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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 abundance and biomass were estimated for the period 1997-2009 for Roughhead grenadier and Thorny skate, and 2001-2009 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 years 2004-2006, mainly in 2004. In 2007 the biomass were on the level of 2003 value, with a slight increase since then. Thorny skate indices decreased since 2001 until 2003, increased for 2004-2006 and decreased again since 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, 2007 and mainly in 2008. In 2009 there was a sligth increase, reaching a value between the 2006 and the 2007 biomass. 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 1997-2009. 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 1997-2009 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 2001-2009.

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 2002-2009. 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).

Due to technical problems in the vessel, this year two strata were not surveyed and six more have only one haul, so there are no standard deviations for these strata. As on these strata usually the catch of Thorny skate and White hake is not important, this fact is not significant for the calculation of the final standard deviation for the mean weight per tow and biomass for these species. The same does not occur for Roughhead grenadier, as the strata are the deepest, so a recalculation must be made. So, for this species, to calculate the standard deviation, we put together the catch of the strata with only one haul in the same range of depth and calculate the standard deviation as if they were only one stratum. The total variance was calculated as usual with this single stratum.

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, 2009).

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 (1997-2009) 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. In 2008 and 2009 the biomass increased with respect to 2007, but without reaching the level of the period 2004-2006. (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 1997-2009. The data have been grouped two by two**,** so we present the data every one cm. We can follow easily a cohort since 1998. In lasts years it can be seen a quite good recruitment. In recent years 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 from 1996 to 2004 but at lower level than in the mid-1980s. During recent years the biomass has increased slightly (NAFO, 2009).

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 (1997-2009) 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 since 2007. Values of the period 2004-2006 were in the level of the 2000 value, the highest of the time series, but 2007-2009 values are 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 1997-2009, in two-cm groups. In 1997, we have a recruitment modal value that can be more or less followed until 2009. In 1998 there was another modal value at small lengths that can be roughly 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. In the last three years all the length classes are poorer than the rest of the 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 2004-2007. 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 and remains at levels comparable to the beginning of the Campelen time series in 1996-1999 (NAFO, 2009).

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 2002-2009. 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 and mainly in 2008 it dropped off. In 2009 we can see an increase in the value of the biomass, reaching a level between the 2006 and the 2007 biomass.

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 2006-2009 there is no length class with a good presence.

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TABLE 1.- Spanish spring bottom trawl surveys on NAFO Div. 3NO: 1997-2009

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
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
2008	R/V *Vizconde de Eza*	122	45-1374	May 27–June 16
2009	R/V *Vizconde de Eza*	109	45-1374	May 31–June 18

(*) 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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	1997				1998				1999				2000				2001			
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	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	0.0341	3	0.000	0.000
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	0.0338	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	0.0240	2	0.000	0.000
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	0.0240	2	0.000	0.000
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	-	0.0244	2	0.170	0.240
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	0.0345	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	0.0803	7	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	0.2423	20	0.390	1.744
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	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	0.0338	3	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	0.1155	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	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	0.0236	2	0.000	0.000
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	0.0229	2	0.430	0.580
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	0.0206	2	0.03	0.048
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	0.0236	2	0.00	0.00
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	0.0469	4	0.00	0.00
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	0.0248	2	0.220	0.085
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	0.0233	2	2.465	2.878
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	0.0240	2	1.705	0.304
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	0.0353	3	7.507	3.835
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	0.0116	2	1.415	1.832
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	0.0116	2	4.304	5.509
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	0.0225	2	0.21	0.132
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	0.0229	2	1.00	0.241
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	0.0210	2	6.04	3.455
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	0.0214	2	31.57	21.165
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	0.0195	2	75.61	17.890
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	0.0416	4	24.29	19.579
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	0.0113	2	12.796	11.520
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	0.0233	2	20.43	16.686
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	0.0218	2	69.10	46.916
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	0.0221	2	59.11	50.035
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	0.0229	2	7.195	9.468
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	0.0225	2	15.515	2.524
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	0.0116	2	2.839	3.040
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	0.0330	3	15.35	12.271
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	0.0240	2	5.550	3.323
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	0.0113	2	4.385	0.685
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	0.0203	2	2.65	1.233
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	0.0218	2	3.09	1.673

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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2002				2003				2004				2005			
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	0.0476	4	0.000	0.000	0.0334	3	0.000	0.000	0.0338	3	0.000	0.000	0.0353	3	0.000	0.000
354	0.0356	3	0.000	0.000	0.0338	3	0.000	0.000	0.0345	3	0.000	0.000	0.0353	3	0.000	0.000
355	0.0236	2	0.000	0.000	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000	0.0225	2	0.000	0.000
356	0.0233	2	0.000	0.000	0.0225	2	0.115	0.163	0.0221	2	1.225	1.732	0.0233	2	0.260	0.368
357	0.0240	2	1.050	1.061	0.0229	2	1.385	1.959	0.0229	2	0.027	0.037	0.0233	2	15.785	3.090
358	0.0345	3	0.500	0.700	0.0338	3	0.000	0.000	0.0330	3	0.007	0.012	0.0349	3	0.000	0.000
359	0.0686	6	0.041	0.100	0.0791	7	0.000	0.000	0.0791	7	0.479	1.267	0.0814	7	0.103	0.217
360	0.2865	25	0.000	0.000	0.2254	20	0.000	0.000	0.2310	20	0.000	0.000	0.2325	20	0.000	0.000
374	0.0345	3	0.000	0.000	0.0225	2	0.000	0.000	0.0233	2	0.000	0.000	0.0229	2	0.000	0.000
375	0.0353	3	0.000	0.000	0.0330	3	0.000	0.000	0.0338	3	0.000	0.000	0.0349	3	0.000	0.000
376	0.1140	10	0.000	0.000	0.1125	10	0.000	0.000	0.1166	10	0.000	0.000	0.1174	10	0.000	0.000
377	0.0229	2	0.273	0.386	0.0225	2	0.000	0.000	0.0218	2	0.000	0.000	0.0233	2	0.000	0.000
378	0.0233	2	0.008	0.011	0.0225	2	0.000	0.000	0.0225	2	0.000	0.000	0.0225	2	0.620	0.877
379	0.0229	2	0.265	0.375	0.0229	2	0.124	0.175	0.0124	1	3.960	-	0.0236	2	26.975	17.006
380	0.0225	2	0.008	0.011	0.0229	2	0.085	0.120	0.0221	2	278.650	209.516	0.0229	2	194.750	113.491
381	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000	0.0225	2	4.145	5.169	0.0233	2	17.450	11.384
382	0.0341	3	0.002	0.004	0.0454	4	0.000	0.000	0.0461	4	0.080	0.160	0.0458	4	0.235	0.286
721	0.0233	2	1.250	1.768	0.0225	2	0.000	0.000	0.0221	2	3.473	0.449	0.0229	2	1.173	1.609
722	0.0236	2	10.930	14.213	0.0221	2	4.315	4.547	0.0218	2	4.530	2.676	0.0233	2	5.415	4.985
723	0.0233	2	0.700	0.283	0.0229	2	8.370	3.253	0.0229	2	10.053	4.938	0.0233	2	21.528	23.869
724	0.0225	2	10.000	4.384	0.0225	2	4.980	1.669	0.0214	2	10.746	0.701	0.0225	2	9.500	8.514
725	0.0225	2	2.650	1.344	0.0229	2	0.377	0.532	0.0225	2	92.415	82.046	0.0236	2	104.420	135.072
726	0.0214	2	2.650	1.909	0.0225	2	0.000	0.000	0.0225	2	59.865	19.608	0.0113	1	34.900	-
727	0.0233	2	0.570	0.806	0.0218	2	21.900	24.607	0.0233	2	16.700	1.697	0.0229	2	18.650	12.657
728	0.0229	2	0.620	0.876	0.0225	2	32.650	3.748	0.0180	2	15.650	9.687	0.0109	1	35.400	-
752	0.0116	1	1.950	2.758	0.0229	2	77.900	100.268	0.0214	2	94.610	95.162	0.0236	2	21.590	3.677
753	0.0229	2	5.400	7.637	0.0229	2	57.050	55.791	0.0218	2	63.835	45.912	0.0225	2	63.320	12.629
754	0.0341	3	98.450	82.237	0.0218	2	65.600	40.729	0.0214	2	33.355	11.377	0.0225	2	13.957	14.981
755	0.0338	3	1.460	1.307	0.0221	2	18.200	25.597	0.0319	3	14.658	21.304	0.0450	4	34.228	9.637
756	0.0229	2	11.750	10.819	0.0221	2	7.160	9.051	0.0218	2	9.772	3.778	0.0233	2	23.675	12.693
757	0.0225	2	16.250	16.193	0.0221	2	8.575	2.765	0.0218	2	12.890	8.330	0.0225	2	17.758	8.403
758	0.0225	2	141.550	101.470	0.0221	2	41.050	58.053	0.0214	2	32.955	10.260	0.0225	2	34.043	1.042
759	0.0225	2	69.250	97.934	0.0113	1	78.080	-	0.0214	2	39.980	4.921	0.0229	2	46.825	37.512
760	0.0229	2	11.950	4.172	0.0218	2	40.650	3.465	0.0221	2	76.475	94.293	0.0229	2	57.790	20.492
761	0.0225	2	5.350	5.445	0.0225	2	12.750	9.263	0.0221	2	25.610	28.055	0.0221	2	37.553	18.438
762	0.0225	2	0.325	0.460	0.0225	2	14.650	3.861	0.0233	2	15.729	4.594	0.0225	2	11.938	8.432
763	0.0225	2	1.225	1.732	0.0311	3	2.717	4.705	0.0326	3	28.000	21.696	0.0334	3	13.424	3.205
764	0.0236	2	20.050	11.526	0.0221	2	19.420	19.771	0.0229	2	40.790	41.988	0.0233	2	1.161	1.642
765	0.0236	2	2.700	2.404	0.0113	1	10.400	-	0.0225	2	5.347	2.710	0.0229	2	7.252	2.647
766	0.0233	2	9.125	9.016	0.0225	2	5.690	6.548	0.0225	2	7.214	1.582	0.0229	2	6.355	4.794
767	0.0225	2	9.150	12.940	0.0229	2	3.130	2.461	0.0218	2	3.667	0.401	0.0113	1	4.646	-

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

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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	2006				2007				2008				2009			
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	0.0371	3	0.000	0.000	0.0364	3	0.000	0.000	0.0341	3	0.000	0.000	0.0345	3	0.000	0.000
354	0.0364	3	0.000	0.000	0.0364	3	0.000	0.000	0.0345	3	0.000	0.000	0.0338	3	0.000	0.000
355	0.0248	2	0.000	0.000	0.0240	2	0.000	0.000	0.0221	2	0.000	0.000	0.0233	2	1.225	1.732
356	0.0240	2	0.350	0.495	0.0240	2	0.000	0.000	0.0236	2	0.000	0.000	0.0229	2	0.000	0.000
357	0.0244	2	42.575	1.407	0.0360	3	1.907	1.661	0.0233	2	0.845	0.813	0.0116	2	15.888	19.160
358	0.0349	3	0.000	0.000	0.0368	3	0.283	0.491	0.0345	3	0.320	0.554	0.0341	3	0.000	0.000
359	0.0975	8	0.000	0.000	0.0855	7	0.000	0.000	0.0799	7	0.000	0.000	0.0795	7	0.066	0.187
360	0.2340	19	0.000	0.000	0.2378	20	0.000	0.000	0.2340	20	0.000	0.000	0.2273	20	0.000	0.000
374	0.0236	2	0.000	0.000	0.0240	2	0.000	0.000	0.0233	2	0.000	0.000	0.0225	2	0.000	0.000
375	0.0364	3	0.000	0.000	0.0364	3	0.000	0.000	0.0334	3	0.000	0.000	0.0341	3	0.000	0.000
376	0.1219	10	0.000	0.000	0.1185	10	0.000	0.000	0.1129	10	0.000	0.000	0.1133	10	0.000	0.000
377	0.0236	2	0.000	0.000	0.0240	2	0.000	0.000	0.0233	2	0.000	0.000	0.0225	2	0.000	0.000
378	0.0240	2	0.260	0.367	0.0233	2	0.000	0.000	0.0240	2	0.000	0.000	0.0229	2	0.000	0.000
379	0.0236	2	112.080	148.252	0.0240	2	6.478	1.813	0.0229	2	2.890	3.881	0.0229	2	7.140	3.620
380	0.0229	2	130.294	89.342	0.0240	2	22.490	15.712	0.0225	2	17.273	4.847	0.0229	2	7.528	9.153
381	0.0229	2	101.485	42.122	0.0240	2	0.000	0.000	0.0229	2	0.000	0.000	0.0229	2	0.000	0.000
382	0.0469	4	0.200	0.400	0.0484	4	0.163	0.325	0.0458	4	0.000	0.000	0.0450	4	0.000	0.000
721	0.0236	2	3.005	3.415	0.0116	1	0.830	-	0.0225	2	0.876	1.238	0.0229	2	4.205	0.777
722	0.0240	2	0.901	1.005	0.0225	2	3.945	1.902	0.0206	2	2.791	2.044	0.0225	2	0.744	0.723
723	0.0236	2	20.810	0.919	0.0240	2	4.417	2.512	0.0225	2	3.870	1.032	0.0225	2	17.995	3.825
724	0.0233	2	4.712	4.322	0.0233	2	8.758	3.297	0.0221	2	8.207	6.406	0.0233	2	9.931	4.258
725	0.0233	2	48.050	48.578	0.0225	2	12.730	7.742	0.0229	2	4.897	4.530	0.0229	2	5.905	1.633
726	0.0225	2	21.017	5.822	0.0229	2	40.814	22.325	0.0225	2	40.678	6.418	0.0229	2	34.425	22.026
727	0.0225	2	14.650	7.283	0.0240	2	10.079	6.405	0.0221	2	6.987	1.466	0.0113	1	7.942	-
728	0.0225	2	25.250	1.626	0.0225	2	17.355	10.953	0.0221	2	8.250	4.738	0.0229	2	7.339	2.176
752	0.0225	2	25.200	10.041	0.0225	2	19.404	27.432	0.0218	2	60.305	30.342	0.0229	2	30.594	14.292
753	0.0225	2	14.863	7.973	0.0225	2	31.106	20.248	0.0221	2	115.900	93.904	0.0116	1	117.400	-
754	0.0225	2	5.055	7.148	0.0225	2	53.404	6.218	0.0218	2	44.000	20.648	0.0113	1	145.500	-
755	0.0338	3	22.257	27.055	0.0338	3	28.680	19.358	0.0431	4	27.444	18.211	0.0116	1	11.291	-
756	0.0229	2	26.875	13.103	0.0225	2	85.074	23.863	0.0218	2	33.632	38.465	0.0225	2	39.305	29.380
757	0.0225	2	7.399	6.079	0.0229	2	46.664	28.618	0.0221	2	25.709	21.867	0.0229	2	18.680	1.584
758	0.0225	2	111.965	139.915	0.0225	2	18.887	14.302	0.0218	2	43.538	28.655	0.0225	2	43.930	8.726
759	0.0225	2	2.410	3.242	n.s.	n.s.	n.s.	n.s.	0.0221	2	29.143	17.052	0.0113	1	48.810	-
760	0.0225	2	42.124	31.854	0.0233	2	27.625	32.492	0.0225	2	4.170	1.222	0.0229	2	22.890	6.633
761	0.0233	2	18.333	4.104	0.0225	2	20.654	18.550	0.0214	2	16.773	10.221	0.0225	2	10.145	1.916
762	0.0233	2	22.712	29.399	n.s.	n.s.	n.s.	n.s.	0.0214	2	22.299	3.500	0.0225	2	10.315	7.898
763	0.0225	2	29.163	24.236	n.s.	n.s.	n.s.	n.s.	0.0311	3	14.405	3.867	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	3.134	0.699	0.0225	2	22.213	23.443	0.0221	2	11.735	15.308	0.0116	1	20.543	-
765	0.0236	2	15.093	19.846	0.0225	2	5.328	4.173	0.0214	2	6.893	6.777	0.0225	2	6.485	0.898
766	0.0229	2	3.463	2.077	n.s.	n.s.	n.s.	n.s.	0.0218	2	8.243	4.294	0.0225	2	1.946	0.629
767	0.0233	2	2.495	3.528	n.s.	n.s.	n.s.	n.s.	0.0214	2	9.859	4.599	n.s.	n.s.	n.s.	n.s.

TABLE 3.- Stratified mean catches (Kg) by stratum and year and SD by year of Roughhead grenadier (1997-2009). n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2009 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	2008	2009
353	0.00	0.00	0.00	0.61	0.00	0.00	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	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	0.00	90.65
356	0.00	20.01	0.88	3.96	0.00	0.00	5.41	57.58	12.22	16.45	0.00	0.00	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	138.58	2605.63
358	0.00	0.00	52.35	0.00	0.00	112.50	0.00	1.50	0.00	0.00	63.75	72.00	0.00
359	0.00	0.00	0.00	0.00	0.00	17.19	0.00	201.66	43.30	0.00	0.00	0.00	27.89
360	0.00	0.00	0.00	0.00	1085.37	0.00	0.00	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	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	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	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	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	0.00	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	306.29	756.84
380	21.00	0.00	0.33	15.12	3.27	0.72	8.16	26750.40	18696.00	12508.18	2159.04	1658.16	722.64
381	0.00	0.00	0.00	10.67	0.00	0.00	0.00	596.88	2512.80	14613.84	0.00	0.00	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	0.00	0.00
721	0.00	49.25	158.81	52.79	14.30	81.25	0.00	225.71	76.21	195.33	53.95	56.91	273.29
722	2.15	331.80	324.65	400.45	207.06	918.12	362.46	380.48	454.86	75.64	331.38	234.44	62.45
723	0.00	39.59	366.82	443.22	264.28	108.50	1297.35	1558.14	3336.84	3225.55	684.56	599.85	2789.23
724	69.67	131.95	456.02	512.18	930.83	1240.00	617.52	1332.50	1178.00	584.29	1085.93	1017.67	1231.44
725	0.00	8.04	390.44	1327.83	148.53	278.25	39.53	9703.58	10964.10	5045.25	1336.60	514.19	620.03
726	n.s.	159.36	525.28	1060.37	309.91	190.80	0.00	4310.28	2512.80	1513.22	2938.57	2928.82	2478.60
727	34.32	18.80	63.42	239.94	20.43	54.72	2102.40	1603.20	1790.40	1406.40	967.58	670.70	762.43
728	65.14	71.71	1403.72	565.40	78.35	48.32	2546.70	1220.70	2761.20	1969.50	1353.69	643.50	572.44
752	1157.57	1070.59	1183.22	3492.80	790.67	255.45	10204.90	12393.91	2828.29	3301.20	2541.92	7899.96	4007.81
753	2142.81	4917.66	3924.96	6783.22	4356.11	745.20	7872.90	8809.23	8738.16	2051.03	4292.56	15994.20	16201.20
754	12634.78	10930.12	4747.16	12024.20	13610.16	17721.00	11808.00	6003.90	2512.26	909.81	9612.63	7920.00	26190.00
755	n.s.	16203.89	9034.94	10853.88	9350.67	562.10	7007.00	5643.46	13177.59	8568.82	11041.67	10565.84	4347.04
756	328.45	696.44	2993.85	1803.02	1292.39	1186.75	723.16	986.92	2391.18	2714.38	8592.42	3396.83	3969.81
757	2129.06	4009.91	907.40	9047.90	2083.97	1657.50	874.65	1314.78	1811.32	754.65	4759.73	2622.27	1905.36
758	4635.47	7626.33	4573.78	5478.08	6840.86	14013.45	4063.95	3262.55	3370.26	11084.54	1869.81	4310.26	4349.07
759	n.s.	8431.85	2856.38	4168.89	7507.47	8794.75	9916.16	5077.46	5946.78	306.01	n.s.	3701.10	6198.87
760	603.06	1364.74	617.48	2734.73	1108.03	1840.30	6260.10	11777.15	8899.66	6487.10	4254.25	642.18	3525.06
761	3282.93	4307.46	2837.19	1972.49	2653.07	914.85	2180.25	4379.31	6421.48	3134.94	3531.75	2868.10	1734.80
762	5147.01	6374.36	3678.97	4025.85	601.93	68.90	3105.80	3334.44	2530.75	4814.94	n.s.	4727.39	2186.78
763	n.s.	2824.01	2987.69	3790.53	4005.31	319.73	709.05	7307.91	3503.58	7611.41	n.s.	3759.62	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	1173.45	2054.30
765	1457.26	834.98	768.48	961.66	543.70	334.80	1289.60	662.97	899.19	1871.53	660.61	854.73	804.14
766	1114.72	992.95	794.36	458.47	381.98	1314.00	819.36	1038.74	915.12	498.67	n.s.	1186.92	280.15
767	n.s.	1031.65	765.33	400.82	488.25	1445.70	494.54	579.31	734.07	394.21	n.s.	1557.72	n.s.
TOTAL	35543	72931	46898	73232	59305	56459	76491	125045	114749	114938	65409	82022	90748
$\overline{Y}$	3.81	7.05	4.53	7.08	5.73	5.46	7.40	12.09	11.10	11.11	6.93	7.93	9.15
S.D.	0.31	0.61	0.45	0.85	0.77	1.51	1.42	2.17	1.38	1.89	0.83	1.11	0.40

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. 2002-2009 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	2008	2009
353	0	0	0	0	0	0	0	0	0	0	0	0	0
354	0	0	0	0	0	0	0	0	0	0	0	0	0
355	0	0	0	1	0	0	0	0	0	0	0	0	8
356	0	2	0	0	0	0	0	5	1	1	0	0	0
357	1	0	3	6	2	14	20	0	223	573	26	12	448
358	0	0	5	0	0	10	0	0	0	0	5	6	0
359	0	0	0	0	0	2	0	18	4	0	0	0	3
360	0	0	0	0	90	0	0	0	0	0	0	0	0
374	0	0	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0	0	0
376	0	0	0	0	0	0	0	0	0	0	0	0	0
377	0	0	0	0	0	2	0	0	0	0	0	0	0
378	6	0	4	2	0	0	0	0	8	3	0	0	0
379	0	0	0	5	4	2	1	34	242	1006	57	27	66
380	2	0	0	1	0	0	1	2418	1635	1094	180	147	63
381	0	0	0	1	0	0	0	53	216	1278	0	0	0
382	0	0	0	0	0	0	0	2	7	6	5	0	0
721	0	5	13	4	1	7	0	20	7	17	5	5	24
722	0	31	28	37	18	78	33	35	39	6	29	23	6
723	0	3	32	36	22	9	113	136	287	273	57	53	248
724	6	13	41	44	79	110	55	125	105	50	93	92	106
725	0	1	34	126	13	25	3	863	928	434	119	45	54
726	0	15	47	96	25	18	0	383	223	135	257	260	217
727	4	2	5	23	2	5	193	138	157	125	81	61	68
728	6	7	121	54	7	4	226	136	254	175	120	58	50
752	106	94	102	339	75	22	892	1160	239	293	226	726	350
753	200	452	343	624	407	65	688	810	777	182	382	1446	1394
754	1149	1041	460	1233	1395	1549	1086	562	223	81	854	728	2328
755	n.s.	1571	871	1007	899	50	633	531	1171	762	981	980	374
756	30	62	266	178	113	104	65	91	206	237	764	312	353
757	210	389	78	847	179	147	79	121	161	67	416	237	167
758	434	701	428	522	629	1246	367	305	300	985	166	396	387
759	n.s.	789	263	397	679	782	881	475	520	27	n.s.	335	551
760	57	128	55	260	97	161	576	1065	778	577	366	57	308
761	313	418	270	178	236	81	194	396	580	270	314	268	154
762	502	618	350	398	54	6	276	287	225	414	n.s.	442	194
763	n.s.	260	288	364	364	28	68	672	315	677	n.s.	362	n.s.
764	62	44	36	41	46	170	176	357	10	27	197	106	177
765	141	80	69	95	49	28	115	59	79	158	59	80	71
766	109	104	73	43	38	113	73	92	80	44	n.s.	109	25
767	n.s.	93	72	38	45	129	43	53	65	34	n.s.	146	n.s.
TOTAL	3340	6922	4357	7000	5568	4968	6860	11402	10064	10010	5760	7521	8193
S.D.	290	644	431	807	700	1365	1316	2043	1236	1716	695	1028	286

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: 1997-2009. 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	2008	2009
Males	a	0.0687	0.1094	0.0650	0.0554	0.1095	0.0882	0.1141	0.0904	0.0600	0.1058	0.1287	0.1096	0.0811
		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	E = 0.1182	E = 0.1408
	b	3.0453	2.8929	3.1085	3.1411	2.8906	2.9672	2.8805	2.9517	3.1090	2.9150	2.8342	2.8880	2.9975
		E = 0.1340	E = 0.0937	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	E = 0.0473	E = 0.0554
		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	R2 = 0.994	R2 = 0.988
		N = 26	N = 201	N = 102	N = 269	N = 116	N = 292	N = 496	N = 525	N = 411	N = 463	N= 473	N= 468	N= 217
Females	a	0.0937	0.0673	0.1185	0.0790	0.2843	0.0856	0.1132	0.0804	0.0802	0.3193	0.1128	0.1472	0.1202
		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	E = 0.1062	E = 0.0194
	b	2.9395	3.0551	2.8739	3.0192	2.5397	2.9736	2.8864	2.9919	2.9950	2.5373	2.8872	2.7984	2.8658
		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	E = 0.0.72	E = 0.0551
		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	R2 = 0.994	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	N=792	N=465
Indet.	a	0.0909	0.0907	0.1185	0.0736	0.1862	0.1040	0.1104	0.0924	0.0833	0.2939	0.1168	0.1116	0.1179
		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	E = 0.0578	E = 0.0743
	b	2.9494	2.9631	2.8773	3.0409	2.6892	2.9096	2.8949	2.9466	2.9832	2.5661	2.8774	2.8880	2.8704
		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	E = 0.0204	E = 0.0271
		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	R2 = 0.998	R2 = 0.995
		N = 67	N = 655	N = 338	N = 820	N = 292	N = 787	N = 1288	N = 1379	N = 1078	N = 1218	N= 1401	N= 1263	N= 710

TABLE 6.- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V Playa de Menduíña data. 2002-2009 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				2001			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1.5	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	0.000	0.000	0.000	0.000
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	0.000	0.000	0.036	0.036
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	0.007	0.021	0.050	0.079
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	0.059	0.013	0.029	0.102
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	0.110	0.143	0.010	0.263
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	0.074	0.087	0.000	0.161
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	0.051	0.060	0.000	0.111
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	0.121	0.134	0.000	0.254
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	0.158	0.090	0.000	0.248
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	0.189	0.215	0.000	0.404
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	0.319	0.371	0.000	0.690
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	0.476	0.550	0.000	1.026
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	0.959	1.182	0.000	2.141
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	1.521	1.543	0.000	3.063
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	1.453	1.650	0.000	3.104
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	0.844	1.158	0.000	2.003
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	0.773	0.628	0.000	1.401
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	0.646	0.464	0.000	1.111
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	0.283	0.317	0.000	0.600
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	0.071	0.361	0.000	0.432
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	0.025	0.148	0.000	0.173
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	0.001	0.095	0.000	0.095
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	0.000	0.082	0.000	0.082
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	0.000	0.061	0.000	0.061
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	0.002	0.058	0.000	0.060
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	0.004	0.040	0.000	0.044
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	0.000	0.026	0.000	0.026
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	0.002	0.040	0.000	0.041
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	0.000	0.027	0.000	0.027
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	0.000	0.032	0.000	0.032
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	0.000	0.029	0.000	0.029
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	0.000	0.021	0.000	0.021
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	0.000	0.008	0.000	0.008
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	0.000	0.008	0.000	0.008
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	0.000	0.008	0.000	0.008
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	0.000	0.004	0.000	0.004
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	0.000	0.003	0.000	0.003
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	0.000	0.000	0.000	0.000
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	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	0.000	0.001	0.000	0.001
41.5	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	0.000	0.000	0.000	0.000
42.5	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	0.000	0.000	0.000	0.000
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	8.149	9.677	0.125	17.952
Nº samples (*):				14				47				53				57				22
Nº Ind. (*):	416	609	2	1027	1647	2421	8	4076	2501	3512	7	6020	1957	2967	4	4928	149	208	10	367
Sampled catch:				89				338				379				318				107
Range (*):				5.5-37				3.5-39.5				4-38				3-40.5				2.5-29
Total catch:				626				892				650				1080				453
Total hauls (*):				128				124				114				118				123

TABLE 6 (cont.).- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V Playa de Menduíña data. 2002-2009 data are original R/V Vizconde de Eza data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

.	2002				2003				2004				2005			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1.5	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
2.5	0.031	0.009	0.012	0.052	0.016	0.000	0.019	0.035	0.000	0.000	0.026	0.026	0.000	0.000	0.000	0.000
3.5	0.112	0.036	0.047	0.195	0.219	0.069	0.074	0.362	0.070	0.024	0.651	0.746	0.030	0.026	0.289	0.344
4.5	0.088	0.039	0.017	0.144	0.045	0.052	0.015	0.113	0.089	0.006	0.080	0.176	0.046	0.030	0.106	0.182
5.5	0.198	0.208	0.009	0.414	0.353	0.390	0.000	0.743	0.161	0.124	0.005	0.290	0.015	0.038	0.000	0.053
6.5	0.058	0.102	0.005	0.165	0.653	0.652	0.000	1.305	0.649	0.567	0.000	1.216	0.499	0.510	0.000	1.009
7.5	0.095	0.080	0.000	0.175	0.215	0.256	0.000	0.470	0.223	0.196	0.000	0.419	0.324	0.308	0.000	0.633
8.5	0.087	0.149	0.000	0.235	0.401	0.491	0.000	0.892	0.617	0.550	0.000	1.167	0.339	0.383	0.009	0.732
9.5	0.084	0.063	0.000	0.147	0.254	0.233	0.000	0.487	0.592	0.860	0.000	1.452	0.393	0.671	0.000	1.064
10.5	0.110	0.098	0.000	0.208	0.351	0.320	0.000	0.671	0.442	0.694	0.000	1.136	0.452	0.603	0.000	1.055
11.5	0.109	0.185	0.000	0.294	0.220	0.407	0.000	0.627	0.715	0.673	0.000	1.387	0.939	1.113	0.000	2.052
12.5	0.201	0.243	0.000	0.444	0.312	0.354	0.000	0.665	0.684	0.650	0.000	1.335	0.740	0.907	0.000	1.647
13.5	0.378	0.284	0.000	0.662	0.482	0.542	0.000	1.024	0.678	0.716	0.000	1.393	0.631	0.792	0.000	1.423
14.5	0.603	0.552	0.000	1.155	0.751	0.859	0.000	1.610	0.932	0.683	0.000	1.615	0.560	0.795	0.000	1.355
15.5	0.627	0.904	0.000	1.531	1.246	1.169	0.000	2.414	1.046	0.901	0.000	1.947	0.621	0.821	0.000	1.442
16.5	0.612	0.928	0.000	1.540	1.525	1.389	0.000	2.914	1.197	1.295	0.000	2.492	0.781	0.646	0.000	1.427
17.5	0.343	0.729	0.000	1.072	0.793	1.335	0.000	2.128	1.429	1.270	0.000	2.699	1.170	1.050	0.000	2.220
18.5	0.244	0.502	0.000	0.746	0.384	0.806	0.000	1.190	1.051	1.573	0.000	2.623	1.129	0.991	0.000	2.120
19.5	0.202	0.505	0.000	0.707	0.234	0.656	0.000	0.890	0.476	1.333	0.000	1.808	0.668	1.323	0.000	1.991
20.5	0.115	0.387	0.000	0.502	0.171	0.356	0.000	0.527	0.334	0.875	0.000	1.209	0.258	1.113	0.000	1.371
21.5	0.028	0.349	0.000	0.377	0.005	0.257	0.000	0.262	0.157	0.681	0.000	0.839	0.066	0.708	0.000	0.774
22.5	0.017	0.299	0.000	0.316	0.019	0.289	0.000	0.308	0.027	0.597	0.000	0.624	0.061	0.546	0.000	0.607
23.5	0.008	0.152	0.000	0.160	0.008	0.187	0.000	0.195	0.028	0.437	0.000	0.466	0.009	0.551	0.000	0.559
24.5	0.004	0.102	0.000	0.106	0.000	0.108	0.000	0.108	0.018	0.391	0.000	0.409	0.016	0.481	0.000	0.497
25.5	0.000	0.070	0.000	0.070	0.000	0.111	0.000	0.111	0.000	0.266	0.000	0.266	0.009	0.259	0.000	0.268
26.5	0.000	0.114	0.000	0.114	0.000	0.109	0.000	0.109	0.005	0.265	0.000	0.270	0.006	0.173	0.000	0.179
27.5	0.000	0.149	0.000	0.149	0.000	0.100	0.000	0.100	0.000	0.178	0.000	0.178	0.000	0.235	0.000	0.235
28.5	0.000	0.086	0.000	0.086	0.000	0.104	0.000	0.104	0.000	0.154	0.000	0.154	0.000	0.106	0.000	0.106
29.5	0.000	0.063	0.000	0.063	0.000	0.083	0.000	0.083	0.005	0.185	0.000	0.190	0.000	0.119	0.000	0.119
30.5	0.000	0.059	0.000	0.059	0.000	0.073	0.000	0.073	0.000	0.146	0.000	0.146	0.000	0.120	0.000	0.120
31.5	0.000	0.062	0.000	0.062	0.000	0.018	0.000	0.018	0.000	0.086	0.000	0.086	0.000	0.083	0.000	0.083
32.5	0.000	0.023	0.000	0.023	0.000	0.040	0.000	0.040	0.000	0.059	0.000	0.059	0.000	0.029	0.000	0.029
33.5	0.000	0.034	0.000	0.034	0.000	0.016	0.000	0.016	0.000	0.062	0.000	0.062	0.000	0.025	0.000	0.025
34.5	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.040	0.000	0.040	0.000	0.046	0.000	0.046
35.5	0.000	0.041	0.000	0.041	0.000	0.030	0.000	0.030	0.000	0.018	0.000	0.018	0.000	0.016	0.000	0.016
36.5	0.000	0.018	0.000	0.018	0.000	0.010	0.000	0.010	0.000	0.013	0.000	0.013	0.000	0.016	0.000	0.016
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	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	0.009	0.000	0.009	0.000	0.009	0.000	0.009
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	0.000	0.000	0.000
41.5	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
42.5	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
Total	4.352	7.622	0.090	12.063	8.655	11.875	0.108	20.638	11.623	16.579	0.763	28.964	9.762	15.641	0.403	25.807
Nº samples(*):				48				43				59				61
Nº Ind. (*):	604	1018	18	1640	1089	1500	21	2610	1535	2270	157	3962	1250	2028	57	3335
Sampled catch:				754				931				1742				1499
Range(*):				2-36.5				2.5-36				2.5-39				3-39
Total catch:				877				990				2055				1781
Total hauls(*):				125				118				120				119

TABLE 6 (cont.).- Roughhead grenadier length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V Playa de Menduíña data. 2002-2009 data are original R/V Vizconde de Eza data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

.	2006				2007				2008				2009			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1.5	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	0.005	0.005
2.5	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.027	0.005	0.005	0.005	0.015	0.000	0.000	0.015	0.015
3.5	0.120	0.012	0.141	0.273	0.090	0.041	0.623	0.754	0.072	0.025	0.051	0.148	0.006	0.000	0.233	0.239
4.5	0.155	0.063	0.007	0.225	0.010	0.027	0.089	0.126	0.022	0.010	0.000	0.032	0.023	0.005	0.022	0.050
5.5	0.069	0.063	0.000	0.132	0.054	0.077	0.000	0.131	0.054	0.074	0.000	0.127	0.029	0.041	0.043	0.114
6.5	0.374	0.448	0.004	0.826	0.266	0.278	0.005	0.550	0.318	0.249	0.012	0.580	0.134	0.173	0.053	0.361
7.5	0.386	0.312	0.000	0.698	0.089	0.083	0.000	0.173	0.038	0.099	0.000	0.137	0.076	0.138	0.000	0.213
8.5	0.216	0.140	0.000	0.356	0.129	0.355	0.000	0.485	0.191	0.161	0.000	0.352	0.220	0.261	0.000	0.481
9.5	0.378	0.317	0.000	0.695	0.315	0.204	0.000	0.520	0.214	0.235	0.000	0.449	0.167	0.211	0.000	0.378
10.5	0.194	0.331	0.000	0.524	0.301	0.249	0.000	0.550	0.192	0.343	0.000	0.535	0.235	0.324	0.000	0.559
11.5	0.381	0.428	0.000	0.810	0.364	0.414	0.000	0.778	0.227	0.331	0.000	0.559	0.275	0.421	0.000	0.696
12.5	0.493	0.653	0.000	1.146	0.264	0.414	0.000	0.678	0.278	0.398	0.005	0.681	0.225	0.514	0.000	0.739
13.5	0.846	0.672	0.000	1.519	0.370	0.397	0.000	0.768	0.388	0.286	0.000	0.674	0.358	0.583	0.000	0.941
14.5	0.637	0.790	0.000	1.427	0.475	0.511	0.000	0.987	0.484	0.462	0.000	0.946	0.592	0.834	0.000	1.426
15.5	0.748	0.912	0.000	1.660	0.459	0.457	0.000	0.916	0.663	0.501	0.000	1.164	0.633	0.692	0.000	1.325
16.5	0.704	0.522	0.000	1.225	0.470	0.471	0.000	0.941	0.662	0.547	0.000	1.209	0.812	0.879	0.000	1.691
17.5	0.876	0.619	0.000	1.495	0.317	0.323	0.000	0.639	0.358	0.521	0.000	0.878	0.476	0.849	0.000	1.324
18.5	0.884	0.834	0.000	1.718	0.403	0.318	0.000	0.721	0.331	0.332	0.000	0.664	0.267	0.487	0.000	0.754
19.5	0.695	1.050	0.000	1.745	0.568	0.373	0.000	0.941	0.354	0.368	0.000	0.722	0.270	0.330	0.000	0.600
20.5	0.387	1.165	0.000	1.552	0.274	0.407	0.000	0.681	0.176	0.266	0.000	0.442	0.101	0.408	0.000	0.509
21.5	0.154	1.101	0.000	1.255	0.105	0.492	0.000	0.597	0.135	0.339	0.000	0.474	0.095	0.426	0.000	0.522
22.5	0.038	0.923	0.000	0.961	0.067	0.422	0.000	0.489	0.037	0.510	0.000	0.547	0.048	0.535	0.000	0.583
23.5	0.013	0.748	0.000	0.761	0.020	0.437	0.000	0.456	0.053	0.581	0.000	0.634	0.027	0.390	0.000	0.418
24.5	0.008	0.483	0.000	0.491	0.000	0.442	0.000	0.442	0.000	0.525	0.000	0.525	0.000	0.665	0.000	0.665
25.5	0.000	0.387	0.000	0.387	0.014	0.299	0.000	0.314	0.000	0.522	0.000	0.522	0.000	0.551	0.000	0.551
26.5	0.000	0.266	0.000	0.266	0.000	0.261	0.000	0.261	0.008	0.288	0.000	0.296	0.000	0.519	0.000	0.519
27.5	0.013	0.091	0.000	0.105	0.000	0.219	0.000	0.219	0.000	0.329	0.000	0.329	0.003	0.474	0.000	0.477
28.5	0.005	0.120	0.000	0.125	0.005	0.095	0.000	0.101	0.000	0.172	0.000	0.172	0.000	0.154	0.000	0.154
29.5	0.000	0.112	0.000	0.112	0.000	0.115	0.000	0.115	0.000	0.138	0.000	0.138	0.000	0.177	0.000	0.177
30.5	0.000	0.105	0.000	0.105	0.000	0.089	0.000	0.089	0.000	0.059	0.000	0.059	0.000	0.087	0.000	0.087
31.5	0.000	0.107	0.000	0.107	0.000	0.031	0.000	0.031	0.000	0.036	0.000	0.036	0.000	0.052	0.000	0.052
32.5	0.000	0.080	0.000	0.080	0.000	0.016	0.000	0.016	0.000	0.037	0.000	0.037	0.000	0.024	0.000	0.024
33.5	0.000	0.060	0.000	0.060	0.000	0.033	0.000	0.033	0.000	0.041	0.000	0.041	0.000	0.029	0.000	0.029
34.5	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014	0.000	0.013	0.000	0.013	0.000	0.000	0.000	0.000
35.5	0.000	0.015	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035	0.000	0.000	0.000	0.000
36.5	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.019	0.000	0.008	0.000	0.008
37.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.016	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	0.010	0.000	0.010	0.000	0.023	0.000	0.023
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	0.000	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	0.000	0.000	0.000
41.5	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
42.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000
Total	8.775	13.935	0.152	22.862	5.432	8.365	0.744	14.541	5.260	8.890	0.073	14.223	5.072	11.265	0.372	16.709
Nº samples(*):				57				46				57				46
Nº Ind. (*):	1140	1930	20	3090	671	1149	83	1903	786	1373	14	2173	430	940	45	1415
Sampled catch:				1629				1009				1213				723
Range(*):				3-36				2.5-34.5				2.5-42.5				1.5-38.5
Total catch:				1779				1009				1213				945
Total hauls(*):				120				110				122				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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

	1997				1998				1999				2000				2001			
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	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	0.0341	3	351.90	283.060
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	0.0338	3	67.63	19.515
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	0.0240	2	20.60	11.031
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	0.0240	2	0.29	0.410
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	-	0.0244	2	2.35	1.669
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	0.0345	3	4.05	6.974
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	0.0803	7	15.45	24.999
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	0.2423	20	67.67	79.827
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	0.0240	2	0.73	1.032
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	0.0338	3	0.51	0.878
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	0.1155	10	22.67	19.650
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	0.0229	2	5.70	2.270
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	0.0236	2	0.16	0.099
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	0.0229	2	0.00	0.000
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	0.0206	2	1.35	0.209
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	0.0236	2	0.74	0.419
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	0.0469	4	1.77	1.265
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	0.0248	2	0.00	0.000
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	0.0233	2	10.10	5.374
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	0.0240	2	2.40	2.121
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	0.0353	3	67.38	91.221
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	0.0116	2	1.91	1.235
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	0.0116	2	1.32	1.381
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	0.0225	2	0.64	0.905
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	0.0229	2	1.65	1.531
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	0.0210	2	8.93	5.430
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	0.0214	2	13.11	15.123
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	0.0195	2	98.76	126.307
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	0.0416	4	0.14	0.283
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	0.0113	2	7.04	3.761
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	0.0233	2	15.10	19.889
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	0.0218	2	184.47	248.733
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	0.0221	2	4.93	3.950
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	0.0229	2	6.47	5.282
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	0.0225	2	66.60	89.661
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	0.0116	2	0.00	0.000
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	0.0330	3	0.00	0.000
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	0.0240	2	2.45	3.465
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	0.0113	2	1.03	1.462
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	0.0203	2	0.00	0.000
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	0.0218	2	0.00	0.000

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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

	2002				2003				2004				2005			
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	0.0476	4	356.30	215.772	0.0334	3	78.36	33.796	0.0338	3	53.70	33.407	0.0353	3	40.97	40.382
354	0.0356	3	89.80	80.809	0.0338	3	40.33	40.683	0.0345	3	147.46	134.348	0.0353	3	48.19	40.450
355	0.0236	2	2.67	3.723	0.0229	2	19.53	22.422	0.0229	2	25.07	4.384	0.0225	2	17.80	2.628
356	0.0233	2	1.55	2.192	0.0225	2	5.19	7.333	0.0221	2	16.31	7.732	0.0233	2	10.81	2.242
357	0.0240	2	2.00	2.828	0.0229	2	2.25	3.182	0.0229	2	46.05	28.438	0.0233	2	51.88	55.763
358	0.0345	3	11.47	19.861	0.0338	3	21.14	25.809	0.0330	3	42.24	13.838	0.0349	3	72.15	80.699
359	0.0686	6	72.34	148.583	0.0791	7	25.86	23.965	0.0791	7	46.56	62.119	0.0814	7	45.11	63.415
360	0.2865	25	20.63	24.987	0.2254	20	35.53	29.397	0.2310	20	93.53	78.305	0.2325	20	59.30	63.584
374	0.0345	3	0.30	0.520	0.0225	2	0.00	0.000	0.0233	2	1.89	2.673	0.0229	2	2.70	1.082
375	0.0353	3	1.40	2.425	0.0330	3	2.29	2.414	0.0338	3	10.32	5.359	0.0349	3	12.31	10.043
376	0.1140	10	12.59	12.093	0.1125	10	10.77	12.802	0.1166	10	89.67	62.815	0.1174	10	154.50	136.423
377	0.0229	2	1.17	1.655	0.0225	2	0.46	0.438	0.0218	2	7.23	9.648	0.0233	2	29.36	30.186
378	0.0233	2	0.02	0.021	0.0225	2	2.98	4.076	0.0225	2	26.20	17.402	0.0225	2	6.10	7.264
379	0.0229	2	5.45	1.909	0.0229	2	0.01	0.014	0.0124	1	13.61	-	0.0236	2	32.60	16.971
380	0.0225	2	4.42	4.476	0.0229	2	4.09	0.559	0.0221	2	119.25	56.639	0.0229	2	66.74	45.199
381	0.0229	2	0.71	0.071	0.0229	2	3.40	3.394	0.0225	2	70.60	17.536	0.0233	2	52.28	28.354
382	0.0341	3	0.65	0.257	0.0454	4	0.00	0.000	0.0461	4	6.28	6.990	0.0458	4	5.06	4.563
721	0.0233	2	0.00	0.000	0.0225	2	10.63	7.481	0.0221	2	2.70	3.818	0.0229	2	6.15	8.697
722	0.0236	2	0.00	0.000	0.0221	2	0.91	0.021	0.0218	2	0.00	0.000	0.0233	2	6.90	9.758
723	0.0233	2	0.60	0.849	0.0229	2	5.19	4.865	0.0229	2	4.85	1.913	0.0233	2	0.00	0.000
724	0.0225	2	25.85	14.354	0.0225	2	26.32	0.226	0.0214	2	0.00	0.000	0.0225	2	4.20	5.940
725	0.0225	2	1.82	2.574	0.0229	2	1.31	0.506	0.0225	2	44.22	57.679	0.0236	2	30.95	43.775
726	0.0214	2	3.30	1.980	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0113	1	0.00	-
727	0.0233	2	3.05	4.313	0.0218	2	96.69	91.097	0.0233	2	10.16	10.380	0.0229	2	7.57	7.969
728	0.0229	2	6.69	9.454	0.0225	2	17.23	8.301	0.0180	2	2.69	3.804	0.0109	1	0.00	-
752	0.0116	1	0.49	0.686	0.0229	2	183.35	38.537	0.0214	2	0.00	0.000	0.0236	2	0.00	0.000
753	0.0229	2	12.90	18.243	0.0229	2	7.99	1.775	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
754	0.0341	3	595.65	819.042	0.0218	2	3.35	4.731	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
755	0.0338	3	0.00	0.000	0.0221	2	0.00	0.000	0.0319	3	1.26	2.188	0.0450	4	0.00	0.000
756	0.0229	2	9.36	7.835	0.0221	2	133.16	187.864	0.0218	2	0.00	0.000	0.0233	2	0.00	0.000
757	0.0225	2	1.55	2.192	0.0221	2	6.99	9.885	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
758	0.0225	2	32.45	41.224	0.0221	2	4.29	6.060	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0225	2	3.70	5.233	0.0113	1	3.89	-	0.0214	2	0.00	0.000	0.0229	2	0.00	0.000
760	0.0229	2	1.89	2.673	0.0218	2	30.68	30.717	0.0221	2	0.00	0.000	0.0229	2	4.43	6.265
761	0.0225	2	11.90	4.667	0.0225	2	0.00	0.000	0.0221	2	2.69	0.912	0.0221	2	0.00	0.000
762	0.0225	2	0.00	0.000	0.0225	2	2.99	1.570	0.0233	2	1.15	1.619	0.0225	2	0.00	0.000
763	0.0225	2	0.00	0.000	0.0311	3	0.00	0.000	0.0326	3	0.00	0.000	0.0334	3	0.00	0.000
764	0.0236	2	0.00	0.000	0.0221	2	42.05	45.064	0.0229	2	4.35	6.152	0.0233	2	0.00	0.000
765	0.0236	2	0.71	1.004	0.0113	1	2.23	-	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000
766	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0225	2	0.67	0.940	0.0229	2	0.00	0.000
767	0.0225	2	0.00	0.000	0.0229	2	1.13	0.215	0.0218	2	2.41	3.401	0.0113	1	0.00	-

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: 1997-2009. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001,there are data from the two vessels.

	2006				2007				2008				2009			
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	0.0371	3	48.27	33.965	0.0364	3	23.20	8.044	0.0341	3	55.00	18.097	0.0345	3	39.40	49.720
354	0.0364	3	62.30	19.336	0.0364	3	52.94	32.333	0.0345	3	127.21	63.410	0.0338	3	53.70	35.954
355	0.0248	2	1.51	2.128	0.0240	2	20.47	0.990	0.0221	2	6.00	8.485	0.0233	2	10.80	0.566
356	0.0240	2	19.15	18.314	0.0240	2	4.02	2.461	0.0236	2	10.25	14.489	0.0229	2	30.59	27.174
357	0.0244	2	28.29	40.007	0.0360	3	7.02	6.365	0.0233	2	10.56	9.397	0.0116	2	46.26	47.489
358	0.0349	3	5.75	6.983	0.0368	3	76.01	65.231	0.0345	3	17.81	5.687	0.0341	3	17.42	15.082
359	0.0975	8	45.28	34.608	0.0855	7	28.01	25.576	0.0799	7	27.28	41.820	0.0795	7	36.17	56.574
360	0.2340	19	74.59	59.722	0.2378	20	46.42	42.247	0.2340	20	40.69	26.252	0.2273	20	27.22	33.734
374	0.0236	2	9.84	3.118	0.0240	2	0.00	0.000	0.0233	2	1.81	2.553	0.0225	2	0.00	0.000
375	0.0364	3	34.35	17.964	0.0364	3	35.80	59.229	0.0334	3	9.01	4.406	0.0341	3	5.27	5.352
376	0.1219	10	183.56	254.026	0.1185	10	40.71	34.911	0.1129	10	70.05	51.740	0.1133	10	41.19	39.191
377	0.0236	2	61.48	33.411	0.0240	2	1.08	1.520	0.0233	2	32.35	2.475	0.0225	2	2.44	3.444
378	0.0240	2	5.86	8.280	0.0233	2	7.48	3.055	0.0240	2	31.62	0.820	0.0229	2	11.87	16.787
379	0.0236	2	181.31	256.409	0.0240	2	33.71	20.209	0.0229	2	11.69	3.083	0.0229	2	15.35	21.708
380	0.0229	2	110.30	2.687	0.0240	2	77.10	66.320	0.0225	2	92.75	74.741	0.0229	2	10.38	10.215
381	0.0229	2	72.41	8.775	0.0240	2	5.05	7.142	0.0229	2	16.49	20.687	0.0229	2	0.00	0.000
382	0.0469	4	3.41	3.064	0.0484	4	0.00	0.000	0.0458	4	0.48	0.950	0.0450	4	0.00	0.000
721	0.0236	2	0.00	0.000	0.0116	1	0.00	-	0.0225	2	0.00	0.000	0.0229	2	116.69	145.250
722	0.0240	2	0.00	0.000	0.0225	2	3.43	4.844	0.0206	2	14.00	19.799	0.0225	2	1.90	2.687
723	0.0236	2	5.41	4.226	0.0240	2	13.23	10.529	0.0225	2	5.31	7.502	0.0225	2	19.28	9.228
724	0.0233	2	0.00	0.000	0.0233	2	7.22	10.204	0.0221	2	4.28	6.053	0.0233	2	3.40	4.808
725	0.0233	2	73.01	100.261	0.0225	2	19.87	18.314	0.0229	2	1.95	2.755	0.0229	2	3.23	4.561
726	0.0225	2	3.66	1.237	0.0229	2	2.11	2.984	0.0225	2	0.65	0.919	0.0229	2	38.98	21.107
727	0.0225	2	0.00	0.000	0.0240	2	10.56	4.327	0.0221	2	8.49	12.007	0.0113	1	111.50	-
728	0.0225	2	1.32	1.860	0.0225	2	12.85	14.107	0.0221	2	1.63	2.298	0.0229	2	53.78	27.400
752	0.0225	2	0.73	1.025	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0229	2	0.00	0.000
753	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0116	1	0.00	-
754	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0113	1	0.00	-
755	0.0338	3	0.00	0.000	0.0338	3	0.00	0.000	0.0431	4	0.00	0.000	0.0116	1	0.00	-
756	0.0229	2	0.01	0.008	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0225	2	2.46	3.479
757	0.0225	2	0.51	0.718	0.0229	2	0.00	0.000	0.0221	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	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0221	2	0.00	0.000	0.0113	1	0.00	-
760	0.0225	2	0.00	0.000	0.0233	2	1.65	2.333	0.0225	2	0.00	0.000	0.0229	2	2.92	4.130
761	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
762	0.0233	2	1.45	2.044	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
763	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0311	3	0.00	0.000	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	7.90	11.172	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0116	1	0.00	-
765	0.0236	2	4.40	6.223	0.0225	2	3.92	5.537	0.0214	2	1.70	2.404	0.0225	2	0.00	0.000
766	0.0229	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
767	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.

TABLE 8.- Stratified mean catches (Kg) by stratum and year and SD by year of Thorny skate (1997-2009). n.s. means stratum not surveyed. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2009 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	2008	2009
353	1669.97	7010.90	85905.05	40337.51	94661.10	95844.70	21079.74	14444.04	11021.83	12983.73	6241.70	14795.00	10598.60
354	295.14	16784.41	4970.54	20279.74	16637.80	22090.80	9922.00	36275.57	11854.08	15324.98	13024.06	31294.48	13210.53
355	2012.42	254.06	917.88	2452.15	1524.40	197.40	1444.85	1855.18	1317.05	111.37	1514.78	444.00	799.20
356	127.82	32.39	72.76	104.05	13.63	72.85	243.70	766.45	507.84	900.05	188.94	481.52	1437.50
357	216.74	276.48	488.38	0.00	385.40	328.00	369.00	7551.46	8508.73	4639.40	1151.83	1731.02	7586.64
358	351.96	223.34	632.19	3484.89	910.50	2580.00	4755.75	9504.23	16232.63	1293.75	17102.25	4006.43	3918.45
359	3142.88	3339.74	5577.75	30200.14	6505.05	30455.91	10885.26	19600.14	18990.11	19063.93	11792.21	11486.26	15225.47
360	28142.65	49941.51	188345.34	367770.68	188311.70	57415.52	98885.56	260307.63	165039.55	207581.48	129182.27	113253.49	75746.30
374	490.16	87.78	1264.01	151.68	156.22	64.20	0.00	404.46	576.73	2104.69	0.00	386.27	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	2442.61	1427.27
376	20225.18	32095.39	101299.43	91833.65	30244.45	16788.39	14361.84	119622.45	206104.33	244867.71	54306.47	93444.70	54943.46
377	127.98	31.99	103.98	56.97	569.50	117.05	46.00	723.25	2935.50	6147.50	107.50	3235.00	243.50
378	287.36	287.36	1156.26	769.70	22.24	2.09	413.87	3641.11	847.41	813.85	1039.72	4395.18	1649.93
379	57.26	179.13	80.48	116.74	0.00	577.70	1.06	1442.66	3455.60	19218.70	3573.26	1239.14	1627.10
380	121.68	432.36	380.38	121.44	129.94	423.84	392.16	11448.00	6406.99	10588.80	7401.12	8904.00	996.19
381	887.94	1102.17	148.85	567.92	106.50	102.24	489.60	10166.40	7528.46	10426.32	727.20	2374.27	0.00
382	220.75	350.60	1522.42	1838.77	607.79	224.32	0.00	2153.18	1734.72	1167.92	0.00	162.93	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	0.00	7585.01
722	633.11	3220.86	906.51	1158.73	848.40	0.00	76.02	0.00	579.60	0.00	287.70	1176.00	159.60
723	979.42	406.26	584.98	627.32	372.00	93.00	804.45	752.22	0.00	838.78	2049.88	822.28	2987.63
724	254.82	1524.34	1219.17	288.39	8355.12	3205.40	3263.68	0.00	520.80	0.00	894.66	530.72	421.60
725	28.43	408.29	381.16	431.94	200.22	191.10	137.81	4642.58	3250.12	7665.53	2086.35	204.54	338.63
726	n.s.	18.61	63.79	697.27	95.29	237.60	0.00	0.00	0.00	263.16	151.92	46.80	2806.20
727	323.68	577.66	271.70	56.11	61.43	292.80	9281.76	975.36	726.24	0.00	1013.76	815.04	10704.00
728	113.26	364.73	382.97	143.97	128.62	521.43	1343.94	209.82	0.00	102.57	1001.91	126.75	4194.45
752	556.95	7679.60	293.39	157.17	1170.32	63.54	24018.85	0.00	0.00	94.98	0.00	0.00	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	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	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	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	0.00	248.46
757	3333.76	6873.20	1095.75	5660.73	1540.20	158.10	712.98	0.00	0.00	51.77	0.00	0.00	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	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.	0.00	0.00
760	0.00	1036.58	1417.48	1997.36	995.61	291.06	4724.72	0.00	682.22	0.00	254.10	0.00	449.68
761	10133.38	3013.25	121.20	1744.82	11388.60	2034.90	0.00	459.14	0.00	0.00	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.	0.00	0.00
763	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n.s.	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	0.00	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	210.80	0.00
766	2192.53	73.89	0.00	0.00	0.00	0.00	0.00	95.76	0.00	0.00	n.s.	0.00	0.00
767	n.s.	446.89	0.00	0.00	0.00	0.00	178.22	379.99	0.00	0.00	n.s.	0.00	n.s.
TOTAL	108029	211054	421902	598341	405693	348466	230330	511557	472557	577201	265282	298009	219305
$\overline{Y}$	11.57	20.41	40.79	57.86	39.23	33.69	22.27	49.46	45.69	55.81	28.10	28.82	22.10
S.D.	1.74	3.26	4.32	9.12	6.99	10.91	2.57	5.82	7.00	11.22	3.57	2.92	3.13

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. 2002-2009 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	2008	2009
353	139	603	7159	3397	8321	8050	1895	1284	938	1049	515	1301	922
354	25	1413	457	1708	1479	1860	882	3154	1009	1264	1074	2721	1174
355	173	23	80	211	127	17	126	162	117	9	126	40	69
356	11	3	6	9	1	6	22	69	44	75	16	41	126
357	20	23	41	0	32	27	32	660	732	381	96	149	1305
358	31	19	54	306	79	224	423	864	1396	111	1396	348	344
359	273	287	460	2577	567	2663	963	1734	1634	1564	965	1007	1347
360	2399	4307	15392	30696	15548	5010	8775	22537	14197	16855	10867	9680	6666
374	42	7	104	13	13	6	0	35	50	178	0	33	0
375	20	46	151	77	12	32	56	249	287	768	800	220	125
376	1789	2779	8312	7653	2618	1473	1277	10257	17559	20092	4583	8279	4852
377	11	3	9	5	50	10	4	67	253	520	9	278	22
378	27	25	101	66	2	0	37	324	75	68	89	366	144
379	6	15	7	10	0	51	0	117	293	1627	298	108	142
380	12	38	32	10	13	38	34	1035	560	926	617	791	87
381	80	96	13	48	9	9	43	904	648	912	61	208	0
382	19	31	126	147	52	20	0	187	152	100	0	14	0
721	13	52	6	36	0	0	61	16	35	0	0	0	663
722	59	301	79	107	73	0	7	0	50	0	26	114	14
723	93	35	51	51	31	8	70	66	0	71	171	73	266
724	23	148	108	25	711	285	290	0	46	0	77	48	36
725	3	47	33	41	17	17	12	413	275	659	185	18	30
726	n.s.	2	6	63	8	22	0	0	0	23	13	4	245
727	35	50	23	5	5	25	853	84	63	0	84	74	951
728	11	35	33	14	11	46	119	23	0	9	89	11	367
752	51	671	25	15	111	6	2100	0	0	8	0	0	0
753	175	51	207	38	169	156	96	0	0	0	0	0	0
754	742	1924	291	1015	1822	9374	55	0	0	0	0	0	0
755	n.s.	293	0	98	5	0	0	46	0	0	0	0	0
756	129	571	145	37	62	83	1216	0	0	0	0	0	22
757	329	666	94	530	132	14	64	0	0	5	0	0	0
758	487	2148	1088	527	1679	286	38	0	0	0	0	0	0
759	n.s.	1356	5	506	57	42	44	0	0	0	n.s.	0	0
760	0	97	126	190	87	25	434	0	60	0	22	0	39
761	965	292	12	158	1012	181	0	42	0	0	0	0	0
762	1050	108	167	116	0	0	56	21	0	26	n.s.	0	0
763	n.s.	0	0	0	0	0	0	0	0	0	n.s.	0	n.s.
764	144	115	0	0	20	0	380	38	0	68	0	0	0
765	179	143	0	17	12	7	25	0	0	46	43	20	0
766	214	8	0	0	0	0	0	9	0	0	n.s.	0	0
767	n.s.	40	0	0	0	0	16	35	0	0	n.s.	0	n.s.
TOTAL	9779	18875	35004	50521	34948	30072	20508	44429	40473	47415	22223	25946	19959
S.D.	1544	3114	3736	7991	10687	9699	2371	5281	6171	9207	2898	2641	2745

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: 1997-2009. 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	2008	2009
Males	a	0.0069	0.0064	0.0250	0.0506	0.0085	0.0075	0.0079	0.0060	0.0066	0.0079	0.0091	0.0167	0.0104
		E = 0.202	E = 0.259	E = 0.456	E = 0.192	E = 0.091	E = 0.086	E = 0.101	E = 0.0978	E = 0.0954	E = 0.1133	E = 0.0916	E = 0.2359	E = 0.1092
	b	3.0921	3.1161	2.769	2.5954	3.0171	3.0566	3.0414	3.1122	3.0882	3.0399	3.0106	2.8671	2.9701
		E = 0.052	E = 0.075	E = 0.124	E = 0.049	E = 0.022	E = 0.022	E =0.026	E = 0.0251	E = 0.0246	E = 0.0292	E = 0.0232	E = 0.0605	E = 0.0274
		R2 = 0.987	R2 = 0.986	R2 = 0.967	R2 = 0.983	R2 = 0.998	R2 = 0.996	R2 = 0.995	R2 = 0.996	R2 = 0.996	R2 = 0.997	R2 = 0.996	R2 = 0.985	R2 = 0.995
		N = 107	N = 67	N = 33	N = 199	N = 104	N = 374	N = 426	N = 368	N = 360	N = 7492	N= 346	N= 350	N= 185
Females	a	0.0072	0.0098	0.0294	0.0313	0.0073	0.0061	0.0067	0.0071	0.0036	0.0104	0.0082	0.0062	0.0103
		E = 0.182	E = 0.169	E = 0.268	E =0.223	E = 0.119	E =0.074	E = 0.101	E = 0.1072	E = 0.2213	E = 0.2042	E = 0.0952	E = 0.1131	E = 0.2201
	b	3.0927	2.9904	2.7383	2.7247	3.0509	3.1115	3.0887	3.0752	3.2435	2.9798	3.0399	3.1108	2.9806
		E = 0.046	E = 0.046	E = 0.072	E = 0.058	E = 0.031	E = 0.019	E = 0.026	E = 0.0281	E = 0.0575	E = 0.0534	E = 0.0246	E = 0.0294	E = 0.0563
		R2 = 0.991	R2 = 0.992	R2 = 0.985	R2 = 0.977	R2 = 0.996	R2 = 0.997	R2 = 0.996	R2 = 0.994	R2 = 0.980	R2 = 0.990	R2 = 0.996	R2 = 0.997	R2 = 0.982
		N = 113	N = 89	N = 53	N = 245	N = 77	N = 425	N = 477	N = 442	N = 396	N = 583	N= 423	N= 368	N= 193
Indet.	a	0.0068	0.0072	0.0267	0.0423	0.0077	0.0066	0.0075	0.0071	0.0057	0.0091	0.0081	0.0110	0.0093
		E = 0.144	E = 0.166	E = 0.205	E = 0.174	E = 0.079	E = 0.068	E = 0.095	E = 0.0091	E = 0.1146	E = 0.1258	E = 0.0800	E = 0.1796	E = 0.1144
	b	3.099	3.073	2.7618	2.6472	3.0411	3.0887	3.0552	3.0730	3.1287	3.0086	3.0385	2.9684	3.0029
		E = 0.037	E = 0.046	E = 0.055	E = 0.045	E = 0.020	E = 0.018	E = 0.025	E = 0.0237	E = 0.0298	E = 0.0326	E = 0.0206	E = 0.0468	E = 0.0293
		R^2 = 0.993	R^2 = 0.991	R^2 = 0.990	R^2 = 0.984	R^2 = 0.998	R^2 = 0.998	R^2 = 0.995	R^2 = 0.996	R^2 = 0.993	R^2 = 0.995	R2 = 0.997	R2 = 0.991	R2 = 0.994
		N = 220	N =156	N = 86	N = 444	N = 181	N = 800	N = 903	N = 810	N = 756	N = 1075	N= 769	N= 178	N= 378

TABLE 11.- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2009 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				2001			
Length (cm.)	Males	Females	Indet.	Total	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	0.000	0.011	0.000	0.011
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	0.063	0.089	0.000	0.153
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	0.026	0.088	0.000	0.114
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	0.018	0.020	0.000	0.038
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	0.033	0.010	0.000	0.043
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	0.008	0.042	0.000	0.050
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	0.000	0.037	0.000	0.037
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	0.045	0.019	0.000	0.064
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	0.000	0.070	0.000	0.070
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	0.023	0.040	0.000	0.063
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	0.029	0.077	0.000	0.106
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	0.075	0.140	0.000	0.215
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	0.124	0.255	0.000	0.379
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	0.184	0.249	0.000	0.434
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	0.400	0.497	0.000	0.897
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	0.343	0.372	0.000	0.715
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	0.396	0.575	0.000	0.971
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	0.474	0.576	0.000	1.049
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	0.452	0.623	0.000	1.075
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	0.548	0.473	0.000	1.021
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	0.618	0.582	0.000	1.199
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	0.452	0.580	0.000	1.032
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	0.672	0.381	0.000	1.053
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	0.377	0.448	0.000	0.825
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	0.342	0.434	0.000	0.776
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	0.197	0.349	0.000	0.547
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	0.392	0.389	0.000	0.781
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	0.233	0.561	0.000	0.794
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	0.228	0.580	0.000	0.808
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	0.274	0.401	0.000	0.675
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	0.218	0.438	0.000	0.656
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	0.327	0.342	0.000	0.668
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	0.481	0.335	0.000	0.816
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	0.334	0.189	0.000	0.523
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	0.171	0.196	0.000	0.367
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	0.131	0.067	0.000	0.198
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	0.109	0.011	0.000	0.120
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	0.142	0.014	0.000	0.157
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	0.031	0.010	0.000	0.041
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	0.009	0.000	0.000	0.009
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	0.011	0.000	0.000	0.011
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	0.000	0.000	0.000	0.000
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	0.000	0.000	0.000	0.000
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	0.004	0.003	0.000	0.008
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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	8.996	10.572	0.000	19.568
Nº samples (*):				33				33				88				83				66
Nº Ind. (*):	404	425	0	829	723	812	0	1535	2082	2200	4	4286	2397	2429	0	4826	629	632	0	1261
Sampled catch:				212				461				1526				2289				2777
Range (*):				12-87				13-131				13-93				13-99				13-99
Total catch:				1580				2696				3672				5076				3413
Total hauls (*):				128				124				114				118				123

TABLE 11 (cont.).- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2009 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	2002				2003				2004				2005			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.035	0.021	0.000	0.056	0.007	0.000	0.000	0.007	0.038	0.019	0.000	0.057	0.030	0.015	0.000	0.045
14	0.089	0.192	0.005	0.285	0.026	0.043	0.000	0.069	0.090	0.076	0.000	0.166	0.030	0.039	0.000	0.070
16	0.125	0.181	0.000	0.305	0.016	0.011	0.000	0.027	0.036	0.058	0.000	0.094	0.034	0.013	0.000	0.047
18	0.094	0.320	0.000	0.415	0.040	0.035	0.000	0.075	0.061	0.059	0.000	0.120	0.085	0.070	0.000	0.155
20	0.049	0.096	0.000	0.146	0.059	0.008	0.000	0.067	0.076	0.062	0.000	0.138	0.053	0.045	0.000	0.098
22	0.034	0.074	0.000	0.109	0.050	0.056	0.000	0.106	0.078	0.057	0.000	0.135	0.066	0.064	0.000	0.130
24	0.014	0.027	0.000	0.041	0.007	0.020	0.000	0.027	0.095	0.048	0.000	0.143	0.116	0.117	0.000	0.233
26	0.023	0.047	0.000	0.070	0.027	0.000	0.000	0.027	0.085	0.042	0.000	0.127	0.128	0.089	0.000	0.217
28	0.021	0.044	0.000	0.065	0.040	0.019	0.000	0.059	0.064	0.047	0.000	0.111	0.123	0.120	0.000	0.243
30	0.060	0.056	0.000	0.115	0.038	0.023	0.000	0.061	0.129	0.133	0.000	0.263	0.149	0.115	0.000	0.264
32	0.059	0.105	0.000	0.164	0.145	0.095	0.000	0.239	0.217	0.133	0.000	0.349	0.158	0.247	0.000	0.405
34	0.082	0.336	0.000	0.419	0.096	0.078	0.000	0.174	0.200	0.244	0.000	0.444	0.180	0.136	0.000	0.316
36	0.180	0.151	0.000	0.331	0.175	0.137	0.000	0.312	0.295	0.284	0.000	0.579	0.241	0.338	0.000	0.579
38	0.344	0.333	0.000	0.677	0.209	0.172	0.000	0.382	0.332	0.422	0.000	0.755	0.266	0.255	0.000	0.521
40	0.733	0.617	0.000	1.350	0.295	0.399	0.000	0.694	0.373	0.402	0.000	0.776	0.286	0.306	0.000	0.592
42	0.811	0.913	0.000	1.724	0.358	0.323	0.000	0.681	0.709	0.681	0.000	1.390	0.455	0.554	0.000	1.009
44	0.763	0.887	0.000	1.650	0.382	0.400	0.000	0.782	0.760	0.744	0.000	1.504	0.454	0.534	0.000	0.987
46	0.849	0.920	0.000	1.769	0.309	0.374	0.000	0.683	0.575	0.672	0.000	1.247	0.541	0.592	0.000	1.134
48	0.651	1.024	0.000	1.675	0.320	0.456	0.000	0.776	0.653	0.759	0.000	1.413	0.693	0.575	0.000	1.268
50	0.773	0.698	0.000	1.471	0.283	0.377	0.000	0.660	0.469	0.627	0.000	1.096	0.711	0.680	0.000	1.390
52	0.551	0.711	0.000	1.261	0.257	0.372	0.000	0.630	0.824	0.621	0.000	1.444	0.686	0.615	0.000	1.302
54	0.482	0.452	0.000	0.934	0.324	0.394	0.000	0.718	0.419	0.576	0.000	0.995	0.531	0.581	0.000	1.112
56	0.244	0.389	0.000	0.633	0.256	0.285	0.000	0.541	0.498	0.899	0.000	1.398	0.741	0.696	0.000	1.436
58	0.487	0.325	0.000	0.812	0.284	0.342	0.000	0.626	0.511	0.781	0.000	1.293	0.576	0.525	0.000	1.100
60	0.179	0.196	0.000	0.375	0.247	0.330	0.000	0.578	0.424	0.680	0.000	1.104	0.527	0.586	0.000	1.114
62	0.279	0.187	0.000	0.466	0.186	0.257	0.000	0.443	0.449	0.735	0.000	1.184	0.375	0.640	0.000	1.016
64	0.221	0.212	0.000	0.433	0.083	0.259	0.000	0.342	0.383	0.655	0.000	1.038	0.469	0.394	0.000	0.863
66	0.171	0.334	0.000	0.505	0.187	0.203	0.000	0.390	0.349	0.562	0.000	0.911	0.398	0.586	0.000	0.984
68	0.155	0.254	0.000	0.409	0.152	0.332	0.000	0.484	0.343	0.418	0.000	0.761	0.252	0.664	0.000	0.916
70	0.240	0.292	0.000	0.532	0.144	0.221	0.000	0.365	0.503	0.492	0.000	0.994	0.324	0.433	0.000	0.757
72	0.142	0.437	0.000	0.580	0.136	0.159	0.000	0.295	0.245	0.461	0.000	0.705	0.248	0.523	0.000	0.771
74	0.195	0.305	0.000	0.501	0.134	0.274	0.000	0.408	0.360	0.392	0.000	0.752	0.254	0.377	0.000	0.631
76	0.210	0.086	0.000	0.296	0.091	0.150	0.000	0.240	0.392	0.299	0.000	0.692	0.242	0.186	0.000	0.428
78	0.152	0.092	0.000	0.245	0.096	0.111	0.000	0.207	0.259	0.164	0.000	0.423	0.263	0.168	0.000	0.431
80	0.164	0.035	0.000	0.199	0.073	0.040	0.000	0.113	0.226	0.117	0.000	0.342	0.193	0.178	0.000	0.371
82	0.135	0.157	0.000	0.292	0.074	0.014	0.000	0.088	0.121	0.073	0.000	0.194	0.190	0.004	0.000	0.194
84	0.048	0.013	0.000	0.062	0.020	0.033	0.000	0.053	0.180	0.003	0.000	0.183	0.062	0.034	0.000	0.096
86	0.015	0.008	0.000	0.023	0.023	0.000	0.000	0.023	0.076	0.018	0.000	0.094	0.074	0.020	0.000	0.094
88	0.041	0.013	0.000	0.054	0.000	0.000	0.000	0.000	0.055	0.014	0.000	0.069	0.026	0.000	0.000	0.026
90	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009	0.028	0.000	0.000	0.028	0.000	0.000	0.000	0.000
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	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	0.005	0.000	0.000	0.005	0.003	0.006	0.000	0.009
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	0.004	0.000	0.004
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	0.000	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	9.903	11.540	0.005	21.448	5.660	6.802	0.000	12.461	11.985	13.529	0.000	25.514	11.235	12.125	0.000	23.360
Nº samples (*):				78				88				83				78
Nº Ind. (*):	888	928	1	1817	743	811	0	1554	1150	1290	0	2440	1012	1102	0	2114
Sampled catch:				2961				2627				4666				4130
Range (*):				12-89				13-90				12-95				12-96
Total catch:				4271				2656				4674				4249
Total hauls (*):				125				118				120				119

TABLE 11 (cont.).- Thorny skate length distribution. Estimated numbers per haul stratified mean catches. Spanish Spring Survey on NAFO 3NO: 1997-2009. Indet. means indeterminate. 1997-2000 data are transformed C/V *Playa de Menduíña* data. 2002-2009 data are original R/V *Vizconde de Eza* data. In 2001, there are data from the two vessels. (*) indicates untransformed data.

	2006				2007				2008				2009			
Length (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.009	0.005	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.005	0.000	0.005
14	0.036	0.022	0.000	0.059	0.035	0.000	0.000	0.035	0.013	0.000	0.000	0.013	0.013	0.000	0.000	0.013
16	0.014	0.013	0.000	0.027	0.006	0.006	0.000	0.012	0.025	0.019	0.000	0.044	0.020	0.018	0.000	0.038
18	0.025	0.010	0.000	0.036	0.000	0.006	0.000	0.006	0.031	0.006	0.000	0.037	0.000	0.010	0.000	0.010
20	0.041	0.085	0.000	0.126	0.012	0.013	0.000	0.024	0.013	0.024	0.000	0.037	0.025	0.014	0.000	0.040
22	0.090	0.078	0.000	0.168	0.006	0.039	0.000	0.045	0.063	0.032	0.000	0.096	0.013	0.015	0.000	0.029
24	0.039	0.113	0.000	0.153	0.015	0.067	0.000	0.082	0.024	0.043	0.000	0.067	0.033	0.036	0.000	0.069
26	0.054	0.049	0.000	0.103	0.006	0.040	0.000	0.046	0.042	0.059	0.000	0.100	0.000	0.006	0.000	0.006
28	0.066	0.154	0.000	0.220	0.052	0.072	0.000	0.124	0.051	0.062	0.000	0.112	0.035	0.045	0.000	0.080
30	0.059	0.173	0.000	0.232	0.060	0.067	0.000	0.127	0.019	0.073	0.000	0.092	0.058	0.021	0.000	0.079
32	0.086	0.260	0.000	0.346	0.040	0.065	0.000	0.105	0.099	0.083	0.000	0.182	0.045	0.028	0.000	0.073
34	0.142	0.211	0.000	0.353	0.087	0.098	0.000	0.185	0.086	0.085	0.000	0.170	0.015	0.098	0.000	0.113
36	0.194	0.219	0.000	0.413	0.111	0.165	0.000	0.277	0.087	0.084	0.000	0.171	0.117	0.054	0.000	0.171
38	0.226	0.164	0.000	0.390	0.080	0.085	0.000	0.165	0.171	0.153	0.000	0.324	0.059	0.068	0.000	0.127
40	0.296	0.351	0.000	0.647	0.072	0.156	0.000	0.227	0.112	0.121	0.000	0.233	0.058	0.115	0.000	0.173
42	0.328	0.401	0.000	0.729	0.162	0.111	0.000	0.273	0.064	0.171	0.000	0.235	0.082	0.015	0.000	0.097
44	0.239	0.635	0.000	0.874	0.168	0.101	0.000	0.268	0.109	0.118	0.000	0.227	0.079	0.094	0.000	0.173
46	0.484	0.494	0.000	0.977	0.212	0.159	0.000	0.371	0.117	0.170	0.000	0.288	0.065	0.064	0.000	0.129
48	0.456	0.608	0.000	1.064	0.201	0.222	0.000	0.423	0.147	0.121	0.000	0.269	0.088	0.075	0.000	0.164
50	0.638	0.680	0.000	1.318	0.134	0.151	0.000	0.285	0.098	0.152	0.000	0.250	0.115	0.117	0.000	0.233
52	0.872	1.205	0.000	2.077	0.168	0.298	0.000	0.466	0.154	0.246	0.000	0.400	0.051	0.105	0.000	0.156
54	0.932	0.929	0.000	1.861	0.230	0.189	0.000	0.419	0.127	0.185	0.000	0.312	0.135	0.110	0.000	0.245
56	0.700	0.939	0.000	1.640	0.227	0.349	0.000	0.576	0.208	0.298	0.000	0.506	0.142	0.110	0.000	0.251
58	0.644	0.724	0.000	1.367	0.278	0.348	0.000	0.626	0.260	0.282	0.000	0.542	0.153	0.133	0.000	0.286
60	0.707	0.692	0.000	1.398	0.234	0.243	0.000	0.477	0.119	0.294	0.000	0.412	0.224	0.257	0.000	0.480
62	0.549	0.776	0.000	1.325	0.208	0.296	0.000	0.505	0.302	0.272	0.000	0.574	0.173	0.117	0.000	0.290
64	0.472	0.780	0.000	1.252	0.205	0.406	0.000	0.611	0.260	0.271	0.000	0.531	0.108	0.336	0.000	0.444
66	0.448	0.669	0.000	1.117	0.282	0.343	0.000	0.625	0.334	0.342	0.000	0.676	0.149	0.130	0.000	0.279
68	0.344	0.766	0.000	1.111	0.317	0.500	0.000	0.817	0.164	0.365	0.000	0.528	0.299	0.372	0.000	0.671
70	0.429	0.858	0.000	1.287	0.342	0.266	0.000	0.608	0.210	0.431	0.000	0.642	0.160	0.463	0.000	0.623
72	0.230	0.829	0.000	1.059	0.247	0.379	0.000	0.626	0.290	0.343	0.000	0.633	0.223	0.434	0.000	0.657
74	0.270	0.519	0.000	0.789	0.324	0.277	0.000	0.601	0.349	0.303	0.000	0.652	0.348	0.165	0.000	0.513
76	0.377	0.300	0.000	0.677	0.257	0.208	0.000	0.465	0.364	0.206	0.000	0.570	0.351	0.209	0.000	0.559
78	0.282	0.196	0.000	0.478	0.245	0.133	0.000	0.378	0.274	0.145	0.000	0.419	0.222	0.119	0.000	0.341
80	0.312	0.077	0.000	0.389	0.165	0.045	0.000	0.210	0.342	0.063	0.000	0.405	0.277	0.011	0.000	0.287
82	0.234	0.000	0.000	0.234	0.128	0.023	0.000	0.151	0.164	0.058	0.000	0.222	0.155	0.012	0.000	0.167
84	0.187	0.000	0.000	0.187	0.103	0.025	0.000	0.129	0.106	0.000	0.000	0.106	0.083	0.002	0.000	0.086
86	0.075	0.017	0.000	0.092	0.039	0.000	0.000	0.039	0.052	0.008	0.000	0.060	0.021	0.014	0.000	0.036
88	0.058	0.000	0.000	0.058	0.033	0.006	0.000	0.039	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.008
90	0.000	0.005	0.000	0.005	0.006	0.000	0.000	0.006	0.021	0.005	0.000	0.026	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.005	0.000	0.013	0.014	0.002	0.000	0.016
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	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000
98	0.012	0.000	0.000	0.012	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	11.658	15.005	0.000	26.663	5.501	5.955	0.000	11.456	5.484	5.701	0.000	11.184	4.218	3.999	0.000	8.217
Nº samples (*):				45				73				72				66
Nº Ind. (*):	928	1198	0	2126	494	534	0	1028	537	545	0	1082	392	331	0	723
Sampled catch:				4595				2564				2805				2053
Range (*):				13-99				14-90				13-96				12-93
Total catch:				5258				2564				2837				2410
Total hauls (*):				120				110				122				109

TABLE 12.- Swept area, number of hauls and White hake mean catch (kg) and SD by stratum. Spanish Spring Surveys on NAFO Div. 3NO: 2001-2009. Swept area in square miles. n.s. means strata not surveyed.

	2001				2002				2003				2004				2005			
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	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	0.0353	3	0.01	0.023
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	0.0353	3	54.33	91.362
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	0.0225	2	41.75	40.489
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	0.0233	2	12.32	6.795
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	0.0233	2	0.00	0.000
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	0.0349	3	30.64	53.008
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	0.0814	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	0.2325	20	0.00	0.007
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	0.0229	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	0.0349	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	0.1174	10	0.01	0.019
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	0.0233	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	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	-	0.0236	2	0.07	0.099
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	0.0229	2	0.53	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	0.0233	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	0.0458	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	0.0229	2	0.00	0.000
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	0.0233	2	0.00	0.000
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	0.0233	2	1.51	2.128
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	0.0225	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	0.0236	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	0.0113	1	0.00	-
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	0.0229	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	0.0109	1	0.00	-
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	0.0236	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	0.0225	2	0.00	0.000
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	0.0225	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	0.0450	4	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	0.0233	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	0.0225	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	0.0225	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	0.0229	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	0.0229	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	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	0.0225	2	0.01	0.014
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	0.0334	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	0.0233	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	0.0229	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	0.0229	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	0.0113	1	0.00	-

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: 2001-2009. Swept area in square miles. n.s. means strata not surveyed.

	2006				2007				2008				2009			
Stratum	Swept area	Tow number	White hake Mean catch	White hake	Swept area	Tow number	White hake Mean catch	White hake	Swept area	Tow number	White hake Mean catch	White hake	Swept area	Tow number	White hake Mean	White hake
353	0.0371	3	1.87	3.245	0.0364	3	0.00	0.000	0.0341	3	0.00	0.000	0.0345	3	0.00	0.000
354	0.0364	3	34.59	33.056	0.0364	3	14.76	5.726	0.0345	3	0.00	0.000	0.0338	3	9.30	3.736
355	0.0248	2	2.17	3.062	0.0240	2	0.00	0.000	0.0221	2	5.86	8.280	0.0233	2	24.45	1.344
356	0.0240	2	0.80	1.131	0.0240	2	0.00	0.000	0.0236	2	6.03	8.521	0.0229	2	6.13	6.329
357	0.0244	2	0.00	0.000	0.0360	3	4.02	6.957	0.0233	2	0.72	1.011	0.0116	2	6.08	2.967
358	0.0349	3	1.69	2.923	0.0368	3	1.54	2.662	0.0345	3	0.00	0.000	0.0341	3	2.16	3.748
359	0.0975	8	6.29	10.192	0.0855	7	0.04	0.090	0.0799	7	0.00	0.000	0.0795	7	0.00	0.000
360	0.2340	19	0.00	0.000	0.2378	20	0.00	0.000	0.2340	20	0.00	0.000	0.2273	20	0.00	0.000
374	0.0236	2	0.00	0.000	0.0240	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
375	0.0364	3	0.00	0.000	0.0364	3	0.00	0.000	0.0334	3	0.00	0.000	0.0341	3	0.00	0.000
376	0.1219	10	0.00	0.000	0.1185	10	0.00	0.000	0.1129	10	0.00	0.000	0.1133	10	0.00	0.000
377	0.0236	2	0.00	0.000	0.0240	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000
378	0.0240	2	0.00	0.000	0.0233	2	0.00	0.000	0.0240	2	0.00	0.000	0.0229	2	0.00	0.000
379	0.0236	2	0.10	0.141	0.0240	2	0.00	0.000	0.0229	2	0.04	0.057	0.0229	2	0.00	0.000
380	0.0229	2	0.15	0.212	0.0240	2	0.00	0.000	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000
381	0.0229	2	0.00	0.000	0.0240	2	0.00	0.000	0.0229	2	0.00	0.000	0.0229	2	0.00	0.000
382	0.0469	4	0.00	0.000	0.0484	4	0.00	0.000	0.0458	4	0.00	0.000	0.0450	4	0.00	0.000
721	0.0236	2	6.18	6.901	0.0116	1	6.10	-	0.0225	2	0.00	0.000	0.0229	2	1.80	2.546
722	0.0240	2	0.00	0.000	0.0225	2	2.56	3.620	0.0206	2	0.00	0.000	0.0225	2	0.00	0.000
723	0.0236	2	1.84	2.496	0.0240	2	0.10	0.134	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000
724	0.0233	2	0.00	0.000	0.0233	2	0.00	0.000	0.0221	2	0.00	0.000	0.0233	2	0.01	0.011
725	0.0233	2	0.51	0.714	0.0225	2	0.04	0.055	0.0229	2	0.00	0.000	0.0229	2	0.16	0.226
726	0.0225	2	0.00	0.000	0.0229	2	0.14	0.193	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000
727	0.0225	2	0.00	0.000	0.0240	2	0.00	0.000	0.0221	2	0.00	0.000	0.0113	1	0.00	-
728	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0229	2	0.00	0.000
752	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0229	2	0.00	0.000
753	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0116	1	0.00	-
754	0.0225	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0113	1	0.00	-
755	0.0338	3	0.00	0.000	0.0338	3	0.00	0.000	0.0431	4	0.00	0.000	0.0116	1	0.00	-
756	0.0229	2	0.00	0.000	0.0225	2	0.00	0.000	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
757	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000	0.0221	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	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
759	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0221	2	0.00	0.000	0.0113	1	0.00	-
760	0.0225	2	0.00	0.000	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0229	2	0.00	0.000
761	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
762	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
763	0.0225	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0311	3	0.00	0.000	n.s.	n.s.	n.s.	n.s.
764	0.0233	2	0.00	0.000	0.0225	2	0.00	0.000	0.0221	2	0.00	0.000	0.0116	1	0.00	-
765	0.0236	2	0.00	0.000	0.0225	2	0.00	0.000	0.0214	2	0.00	0.000	0.0225	2	0.00	0.000
766	0.0229	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0218	2	0.00	0.000	0.0225	2	0.00	0.000
767	0.0233	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.0214	2	0.00	0.000	n.s.	n.s.	n.s.	n.s.

TABLE 13.- Stratified mean catches (Kg) by stratum and year and SD by year of White hake (2001-2009). n.s. means strata not surveyed.

Stratum	2001	2002	2003	2004	2005	2006	2007	2008	2009
353	279.76	13.45	0.00	0.00	3.59	503.93	0.00	0.00	0.00
354	18868.20	16.40	0.00	5694.08	13365.18	8509.96	3631.37	0.00	2288.46
355	9764.30	11599.50	2311.76	1106.30	3089.50	160.21	0.00	433.27	1809.30
356	1125.65	4037.30	696.78	195.05	578.81	37.60	0.00	283.18	287.88
357	287.00	0.00	369.00	147.60	0.00	0.00	658.73	117.26	996.79
358	97.50	37.50	90.00	2703.75	6894.98	379.73	345.75	0.00	486.83
359	6946.50	0.00	0.00	0.00	0.00	2648.25	18.28	0.00	0.00
360	13.92	0.00	0.00	201.77	6.26	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
375	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	8.14	0.00	0.00	0.00	0.00
377	0.00	0.00	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	0.00	0.00
379	0.00	2.44	0.00	0.00	7.42	10.55	0.00	4.29	0.00
380	n.s.	0.00	0.00	3.36	50.40	14.40	0.00	0.00	0.00
381	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
382	n.s.	0.00	0.00	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	0.00	117.00
722	1827.00	1528.38	2358.30	108.36	0.00	0.00	215.04	0.00	0.00
723	248.00	0.00	0.00	162.75	233.28	284.43	14.73	0.00	0.00
724	166.16	254.20	0.00	0.00	0.00	0.00	0.00	0.00	0.93
725	0.00	0.00	0.00	0.00	0.00	53.03	4.10	0.00	16.80
726	0.00	0.00	0.00	0.00	0.00	0.00	9.83	0.00	0.00
727	n.s.	0.00	0.00	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	0.00	0.00
752	n.s.	0.00	0.00	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	0.00	0.00
754	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	n.s.	0.00	0.00	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.	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
762	0.00	0.00	0.00	0.00	2.12	0.00	n.s.	0.00	0.00
763	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.	0.00	n.s.
764	0.00	0.00	377.50	0.00	0.00	0.00	0.00	0.00	0.00
765	0.00	204.60	0.00	0.00	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.	0.00	0.00
767	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.	0.00	n.s.
TOTAL	40337	20944	7743	10655	24240	13004	5294	838	6004
$(\bar{Y})$	5.13	2.03	0.75	1.03	2.34	1.26	0.56	0.08	0.61
S.D.	1.87	0.43	0.24	0.52	1.44	0.48	0.12	0.05	0.08

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	2008	2009
353	25	1	0	0	0	41	0	0	0
354	1677	1	0	495	1137	702	299	0	203
355	814	982	202	97	275	13	0	39	156
356	94	347	62	18	50	3	0	24	25
357	24	0	32	13	0	0	55	10	171
358	8	3	8	246	593	33	28	0	43
359	606	0	0	0	0	217	1	0	0
360	1	0	0	17	1	0	0	0	0
374	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0
376	0	0	0	0	1	0	0	0	0
377	0	0	0	0	0	0	0	0	0
378	0	0	0	0	0	0	0	0	0
379	0	0	0	0	1	1	0	0	0
380	0	0	0	0	4	1	0	0	0
381	0	0	0	0	0	0	0	0	0
382	0	0	0	0	0	0	0	0	0
721	57	280	137	21	0	34	34	0	10
722	157	129	213	10	0	0	19	0	0
723	21	0	0	14	20	24	1	0	0
724	15	23	0	0	0	0	0	0	0
725	0	0	0	0	0	5	0	0	1
726	0	0	0	0	0	0	1	0	0
727	0	0	0	0	0	0	0	0	0
728	0	0	0	0	0	0	0	0	0
752	0	0	0	0	0	0	0	0	0
753	0	0	0	9	0	0	0	0	0
754	0	0	0	0	0	0	0	0	0
755	0	0	0	0	0	0	0	0	0
756	0	0	0	0	0	0	0	0	0
757	0	0	0	0	0	0	0	0	0
758	0	0	0	0	0	0	0	0	0
759	0	0	0	0	0	0	n.s.	0	0
760	0	0	0	0	0	0	0	0	0
761	0	0	0	0	0	0	0	0	0
762	0	0	0	0	0	0	n.s.	0	0
763	0	0	0	0	0	0	n.s.	0	n.s.
764	0	0	34	0	0	0	0	0	0
765	0	17	0	0	0	0	0	0	0
766	0	0	0	0	0	0	n.s.	0	0
767	0	0	0	0	0	0	n.s.	0	n.s.
TOTAL	3498	1784	688	940	2082	1073	440	74	610
S.D.	1107	389	224	464	1270	407	94	46	73

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: 2002-2009. To calculate the parameters for the indeterminate individuals, we used the total data (males + females + indeterminate individuals).

		2002	2003	2004	2005	2006	2007	2008	2009
Males	a	0.0018 E = 0.234	0.0045 E = 0.243	0.0043 E = 0.237	0.0034 E = 0.1497	0.0175 E = 0.5190	0.0050 E = 0.3158	0.0053 E = 0.1381	0.0090 E = 0.3934
	b	3.3586 E = 0.060	3.1161 E = 0.062	3.1313 E = 0.063	3.2086 E = 0.0395	2.7891 E = 0.1320	3.1245 E = 0.0828	3.0934 E = 0.0351	2.9577 E = 0.0994
		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	R2 = 0.999 N= 7	R2 = 0.978 N= 26
Females	a	0.0027 E = 0.221	0.0013 E = 0.465	0.0037 E = 0.202	0.0043 E = 0.0992	0.0019 E = 0.2136	0.0025 E = 0.2163	0.0017 E = 2.2151	0.0034 E = 0.1912
	b	3.2537 E = 0.056	3.4264 E = 0.115	3.1960 E = 0.056	3.1602 E = 0.0253	3.3563 E = 0.0530	3.3097 E = 0.0541	3.3879 Er = 0.5170	3.2053 E = 0.0493
		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	R2 = 0.997 N= 4	R2 = 0.996 N= 19
Indet.	a	0.0025 E = 0.152	0.0026 E = 0.254	0.0048 E = 0.127	0.0036 E = 0.1026	0.0066 E = 0.367	0.0031 E = 0.1879	0.0038 E = 0.3193	0.0033 E = 0.2001
	b	3.2731 E = 0.039	3.2565 E = 0.064	3.1208 E = 0.035	3.1961 E = 0.0266	3.0472 E = 0.0930	3.2481 E = 0.0478	3.1857 E = 0.0786	3.2109 E = 0.0516
		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	R2 = 0.997 N= 11	R2 = 0.992 N= 49

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: 2001-2009. Indet. means indeterminate.

	2001				2002				2003				2004				2005			
Lenght (cm.)	Males	Females	Indet.	Total	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	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	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	0.040	0.000	0.000	0.040
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	0.009	0.000	0.000	0.009
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	0.005	0.004	0.000	0.009
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	0.028	0.015	0.000	0.043
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	0.008	0.000	0.000	0.008
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	0.013	0.014	0.000	0.027
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	0.043	0.007	0.000	0.051
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	0.000	0.013	0.000	0.013
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	0.013	0.005	0.000	0.017
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	0.016	0.000	0.000	0.016
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	0.007	0.038	0.000	0.045
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	0.015	0.023	0.000	0.038
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	0.023	0.023	0.000	0.046
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	0.000	0.016	0.000	0.016
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	0.008	0.019	0.000	0.027
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	0.008	0.007	0.000	0.015
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	0.007	0.000	0.000	0.007
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	0.008	0.000	0.000	0.008
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	0.016	0.000	0.000	0.016
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	0.068	0.004	0.000	0.072
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	0.122	0.018	0.000	0.140
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	0.085	0.019	0.000	0.104
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	0.151	0.028	0.000	0.179
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	0.098	0.010	0.000	0.108
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	0.092	0.030	0.000	0.122
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	0.027	0.026	0.000	0.052
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	0.027	0.052	0.000	0.079
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	0.019	0.038	0.000	0.057
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	0.000	0.081	0.000	0.081
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	0.000	0.032	0.000	0.032
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	0.000	0.011	0.000	0.011
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	0.000	0.015	0.000	0.015
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	0.000	0.022	0.000	0.022
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	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	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	0.000	0.008	0.000	0.008
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	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	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	0.953	0.579	0.000	1.532
Nº samples (*):				12				11				9				11				14
Nº Ind. (*):	427	328	1	756	329	222	0	551	102	79	0	181	59	59	0	118	137	91	0	228
Sampled catch:				401				303				195				144				367
Range (*):				10-89				13-80				22-80				16-75				15-85
Total catch:				738				630				209				160				367
Total hauls (*):				123				125				118				120				119

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: 2001-2009. Indet. means indeterminate.

	2006				2007				2008				2009			
Length (cm.)	Males	Females	Indet.	Total	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	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	0.000	0.000	0.000	0.000
14	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
16	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
18	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
20	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	0.005	0.000	0.000	0.005	0.000	0.006	0.000	0.006	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000
24	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.003
26	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
28	0.013	0.000	0.000	0.013	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.007	0.007	0.000	0.014
30	0.000	0.011	0.000	0.011	0.008	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	0.000	0.000	0.000	0.000	0.009	0.023	0.000	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	0.000	0.011	0.000	0.011	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.007	0.008	0.000	0.014
36	0.008	0.005	0.000	0.013	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	0.012	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.008
40	0.012	0.004	0.000	0.015	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.008	0.007	0.000	0.014
42	0.015	0.008	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.003	0.000	0.011
44	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	0.007	0.000	0.007
46	0.016	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.011	0.000	0.018
48	0.009	0.008	0.000	0.017	0.017	0.017	0.000	0.034	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.013
50	0.020	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.014
52	0.028	0.000	0.000	0.028	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.018	0.007	0.000	0.024
54	0.005	0.010	0.000	0.016	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.000	0.014	0.000	0.014
56	0.028	0.008	0.000	0.036	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.010	0.011	0.008	0.000	0.019
58	0.031	0.000	0.000	0.031	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.014	0.000	0.002	0.016
60	0.075	0.013	0.000	0.089	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.028	0.016	0.000	0.044
62	0.066	0.000	0.000	0.066	0.017	0.000	0.000	0.017	0.000	0.002	0.000	0.002	0.010	0.003	0.000	0.014
64	0.076	0.000	0.000	0.076	0.014	0.000	0.000	0.014	0.000	0.002	0.000	0.002	0.003	0.086	0.000	0.089
66	0.024	0.000	0.000	0.024	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.011
68	0.021	0.000	0.000	0.021	0.009	0.006	0.000	0.014	0.000	0.000	0.000	0.000	0.008	0.011	0.000	0.019
70	0.016	0.008	0.000	0.024	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003
72	0.016	0.021	0.000	0.037	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.000	0.003	0.000	0.003
74	0.000	0.005	0.000	0.005	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.008	0.008	0.000	0.015
76	0.008	0.026	0.000	0.034	0.000	0.016	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.020	0.000	0.020	0.000	0.012	0.000	0.012	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
80	0.000	0.013	0.000	0.013	0.000	0.012	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	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
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.004	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	0.000	0.000	0.000	0.000
Total	0.512	0.172	0.000	0.684	0.115	0.161	0.000	0.275	0.025	0.012	0.000	0.037	0.184	0.208	0.002	0.394
Nº samples (*):				14				11				4				9
Nº Ind. (*):	73	28	0	101	14	21	0	35	7	4	0	11	38	25	1	64
Sampled catch:				187				727				25				100
Range (*):				23-80				21-83				22-86				24-75
Total catch:				187				73				25				112
Total hauls (*):				120				110				122				109

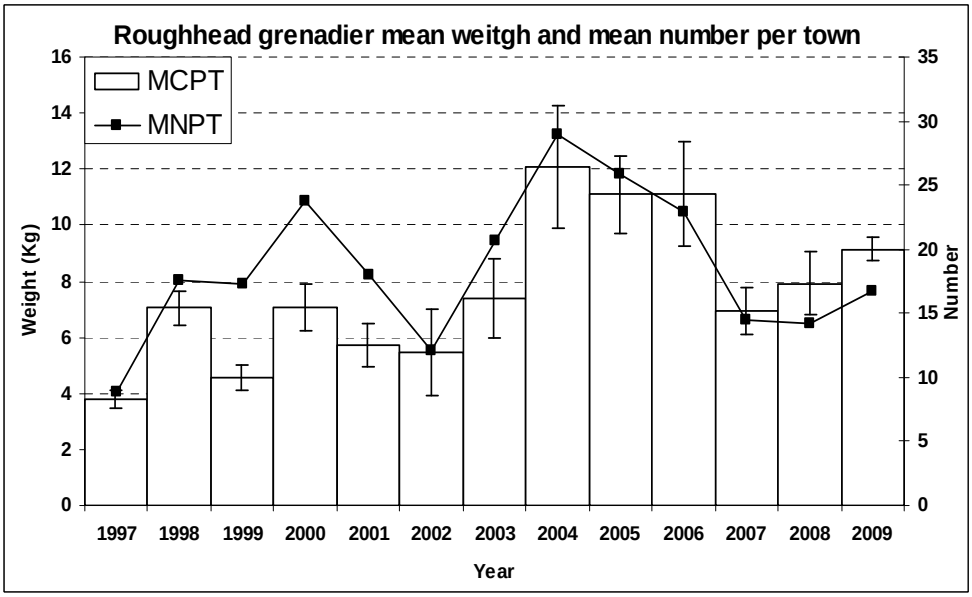

FIGURE 1.- Roughhead grenadier stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2009 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2009 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

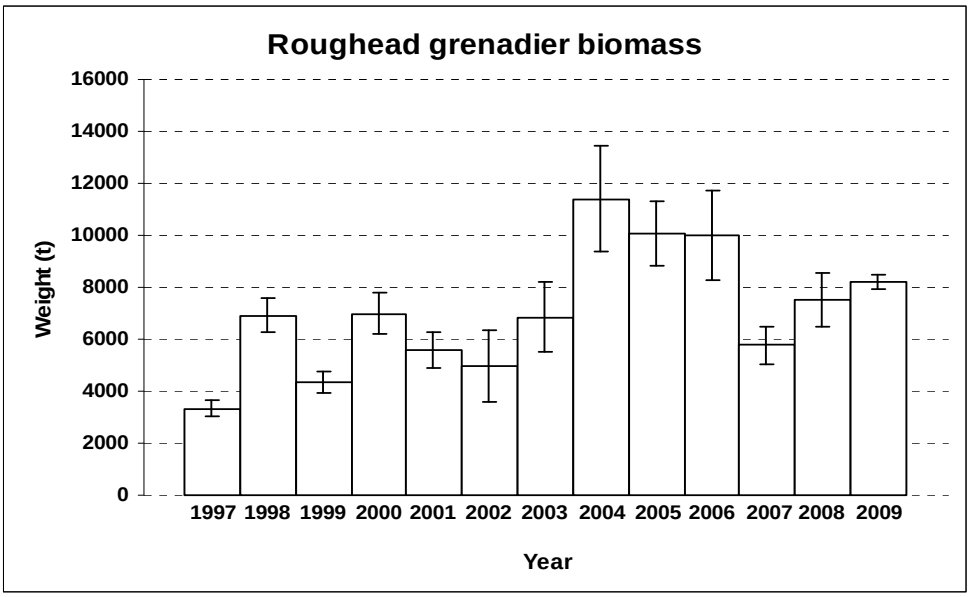

FIGURE 2.- Roughhead grenadier biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2009 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2009 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

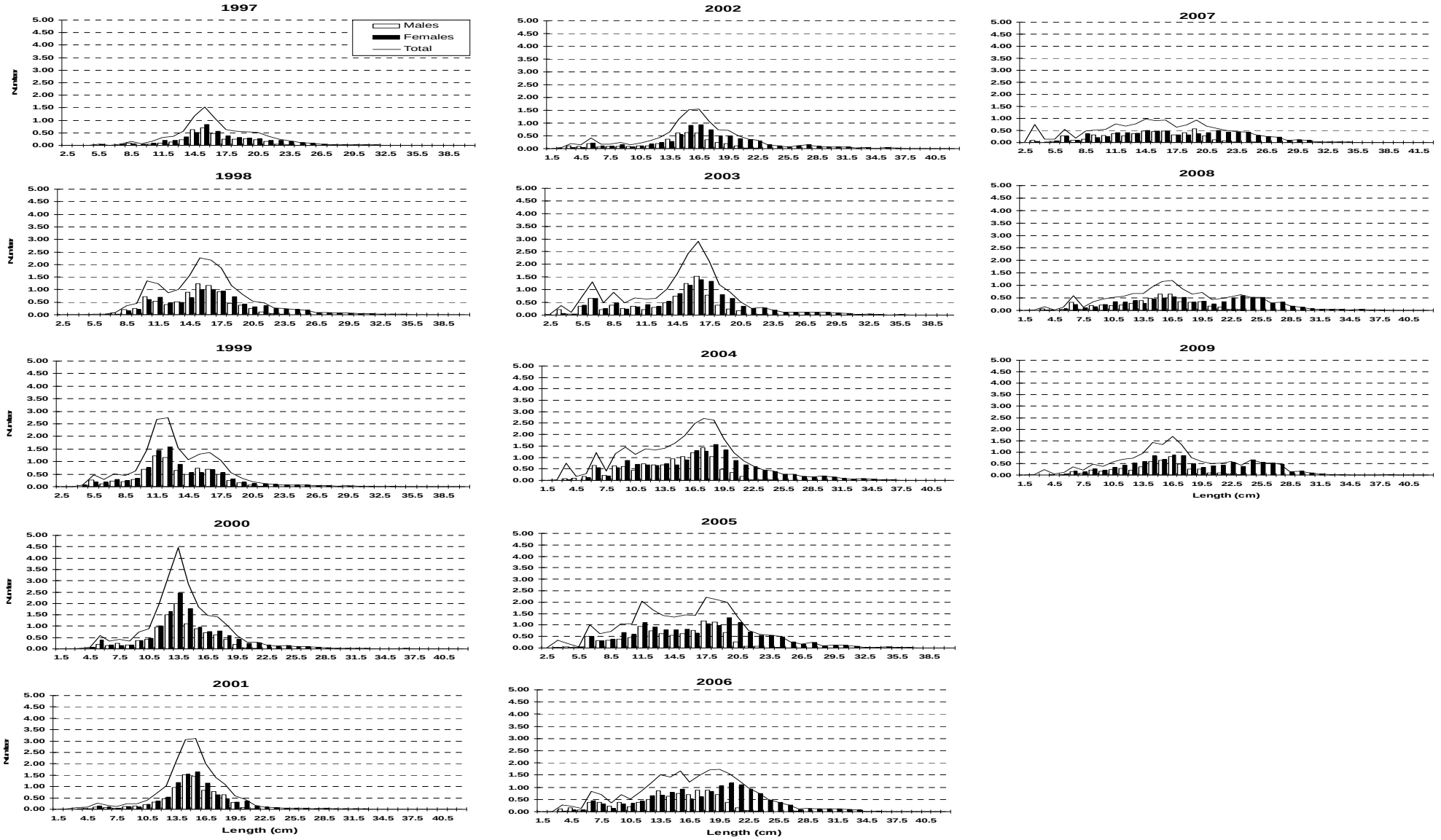

FIGURE 3.- Roughhead grenadier length distribution (cm) on NAFO 3NO: 1997-2009. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels.

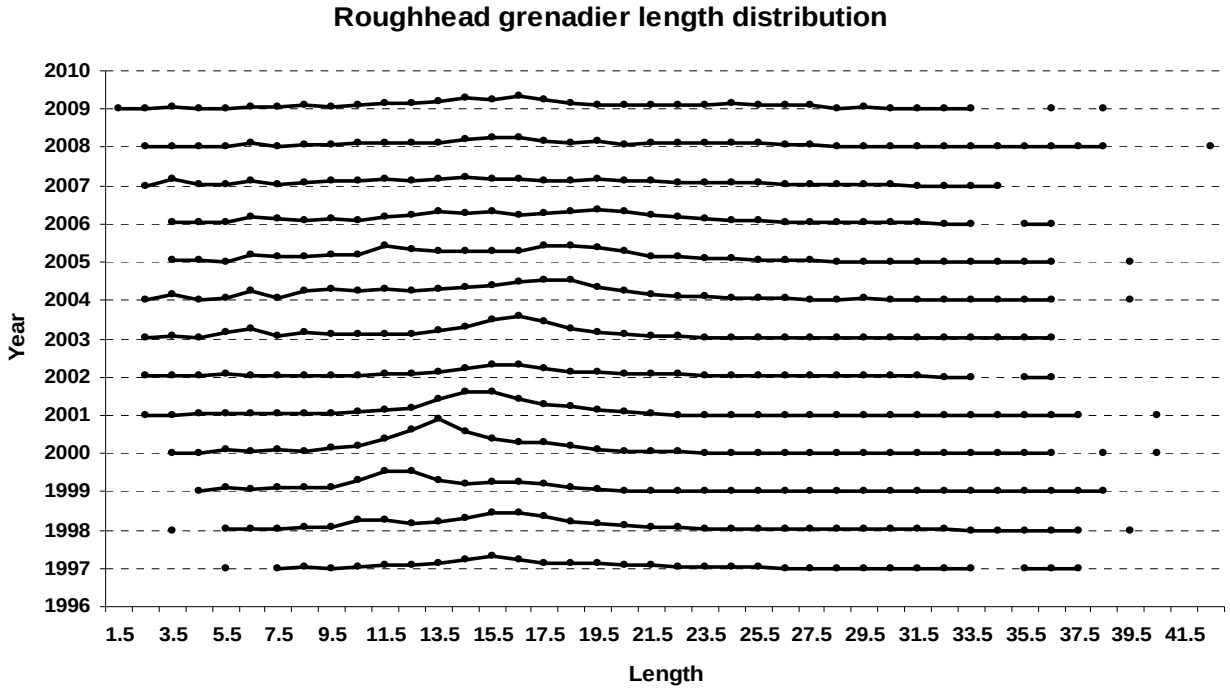

FIGURE 4.- Roughhead grenadier mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2009.

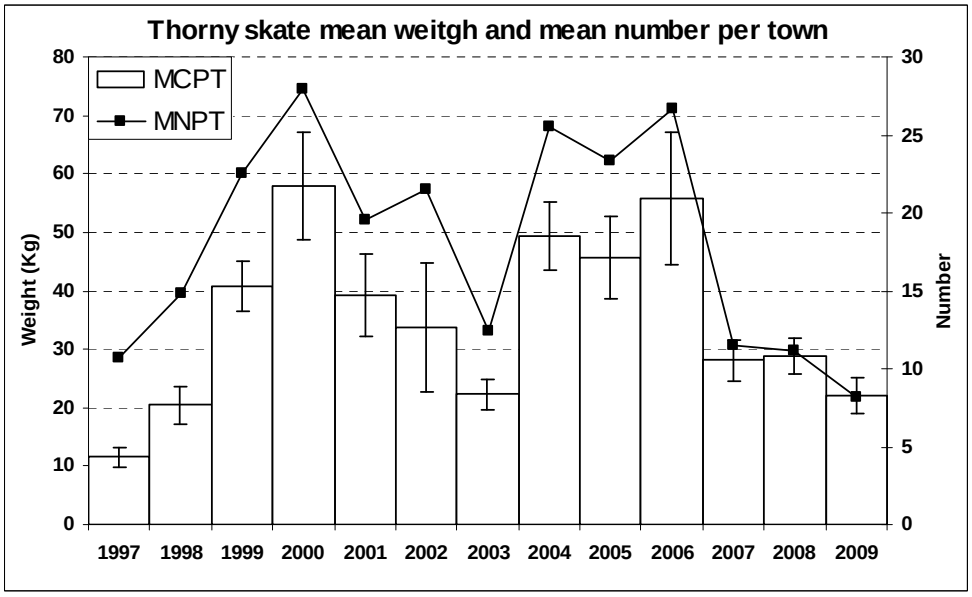

FIGURE 5.- Thorny skate stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2009 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2009 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

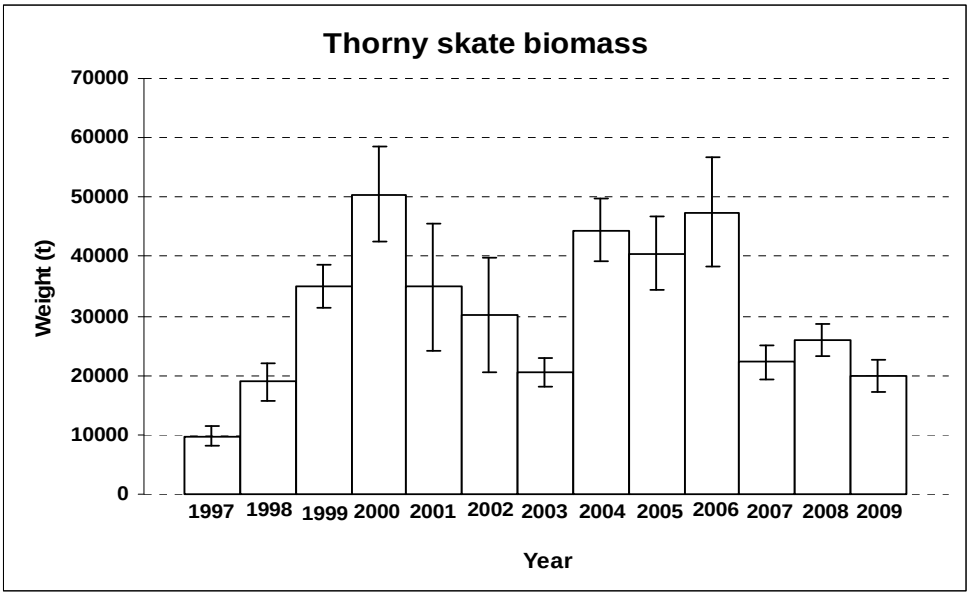

FIGURE 6.- Thorny skate biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 1997-2009 (1997-2000 transformed data from C/V *Playa de Menduíña*; 2002-2009 original data from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels).

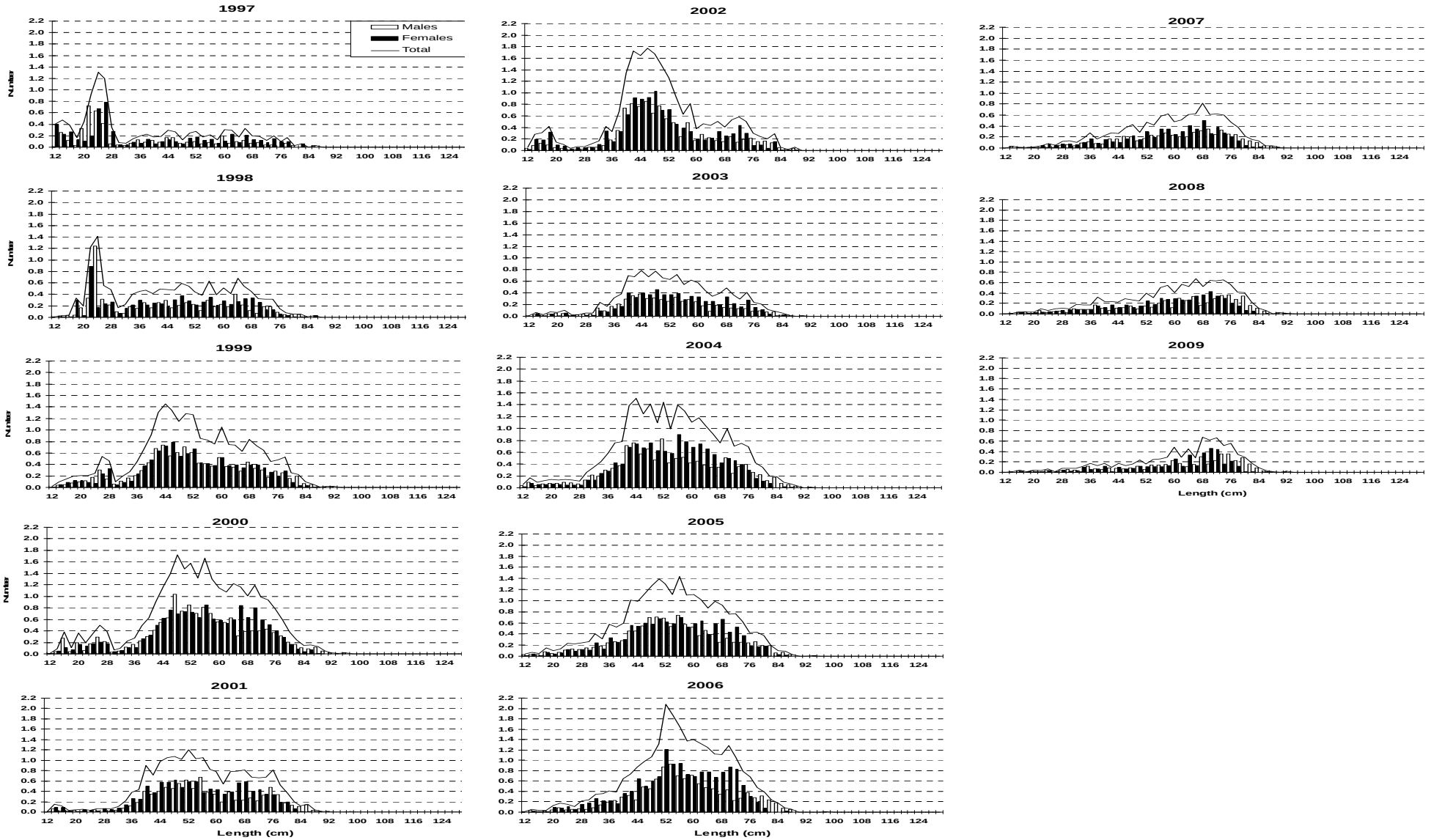

FIGURE 7.- Thorny skate length distribution (cm) on NAFO 3NO: 1997-2009. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduíña*, and 2002-2009 data are original from R/V *Vizconde de Eza*. In 2001, there are data from the two vessels

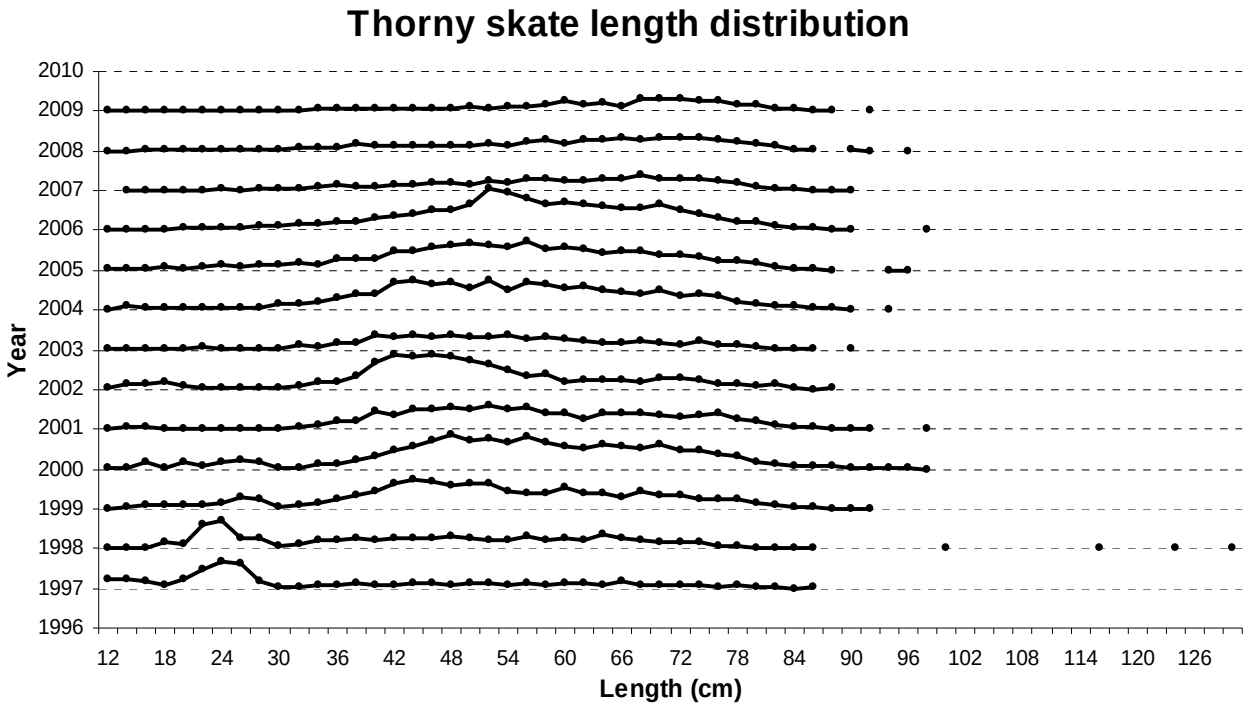

FIGURE 8.- Thorny skate mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2009.

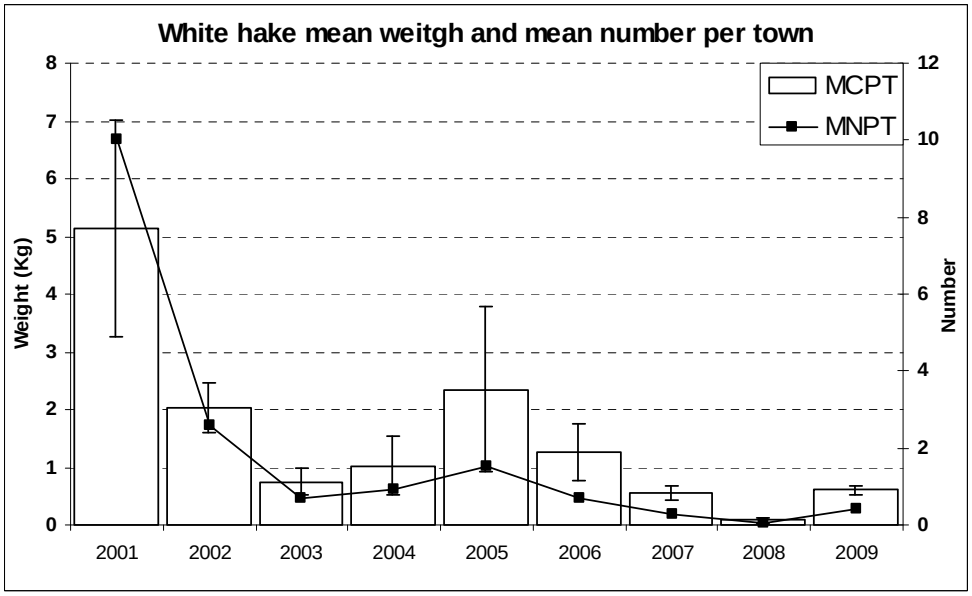

FIGURE 9.- White hake stratified mean catches in Kg and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 2001-2009.

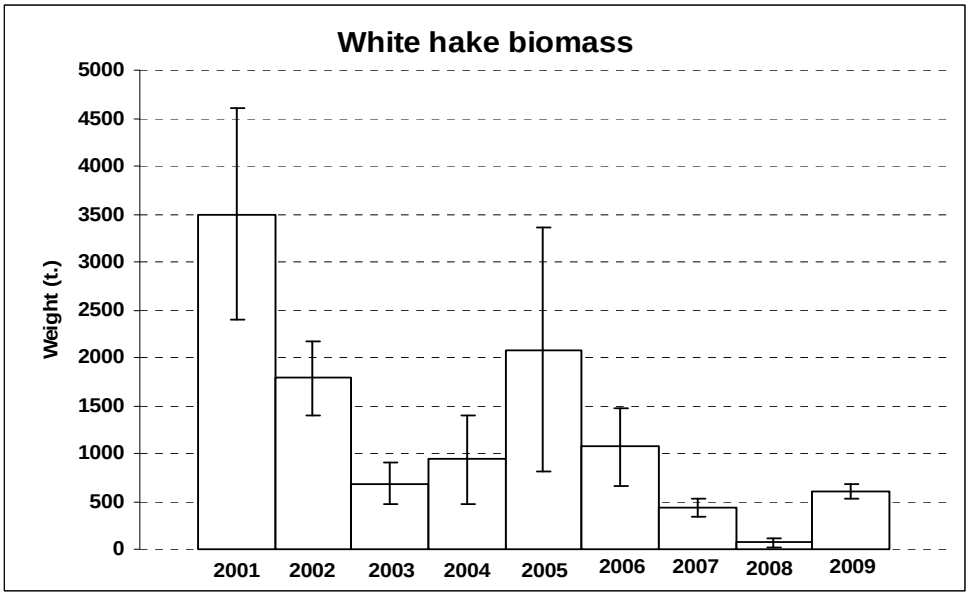

FIGURE 10.- White hake biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys on NAFO Div. 3NO: 2001-2009.

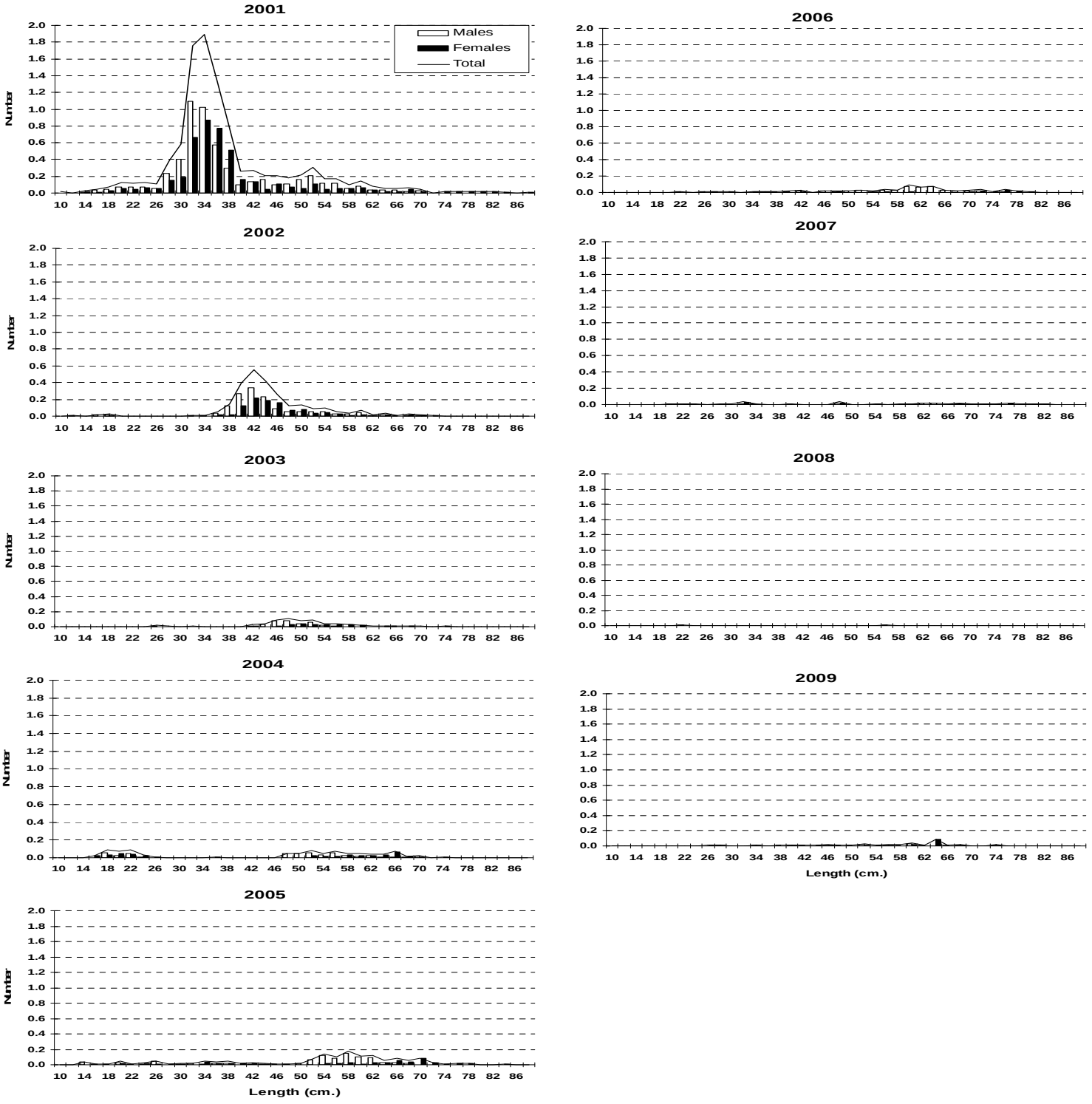

FIGURE 11.- White hake length distribution (cm) on NAFO 3NO: 2001-2009. Number per stratified mean catches.

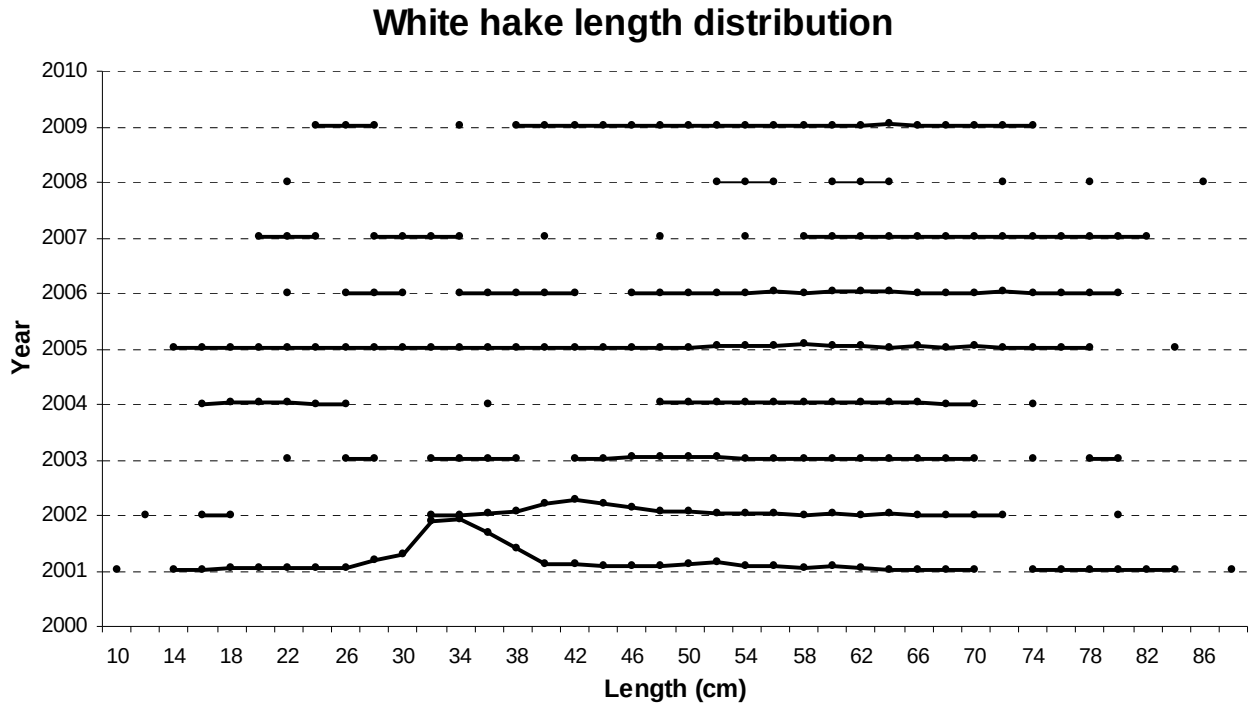

FIGURE 12.- White hake mean catches per tow length distribution (cm) on NAFO 3NO: 2001-2009.