	0.00	0.000
382	0.0469	4	0.12	0.145	0.0341	3	0.04	0.076	0.0454	4	0.00	0.000
721	0.0248	2	4.85	6.859	0.0233	2	1.01	1.430	0.0225	2	9.40	13.287
722	0.0233	2	0.00	0.000	0.0236	2	0.00	0.000	0.0221	2	1.73	2.447
723	0.0240	2	676.15	932.179	0.0233	2	55.60	69.155	0.0229	2	0.65	0.919
724	0.0353	3	6.16	10.254	0.0225	2	49.80	70.428	0.0225	2	10.46	14.786
725	0.0116	2	1367.61	1856.733	0.0225	2	9.25	7.849	0.0229	2	2.17	3.062
726	0.0116	2	1.83	2.593	0.0214	2	1122.95	1569.289	0.0225	2	0.00	0.000
727	0.0225	2	10.40	4.810	0.0233	2	2.80	3.960	0.0218	2	7.45	9.405
728	0.0229	2	0.00	0.000	0.0229	2	21.40	30.264	0.0225	2	0.00	0.000
752	0.0210	2	0.00	0.000	0.0116	1	0.00	0.000	0.0229	2	0.00	0.000
753	0.0214	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
754	0.0195	2	0.00	0.000	0.0341	3	0.00	0.000	0.0218	2	0.00	0.000
755	0.0416	4	0.00	0.000	0.0338	3	0.00	0.000	0.0221	2	0.00	0.000
756	0.0113	2	0.04	0.057	0.0229	2	0.00	0.000	0.0221	2	0.00	0.000
757	0.0233	2	0.00	0.000	0.0225	2	64.40	91.075	0.0221	2	0.00	0.000
758	0.0218	2	0.00	0.000	0.0225	2	2.80	3.960	0.0221	2	0.00	0.000
759	0.0221	2	0.00	0.000	0.0225	2	0.00	0.000	0.0113	1	0.00	-
760	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000
761	0.0225	2	0.00	0.000	0.0225	2	0.17	0.236	0.0225	2	0.00	0.000
762	0.0116	2	0.00	0.000	0.0225	2	0.15	0.212	0.0225	2	0.00	0.000
763	0.0330	3	0.00	0.000	0.0225	2	0.00	0.000	0.0311	3	0.00	0.000
764	0.0240	2	0.00	0.000	0.0236	2	0.00	0.000	0.0221	2	0.00	0.000
765	0.0113	2	0.00	0.000	0.0236	2	0.00	0.000	0.0113	1	0.00	-
766	0.0203	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
767	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000

$$SD = \frac{\sum \left(x_i - \bar{x} \right)^2}{n-1}$$

TABLE 2 (cont.).- Swept area, number of hauls and Atlantic cod mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2006. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2004				2005				2006			
Stratum	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD	Swept area	Tow number	A. cod Mean catch	A. cod SD
353	0.033750	3	10.21	8.691	0.0353	3	4.20	3.962	0.0371	3	11.53	7.341
354	0.034500	3	4.76	3.335	0.0353	3	6.76	8.311	0.0364	3	10.98	14.032
355	0.022875	2	5.09	3.267	0.0225	2	1.97	0.255	0.0248	2	3.04	0.078
356	0.022125	2	2.97	0.714	0.0233	2	1.43	1.478	0.0240	2	3.88	3.247
357	0.022875	2	13.30	17.727	0.0233	2	3.98	4.603	0.0244	2	12.75	8.400
358	0.033000	3	14.41	12.455	0.0349	3	22.75	17.967	0.0349	3	82.54	80.442
359	0.079125	7	29.83	54.712	0.0814	7	57.31	134.609	0.0975	8	372.36	643.214
360	0.231000	20	3.55	4.484	0.2325	20	2.47	4.698	0.2340	19	7.35	8.119
374	0.023250	2	0.00	0.000	0.0229	2	0.11	0.148	0.0236	2	0.00	0.000
375	0.033750	3	0.05	0.081	0.0349	3	0.00	0.000	0.0364	3	13.53	15.862
376	0.116625	10	0.60	0.733	0.1174	10	0.76	0.963	0.1219	10	6.84	11.380
377	0.021750	2	19.60	24.020	0.0233	2	61.19	64.955	0.0236	2	90.62	69.919
378	0.022500	2	17.75	3.989	0.0225	2	8.59	10.087	0.0240	2	90.32	85.680
379	0.012375	1	23.95	-	0.0236	2	5.70	7.078	0.0236	2	6.30	8.627
380	0.022125	2	7.77	2.305	0.0229	2	27.53	24.784	0.0229	2	8.70	1.697
381	0.022500	2	5.47	4.150	0.0233	2	3.63	3.765	0.0229	2	8.43	1.167
382	0.046125	4	0.47	0.888	0.0458	4	0.97	0.639	0.0469	4	0.75	1.033
721	0.022125	2	2.20	3.111	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000
722	0.021750	2	0.00	0.000	0.0233	2	0.00	0.000	0.0240	2	0.00	0.000
723	0.022875	2	1.94	2.744	0.0233	2	0.00	0.000	0.0236	2	0.00	0.000
724	0.021375	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
725	0.022500	2	0.29	0.403	0.0236	2	1.47	2.073	0.0233	2	0.00	0.000
726	0.022500	2	0.00	0.000	0.0113	1	0.00	-	0.0225	2	0.00	0.000
727	0.023250	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
728	0.018000	2	0.00	0.000	0.0109	1	0.00	-	0.0225	2	0.00	0.000
752	0.021375	2	0.00	0.000	0.0236	2	0.00	0.000	0.0225	2	0.00	0.000
753	0.021750	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
754	0.021375	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
755	0.031875	3	0.00	0.000	0.0450	4	0.00	0.000	0.0338	3	0.00	0.000
756	0.021750	2	0.00	0.000	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000
757	0.021750	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
758	0.021375	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.021375	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
760	0.022125	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
761	0.022125	2	0.00	0.000	0.0221	2	0.00	0.000	0.0233	2	0.00	0.000
762	0.023250	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
763	0.032625	3	0.00	0.000	0.0334	3	0.00	0.000	0.0225	2	0.00	0.000
764	0.022875	2	0.00	0.000	0.0233	2	0.00	0.000	0.0233	2	0.00	0.000
765	0.022500	2	0.00	0.000	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000
766	0.022500	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
767	0.021750	2	0.00	0.000	0.0113	1	0.00	-	0.0233	2	0.00	0.000

TABLE 3.- Stratified mean catches (Kg) by stratum and year and SD by year of Atlantic cod (1997-2006). n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
353	0.00	0.59	1684.29	2310.56	1972.67	0.40	0.00	2746.49	1129.80	3100.67
354	0.00	4347.10	1209.44	4536.47	3954.04	1.64	1877.80	1172.11	1662.39	2700.42
355	317.46	2001.63	472.57	7017.36	4152.14	71.15	223.48	376.66	145.78	224.59
356	366.75	292.75	1935.74	768.05	7031.20	714.40	733.44	139.36	66.98	182.17
357	15014.55	1222.35	1659.07	1500.68	4460.80	1090.60	865.10	2180.38	651.90	2091.00
358	397.76	1002.53	2246.51	41597.12	768.75	592.50	46625.25	3241.50	5119.50	18570.75
359	473.87	164.50	3052.91	7687.04	74245.15	1146.52	435.31	12557.95	24128.71	156764.14
360	301.58	616.24	6478.57	6017.33	31605.14	2283.17	3169.28	9886.61	6869.14	20449.63
374	12.23	0.00	124.31	0.00	0.00	0.00	0.00	0.00	22.47	0.00
375	0.00	211.79	261.73	0.00	0.00	126.47	129.18	12.65	0.00	3665.73
376	0.00	263.27	822.50	1202.94	50.03	0.00	864.70	801.87	1010.91	9129.90
377	26.59	188.96	21.35	1.92	0.00	0.00	125.00	1959.50	6119.00	9062.00
378	325.88	481.53	1078.58	1480.09	1665.22	201.55	2665.33	2466.56	1194.36	12553.79
379	390.21	880.31	553.41	4358.29	1010.71	2631.45	461.10	2538.70	603.67	667.80
380	34.94	223.39	3703.59	788.08	576.11	30.19	104.64	745.92	2642.40	835.20
381	10.08	30.36	125.22	250.68	95.74	5.76	0.00	787.90	523.08	1213.20
382	0.00	108.42	18.00	243.65	41.41	14.98	0.00	160.78	332.28	255.54
721	1363.56	39.80	5738.57	1842.35	315.25	65.75	610.68	143.00	0.00	0.00
722	26.16	0.00	0.00	75.84	0.00	0.00	145.32	0.00	0.00	0.00
723	1534.94	680.69	2614.28	3413.20	104803.25	8618.00	100.75	300.70	0.00	0.00
724	161.20	184615.64	2.82	87.21	764.25	6175.20	1296.42	0.00	0.00	0.00
725	2467.77	3240.64	1432.94	455.78	143598.88	971.25	227.33	29.93	153.93	0.00
726	n.s	341.39	58.07	637.55	132.02	80852.04	0.00	0.00	0.00	0.00
727	11.42	255.30	883.49	879.12	998.37	268.80	715.20	0.00	0.00	0.00
728	91.43	120.09	0.00	69.87	0.00	1669.20	0.00	0.00	0.00	0.00
752	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
753	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
754	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	n.s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	32.07	23.86	36.40	4.04	0.00	0.00	0.00	0.00	0.00
757	0.00	0.00	0.00	0.00	0.00	6568.80	0.00	0.00	0.00	0.00
758	0.00	0.00	0.00	0.00	0.00	277.20	0.00	0.00	0.00	0.00
759	n.s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	0.00	0.00	28.56	0.00	0.00	0.00	0.00
762	0.00	0.00	0.00	0.00	0.00	31.80	0.00	0.00	0.00	0.00
763	n.s	0.00	0.00	283.12	0.00	0.00	0.00	0.00	0.00	0.00
764	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
765	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
766	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
767	n.s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	23328.40	201361.35	36201.79	87540.73	382245.17	114437.38	61375.29	42248.54	52376.29	241466.52
$\left(\overline{Y}\right)$	2.50	19.47	3.50	8.46	36.96	11.07	5.93	4.09	5.06	23.35
S.D.	1.54	17.82	0.75	2.58	17.97	7.82	3.29	0.95	2.16	9.39

TABLE 4.- Survey estimates (by the swept area method) of Atlantic cod biomass (t) and SD by stratum and year on NAFO Div. 3NO. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
353	0	0	140	195	173	0	0	244	96	251
354	0	366	111	382	351	0	167	102	141	223
355	27	181	41	604	346	6	20	33	13	18
356	33	26	169	68	586	61	65	13	6	15
357	1357	102	140	121	366	91	76	191	56	172
358	35	86	194	3657	67	52	4144	295	440	1597
359	41	14	252	656	6476	100	39	1111	2076	12863
360	26	53	529	502	2609	199	281	856	591	1660
374	1	0	10	0	0	0	0	0	2	0
375	0	18	22	0	0	11	12	1	0	302
376	0	23	67	100	4	0	77	69	86	749
377	2	17	2	0	0	0	11	180	526	767
378	31	41	95	127	141	17	237	219	106	1046
379	38	74	47	387	88	230	40	205	51	57
380	3	20	314	67	56	3	9	67	231	73
381	1	3	11	21	8	1	0	70	45	106
382	0	10	1	20	4	1	0	14	29	22
721	123	4	471	156	25	6	54	13	0	0
722	2	0	0	7	0	0	13	0	0	0
723	146	59	229	276	8734	741	9	26	0	0
724	14	17902	0	8	65	549	115	0	0	0
725	239	376	125	43	12347	86	20	3	13	0
726	n.s.	33	5	58	11	7565	0	0	0	0
727	1	22	75	84	89	23	66	0	0	0
728	9	12	0	7	0	146	0	0	0	0
752	0	0	0	0	0	0	0	0	0	0
753	0	0	0	0	0	0	0	0	0	0
754	0	0	0	0	0	0	0	0	0	0
755	n.s.	0	0	0	0	0	0	0	0	0
756	0	3	2	4	0	0	0	0	0	0
757	0	0	0	0	0	584	0	0	0	0
758	0	0	0	0	0	25	0	0	0	0
759	n.s.	0	0	0	0	0	0	0	0	0
760	0	0	0	0	0	0	0	0	0	0
761	0	0	0	0	0	3	0	0	0	0
762	0	0	0	0	0	3	0	0	0	0
763	n.s.	0	0	27	0	0	0	0	0	0
764	0	0	0	0	0	0	0	0	0	0
765	0	0	0	0	0	0	0	0	0	0
766	0	0	0	0	0	0	0	0	0	0
767	n.s.	0	0	0	0	0	0	0	0	0
TOTAL	2131	19444	3054	7576	32548	10502	5455	3712	4509	19921
S.D.	1322	18206	655	2566	15903	7971	3016	848	1984	8109

TABLE 5.- Length weight relationships in the calculation of Atlantic cod biomass. The equation is $Weight = a(l + 0.5)^b$ Spanish Spring Surveys on NAFO Div. 3NO: 1997-2006.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
a	0.0102 Error = 0.2480	0.0061 Error = 0.0748	0.0048 Error = 0.0788	0.0060 Error = 0.0706	0.0048 Error = 0.0893	0.0057 Error = 0.1025	0.0046 Error = 0.0581	0.0052 Error = 0.0698	0.0052 Error = 0.0715	0.0058 Error = 0.0678
b	2.9387 Error = 0.0629	3.0671 Error = 0.0197	3.1313 Error = 0.0203	3.0822 Error = 0.0179	3.1198 Error = 0.0228	3.0783 Error = 0.0274	3.1370 Error = 0.0153	3.1107 Error = 0.0185	3.1238 Error = 0.0189	3.0965 Error = 0.0174
	R^2 = 0.975 N = 431	R2 = 0.997 N = 687	R^2 = 0.997 N = 430	R^2 = 0.997 N = 877	R^2 = 0.996 N = 488	R^2 = 0.995 N = 678	R^2 = 0.998 N = 516	R^2 = 0.997 N = 656	R^2 = 0.997 N = 612	R^2 = 0.999 N = 1129

TABLE 6.- Atlantic cod length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2006. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original R/V *Vizconde de Eza* data. (*) indicates untransformed data.

Length (cm.)	1997.	1998	1999	2000	2001	2002	2003	2004	2005	2006
8	0.000	0.000	0.013	0.000	0.009	0.011	0.000	0.000	0.000	0.014
10	0.000	0.000	0.011	0.000	0.000	0.039	0.000	0.408	0.088	0.000
12	0.000	0.010	0.010	0.006	0.000	0.030	0.054	2.141	0.722	0.014
14	0.000	0.025	0.205	0.020	0.000	0.000	0.065	1.542	1.129	0.008
16	0.000	0.011	0.741	0.124	0.021	0.040	0.028	0.828	0.644	0.014
18	0.000	0.007	0.774	0.115	0.019	0.007	0.037	0.186	0.245	0.013
20	0.000	0.004	0.287	0.211	0.103	0.000	0.061	0.063	0.036	0.007
22	0.000	0.002	0.478	0.285	0.184	0.083	0.062	0.076	0.094	0.041
24	0.002	0.005	1.173	0.241	0.175	0.096	0.075	0.119	0.224	0.367
26	0.002	0.009	1.740	0.319	0.194	0.139	0.150	0.219	0.515	0.948
28	0.013	0.028	1.251	0.385	0.216	0.153	0.189	0.141	1.044	3.595
30	0.013	0.037	0.525	0.417	0.132	0.284	0.243	0.162	1.151	5.313
32	0.051	0.028	0.172	0.327	0.162	0.312	0.087	0.149	0.551	3.854
34	0.087	0.030	0.096	0.438	0.380	0.524	0.067	0.330	0.393	1.710
36	0.142	0.022	0.070	0.559	0.923	0.596	0.071	0.421	0.189	1.102
38	0.184	0.026	0.090	1.038	1.787	0.572	0.121	0.420	0.129	2.258
40	0.108	0.105	0.086	1.030	3.363	0.689	0.081	0.217	0.135	5.496
42	0.066	0.075	0.031	0.897	3.463	1.005	0.078	0.248	0.113	5.305
44	0.106	0.365	0.047	0.473	4.234	1.141	0.117	0.101	0.097	4.004
46	0.073	0.603	0.025	0.307	5.028	1.483	0.111	0.110	0.136	2.317
48	0.091	0.931	0.045	0.183	5.686	1.090	0.175	0.077	0.173	1.054
50	0.043	0.963	0.044	0.137	4.959	1.058	0.225	0.060	0.101	0.487
52	0.074	0.924	0.063	0.099	4.098	1.111	0.298	0.088	0.128	0.279
54	0.087	1.499	0.106	0.109	3.195	0.895	0.390	0.072	0.026	0.276
56	0.142	1.537	0.081	0.069	1.224	0.691	0.428	0.065	0.028	0.227
58	0.124	1.764	0.113	0.136	0.693	0.223	0.322	0.110	0.012	0.231
60	0.195	1.026	0.130	0.101	0.532	0.370	0.306	0.074	0.055	0.256
62	0.114	0.540	0.098	0.065	0.181	0.126	0.183	0.093	0.078	0.229
64	0.088	0.505	0.072	0.152	0.032	0.005	0.227	0.104	0.092	0.204
66	0.111	0.163	0.049	0.134	0.047	0.057	0.098	0.063	0.089	0.114
68	0.014	0.271	0.067	0.101	0.014	0.000	0.093	0.071	0.077	0.098
70	0.029	0.157	0.019	0.137	0.015	0.061	0.085	0.042	0.093	0.092
72	0.004	0.193	0.013	0.104	0.028	0.007	0.027	0.031	0.083	0.074
74	0.013	0.136	0.018	0.142	0.012	0.000	0.011	0.033	0.078	0.096
76	0.002	0.086	0.011	0.066	0.017	0.002	0.015	0.030	0.079	0.071
78	0.003	0.080	0.008	0.034	0.022	0.000	0.010	0.017	0.056	0.121
80	0.006	0.079	0.015	0.073	0.039	0.000	0.027	0.036	0.047	0.051
82	0.001	0.038	0.005	0.032	0.013	0.000	0.000	0.009	0.018	0.103
84	0.003	0.000	0.004	0.044	0.000	0.011	0.025	0.003	0.006	0.057
86	0.001	0.048	0.012	0.026	0.021	0.000	0.008	0.000	0.022	0.041
88	0.000	0.042	0.010	0.021	0.003	0.007	0.002	0.022	0.014	0.041
90	0.001	0.000	0.000	0.016	0.011	0.000	0.000	0.008	0.014	0.013
92	0.000	0.003	0.019	0.020	0.000	0.000	0.000	0.009	0.000	0.039
94	0.000	0.000	0.000	0.005	0.003	0.000	0.000	0.013	0.000	0.005
96	0.000	0.000	0.005	0.003	0.012	0.000	0.008	0.000	0.000	0.000
98	0.000	0.000	0.005	0.003	0.008	0.000	0.000	0.000	0.000	0.026
100	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.025
102	0.000	0.000	0.000	0.010	0.000	0.000	0.008	0.000	0.000	0.000
104	0.000	0.001	0.000	0.000	0.000	0.011	0.000	0.027	0.000	0.014
106	0.000	0.000	0.000	0.005	0.000	0.000	0.014	0.000	0.000	0.014
108	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000
114	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.002	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000
Total	1.997	12.378	8.847	9.220	41.290	12.930	4.684	9.035	9.005	40.718
Nº samples (*):	40	55	72	70	32	41	42	58	59	64
Nº Ind. (*):	742	967	2770	2753	1591	1030	539	939	1126	2909
Sampled catch:	248	410	527	752	1107	776	654	554	778	2026
Range (*):	24-118	12-104	9-121	13-118	8-132	9-104	12-106	10-105	11-91	7-104
Total catch:	572	3873	613	1274	3487	2806	846	554	794	3994
Total hauls (*):	128	124	114	118	123	125	118	120	119	120

TABLE 7.- Swept area, number of hauls and Yellowtail flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1995-2006. Swept area in square miles. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	1995				1996				1997				1998			
Stratum	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD
353	0.0353	3	5.82	4.105	0.0371	3	74.88	94.62	0.0480	4	12.55	14.26	0.0465	4	12.22	20.16
354	0.0353	3	1.78	3.089	0.0319	3	1.11	0.84	0.0233	2	1.41	1.56	0.0356	3	1.22	0.24
355	n.s.	n.s.	n.s.	n.s.	0.0221	2	0.25	0.35	0.0233	2	2.20	0.31	0.0221	2	0.13	0.18
356	n.s.	n.s.	n.s.	n.s.	0.0203	2	0.00	0.00	0.0225	2	0.32	0.46	0.0221	2	0.00	0.00
357	0.0109	1	0.00	-	0.0218	2	0.00	0.00	0.0443	4	0.00	0.00	0.0240	2	0.00	0.00
358	0.0319	3	0.00	0.000	0.0319	3	0.13	0.23	0.0563	5	0.02	0.04	0.0236	3	0.00	0.00
359	0.0345	3	1.35	2.336	0.0548	5	0.92	0.83	0.0690	6	0.08	0.14	0.0698	6	0.17	0.22
360	0.3563	31	20.44	40.707	0.3761	31	142.09	128.86	0.3754	32	80.92	155.59	0.2561	25	373.90	629.84
374	0.0225	2	0.00	0.000	0.0233	2	0.00	0.00	0.0353	3	0.00	0.00	0.0353	3	0.04	0.02
375	0.0225	2	1.48	1.875	0.0229	2	41.40	58.54	0.0116	1	0.20	-	0.0345	3	12.37	21.37
376	0.1729	15	35.06	58.691	0.1650	14	71.40	86.94	0.1583	14	162.35	179.83	0.0930	10	279.27	181.29
377	0.0221	2	0.00	0.000	0.0229	2	0.00	0.00	0.0116	1	0.00	-	0.0229	2	0.00	0.00
378	0.0435	4	0.00	0.000	0.0330	3	0.06	0.10	0.0210	2	0.00	0.00	0.0120	2	0.00	0.00
379	0.0221	2	0.00	0.000	0.0113	1	0.00	-	0.0206	2	0.00	0.00	0.0356	3	0.00	0.00
380	n.s.	n.s.	n.s.	n.s.	0.0221	2	0.00	0.00	0.0210	2	0.00	0.00	0.0113	2	0.00	0.00
381	n.s.	n.s.	n.s.	n.s.	0.0229	2	0.00	0.00	0.0221	2	0.00	0.00	0.0229	2	0.00	0.00
382	n.s.	n.s.	n.s.	n.s.	0.0338	3	0.00	0.00	0.0461	4	0.00	0.00	0.0229	3	0.00	0.00
721	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.03	0.05	0.0221	2	0.75	1.06	0.0203	2	0.00	0.00
722	n.s.	n.s.	n.s.	n.s.	0.0206	2	0.00	0.00	0.0214	2	0.00	0.00	0.0101	2	0.00	0.00
723	n.s.	n.s.	n.s.	n.s.	0.0109	1	0.00	-	0.0210	2	0.00	0.00	0.0233	2	0.00	0.00
724	0.0105	1	0.00	-	0.0203	2	0.00	0.00	0.0225	2	0.00	0.00	0.0206	2	0.00	0.00
725	0.0334	3	0.00	0.000	0.0225	2	0.00	0.00	0.0206	2	0.00	0.00	0.0086	1	0.00	-
726	0.0214	2	0.00	0.000	0.0218	2	0.00	0.00	n.s.	n.s.	n.s.	n.s.	0.0094	2	0.00	0.00
727	n.s.	n.s.	n.s.	n.s.	0.0210	2	0.00	0.00	0.0094	1	0.00	-	0.0233	2	0.00	0.00
728	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.00	0.0214	2	0.00	0.00	0.0206	2	0.00	0.00
752	n.s.	n.s.	n.s.	n.s.	0.0109	1	0.00	-	0.0218	2	0.00	0.00	0.0229	2	0.00	0.00
753	n.s.	n.s.	n.s.	n.s.	0.0199	2	0.00	0.00	0.0214	2	0.00	0.00	0.0218	2	0.00	0.00
754	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0330	3	0.00	0.00	0.0210	2	0.00	0.00
755	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0206	2	0.00	0.00
756	n.s.	n.s.	n.s.	n.s.	0.0210	2	0.00	0.00	0.0109	1	0.00	-	0.0225	2	0.00	0.00
757	n.s.	n.s.	n.s.	n.s.	0.0188	2	0.00	0.00	0.0304	3	0.00	0.00	0.0206	2	0.00	0.00
758	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.00	0.0105	2	0.00	0.00
759	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.00
760	n.s.	n.s.	n.s.	n.s.	0.0210	2	0.00	0.00	0.0105	1	0.00	-	0.0214	2	0.00	0.00
761	n.s.	n.s.	n.s.	n.s.	0.0199	2	0.00	0.00	0.0315	3	0.00	0.00	0.0206	2	0.00	0.00
762	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.00	0.00	0.0094	2	0.00	0.00
763	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.00
764	n.s.	n.s.	n.s.	n.s.	0.0210	2	0.00	0.00	0.0206	2	0.00	0.00	0.0218	2	0.00	0.00
765	n.s.	n.s.	n.s.	n.s.	0.0199	2	0.00	0.00	0.0206	2	0.00	0.00	0.0098	2	0.00	0.00
766	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0308	3	0.00	0.00	0.0191	2	0.00	0.00
767	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0109	2	0.00	0.00

$$SD = \frac{\sum \left(x_i - \bar{x} \right)^2}{n-1}$$

TABLE 7 (cont.).- Swept area, number of hauls and Yellowtail flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1995-2006. Swept area in square miles. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

	1999				2000				2001				2002			
Stratum	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD
353	0.0360	3	150.18	182.44	0.0356	3	67.87	91.37	0.0341	3	61.42	102.797	0.0476	4	75.13	88.259
354	0.0218	2	0.08	0.12	0.0356	3	1.79	1.93	0.0338	3	0.34	0.322	0.0356	3	0.17	0.289
355	0.0229	2	0.00	0.00	0.0233	2	0.00	0.00	0.0240	2	0.00	0.000	0.0236	2	0.00	0.000
356	0.0229	2	0.00	0.00	0.0225	2	0.00	0.00	0.0240	2	0.01	0.007	0.0233	2	0.00	0.000
357	0.0236	2	0.00	0.00	0.0124	1	0.00	-	0.0244	2	0.00	0.000	0.0240	2	0.00	0.000
358	0.0349	3	0.00	0.00	0.0341	3	0.00	0.00	0.0345	3	0.00	0.000	0.0345	3	0.00	0.000
359	0.0364	3	0.34	0.47	0.0469	4	2.36	2.93	0.0803	7	1.42	2.836	0.0686	6	0.11	0.261
360	0.2325	19	545.18	424.37	0.2396	20	391.18	331.64	0.2423	20	536.80	488.657	0.2865	25	340.23	356.687
374	0.0244	2	74.16	103.18	0.0240	2	20.47	23.55	0.0240	2	238.75	111.369	0.0345	3	32.04	52.542
375	0.0236	2	347.15	168.25	0.0244	2	153.36	2.06	0.0338	3	100.33	68.319	0.0353	3	48.61	68.927
376	0.1219	10	551.60	165.61	0.1200	10	435.27	236.60	0.1155	10	443.12	196.619	0.1140	10	533.62	416.745
377	0.0240	2	0.00	0.00	0.0229	2	0.05	0.06	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
378	0.0229	2	0.00	0.00	0.0233	2	0.00	0.00	0.0236	2	0.00	0.000	0.0233	2	0.00	0.000
379	0.0236	2	0.00	0.00	0.0225	2	0.00	0.00	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
380	0.0236	2	0.00	0.00	0.0236	2	0.00	0.00	0.0206	2	0.00	0.000	0.0225	2	0.00	0.000
381	0.0229	2	0.00	0.00	0.0236	2	0.00	0.00	0.0236	2	0.00	0.000	0.0229	2	0.00	0.000
382	0.0484	4	0.00	0.00	0.0499	4	0.00	0.00	0.0469	4	0.02	0.030	0.0341	3	0.00	0.000
721	0.0244	2	0.00	0.00	0.0236	2	0.00	0.00	0.0248	2	0.00	0.000	0.0233	2	0.00	0.000
722	0.0229	2	0.00	0.00	0.0218	2	0.00	0.00	0.0233	2	0.00	0.000	0.0236	2	0.00	0.000
723	0.0229	2	0.00	0.00	0.0248	2	0.00	0.00	0.0240	2	0.00	0.000	0.0233	2	0.00	0.000
724	0.0225	2	0.00	0.00	0.0233	2	0.00	0.00	0.0353	3	0.00	0.000	0.0225	2	0.00	0.000
725	0.0229	2	0.00	0.00	0.0210	2	0.00	0.00	0.0116	2	0.00	0.000	0.0225	2	0.00	0.000
726	0.0225	2	0.00	0.00	0.0221	2	0.00	0.00	0.0116	2	0.00	0.000	0.0214	2	0.00	0.000
727	0.0236	2	0.00	0.00	0.0210	2	0.00	0.00	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
728	0.0233	2	0.00	0.00	0.0210	2	0.00	0.00	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
752	0.0233	2	0.00	0.00	0.0206	2	0.00	0.00	0.0210	2	0.06	0.083	0.0116	1	0.00	-
753	0.0229	2	0.00	0.00	0.0218	2	0.00	0.00	0.0214	2	0.00	0.000	0.0229	2	0.00	0.000
754	0.0206	2	0.00	0.00	0.0195	2	0.00	0.00	0.0195	2	0.00	0.000	0.0341	3	0.00	0.000
755	0.0311	3	0.00	0.00	0.0431	4	0.00	0.00	0.0416	4	0.00	0.000	0.0338	3	0.00	0.000
756	0.0225	2	0.00	0.00	0.0203	2	0.00	0.00	0.0113	2	0.00	0.000	0.0229	2	0.00	0.000
757	0.0233	2	0.00	0.00	0.0214	2	0.00	0.00	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
758	0.0214	2	0.00	0.00	0.0210	2	0.00	0.00	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0218	2	0.00	0.00	0.0210	2	0.00	0.00	0.0221	2	0.00	0.000	0.0225	2	0.00	0.000
760	0.0225	2	0.00	0.00	0.0210	2	0.00	0.00	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
761	0.0210	2	0.00	0.00	0.0221	2	0.00	0.00	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
762	0.0210	2	0.00	0.00	0.0203	2	0.00	0.00	0.0116	2	0.00	0.000	0.0225	2	0.00	0.000
763	0.0311	3	0.00	0.00	0.0416	4	0.00	0.00	0.0330	3	0.00	0.000	0.0225	2	0.00	0.000
764	0.0225	2	0.00	0.00	0.0218	2	0.00	0.00	0.0240	2	0.00	0.000	0.0236	2	0.00	0.000
765	0.0221	2	0.00	0.00	0.0203	2	0.00	0.00	0.0113	2	0.00	0.000	0.0236	2	0.00	0.000
766	0.0218	2	0.00	0.00	0.0214	2	0.00	0.00	0.0203	2	0.00	0.000	0.0233	2	0.00	0.000
767	0.0214	2	0.00	0.00	0.0210	2	0.00	0.00	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000

$$SD = \frac{\sum \left(x_i - \bar{x} \right)^2}{n-1}$$

TABLE 7 (cont.).- Swept area, number of hauls and Yellowtail flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1995-2006. Swept area in square miles. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2003				2004				2005				2006			
Stratum	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD	Swept area	Tow number	Y. flounder Mean catch	Y. flounder SD
353	0.0334	3	11.15	19.307	0.0338	3	8.79	14.005	0.0353	3	58.83	99.610	0.0371	3	71.98	122.954
354	0.0338	3	0.00	0.000	0.0345	3	0.62	1.065	0.0353	3	0.21	0.188	0.0364	3	0.21	0.371
355	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0248	2	0.00	0.000
356	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0233	2	0.00	0.000	0.0240	2	0.00	0.000
357	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0233	2	0.00	0.000	0.0244	2	0.00	0.000
358	0.0338	3	0.00	0.000	0.0330	3	0.26	0.442	0.0349	3	0.00	0.000	0.0349	3	0.00	0.000
359	0.0791	7	0.00	0.000	0.0791	7	25.01	38.371	0.0814	7	99.52	142.727	0.0975	8	169.33	359.779
360	0.2254	20	360.55	298.992	0.2310	20	403.19	333.463	0.2325	20	342.14	223.566	0.2340	19	361.02	266.205
374	0.0225	2	16.13	8.238	0.0233	2	193.46	225.058	0.0229	2	300.46	128.092	0.0236	2	610.03	73.518
375	0.0330	3	28.45	35.557	0.0338	3	543.04	155.015	0.0349	3	288.64	138.290	0.0364	3	287.65	109.715
376	0.1125	10	391.60	257.289	0.1166	10	481.06	140.810	0.1174	10	500.53	238.908	0.1219	10	489.81	231.495
377	0.0225	2	0.70	0.990	0.0218	2	0.00	0.000	0.0233	2	42.84	60.518	0.0236	2	6.09	8.605
378	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0240	2	0.00	0.000
379	0.0229	2	0.00	0.000	0.0124	1	0.00	-	0.0236	2	0.00	0.000	0.0236	2	0.00	0.000
380	0.0229	2	0.00	0.000	0.0221	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
381	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000
382	0.0454	4	0.00	0.000	0.0461	4	0.00	0.000	0.0458	4	0.00	0.000	0.0469	4	0.00	0.000
721	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000
722	0.0221	2	0.00	0.000	0.0218	2	0.00	0.000	0.0233	2	0.00	0.000	0.0240	2	0.00	0.000
723	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0233	2	0.00	0.000	0.0236	2	0.18	0.247
724	0.0225	2	0.52	0.735	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
725	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0236	2	0.00	0.000	0.0233	2	0.00	0.000
726	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0113	1	0.00	-	0.0225	2	0.00	0.000
727	0.0218	2	0.00	0.000	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
728	0.0225	2	0.00	0.000	0.0180	2	0.00	0.000	0.0109	1	0.00	-	0.0225	2	0.00	0.000
752	0.0229	2	0.00	0.000	0.0214	2	0.00	0.000	0.0236	2	0.00	0.000	0.0225	2	0.00	0.000
753	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
754	0.0218	2	0.00	0.000	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
755	0.0221	2	0.00	0.000	0.0319	3	0.00	0.000	0.0450	4	0.00	0.000	0.0338	3	0.00	0.000
756	0.0221	2	0.00	0.000	0.0218	2	0.00	0.000	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000
757	0.0221	2	0.00	0.000	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
758	0.0221	2	0.00	0.000	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0113	1	0.00	-	0.0214	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
760	0.0218	2	0.00	0.000	0.0221	2	0.00	0.000	0.0229	2	0.35	0.488	0.0225	2	0.00	0.000
761	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0221	2	0.00	0.000	0.0233	2	0.00	0.000
762	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
763	0.0311	3	0.00	0.000	0.0326	3	0.00	0.000	0.0334	3	0.00	0.000	0.0225	2	0.00	0.000
764	0.0221	2	0.00	0.000	0.0229	2	0.00	0.000	0.0233	2	0.00	0.000	0.0233	2	0.00	0.000
765	0.0113	1	0.00	-	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000
766	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
767	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000	0.0113	1	0.00	-	0.0233	2	0.00	0.000

TABLE 8.- Stratified mean catches (Kg) by stratum and year and SD by year of Yellowtail flounder (1995-2006). n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

Stratum	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
353	1565.07	20142.03	3376.59	3288.11	40399.20	18255.85	16521.08	20208.63	2998.45	2364.96	15825.27	19363.88
354	438.70	0.00	346.30	299.00	20.56	439.52	83.64	41.00	0.00	151.29	52.07	52.64
355	n.s.	0.00	163.06	9.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
356	n.s.	0.00	15.24	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00
357	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
358	0.00	30.09	4.21	0.00	0.00	0.00	0.00	0.00	0.00	57.45	0.00	0.00
359	567.78	385.71	34.00	72.73	143.12	994.90	597.82	44.91	0.00	10527.59	41896.12	71289.88
360	56884.98	395448.50	225203.35	1040562.34	1517232.56	1088647.76	1493908.83	946847.84	1003413.43	1122077.77	952164.35	1004707.97
374	0.00	0.00	0.00	9.54	15871.12	4379.59	51092.50	6856.85	3450.75	41400.44	64297.37	130545.35
375	401.88	11218.18	54.37	3352.77	94076.82	41560.71	27190.33	13173.31	7709.95	147164.74	78220.54	77952.61
376	46774.78	95247.02	216576.13	372549.36	735836.39	580653.95	591126.08	711849.08	522389.06	641736.71	667712.36	653412.94
377	0.00	0.00	0.00	0.00	0.00	4.51	0.00	0.00	70.00	0.00	4283.75	608.50
378	0.00	7.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
381	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
382	n.s.	0.00	0.00	0.00	0.00	0.00	5.16	0.00	0.00	0.00	0.00	0.00
721	n.s.	2.17	48.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
722	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
723	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.13
724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.48	0.00	0.00	0.00
725	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
726	0.00	0.00	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
727	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
728	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
752	n.s.	0.00	0.00	0.00	0.00	0.00	7.67	0.00	0.00	0.00	0.00	0.00
753	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
754	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.13	0.00
761	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
762	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
763	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
765	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
766	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
767	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	106633.19	522481.47	445822.16	1420143.19	2403579.77	1734936.80	2180533.35	1699021.61	1540096.13	1965480.95	1824504.95	1957960.89
$(\bar{Y})$	16.22	59.54	47.74	137.32	232.41	167.76	210.84	164.28	148.92	190.05	176.42	189.32
S.D.	4.37	8.41	10.69	34.70	27.41	22.21	30.58	24.92	20.84	21.27	17.06	19.83

TABLE 9.- Survey estimates (by the swept area method) of Yellowtail flounder biomass (t) and SD by stratum and year on NAFO Div. 3NO. n.s. means stratum not surveyed. 1995-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

Stratum	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
353	133	1628	281	282	3367	1537	1452	1697	270	210	1347	1565
354	37	26	30	25	2	37	7	3	0	13	4	4
355	n.s.	2	14	0	0	0	0	0	0	0	0	0
356	n.s.	0	1	0	0	0	0	0	0	0	0	0
357	0	0	0	0	0	0	0	0	0	0	0	0
358	0	3	0	0	0	0	0	0	0	5	0	0
359	49	35	3	6	12	85	52	4	0	931	3604	5849
360	4950	32593	19198	89742	123989	90863	123341	82622	89057	97150	81907	81579
374	0	0	0	0	1302	365	4258	596	307	3561	5622	11051
375	36	981	5	291	7964	3410	2417	1121	701	13081	6729	6429
376	4059	8082	19160	32255	60376	48388	51175	62443	46435	55026	56887	53613
377	0	0	0	0	0	0	0	0	6	0	368	52
378	0	1	0	0	0	0	0	0	0	0	0	0
379	0	0	0	0	0	0	0	0	0	0	0	0
380	n.s.	0	0	0	0	0	0	0	0	0	0	0
381	n.s.	0	0	0	0	0	0	0	0	0	0	0
382	n.s.	0	0	0	0	0	0	0	0	0	0	0
721	n.s.	0	4	0	0	0	0	0	0	0	0	0
722	n.s.	0	0	0	0	0	0	0	0	0	0	0
723	n.s.	0	0	0	0	0	0	0	0	0	0	2
724	0	0	0	0	0	0	0	0	0	0	0	0
725	0	0	0	0	0	0	0	0	0	0	0	0
726	0	0	n.s.	0	0	0	0	0	0	0	0	0
727	n.s.	0	0	0	0	0	0	0	0	0	0	0
728	n.s.	0	0	0	0	0	0	0	0	0	0	0
752	n.s.	0	0	0	0	0	1	0	0	0	0	0
753	n.s.	0	0	0	0	0	0	0	0	0	0	0
754	n.s.	n.s.	0	0	0	0	0	0	0	0	0	0
755	n.s.	n.s.	n.s.	0	0	0	0	0	0	0	0	0
756	n.s.	0	0	0	0	0	0	0	0	0	0	0
757	n.s.	0	0	0	0	0	0	0	0	0	0	0
758	n.s.	n.s.	0	0	0	0	0	0	0	0	0	0
759	n.s.	n.s.	n.s.	0	0	0	0	0	0	0	0	0
760	n.s.	0	0	0	0	0	0	0	0	0	5	0
761	n.s.	0	0	0	0	0	0	0	0	0	0	0
762	n.s.	n.s.	0	0	0	0	0	0	0	0	0	0
763	n.s.	n.s.	n.s.	0	0	0	0	0	0	0	0	0
764	n.s.	0	0	0	0	0	0	0	0	0	0	0
765	n.s.	0	0	0	0	0	0	0	0	0	0	0
766	n.s.	n.s.	0	0	0	0	0	0	0	0	0	0
767	n.s.	n.s.	n.s.	0	0	0	0	0	0	0	0	0
TOTAL	9264	43349	38697	122601	197012	144685	182704	148487	136775	169978	156472	160145
S.D.	2484	6032	8527	31359	22938	19097	25847	23368	19287	18869	15271	16458

TABLE 10.- Length weight relationships in the calculation of Yellowtail flounder biomass. The equation is $Weight = a(l + 0.5)^b$ Spanish Spring Surveys on NAFO Div. 3NO: 1995-2006. To calculate the parameters for the indeterminate individuals, we used the total data (males + females + indeterminate individuals)

		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Males	a	0.0079	0.0080	0.0081	0.0075	0.0084	0.0036	0.0081	0.0075	0.0121	0.0053	0.0027	0.0096
		Error = 0.2653	Error = 0.0907	Error = 0.0936	Error = 0.1034	Error = 0.2119	Error = 0.0994	Error = 0.1248	Error = 0.0729	Error = 0.1109	Error = 0.1352	Error = 0.0882	Error = 0.0825
	b	3.0416	3.0342	3.0197	3.0376	3.0098	3.2403	3.0176	3.0271	2.8978	3.1236	3.3274	2.9463
		Error = 0.0799	Error = 0.0269	Error = 0.0281	Error = 0.0313	Error = 0.0610	Error = 0.0300	Error = 0.0374	Error = 0.0226	Error = 0.0348	Error = 0.0419	Error = 0.0274	Error = 0.0263
		R2 = 0.984	R2 = 0.998	R2 = 0.997	R2 = 0.997	R2 = 0.994	R2 = 0.997	R2 = 0.995	R2 = 0.998	R2 = 0.995	R2 = 0.995	R2 = 0.997	R2 = 0.999
		N=137	N=430	N=556	N=523	N=56	N=270	N=271	N=274	N=316	N=411	N=311	N=371
Females	a	0.0063	0.0056	0.0056	0.0067	0.0073	0.0026	0.0060	0.0051	0.0061	0.0047	0.0027	0.0069
		Error = 0.1251	Error = 0.0632	Error = 0.0517	Error = 0.1290	Error = 0.2607	Error = 0.0914	Error = 0.0841	Error = 0.0901	Error = 0.0995	Error = 0.0630	Error = 0.0634	Error = 0.1137
	b	3.1083	3.1496	3.1382	3.0788	3.0577	3.3504	3.1122	3.1448	3.1079	3.1768	3.3290	3.0584
		Error = 0.0367	Error = 0.0179	Error = 0.0152	Error = 0.0384	Error = 0.0739	Error = 0.0267	Error = 0.0249	Error = 0.0274	Error = 0.0307	Error = 0.0191	Error = 0.0177	Error = 0.0.347
		R2 = 0.995	R2 = 0.999	R2 = 0.999	R2 = 0.994	R2 = 0.989	R2 = 0.998	R2 = 0.997	R2 = 0.997	R2 = 0.996	R2 = 0.999	R2 = 0.998	R2 = 0.997
		N=246	N=735	N=910	N=682	N=62	N=344	N=378	N=343	N=513	N=547	N=569	N=507
Indet.	a	0.0088	0.0060	0.0060	0.0071	0.0078	0.0026	0.0092	0.0060	0.0069	0.0040	0.0025	0.0102
		Error = 0.1109	Error = 0.0656	Error = 0.0580	Error = 0.0652	Error = 0.1656	Error = 0.0835	Error = 0.1075	Error = 0.0402	Error = 0.1095	Error = 0.0608	Error = 0.0523	Error = 0.1453
	b	3.0144	3.1285	3.1166	3.0614	3.0406	3.3423	2.9883	3.0977	3.0737	3.2137	3.3552	2.9471
		Error = 0.0330	Error = 0.0188	Error = 0.0171	Error = 0.0195	Error = 0.0477	Error = 0.0245	Error = 0.0329	Error = 0.0123	Error = 0.0337	Error = 0.0186	Error = 0.0148	Error = 0.0448
		R2 = 0.996	R2 = 0.999	R2 = 0.999	R2 = 0.994	R2 = 0.995	R2 = 0.999	R2 = 0.994	R2 = 0.999	R2 = 0.995	R2 = 0.999	R2 = 0.999	R2 = 0.995
		N=391	N=1181	N=1466	N=1211	N=118	N=614	N=703	N=620	N=833	N=969	N=884	N=887

TABLE 11.- Yellowtail flounder length distribution. Estimated numbers per haul mean catches. Spanish Spring Survey on NAFO 3NO: 1995-2006. Indet. means indeterminate. 1995-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	1995				1996				1997				1998			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.185	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.456	0.456	0.000	0.000	0.498	0.498	0.000	0.000	0.000	0.000	0.000	0.000	0.071	0.071
12	0.103	0.870	2.350	3.323	0.000	0.000	0.877	0.877	1.356	0.560	0.000	1.916	0.000	0.000	1.538	1.538
14	1.557	1.441	2.842	5.840	0.000	0.048	2.711	2.759	0.155	0.819	0.000	0.974	0.121	0.157	0.000	0.278
16	2.045	3.581	0.277	5.903	0.288	3.152	5.167	8.607	2.947	1.811	0.000	4.758	1.500	1.535	0.000	3.034
18	2.649	3.358	0.031	6.038	2.334	15.279	3.167	20.780	5.076	4.415	0.000	9.491	8.365	5.129	0.000	13.495
20	2.984	3.212	0.000	6.196	5.319	26.981	0.750	33.050	13.857	15.055	0.000	28.912	8.974	10.166	0.000	19.140
22	4.807	6.015	0.000	10.823	8.522	32.231	0.065	40.818	28.296	23.048	0.000	51.345	25.957	20.452	0.000	46.409
24	4.810	6.082	0.000	10.892	10.962	32.203	0.000	43.165	31.348	27.786	0.000	59.134	44.950	37.421	0.000	82.371
26	2.340	2.446	0.000	4.786	9.552	16.875	0.000	26.427	24.015	26.970	0.000	50.985	72.376	60.520	0.000	132.896
28	2.704	2.544	0.000	5.248	9.151	11.591	0.000	20.742	13.921	21.248	0.000	35.169	57.459	62.401	0.000	119.861
30	2.588	4.738	0.000	7.325	7.206	9.915	0.000	17.122	6.159	10.349	0.000	16.508	32.472	56.275	0.000	88.747
32	1.664	4.451	0.000	6.115	6.379	6.166	0.000	12.545	3.761	5.090	0.000	8.851	15.566	32.294	0.000	47.859
34	1.290	3.070	0.000	4.361	5.565	6.928	0.000	12.493	1.894	2.803	0.000	4.698	5.840	22.613	0.000	28.453
36	0.661	1.797	0.000	2.459	4.143	9.508	0.000	13.651	1.195	2.683	0.000	3.878	2.638	12.385	0.000	15.023
38	0.475	1.395	0.000	1.870	2.083	6.687	0.000	8.771	0.485	2.407	0.000	2.892	2.475	8.439	0.000	10.914
40	0.373	0.937	0.000	1.310	0.724	5.018	0.000	5.742	0.245	1.723	0.000	1.968	1.060	7.705	0.000	8.765
42	0.059	0.588	0.000	0.647	0.694	3.305	0.000	4.000	0.099	0.801	0.000	0.899	0.065	3.260	0.000	3.324
44	0.004	0.471	0.000	0.475	0.087	1.550	0.000	1.637	0.031	0.281	0.000	0.311	0.008	1.729	0.000	1.737
46	0.004	0.081	0.000	0.085	0.081	0.969	0.000	1.050	0.006	0.044	0.000	0.049	0.000	0.600	0.000	0.600
48	0.000	0.191	0.000	0.191	0.018	0.286	0.000	0.304	0.000	0.052	0.000	0.052	0.004	0.273	0.000	0.277
50	0.000	0.027	0.000	0.027	0.000	0.045	0.000	0.045	0.000	0.018	0.000	0.018	0.000	0.000	0.000	0.000
52	0.000	0.052	0.000	0.052	0.000	0.053	0.000	0.053	0.000	0.018	0.000	0.018	0.000	0.000	0.000	0.000
54	0.000	0.005	0.000	0.005	0.000	0.039	0.000	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	0.000	0.005	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	31.117	47.358	6.141	84.616	73.109	188.829	13.235	275.173	134.845	147.982	0.000	282.827	279.828	343.354	1.609	624.791
Nº samples (*):				43				33				54				48
Nº Ind. (*):	1876	3003	81	4960	1837	4584	249	6670	3635	4469	0	8104	2848	3693	3	6544
Sampled catch:				375				532				585				536
Range (*):				9-56				10-55				12-53				11-49
Total catch:				2731				5721				4956				12231
Total hauls (*):				77				112				128				124

TABLE 11 (cont.).- Yellowtail flounder length distribution. Estimated numbers per haul mean catches. Spanish Spring Survey on NAFO 3NO: 1995-2006. Indet. means indeterminate. 1995-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	1999				2000				2001				2002			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.325	0.325	0.000	0.141	0.475	0.616
8	0.000	0.000	1.516	1.516	0.000	0.000	0.000	0.000	0.000	0.000	1.937	1.937	0.349	0.639	0.332	1.321
10	5.154	3.352	2.960	11.465	0.000	0.793	0.000	0.793	0.104	0.356	1.850	2.310	1.315	0.712	0.000	2.027
12	12.807	8.911	0.000	21.718	3.716	1.266	0.000	4.982	0.320	1.239	1.187	2.746	0.620	0.675	0.000	1.295
14	19.227	16.710	0.000	35.938	7.773	11.915	0.000	19.687	0.952	1.477	1.114	3.543	1.544	1.064	0.000	2.608
16	13.999	15.356	0.000	29.355	10.311	10.506	0.000	20.817	3.575	4.509	0.412	8.497	1.889	2.134	0.000	4.023
18	8.893	10.757	0.000	19.650	14.266	16.475	0.000	30.741	10.107	10.530	0.149	20.786	3.180	2.479	0.000	5.660
20	14.809	10.199	0.000	25.008	16.177	19.576	0.000	35.753	17.815	24.898	0.000	42.713	7.908	6.122	0.000	14.030
22	33.285	22.789	0.000	56.073	17.231	18.660	0.000	35.891	21.299	29.178	0.000	50.477	16.552	12.664	0.000	29.217
24	61.756	39.009	0.000	100.765	21.395	20.983	0.000	42.378	24.254	23.840	0.000	48.094	21.724	22.245	0.000	43.968
26	98.561	59.521	0.000	158.083	48.000	33.100	0.000	81.100	28.911	24.809	0.000	53.720	27.246	24.307	0.000	51.553
28	107.816	84.193	0.000	192.009	67.229	39.182	0.000	106.412	58.237	33.305	0.000	91.542	40.151	22.443	0.000	62.594
30	72.947	92.236	0.000	165.183	64.336	44.684	0.000	109.020	72.412	45.107	0.000	117.519	57.549	34.445	0.000	91.994
32	28.850	75.169	0.000	104.018	36.450	53.416	0.000	89.865	49.179	59.052	0.000	108.232	46.938	50.680	0.000	97.618
34	15.810	43.595	0.000	59.405	12.695	39.970	0.000	52.665	22.267	64.772	0.000	87.039	18.047	57.599	0.000	75.646
36	9.185	24.775	0.000	33.960	6.653	25.712	0.000	32.365	8.702	46.598	0.000	55.300	7.014	45.699	0.000	52.713
38	3.658	14.964	0.000	18.623	3.526	15.747	0.000	19.274	6.293	30.315	0.000	36.608	2.651	25.514	0.000	28.165
40	1.466	8.582	0.000	10.049	1.996	10.642	0.000	12.638	2.145	12.925	0.000	15.070	1.183	12.427	0.000	13.610
42	0.262	5.318	0.000	5.580	0.286	6.803	0.000	7.089	0.857	7.788	0.000	8.645	0.616	6.257	0.000	6.873
44	0.111	2.620	0.000	2.731	0.013	4.005	0.000	4.018	0.614	4.596	0.000	5.210	0.042	2.690	0.000	2.732
46	0.028	0.988	0.000	1.016	0.000	1.806	0.000	1.806	0.221	1.968	0.000	2.190	0.024	1.150	0.000	1.174
48	0.096	0.486	0.000	0.582	0.003	0.845	0.000	0.848	0.000	0.775	0.000	0.775	0.000	0.818	0.000	0.818
50	0.000	0.140	0.000	0.140	0.000	0.246	0.000	0.246	0.000	0.242	0.000	0.242	0.020	0.149	0.000	0.169
52	0.000	0.032	0.000	0.032	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.051	0.000	0.038	0.000	0.038
54	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	508.721	539.702	4.475	1052.898	332.057	376.364	0.000	708.421	328.265	428.326	6.975	763.567	256.565	333.090	0.807	590.462
Nº samples (*):				39				42				43				43
Nº Ind. (*):	4616	5076	6	9698	3323	4100	0	7423	3358	4684	80	8122	3419	4576	7	8002
Sampled catch:				796				717				2298				2269
Range (*):				8-52				11-54				6-53				6-52
Total catch:				17169				12742				16141				14385
Total hauls (*):				114				118				123				125

TABLE 11 (cont.).- Yellowtail flounder length distribution. Estimated numbers per haul mean catches. Spanish Spring Survey on NAFO 3NO: 1995-2006. Indet. means indeterminate. 1995-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2006 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	2003				2004				2005				2006			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
4	0.000	0.000	0.009	0.009	0.000	0.000	0.116	0.116	0.000	0.000	0.000	0.000	0.060	0.000	0.000	0.060
6	0.000	0.107	0.297	0.404	0.000	0.000	0.337	0.337	0.000	0.013	0.192	0.205	0.000	0.000	0.079	0.079
8	0.036	0.121	0.274	0.431	0.109	0.049	0.741	0.899	0.269	0.018	0.054	0.341	0.187	0.162	0.245	0.594
10	0.847	0.572	0.140	1.559	0.528	0.637	0.000	1.165	1.725	0.467	0.051	2.243	0.686	0.384	0.276	1.346
12	0.969	1.205	0.000	2.174	2.005	1.577	0.000	3.582	2.353	1.877	0.000	4.229	2.026	1.734	0.000	3.760
14	0.977	0.869	0.000	1.846	3.503	2.632	0.000	6.135	4.728	3.053	0.000	7.780	3.645	3.862	0.000	7.507
16	0.946	0.289	0.000	1.234	4.580	3.608	0.000	8.188	4.674	3.630	0.000	8.304	5.776	6.009	0.000	11.785
18	1.665	1.689	0.000	3.355	4.649	3.543	0.000	8.192	3.334	3.348	0.000	6.682	5.989	5.547	0.000	11.536
20	1.695	2.233	0.000	3.928	5.414	6.205	0.000	11.619	4.905	4.847	0.000	9.752	9.721	8.196	0.000	17.917
22	4.214	4.602	0.000	8.817	5.563	5.757	0.000	11.321	8.934	6.836	0.000	15.770	10.735	10.545	0.000	21.280
24	11.364	8.741	0.000	20.105	8.232	7.732	0.000	15.964	8.930	7.162	0.000	16.092	11.073	12.977	0.000	24.050
26	27.765	19.581	0.000	47.347	25.572	16.572	0.000	42.145	15.997	8.451	0.000	24.447	13.117	13.439	0.000	26.556
28	37.413	29.153	0.000	66.566	57.974	27.637	0.000	85.611	34.840	17.504	0.000	52.344	26.251	15.412	0.000	41.663
30	52.296	29.328	0.000	81.624	87.376	52.285	0.000	139.661	75.001	34.103	0.000	109.105	64.180	25.059	0.000	89.238
32	45.761	40.076	0.000	85.836	74.712	58.683	0.000	133.396	70.556	58.866	0.000	129.423	74.126	52.415	0.000	126.541
34	19.769	52.100	0.000	71.869	30.847	58.596	0.000	89.443	28.072	62.961	0.000	91.032	38.379	67.737	0.000	106.116
36	6.757	39.555	0.000	46.312	7.531	46.290	0.000	53.820	8.105	48.672	0.000	56.777	11.021	63.706	0.000	74.727
38	2.130	23.649	0.000	25.779	2.056	26.594	0.000	28.650	1.965	26.547	0.000	28.512	3.046	39.877	0.000	42.923
40	0.832	9.444	0.000	10.276	1.716	10.932	0.000	12.648	0.908	11.697	0.000	12.606	0.981	17.493	0.000	18.474
42	0.256	3.895	0.000	4.151	0.514	3.725	0.000	4.240	0.172	4.746	0.000	4.918	0.081	5.709	0.000	5.789
44	0.268	2.432	0.000	2.700	0.028	2.033	0.000	2.061	0.050	2.020	0.000	2.070	0.072	2.190	0.000	2.262
46	0.000	1.113	0.000	1.113	0.000	0.575	0.000	0.575	0.000	1.128	0.000	1.128	0.000	1.341	0.000	1.341
48	0.000	0.525	0.000	0.525	0.000	0.303	0.000	0.303	0.000	0.200	0.000	0.200	0.000	0.560	0.000	0.560
50	0.000	0.202	0.000	0.202	0.000	0.009	0.000	0.009	0.000	0.030	0.000	0.030	0.000	0.231	0.000	0.231
52	0.000	0.009	0.000	0.009	0.000	0.055	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.012
54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.079	0.000	0.079	0.000	0.091	0.000	0.091
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	215.959	271.489	0.721	488.169	322.910	336.032	1.193	660.136	275.518	308.254	0.297	584.069	281.150	354.688	0.601	636.440
Nº samples (*):				37				45				48				45
Nº Ind. (*):	2424	3254	12	5690	3703	4234	16	7953	4790	6556	6	11352	4404	6012	10	10426
Sampled catch:				1864				2587				3784				3407
Range (*):				5-52				5-53				6-55				5-54
Total catch:				11280				15117				14275				15424
Total hauls (*):				118				120				119				120

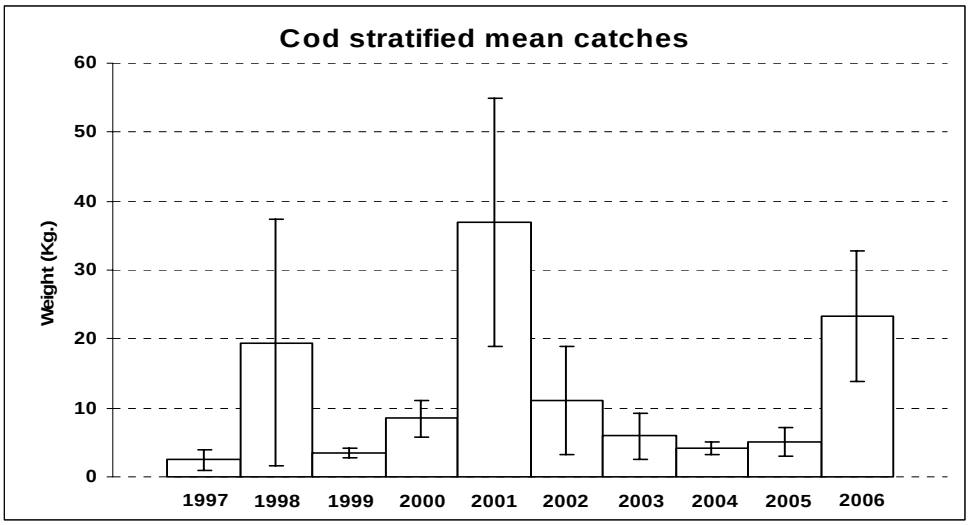

FIGURE 1.- Atlantic cod stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2006 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2006 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

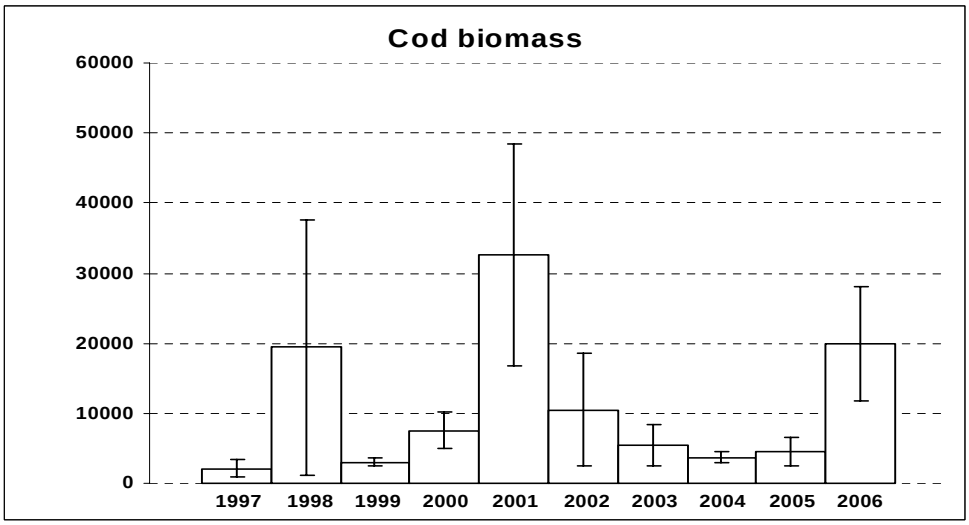

FIGURE 2.- Atlantic cod biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2006 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2006 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

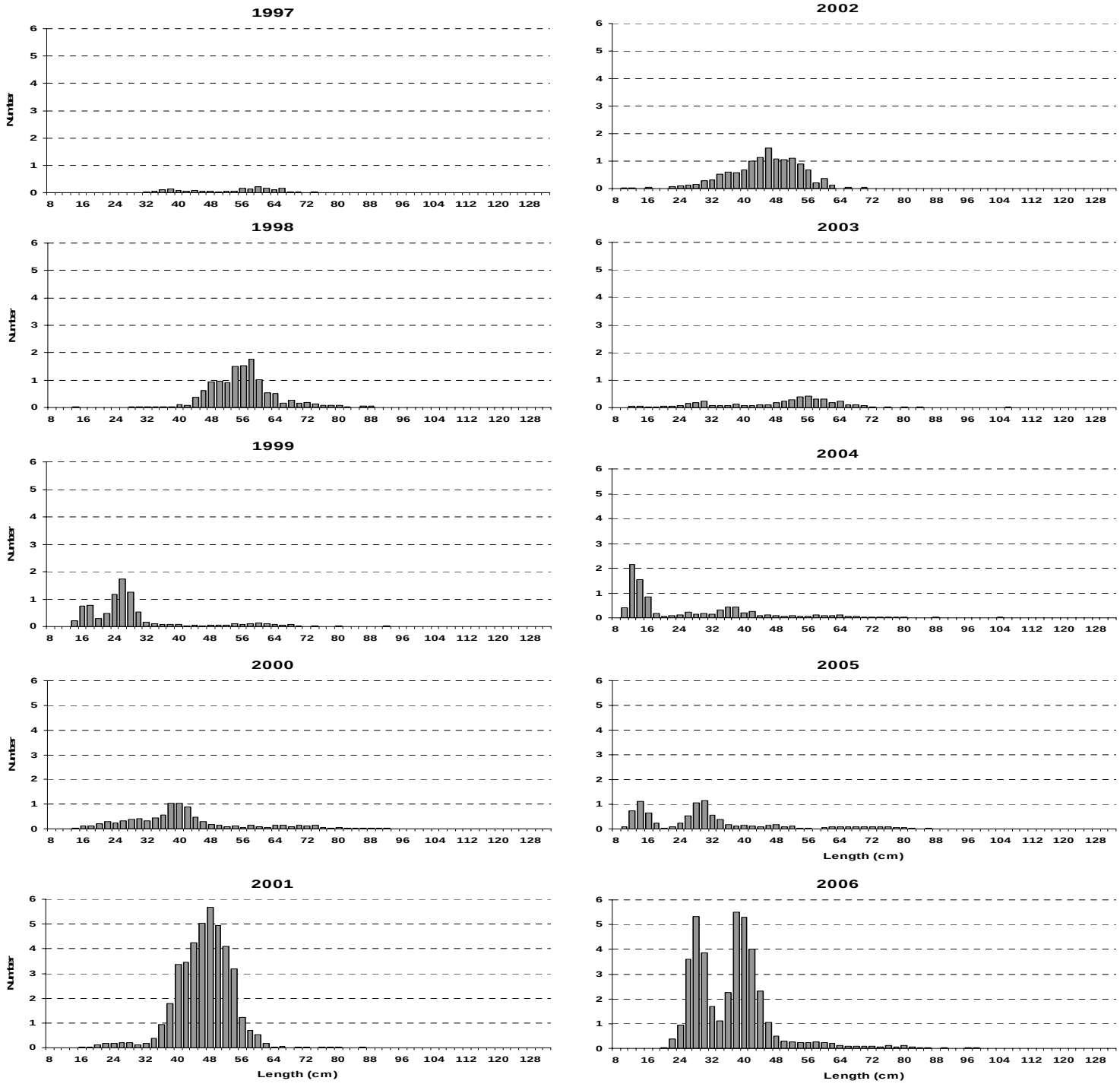

FIGURE 3.- Atlantic cod length distribution (cm) on NAFO 3NO: 1997-2006. Mean catches per tow numbers. 1997-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data form the two vessels.

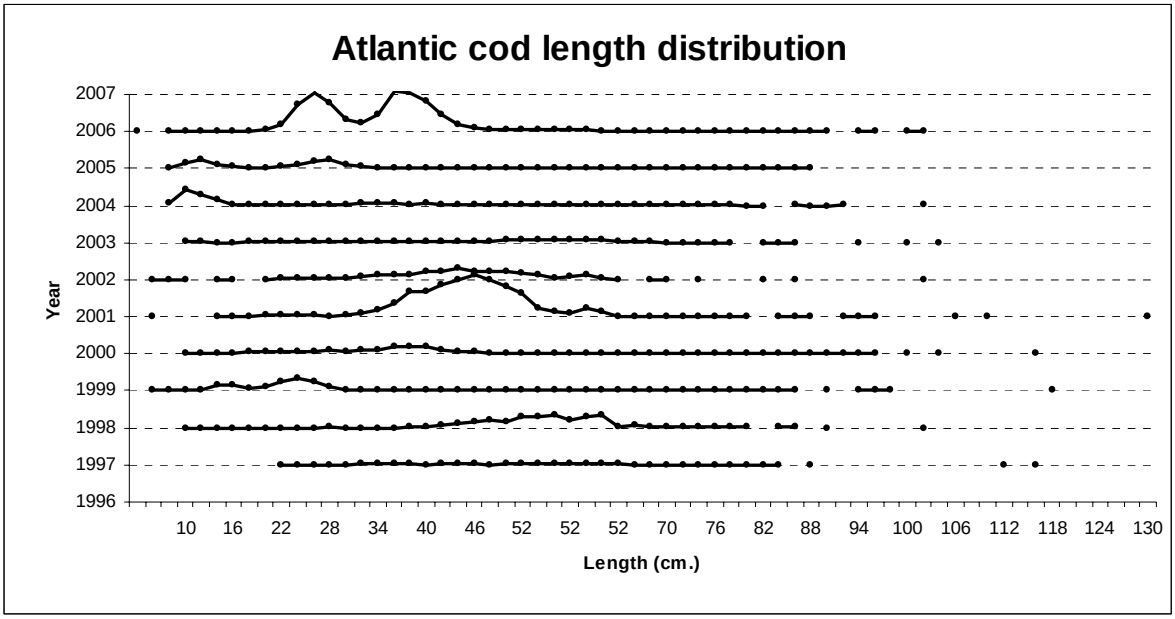

FIGURE 4.- Atlantic cod mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2006.

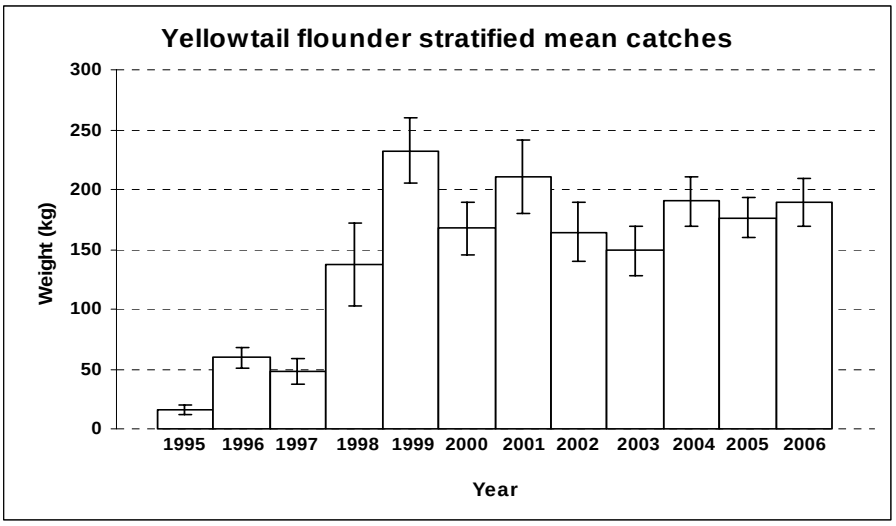

FIGURE 5.- Yellowtail flounder stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1995-2006 (1995-2000 transformed data from C/V *Playa de Menduíña*; 2002-2006 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

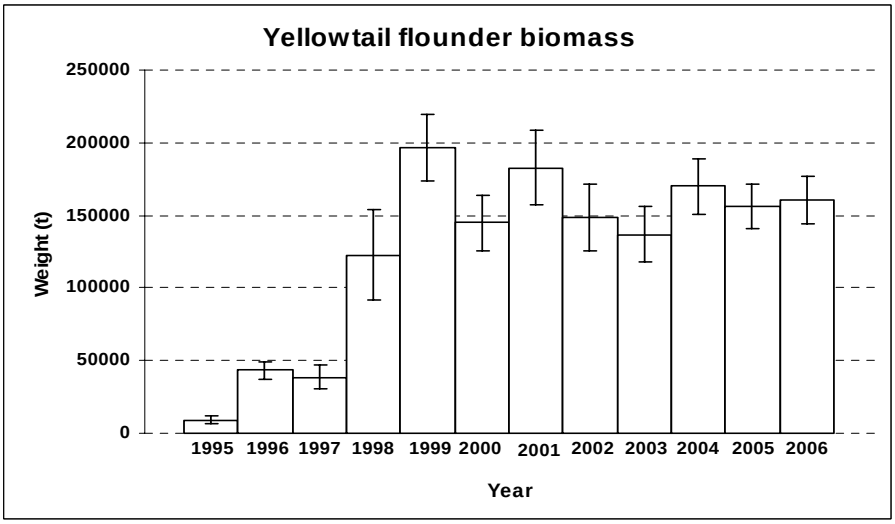

FIGURE 6.- Yellowtail flounder biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1995-2006 (1995-2000 transformed data from C/V *Playa de Menduíña*; 2002-2006 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

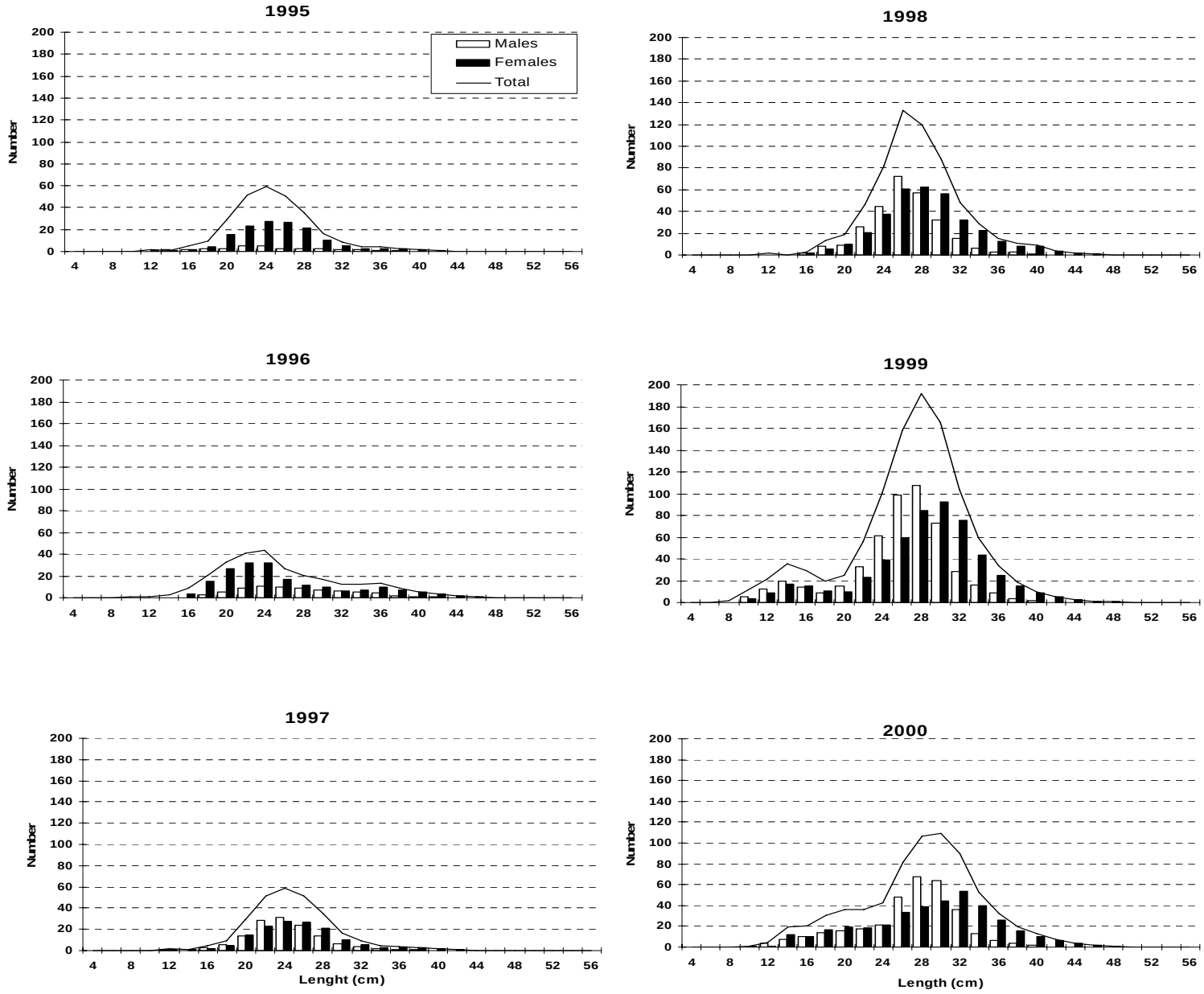

FIGURE 7.- Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2006. Mean catches per tow numbers. 1995-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2006 data are original from R/V *Vizconde de Eza.* In 2001, there are data from the two vessels

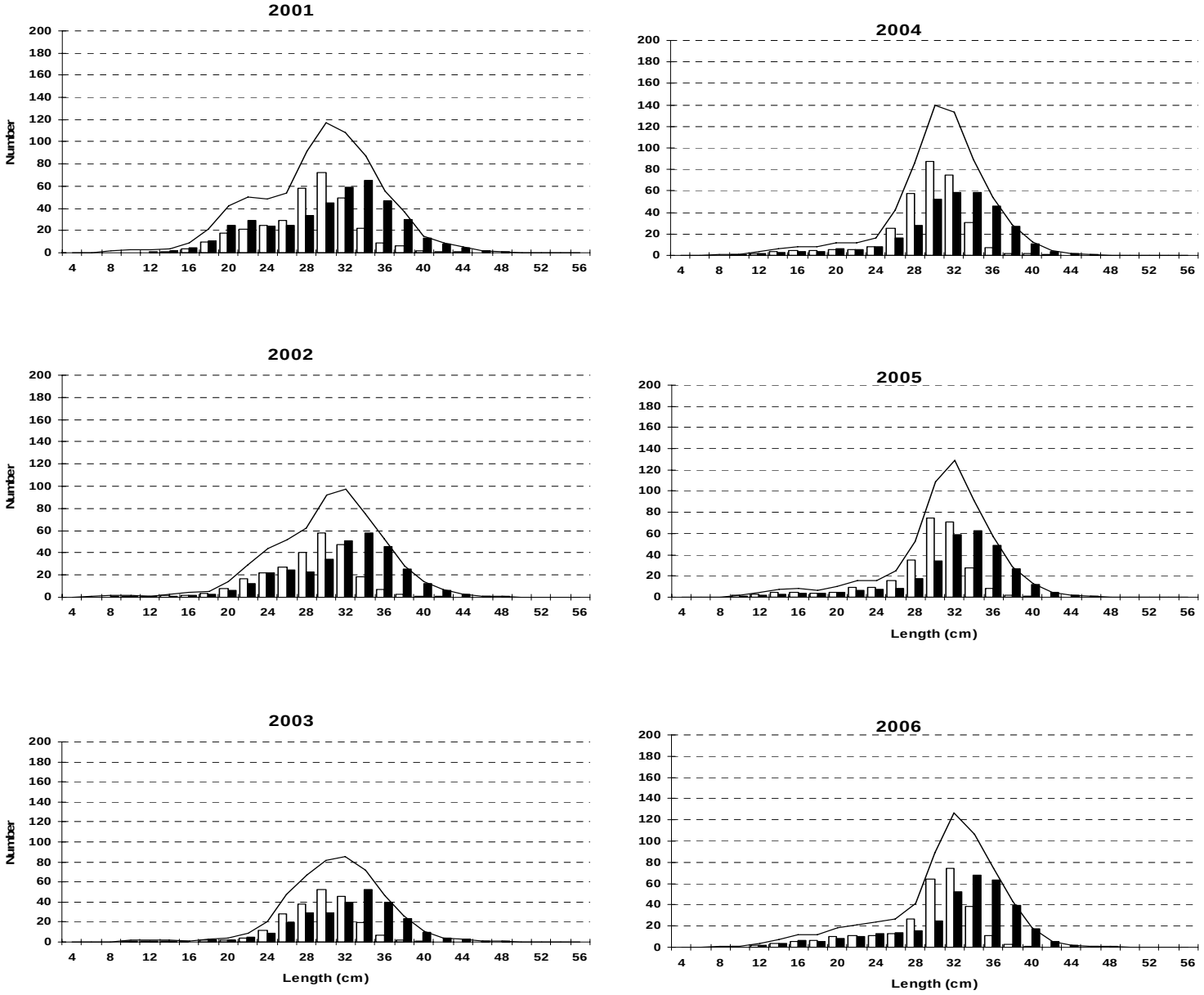

FIGURE 7 (Cont.).- Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2006. Mean catches per tow numbers. 1995-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2006 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels

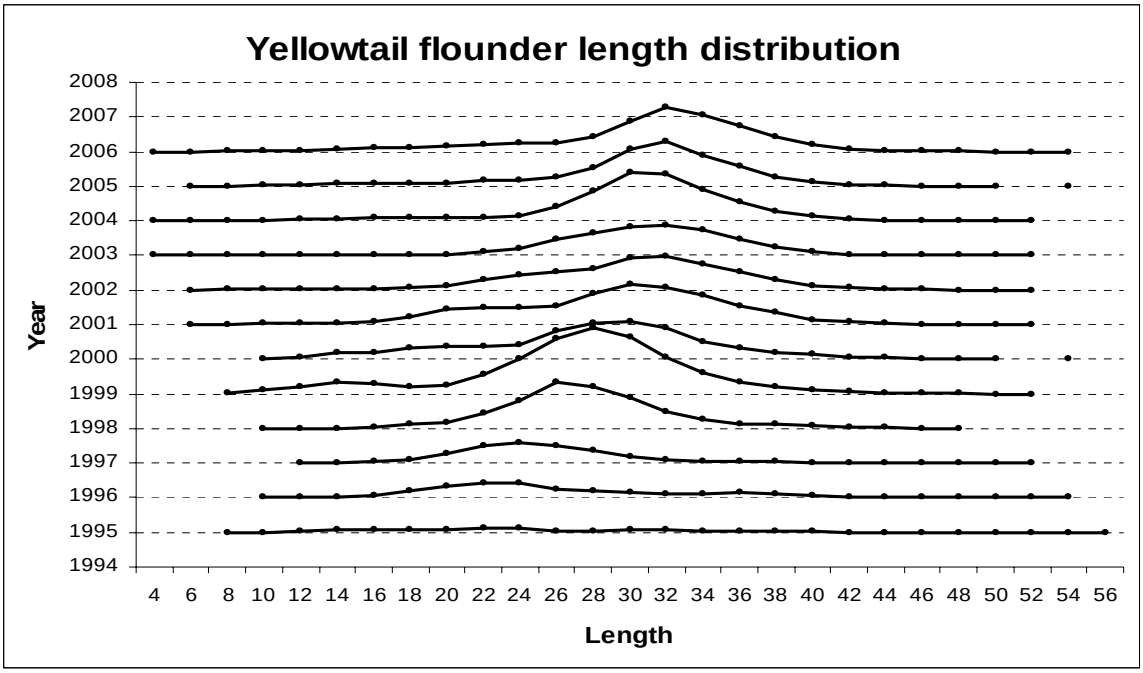

FIGURE 8.- Yellowtail flounder mean catches per tow length distribution (cm) on NAFO 3NO: 1995-2006.