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Biomass and length distribution for Roughhead grenadier, Thorny skate and White hake from the surveys conducted by Spain in NAFO 3NO

by

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Abstract

Data for Roughhead grenadier (*Macrourus berglax*), Thorny skate (*Amblyraja radiata*) and White hake (*Urophycis tenuis*) from Spanish Spring survey are presented. The survey vessel changed in 2001, from the C/V *Playa de Menduíña* to the R/V *Vizconde de Eza*, so, in order to maintain the historical series, we transformed the data for Roughhead grenadier and Thorny skate until that year. 1997-2000 data are transformed data from the C/V *Playa de Menduíña* and 2002-2007 data are original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels for these two species. The abundance and biomass were estimated for the period 1997-2007 for Roughhead grenadier and Thorny skate, and 2001-2007 for White hake. The length distribution was obtained and presented in numbers per haul stratified mean catches. The indices of Roughhead grenadier present no trend along the years until 2003, with an increase in the years 2003-2006, mainly in 2004. This year the biomass decreased under the level of the year 2003. Thorny skate indices decreased since 2001 until 2003, increased for 2004-2006 and decreased again in 2007. For White hake, there were great catches in 2001, and a sharp decrease since then, broken in 2005 for an increase in the indices, but a new decrease in 2006 and 2007. 2007 biomass is the lowest value if the series. In 2004 we can see a good presence of individuals between 16 and 26 cm.

Material and Methods

Spain carries out a spring survey since 1995 on board the vessel C/V *Playa de Menduíña* in Div. 3NO of the NAFO Regulatory Area, using a bottom trawl net type *Pedreira*. In 2001, this vessel was replaced by the R/V *Vizconde de Eza*, with a bottom trawl net type *Campelen*, in the carrying out of the survey. 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). The number of valid tows, the depth strata covered and the dates of the surveys are presented in Table 1 for the period 1997-2007. The survey area was stratified following the standard stratification schemes (Bishop, 1994). The number of hauls was assigned to each strata proportionally to their size on a random way, with a minimum of two planned hauls per stratum (Doubleday, 1981). Biomass and abundance indices were calculated by swept area method (Cochran, 1997) assuming catchability factor of 1.

The catch of each haul was sorted and weighted into species and a sample of each species was taken in order to measure the length distribution. For Roughhead grenadier each individual of the sample was measured from tip of

snout to base of first anal-fin ray, in 0.5 cm intervals to the nearest lower half cm., and for Thorny skate and White hake each individual was measured to the total length to the nearest lower cm. We present the indices for the period 1997-2007 for Roughhead grenadier and Thorny skate. Years 1995 and 1996 are not representative, because these years the deeper strata were not surveyed, so they are not included in the analysis. Before 2001, we have no data for White hake in this survey. For this species, we present the data for the period 2001-2007.

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 2002-2007. 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.*, 2005. For White hake, it was no necessary to perform the calibration (González Troncoso and Paz, 2005)

Results

Roughhead grenadier

There is no directed fishery for Roughhead grenadier and most of the catches are taken as by-catches in the Greenland halibut fishery in Subareas 2 and 3. At the beginning of the Greenland halibut fishery in Subarea 3 of the Regulatory Area in 1988, the grenadier catches were systematically misreported as Roundnose grenadier. In last years the biomass of this species presents a decreasing trend (NAFO, 2007).

Mean Catches and Biomass

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

The entire time series (1997-2007) of biomass and their SD estimates for Roughhead grenadier are presented in Table 4. Estimated parameters *a* and *b* values of length-weight relationship are presented in Table 5.

The indices of Roughhead grenadier present no trend along the years until 2003, with a marked increasing in 2004 and then remains stable with a slight decrease. The indices were in this period over the 1997-2003 values. In 2007, a decrease over the year 2006 can be seen, and the biomass is under the 2003 value (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 1997-2007. The data have been grouped two by two**,** so we present the data every two cm. We can follow easily a cohort since 1999. In lasts years it can be seen a quite good recruitment. In 2007, all the length classes were poor.

Thorny skate

Thorny skate catches comprises the most of the skates catches during the Spanish Spring survey and the Canadian surveys. This species is under TAC since 2004. Nominal catches increased in the mid-1980s with the commencement of a directed fishery for Thorny skate The catches reached their lowest value in the period 1993-1995. The biomass has been relatively stable form 1996 to 2005 but at lower level than in the mid-1980s (NAFO, 2006).

Mean Catches and Biomass

In Table 7 we present the Thorny skate haul mean catches by stratum, included swept area, number of hauls and SD. Their stratified mean catches per tow by stratum and year, next to their SD, are presented in Table 8.

The entire time series (1997-2007) of biomass and their SD estimates of Thorny skate are presented in Table 9. The estimated parameters *a* and *b* values of length-weight relationship are presented in Table 10.

The indices of the Thorny skate presented a decreasing since the year 2001, following for an increase in the period 2004-2006 and decrease again in 2007. Values of the period 2004-2006 were in the level of the 2000 value, the highest of the time series, but 2007 value is much under that value (Fig. 5 and 6).

Length Distribution

The stratified mean catches per haul length distribution by sex and year are presented in Table 11 and Figures 7 and 8, besides the sampled size and its catch, for the period 1997-2007, in two-cm groups. In 1997, we have a recruitment modal value that can be followed more or less until 2007. In 1998 there was another modal value at small lengths that can be more or less followed along the years, reaching a maximum in 2002. In 2002, too, there was a quite good recruitment, but we can no follow this peak in the following years. This year all the length classes are poorer than another years.

White hake

Catches of white hake in Div. 3NO peaked in 1987, then declined from 1988 to 1994. With the restriction of fishing by other countries to areas outside Canada's 200-mile limit in 1992, non-Canadian landings fell to zero. Average catch was at its lowest in 1995-2001; then increased in 2002 to decrease slightly in 2003. Total catch decreased sharply in 2004-2006. The 1999 year-class was large. Year-classes since then have been extremely low, as compared to the 1999 year-class. The biomass of this stock increased in 2000 with the large 1999 year-class. Subsequently, the biomass index has decreased (NAFO, 2007).

Mean catches and biomass

Table 12 presents the mean catches per stratum, besides the standard deviation, the surveyed area and the number of hauls. In table 13 and in Figure 9, the stratified mean catches per tow by stratum and year, as well as the annual variance, are presented. And in table 14 and Figure 10 we present the biomass per stratum and year, and the correspondent annual variance.

Table 15 presents the length weight relationship parameters for White hake for the period 2002-2007. In 2001, we have no sufficient data to calculate the parameters, so we used the parameters of the year 2002.

The indices of the White hake show a great presence in 2001, with a peak in the biomass that is more than the double of the 2002 biomass. In 2003 and 2004 the biomass decreased respect to the two previous years, and in 2005 an increasing occurs, reaching the second highest value in the series, but in 2006 the biomass decreased again up to 2004 value and in 2007 it dropped off. These results are totally agree with the NAFO Scientific Council results.

Length distribution

Table 16 presents the stratified mean catches per tow length distribution, by sex and year, as the number of samples, the number of sampled individuals, the sampled catch, the sampled range, the total catch and the total numbers of hauls, and in Figures 11 and 12 it we can be seeing the distribution along the years.

In 2001, we can see a great presence of individuals, that decreasing in the later years. In 2002 and 2003, it is no presence of juveniles, although in 2004 there is a quite good presence of individuals between 16 and 26 cm. Except in 2004, no presence of new cohort is seen. In 2005, the length distribution decreased although the biomass increased. We can see the presence of individuals between 52 cm and 70 cm and a quite good presence of individuals between 14 and 38 cm, but at low level compared with years 2001 and 2002. In 2006 and 2007 there is no length class with a good presence.

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TABLE 1.- Spanish spring bottom trawl surveys on NAFO Div. 3NO: 1997-2007

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
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
2007	R/V *Vizconde de Eza*	110	45-1374	May 29–June 19

(*) 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 Roughhead grenadier mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 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	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD
353	0.0480	4	0.000	0.000	0.0465	4	0.000	0.000	0.0360	3	0.000	0.000	0.0356	3	0.002	0.004
354	0.0233	2	0.000	0.000	0.0356	3	0.000	0.000	0.0218	2	0.000	0.000	0.0356	3	0.000	0.000
355	0.0233	2	0.000	0.000	0.0221	2	0.000	0.000	0.0229	2	0.000	0.000	0.0233	2	0.083	0.117
356	0.0225	2	0.000	0.000	0.0221	2	0.426	0.602	0.0229	2	0.019	0.026	0.0225	2	0.084	0.016
357	0.0443	4	0.101	0.202	0.0240	2	0.000	0.000	0.0236	2	0.216	0.152	0.0124	1	0.473	-
358	0.0563	5	0.000	0.000	0.0236	3	0.000	0.000	0.0349	3	0.233	0.403	0.0341	3	0.000	0.000
359	0.0690	6	0.000	0.000	0.0698	6	0.000	0.000	0.0364	3	0.000	0.000	0.0469	4	0.000	0.000
360	0.3754	32	0.000	0.000	0.2561	25	0.000	0.000	0.2325	19	0.000	0.000	0.2396	20	0.000	0.000
374	0.0353	3	0.000	0.000	0.0353	3	0.000	0.000	0.0244	2	0.000	0.000	0.0240	2	0.000	0.000
375	0.0116	1	0.000	-	0.0345	3	0.000	0.000	0.0236	2	0.000	0.000	0.0244	2	0.000	0.000
376	0.1583	14	0.000	0.000	0.0930	10	0.000	0.000	0.1219	10	0.000	0.000	0.1200	10	0.000	0.000
377	0.0116	1	0.000	-	0.0229	2	0.000	0.000	0.0240	2	0.000	0.000	0.0229	2	0.000	0.000
378	0.0210	2	0.447	0.632	0.0120	2	0.000	0.000	0.0229	2	0.298	0.421	0.0233	2	0.149	0.211
379	0.0206	2	0.000	0.000	0.0356	3	0.011	0.020	0.0236	2	0.024	0.034	0.0225	2	0.511	0.722
380	0.0210	2	0.219	0.309	0.0113	2	0.000	0.000	0.0236	2	0.003	0.005	0.0236	2	0.157	0.220
381	0.0221	2	0.000	0.000	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000	0.0236	2	0.074	0.100
382	0.0461	4	0.000	0.000	0.0229	3	0.000	0.000	0.0484	4	0.000	0.000	0.0499	4	0.004	0.009
721	0.0221	2	0.000	0.000	0.0203	2	0.758	0.253	0.0244	2	2.443	0.132	0.0236	2	0.812	0.778
722	0.0214	2	0.026	0.036	0.0101	2	3.950	0.385	0.0229	2	3.865	3.202	0.0218	2	4.767	1.204
723	0.0210	2	0.000	0.000	0.0233	2	0.255	0.361	0.0229	2	2.367	2.528	0.0248	2	2.859	1.554
724	0.0225	2	0.562	0.048	0.0206	2	1.064	0.349	0.0225	2	3.678	0.217	0.0233	2	4.130	1.074
725	0.0206	2	0.000	0.000	0.0086	1	0.077	-	0.0229	2	3.718	3.790	0.0210	2	12.646	17.511
726	n.s.	n.s.	n.s.	n.s.	0.0094	2	2.213	2.336	0.0225	2	7.296	0.205	0.0221	2	14.727	0.120
727	0.0094	1	0.358	-	0.0233	2	0.196	0.181	0.0236	2	0.661	0.236	0.0210	2	2.499	2.726
728	0.0214	2	0.835	0.167	0.0206	2	0.919	0.457	0.0233	2	17.996	15.217	0.0210	2	7.249	6.640
752	0.0218	2	8.836	3.973	0.0229	2	8.172	6.983	0.0233	2	9.032	3.744	0.0206	2	26.663	9.968
753	0.0214	2	15.528	7.705	0.0218	2	35.635	9.342	0.0229	2	28.442	30.760	0.0218	2	49.154	1.830
754	0.0330	3	70.193	8.839	0.0210	2	60.723	3.985	0.0206	2	26.373	8.716	0.0195	2	66.801	41.403
755	n.s.	n.s.	n.s.	n.s.	0.0206	2	42.088	3.130	0.0311	3	23.467	7.041	0.0431	4	28.192	7.595
756	0.0109	1	3.252	-	0.0225	2	6.895	5.707	0.0225	2	29.642	5.995	0.0203	2	17.852	0.205
757	0.0304	3	20.873	17.870	0.0206	2	39.313	39.079	0.0233	2	8.896	5.646	0.0214	2	88.705	79.940
758	0.0214	2	46.823	8.232	0.0105	2	77.034	32.807	0.0214	2	46.200	23.151	0.0210	2	55.334	32.746
759	n.s.	n.s.	n.s.	n.s.	0.0214	2	66.392	41.956	0.0218	2	22.491	13.002	0.0210	2	32.826	6.694
760	0.0105	1	3.916	-	0.0214	2	8.862	1.890	0.0225	2	4.010	1.409	0.0210	2	17.758	2.817
761	0.0315	3	19.198	3.744	0.0206	2	25.190	8.102	0.0210	2	16.592	10.125	0.0221	2	11.535	5.093
762	0.0308	3	24.278	18.462	0.0094	2	30.068	18.564	0.0210	2	17.354	9.397	0.0203	2	18.990	4.928
763	n.s.	n.s.	n.s.	n.s.	0.0218	2	10.820	5.285	0.0311	3	11.447	3.789	0.0416	4	14.523	15.110
764	0.0206	2	6.393	4.081	0.0218	2	4.827	2.059	0.0225	2	4.044	1.240	0.0218	2	4.427	2.047
765	0.0206	2	11.752	5.592	0.0098	2	6.734	3.431	0.0221	2	6.197	1.421	0.0203	2	7.755	4.467
766	0.0308	3	7.741	2.498	0.0191	2	6.895	1.902	0.0218	2	5.516	3.371	0.0214	2	3.184	1.156
767	n.s.	n.s.	n.s.	n.s.	0.0109	2	6.529	2.950	0.0214	2	4.844	0.277	0.0210	2	2.537	0.506

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

TABLE 2 (cont.).- Swept area, number of hauls and Roughhead grenadier mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2001				2002				2003				2004			
Stratum	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD
353	0.0341	3	0.000	0.000	0.0476	4	0.000	0.000	0.0334	3	0.000	0.000	0.0338	3	0.000	0.000
354	0.0338	3	0.000	0.000	0.0356	3	0.000	0.000	0.0338	3	0.000	0.000	0.0345	3	0.000	0.000
355	0.0240	2	0.000	0.000	0.0236	2	0.000	0.000	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000
356	0.0240	2	0.000	0.000	0.0233	2	0.000	0.000	0.0225	2	0.115	0.163	0.0221	2	1.225	1.732
357	0.0244	2	0.170	0.240	0.0240	2	1.050	1.061	0.0229	2	1.385	1.959	0.0229	2	0.027	0.037
358	0.0345	3	0.000	0.000	0.0345	3	0.500	0.700	0.0338	3	0.000	0.000	0.0330	3	0.007	0.012
359	0.0803	7	0.000	0.000	0.0686	6	0.041	0.100	0.0791	7	0.000	0.000	0.0791	7	0.479	1.267
360	0.2423	20	0.390	1.744	0.2865	25	0.000	0.000	0.2254	20	0.000	0.000	0.2310	20	0.000	0.000
374	0.0240	2	0.000	0.000	0.0345	3	0.000	0.000	0.0225	2	0.000	0.000	0.0233	2	0.000	0.000
375	0.0338	3	0.000	0.000	0.0353	3	0.000	0.000	0.0330	3	0.000	0.000	0.0338	3	0.000	0.000
376	0.1155	10	0.000	0.000	0.1140	10	0.000	0.000	0.1125	10	0.000	0.000	0.1166	10	0.000	0.000
377	0.0229	2	0.000	0.000	0.0229	2	0.273	0.386	0.0225	2	0.000	0.000	0.0218	2	0.000	0.000
378	0.0236	2	0.000	0.000	0.0233	2	0.008	0.011	0.0225	2	0.000	0.000	0.0225	2	0.000	0.000
379	0.0229	2	0.430	0.580	0.0229	2	0.265	0.375	0.0229	2	0.124	0.175	0.0124	1	3.960	-
380	0.0206	2	0.03	0.048	0.0225	2	0.008	0.011	0.0229	2	0.085	0.120	0.0221	2	278.650	209.516
381	0.0236	2	0.00	0.00	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000	0.0225	2	4.145	5.169
382	0.0469	4	0.00	0.00	0.0341	3	0.002	0.004	0.0454	4	0.000	0.000	0.0461	4	0.080	0.160
721	0.0248	2	0.220	0.085	0.0233	2	1.250	1.768	0.0225	2	0.000	0.000	0.0221	2	3.473	0.449
722	0.0233	2	2.465	2.878	0.0236	2	10.930	14.213	0.0221	2	4.315	4.547	0.0218	2	4.530	2.676
723	0.0240	2	1.705	0.304	0.0233	2	0.700	0.283	0.0229	2	8.370	3.253	0.0229	2	10.053	4.938
724	0.0353	3	7.507	3.835	0.0225	2	10.000	4.384	0.0225	2	4.980	1.669	0.0214	2	10.746	0.701
725	0.0116	2	1.415	1.832	0.0225	2	2.650	1.344	0.0229	2	0.377	0.532	0.0225	2	92.415	82.046
726	0.0116	2	4.304	5.509	0.0214	2	2.650	1.909	0.0225	2	0.000	0.000	0.0225	2	59.865	19.608
727	0.0225	2	0.21	0.132	0.0233	2	0.570	0.806	0.0218	2	21.900	24.607	0.0233	2	16.700	1.697
728	0.0229	2	1.00	0.241	0.0229	2	0.620	0.876	0.0225	2	32.650	3.748	0.0180	2	15.650	9.687
752	0.0210	2	6.04	3.455	0.0116	1	1.950	2.758	0.0229	2	77.900	100.268	0.0214	2	94.610	95.162
753	0.0214	2	31.57	21.165	0.0229	2	5.400	7.637	0.0229	2	57.050	55.791	0.0218	2	63.835	45.912
754	0.0195	2	75.61	17.890	0.0341	3	98.450	82.237	0.0218	2	65.600	40.729	0.0214	2	33.355	11.377
755	0.0416	4	24.29	19.579	0.0338	3	1.460	1.307	0.0221	2	18.200	25.597	0.0319	3	14.658	21.304
756	0.0113	2	12.796	11.520	0.0229	2	11.750	10.819	0.0221	2	7.160	9.051	0.0218	2	9.772	3.778
757	0.0233	2	20.43	16.686	0.0225	2	16.250	16.193	0.0221	2	8.575	2.765	0.0218	2	12.890	8.330
758	0.0218	2	69.10	46.916	0.0225	2	141.550	101.470	0.0221	2	41.050	58.053	0.0214	2	32.955	10.260
759	0.0221	2	59.11	50.035	0.0225	2	69.250	97.934	0.0113	1	78.080	-	0.0214	2	39.980	4.921
760	0.0229	2	7.195	9.468	0.0229	2	11.950	4.172	0.0218	2	40.650	3.465	0.0221	2	76.475	94.293
761	0.0225	2	15.515	2.524	0.0225	2	5.350	5.445	0.0225	2	12.750	9.263	0.0221	2	25.610	28.055
762	0.0116	2	2.839	3.040	0.0225	2	0.325	0.460	0.0225	2	14.650	3.861	0.0233	2	15.729	4.594
763	0.0330	3	15.35	12.271	0.0225	2	1.225	1.732	0.0311	3	2.717	4.705	0.0326	3	28.000	21.696
764	0.0240	2	5.550	3.323	0.0236	2	20.050	11.526	0.0221	2	19.420	19.771	0.0229	2	40.790	41.988
765	0.0113	2	4.385	0.685	0.0236	2	2.700	2.404	0.0113	1	10.400	-	0.0225	2	5.347	2.710
766	0.0203	2	2.65	1.233	0.0233	2	9.125	9.016	0.0225	2	5.690	6.548	0.0225	2	7.214	1.582
767	0.0218	2	3.09	1.673	0.0225	2	9.150	12.940	0.0229	2	3.130	2.461	0.0218	2	3.667	0.401

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

TABLE 2 (cont.).- Swept area, number of hauls and Roughhead grenadier mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2005				2006				2007			
Stratum	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD	Swept area	Tow number	R. grenadier Mean catch	R. grenadier SD
353	0.0353	3	0.000	0.000	0.0371	3	0.000	0.000	0.0364	3	0.000	0.000
354	0.0353	3	0.000	0.000	0.0364	3	0.000	0.000	0.0364	3	0.000	0.000
355	0.0225	2	0.000	0.000	0.0248	2	0.000	0.000	0.0240	2	0.000	0.000
356	0.0233	2	0.260	0.368	0.0240	2	0.350	0.495	0.0240	2	0.000	0.000
357	0.0233	2	15.785	3.090	0.0244	2	42.575	1.407	0.0360	3	1.907	1.661
358	0.0349	3	0.000	0.000	0.0349	3	0.000	0.000	0.0368	3	0.283	0.491
359	0.0814	7	0.103	0.217	0.0975	8	0.000	0.000	0.0855	7	0.000	0.000
360	0.2325	20	0.000	0.000	0.2340	19	0.000	0.000	0.2378	20	0.000	0.000
374	0.0229	2	0.000	0.000	0.0236	2	0.000	0.000	0.0240	2	0.000	0.000
375	0.0349	3	0.000	0.000	0.0364	3	0.000	0.000	0.0364	3	0.000	0.000
376	0.1174	10	0.000	0.000	0.1219	10	0.000	0.000	0.1185	10	0.000	0.000
377	0.0233	2	0.000	0.000	0.0236	2	0.000	0.000	0.0240	2	0.000	0.000
378	0.0225	2	0.620	0.877	0.0240	2	0.260	0.367	0.0233	2	0.000	0.000
379	0.0236	2	26.975	17.006	0.0236	2	112.080	148.252	0.0240	2	6.478	1.813
380	0.0229	2	194.750	113.491	0.0229	2	130.294	89.342	0.0240	2	22.490	15.712
381	0.0233	2	17.450	11.384	0.0229	2	101.485	42.122	0.0240	2	0.000	0.000
382	0.0458	4	0.235	0.286	0.0469	4	0.200	0.400	0.0484	4	0.163	0.325
721	0.0229	2	1.173	1.609	0.0236	2	3.005	3.415	0.0116	1	0.830	-
722	0.0233	2	5.415	4.985	0.0240	2	0.901	1.005	0.0225	2	3.945	1.902
723	0.0233	2	21.528	23.869	0.0236	2	20.810	0.919	0.0240	2	4.417	2.512
724	0.0225	2	9.500	8.514	0.0233	2	4.712	4.322	0.0233	2	8.758	3.297
725	0.0236	2	104.420	135.072	0.0233	2	48.050	48.578	0.0225	2	12.730	7.742
726	0.0113	1	34.900	-	0.0225	2	21.017	5.822	0.0229	2	40.814	22.325
727	0.0229	2	18.650	12.657	0.0225	2	14.650	7.283	0.0240	2	10.079	6.405
728	0.0109	1	35.400	-	0.0225	2	25.250	1.626	0.0225	2	17.355	10.953
752	0.0236	2	21.590	3.677	0.0225	2	25.200	10.041	0.0225	2	19.404	27.432
753	0.0225	2	63.320	12.629	0.0225	2	14.863	7.973	0.0225	2	31.106	20.248
754	0.0225	2	13.957	14.981	0.0225	2	5.055	7.148	0.0225	2	53.404	6.218
755	0.0450	4	34.228	9.637	0.0338	3	22.257	27.055	0.0338	3	28.680	19.358
756	0.0233	2	23.675	12.693	0.0229	2	26.875	13.103	0.0225	2	85.074	23.863
757	0.0225	2	17.758	8.403	0.0225	2	7.399	6.079	0.0229	2	46.664	28.618
758	0.0225	2	34.043	1.042	0.0225	2	111.965	139.915	0.0225	2	18.887	14.302
759	0.0229	2	46.825	37.512	0.0225	2	2.410	3.242	n.s.	n.s.	n.s.	n.s.
760	0.0229	2	57.790	20.492	0.0225	2	42.124	31.854	0.0233	2	27.625	32.492
761	0.0221	2	37.553	18.438	0.0233	2	18.333	4.104	0.0225	2	20.654	18.550
762	0.0225	2	11.938	8.432	0.0233	2	22.712	29.399	n.s.	n.s.	n.s.	n.s.
763	0.0334	3	13.424	3.205	0.0225	2	29.163	24.236	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	1.161	1.642	0.0233	2	3.134	0.699	0.0225	2	22.213	23.443
765	0.0229	2	7.252	2.647	0.0236	2	15.093	19.846	0.0225	2	5.328	4.173
766	0.0229	2	6.355	4.794	0.0229	2	3.463	2.077	n.s.	n.s.	n.s.	n.s.
767	0.0113	1	4.646	-	0.0233	2	2.495	3.528	n.s.	n.s.	n.s.	n.s.

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

TABLE 3.- Stratified mean catches (Kg) by stratum and year and SD by year of Roughhead grenadier (1997-2007). n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 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	2007
353	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
354	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355	0.00	0.00	0.00	6.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
356	0.00	20.01	0.88	3.96	0.00	0.00	5.41	57.58	12.22	16.45	0.00
357	16.54	0.00	35.46	77.62	27.88	172.20	227.14	4.35	2588.74	6982.30	312.69
358	0.00	0.00	52.35	0.00	0.00	112.50	0.00	1.50	0.00	0.00	63.75
359	0.00	0.00	0.00	0.00	0.00	17.19	0.00	201.66	43.30	0.00	0.00
360	0.00	0.00	0.00	0.00	1085.37	0.00	0.00	0.00	0.00	0.00	0.00
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
377	0.00	0.00	0.00	0.00	0.00	27.30	0.00	0.00	0.00	0.00	0.00
378	62.12	0.00	41.42	20.71	0.00	1.04	0.00	0.00	86.18	36.07	0.00
379	0.00	1.20	2.53	54.14	45.58	28.09	13.14	419.76	2859.35	11880.48	686.67
380	21.00	0.00	0.33	15.12	3.27	0.72	8.16	26750.40	18696.00	12508.18	2159.04
381	0.00	0.00	0.00	10.67	0.00	0.00	0.00	596.88	2512.80	14613.84	0.00
382	0.00	0.00	0.00	1.46	0.00	0.80	0.00	27.44	80.61	68.60	55.74
721	0.00	49.25	158.81	52.79	14.30	81.25	0.00	225.71	76.21	195.33	53.95
722	2.15	331.80	324.65	400.45	207.06	918.12	362.46	380.48	454.86	75.64	331.38
723	0.00	39.59	366.82	443.22	264.28	108.50	1297.35	1558.14	3336.84	3225.55	684.56
724	69.67	131.95	456.02	512.18	930.83	1240.00	617.52	1332.50	1178.00	584.29	1085.93
725	0.00	8.04	390.44	1327.83	148.53	278.25	39.53	9703.58	10964.10	5045.25	1336.60
726	n.s.	159.36	525.28	1060.37	309.91	190.80	0.00	4310.28	2512.80	1513.22	2938.57
727	34.32	18.80	63.42	239.94	20.43	54.72	2102.40	1603.20	1790.40	1406.40	967.58
728	65.14	71.71	1403.72	565.40	78.35	48.32	2546.70	1220.70	2761.20	1969.50	1353.69
752	1157.57	1070.59	1183.22	3492.80	790.67	255.45	10204.90	12393.91	2828.29	3301.20	2541.92
753	2142.81	4917.66	3924.96	6783.22	4356.11	745.20	7872.90	8809.23	8738.16	2051.03	4292.56
754	12634.78	10930.12	4747.16	12024.20	13610.16	17721.00	11808.00	6003.90	2512.26	909.81	9612.63
755	n.s.	16203.89	9034.94	10853.88	9350.67	562.10	7007.00	5643.46	13177.59	8568.82	11041.67
756	328.45	696.44	2993.85	1803.02	1292.39	1186.75	723.16	986.92	2391.18	2714.38	8592.42
757	2129.06	4009.91	907.40	9047.90	2083.97	1657.50	874.65	1314.78	1811.32	754.65	4759.73
758	4635.47	7626.33	4573.78	5478.08	6840.86	14013.45	4063.95	3262.55	3370.26	11084.54	1869.81
759	n.s.	8431.85	2856.38	4168.89	7507.47	8794.75	9916.16	5077.46	5946.78	306.01	n.s.
760	603.06	1364.74	617.48	2734.73	1108.03	1840.30	6260.10	11777.15	8899.66	6487.10	4254.25
761	3282.93	4307.46	2837.19	1972.49	2653.07	914.85	2180.25	4379.31	6421.48	3134.94	3531.75
762	5147.01	6374.36	3678.97	4025.85	601.93	68.90	3105.80	3334.44	2530.75	4814.94	n.s.
763	n.s.	2824.01	2987.69	3790.53	4005.31	319.73	709.05	7307.91	3503.58	7611.41	n.s.
764	639.32	482.68	404.37	442.67	555.00	2005.00	1942.00	4079.00	116.10	313.40	2221.30
765	1457.26	834.98	768.48	961.66	543.70	334.80	1289.60	662.97	899.19	1871.53	660.61
766	1114.72	992.95	794.36	458.47	381.98	1314.00	819.36	1038.74	915.12	498.67	n.s.
767	n.s.	1031.65	765.33	400.82	488.25	1445.70	494.54	579.31	734.07	394.21	n.s.
TOTAL	35543.40	72931.33	46897.68	73231.81	59305.36	56459.28	76491.23	125045.18	114749.37	114937.72	65408.81
$(\overline{Y})$	3.81	7.05	4.53	7.08	5.73	5.46	7.40	12.09	11.10	11.11	6.93
S.D.	0.31	0.61	0.45	0.85	0.77	1.51	1.42	2.17	1.38	1.89	0.83

TABLE 4.- Survey estimates (by the swept area method) of Roughhead grenadier 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. 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels. The last row presents the biomass obtained from the length distribution.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
353	0	0	0	0	0	0	0	0	0	0	0
354	0	0	0	0	0	0	0	0	0	0	0
355	0	0	0	1	0	0	0	0	0	0	0
356	0	2	0	0	0	0	0	5	1	1	0
357	1	0	3	6	2	14	20	0	223	573	26
358	0	0	5	0	0	10	0	0	0	0	5
359	0	0	0	0	0	2	0	18	4	0	0
360	0	0	0	0	90	0	0	0	0	0	0
374	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0	0	0	0
377	0	0	0	0	0	2	0	0	0	0	0
378	6	0	4	2	0	0	0	0	8	3	0
379	0	0	0	5	4	2	1	34	242	1006	57
380	2	0	0	1	0	0	1	2418	1635	1094	180
381	0	0	0	1	0	0	0	53	216	1278	0
382	0	0	0	0	0	0	0	2	7	6	5
721	0	5	13	4	1	7	0	20	7	17	5
722	0	31	28	37	18	78	33	35	39	6	29
723	0	3	32	36	22	9	113	136	287	273	57
724	6	13	41	44	79	110	55	125	105	50	93
725	0	1	34	126	13	25	3	863	928	434	119
726	0	15	47	96	25	18	0	383	223	135	257
727	4	2	5	23	2	5	193	138	157	125	81
728	6	7	121	54	7	4	226	136	254	175	120
752	106	94	102	339	75	22	892	1160	239	293	226
753	200	452	343	624	407	65	688	810	777	182	382
754	1149	1041	460	1233	1395	1549	1086	562	223	81	854
755	n.s.	1571	871	1007	899	50	633	531	1171	762	981
756	30	62	266	178	113	104	65	91	206	237	764
757	210	389	78	847	179	147	79	121	161	67	416
758	434	701	428	522	629	1246	367	305	300	985	166
759	n.s.	789	263	397	679	782	881	475	520	27	n.s.
760	57	128	55	260	97	161	576	1065	778	577	366
761	313	418	270	178	236	81	194	396	580	270	314
762	502	618	350	398	54	6	276	287	225	414	n.s.
763	n.s.	260	288	364	364	28	68	672	315	677	n.s.
764	62	44	36	41	46	170	176	357	10	27	197
765	141	80	69	95	49	28	115	59	79	158	59
766	109	104	73	43	38	113	73	92	80	44	n.s.
767	n.s.	93	72	38	45	129	43	53	65	34	n.s.
TOTAL	3340	6922	4357	7000	5568	4968	6860	11402	10064	10010	5760
S.D.	290	644	431	807	700	1365	1316	2043	1236	1716	695

TABLE 5.- Length weight relationships in the calculation of Roughead grenadier biomass. The equation is $Weight = a(l + 0.25)^b$ Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. To calculate the parameters for the indeterminate individuals, we used the total data (males + females + indeterminate individuals). *E* means Error.

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Males	a	0.0687	0.1094	0.0650	0.0554	0.1095	0.0882	0.1141	0.0904	0.0600	0.1058	0.1287
		E = 0.3814	E = 0.0983	E = 0.1812	E = 0.1403	E = 0.0689	E = 0.0485	E = 0.0628	E = 0.0792	E = 0.1014	E = 0.1087	E = 0.0819
	b	3.0453	2.8929	3.1085	3.1411	2.8906	2.9672	2.8805	2.9517	3.1090	2.9150	2.8342
		E = 0.1340	E = 0.09370	E = 0.0728	E = 0.0547	E = 0.0279	E = 0.0200	E = 0.0262	E = 0.0311	E = 0.0389	E = 0.0442	E = 0.0317
		R2 = 0.979	R2 = 0.995	R2 = 0.984	R2 = 0.989	R2 = 0.997	R2 = 0.998	R2 = 0.997	R2 = 0.995	R2 = 0.994	R2 = 0.995	R2 = 0.995
		N = 26	N = 201	N = 102	N = 269	N = 116	N = 292	N = 496	N = 525	N = 411	N = 463	N= 473
Females	a	0.0937	0.0673	0.1185	0.0790	0.2843	0.0856	0.1132	0.0804	0.0802	0.3193	0.1128
		E = 0.1618	E = 0.0938	E = 0.1245	E = 0.0608	E = 0.3519	E = 0.0950	E = 0.0441	E = 0.0351	E = 0.0499	E = 0.3878	E = 0.0627
	b	2.9395	3.0551	2.8739	3.0192	2.5397	2.9736	2.8864	2.9919	2.9950	2.5373	2.8872
		E = 0.0531	E = 0.0315	E = 0.0422	E = 0.0209	E = 0.1311	E = 0.0336	E = 0.0156	E = 0.0123	E = 0.0175	E = 0.1408	E = 0.0218
		R2 = 0.993	R2 = 0.993	R2 = 0.987	R2 = 0.997	R2 = 0.901	R2 = 0.992	R2 = 0.998	R2 = 0.999	R2 = 0.998	R2 = 0.918	R2 = 0.997
		N = 41	N = 450	N = 233	N = 548	N = 168	N = 477	N = 788	N = 806	N = 626	N = 737	N= 907
Indet.	a	0.0909	0.0907	0.1185	0.0736	0.1862	0.1040	0.1104	0.0924	0.0833	0.2939	0.1168
		E = 0.1433	E = 0.0484	E = 0.1043	E = 0.0625	E = 0.1546	E = 0.0542	E = 0.0425	E = 0.0578	E = 0.0451	E = 0.3531	E = 0.0399
	b	2.9494	2.9631	2.8773	3.0409	2.6892	2.9096	2.8949	2.9466	2.9832	2.5661	2.8774
		E = 0.0475	E = 0.0164	E = 0.0357	E = 0.0218	E = 0.0603	E = 0.0196	E = 0.0151	E = 0.0207	E = 0.0161	E = 0.1301	E = 0.0143
		R2 = 0.994	R2 = 0.998	R2 = 0.990	R2 = 0.997	R2 = 0.977	R2 = 0.997	R2 = 0.998	R2 = 0.997	R2 = 0.998	R2 = 0.928	R2 = 0.998
		N = 67	N = 655	N = 338	N = 820	N = 292	N = 787	N = 1288	N = 1379	N = 1078	N = 1218	N= 1401

TABLE 6.- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

.	1997				1998				1999				2000			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
2.5	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
3.5	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.023
4.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.009	0.070	0.016	0.063	0.000	0.079
5.5	0.000	0.042	0.000	0.042	0.000	0.000	0.030	0.030	0.265	0.186	0.021	0.472	0.191	0.393	0.000	0.584
6.5	0.000	0.000	0.000	0.000	0.005	0.013	0.007	0.024	0.105	0.171	0.003	0.280	0.153	0.169	0.027	0.349
7.5	0.000	0.055	0.000	0.055	0.061	0.025	0.002	0.087	0.213	0.296	0.000	0.509	0.253	0.159	0.000	0.412
8.5	0.087	0.070	0.000	0.156	0.201	0.152	0.000	0.353	0.191	0.253	0.000	0.444	0.172	0.174	0.000	0.346
9.5	0.006	0.054	0.000	0.060	0.238	0.208	0.000	0.446	0.301	0.331	0.000	0.631	0.379	0.358	0.000	0.737
10.5	0.055	0.097	0.000	0.152	0.725	0.612	0.000	1.337	0.702	0.754	0.000	1.456	0.420	0.461	0.000	0.881
11.5	0.095	0.211	0.000	0.305	0.537	0.691	0.000	1.227	1.232	1.447	0.000	2.679	0.955	1.019	0.000	1.974
12.5	0.141	0.208	0.000	0.349	0.399	0.471	0.000	0.870	1.156	1.582	0.000	2.738	1.506	1.653	0.000	3.159
13.5	0.236	0.332	0.000	0.568	0.522	0.484	0.000	1.006	0.643	0.889	0.000	1.532	1.993	2.471	0.000	4.464
14.5	0.639	0.529	0.000	1.168	0.899	0.678	0.000	1.576	0.498	0.569	0.000	1.067	1.107	1.762	0.000	2.869
15.5	0.699	0.836	0.000	1.536	1.242	1.013	0.000	2.255	0.728	0.565	0.000	1.293	0.879	0.972	0.000	1.851
16.5	0.471	0.554	0.000	1.025	1.159	1.006	0.000	2.165	0.698	0.663	0.000	1.361	0.709	0.771	0.000	1.480
17.5	0.251	0.374	0.000	0.625	0.920	0.943	0.000	1.862	0.480	0.561	0.000	1.041	0.626	0.789	0.000	1.415
18.5	0.244	0.319	0.000	0.563	0.455	0.707	0.000	1.162	0.245	0.318	0.000	0.563	0.427	0.589	0.000	1.016
19.5	0.263	0.288	0.000	0.551	0.380	0.429	0.000	0.808	0.151	0.181	0.000	0.332	0.191	0.412	0.000	0.603
20.5	0.235	0.280	0.000	0.514	0.235	0.303	0.000	0.538	0.067	0.131	0.000	0.198	0.057	0.250	0.000	0.308
21.5	0.159	0.198	0.000	0.358	0.118	0.359	0.000	0.476	0.022	0.116	0.000	0.138	0.028	0.274	0.000	0.302
22.5	0.042	0.212	0.000	0.254	0.035	0.237	0.000	0.272	0.008	0.079	0.000	0.087	0.007	0.167	0.000	0.174
23.5	0.022	0.165	0.000	0.187	0.025	0.223	0.000	0.248	0.002	0.071	0.000	0.074	0.006	0.118	0.000	0.124
24.5	0.000	0.116	0.000	0.116	0.002	0.203	0.000	0.204	0.001	0.074	0.000	0.075	0.000	0.143	0.000	0.143
25.5	0.002	0.082	0.000	0.084	0.001	0.187	0.000	0.188	0.001	0.058	0.000	0.059	0.005	0.092	0.000	0.097
26.5	0.000	0.046	0.000	0.046	0.003	0.076	0.000	0.079	0.002	0.045	0.000	0.047	0.002	0.091	0.000	0.094
27.5	0.000	0.014	0.000	0.014	0.009	0.071	0.000	0.080	0.000	0.038	0.000	0.038	0.004	0.070	0.000	0.074
28.5	0.000	0.033	0.000	0.033	0.000	0.066	0.000	0.066	0.000	0.033	0.000	0.033	0.000	0.057	0.000	0.057
29.5	0.008	0.022	0.000	0.030	0.007	0.051	0.000	0.057	0.002	0.033	0.000	0.035	0.000	0.034	0.000	0.034
30.5	0.000	0.014	0.000	0.014	0.001	0.054	0.000	0.054	0.000	0.013	0.000	0.013	0.000	0.037	0.000	0.037
31.5	0.000	0.012	0.000	0.012	0.000	0.044	0.000	0.044	0.000	0.014	0.000	0.014	0.000	0.025	0.000	0.025
32.5	0.000	0.011	0.000	0.011	0.000	0.023	0.000	0.023	0.000	0.010	0.000	0.010	0.000	0.018	0.000	0.018
33.5	0.000	0.008	0.000	0.008	0.000	0.016	0.000	0.016	0.000	0.013	0.000	0.013	0.000	0.004	0.000	0.004
34.5	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.015	0.000	0.004	0.000	0.004	0.000	0.011	0.000	0.011
35.5	0.000	0.001	0.000	0.001	0.000	0.010	0.000	0.010	0.000	0.003	0.000	0.003	0.000	0.002	0.000	0.002
36.5	0.000	0.005	0.000	0.005	0.000	0.007	0.000	0.007	0.000	0.001	0.000	0.001	0.000	0.019	0.000	0.019
37.5	0.000	0.003	0.000	0.003	0.000	0.003	0.000	0.003	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000
38.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.002
39.5	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.5	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	0.002	0.000	0.002
Total	3.654	5.191	0.000	8.845	8.176	9.385	0.039	17.600	7.712	9.565	0.033	17.309	10.087	13.633	0.050	23.770
Nº samples(*):				14				47				53				57
Nº Ind. (*):	416	609	2	1027	1647	2421	8	4076	2501	3512	7	6020	1957	2967	4	4928
Sampled catch:				89				338				379				318
Range(*):				5.5-37				3.5-39.5				4-38				3-40.5
Total catch:				626				892				650				1080
Total hauls(*):				128				124				114				118

TABLE 6 (cont.).- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

.	2001				2002				2003				2004			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
2.5	0.000	0.000	0.036	0.036	0.031	0.009	0.012	0.052	0.016	0.000	0.019	0.035	0.000	0.000	0.026	0.026
3.5	0.007	0.021	0.050	0.079	0.112	0.036	0.047	0.195	0.219	0.069	0.074	0.362	0.070	0.024	0.651	0.746
4.5	0.059	0.013	0.029	0.102	0.088	0.039	0.017	0.144	0.045	0.052	0.015	0.113	0.089	0.006	0.080	0.176
5.5	0.110	0.143	0.010	0.263	0.198	0.208	0.009	0.414	0.353	0.390	0.000	0.743	0.161	0.124	0.005	0.290
6.5	0.074	0.087	0.000	0.161	0.058	0.102	0.005	0.165	0.653	0.652	0.000	1.305	0.649	0.567	0.000	1.216
7.5	0.051	0.060	0.000	0.111	0.095	0.080	0.000	0.175	0.215	0.256	0.000	0.470	0.223	0.196	0.000	0.419
8.5	0.121	0.134	0.000	0.254	0.087	0.149	0.000	0.235	0.401	0.491	0.000	0.892	0.617	0.550	0.000	1.167
9.5	0.158	0.090	0.000	0.248	0.084	0.063	0.000	0.147	0.254	0.233	0.000	0.487	0.592	0.860	0.000	1.452
10.5	0.189	0.215	0.000	0.404	0.110	0.098	0.000	0.208	0.351	0.320	0.000	0.671	0.442	0.694	0.000	1.136
11.5	0.319	0.371	0.000	0.690	0.109	0.185	0.000	0.294	0.220	0.407	0.000	0.627	0.715	0.673	0.000	1.387
12.5	0.476	0.550	0.000	1.026	0.201	0.243	0.000	0.444	0.312	0.354	0.000	0.665	0.684	0.650	0.000	1.335
13.5	0.959	1.182	0.000	2.141	0.378	0.284	0.000	0.662	0.482	0.542	0.000	1.024	0.678	0.716	0.000	1.393
14.5	1.521	1.543	0.000	3.063	0.603	0.552	0.000	1.155	0.751	0.859	0.000	1.610	0.932	0.683	0.000	1.615
15.5	1.453	1.650	0.000	3.104	0.627	0.904	0.000	1.531	1.246	1.169	0.000	2.414	1.046	0.901	0.000	1.947
16.5	0.844	1.158	0.000	2.003	0.612	0.928	0.000	1.540	1.525	1.389	0.000	2.914	1.197	1.295	0.000	2.492
17.5	0.773	0.628	0.000	1.401	0.343	0.729	0.000	1.072	0.793	1.335	0.000	2.128	1.429	1.270	0.000	2.699
18.5	0.646	0.464	0.000	1.111	0.244	0.502	0.000	0.746	0.384	0.806	0.000	1.190	1.051	1.573	0.000	2.623
19.5	0.283	0.317	0.000	0.600	0.202	0.505	0.000	0.707	0.234	0.656	0.000	0.890	0.476	1.333	0.000	1.808
20.5	0.071	0.361	0.000	0.432	0.115	0.387	0.000	0.502	0.171	0.356	0.000	0.527	0.334	0.875	0.000	1.209
21.5	0.025	0.148	0.000	0.173	0.028	0.349	0.000	0.377	0.005	0.257	0.000	0.262	0.157	0.681	0.000	0.839
22.5	0.001	0.095	0.000	0.095	0.017	0.299	0.000	0.316	0.019	0.289	0.000	0.308	0.027	0.597	0.000	0.624
23.5	0.000	0.082	0.000	0.082	0.008	0.152	0.000	0.160	0.008	0.187	0.000	0.195	0.028	0.437	0.000	0.466
24.5	0.000	0.061	0.000	0.061	0.004	0.102	0.000	0.106	0.000	0.108	0.000	0.108	0.018	0.391	0.000	0.409
25.5	0.002	0.058	0.000	0.060	0.000	0.070	0.000	0.070	0.000	0.111	0.000	0.111	0.000	0.266	0.000	0.266
26.5	0.004	0.040	0.000	0.044	0.000	0.114	0.000	0.114	0.000	0.109	0.000	0.109	0.005	0.265	0.000	0.270
27.5	0.000	0.026	0.000	0.026	0.000	0.149	0.000	0.149	0.000	0.100	0.000	0.100	0.000	0.178	0.000	0.178
28.5	0.002	0.040	0.000	0.041	0.000	0.086	0.000	0.086	0.000	0.104	0.000	0.104	0.000	0.154	0.000	0.154
29.5	0.000	0.027	0.000	0.027	0.000	0.063	0.000	0.063	0.000	0.083	0.000	0.083	0.005	0.185	0.000	0.190
30.5	0.000	0.032	0.000	0.032	0.000	0.059	0.000	0.059	0.000	0.073	0.000	0.073	0.000	0.146	0.000	0.146
31.5	0.000	0.029	0.000	0.029	0.000	0.062	0.000	0.062	0.000	0.018	0.000	0.018	0.000	0.086	0.000	0.086
32.5	0.000	0.021	0.000	0.021	0.000	0.023	0.000	0.023	0.000	0.040	0.000	0.040	0.000	0.059	0.000	0.059
33.5	0.000	0.008	0.000	0.008	0.000	0.034	0.000	0.034	0.000	0.016	0.000	0.016	0.000	0.062	0.000	0.062
34.5	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.040	0.000	0.040
35.5	0.000	0.008	0.000	0.008	0.000	0.041	0.000	0.041	0.000	0.030	0.000	0.030	0.000	0.018	0.000	0.018
36.5	0.000	0.004	0.000	0.004	0.000	0.018	0.000	0.018	0.000	0.010	0.000	0.010	0.000	0.013	0.000	0.013
37.5	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38.5	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
39.5	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	0.009	0.000	0.009
40.5	0.000	0.001	0.000	0.001	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	8.149	9.677	0.125	17.952	4.352	7.622	0.090	12.063	8.655	11.875	0.108	20.638	11.623	16.579	0.763	28.964
Nº samples(*):				22				48				43				59
Nº Ind. (*):	149	208	10	367	604	1018	18	1640	1089	1500	21	2610	1535	2270	157	3962
Sampled catch:				107				754				931				1742
Range(*):				2.5-29				2-36.5				2.5-36				2.5-39
Total catch:				453				877				990				2055
Total hauls(*):				123				125				118				120

TABLE 6 (cont.).- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

.	2005				2006				2007			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
2.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.027
3.5	0.030	0.026	0.289	0.344	0.120	0.012	0.141	0.273	0.090	0.041	0.623	0.754
4.5	0.046	0.030	0.106	0.182	0.155	0.063	0.007	0.225	0.010	0.027	0.089	0.126
5.5	0.015	0.038	0.000	0.053	0.069	0.063	0.000	0.132	0.054	0.077	0.000	0.131
6.5	0.499	0.510	0.000	1.009	0.374	0.448	0.004	0.826	0.266	0.278	0.005	0.550
7.5	0.324	0.308	0.000	0.633	0.386	0.312	0.000	0.698	0.089	0.083	0.000	0.173
8.5	0.339	0.383	0.009	0.732	0.216	0.140	0.000	0.356	0.129	0.355	0.000	0.485
9.5	0.393	0.671	0.000	1.064	0.378	0.317	0.000	0.695	0.315	0.204	0.000	0.520
10.5	0.452	0.603	0.000	1.055	0.194	0.331	0.000	0.524	0.301	0.249	0.000	0.550
11.5	0.939	1.113	0.000	2.052	0.381	0.428	0.000	0.810	0.364	0.414	0.000	0.778
12.5	0.740	0.907	0.000	1.647	0.493	0.653	0.000	1.146	0.264	0.414	0.000	0.678
13.5	0.631	0.792	0.000	1.423	0.846	0.672	0.000	1.519	0.370	0.397	0.000	0.768
14.5	0.560	0.795	0.000	1.355	0.637	0.790	0.000	1.427	0.475	0.511	0.000	0.987
15.5	0.621	0.821	0.000	1.442	0.748	0.912	0.000	1.660	0.459	0.457	0.000	0.916
16.5	0.781	0.646	0.000	1.427	0.704	0.522	0.000	1.225	0.470	0.471	0.000	0.941
17.5	1.170	1.050	0.000	2.220	0.876	0.619	0.000	1.495	0.317	0.323	0.000	0.639
18.5	1.129	0.991	0.000	2.120	0.884	0.834	0.000	1.718	0.403	0.318	0.000	0.721
19.5	0.668	1.323	0.000	1.991	0.695	1.050	0.000	1.745	0.568	0.373	0.000	0.941
20.5	0.258	1.113	0.000	1.371	0.387	1.165	0.000	1.552	0.274	0.407	0.000	0.681
21.5	0.066	0.708	0.000	0.774	0.154	1.101	0.000	1.255	0.105	0.492	0.000	0.597
22.5	0.061	0.546	0.000	0.607	0.038	0.923	0.000	0.961	0.067	0.422	0.000	0.489
23.5	0.009	0.551	0.000	0.559	0.013	0.748	0.000	0.761	0.020	0.437	0.000	0.456
24.5	0.016	0.481	0.000	0.497	0.008	0.483	0.000	0.491	0.000	0.442	0.000	0.442
25.5	0.009	0.259	0.000	0.268	0.000	0.387	0.000	0.387	0.014	0.299	0.000	0.314
26.5	0.006	0.173	0.000	0.179	0.000	0.266	0.000	0.266	0.000	0.261	0.000	0.261
27.5	0.000	0.235	0.000	0.235	0.013	0.091	0.000	0.105	0.000	0.219	0.000	0.219
28.5	0.000	0.106	0.000	0.106	0.005	0.120	0.000	0.125	0.005	0.095	0.000	0.101
29.5	0.000	0.119	0.000	0.119	0.000	0.112	0.000	0.112	0.000	0.115	0.000	0.115
30.5	0.000	0.120	0.000	0.120	0.000	0.105	0.000	0.105	0.000	0.089	0.000	0.089
31.5	0.000	0.083	0.000	0.083	0.000	0.107	0.000	0.107	0.000	0.031	0.000	0.031
32.5	0.000	0.029	0.000	0.029	0.000	0.080	0.000	0.080	0.000	0.016	0.000	0.016
33.5	0.000	0.025	0.000	0.025	0.000	0.060	0.000	0.060	0.000	0.033	0.000	0.033
34.5	0.000	0.046	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
35.5	0.000	0.016	0.000	0.016	0.000	0.015	0.000	0.015	0.000	0.000	0.000	0.000
36.5	0.000	0.016	0.000	0.016	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
37.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39.5	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.5	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	9.762	15.641	0.403	25.807	8.775	13.935	0.152	22.862	5.432	8.365	0.744	14.541
Nº samples(*):				61				57				46
Nº Ind. (*):	1250	2028	57	3335	1140	1930	20	3090	671	1149	83	1903
Sampled catch:				1499				1629				1009
Range(*):				3-39				3-36				2.5-34.5
Total catch:				1781				1779				1009
Total hauls(*):				119				120				110

TABLE 7.- Swept area, number of hauls and Thorny skate mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 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	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD
353	0.0480	4	6.21	1.73	0.0465	4	26.06	11.09	0.0360	3	319.35	89.29	0.0356	3	149.95	44.45
354	0.0233	2	1.20	1.12	0.0356	3	68.23	87.97	0.0218	2	20.21	28.57	0.0356	3	82.44	34.12
355	0.0233	2	27.19	22.38	0.0221	2	3.43	0.23	0.0229	2	12.40	17.54	0.0233	2	33.14	41.19
356	0.0225	2	2.72	0.61	0.0221	2	0.69	0.42	0.0229	2	1.55	0.28	0.0225	2	2.21	0.51
357	0.0443	4	1.32	1.56	0.0240	2	1.69	1.37	0.0236	2	2.98	1.74	0.0124	1	0.00	-
358	0.0563	5	1.56	1.52	0.0236	3	0.99	1.17	0.0349	3	2.81	2.22	0.0341	3	15.49	17.71
359	0.0690	6	7.47	2.92	0.0698	6	7.93	5.95	0.0364	3	13.25	14.73	0.0469	4	71.73	91.22
360	0.3754	32	10.11	11.61	0.2561	25	17.95	23.86	0.2325	19	67.68	55.88	0.2396	20	132.15	142.67
374	0.0353	3	2.29	1.19	0.0353	3	0.41	0.61	0.0244	2	5.91	0.14	0.0240	2	0.71	1.00
375	0.0116	1	0.84	-	0.0345	3	1.97	1.81	0.0236	2	6.57	0.77	0.0244	2	3.48	0.40
376	0.1583	14	15.16	16.62	0.0930	10	24.06	35.48	0.1219	10	75.94	45.71	0.1200	10	68.84	52.60
377	0.0116	1	1.28	-	0.0229	2	0.32	0.31	0.0240	2	1.04	0.18	0.0229	2	0.57	0.81
378	0.0210	2	2.07	0.59	0.0120	2	2.07	2.40	0.0229	2	8.32	5.01	0.0233	2	5.54	3.31
379	0.0206	2	0.54	0.24	0.0356	3	1.69	1.09	0.0236	2	0.76	0.53	0.0225	2	1.10	0.51
380	0.0210	2	1.27	0.37	0.0113	2	4.50	2.78	0.0236	2	3.96	1.95	0.0236	2	1.26	1.17
381	0.0221	2	6.17	7.81	0.0229	2	7.65	0.24	0.0229	2	1.03	0.28	0.0236	2	3.94	0.36
382	0.0461	4	0.64	0.95	0.0229	3	1.02	0.85	0.0484	4	4.44	3.05	0.0499	4	5.36	0.80
721	0.0221	2	2.28	0.18	0.0203	2	8.17	9.33	0.0244	2	1.16	1.64	0.0236	2	6.54	6.27
722	0.0214	2	7.54	10.66	0.0101	2	38.34	45.25	0.0229	2	10.79	15.26	0.0218	2	13.79	6.07
723	0.0210	2	6.32	7.25	0.0233	2	2.62	0.40	0.0229	2	3.77	3.99	0.0248	2	4.05	4.37
724	0.0225	2	2.06	2.45	0.0206	2	12.29	3.71	0.0225	2	9.83	6.80	0.0233	2	2.33	3.29
725	0.0206	2	0.27	0.31	0.0086	1	3.89	-	0.0229	2	3.63	5.13	0.0210	2	4.11	5.03
726	n.s.	n.s.	n.s.	n.s.	0.0094	2	0.26	0.37	0.0225	2	0.89	1.25	0.0221	2	9.68	10.56
727	0.0094	1	3.37	-	0.0233	2	6.02	2.84	0.0236	2	2.83	0.63	0.0210	2	0.58	0.60
728	0.0214	2	1.45	1.11	0.0206	2	4.68	2.68	0.0233	2	4.91	3.22	0.0210	2	1.85	1.22
752	0.0218	2	4.25	2.51	0.0229	2	58.62	78.69	0.0233	2	2.24	1.11	0.0206	2	1.20	1.30
753	0.0214	2	13.56	17.61	0.0218	2	4.01	5.19	0.0229	2	17.13	19.39	0.0218	2	3.01	4.26
754	0.0330	3	45.32	25.00	0.0210	2	112.25	14.65	0.0206	2	16.66	23.56	0.0195	2	54.96	23.46
755	n.s.	n.s.	n.s.	n.s.	0.0206	2	7.84	5.34	0.0311	3	0.00	0.00	0.0431	4	2.74	5.48
756	0.0109	1	13.91	-	0.0225	2	63.66	36.74	0.0225	2	16.21	19.54	0.0203	2	3.69	3.64
757	0.0304	3	32.68	39.04	0.0206	2	67.38	86.94	0.0233	2	10.74	10.98	0.0214	2	55.50	20.36
758	0.0214	2	52.54	7.90	0.0105	2	235.97	239.70	0.0214	2	117.49	142.60	0.0210	2	55.87	79.01
759	n.s.	n.s.	n.s.	n.s.	0.0214	2	114.12	147.96	0.0218	2	0.43	0.26	0.0210	2	41.86	56.21
760	0.0105	1	0.00	-	0.0214	2	6.73	3.05	0.0225	2	9.20	11.14	0.0210	2	12.97	11.59
761	0.0315	3	59.26	86.28	0.0206	2	17.62	10.16	0.0210	2	0.71	0.32	0.0221	2	10.20	13.55
762	0.0308	3	50.77	82.75	0.0094	2	5.24	4.35	0.0210	2	8.28	10.49	0.0203	2	5.54	7.83
763	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.00	0.0311	3	0.00	0.00	0.0416	4	0.00	0.00
764	0.0206	2	14.84	5.60	0.0218	2	12.47	10.81	0.0225	2	0.00	0.00	0.0218	2	0.00	0.00
765	0.0206	2	14.88	18.39	0.0098	2	12.08	15.52	0.0221	2	0.00	0.00	0.0203	2	1.35	1.91
766	0.0308	3	15.23	9.42	0.0191	2	0.51	0.20	0.0218	2	0.00	0.00	0.0214	2	0.00	0.00
767	n.s.	n.s.	n.s.	n.s.	0.0109	2	2.83	3.87	0.0214	2	0.00	0.00	0.0210	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 Thorny skate mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

	2001				2002				2003				2004			
Stratum	Swept area	Tow number	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD	Swept area	Tow number	T. skate Mean	T. skate SD
353	0.0341	3	351.90	283.060	0.0476	4	356.30	215.772	0.0334	3	78.36	33.796	0.0338	3	53.70	33.407
354	0.0338	3	67.63	19.515	0.0356	3	89.80	80.809	0.0338	3	40.33	40.683	0.0345	3	147.46	134.348
355	0.0240	2	20.60	11.031	0.0236	2	2.67	3.723	0.0229	2	19.53	22.422	0.0229	2	25.07	4.384
356	0.0240	2	0.29	0.410	0.0233	2	1.55	2.192	0.0225	2	5.19	7.333	0.0221	2	16.31	7.732
357	0.0244	2	2.35	1.669	0.0240	2	2.00	2.828	0.0229	2	2.25	3.182	0.0229	2	46.05	28.438
358	0.0345	3	4.05	6.974	0.0345	3	11.47	19.861	0.0338	3	21.14	25.809	0.0330	3	42.24	13.838
359	0.0803	7	15.45	24.999	0.0686	6	72.34	148.583	0.0791	7	25.86	23.965	0.0791	7	46.56	62.119
360	0.2423	20	67.67	79.827	0.2865	25	20.63	24.987	0.2254	20	35.53	29.397	0.2310	20	93.53	78.305
374	0.0240	2	0.73	1.032	0.0345	3	0.30	0.520	0.0225	2	0.00	0.000	0.0233	2	1.89	2.673
375	0.0338	3	0.51	0.878	0.0353	3	1.40	2.425	0.0330	3	2.29	2.414	0.0338	3	10.32	5.359
376	0.1155	10	22.67	19.650	0.1140	10	12.59	12.093	0.1125	10	10.77	12.802	0.1166	10	89.67	62.815
377	0.0229	2	5.70	2.270	0.0229	2	1.17	1.655	0.0225	2	0.46	0.438	0.0218	2	7.23	9.648
378	0.0236	2	0.16	0.099	0.0233	2	0.02	0.021	0.0225	2	2.98	4.076	0.0225	2	26.20	17.402
379	0.0229	2	0.00	0.000	0.0229	2	5.45	1.909	0.0229	2	0.01	0.014	0.0124	1	13.61	-
380	0.0206	2	1.35	0.209	0.0225	2	4.42	4.476	0.0229	2	4.09	0.559	0.0221	2	119.25	56.639
381	0.0236	2	0.74	0.419	0.0229	2	0.71	0.071	0.0229	2	3.40	3.394	0.0225	2	70.60	17.536
382	0.0469	4	1.77	1.265	0.0341	3	0.65	0.257	0.0454	4	0.00	0.000	0.0461	4	6.28	6.990
721	0.0248	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	10.63	7.481	0.0221	2	2.70	3.818
722	0.0233	2	10.10	5.374	0.0236	2	0.00	0.000	0.0221	2	0.91	0.021	0.0218	2	0.00	0.000
723	0.0240	2	2.40	2.121	0.0233	2	0.60	0.849	0.0229	2	5.19	4.865	0.0229	2	4.85	1.913
724	0.0353	3	67.38	91.221	0.0225	2	25.85	14.354	0.0225	2	26.32	0.226	0.0214	2	0.00	0.000
725	0.0116	2	1.91	1.235	0.0225	2	1.82	2.574	0.0229	2	1.31	0.506	0.0225	2	44.22	57.679
726	0.0116	2	1.32	1.381	0.0214	2	3.30	1.980	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
727	0.0225	2	0.64	0.905	0.0233	2	3.05	4.313	0.0218	2	96.69	91.097	0.0233	2	10.16	10.380
728	0.0229	2	1.65	1.531	0.0229	2	6.69	9.454	0.0225	2	17.23	8.301	0.0180	2	2.69	3.804
752	0.0210	2	8.93	5.430	0.0116	1	0.49	0.686	0.0229	2	183.35	38.537	0.0214	2	0.00	0.000
753	0.0214	2	13.11	15.123	0.0229	2	12.90	18.243	0.0229	2	7.99	1.775	0.0218	2	0.00	0.000
754	0.0195	2	98.76	126.307	0.0341	3	595.65	819.042	0.0218	2	3.35	4.731	0.0214	2	0.00	0.000
755	0.0416	4	0.14	0.283	0.0338	3	0.00	0.000	0.0221	2	0.00	0.000	0.0319	3	1.26	2.188
756	0.0113	2	7.04	3.761	0.0229	2	9.36	7.835	0.0221	2	133.16	187.864	0.0218	2	0.00	0.000
757	0.0233	2	15.10	19.889	0.0225	2	1.55	2.192	0.0221	2	6.99	9.885	0.0218	2	0.00	0.000
758	0.0218	2	184.47	248.733	0.0225	2	32.45	41.224	0.0221	2	4.29	6.060	0.0214	2	0.00	0.000
759	0.0221	2	4.93	3.950	0.0225	2	3.70	5.233	0.0113	1	3.89	#¡DIV/0!	0.0214	2	0.00	0.000
760	0.0229	2	6.47	5.282	0.0229	2	1.89	2.673	0.0218	2	30.68	30.717	0.0221	2	0.00	0.000
761	0.0225	2	66.60	89.661	0.0225	2	11.90	4.667	0.0225	2	0.00	0.000	0.0221	2	2.69	0.912
762	0.0116	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	2.99	1.570	0.0233	2	1.15	1.619
763	0.0330	3	0.00	0.000	0.0225	2	0.00	0.000	0.0311	3	0.00	0.000	0.0326	3	0.00	0.000
764	0.0240	2	2.45	3.465	0.0236	2	0.00	0.000	0.0221	2	42.05	45.064	0.0229	2	4.35	6.152
765	0.0113	2	1.03	1.462	0.0236	2	0.71	1.004	0.0113	1	2.23	-	0.0225	2	0.00	0.000
766	0.0203	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.67	0.940
767	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000	0.0229	2	1.13	0.215	0.0218	2	2.41	3.401

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

TABLE 7 (cont.).- Swept area, number of hauls and Thorny skate mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

	2005				2006				2007			
Stratum	Swept area	Tow number	T. skate Mean catch	T. skate SD	Swept area	Tow number	T. skate Mean catch	T. skate SD	Swept area	Tow number	T. skate Mean catch	T. skate SD
353	0.0353	3	40.97	40.382	0.0371	3	48.27	33.965	0.0364	3	23.20	8.044
354	0.0353	3	48.19	40.450	0.0364	3	62.30	19.336	0.0364	3	52.94	32.333
355	0.0225	2	17.80	2.628	0.0248	2	1.51	2.128	0.0240	2	20.47	0.990
356	0.0233	2	10.81	2.242	0.0240	2	19.15	18.314	0.0240	2	4.02	2.461
357	0.0233	2	51.88	55.763	0.0244	2	28.29	40.007	0.0360	3	7.02	6.365
358	0.0349	3	72.15	80.699	0.0349	3	5.75	6.983	0.0368	3	76.01	65.231
359	0.0814	7	45.11	63.415	0.0975	8	45.28	34.608	0.0855	7	28.01	25.576
360	0.2325	20	59.30	63.584	0.2340	19	74.59	59.722	0.2378	20	46.42	42.247
374	0.0229	2	2.70	1.082	0.0236	2	9.84	3.118	0.0240	2	0.00	0.000
375	0.0349	3	12.31	10.043	0.0364	3	34.35	17.964	0.0364	3	35.80	59.229
376	0.1174	10	154.50	136.423	0.1219	10	183.56	254.026	0.1185	10	40.71	34.911
377	0.0233	2	29.36	30.186	0.0236	2	61.48	33.411	0.0240	2	1.08	1.520
378	0.0225	2	6.10	7.264	0.0240	2	5.86	8.280	0.0233	2	7.48	3.055
379	0.0236	2	32.60	16.971	0.0236	2	181.31	256.409	0.0240	2	33.71	20.209
380	0.0229	2	66.74	45.199	0.0229	2	110.30	2.687	0.0240	2	77.10	66.320
381	0.0233	2	52.28	28.354	0.0229	2	72.41	8.775	0.0240	2	5.05	7.142
382	0.0458	4	5.06	4.563	0.0469	4	3.41	3.064	0.0484	4	0.00	0.000
721	0.0229	2	6.15	8.697	0.0236	2	0.00	0.000	0.0116	1	0.00	-
722	0.0233	2	6.90	9.758	0.0240	2	0.00	0.000	0.0225	2	3.43	4.844
723	0.0233	2	0.00	0.000	0.0236	2	5.41	4.226	0.0240	2	13.23	10.529
724	0.0225	2	4.20	5.940	0.0233	2	0.00	0.000	0.0233	2	7.22	10.204
725	0.0236	2	30.95	43.775	0.0233	2	73.01	100.261	0.0225	2	19.87	18.314
726	0.0113	1	0.00	-	0.0225	2	3.66	1.237	0.0229	2	2.11	2.984
727	0.0229	2	7.57	7.969	0.0225	2	0.00	0.000	0.0240	2	10.56	4.327
728	0.0109	1	0.00	-	0.0225	2	1.32	1.860	0.0225	2	12.85	14.107
752	0.0236	2	0.00	0.000	0.0225	2	0.73	1.025	0.0225	2	0.00	0.000
753	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
754	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
755	0.0450	4	0.00	0.000	0.0338	3	0.00	0.000	0.0338	3	0.00	0.000
756	0.0233	2	0.00	0.000	0.0229	2	0.01	0.008	0.0225	2	0.00	0.000
757	0.0225	2	0.00	0.000	0.0225	2	0.51	0.718	0.0229	2	0.00	0.000
758	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
760	0.0229	2	4.43	6.265	0.0225	2	0.00	0.000	0.0233	2	1.65	2.333
761	0.0221	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
762	0.0225	2	0.00	0.000	0.0233	2	1.45	2.044	n.s.	n.s.	n.s.	n.s.
763	0.0334	3	0.00	0.000	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	0.00	0.000	0.0233	2	7.90	11.172	0.0225	2	0.00	0.000
765	0.0229	2	0.00	0.000	0.0236	2	4.40	6.223	0.0225	2	3.92	5.537
766	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
767	0.0113	1	0.00	-	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.

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

TABLE 8.- Stratified mean catches (Kg) by stratum and year and SD by year of Thorny skate (1997-2007). n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 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	2007
353	1669.97	7010.90	85905.05	40337.51	94661.10	95844.70	21079.74	14444.04	11021.83	12983.73	6241.70
354	295.14	16784.41	4970.54	20279.74	16637.80	22090.80	9922.00	36275.57	11854.08	15324.98	13024.06
355	2012.42	254.06	917.88	2452.15	1524.40	197.40	1444.85	1855.18	1317.05	111.37	1514.78
356	127.82	32.39	72.76	104.05	13.63	72.85	243.70	766.45	507.84	900.05	188.94
357	216.74	276.48	488.38	0.00	385.40	328.00	369.00	7551.46	8508.73	4639.40	1151.83
358	351.96	223.34	632.19	3484.89	910.50	2580.00	4755.75	9504.23	16232.63	1293.75	17102.25
359	3142.88	3339.74	5577.75	30200.14	6505.05	30455.91	10885.26	19600.14	18990.11	19063.93	11792.21
360	28142.65	49941.51	188345.34	367770.68	188311.70	57415.52	98885.56	260307.63	165039.55	207581.48	129182.27
374	490.16	87.78	1264.01	151.68	156.22	64.20	0.00	404.46	576.73	2104.69	0.00
375	226.76	533.56	1780.76	942.07	137.31	379.40	619.69	2796.27	3336.91	9307.95	9702.70
376	20225.18	32095.39	101299.43	91833.65	30244.45	16788.39	14361.84	119622.45	206104.33	244867.71	54306.47
377	127.98	31.99	103.98	56.97	569.50	117.05	46.00	723.25	2935.50	6147.50	107.50
378	287.36	287.36	1156.26	769.70	22.24	2.09	413.87	3641.11	847.41	813.85	1039.72
379	57.26	179.13	80.48	116.74	0.00	577.70	1.06	1442.66	3455.60	19218.70	3573.26
380	121.68	432.36	380.38	121.44	129.94	423.84	392.16	11448.00	6406.99	10588.80	7401.12
381	887.94	1102.17	148.85	567.92	106.50	102.24	489.60	10166.40	7528.46	10426.32	727.20
382	220.75	350.60	1522.42	1838.77	607.79	224.32	0.00	2153.18	1734.72	1167.92	0.00
721	148.37	531.10	75.19	425.20	0.00	0.00	690.95	175.50	399.75	0.00	0.00
722	633.11	3220.86	906.51	1158.73	848.40	0.00	76.02	0.00	579.60	0.00	287.70
723	979.42	406.26	584.98	627.32	372.00	93.00	804.45	752.22	0.00	838.78	2049.88
724	254.82	1524.34	1219.17	288.39	8355.12	3205.40	3263.68	0.00	520.80	0.00	894.66
725	28.43	408.29	381.16	431.94	200.22	191.10	137.81	4642.58	3250.12	7665.53	2086.35
726	n.s.	18.61	63.79	697.27	95.29	237.60	0.00	0.00	0.00	263.16	151.92
727	323.68	577.66	271.70	56.11	61.43	292.80	9281.76	975.36	726.24	0.00	1013.76
728	113.26	364.73	382.97	143.97	128.62	521.43	1343.94	209.82	0.00	102.57	1001.91
752	556.95	7679.60	293.39	157.17	1170.32	63.54	24018.85	0.00	0.00	94.98	0.00
753	1871.36	553.60	2364.16	416.05	1808.52	1780.20	1101.93	0.00	0.00	0.00	0.00
754	8157.59	20204.97	2999.07	9892.06	17777.36	107217.00	602.10	0.00	0.00	0.00	0.00
755	n.s.	3017.84	0.00	1054.11	54.48	0.00	0.00	486.38	0.00	0.00	0.00
756	1404.41	6429.24	1636.83	372.60	711.08	945.36	13449.16	0.00	0.00	0.61	0.00
757	3333.76	6873.20	1095.75	5660.73	1540.20	158.10	712.98	0.00	0.00	51.77	0.00
758	5201.49	23360.86	11631.70	5530.78	18262.55	3212.55	424.22	0.00	0.00	0.00	0.00
759	n.s.	14493.27	54.38	5316.60	626.68	469.90	494.03	0.00	0.00	0.00	n.s.
760	0.00	1036.58	1417.48	1997.36	995.61	291.06	4724.72	0.00	682.22	0.00	254.10
761	10133.38	3013.25	121.20	1744.82	11388.60	2034.90	0.00	459.14	0.00	0.00	0.00
762	10763.16	1111.32	1755.68	1173.93	0.00	0.00	633.88	242.74	0.00	306.34	n.s.
763	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n.s.
764	1484.03	1246.54	0.00	0.00	245.00	0.00	4204.50	435.00	0.00	790.00	0.00
765	1844.78	1498.40	0.00	167.85	128.17	88.04	276.52	0.00	0.00	545.60	485.46
766	2192.53	73.89	0.00	0.00	0.00	0.00	0.00	95.76	0.00	0.00	n.s.
767	n.s.	446.89	0.00	0.00	0.00	0.00	178.22	379.99	0.00	0.00	n.s.
TOTAL	108029.16	211054.49	421901.59	598341.10	405693.16	348466.38	230329.79	511556.95	472557.21	577201.44	265281.74
	11.57	20.41	40.79	57.86	39.23	33.69	22.27	49.46	45.69	55.81	28.10
S.D.	1.74	3.26	4.32	9.12	6.99	10.91	2.57	5.82	7.00	11.22	3.57

TABLE 9.- Survey estimates (by the swept area method) of Thorny skate 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. 2002-2007 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	2007
353	139	603	7159	3397	8321	8050	1895	1284	938	1049	515
354	25	1413	457	1708	1479	1860	882	3154	1009	1264	1074
355	173	23	80	211	127	17	126	162	117	9	126
356	11	3	6	9	1	6	22	69	44	75	16
357	20	23	41	0	32	27	32	660	732	381	96
358	31	19	54	306	79	224	423	864	1396	111	1396
359	273	287	460	2577	567	2663	963	1734	1634	1564	965
360	2399	4307	15392	30696	15548	5010	8775	22537	14197	16855	10867
374	42	7	104	13	13	6	0	35	50	178	0
375	20	46	151	77	12	32	56	249	287	768	800
376	1789	2779	8312	7653	2618	1473	1277	10257	17559	20092	4583
377	11	3	9	5	50	10	4	67	253	520	9
378	27	25	101	66	2	0	37	324	75	68	89
379	6	15	7	10	0	51	0	117	293	1627	298
380	12	38	32	10	13	38	34	1035	560	926	617
381	80	96	13	48	9	9	43	904	648	912	61
382	19	31	126	147	52	20	0	187	152	100	0
721	13	52	6	36	0	0	61	16	35	0	0
722	59	301	79	107	73	0	7	0	50	0	26
723	93	35	51	51	31	8	70	66	0	71	171
724	23	148	108	25	711	285	290	0	46	0	77
725	3	47	33	41	17	17	12	413	275	659	185
726	n.s.	2	6	63	8	22	0	0	0	23	13
727	35	50	23	5	5	25	853	84	63	0	84
728	11	35	33	14	11	46	119	23	0	9	89
752	51	671	25	15	111	6	2100	0	0	8	0
753	175	51	207	38	169	156	96	0	0	0	0
754	742	1924	291	1015	1822	9374	55	0	0	0	0
755	n.s.	293	0	98	5	0	0	46	0	0	0
756	129	571	145	37	62	83	1216	0	0	0	0
757	329	666	94	530	132	14	64	0	0	5	0
758	487	2148	1088	527	1679	286	38	0	0	0	0
759	n.s.	1356	5	506	57	42	44	0	0	0	n.s.
760	0	97	126	190	87	25	434	0	60	0	22
761	965	292	12	158	1012	181	0	42	0	0	0
762	1050	108	167	116	0	0	56	21	0	26	n.s.
763	n.s.	0	0	0	0	0	0	0	0	0	n.s.
764	144	115	0	0	20	0	380	38	0	68	0
765	179	143	0	17	12	7	25	0	0	46	43
766	214	8	0	0	0	0	0	9	0	0	n.s.
767	n.s.	40	0	0	0	0	16	35	0	0	n.s.
TOTAL	9779	18875	35004	50521	34948	30072	20508	44429	40473	47415	22223
S.D.	1544	3114	3736	7991	10687	9699	2371	5281	6171	9207	2898

TABLE 10.- Length weight relationships in the calculation of Thorny skate biomass. The equation is $Weight = a(l + 0.5)^b$ Spanish Spring Surveys on NAFO Div. 3NO: 1997-2007. To calculate the parameters for the indeterminate individuals, we used the total data (males + females + indeterminate individuals). *E* means Error.

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Males	a	0.0069 E = 0.202	0.0064 E = 0.259	0.025 E = 0.456	0.0506 E = 0.192	0.0085 E = 0.091	0.0075 E = 0.086	0.0079 E = 0.101	0.0060 E = 0.0978	0.0066 E = 0.0954	0.0079 E = 0.1133	0.0091 E = 0.0916
	b	3.0921 E = 0.052	3.1161 E = 0.075	2.769 E = 0.124	2.5954 E = 0.049	3.0171 E = 0.022	3.0566 E = 0.022	3.0414 E =0.026	3.1122 E = 0.0251	3.0882 E = 0.0246	3.0399 E = 0.0292	3.0106 E = 0.0232
		R2 = 0.987 N = 107	R2 = 0.986 N = 67	R2 = 0.967 N = 33	R2 = 0.983 N = 199	R2 = 0.998 N = 104	R2 = 0.996 N = 374	R2 = 0.995 N = 426	R2 = 0.996 N = 368	R2 = 0.996 N = 360	R2 = 0.997 N = 7492	R2 = 0.996 N= 346
Females	a	0.0072 E = 0.182	0.0098 E = 0.169	0.0294 E = 0.268	0.0313 E =0.223	0.0073 E = 0.119	0.0061 E =0.074	0.0067 E = 0.101	0.0071 E = 0.1072	0.0036 E = 0.2213	0.0104 E = 0.2042	0.0082 E = 0.0952
	b	3.0927 E = 0.046	2.9904 E = 0.046	2.7383 E = 0.072	2.7247 E = 0.058	3.0509 E = 0.031	3.1115 E = 0.019	3.0887 E = 0.026	3.0752 E = 0.0281	3.2435 E = 0.0575	2.9798 E = 0.0534	3.0399 E = 0.0246
		R2 = 0.991 N = 113	R2 = 0.992 N = 89	R2 = 0.985 N = 53	R2 = 0.977 N = 245	R2 = 0.996 N = 77	R2 = 0.997 N = 425	R2 = 0.996 N = 477	R2 = 0.994 N = 442	R2 = 0.980 N = 396	R2 = 0.990 N = 583	R2 = 0.996 N= 423
Indet.	a	0.0068 E = 0.144	0.0072 E = 0.166	0.0267 E = 0.205	0.0423 E = 0.174	0.0077 E = 0.079	0.0066 E = 0.068	0.0075 E = 0.095	0.0071 E = 0.0091	0.0057 E = 0.1146	0.0091 E = 0.1258	0.0081 E = 0.0800
	b	3.099 E = 0.037	3.073 E = 0.046	2.7618 E = 0.055	2.6472 E = 0.045	3.0411 E = 0.020	3.0887 E = 0.018	3.0552 E = 0.025	3.0730 E = 0.0237	3.1287 E = 0.0298	3.0086 E = 0.0326	3.0385 E = 0.0206
		R^2 = 0.993 N = 220	R^2 = 0.991 N =156	R^2 = 0.990 N = 86	R^2 = 0.984 N = 444	R^2 = 0.998 N = 181	R^2 = 0.998 N = 800	R^2 = 0.995 N = 903	R^2 = 0.996 N = 810	R^2 = 0.993 N = 756	R^2 = 0.995 N = 1075	R2 = 0.997 N= 769

TABLE 11.- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	1997				1998				1999				2000			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.014	0.394	0.000	0.408	0.014	0.000	0.000	0.014	0.000	0.013	0.006	0.019	0.006	0.006	0.000	0.013
14	0.254	0.224	0.000	0.479	0.021	0.013	0.000	0.034	0.035	0.053	0.006	0.094	0.037	0.047	0.000	0.083
16	0.116	0.272	0.000	0.388	0.026	0.009	0.000	0.035	0.049	0.092	0.006	0.148	0.271	0.106	0.000	0.377
18	0.033	0.132	0.000	0.165	0.042	0.294	0.000	0.336	0.075	0.120	0.000	0.195	0.039	0.065	0.000	0.104
20	0.331	0.112	0.000	0.443	0.164	0.030	0.000	0.193	0.094	0.115	0.000	0.209	0.197	0.167	0.000	0.364
22	0.728	0.202	0.000	0.930	0.337	0.886	0.000	1.223	0.115	0.091	0.000	0.206	0.058	0.135	0.000	0.193
24	0.635	0.670	0.000	1.305	1.239	0.171	0.000	1.410	0.176	0.073	0.000	0.249	0.178	0.175	0.000	0.353
26	0.416	0.781	0.000	1.197	0.314	0.238	0.000	0.552	0.305	0.240	0.000	0.545	0.290	0.206	0.000	0.496
28	0.064	0.282	0.000	0.346	0.217	0.268	0.000	0.485	0.143	0.321	0.000	0.464	0.217	0.174	0.000	0.391
30	0.044	0.037	0.000	0.080	0.095	0.069	0.000	0.164	0.060	0.041	0.000	0.102	0.028	0.038	0.000	0.066
32	0.033	0.038	0.000	0.071	0.071	0.156	0.000	0.227	0.105	0.091	0.000	0.196	0.048	0.054	0.000	0.101
34	0.068	0.085	0.000	0.153	0.190	0.217	0.000	0.407	0.165	0.112	0.000	0.277	0.119	0.105	0.000	0.224
36	0.131	0.067	0.000	0.197	0.160	0.295	0.000	0.454	0.205	0.237	0.000	0.442	0.170	0.105	0.000	0.275
38	0.086	0.141	0.000	0.227	0.256	0.217	0.000	0.472	0.294	0.371	0.000	0.665	0.228	0.265	0.000	0.493
40	0.123	0.058	0.000	0.181	0.168	0.242	0.000	0.410	0.431	0.483	0.000	0.914	0.300	0.322	0.000	0.621
42	0.092	0.097	0.000	0.189	0.254	0.241	0.000	0.494	0.676	0.634	0.000	1.310	0.410	0.498	0.000	0.908
44	0.172	0.129	0.000	0.301	0.291	0.191	0.000	0.482	0.737	0.720	0.000	1.458	0.549	0.617	0.000	1.166
46	0.165	0.100	0.000	0.265	0.169	0.309	0.000	0.478	0.546	0.787	0.010	1.343	0.629	0.762	0.000	1.391
48	0.066	0.064	0.000	0.130	0.211	0.378	0.000	0.589	0.608	0.541	0.000	1.149	1.035	0.690	0.000	1.725
50	0.089	0.156	0.000	0.245	0.260	0.286	0.000	0.546	0.709	0.580	0.000	1.290	0.745	0.730	0.000	1.475
52	0.098	0.181	0.000	0.279	0.231	0.216	0.000	0.447	0.605	0.665	0.000	1.270	0.847	0.726	0.000	1.573
54	0.064	0.118	0.000	0.182	0.122	0.265	0.000	0.388	0.418	0.436	0.000	0.854	0.702	0.623	0.000	1.325
56	0.078	0.139	0.000	0.217	0.292	0.341	0.000	0.633	0.411	0.413	0.000	0.824	0.814	0.849	0.000	1.663
58	0.055	0.071	0.000	0.126	0.186	0.211	0.000	0.397	0.378	0.379	0.000	0.757	0.700	0.605	0.000	1.305
60	0.200	0.105	0.000	0.305	0.222	0.290	0.000	0.512	0.523	0.523	0.000	1.047	0.562	0.581	0.000	1.143
62	0.066	0.227	0.000	0.293	0.188	0.227	0.000	0.415	0.364	0.379	0.000	0.743	0.548	0.532	0.000	1.080
64	0.103	0.079	0.000	0.182	0.403	0.276	0.000	0.679	0.350	0.388	0.000	0.739	0.621	0.600	0.000	1.221
66	0.116	0.206	0.000	0.322	0.213	0.327	0.000	0.540	0.289	0.339	0.000	0.628	0.317	0.842	0.000	1.159
68	0.074	0.127	0.000	0.200	0.119	0.331	0.000	0.449	0.439	0.397	0.000	0.836	0.387	0.621	0.000	1.008
70	0.075	0.116	0.000	0.191	0.066	0.257	0.000	0.323	0.334	0.393	0.000	0.726	0.398	0.799	0.000	1.197
72	0.040	0.079	0.000	0.119	0.188	0.124	0.000	0.312	0.301	0.343	0.000	0.644	0.398	0.585	0.000	0.983
74	0.044	0.151	0.000	0.195	0.187	0.125	0.000	0.312	0.179	0.268	0.000	0.447	0.434	0.505	0.000	0.939
76	0.000	0.098	0.000	0.098	0.085	0.058	0.000	0.144	0.288	0.192	0.000	0.480	0.373	0.405	0.000	0.778
78	0.067	0.100	0.000	0.167	0.047	0.033	0.000	0.080	0.251	0.282	0.000	0.533	0.317	0.282	0.000	0.599
80	0.027	0.000	0.000	0.027	0.045	0.012	0.000	0.057	0.161	0.092	0.000	0.253	0.209	0.167	0.000	0.377
82	0.005	0.055	0.000	0.059	0.050	0.009	0.000	0.060	0.196	0.027	0.000	0.224	0.166	0.077	0.000	0.243
84	0.005	0.000	0.000	0.005	0.010	0.000	0.000	0.010	0.066	0.028	0.000	0.093	0.109	0.040	0.000	0.149
86	0.029	0.000	0.000	0.029	0.000	0.031	0.000	0.031	0.050	0.006	0.000	0.056	0.087	0.066	0.000	0.153
88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009	0.116	0.010	0.000	0.126
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.001	0.000	0.015	0.046	0.000	0.000	0.046
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.003	0.000	0.020	0.023	0.000	0.000	0.023
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.011
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.022
98	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	0.001	0.000	0.001
100	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	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
104	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
106	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
108	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
110	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
112	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
114	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
116	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	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
120	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
122	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
124	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003	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	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	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	4.803	5.892	0.000	10.695	7.158	7.649	0.000	14.808	11.173	11.271	0.029	22.472	13.760	14.185	0.000	27.945
Nº samples (*):				33				33				88				83
Nº Ind. (*):	404	425	0	829	723	812	0	1535	2082	2200	4	4286	2397	2429	0	4826
Sampled catch:				212				461				1526				2289
Range (*):				12-87				13-131				13-93				13-99
Total catch:				1580				2696				3672				5076
Total hauls (*):				128				124				114				118

TABLE 11 (cont.).- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	2001				2002				2003				2004			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.000	0.011	0.000	0.011	0.035	0.021	0.000	0.056	0.007	0.000	0.000	0.007	0.038	0.019	0.000	0.057
14	0.063	0.089	0.000	0.153	0.089	0.192	0.005	0.285	0.026	0.043	0.000	0.069	0.090	0.076	0.000	0.166
16	0.026	0.088	0.000	0.114	0.125	0.181	0.000	0.305	0.016	0.011	0.000	0.027	0.036	0.058	0.000	0.094
18	0.018	0.020	0.000	0.038	0.094	0.320	0.000	0.415	0.040	0.035	0.000	0.075	0.061	0.059	0.000	0.120
20	0.033	0.010	0.000	0.043	0.049	0.096	0.000	0.146	0.059	0.008	0.000	0.067	0.076	0.062	0.000	0.138
22	0.008	0.042	0.000	0.050	0.034	0.074	0.000	0.109	0.050	0.056	0.000	0.106	0.078	0.057	0.000	0.135
24	0.000	0.037	0.000	0.037	0.014	0.027	0.000	0.041	0.007	0.020	0.000	0.027	0.095	0.048	0.000	0.143
26	0.045	0.019	0.000	0.064	0.023	0.047	0.000	0.070	0.027	0.000	0.000	0.027	0.085	0.042	0.000	0.127
28	0.000	0.070	0.000	0.070	0.021	0.044	0.000	0.065	0.040	0.019	0.000	0.059	0.064	0.047	0.000	0.111
30	0.023	0.040	0.000	0.063	0.060	0.056	0.000	0.115	0.038	0.023	0.000	0.061	0.129	0.133	0.000	0.263
32	0.029	0.077	0.000	0.106	0.059	0.105	0.000	0.164	0.145	0.095	0.000	0.239	0.217	0.133	0.000	0.349
34	0.075	0.140	0.000	0.215	0.082	0.336	0.000	0.419	0.096	0.078	0.000	0.174	0.200	0.244	0.000	0.444
36	0.124	0.255	0.000	0.379	0.180	0.151	0.000	0.331	0.175	0.137	0.000	0.312	0.295	0.284	0.000	0.579
38	0.184	0.249	0.000	0.434	0.344	0.333	0.000	0.677	0.209	0.172	0.000	0.382	0.332	0.422	0.000	0.755
40	0.400	0.497	0.000	0.897	0.733	0.617	0.000	1.350	0.295	0.399	0.000	0.694	0.373	0.402	0.000	0.776
42	0.343	0.372	0.000	0.715	0.811	0.913	0.000	1.724	0.358	0.323	0.000	0.681	0.709	0.681	0.000	1.390
44	0.396	0.575	0.000	0.971	0.763	0.887	0.000	1.650	0.382	0.400	0.000	0.782	0.760	0.744	0.000	1.504
46	0.474	0.576	0.000	1.049	0.849	0.920	0.000	1.769	0.309	0.374	0.000	0.683	0.575	0.672	0.000	1.247
48	0.452	0.623	0.000	1.075	0.651	1.024	0.000	1.675	0.320	0.456	0.000	0.776	0.653	0.759	0.000	1.413
50	0.548	0.473	0.000	1.021	0.773	0.698	0.000	1.471	0.283	0.377	0.000	0.660	0.469	0.627	0.000	1.096
52	0.618	0.582	0.000	1.199	0.551	0.711	0.000	1.261	0.257	0.372	0.000	0.630	0.824	0.621	0.000	1.444
54	0.452	0.580	0.000	1.032	0.482	0.452	0.000	0.934	0.324	0.394	0.000	0.718	0.419	0.576	0.000	0.995
56	0.672	0.381	0.000	1.053	0.244	0.389	0.000	0.633	0.256	0.285	0.000	0.541	0.498	0.899	0.000	1.398
58	0.377	0.448	0.000	0.825	0.487	0.325	0.000	0.812	0.284	0.342	0.000	0.626	0.511	0.781	0.000	1.293
60	0.342	0.434	0.000	0.776	0.179	0.196	0.000	0.375	0.247	0.330	0.000	0.578	0.424	0.680	0.000	1.104
62	0.197	0.349	0.000	0.547	0.279	0.187	0.000	0.466	0.186	0.257	0.000	0.443	0.449	0.735	0.000	1.184
64	0.392	0.389	0.000	0.781	0.221	0.212	0.000	0.433	0.083	0.259	0.000	0.342	0.383	0.655	0.000	1.038
66	0.233	0.561	0.000	0.794	0.171	0.334	0.000	0.505	0.187	0.203	0.000	0.390	0.349	0.562	0.000	0.911
68	0.228	0.580	0.000	0.808	0.155	0.254	0.000	0.409	0.152	0.332	0.000	0.484	0.343	0.418	0.000	0.761
70	0.274	0.401	0.000	0.675	0.240	0.292	0.000	0.532	0.144	0.221	0.000	0.365	0.503	0.492	0.000	0.994
72	0.218	0.438	0.000	0.656	0.142	0.437	0.000	0.580	0.136	0.159	0.000	0.295	0.245	0.461	0.000	0.705
74	0.327	0.342	0.000	0.668	0.195	0.305	0.000	0.501	0.134	0.274	0.000	0.408	0.360	0.392	0.000	0.752
76	0.481	0.335	0.000	0.816	0.210	0.086	0.000	0.296	0.091	0.150	0.000	0.240	0.392	0.299	0.000	0.692
78	0.334	0.189	0.000	0.523	0.152	0.092	0.000	0.245	0.096	0.111	0.000	0.207	0.259	0.164	0.000	0.423
80	0.171	0.196	0.000	0.367	0.164	0.035	0.000	0.199	0.073	0.040	0.000	0.113	0.226	0.117	0.000	0.342
82	0.131	0.067	0.000	0.198	0.135	0.157	0.000	0.292	0.074	0.014	0.000	0.088	0.121	0.073	0.000	0.194
84	0.109	0.011	0.000	0.120	0.048	0.013	0.000	0.062	0.020	0.033	0.000	0.053	0.180	0.003	0.000	0.183
86	0.142	0.014	0.000	0.157	0.015	0.008	0.000	0.023	0.023	0.000	0.000	0.023	0.076	0.018	0.000	0.094
88	0.031	0.010	0.000	0.041	0.041	0.013	0.000	0.054	0.000	0.000	0.000	0.000	0.055	0.014	0.000	0.069
90	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009	0.028	0.000	0.000	0.028
92	0.011	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.005
96	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
98	0.004	0.003	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	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
102	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
104	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
106	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
108	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
110	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
112	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
114	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
116	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
118	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
120	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
122	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
124	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
126	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
128	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
130	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	8.996	10.572	0.000	19.568	9.903	11.540	0.005	21.448	5.660	6.802	0.000	12.461	11.985	13.529	0.000	25.514
Nº samples (*):				66				78				88				83
Nº Ind. (*):	629	632	0	1261	888	928	1	1817	743	811	0	1554	1150	1290	0	2440
Sampled catch:				2777				2961				2627				4666
Range (*):				13-99				12-89				13-90				12-95
Total catch:				3413				4271				2656				4674
Total hauls (*):				123				125				118				120

TABLE 11 (cont.).- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2007. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2007 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	2005				2006				2007			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.030	0.015	0.000	0.045	0.009	0.005	0.000	0.014	0.000	0.000	0.000	0.000
14	0.030	0.039	0.000	0.070	0.036	0.022	0.000	0.059	0.035	0.000	0.000	0.035
16	0.034	0.013	0.000	0.047	0.014	0.013	0.000	0.027	0.006	0.006	0.000	0.012
18	0.085	0.070	0.000	0.155	0.025	0.010	0.000	0.036	0.000	0.006	0.000	0.006
20	0.053	0.045	0.000	0.098	0.041	0.085	0.000	0.126	0.012	0.013	0.000	0.024
22	0.066	0.064	0.000	0.130	0.090	0.078	0.000	0.168	0.006	0.039	0.000	0.045
24	0.116	0.117	0.000	0.233	0.039	0.113	0.000	0.153	0.015	0.067	0.000	0.082
26	0.128	0.089	0.000	0.217	0.054	0.049	0.000	0.103	0.006	0.040	0.000	0.046
28	0.123	0.120	0.000	0.243	0.066	0.154	0.000	0.220	0.052	0.072	0.000	0.124
30	0.149	0.115	0.000	0.264	0.059	0.173	0.000	0.232	0.060	0.067	0.000	0.127
32	0.158	0.247	0.000	0.405	0.086	0.260	0.000	0.346	0.040	0.065	0.000	0.105
34	0.180	0.136	0.000	0.316	0.142	0.211	0.000	0.353	0.087	0.098	0.000	0.185
36	0.241	0.338	0.000	0.579	0.194	0.219	0.000	0.413	0.111	0.165	0.000	0.277
38	0.266	0.255	0.000	0.521	0.226	0.164	0.000	0.390	0.080	0.085	0.000	0.165
40	0.286	0.306	0.000	0.592	0.296	0.351	0.000	0.647	0.072	0.156	0.000	0.227
42	0.455	0.554	0.000	1.009	0.328	0.401	0.000	0.729	0.162	0.111	0.000	0.273
44	0.454	0.534	0.000	0.987	0.239	0.635	0.000	0.874	0.168	0.101	0.000	0.268
46	0.541	0.592	0.000	1.134	0.484	0.494	0.000	0.977	0.212	0.159	0.000	0.371
48	0.693	0.575	0.000	1.268	0.456	0.608	0.000	1.064	0.201	0.222	0.000	0.423
50	0.711	0.680	0.000	1.390	0.638	0.680	0.000	1.318	0.134	0.151	0.000	0.285
52	0.686	0.615	0.000	1.302	0.872	1.205	0.000	2.077	0.168	0.298	0.000	0.466
54	0.531	0.581	0.000	1.112	0.932	0.929	0.000	1.861	0.230	0.189	0.000	0.419
56	0.741	0.696	0.000	1.436	0.700	0.939	0.000	1.640	0.227	0.349	0.000	0.576
58	0.576	0.525	0.000	1.100	0.644	0.724	0.000	1.367	0.278	0.348	0.000	0.626
60	0.527	0.586	0.000	1.114	0.707	0.692	0.000	1.398	0.234	0.243	0.000	0.477
62	0.375	0.640	0.000	1.016	0.549	0.776	0.000	1.325	0.208	0.296	0.000	0.505
64	0.469	0.394	0.000	0.863	0.472	0.780	0.000	1.252	0.205	0.406	0.000	0.611
66	0.398	0.586	0.000	0.984	0.448	0.669	0.000	1.117	0.282	0.343	0.000	0.625
68	0.252	0.664	0.000	0.916	0.344	0.766	0.000	1.111	0.317	0.500	0.000	0.817
70	0.324	0.433	0.000	0.757	0.429	0.858	0.000	1.287	0.342	0.266	0.000	0.608
72	0.248	0.523	0.000	0.771	0.230	0.829	0.000	1.059	0.247	0.379	0.000	0.626
74	0.254	0.377	0.000	0.631	0.270	0.519	0.000	0.789	0.324	0.277	0.000	0.601
76	0.242	0.186	0.000	0.428	0.377	0.300	0.000	0.677	0.257	0.208	0.000	0.465
78	0.263	0.168	0.000	0.431	0.282	0.196	0.000	0.478	0.245	0.133	0.000	0.378
80	0.193	0.178	0.000	0.371	0.312	0.077	0.000	0.389	0.165	0.045	0.000	0.210
82	0.190	0.004	0.000	0.194	0.234	0.000	0.000	0.234	0.128	0.023	0.000	0.151
84	0.062	0.034	0.000	0.096	0.187	0.000	0.000	0.187	0.103	0.025	0.000	0.129
86	0.074	0.020	0.000	0.094	0.075	0.017	0.000	0.092	0.039	0.000	0.000	0.039
88	0.026	0.000	0.000	0.026	0.058	0.000	0.000	0.058	0.033	0.006	0.000	0.039
90	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.006	0.000	0.000	0.006
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.003	0.006	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.012	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	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	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	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	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	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	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	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	0.000	0.000
Total	11.235	12.125	0.000	23.360	11.658	15.005	0.000	26.663	5.501	5.955	0.000	11.456
Nº samples (*):				78				45				73
Nº Ind. (*):	1012	1102	0	2114	928	1198	0	2126	494	534	0	1028
Sampled catch:				4130				4595				2564
Range (*):				12-96				13-99				14-90
Total catch:				4249				5258				2564
Total hauls (*):				119				120				110

TABLE 12.- Swept area, number of hauls and White hake mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 2001-2007. Swept area in square miles. n.s. means strata not surveyed.

	2001				2002				2003				2004			
Stratum	Swept area	Tow number	White hake Mean catch	White hake SD	Swept area	Tow number	White hake Mean catch	White hake SD	Swept area	Tow number	White hake Mean catch	White hake SD	Swept area	Tow number	White hake Mean catch	White hake SD
353	0.0356	3	1.04	1.180	0.0476	4	0.05	0.100	0.0334	3	0.00	0.000	0.0338	3	0.00	0.000
354	0.0356	3	76.70	117.298	0.0356	3	0.07	0.115	0.0338	3	0.00	0.000	0.0345	3	23.15	32.074
355	0.0233	2	131.95	135.128	0.0236	2	156.75	55.649	0.0229	2	31.24	26.955	0.0229	2	14.95	15.203
356	0.0225	2	23.95	12.092	0.0233	2	85.90	90.651	0.0225	2	14.83	9.935	0.0221	2	4.15	5.869
357	0.0124	2	1.75	2.475	0.0240	2	0.00	0.000	0.0229	2	2.25	3.182	0.0229	2	0.90	1.273
358	0.0341	3	0.43	0.751	0.0345	3	0.17	0.289	0.0338	3	0.40	0.693	0.0330	3	12.02	20.597
359	0.0469	7	16.50	41.790	0.0686	6	0.00	0.000	0.0791	7	0.00	0.000	0.0791	7	0.00	0.000
360	0.2396	20	0.01	0.022	0.2865	25	0.00	0.000	0.2254	20	0.00	0.000	0.2310	20	0.07	0.172
374	0.0240	2	0.00	0.000	0.0345	3	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
375	0.0244	3	0.00	0.000	0.0353	3	0.00	0.000	0.0330	3	0.00	0.000	0.0338	3	0.00	0.000
376	0.1200	10	0.00	0.000	0.1140	10	0.00	0.000	0.1125	10	0.00	0.000	0.1166	10	0.00	0.000
377	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000
378	0.0233	2	0.03	0.042	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
379	0.0225	2	0.00	0.000	0.0229	2	0.02	0.033	0.0229	2	0.00	0.000	0.0124	1	0.00	-
380	0.0236	2	n.s.	n.s.	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0221	2	0.04	0.049
381	0.0236	2	n.s.	n.s.	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
382	0.0499	4	n.s.	n.s.	0.0341	3	0.00	0.000	0.0454	4	0.00	0.000	0.0461	4	0.00	0.000
721	0.0236	2	10.90	2.828	0.0233	2	50.00	6.223	0.0225	2	23.69	27.280	0.0221	2	3.50	0.544
722	0.0218	2	21.75	30.759	0.0236	2	18.20	23.624	0.0221	2	28.08	24.911	0.0218	2	1.29	1.824
723	0.0248	2	1.60	2.263	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	1.05	1.485
724	0.0233	3	1.34	1.404	0.0225	2	2.05	0.071	0.0225	2	0.00	0.000	0.0214	2	0.00	0.000
725	0.0210	1	0.00	-	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
726	0.0221	1	0.00	-	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
727	0.0210	2	n.s.	n.s.	0.0233	2	0.00	0.000	0.0218	2	0.00	0.000	0.0233	2	0.00	0.000
728	0.0210	2	n.s.	n.s.	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0180	2	0.06	0.078
752	0.0206	2	n.s.	n.s.	0.0116	1	0.00	0.000	0.0229	2	0.00	0.000	0.0214	2	0.00	0.000
753	0.0218	2	n.s.	n.s.	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.73	1.025
754	0.0195	2	n.s.	n.s.	0.0341	3	0.00	0.000	0.0218	2	0.00	0.000	0.0214	2	0.00	0.000
755	0.0431	4	n.s.	n.s.	0.0338	3	0.00	0.000	0.0221	2	0.00	0.000	0.0319	3	0.00	0.000
756	0.0203	1	0.00	-	0.0229	2	0.00	0.006	0.0221	2	0.00	0.000	0.0218	2	0.00	0.000
757	0.0214	2	n.s.	n.s.	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0218	2	0.00	0.000
758	0.0210	2	n.s.	n.s.	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0214	2	0.00	0.000
759	0.0210	2	n.s.	n.s.	0.0225	2	0.00	0.000	0.0113	1	0.00	-	0.0214	2	0.00	0.000
760	0.0210	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000	0.0221	2	0.00	0.000
761	0.0221	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000
762	0.0203	1	0.00	-	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
763	0.0416	3	n.s.	n.s.	0.0225	2	0.00	0.000	0.0311	3	0.00	0.000	0.0326	3	0.00	0.000
764	0.0218	2	0.00	0.000	0.0236	2	0.00	0.000	0.0221	2	3.78	4.236	0.0229	2	0.00	0.000
765	0.0203	1	0.00	-	0.0236	2	1.65	2.333	0.0113	1	0.00	-	0.0225	2	0.00	0.000
766	0.0214	2	n.s.	n.s.	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
767	0.0210	2	n.s.	n.s.	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0218	2	0.00	0.000

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

TABLE 12 (cont.).- Swept area, number of hauls and White hake mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 2001-2007. Swept area in square miles. n.s. means strata not surveyed.

	2005				2006				2007			
Stratum	Swept area	Tow number	White hake Mean catch	White hake SD	Swept area	Tow number	White hake Mean catch	White hake SD	Swept area	Tow number	White hake Mean catch	White hake SD
353	0.0353	3	0.01	0.023	0.0371	3	1.87	3.245	0.0364	3	0.00	0.000
354	0.0353	3	54.33	91.362	0.0364	3	34.59	33.056	0.0364	3	14.76	5.726
355	0.0225	2	41.75	40.489	0.0248	2	2.17	3.062	0.0240	2	0.00	0.000
356	0.0233	2	12.32	6.795	0.0240	2	0.80	1.131	0.0240	2	0.00	0.000
357	0.0233	2	0.00	0.000	0.0244	2	0.00	0.000	0.0360	3	4.02	6.957
358	0.0349	3	30.64	53.008	0.0349	3	1.69	2.923	0.0368	3	1.54	2.662
359	0.0814	7	0.00	0.000	0.0975	8	6.29	10.192	0.0855	7	0.04	0.090
360	0.2325	20	0.00	0.007	0.2340	19	0.00	0.000	0.2378	20	0.00	0.000
374	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000	0.0240	2	0.00	0.000
375	0.0349	3	0.00	0.000	0.0364	3	0.00	0.000	0.0364	3	0.00	0.000
376	0.1174	10	0.01	0.019	0.1219	10	0.00	0.000	0.1185	10	0.00	0.000
377	0.0233	2	0.00	0.000	0.0236	2	0.00	0.000	0.0240	2	0.00	0.000
378	0.0225	2	0.00	0.000	0.0240	2	0.00	0.000	0.0233	2	0.00	0.000
379	0.0236	2	0.07	0.099	0.0236	2	0.10	0.141	0.0240	2	0.00	0.000
380	0.0229	2	0.53	0.049	0.0229	2	0.15	0.212	0.0240	2	0.00	0.000
381	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000	0.0240	2	0.00	0.000
382	0.0458	4	0.00	0.000	0.0469	4	0.00	0.000	0.0484	4	0.00	0.000
721	0.0229	2	0.00	0.000	0.0236	2	6.18	6.901	0.0116	1	6.10	-
722	0.0233	2	0.00	0.000	0.0240	2	0.00	0.000	0.0225	2	2.56	3.620
723	0.0233	2	1.51	2.128	0.0236	2	1.84	2.496	0.0240	2	0.10	0.134
724	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000	0.0233	2	0.00	0.000
725	0.0236	2	0.00	0.000	0.0233	2	0.51	0.714	0.0225	2	0.04	0.055
726	0.0113	1	0.00	-	0.0225	2	0.00	0.000	0.0229	2	0.14	0.193
727	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0240	2	0.00	0.000
728	0.0109	1	0.00	-	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
752	0.0236	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
753	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
754	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
755	0.0450	4	0.00	0.000	0.0338	3	0.00	0.000	0.0338	3	0.00	0.000
756	0.0233	2	0.00	0.000	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000
757	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000
758	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
760	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000
761	0.0221	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
762	0.0225	2	0.01	0.014	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
763	0.0334	3	0.00	0.000	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
765	0.0229	2	0.00	0.000	0.0236	2	0.00	0.000	0.0225	2	0.00	0.000
766	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.
767	0.0113	1	0.00	-	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.

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

TABLE 13.- Stratified mean catches (Kg) by stratum and year and SD by year of White hake (2001-2007). n.s. means strata not surveyed.

Stratum	2001	2002	2003	2004	2005	2006	2007
353	279.76	13.45	0.00	0.00	3.59	503.93	0.00
354	18868.20	16.40	0.00	5694.08	13365.18	8509.96	3631.37
355	9764.30	11599.50	2311.76	1106.30	3089.50	160.21	0.00
356	1125.65	4037.30	696.78	195.05	578.81	37.60	0.00
357	287.00	0.00	369.00	147.60	0.00	0.00	658.73
358	97.50	37.50	90.00	2703.75	6894.98	379.73	345.75
359	6946.50	0.00	0.00	0.00	0.00	2648.25	18.28
360	13.92	0.00	0.00	201.77	6.26	0.00	0.00
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.00	0.00	0.00	0.00	8.14	0.00	0.00
377	0.00	0.00	0.00	0.00	0.00	0.00	0.00
378	4.17	0.00	0.00	0.00	0.00	0.00	0.00
379	0.00	2.44	0.00	0.00	7.42	10.55	0.00
380	n.s.	0.00	0.00	3.36	50.40	14.40	0.00
381	n.s.	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	0.00
721	708.50	3250.00	1539.85	227.18	0.00	401.70	396.50
722	1827.00	1528.38	2358.30	108.36	0.00	0.00	215.04
723	248.00	0.00	0.00	162.75	233.28	284.43	14.73
724	166.16	254.20	0.00	0.00	0.00	0.00	0.00
725	0.00	0.00	0.00	0.00	0.00	53.03	4.10
726	0.00	0.00	0.00	0.00	0.00	0.00	9.83
727	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
728	n.s.	0.00	0.00	4.29	0.00	0.00	0.00
752	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
753	n.s.	0.00	0.00	100.05	0.00	0.00	0.00
754	n.s.	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
756	0.00	0.45	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
758	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
759	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.
760	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	0.00	0.00
762	0.00	0.00	0.00	0.00	2.12	0.00	n.s.
763	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.
764	0.00	0.00	377.50	0.00	0.00	0.00	0.00
765	0.00	204.60	0.00	0.00	0.00	0.00	0.00
766	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.
767	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.
TOTAL	40336.66	20944.22	7743.19	10654.53	24239.66	13003.77	5294.32
$(\bar{Y})$	5.13	2.03	0.75	1.03	2.34	1.26	0.56
S.D.	1.87	0.43	0.24	0.52	1.44	0.48	0.12

TABLE 14.- Survey estimates (by the swept area method) of White hake biomass (t) and SD by stratum and year on NAFO Div. 3NO. n.s. means stratum not surveyed.

Stratum	2001	2002	2003	2004	2005	2006	2007
353	25	1	0	0	0	41	0
354	1677	1	0	495	1137	702	299
355	814	982	202	97	275	13	0
356	94	347	62	18	50	3	0
357	24	0	32	13	0	0	55
358	8	3	8	246	593	33	28
359	606	0	0	0	0	217	1
360	1	0	0	17	1	0	0
374	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0
376	0	0	0	0	1	0	0
377	0	0	0	0	0	0	0
378	0	0	0	0	0	0	0
379	0	0	0	0	1	1	0
380	0	0	0	0	4	1	0
381	0	0	0	0	0	0	0
382	0	0	0	0	0	0	0
721	57	280	137	21	0	34	34
722	157	129	213	10	0	0	19
723	21	0	0	14	20	24	1
724	15	23	0	0	0	0	0
725	0	0	0	0	0	5	0
726	0	0	0	0	0	0	1
727	0	0	0	0	0	0	0
728	0	0	0	0	0	0	0
752	0	0	0	0	0	0	0
753	0	0	0	9	0	0	0
754	0	0	0	0	0	0	0
755	0	0	0	0	0	0	0
756	0	0	0	0	0	0	0
757	0	0	0	0	0	0	0
758	0	0	0	0	0	0	0
759	0	0	0	0	0	0	n.s.
760	0	0	0	0	0	0	0
761	0	0	0	0	0	0	0
762	0	0	0	0	0	0	n.s.
763	0	0	0	0	0	0	n.s.
764	0	0	34	0	0	0	0
765	0	17	0	0	0	0	0
766	0	0	0	0	0	0	n.s.
767	0	0	0	0	0	0	n.s.
TOTAL	3498	1784	688	940	2082	1073	440
S.D.	1107	389	224	464	1270	407	94

TABLE 15.- Length weight relationships in the calculation of White hake biomass. The equation is $Weight = a(l + 0.5)^b$ Spanish Spring Surveys on NAFO Div. 3NO: 2002-2007. To calculate the parameters for the indeterminate individuals, we used the total data (males + females + indeterminate individuals).

		2002	2003	2004	2005	2006	2007
Males	a	0.0018 Error = 0.234	0.0045 Error = 0.243	0.0043 Error = 0.237	0.0034 Error = 0.1497	0.0175 Error = 0.5190	0.0050 Error = 0.3158
	b	3.3586 Error = 0.060	3.1161 Error = 0.062	3.1313 Error = 0.063	3.2086 Error = 0.0395	2.7891 Error = 0.1320	3.1245 Error = 0.0828
		R2 = 0.991 N = 107	R2 = 0.992 N = 73	R2 = 0.992 N = 41	R2 = 0.995 N = 108	R2 = 0.965 N = 75	R2 = 0.992 N= 14
Females	a	0.0027 Error = 0.221	0.0013 Error = 0.465	0.0037 Error = 0.202	0.0043 Error = 0.0992	0.0019 Error = 0.2136	0.0025 Error = 0.2163
	b	3.2537 Error = 0.056	3.4264 Error = 0.115	3.1960 Error = 0.056	3.1602 Error = 0.0253	3.3563 Error = 0.0530	3.3097 Error = 0.0541
		R2 = 0.992 N = 61	R2 = 0.977 N = 51	R2 = 0.995 N = 32	R2 = 0.997 N = 80	R2 = 0.998 N = 28	R2 = 0.997 N= 18
Indet.	a	0.0025 Error = 0.152	0.0026 Error = 0.254	0.0048 Error = 0.127	0.0036 Error = 0.1026	0.0066 Error = 0.367	0.0031 Error = 0.1879
	b	3.2731 Error = 0.039	3.2565 Error = 0.064	3.1208 Error = 0.035	3.1961 Error = 0.0266	3.0472 Error = 0.0930	3.2481 Error = 0.0478
		R2 = 0.995 N = 168	R2 = 0.989 N = 125	R2 = 0.997 N = 91	R2 = 0.997 N = 188	R2 = 0.980 N = 103	R2 = 0.995 N= 32

TABLE 16.- White hake length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Spring Survey on NAFO 3NO: 2001-2007. Indet. means indeterminate.

	2001				2002				2003				2004			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
10	0.000	0.000	0.015	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.009	0.020	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.034	0.009	0.000	0.043	0.014	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.025
18	0.048	0.024	0.000	0.073	0.014	0.012	0.000	0.026	0.000	0.000	0.000	0.000	0.058	0.034	0.000	0.092
20	0.074	0.055	0.000	0.129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.050	0.000	0.075
22	0.075	0.044	0.000	0.120	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.004	0.050	0.042	0.000	0.091
24	0.069	0.058	0.000	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.025	0.000	0.033
26	0.055	0.055	0.000	0.110	0.000	0.000	0.000	0.000	0.011	0.004	0.000	0.015	0.000	0.005	0.000	0.005
28	0.229	0.154	0.000	0.383	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.007	0.000	0.000	0.000	0.000
30	0.399	0.188	0.000	0.587	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	1.092	0.665	0.000	1.758	0.009	0.000	0.000	0.009	0.004	0.004	0.000	0.007	0.000	0.000	0.000	0.000
34	1.019	0.873	0.000	1.892	0.007	0.004	0.000	0.011	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
36	0.572	0.768	0.000	1.340	0.035	0.018	0.000	0.053	0.004	0.000	0.000	0.004	0.000	0.008	0.000	0.008
38	0.294	0.511	0.000	0.806	0.123	0.017	0.000	0.140	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
40	0.101	0.159	0.000	0.260	0.268	0.128	0.000	0.397	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
42	0.134	0.131	0.000	0.265	0.340	0.212	0.000	0.553	0.010	0.015	0.000	0.025	0.000	0.000	0.000	0.000
44	0.165	0.042	0.000	0.207	0.228	0.192	0.000	0.420	0.033	0.004	0.000	0.037	0.000	0.000	0.000	0.000
46	0.098	0.110	0.000	0.208	0.093	0.162	0.000	0.256	0.080	0.012	0.000	0.092	0.000	0.000	0.000	0.000
48	0.107	0.069	0.000	0.177	0.055	0.074	0.000	0.128	0.079	0.028	0.000	0.107	0.046	0.000	0.000	0.046
50	0.164	0.053	0.000	0.217	0.052	0.077	0.000	0.129	0.041	0.041	0.000	0.082	0.049	0.000	0.000	0.049
52	0.203	0.105	0.000	0.308	0.054	0.033	0.000	0.086	0.061	0.028	0.000	0.089	0.057	0.024	0.000	0.082
54	0.119	0.047	0.000	0.166	0.051	0.044	0.000	0.095	0.017	0.026	0.000	0.043	0.030	0.016	0.000	0.047
56	0.119	0.050	0.000	0.168	0.028	0.025	0.000	0.053	0.014	0.027	0.000	0.041	0.058	0.016	0.000	0.075
58	0.051	0.050	0.000	0.101	0.025	0.009	0.000	0.034	0.004	0.029	0.000	0.034	0.021	0.029	0.000	0.050
60	0.078	0.063	0.000	0.141	0.048	0.021	0.000	0.070	0.000	0.016	0.000	0.016	0.017	0.028	0.000	0.045
62	0.040	0.040	0.000	0.081	0.008	0.010	0.000	0.018	0.004	0.004	0.000	0.008	0.021	0.021	0.000	0.042
64	0.034	0.022	0.000	0.056	0.020	0.018	0.000	0.038	0.000	0.013	0.000	0.013	0.008	0.032	0.000	0.041
66	0.035	0.019	0.000	0.054	0.010	0.000	0.000	0.010	0.011	0.000	0.000	0.011	0.008	0.062	0.000	0.070
68	0.019	0.046	0.000	0.065	0.011	0.016	0.000	0.027	0.004	0.009	0.000	0.013	0.004	0.013	0.000	0.017
70	0.026	0.019	0.000	0.045	0.007	0.008	0.000	0.015	0.004	0.004	0.000	0.009	0.017	0.008	0.000	0.025
72	0.000	0.000	0.000	0.000	0.004	0.007	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	0.000	0.015	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.008	0.000	0.008
76	0.000	0.016	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.015	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
80	0.000	0.016	0.000	0.016	0.000	0.003	0.000	0.003	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000
82	0.000	0.020	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.006	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	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
88	0.000	0.006	0.000	0.006	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	5.462	4.544	0.015	10.022	1.511	1.091	0.000	2.602	0.387	0.295	0.000	0.682	0.480	0.447	0.000	0.927
Nº samples (*):				12				11				9				11
Nº Ind. (*):	427	328	1	756	329	222	0	551	102	79	0	181	59	59	0	118
Sampled catch:				401				303				195				144
Range (*):				10-89				13-80				22-80				16-75
Total catch:				738				630				209				160
Total hauls (*):				123				125				118				120

TABLE 16 (cont.).- White hake length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Spring Survey on NAFO 3NO: 2001-2007. Indet. means indeterminate.

	2005				2006				2007			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.040	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	0.005	0.004	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.028	0.015	0.000	0.043	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006
22	0.008	0.000	0.000	0.008	0.005	0.000	0.000	0.005	0.000	0.006	0.000	0.006
24	0.013	0.014	0.000	0.027	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009
26	0.043	0.007	0.000	0.051	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000
28	0.000	0.013	0.000	0.013	0.013	0.000	0.000	0.013	0.000	0.009	0.000	0.009
30	0.013	0.005	0.000	0.017	0.000	0.011	0.000	0.011	0.008	0.000	0.000	0.008
32	0.016	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.009	0.023	0.000	0.032
34	0.007	0.038	0.000	0.045	0.000	0.011	0.000	0.011	0.009	0.000	0.000	0.009
36	0.015	0.023	0.000	0.038	0.008	0.005	0.000	0.013	0.000	0.000	0.000	0.000
38	0.023	0.023	0.000	0.046	0.012	0.000	0.000	0.012	0.000	0.000	0.000	0.000
40	0.000	0.016	0.000	0.016	0.012	0.004	0.000	0.015	0.009	0.000	0.000	0.009
42	0.008	0.019	0.000	0.027	0.015	0.008	0.000	0.023	0.000	0.000	0.000	0.000
44	0.008	0.007	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46	0.007	0.000	0.000	0.007	0.016	0.000	0.000	0.016	0.000	0.000	0.000	0.000
48	0.008	0.000	0.000	0.008	0.009	0.008	0.000	0.017	0.017	0.017	0.000	0.034
50	0.016	0.000	0.000	0.016	0.020	0.000	0.000	0.020	0.000	0.000	0.000	0.000
52	0.068	0.004	0.000	0.072	0.028	0.000	0.000	0.028	0.000	0.000	0.000	0.000
54	0.122	0.018	0.000	0.140	0.005	0.010	0.000	0.016	0.000	0.009	0.000	0.009
56	0.085	0.019	0.000	0.104	0.028	0.008	0.000	0.036	0.000	0.000	0.000	0.000
58	0.151	0.028	0.000	0.179	0.031	0.000	0.000	0.031	0.000	0.009	0.000	0.009
60	0.098	0.010	0.000	0.108	0.075	0.013	0.000	0.089	0.000	0.009	0.000	0.009
62	0.092	0.030	0.000	0.122	0.066	0.000	0.000	0.066	0.017	0.000	0.000	0.017
64	0.027	0.026	0.000	0.052	0.076	0.000	0.000	0.076	0.014	0.000	0.000	0.014
66	0.027	0.052	0.000	0.079	0.024	0.000	0.000	0.024	0.000	0.009	0.000	0.009
68	0.019	0.038	0.000	0.057	0.021	0.000	0.000	0.021	0.009	0.006	0.000	0.014
70	0.000	0.081	0.000	0.081	0.016	0.008	0.000	0.024	0.009	0.000	0.000	0.009
72	0.000	0.032	0.000	0.032	0.016	0.021	0.000	0.037	0.000	0.009	0.000	0.009
74	0.000	0.011	0.000	0.011	0.000	0.005	0.000	0.005	0.000	0.009	0.000	0.009
76	0.000	0.015	0.000	0.015	0.008	0.026	0.000	0.034	0.000	0.016	0.000	0.016
78	0.000	0.022	0.000	0.022	0.000	0.020	0.000	0.020	0.000	0.012	0.000	0.012
80	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.013	0.000	0.012	0.000	0.012
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009
84	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	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	0.953	0.579	0.000	1.532	0.512	0.172	0.000	0.684	0.115	0.161	0.000	0.275
Nº samples:				14				14				11
Nº Ind.:	137	91	0	228	73	28	0	101	14	21	0	35
Sampled catch:				367				187				727
Range:				15-85				23-80				21-83
Total catch:				367				187				73
Total hauls:				119				120				110

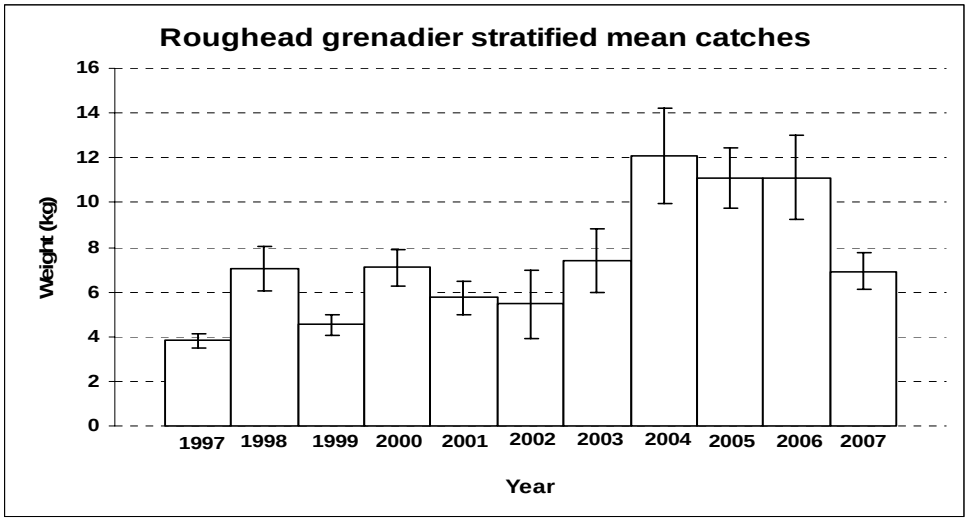

FIGURE 1.- Roughhead grenadier stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2007 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2007 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

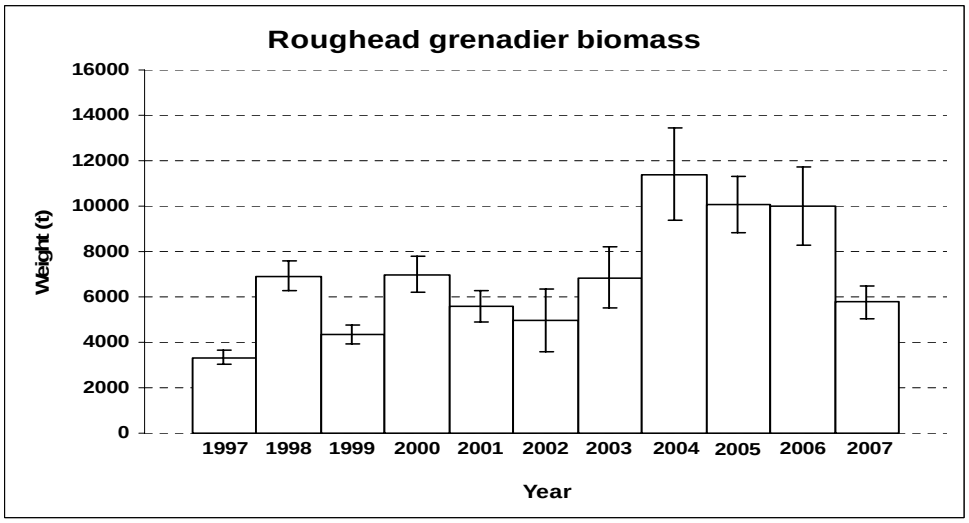

FIGURE 2.- Roughhead grenadier biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2007 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2007 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

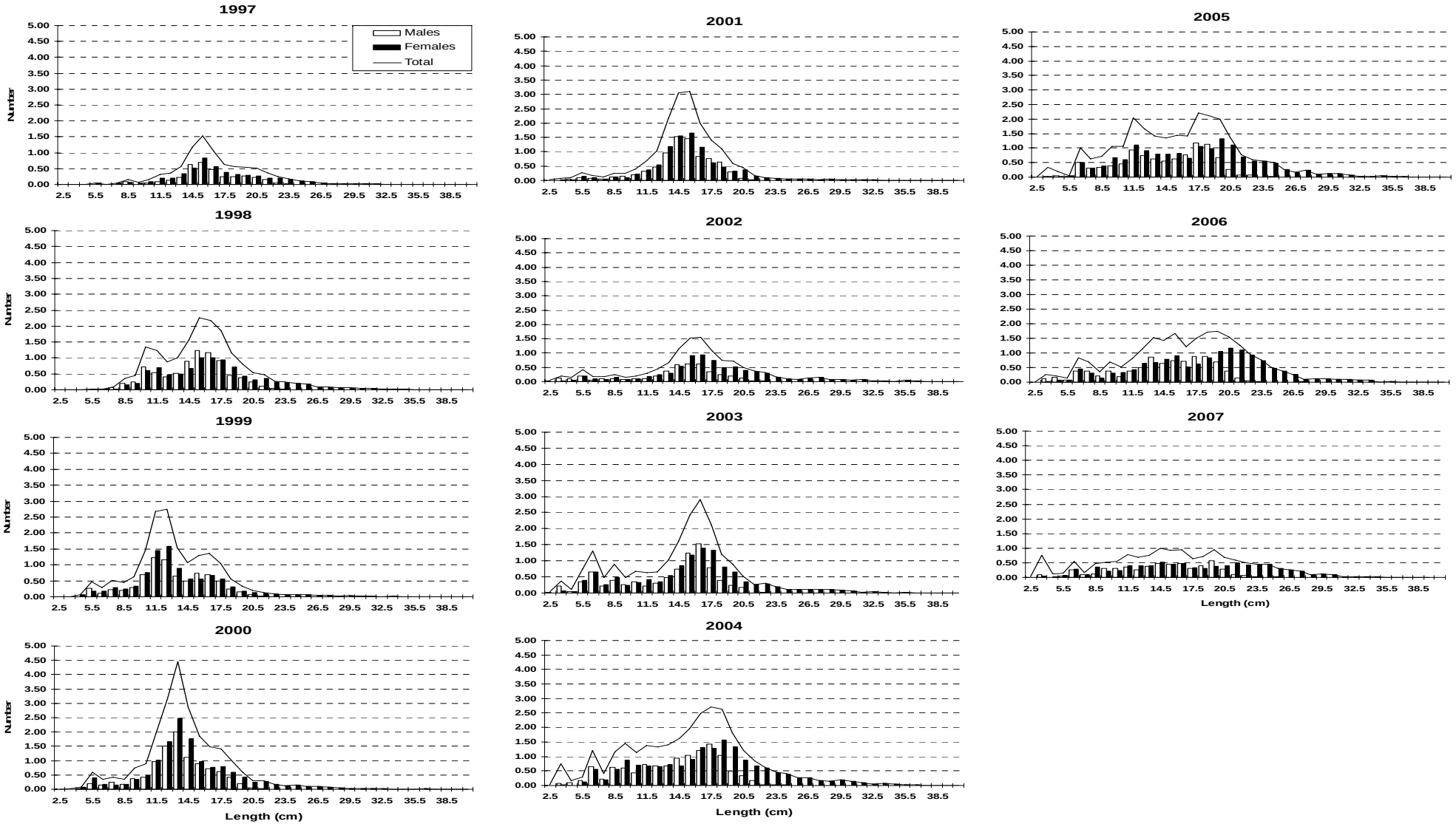

FIGURE 3.- Roughhead grenadier length distribution (cm) on NAFO 3NO: 1997-2007. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

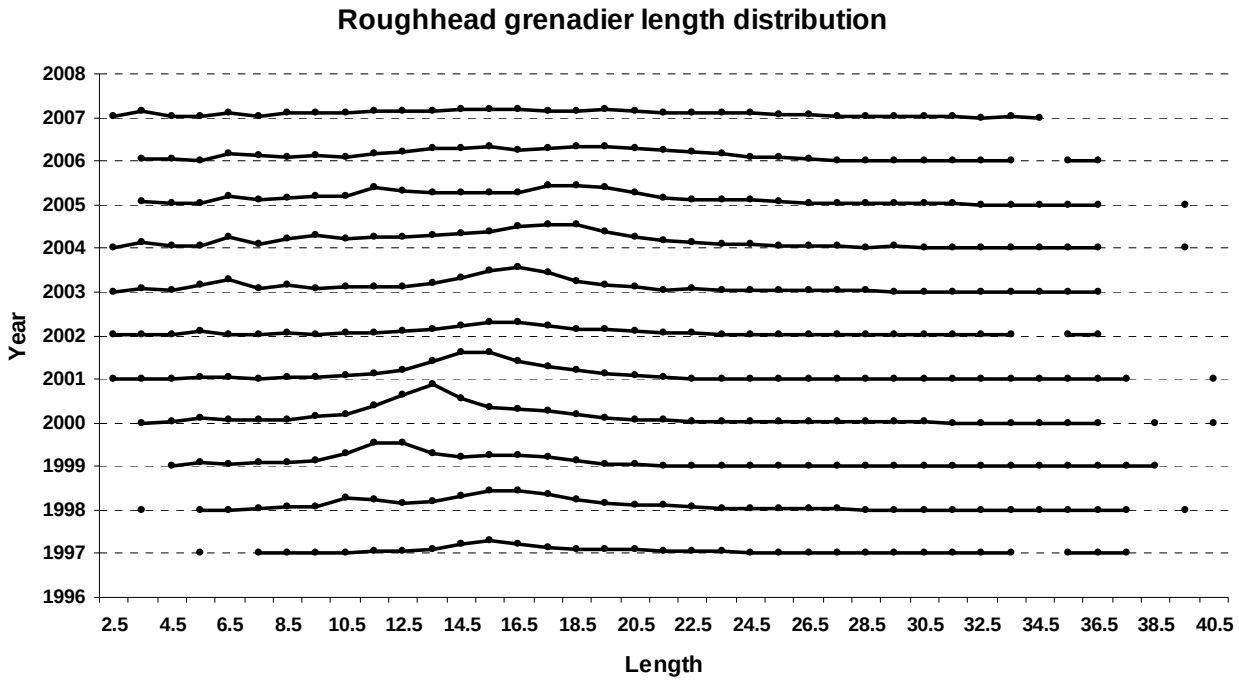

FIGURE 4.- Roughhead grenadier mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2007.

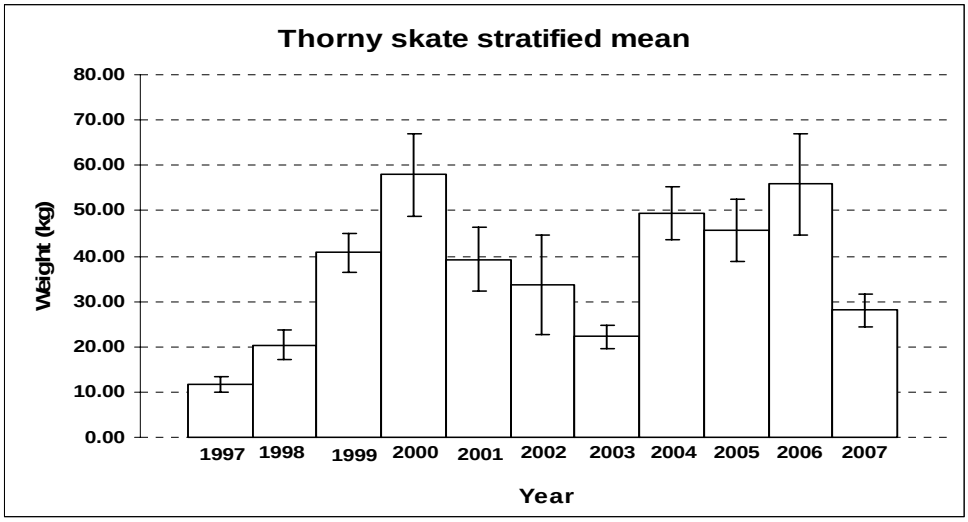

FIGURE 5.- Thorny skate stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2007 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2007 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

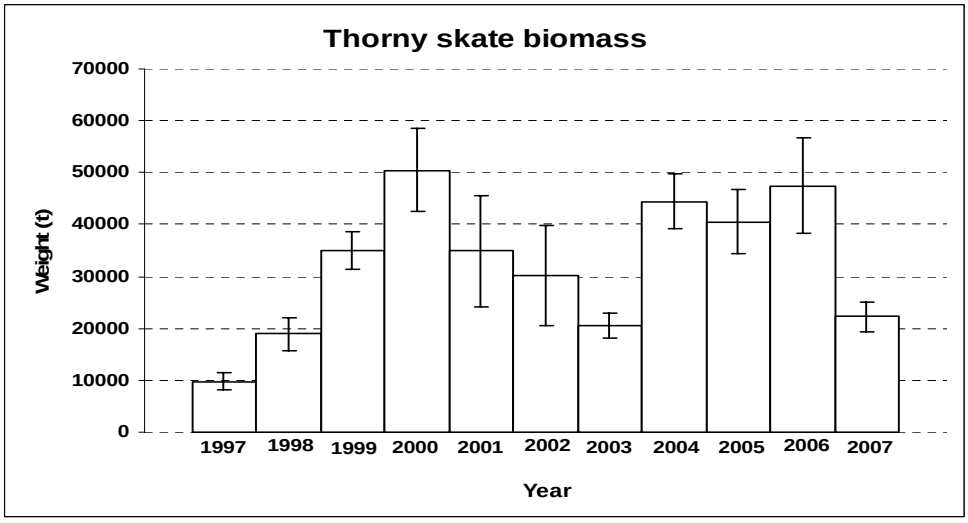

FIGURE 6.- Thorny skate biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2007 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2007 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

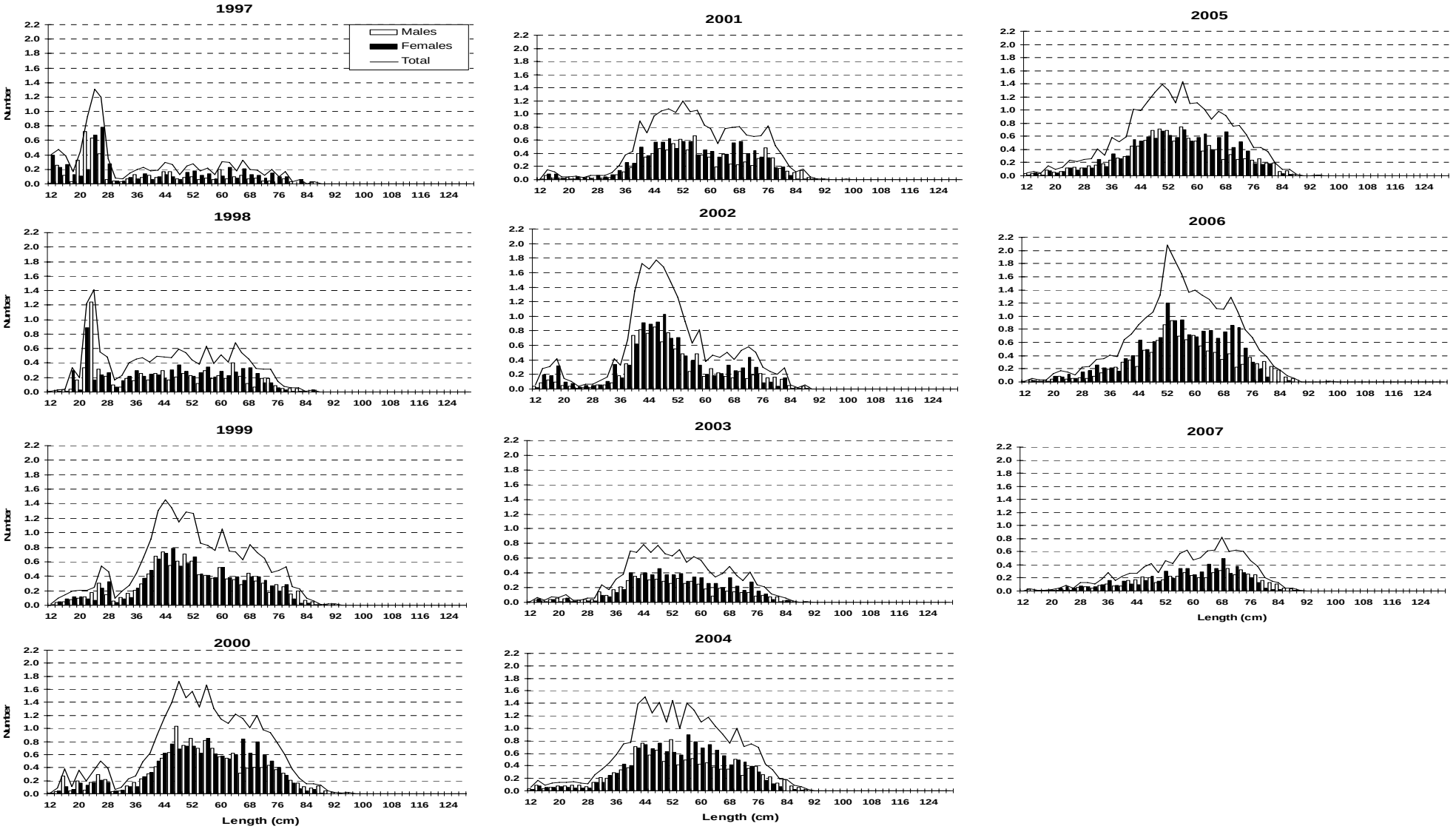

FIGURE 7.- Thorny skate length distribution (cm) on NAFO 3NO: 1997-2007. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2007 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels

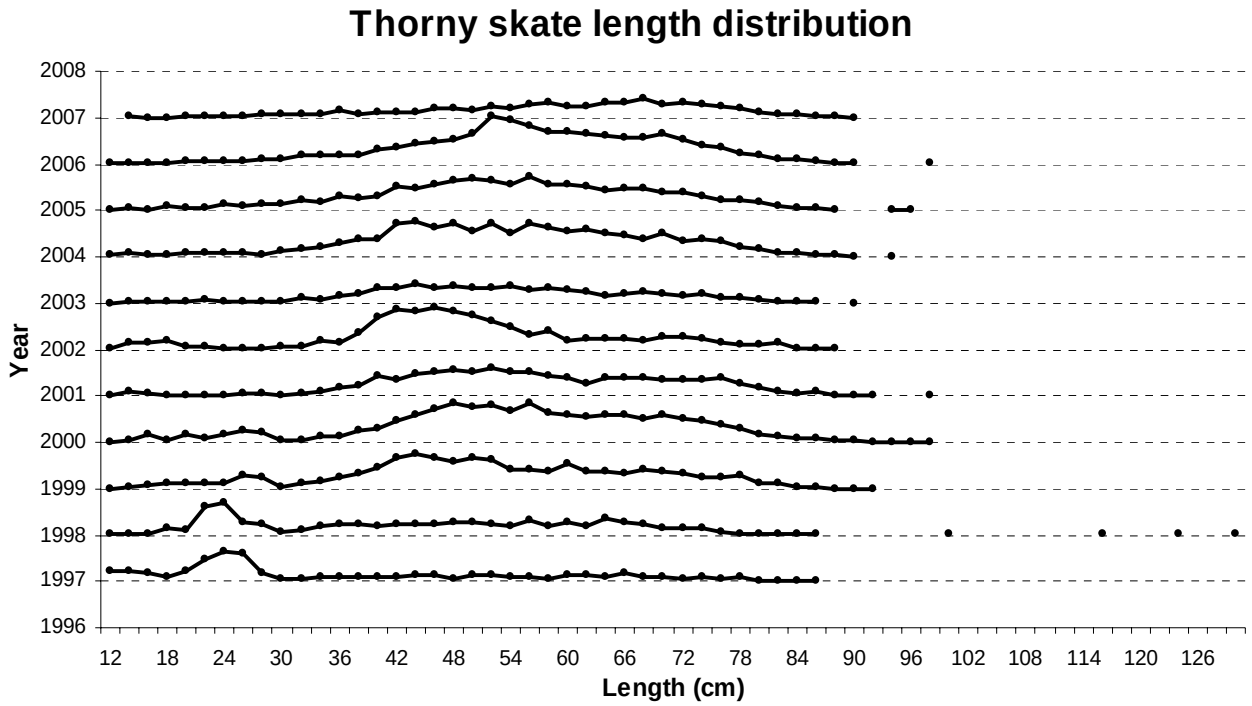

FIGURE 8.- Thorny skate mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2007.

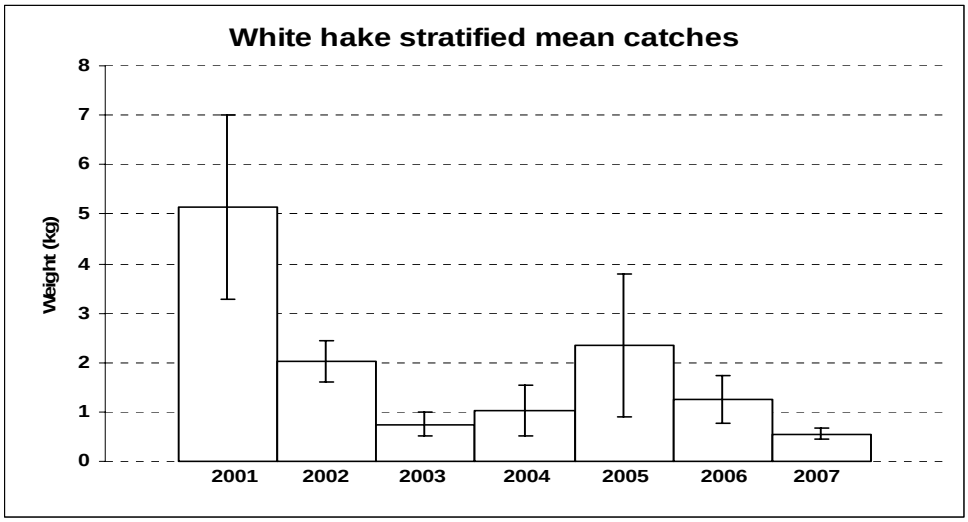

FIGURE 9.- White hake stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 2001-2007.

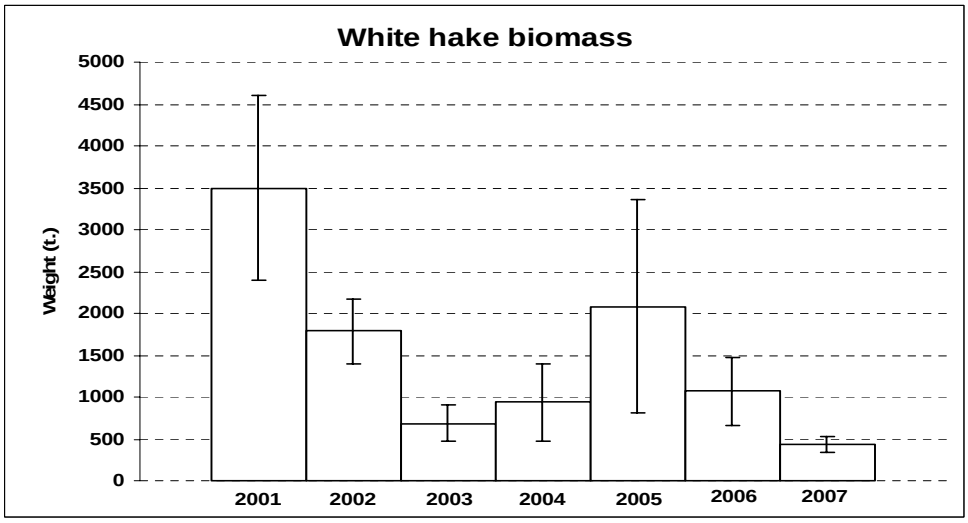

FIGURE 10.- White hake biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 2001-2007.

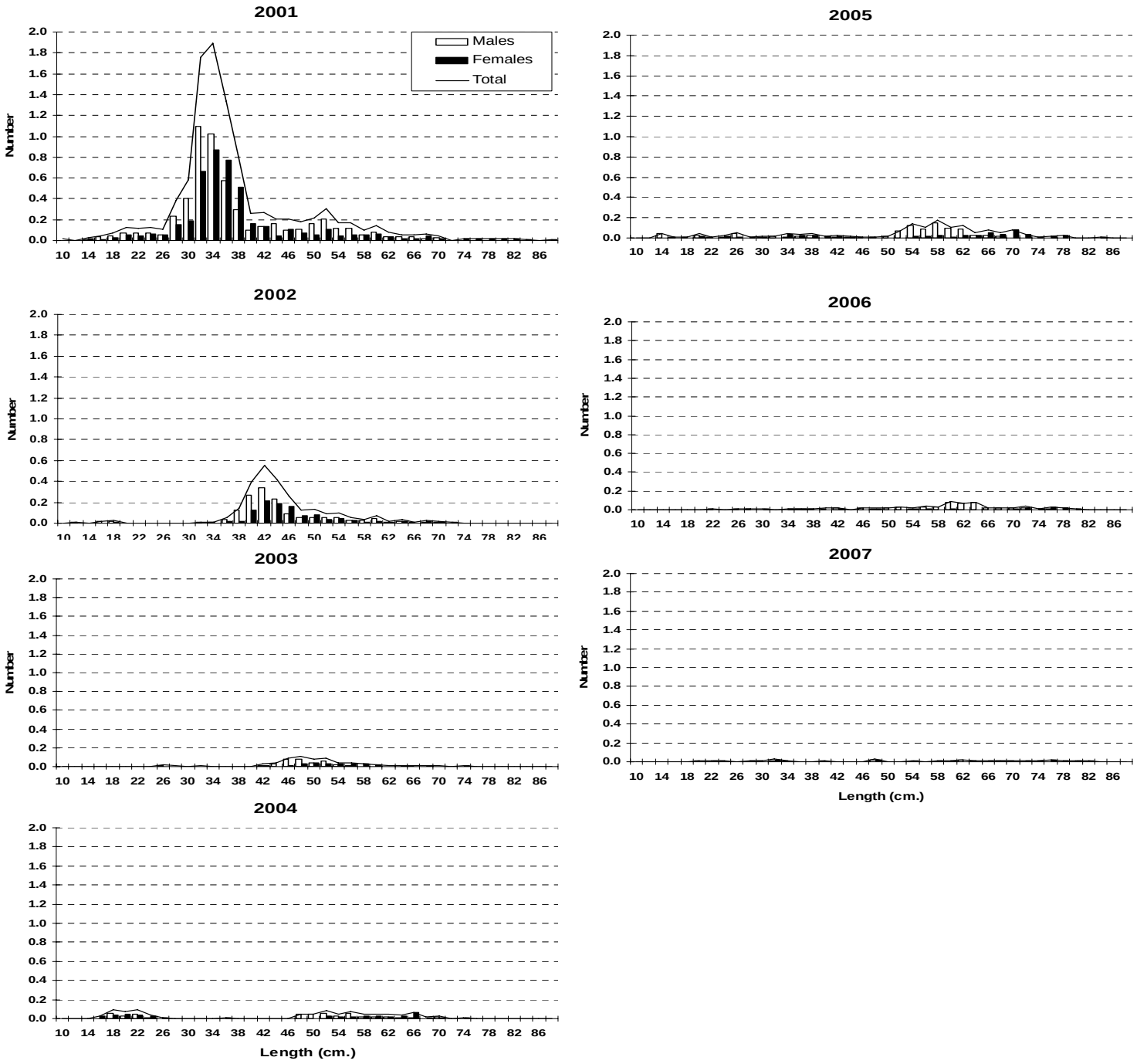

FIGURE 11.- White hake length distribution (cm) on NAFO 3NO: 2001-2007. Number per stratified mean catches.

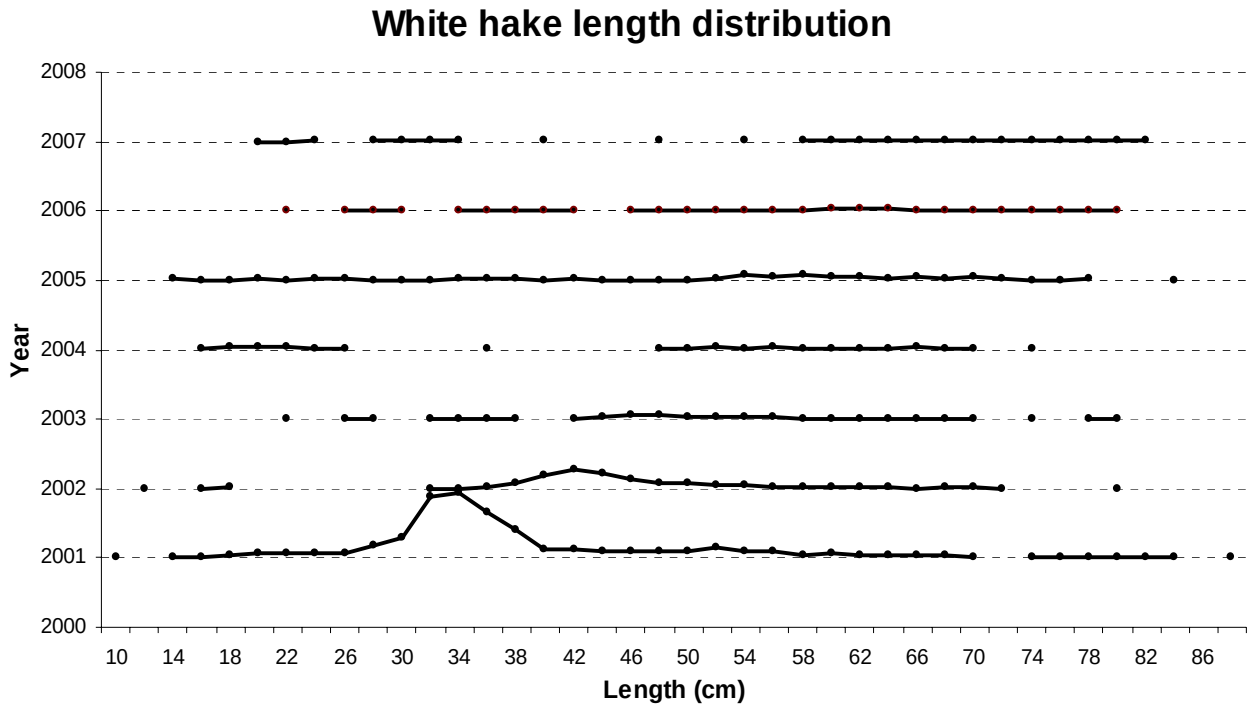

FIGURE 12.- White hake mean catches per tow length distribution (cm) on NAFO 3NO: 2001-2007.