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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 the Spanish Spring survey are presented. Abundance and biomass were estimated for roughhead grenadier and thorny skate for the period 1997-2012 and for white hake for the period 2001-2012. The length distribution is presented as numbers per haul stratified mean catches. The indices of roughhead grenadier show no trend until 2003, increasing in years 2004-2006 but mainly in 2004 and afterwards stabilised at levels slightly higher than in the early years. The thorny skate indices increased to a historical maximum in 2000 and after which it has followed an oscillating trend until 2011 with an increase in 2012. White hake biomass shows a decline since the great maximum in 2001, with a small peak in 2005. Values in 2011 and 2012 were slightly higher than in previous year but nevertheless represented one fifth of the 2001 maximum. Individuals within the length range 16 - 26 cm can only be seen in 2001 and 2004.

Material and Methods

Spain has carried out a spring survey in Div. 3NO of the NAFO Regulatory Area since 1995. To this purpose, the vessel C/V *Playa de Menduiña*, equipped with a bottom trawl net type *Pedreira* was used until 2001, when it was replaced by the R/V *Vizconde de Eza* with a bottom trawl net type *Campelen*. The technical specifications and geometry of these gears, their rigging profile and the net plan, and an abstract with the survey technical information are described in Walsh *et al.*, 2001. The number of valid tows, the depth strata covered and survey dates for the period 1997-2012 are shown in Table 1. The survey area was stratified following the standard stratification schemes (Bishop, 1994). The number of hauls was assigned to each stratum 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 a catchability factor of 1. The swept area and number of hauls by stratum for the entire period are presented in table 2.

The catch of each haul is sorted and weighted by species and a sample of each species is length measured. For roughhead grenadier, pre-anal length in 0.5 cm intervals to the inferior 0.5 cm is taken. Thorny skate and white hake are measured to the nearest lower cm of total length. This paper presents the 1997-2012 indices for roughhead grenadier and thorny skate. Years 1995 and 1996 are not representative as the deeper strata were not surveyed those years, thus they are excluded from the analysis. White hake data are only available since 2001.

Mean catch with variance and stratified mean catches with annual variance by stratum and year are presented for each species, transformed until 2000 and no-transformed for the period 2002-2012. Biomass per stratum and year, with annual variance, and length distribution of catches per haul are also presented. For 2001 there are both transformed data from C/V *Playa de Menduiña* and original data from R/V *Vizconde de Eza*. White hake data did not need calibration (González Troncoso and Paz, 2005). Further information about the calculation of these indices is available in González Troncoso *et al.*, 2005.

At the end of the document, in the Figure 14, we present maps with the distribution of the catches of the three species during the 2012 Spanish 2NO survey.

Results

Roughhead grenadier

There is no directed fishery for roughhead grenadier. Most of the catches are taken as by-catch 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, grenadier catches were systematically misreported as roundnose grenadier. Grenadier biomass shows a decreasing trend over the last years (NAFO, 2012).

Mean Catches and Biomass

Mean catch and SD of roughhead grenadier by stratum are presented in Table 3. Stratified mean catches and SD per stratum and year are presented in Table 4.

Biomass estimates and SD for the period 1997-2012 are presented in Table 5. The estimated parameters a and b values of length-weight relationship are presented in Table 6.

The roughhead grenadier indices show no trend until 2003. They reached a maximum in 2004- 2006 and afterwards stabilised at levels slightly higher than in the early years (Figs. 1 and 2).

Length Distribution

Table 7 and Figures 3 and 4 show the annual length distribution of the stratified mean catches, besides the sampled size and catch, for the period 1997-2012. Results are presented in length intervals of 1 cm. The 1998 cohort is easily followed, but it has started to disappear over the past years. Recruitment seems to be good recently, specially in 2012, whereas all the length classes were poor, specially the largest.

Thorny skate

Thorny skate catches comprises the most of the skates catches during the Spanish Spring survey and the Canadian surveys. This species has been managed with a TAC since 2004. Nominal catches increased in the mid-1980s with the beginning of a directed fishery, reaching a minimum during the period 1993-1995. Biomass has been relatively stable from 1996 to 2004, but at a lower level than in the mid-1980s. During recent years the biomass has increased slightly (NAFO, 2012).

Mean Catches and Biomass

Mean catch and SD per stratum are presented in Table 8. Stratified mean catches per tow by stratum and year, next to their SD, are presented in Table 9.

Biomass estimates and SD for the period 1997-2012 are presented in Table 10. The estimated parameters a and b values of length-weight relationship are presented in Table 11.

The thorny skate indices follows a large oscillating trend, with maximum values of roughly 50 000 tons 2001 and 2004-2006, and minimum values of 10 000 -20 000 tons in 1997, 1993 and 2011. There was an increase in 2012, reaching the maximum value since 2007 but still lower than the 2004-2006 period (Fig. 5 and 6).

Length Distribution

Length distribution of stratified mean catch by sex and year, sample size and catch for the period 1997-2012 are presented in Table 12 and Figures 7 and 8. Length is aggregated into 2 cm intervals. The recruitment modal value was in 1997 and can be followed until 2012. A second modal value at small lengths starting in 1998 can be roughly followed throughout years, reaching a maximum in 2002. Recruitment was also quite good in 2002, but this cohort is not seen in following years. All length classes have been poorer than usual over the last years, but recruitment was quite good in 2010 and all the length classes have more or less the same level.

White hake

Catches of white hake in Div. 3NO peaked in 1987 and then declined until 1994, with non-Canadian landings dropping to 0 following by fishing restriction for foreign countries in 1992. Average catch reached a minimum in 1995-2001, increased in 2002 and 2003 and declined sharply in 2004-2007. The 1999 year-class was large and prompted the 2000 stock biomass increase, but following cohorts have been very small in comparison. Subsequently, the biomass index has decreased and remains at levels comparable to the beginning of the *Campelen* time series in 1996-1999 (NAFO, 2012).

Mean catches and biomass

Mean catch and SD per stratum are presented in table 13. Table 14 and Figure 9 show the stratified mean catch per tow disaggregated by stratum and year, as well as the annual variance. Table 15 and Figure 10 present biomass per stratum and year and annual variance.

Table 16 presents the length weight relationship parameters for white hake for the period 2002-2012. The 2001 data were insufficient to calculate the parameters, thus 2002 parameters were used instead.

The white hake biomass index was highest in 2001 and shows an overall decreasing trend since then, with a much smaller peak in 2005. The 2011-2012 indices are very low but nevertheless the highest since 2007.

Length distribution

Table 17 presents the length distribution of the stratified mean catches per tow by sex and year, number of samples, sample size, sampled catch, length range, total catch and numbers of hauls. Figures 11 and 12 show length distribution by year. White hake was not sexed in 2011.

Individuals within the length range 30-38 cm were very abundant in 2001 and can be followed the following years, but by 2006 can hardly be seen. A small recruitment event was detected in 2004, with individuals between 16 - 26 cm. In 2005, the length distribution decreased although the biomass increased. Individuals in the ranges 52-70 cm and 14-38 were most abundant, but nevertheless scarcer than in 2001 and 2002. All year classes have been poor in 2006-2011. In 2012 a slight increase in the lengths between 40-44 cm can be seen.

References

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TABLE 1.- Spanish spring bottom trawl surveys in NAFO Div. 3NO: 1997-2012

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1997	C/V <i>Playa de Menduíña</i>	128	42-1263	April 26-May 18
1998	C/V <i>Playa de Menduíña</i>	124	42-1390	May 06-May 26
1999	C/V <i>Playa de Menduíña</i>	114	41-1381	May 07-May 26
2000	C/V <i>Playa de Menduíña</i>	118	42-1401	May 07-May 28
2001 ^(*)	R/V <i>Vizconde de Eza</i>	83	36-1156	May 03-May 24
	C/V <i>Playa de Menduíña</i>	121	40-1500	May 05-May 23
2002	R/V <i>Vizconde de Eza</i>	125	38-1540	April 29-May 19
2003	R/V <i>Vizconde de Eza</i>	118	38-1666	May 11-June 02
2004	R/V <i>Vizconde de Eza</i>	120	43-1539	June 06-June 24
2005	R/V <i>Vizconde de Eza</i>	119	47-1485	June 10-June 29
2005	R/V <i>Vizconde de Eza</i>	119	47-1485	June 10-June 29
2006	R/V <i>Vizconde de Eza</i>	120	45-1480	June 7-June 27
2007	R/V <i>Vizconde de Eza</i>	110	45-1374	May 29-June 19
2008	R/V <i>Vizconde de Eza</i>	122	45-1374	May 27-June 16
2009	R/V <i>Vizconde de Eza</i>	109	45-1374	May 31-June 18
2010	R/V <i>Vizconde de Eza</i>	95	45-1374	May 30-June 18
2011	R/V <i>Vizconde de Eza</i>	122	44-1450	June 5-June 24
2012	R/V <i>Vizconde de Eza</i>	122	44-1450	June 3-June 21

(*) A total of 83 hauls from the R/V *Vizconde de Eza* and 40 hauls from the C/V *Playa de Menduíña* (123 hauls in total) were used for data analysis.

TABLE 2.- Swept area and number of hauls by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are from C/V *Playa de Mendumía* data, and 2002-2012 data are from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997		1998		1999		2000		2001		2002		2003		2004	
	Swept area	Tow number														
353	0.0480	4	0.0465	4	0.0360	3	0.0356	3	0.0341	3	0.0476	4	0.0334	3	0.0338	3
354	0.0233	2	0.0356	3	0.0218	2	0.0356	3	0.0338	3	0.0356	3	0.0338	3	0.0345	3
355	0.0233	2	0.0221	2	0.0229	2	0.0233	2	0.0240	2	0.0236	2	0.0229	2	0.0229	2
356	0.0225	2	0.0221	2	0.0229	2	0.0225	2	0.0240	2	0.0233	2	0.0225	2	0.0221	2
357	0.0443	4	0.0240	2	0.0236	2	0.0124	1	0.0244	2	0.0240	2	0.0229	2	0.0229	2
358	0.0563	5	0.0236	3	0.0349	3	0.0341	3	0.0345	3	0.0345	3	0.0338	3	0.0330	3
359	0.0690	6	0.0698	6	0.0364	3	0.0469	4	0.0803	7	0.0686	6	0.0791	7	0.0791	7
360	0.3754	32	0.2561	25	0.2325	19	0.2396	20	0.2423	20	0.2865	25	0.2254	20	0.2310	20
374	0.0353	3	0.0353	3	0.0244	2	0.0240	2	0.0240	2	0.0345	3	0.0225	2	0.0233	2
375	0.0116	1	0.0345	3	0.0236	2	0.0244	2	0.0338	3	0.0353	3	0.0330	3	0.0338	3
376	0.1583	14	0.0930	10	0.1219	10	0.1200	10	0.1155	10	0.1140	10	0.1125	10	0.1166	10
377	0.0116	1	0.0229	2	0.0240	2	0.0229	2	0.0229	2	0.0229	2	0.0225	2	0.0218	2
378	0.0210	2	0.0120	2	0.0229	2	0.0233	2	0.0236	2	0.0233	2	0.0225	2	0.0225	2
379	0.0206	2	0.0356	3	0.0236	2	0.0225	2	0.0229	2	0.0229	2	0.0229	2	0.0124	1
380	0.0210	2	0.0113	2	0.0236	2	0.0236	2	0.0206	2	0.0225	2	0.0229	2	0.0221	2
381	0.0221	2	0.0229	2	0.0229	2	0.0236	2	0.0236	2	0.0229	2	0.0229	2	0.0225	2
382	0.0461	4	0.0229	3	0.0484	4	0.0499	4	0.0469	4	0.0341	3	0.0454	4	0.0461	4
721	0.0221	2	0.0203	2	0.0244	2	0.0236	2	0.0248	2	0.0233	2	0.0225	2	0.0221	2
722	0.0214	2	0.0101	2	0.0229	2	0.0218	2	0.0233	2	0.0236	2	0.0221	2	0.0218	2
723	0.0210	2	0.0233	2	0.0229	2	0.0248	2	0.0240	2	0.0233	2	0.0229	2	0.0229	2
724	0.0225	2	0.0206	2	0.0225	2	0.0233	2	0.0353	3	0.0225	2	0.0225	2	0.0214	2
725	0.0206	2	0.0086	1	0.0229	2	0.0210	2	0.0116	1	0.0225	2	0.0229	2	0.0225	2
726	n.s.	n.s.	0.0094	2	0.0225	2	0.0221	2	0.0116	1	0.0214	2	0.0225	2	0.0225	2
727	0.0094	1	0.0233	2	0.0236	2	0.0210	2	0.0225	2	0.0233	2	0.0218	2	0.0233	2
728	0.0214	2	0.0206	2	0.0233	2	0.0210	2	0.0229	2	0.0229	2	0.0225	2	0.0180	2
752	0.0218	2	0.0229	2	0.0233	2	0.0206	2	0.0210	2	0.0116	1	0.0229	2	0.0214	2
753	0.0214	2	0.0218	2	0.0229	2	0.0218	2	0.0214	2	0.0229	2	0.0229	2	0.0218	2
754	0.0330	3	0.0210	2	0.0206	2	0.0195	2	0.0195	2	0.0341	3	0.0218	2	0.0214	2
755	n.s.	n.s.	0.0206	2	0.0311	3	0.0431	4	0.0416	4	0.0338	3	0.0221	2	0.0319	3
756	0.0109	1	0.0225	2	0.0225	2	0.0203	2	0.0113	1	0.0229	2	0.0221	2	0.0218	2
757	0.0304	3	0.0206	2	0.0233	2	0.0214	2	0.0233	2	0.0225	2	0.0221	2	0.0218	2
758	0.0214	2	0.0105	2	0.0214	2	0.0210	2	0.0218	2	0.0225	2	0.0221	2	0.0214	2
759	n.s.	n.s.	0.0214	2	0.0218	2	0.0210	2	0.0221	2	0.0225	2	0.0113	1	0.0214	2
760	0.0105	1	0.0214	2	0.0225	2	0.0210	2	0.0229	2	0.0229	2	0.0218	2	0.0221	2
761	0.0315	3	0.0206	2	0.0210	2	0.0221	2	0.0225	2	0.0225	2	0.0225	2	0.0221	2
762	0.0308	3	0.0094	2	0.0210	2	0.0203	2	0.0116	1	0.0225	2	0.0225	2	0.0233	2
763	n.s.	n.s.	0.0218	2	0.0311	3	0.0416	4	0.0330	3	0.0225	2	0.0311	3	0.0326	3
764	0.0206	2	0.0218	2	0.0225	2	0.0218	2	0.0240	2	0.0236	2	0.0221	2	0.0229	2
765	0.0206	2	0.0098	2	0.0221	2	0.0203	2	0.0113	1	0.0236	2	0.0113	1	0.0225	2
766	0.0308	3	0.0191	2	0.0218	2	0.0214	2	0.0203	2	0.0233	2	0.0225	2	0.0225	2
767	n.s.	n.s.	0.0109	2	0.0214	2	0.0210	2	0.0218	2	0.0225	2	0.0229	2	0.0218	2

TABLE 2 (cont.).- Swept area and number of hauls by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are from C/V *Playa de Menduiña* data, and 2002-2012 data are from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	2005		2006		2007		2008		2009		2010		2011		2012	
	Swept area	Tow number														
353	0.0353	3	0.0371	3	0.0364	3	0.0341	3	0.0345	3	0.0225	2	0.0349	3	0.0338	3
354	0.0353	3	0.0364	3	0.0364	3	0.0345	3	0.0338	3	0.0225	2	0.0345	3	0.0338	3
355	0.0225	2	0.0248	2	0.0240	2	0.0221	2	0.0233	2	0.0229	2	0.0233	2	0.0229	2
356	0.0233	2	0.0240	2	0.0240	2	0.0236	2	0.0229	2	0.0225	2	0.0229	2	0.0225	2
357	0.0233	2	0.0244	2	0.0360	3	0.0233	2	0.0116	2	0.0225	2	0.0225	2	0.0229	2
358	0.0349	3	0.0349	3	0.0368	3	0.0345	3	0.0341	3	0.0225	2	0.0345	3	0.0330	3
359	0.0814	7	0.0975	8	0.0855	7	0.0799	7	0.0795	7	0.0705	6	0.0806	7	0.0806	7
360	0.2325	20	0.2340	19	0.2378	20	0.2340	20	0.2273	20	0.1628	14	0.2374	20	0.2344	20
374	0.0229	2	0.0236	2	0.0240	2	0.0233	2	0.0225	2	0.0225	2	0.0225	2	0.0229	2
375	0.0349	3	0.0364	3	0.0364	3	0.0334	3	0.0341	3	0.0364	3	0.0360	3	0.0349	3
376	0.1174	10	0.1219	10	0.1185	10	0.1129	10	0.1133	10	0.0788	7	0.1178	10	0.1181	10
377	0.0233	2	0.0236	2	0.0240	2	0.0233	2	0.0225	2	0.0233	2	0.0233	2	0.0229	2
378	0.0225	2	0.0240	2	0.0233	2	0.0240	2	0.0229	2	0.0225	2	0.0240	2	0.0229	2
379	0.0236	2	0.0236	2	0.0240	2	0.0229	2	0.0229	2	0.0229	2	0.0221	2	0.0225	2
380	0.0229	2	0.0229	2	0.0240	2	0.0225	2	0.0229	2	0.0236	2	0.0229	2	0.0229	2
381	0.0233	2	0.0229	2	0.0240	2	0.0229	2	0.0229	2	0.0244	2	0.0233	2	0.0221	2
382	0.0458	4	0.0469	4	0.0484	4	0.0458	4	0.0450	4	0.0233	2	0.0450	4	0.0454	4
721	0.0229	2	0.0236	2	0.0116	1	0.0225	2	0.0229	2	0.0225	2	0.0229	2	0.0233	2
722	0.0233	2	0.0240	2	0.0225	2	0.0206	2	0.0225	2	0.0225	2	0.0225	2	0.0221	2
723	0.0233	2	0.0236	2	0.0240	2	0.0225	2	0.0225	2	0.0225	2	0.0218	2	0.0225	2
724	0.0225	2	0.0233	2	0.0233	2	0.0221	2	0.0233	2	0.0229	2	0.0233	2	0.0225	2
725	0.0236	2	0.0233	2	0.0225	2	0.0229	2	0.0229	2	0.0233	2	0.0240	2	0.0225	2
726	0.0113	1	0.0225	2	0.0229	2	0.0225	2	0.0229	2	0.0233	2	0.0225	2	0.0221	2
727	0.0229	2	0.0225	2	0.0240	2	0.0221	2	0.0113	1	0.0240	2	0.0225	2	0.0233	2
728	0.0109	1	0.0225	2	0.0225	2	0.0221	2	0.0229	2	0.0240	2	0.0229	2	0.0229	2
752	0.0236	2	0.0225	2	0.0225	2	0.0218	2	0.0229	2	0.0240	2	0.0236	2	0.0229	2
753	0.0225	2	0.0225	2	0.0225	2	0.0221	2	0.0116	1	n.s.	n.s.	0.0225	2	0.0221	2
754	0.0225	2	0.0225	2	0.0225	2	0.0218	2	0.0113	1	0.0225	2	0.0225	2	0.0221	2
755	0.0450	4	0.0338	3	0.0338	3	0.0431	4	0.0116	1	0.0120	1	0.0454	4	0.0446	4
756	0.0233	2	0.0229	2	0.0225	2	0.0218	2	0.0225	2	0.0225	2	0.0206	2	0.0221	2
757	0.0225	2	0.0225	2	0.0229	2	0.0221	2	0.0229	2	0.0221	2	0.0236	2	0.0214	2
758	0.0225	2	0.0225	2	0.0225	2	0.0218	2	0.0225	2	0.0225	2	0.0225	2	0.0221	2
759	0.0229	2	0.0225	2	n.s.	n.s.	0.0221	2	0.0113	1	0.0225	2	0.0218	2	0.0221	2
760	0.0229	2	0.0225	2	0.0233	2	0.0225	2	0.0229	2	0.0225	2	0.0214	2	0.0225	2
761	0.0221	2	0.0233	2	0.0225	2	0.0214	2	0.0225	2	0.0229	2	0.0236	2	0.0221	2
762	0.0225	2	0.0233	2	n.s.	n.s.	0.0214	2	0.0225	2	0.0229	2	0.0225	2	0.0225	2
763	0.0334	3	0.0225	2	n.s.	n.s.	0.0311	3	n.s.	n.s.	n.s.	n.s.	0.0349	3	0.0330	3
764	0.0233	2	0.0233	2	0.0225	2	0.0221	2	0.0116	1	n.s.	n.s.	0.0225	2	0.0225	2
765	0.0229	2	0.0236	2	0.0225	2	0.0214	2	0.0225	2	0.0225	2	0.0225	2	0.0229	2
766	0.0229	2	0.0229	2	n.s.	n.s.	0.0218	2	0.0225	2	0.0225	2	0.0225	2	0.0225	2
767	0.0113	1	0.0233	2	n.s.	n.s.	0.0214	2	n.s.	n.s.	n.s.	n.s.	0.0233	2	0.0203	2

TABLE 3.- Roughhead grenadier mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed.
1997-2000 data are transformed from C/V *Playa de Menduña* and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997		1998		1999		2000		2001		2002		2003		2004	
	R. grenadier Mean catch	R. grenadier SD														
353	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
354	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
355	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
356	0.000	0.000	0.426	0.602	0.019	0.026	0.084	0.016	0.000	0.000	0.000	0.000	0.115	0.163	1.225	1.732
357	0.101	0.202	0.000	0.000	0.216	0.152	0.473	-	0.170	0.240	1.050	1.061	1.385	1.959	0.027	0.037
358	0.000	0.000	0.000	0.000	0.233	0.403	0.000	0.000	0.000	0.000	0.500	0.700	0.000	0.000	0.007	0.012
359	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.100	0.000	0.000	0.479	1.267
360	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.390	1.744	0.000	0.000	0.000	0.000	0.000	0.000
374	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
375	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
376	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
377	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.273	0.386	0.000	0.000	0.000	0.000
378	0.447	0.632	0.000	0.000	0.298	0.421	0.149	0.211	0.000	0.000	0.008	0.011	0.000	0.000	0.000	0.000
379	0.000	0.000	0.011	0.020	0.024	0.034	0.511	0.722	0.430	0.580	0.265	0.375	0.124	0.175	3.960	-
380	0.219	0.309	0.000	0.000	0.003	0.005	0.157	0.220	0.03	0.048	0.008	0.011	0.085	0.120	278.650	209.516
381	0.000	0.000	0.000	0.000	0.000	0.000	0.074	0.100	0.00	0.00	0.000	0.000	0.000	0.000	4.145	5.169
382	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.009	0.00	0.00	0.002	0.004	0.000	0.000	0.080	0.160
721	0.000	0.000	0.758	0.253	2.443	0.132	0.812	0.778	0.220	0.085	1.250	1.768	0.000	0.000	3.473	0.449
722	0.026	0.036	3.950	0.385	3.865	3.202	4.767	1.204	2.465	2.878	10.930	14.213	4.315	4.547	4.530	2.676
723	0.000	0.000	0.255	0.361	2.367	2.528	2.859	1.554	1.705	0.304	0.700	0.283	8.370	3.253	10.053	4.938
724	0.562	0.048	1.064	0.349	3.678	0.217	4.130	1.074	7.507	3.835	10.000	4.384	4.980	1.669	10.746	0.701
725	0.000	0.000	0.077	-	3.718	3.790	12.646	17.511	1.415	1.832	2.650	1.344	0.377	0.532	92.415	82.046
726	n.s.	n.s.	2.213	2.336	7.296	0.205	14.727	0.120	4.304	5.509	2.650	1.909	0.000	0.000	59.865	19.608
727	0.358	-	0.196	0.181	0.661	0.236	2.499	2.726	0.21	0.132	0.570	0.806	21.900	24.607	16.700	1.697
728	0.835	0.167	0.919	0.457	17.996	15.217	7.249	6.640	1.00	0.241	0.620	0.876	32.650	3.748	15.650	9.687
752	8.836	3.973	8.172	6.983	9.032	3.744	26.663	9.968	6.04	3.455	1.950	2.758	77.900	100.268	94.610	95.162
753	15.528	7.705	35.635	9.342	28.442	30.760	49.154	1.830	31.57	21.165	5.400	7.637	57.050	55.791	63.835	45.912
754	70.193	8.839	60.723	3.985	26.373	8.716	66.801	41.403	75.61	17.890	98.450	82.237	65.600	40.729	33.355	11.377
755	n.s.	n.s.	42.088	3.130	23.467	7.041	28.192	7.595	24.29	19.579	1.460	1.307	18.200	25.597	14.658	21.304
756	3.252	-	6.895	5.707	29.642	5.995	17.852	0.205	12.796	11.520	11.750	10.819	7.160	9.051	9.772	3.778
757	20.873	17.870	39.313	39.079	8.896	5.646	88.705	79.940	20.43	16.686	16.250	16.193	8.575	2.765	12.890	8.330
758	46.823	8.232	77.034	32.807	46.200	23.151	55.334	32.746	69.10	46.916	141.550	101.470	41.050	58.053	32.955	10.260
759	n.s.	n.s.	66.392	41.956	22.491	13.002	32.826	6.694	59.11	50.035	69.250	97.934	78.080	-	39.980	4.921
760	3.916	-	8.862	1.890	4.010	1.409	17.758	2.817	7.195	9.468	11.950	4.172	40.650	3.465	76.475	94.293
761	19.198	3.744	25.190	8.102	16.592	10.125	11.535	5.093	15.515	2.524	5.350	5.445	12.750	9.263	25.610	28.055
762	24.278	18.462	30.068	18.564	17.354	9.397	18.990	4.928	2.839	3.040	0.325	0.460	14.650	3.861	15.729	4.594
763	n.s.	n.s.	10.820	5.285	11.447	3.789	14.523	15.110	15.35	12.271	1.225	1.732	2.717	4.705	28.000	21.696
764	6.393	4.081	4.827	2.059	4.044	1.240	4.427	2.047	5.550	3.323	20.050	11.526	19.420	19.771	40.790	41.988
765	11.752	5.592	6.734	3.431	6.197	1.421	7.755	4.467	4.385	0.685	2.700	2.404	10.400	-	5.347	2.710
766	7.741	2.498	6.895	1.902	5.516	3.371	3.184	1.156	2.65	1.233	9.125	9.016	5.690	6.548	7.214	1.582
767	n.s.	n.s.	6.529	2.950	4.844	0.277	2.537	0.506	3.09	1.673	9.150	12.940	3.130	2.461	3.667	0.401

TABLE 3 (cont.).- Roughhead grenadier mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Mendoña* and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	2005		2006		2007		2008		2009		2010		2011		2012	
	R. grenadier Mean catch	R. grenadier SD														
353	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
354	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
355	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.225	1.732	0.000	0.000	0.000	0.000	0.000	0.000
356	0.260	0.368	0.350	0.495	0.000	0.000	0.000	0.000	0.000	0.000	0.112	0.158	0.000	0.000	0.000	0.000
357	15.785	3.090	42.575	1.407	1.907	1.661	0.845	0.813	15.888	19.160	3.872	3.495	7.236	10.047	8.388	3.241
358	0.000	0.000	0.000	0.000	0.283	0.491	0.320	0.554	0.000	0.000	0.000	0.000	0.307	0.531	1.467	2.540
359	0.103	0.217	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.187	0.000	0.000	0.000	0.000	0.000	0.000
360	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
374	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
376	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
377	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
378	0.620	0.877	0.260	0.367	0.000	0.000	0.000	0.000	0.000	0.000	1.190	1.683	0.440	0.622	2.403	3.398
379	26.975	17.006	112.080	148.252	6.478	1.813	2.890	3.881	7.140	3.620	17.113	1.615	1.928	0.987	8.220	3.507
380	194.750	113.491	130.294	89.342	22.490	15.712	17.273	4.847	7.528	9.153	25.550	0.212	53.845	58.202	8.300	6.039
381	17.450	11.384	101.485	42.122	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.255	119.680	136.076	2.469	3.492
382	0.235	0.286	0.200	0.400	0.163	0.325	0.000	0.000	0.000	0.000	0.000	0.000	7.475	14.950	0.270	0.540
721	1.173	1.609	3.005	3.415	0.830	-	0.876	1.238	4.205	0.777	1.045	0.500	0.825	0.403	2.020	0.863
722	5.415	4.985	0.901	1.005	3.945	1.902	2.791	2.044	0.744	0.723	3.524	2.226	1.850	0.775	8.628	10.278
723	21.528	23.869	20.810	0.919	4.417	2.512	3.870	1.032	17.995	3.825	4.124	0.208	3.628	0.046	10.452	9.958
724	9.500	8.514	4.712	4.322	8.758	3.297	8.207	6.406	9.931	4.258	5.179	0.841	3.333	4.521	5.345	1.690
725	104.420	135.072	48.050	48.578	12.730	7.742	4.897	4.530	5.905	1.633	10.950	3.041	8.924	7.812	13.531	5.629
726	34.900	-	21.017	5.822	40.814	22.325	40.678	6.418	34.425	22.026	41.600	18.950	21.875	20.259	30.805	13.018
727	18.650	12.657	14.650	7.283	10.079	6.405	6.987	1.466	7.942	-	12.450	1.344	6.797	1.280	8.150	2.489
728	35.400	-	25.250	1.626	17.355	10.953	8.250	4.738	7.339	2.176	19.705	7.630	6.261	0.496	10.388	9.209
752	21.590	3.677	25.200	10.041	19.404	27.432	60.305	30.342	30.594	14.292	80.550	70.216	4.564	3.318	11.150	1.344
753	63.320	12.629	14.863	7.973	31.106	20.248	115.900	93.904	117.400	-	n.s.	n.s.	35.399	45.067	76.905	98.846
754	13.957	14.981	5.055	7.148	53.404	6.218	44.000	20.648	145.500	-	69.059	94.821	11.416	4.152	42.590	9.249
755	34.228	9.637	22.257	27.055	28.680	19.358	27.444	18.211	11.291	-	10.439	-	14.548	11.444	52.283	26.152
756	23.675	12.693	26.875	13.103	85.074	23.863	33.632	38.465	39.305	29.380	9.176	5.199	40.313	53.807	57.004	8.773
757	17.758	8.403	7.399	6.079	46.664	28.618	25.709	21.867	18.680	1.584	11.806	0.840	42.742	11.742	156.423	48.616
758	34.043	1.042	111.965	139.915	18.887	14.302	43.538	28.655	43.930	8.726	8.685	1.761	12.365	14.737	25.562	2.897
759	46.825	37.512	2.410	3.242	n.s.	n.s.	29.143	17.052	48.810	-	14.235	7.304	6.929	7.495	16.328	7.155
760	57.790	20.492	42.124	31.854	27.625	32.492	4.170	1.222	22.890	6.633	6.665	4.967	16.436	21.688	2.310	3.267
761	37.553	18.438	18.333	4.104	20.654	18.550	16.773	10.221	10.145	1.916	90.079	121.086	7.827	1.084	6.674	3.753
762	11.938	8.432	22.712	29.399	n.s.	n.s.	22.299	3.500	10.315	7.898	24.257	19.012	33.367	21.681	29.681	21.801
763	13.424	3.205	29.163	24.236	n.s.	n.s.	14.405	3.867	n.s.	n.s.	n.s.	n.s.	10.090	8.233	5.941	6.081
764	1.161	1.642	3.134	0.699	22.213	23.443	11.735	15.308	20.543	-	n.s.	n.s.	9.600	13.062	1.365	1.930
765	7.252	2.647	15.093	19.846	5.328	4.173	6.893	6.777	6.485	0.898	1.854	1.815	1.684	1.843	2.480	2.588
766	6.355	4.794	3.463	2.077	n.s.	n.s.	8.243	4.294	1.946	0.629	1.982	1.431	3.113	3.248	1.253	0.916
767	4.646	-	2.495	3.528	n.s.	n.s.	9.859	4.599	n.s.	n.s.	n.s.	n.s.	2.410	1.160	0.715	0.021

TABLE 4.- Stratified mean catches (Kg) by stratum and year and SD by year for roughhead grenadier (1997-2012). n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Mendoña*. 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
353	0	0	0	1	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	0	0	0
355	0	0	0	6	0	0	0	0	0	0	0	0	91	0	0	0
356	0	20	1	4	0	0	5	58	12	16	0	0	0	5	0	0
357	17	0	35	78	28	172	227	4	2589	6982	313	139	2606	635	1187	1376
358	0	0	52	0	0	113	0	2	0	0	64	72	0	0	69	330
359	0	0	0	0	0	17	0	202	43	0	0	0	28	0	0	0
360	0	0	0	0	1085	0	0	0	0	0	0	0	0	0	0	0
374	0	0	0	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	0	0	0
376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
377	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0
378	62	0	41	21	0	1	0	0	86	36	0	0	0	165	61	334
379	0	1	3	54	46	28	13	420	2859	11880	687	306	757	1814	204	871
380	21	0	0	15	3	1	8	26750	18696	12508	2159	1658	723	2453	5169	797
381	0	0	0	11	0	0	0	597	2513	14614	0	0	0	26	17234	356
382	0	0	0	1	0	1	0	27	81	69	56	0	0	0	2564	93
721	0	49	159	53	14	81	0	226	76	195	54	57	273	68	54	131
722	2	332	325	400	207	918	362	380	455	76	331	234	62	296	155	725
723	0	40	367	443	264	109	1297	1558	3337	3226	685	600	2789	639	562	1620
724	70	132	456	512	931	1240	618	1333	1178	584	1086	1018	1231	642	413	663
725	0	8	390	1328	149	278	40	9704	10964	5045	1337	514	620	1150	937	1421
726	n.s.	159	525	1060	310	191	0	4310	2513	1513	2939	2929	2479	2995	1575	2218
727	34	19	63	240	20	55	2102	1603	1790	1406	968	671	762	1195	653	782
728	65	72	1404	565	78	48	2547	1221	2761	1970	1354	644	572	1537	488	810
752	1158	1071	1183	3493	791	255	10205	12394	2828	3301	2542	7900	4008	10552	598	1461
753	2143	4918	3925	6783	4356	745	7873	8809	8738	2051	4293	15994	16201	n.s.	4885	10613
754	12635	10930	4747	12024	13610	17721	11808	6004	2512	910	9613	7920	26190	12431	2055	7666
755	n.s.	16204	9035	10854	9351	562	7007	5643	13178	8569	11042	10566	4347	4019	5601	20129
756	328	696	2994	1803	1292	1187	723	987	2391	2714	8592	3397	3970	927	4072	5757
757	2129	4010	907	9048	2084	1658	875	1315	1811	755	4760	2622	1905	1204	4360	15955
758	4635	7626	4574	5478	6841	14013	4064	3263	3370	11085	1870	4310	4349	860	1224	2531
759	n.s.	8432	2856	4169	7507	8795	9916	5077	5947	306	n.s.	3701	6199	1808	880	2074
760	603	1365	617	2735	1108	1840	6260	11777	8900	6487	4254	642	3525	1026	2531	356
761	3283	4307	2837	1972	2653	915	2180	4379	6421	3135	3532	2868	1735	15404	1338	1141
762	5147	6374	3679	4026	602	69	3106	3334	2531	4815	n.s.	4727	2187	5142	7074	6292
763	n.s.	2824	2988	3791	4005	320	709	7308	3504	7611	n.s.	3760	n.s.	n.s.	2634	1551
764	639	483	404	443	555	2005	1942	4079	116	313	2221	1173	2054	n.s.	960	137
765	1457	835	768	962	544	335	1290	663	899	1872	661	855	804	230	209	308
766	1115	993	794	458	382	1314	819	1039	915	499	n.s.	1187	280	285	448	180
767	n.s.	1032	765	401	488	1446	495	579	734	394	n.s.	1558	n.s.	n.s.	381	113
TOTAL	35543	72931	46898	73232	59305	56459	76491	125045	114749	114938	65409	82022	90748	67508	70574	88788
\bar{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	6.97	6.82	8.59
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	2.10	1.61	1.18

TABLE 5.- Survey estimates (by the swept area method) of roughhead grenadier biomass (t) and SD by stratum and year in NAFO Div. 3NO. n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Mendumá*. 2002-2012 data are original from R/V *Vizconde de Eza*. For 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	2010	2011	2012
353	0	0	0	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	0	0	0
355	0	0	0	1	0	0	0	0	0	0	0	0	8	0	0	0
356	0	2	0	0	0	0	0	5	1	1	0	0	0	0	0	0
357	1	0	3	6	2	14	20	0	223	573	26	12	448	56	105	120
358	0	0	5	0	0	10	0	0	0	0	5	6	0	0	6	30
359	0	0	0	0	0	2	0	18	4	0	0	0	3	0	0	0
360	0	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0
374	0	0	0	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	0	0	0
376	0	0	0	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	0	0	0
378	6	0	4	2	0	0	0	0	8	3	0	0	0	15	5	29
379	0	0	0	5	4	2	1	34	242	1006	57	27	66	159	18	77
380	2	0	0	1	0	0	1	2418	1635	1094	180	147	63	208	452	70
381	0	0	0	1	0	0	0	53	216	1278	0	0	0	2	1482	32
382	0	0	0	0	0	0	0	2	7	6	5	0	0	0	228	8
721	0	5	13	4	1	7	0	20	7	17	5	5	24	6	5	11
722	0	31	28	37	18	78	33	35	39	6	29	23	6	26	14	66
723	0	3	32	36	22	9	113	136	287	273	57	53	248	57	52	144
724	6	13	41	44	79	110	55	125	105	50	93	92	106	56	36	59
725	0	1	34	126	13	25	3	863	928	434	119	45	54	99	78	126
726	0	15	47	96	25	18	0	383	223	135	257	260	217	258	140	200
727	4	2	5	23	2	5	193	138	157	125	81	61	68	100	58	67
728	6	7	121	54	7	4	226	136	254	175	120	58	50	128	43	71
752	106	94	102	339	75	22	892	1160	239	293	226	726	350	879	51	128
753	200	452	343	624	407	65	688	810	777	182	382	1446	1394	n.s.	434	959
754	1149	1041	460	1233	1395	1549	1086	562	223	81	854	728	2328	1105	183	693
755	n.s.	1571	871	1007	899	50	633	531	1171	762	981	980	374	335	494	1804
756	30	62	266	178	113	104	65	91	206	237	764	312	353	82	395	520
757	210	389	78	847	179	147	79	121	161	67	416	237	167	109	369	1493
758	434	701	428	522	629	1246	367	305	300	985	166	396	387	76	109	229
759	n.s.	789	263	397	679	782	881	475	520	27	n.s.	335	551	161	81	187
760	57	128	55	260	97	161	576	1065	778	577	366	57	308	91	237	32
761	313	418	270	178	236	81	194	396	580	270	314	268	154	1347	113	103
762	502	618	350	398	54	6	276	287	225	414	n.s.	442	194	450	629	559
763	n.s.	260	288	364	364	28	68	672	315	677	n.s.	362	n.s.	n.s.	227	141
764	62	44	36	41	46	170	176	357	10	27	197	106	177	n.s.	85	12
765	141	80	69	95	49	28	115	59	79	158	59	80	71	20	19	27
766	109	104	73	43	38	113	73	92	80	44	n.s.	109	25	25	40	16
767	n.s.	93	72	38	45	129	43	53	65	34	n.s.	146	n.s.	n.s.	33	11
TOTAL	3340	6922	4357	7000	5568	4968	6860	11402	10064	10010	5760	7521	8193	5850	6219	8027
S.D.	290	644	431	807	700	1365	1316	2043	1236	1716	695	1028	286	1773	1508	1073

TABLE 6.- Length weight relationships used for the estimation of roughhead grenadier biomass. The equation is $Weight = a(l + 0.25)^b$
 Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. The parameters for indeterminate individuals were estimated
 from total number of individuals (males + females + indeterminate individuals). E means Error.

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Males	a	0.0687 E = 0.3814	0.1094 E = 0.0983	0.0650 E = 0.1812	0.0554 E = 0.1403	0.1095 E = 0.0689	0.0882 E = 0.0485	0.1141 E = 0.0628	0.0904 E = 0.0792	0.0600 E = 0.1014	0.1058 E = 0.1087	0.1287 E = 0.0819	0.1096 E = 0.1182	0.0811 E = 0.1408	0.0825 E = 0.2275	0.1732 E = 0.1574	0.2983 E = 0.1689
	b	3.0453 E = 0.1340	2.8929 E = 0.0937	3.1085 E = 0.0728	3.1411 E = 0.0547	2.8906 E = 0.0279	2.9672 E = 0.0200	2.8805 E = 0.0262	2.9517 E = 0.0311	3.1090 E = 0.0389	2.9150 E = 0.0442	2.8342 E = 0.0317	2.8880 E = 0.0473	2.9975 E = 0.0554	3.0003 E = 0.0892	2.7508 E = 0.0620	2.5586 E = 0.0654
		$R^2 = 0.979$ N = 26	$R^2 = 0.995$ N = 201	$R^2 = 0.984$ N = 102	$R^2 = 0.989$ N = 269	$R^2 = 0.997$ N = 116	$R^2 = 0.998$ N = 292	$R^2 = 0.997$ N = 496	$R^2 = 0.995$ N = 525	$R^2 = 0.994$ N = 411	$R^2 = 0.995$ N = 463	$R^2 = 0.995$ N = 473	$R^2 = 0.994$ N = 468	$R^2 = 0.988$ N = 217	$R^2 = 0.968$ N = 210	$R^2 = 0.982$ N = 415	$R^2 = 0.988$ N = 551
Females	a	0.0937 E = 0.1618	0.0673 E = 0.0938	0.1185 E = 0.1245	0.0790 E = 0.0608	0.2843 E = 0.3519	0.0856 E = 0.0950	0.1132 E = 0.0441	0.0804 E = 0.0351	0.0802 E = 0.0499	0.3193 E = 0.3878	0.1128 E = 0.0627	0.1472 E = 0.1062	0.1202 E = 0.0194	0.1225 E = 0.0986	0.1350 E = 0.0955	0.1725 E = 0.0689
	b	2.9395 E = 0.0531	3.0551 E = 0.0315	2.8739 E = 0.0422	3.0192 E = 0.0209	2.5397 E = 0.1311	2.9736 E = 0.0336	2.8864 E = 0.0156	2.9919 E = 0.0123	2.9950 E = 0.0175	2.5373 E = 0.1408	2.8872 E = 0.0218	2.7984 E = 0.072	2.8658 E = 0.0551	2.8545 E = 0.0341	2.8396 E = 0.0334	2.7562 E = 0.0242
		$R^2 = 0.993$ N = 41	$R^2 = 0.993$ N = 450	$R^2 = 0.987$ N = 233	$R^2 = 0.997$ N = 548	$R^2 = 0.901$ N = 168	$R^2 = 0.992$ N = 477	$R^2 = 0.998$ N = 788	$R^2 = 0.999$ N = 806	$R^2 = 0.999$ N = 626	$R^2 = 0.918$ N = 737	$R^2 = 0.997$ N = 907	$R^2 = 0.994$ N = 792	$R^2 = 0.997$ N = 465	$R^2 = 0.992$ N = 449	$R^2 = 0.992$ N = 769	$R^2 = 0.998$ N = 1032
Indet.	a	0.0909 E = 0.1433	0.0907 E = 0.0484	0.1185 E = 0.1043	0.0736 E = 0.0625	0.1862 E = 0.1546	0.1040 E = 0.0542	0.1104 E = 0.0425	0.0924 E = 0.0578	0.0833 E = 0.0451	0.2939 E = 0.3531	0.1168 E = 0.0399	0.1116 E = 0.0578	0.1179 E = 0.0743	0.1506 E = 0.1350	0.1368 E = 0.0727	0.3390 E = 0.0919
	b	2.9494 E = 0.0475	2.9631 E = 0.0164	2.8773 E = 0.0357	3.0409 E = 0.0218	2.6892 E = 0.0603	2.9096 E = 0.0196	2.8949 E = 0.0151	2.9466 E = 0.0207	2.9832 E = 0.0161	2.5661 E = 0.1301	2.8774 E = 0.0143	2.8880 E = 0.0204	2.8704 E = 0.0271	2.7834 E = 0.0492	2.8363 E = 0.0263	2.5323 E = 0.0339
		$R^2 = 0.994$ N = 67	$R^2 = 0.998$ N = 655	$R^2 = 0.990$ N = 338	$R^2 = 0.997$ N = 820	$R^2 = 0.977$ N = 292	$R^2 = 0.997$ N = 787	$R^2 = 0.998$ N = 1288	$R^2 = 0.997$ N = 1379	$R^2 = 0.998$ N = 1078	$R^2 = 0.928$ N = 1218	$R^2 = 0.998$ N = 1401	$R^2 = 0.998$ N = 1263	$R^2 = 0.995$ N = 710	$R^2 = 0.982$ N = 665	$R^2 = 0.995$ N = 1210	$R^2 = 0.994$ N = 1614

TABLE 7.- Roughhead grenadier length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Mendoña* data. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	1997				1998				1999				2000				2001							
	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	0.036	0.036	0.031	0.009	0.012	0.052			
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	0.023	0.023	0.007	0.021	0.050	0.079	0.112	0.036	0.047	0.195	
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	0.088	0.039	0.017	0.144
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	0.198	0.208	0.009	0.414
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	0.058	0.102	0.005	0.165
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	0.095	0.080	0.000	0.175
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	0.087	0.149	0.000	0.235
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	0.084	0.063	0.000	0.147
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	0.110	0.098	0.000	0.208
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	0.109	0.185	0.000	0.294
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	0.201	0.243	0.000	0.444
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	0.378	0.284	0.000	0.662
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	0.603	0.552	0.000	1.155
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	0.627	0.904	0.000	1.531
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	0.612	0.928	0.000	1.540
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	0.343	0.729	0.000	1.072
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	0.244	0.502	0.000	0.746
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	0.202	0.505	0.000	0.707
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	0.115	0.387	0.000	0.502
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	0.028	0.349	0.000	0.377
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	0.017	0.299	0.000	0.316
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	0.008	0.152	0.000	0.160
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	0.004	0.102	0.000	0.106
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	0.000	0.070	0.000	0.070
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	0.000	0.114	0.000	0.114
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	0.000	0.149	0.000	0.149
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	0.000	0.086	0.000	0.086
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	0.000	0.063	0.000	0.063
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	0.000	0.059	0.000	0.059
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	0.000	0.062	0.000	0.062
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	0.000	0.023	0.000	0.023
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	0.000	0.034	0.000	0.034
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	0.000	0.000	0.000	0.000
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	0.000	0.041	0.000	0.041
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	0.000	0.018	0.000	0.018
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	0.001	0.000	0.001	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000
38.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.001	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	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	0.000	0.002	0.000	0.002	0.000	0.001	0.000	0.000

TABLE 7 (cont.).- Roughhead grenadier length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Menduña* data. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	2003				2004				2005				2006				2007			
	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	0.016	0.000	0.019	0.035	0.000	0.000	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027
3.5	0.219	0.069	0.074	0.362	0.070	0.024	0.651	0.746	0.030	0.026	0.289	0.344	0.120	0.012	0.141	0.273	0.090	0.041	0.623	0.754
4.5	0.045	0.052	0.015	0.113	0.089	0.006	0.080	0.176	0.046	0.030	0.106	0.182	0.155	0.063	0.007	0.225	0.010	0.027	0.089	0.126
5.5	0.353	0.390	0.000	0.743	0.161	0.124	0.005	0.290	0.015	0.038	0.000	0.053	0.069	0.063	0.000	0.132	0.054	0.077	0.000	0.131
6.5	0.653	0.652	0.000	1.305	0.649	0.567	0.000	1.216	0.499	0.510	0.000	1.009	0.374	0.448	0.004	0.826	0.266	0.278	0.005	0.550
7.5	0.215	0.256	0.000	0.470	0.223	0.196	0.000	0.419	0.324	0.308	0.000	0.633	0.386	0.312	0.000	0.698	0.089	0.083	0.000	0.173
8.5	0.401	0.491	0.000	0.892	0.617	0.550	0.000	1.167	0.339	0.383	0.009	0.732	0.216	0.140	0.000	0.356	0.129	0.355	0.000	0.485
9.5	0.254	0.233	0.000	0.487	0.592	0.860	0.000	1.452	0.393	0.671	0.000	1.064	0.378	0.317	0.000	0.695	0.315	0.204	0.000	0.520
10.5	0.351	0.320	0.000	0.671	0.442	0.694	0.000	1.136	0.452	0.603	0.000	1.055	0.194	0.331	0.000	0.524	0.301	0.249	0.000	0.550
11.5	0.220	0.407	0.000	0.627	0.715	0.673	0.000	1.387	0.939	1.113	0.000	2.052	0.381	0.428	0.000	0.810	0.364	0.414	0.000	0.778
12.5	0.312	0.354	0.000	0.665	0.684	0.650	0.000	1.335	0.740	0.907	0.000	1.647	0.493	0.653	0.000	1.146	0.264	0.414	0.000	0.678
13.5	0.482	0.542	0.000	1.024	0.678	0.716	0.000	1.393	0.631	0.792	0.000	1.423	0.846	0.672	0.000	1.519	0.370	0.397	0.000	0.768
14.5	0.751	0.859	0.000	1.610	0.932	0.683	0.000	1.615	0.560	0.795	0.000	1.355	0.637	0.790	0.000	1.427	0.475	0.511	0.000	0.987
15.5	1.246	1.169	0.000	2.414	1.046	0.901	0.000	1.947	0.621	0.821	0.000	1.442	0.748	0.912	0.000	1.660	0.459	0.457	0.000	0.916
16.5	1.525	1.389	0.000	2.914	1.197	1.295	0.000	2.492	0.781	0.646	0.000	1.427	0.704	0.522	0.000	1.225	0.470	0.471	0.000	0.941
17.5	0.793	1.335	0.000	2.128	1.429	1.270	0.000	2.699	1.170	1.050	0.000	2.220	0.876	0.619	0.000	1.495	0.317	0.323	0.000	0.639
18.5	0.384	0.806	0.000	1.190	1.051	1.573	0.000	2.623	1.129	0.991	0.000	2.120	0.884	0.834	0.000	1.718	0.403	0.318	0.000	0.721
19.5	0.234	0.656	0.000	0.890	0.476	1.333	0.000	1.808	0.668	1.323	0.000	1.991	0.695	1.050	0.000	1.745	0.568	0.373	0.000	0.941
20.5	0.171	0.356	0.000	0.527	0.334	0.875	0.000	1.209	0.258	1.113	0.000	1.371	0.387	1.165	0.000	1.552	0.274	0.407	0.000	0.681
21.5	0.005	0.257	0.000	0.262	0.157	0.681	0.000	0.839	0.066	0.708	0.000	0.774	0.154	1.101	0.000	1.255	0.105	0.492	0.000	0.597
22.5	0.019	0.289	0.000	0.308	0.027	0.597	0.000	0.624	0.061	0.546	0.000	0.607	0.038	0.923	0.000	0.961	0.067	0.422	0.000	0.489
23.5	0.008	0.187	0.000	0.195	0.028	0.437	0.000	0.466	0.009	0.551	0.000	0.559	0.013	0.748	0.000	0.761	0.020	0.437	0.000	0.456
24.5	0.000	0.108	0.000	0.108	0.018	0.391	0.000	0.409	0.016	0.481	0.000	0.497	0.008	0.483	0.000	0.491	0.000	0.442	0.000	0.442
25.5	0.000	0.111	0.000	0.111	0.000	0.266	0.000	0.266	0.009	0.259	0.000	0.268	0.000	0.387	0.000	0.387	0.014	0.299	0.000	0.314
26.5	0.000	0.109	0.000	0.109	0.005	0.265	0.000	0.270	0.006	0.173	0.000	0.179	0.000	0.266	0.000	0.266	0.000	0.261	0.000	0.261
27.5	0.000	0.100	0.000	0.100	0.000	0.178	0.000	0.178	0.000	0.235	0.000	0.235	0.013	0.091	0.000	0.105	0.000	0.219	0.000	0.219
28.5	0.000	0.104	0.000	0.104	0.000	0.154	0.000	0.154	0.000	0.106	0.000	0.106	0.005	0.120	0.000	0.125	0.005	0.095	0.000	0.101
29.5	0.000	0.083	0.000	0.083	0.005	0.185	0.000	0.190	0.000	0.119	0.000	0.119	0.000	0.112	0.000	0.112	0.000	0.115	0.000	0.115
30.5	0.000	0.073	0.000	0.073	0.000	0.146	0.000	0.146	0.000	0.120	0.000	0.120	0.000	0.105	0.000	0.105	0.000	0.089	0.000	0.089
31.5	0.000	0.018	0.000	0.018	0.000	0.086	0.000	0.086	0.000	0.083	0.000	0.083	0.000	0.107	0.000	0.107	0.000	0.031	0.000	0.031
32.5	0.000	0.040	0.000	0.040	0.000	0.059	0.000	0.059	0.000	0.029	0.000	0.029	0.000	0.080	0.000	0.080	0.000	0.016	0.000	0.016
33.5	0.000	0.016	0.000	0.016	0.000	0.062	0.000	0.062	0.000	0.025	0.000	0.025	0.000	0.060	0.000	0.060	0.000	0.033	0.000	0.033
34.5	0.000	0.005	0.000	0.005	0.000	0.040	0.000	0.040	0.000	0.046	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
35.5	0.000	0.030	0.000	0.030	0.000	0.018	0.000	0.018	0.000	0.016	0.000	0.016	0.000	0.015	0.000	0.015	0.000	0.000	0.000	0.000
36.5	0.000	0.010	0.000	0.010	0.000	0.013	0.000	0.013	0.000	0.016	0.000	0.016	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000
37.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000	0.000	0.000
39.5	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	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	8.655	11.875	0.108	20.638	11.623	16.579	0.763	28.964	9.762	15.641	0.403	25.807	8.775	13.935	0.152	22.862	5.432	8.365	0.744	14.541
Nº samples (*):	43				59				61				57				46			
Nº Ind. (*):	1089	1500	21	2610	1535	2270	157	3962	1250	2028	57	3335	1140	1930	20	3090	671	1149	83	1903
Sampled catch:	931				1742				1499				1629				1009			
Range (*):	2.5-36				2.5-39				3-39				3-36				2.5-34.5			
Total catch:	990				2055				1781				1779				1009			
Total hauls (*):	118				120				119				120				110			

TABLE 7 (cont.).- Roughhead grenadier length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Mendumá* data. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	2008				2009				2010				2011				2012			
	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	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.009
2.5	0.005	0.005	0.005	0.015	0.000	0.000	0.015	0.015	0.000	0.000	0.151	0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.083
3.5	0.072	0.025	0.051	0.148	0.006	0.000	0.233	0.239	0.041	0.007	0.209	0.257	0.005	0.005	0.148	0.158	0.000	0.000	0.178	0.178
4.5	0.022	0.010	0.000	0.032	0.023	0.005	0.022	0.050	0.011	0.011	0.000	0.022	0.006	0.000	0.014	0.020	0.025	0.025	0.026	0.077
5.5	0.054	0.074	0.000	0.127	0.029	0.041	0.043	0.114	0.074	0.045	0.007	0.125	0.027	0.013	0.000	0.040	0.183	0.162	0.007	0.352
6.5	0.318	0.249	0.012	0.580	0.134	0.173	0.053	0.361	0.461	0.334	0.000	0.795	0.070	0.069	0.000	0.139	0.452	0.668	0.000	1.120
7.5	0.038	0.099	0.000	0.137	0.076	0.138	0.000	0.213	0.102	0.075	0.000	0.177	0.043	0.052	0.000	0.095	0.186	0.162	0.000	0.348
8.5	0.191	0.161	0.000	0.352	0.220	0.261	0.000	0.481	0.132	0.059	0.000	0.191	0.152	0.149	0.000	0.301	0.227	0.298	0.000	0.526
9.5	0.214	0.235	0.000	0.449	0.167	0.211	0.000	0.378	0.087	0.131	0.000	0.218	0.141	0.141	0.000	0.282	0.221	0.406	0.000	0.627
10.5	0.192	0.343	0.000	0.535	0.235	0.324	0.000	0.559	0.164	0.300	0.000	0.464	0.048	0.087	0.000	0.134	0.450	0.462	0.000	0.912
11.5	0.227	0.331	0.000	0.559	0.275	0.421	0.000	0.696	0.173	0.229	0.000	0.403	0.067	0.103	0.013	0.183	0.304	0.433	0.000	0.737
12.5	0.278	0.398	0.005	0.681	0.225	0.514	0.000	0.739	0.166	0.200	0.000	0.366	0.122	0.126	0.000	0.248	0.216	0.338	0.000	0.555
13.5	0.388	0.286	0.000	0.674	0.358	0.583	0.000	0.941	0.301	0.301	0.000	0.602	0.274	0.276	0.000	0.550	0.334	0.408	0.000	0.742
14.5	0.484	0.462	0.000	0.946	0.592	0.834	0.000	1.426	0.282	0.413	0.000	0.696	0.260	0.380	0.000	0.640	0.418	0.446	0.000	0.864
15.5	0.663	0.501	0.000	1.164	0.633	0.692	0.000	1.325	0.444	0.424	0.000	0.868	0.472	0.337	0.000	0.808	0.471	0.584	0.000	1.055
16.5	0.662	0.547	0.000	1.209	0.812	0.879	0.000	1.691	0.593	0.461	0.000	1.055	0.574	0.507	0.000	1.081	0.489	0.568	0.000	1.057
17.5	0.358	0.521	0.000	0.878	0.476	0.849	0.000	1.324	0.491	0.520	0.000	1.011	0.598	0.419	0.000	1.017	0.476	0.553	0.000	1.029
18.5	0.331	0.332	0.000	0.664	0.267	0.487	0.000	0.754	0.259	0.529	0.000	0.789	0.547	0.522	0.000	1.069	0.309	0.445	0.000	0.754
19.5	0.354	0.368	0.000	0.722	0.270	0.330	0.000	0.600	0.254	0.246	0.000	0.500	0.254	0.520	0.000	0.774	0.171	0.594	0.000	0.765
20.5	0.176	0.266	0.000	0.442	0.101	0.408	0.000	0.509	0.052	0.321	0.000	0.374	0.148	0.540	0.000	0.689	0.085	0.421	0.000	0.506
21.5	0.135	0.339	0.000	0.474	0.095	0.426	0.000	0.522	0.068	0.256	0.000	0.324	0.067	0.283	0.000	0.350	0.018	0.531	0.000	0.549
22.5	0.037	0.510	0.000	0.547	0.048	0.535	0.000	0.583	0.020	0.270	0.000	0.290	0.032	0.208	0.000	0.239	0.037	0.401	0.000	0.438
23.5	0.053	0.581	0.000	0.634	0.027	0.390	0.000	0.418	0.016	0.321	0.000	0.337	0.000	0.282	0.000	0.282	0.029	0.297	0.000	0.326
24.5	0.000	0.525	0.000	0.525	0.000	0.665	0.000	0.665	0.035	0.354	0.000	0.388	0.014	0.271	0.000	0.286	0.007	0.360	0.000	0.368
25.5	0.000	0.522	0.000	0.522	0.000	0.551	0.000	0.551	0.000	0.476	0.000	0.476	0.000	0.350	0.000	0.350	0.007	0.353	0.000	0.360
26.5	0.008	0.288	0.000	0.296	0.000	0.519	0.000	0.519	0.000	0.436	0.000	0.436	0.000	0.307	0.000	0.307	0.000	0.412	0.000	0.412
27.5	0.000	0.329	0.000	0.329	0.003	0.474	0.000	0.477	0.011	0.335	0.000	0.346	0.000	0.269	0.000	0.269	0.000	0.387	0.000	0.387
28.5	0.000	0.172	0.000	0.172	0.000	0.154	0.000	0.154	0.000	0.201	0.000	0.201	0.000	0.207	0.000	0.207	0.000	0.380	0.000	0.380
29.5	0.000	0.138	0.000	0.138	0.000	0.177	0.000	0.177	0.000	0.201	0.000	0.201	0.000	0.163	0.000	0.163	0.000	0.210	0.000	0.210
30.5	0.000	0.059	0.000	0.059	0.000	0.087	0.000	0.087	0.000	0.095	0.000	0.095	0.000	0.102	0.000	0.102	0.000	0.111	0.000	0.111
31.5	0.000	0.036	0.000	0.036	0.000	0.052	0.000	0.052	0.000	0.061	0.000	0.061	0.000	0.042	0.000	0.042	0.000	0.102	0.000	0.102
32.5	0.000	0.037	0.000	0.037	0.000	0.024	0.000	0.024	0.000	0.043	0.000	0.043	0.000	0.029	0.000	0.029	0.000	0.069	0.000	0.069
33.5	0.000	0.041	0.000	0.041	0.000	0.029	0.000	0.029	0.000	0.028	0.000	0.028	0.000	0.014	0.000	0.014	0.000	0.037	0.000	0.037
34.5	0.000	0.013	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.007	0.000	0.007	0.000	0.043	0.000	0.043
35.5	0.000	0.035	0.000	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36.5	0.000	0.019	0.000	0.019	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37.5	0.000	0.016	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011	0.000	0.008	0.000	0.008	0.000	0.006	0.000	0.006
38.5	0.000	0.010	0.000	0.010	0.000	0.023	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	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	0.000	0.000	0.000	0.000
42.5	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	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	5.260	8.890	0.073	14.223	5.072	11.265	0.372	16.709	4.238	7.705	0.367	12.310	3.923	6.787	0.174	10.884	5.115	10.678	0.304	16.097
Nº samples (*):																				
Nº Ind. (*):	786	1373	14	2173	430	940	45	1415	580	1030	48	1658	470	859	27	1356	779	1572	49	2400
Sampled catch:																				
Range (*):				2.5-42.5				1.5-38.5				2-37.5				3-37				1.5-37.5
Total catch:				1213				945				940				1049				1341
Total hauls (*):				122				110				95				122				122

TABLE 8.- Thorny skate mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Menduña*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997		1998		1999		2000		2001		2002		2003		2004	
	T. skate Mean catch	T. skate SD														
353	6.21	1.73	26.06	11.09	319.35	89.29	149.95	44.45	351.90	283.060	356.30	215.772	78.36	33.796	53.70	33.407
354	1.20	1.12	68.23	87.97	20.21	28.57	82.44	34.12	67.63	19.515	89.80	80.809	40.33	40.683	147.46	134.348
355	27.19	22.38	3.43	0.23	12.40	17.54	33.14	41.19	20.60	11.031	2.67	3.723	19.53	22.422	25.07	4.384
356	2.72	0.61	0.69	0.42	1.55	0.28	2.21	0.51	0.29	0.410	1.55	2.192	5.19	7.333	16.31	7.732
357	1.32	1.56	1.69	1.37	2.98	1.74	0.00	-	2.35	1.669	2.00	2.828	2.25	3.182	46.05	28.438
358	1.56	1.52	0.99	1.17	2.81	2.22	15.49	17.71	4.05	6.974	11.47	19.861	21.14	25.809	42.24	13.838
359	7.47	2.92	7.93	5.95	13.25	14.73	71.73	91.22	15.45	24.999	72.34	148.583	25.86	23.965	46.56	62.119
360	10.11	11.61	17.95	23.86	67.68	55.88	132.15	142.67	67.67	79.827	20.63	24.987	35.53	29.397	93.53	78.305
374	2.29	1.19	0.41	0.61	5.91	0.14	0.71	1.00	0.73	1.032	0.30	0.520	0.00	0.000	1.89	2.673
375	0.84	-	1.97	1.81	6.57	0.77	3.48	0.40	0.51	0.878	1.40	2.425	2.29	2.414	10.32	5.359
376	15.16	16.62	24.06	35.48	75.94	45.71	68.84	52.60	22.67	19.650	12.59	12.093	10.77	12.802	89.67	62.815
377	1.28	-	0.32	0.31	1.04	0.18	0.57	0.81	5.70	2.270	1.17	1.655	0.46	0.438	7.23	9.648
378	2.07	0.59	2.07	2.40	8.32	5.01	5.54	3.31	0.16	0.099	0.02	0.021	2.98	4.076	26.20	17.402
379	0.54	0.24	1.69	1.09	0.76	0.53	1.10	0.51	0.00	0.000	5.45	1.909	0.01	0.014	13.61	-
380	1.27	0.37	4.50	2.78	3.96	1.95	1.26	1.17	1.35	0.209	4.42	4.476	4.09	0.559	119.25	56.639
381	6.17	7.81	7.65	0.24	1.03	0.28	3.94	0.36	0.74	0.419	0.71	0.071	3.40	3.394	70.60	17.536
382	0.64	0.95	1.02	0.85	4.44	3.05	5.36	0.80	1.77	1.265	0.65	0.257	0.00	0.000	6.28	6.990
721	2.28	0.18	8.17	9.33	1.16	1.64	6.54	6.27	0.00	0.000	0.00	0.000	10.63	7.481	2.70	3.818
722	7.54	10.66	38.34	45.25	10.79	15.26	13.79	6.07	10.10	5.374	0.00	0.000	0.91	0.021	0.00	0.000
723	6.32	7.25	2.62	0.40	3.77	3.99	4.05	4.37	2.40	2.121	0.60	0.849	5.19	4.865	4.85	1.913
724	2.06	2.45	12.29	3.71	9.83	6.80	2.33	3.29	67.38	91.221	25.85	14.354	26.32	0.226	0.00	0.000
725	0.27	0.31	3.89	-	3.63	5.13	4.11	5.03	1.91	1.235	1.82	2.574	1.31	0.506	44.22	57.679
726	n.s.	n.s.	0.26	0.37	0.89	1.25	9.68	10.56	1.32	1.381	3.30	1.980	0.00	0.000	0.00	0.000
727	3.37	-	6.02	2.84	2.83	0.63	0.58	0.60	0.64	0.905	3.05	4.313	96.69	91.097	10.16	10.380
728	1.45	1.11	4.68	2.68	4.91	3.22	1.85	1.22	1.65	1.531	6.69	9.454	17.23	8.301	2.69	3.804
752	4.25	2.51	58.62	78.69	2.24	1.11	1.20	1.30	8.93	5.430	0.49	0.686	183.35	38.537	0.00	0.000
753	13.56	17.61	4.01	5.19	17.13	19.39	3.01	4.26	13.11	15.123	12.90	18.243	7.99	1.775	0.00	0.000
754	45.32	25.00	112.25	14.65	16.66	23.56	54.96	23.46	98.76	126.307	595.65	819.042	3.35	4.731	0.00	0.000
755	n.s.	n.s.	7.84	5.34	0.00	0.00	2.74	5.48	0.14	0.283	0.00	0.000	0.00	0.000	1.26	2.188
756	13.91	-	63.66	36.74	16.21	19.54	3.69	3.64	7.04	3.761	9.36	7.835	133.16	187.864	0.00	0.000
757	32.68	39.04	67.38	86.94	10.74	10.98	55.50	20.36	15.10	19.889	1.55	2.192	6.99	9.885	0.00	0.000
758	52.54	7.90	235.97	239.70	117.49	142.60	55.87	79.01	184.47	248.733	32.45	41.224	4.29	6.060	0.00	0.000
759	n.s.	n.s.	114.12	147.96	0.43	0.26	41.86	56.21	4.93	3.950	3.70	5.233	3.89	-	0.00	0.000
760	0.00	-	6.73	3.05	9.20	11.14	12.97	11.59	6.47	5.282	1.89	2.673	30.68	30.717	0.00	0.000
761	59.26	86.28	17.62	10.16	0.71	0.32	10.20	13.55	66.60	89.661	11.90	4.667	0.00	0.000	2.69	0.912
762	50.77	82.75	5.24	4.35	8.28	10.49	5.54	7.83	0.00	0.000	0.00	0.000	2.99	1.570	1.15	1.619
763	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
764	14.84	5.60	12.47	10.81	0.00	0.00	0.00	0.00	2.45	3.465	0.00	0.000	42.05	45.064	4.35	6.152
765	14.88	18.39	12.08	15.52	0.00	0.00	1.35	1.91	1.03	1.462	0.71	1.004	2.23	-	0.00	0.000
766	15.23	9.42	0.51	0.20	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.67	0.940
767	n.s.	n.s.	2.83	3.87	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.000	1.13	0.215	2.41	3.401

TABLE 8 (cont.).- Thorny skate mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. Swept area in square miles. n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Menduña*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	2005		2006		2007		2008		2009		2010		2011		2012	
	T. skate Mean catch	T. skate SD														
353	40.97	40.382	48.27	33.965	23.20	8.044	55.00	18.097	39.40	49.720	32.65	38.254	21.75	17.878	16.21	9.679
354	48.19	40.450	62.30	19.336	52.94	32.333	127.21	63.410	53.70	35.954	20.00	2.546	22.70	7.225	50.23	56.368
355	17.80	2.628	1.51	2.128	20.47	0.990	6.00	8.485	10.80	0.566	26.03	28.949	28.30	33.976	11.00	3.818
356	10.81	2.242	19.15	18.314	4.02	2.461	10.25	14.489	30.59	27.174	21.48	24.360	22.69	12.070	44.78	63.328
357	51.88	55.763	28.29	40.007	7.02	6.365	10.56	9.397	46.26	47.489	2.10	2.970	8.07	11.406	4.07	0.997
358	72.15	80.699	5.75	6.983	76.01	65.231	17.81	5.687	17.42	15.082	21.60	30.547	15.61	1.803	6.68	5.896
359	45.11	63.415	45.28	34.608	28.01	25.576	27.28	41.820	36.17	56.574	24.75	40.888	21.97	14.373	22.32	14.066
360	59.30	63.584	74.59	59.722	46.42	42.247	40.69	26.252	27.22	33.734	34.64	45.576	18.21	15.053	57.72	46.636
374	2.70	1.082	9.84	3.118	0.00	0.000	1.81	2.553	0.00	0.000	1.92	2.708	5.67	8.019	0.00	0.000
375	12.31	10.043	34.35	17.964	35.80	59.229	9.01	4.406	5.27	5.352	1.44	2.488	1.17	2.026	18.17	20.618
376	154.50	136.423	183.56	254.026	40.71	34.911	70.05	51.740	41.19	39.191	40.33	32.789	11.78	10.838	93.55	39.647
377	29.36	30.186	61.48	33.411	1.08	1.520	32.35	2.475	2.44	3.444	7.11	4.825	7.82	6.032	15.78	3.493
378	6.10	7.264	5.86	8.280	7.48	3.055	31.62	0.820	11.87	16.787	27.23	32.145	19.33	4.285	19.84	15.665
379	32.60	16.971	181.31	256.409	33.71	20.209	11.69	3.083	15.35	21.708	4.19	4.943	20.33	23.144	6.60	2.546
380	66.74	45.199	110.30	2.687	77.10	66.320	92.75	74.741	10.38	10.215	57.37	58.611	111.27	103.655	30.57	31.265
381	52.28	28.354	72.41	8.775	5.05	7.142	16.49	20.687	0.00	0.000	0.14	0.165	20.31	14.743	7.62	5.728
382	5.06	4.563	3.41	3.064	0.00	0.000	0.48	0.950	0.00	0.000	6.79	6.520	6.38	5.390	0.10	0.200
721	6.15	8.697	0.00	0.000	0.00	-	0.00	0.000	116.69	145.250	27.81	19.219	7.23	3.804	17.40	24.607
722	6.90	9.758	0.00	0.000	3.43	4.844	14.00	19.799	1.90	2.687	2.50	3.536	5.63	7.955	5.60	7.920
723	0.00	0.000	5.41	4.226	13.23	10.529	5.31	7.502	19.28	9.228	5.46	0.438	3.05	4.313	12.27	10.387
724	4.20	5.940	0.00	0.000	7.22	10.204	4.28	6.053	3.40	4.808	10.22	14.453	2.95	4.172	0.00	0.000
725	30.95	43.775	73.01	100.261	19.87	18.314	1.95	2.755	3.23	4.561	4.61	6.495	2.44	3.451	0.00	0.000
726	0.00	-	3.66	1.237	2.11	2.984	0.65	0.919	38.98	21.107	7.20	1.358	1.98	2.800	0.00	0.000
727	7.57	7.969	0.00	0.000	10.56	4.327	8.49	12.007	111.50	-	28.85	16.007	9.29	13.138	5.62	3.366
728	0.00	-	1.32	1.860	12.85	14.107	1.63	2.298	53.78	27.400	5.56	3.196	0.00	0.000	12.05	6.539
752	0.00	0.000	0.73	1.025	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
753	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	-	n.s.	n.s.	0.00	0.000	0.00	0.000
754	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000
755	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	-	0.00	-	0.00	0.000	0.00	0.000
756	0.00	0.000	0.01	0.008	0.00	0.000	0.00	0.000	2.46	3.479	1.73	2.447	0.00	0.000	0.00	0.000
757	0.00	0.000	0.51	0.718	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
758	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
759	0.00	0.000	0.00	0.000	n.s.	n.s.	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	3.03	4.278
760	4.43	6.265	0.00	0.000	1.65	2.333	0.00	0.000	2.92	4.130	2.70	3.818	0.00	0.000	0.00	0.000
761	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	2.80	3.960	0.00	0.000	4.80	6.788
762	0.00	0.000	1.45	2.044	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
763	0.00	0.000	0.00	0.000	n.s.	n.s.	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.00	0.000	0.00	0.000
764	0.00	0.000	7.90	11.172	0.00	0.000	0.00	0.000	0.00	-	n.s.	n.s.	0.00	0.000	6.80	9.617
765	0.00	0.000	4.40	6.223	3.92	5.537	1.70	2.404	0.00	0.000	0.00	0.000	0.00	0.000	0.92	1.301
766	0.00	0.000	0.00	0.000	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
767	0.00	-	0.00	0.000	n.s.	n.s.	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.00	0.000	0.00	0.000

TABLE 9.- Stratified mean catches (Kg) by stratum and year and annual SD for thorny skate (1997-2012). n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Mendoña*. 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
353	1670	7011	85905	40338	94661	95845	21080	14444	11022	12984	6242	14795	10599	8783	5849	4361
354	295	16784	4971	20280	16638	22091	9922	36276	11854	15325	13024	31294	13211	4920	5583	12357
355	2012	254	918	2452	1524	197	1445	1855	1317	111	1515	444	799	1926	2094	814
356	128	32	73	104	14	73	244	766	508	900	189	482	1437	1009	1066	2105
357	217	276	488	0	385	328	369	7551	8509	4639	1152	1731	7587	344	1323	667
358	352	223	632	3485	911	2580	4756	9504	16233	1294	17102	4006	3918	4860	3512	1504
359	3143	3340	5578	30200	6505	30456	10885	19600	18990	19064	11792	11486	15225	10419	9251	9396
360	28143	49942	188345	367771	188312	57416	98886	260308	165040	207581	129182	113253	75746	96404	50687	160630
374	490	88	1264	152	156	64	0	404	577	2105	0	386	0	410	1213	0
375	227	534	1781	942	137	379	620	2796	3337	9308	9703	2443	1427	389	317	4923
376	20225	32095	101299	91834	30244	16788	14362	119622	206104	244868	54306	93445	54943	53800	15713	124791
377	128	32	104	57	570	117	46	723	2936	6148	108	3235	244	711	782	1578
378	287	287	1156	770	22	2	414	3641	847	814	1040	4395	1650	3785	2687	2758
379	57	179	80	117	0	578	1	1443	3456	19219	3573	1239	1627	444	2154	700
380	122	432	380	121	130	424	392	11448	6407	10589	7401	8904	996	5508	10681	2935
381	888	1102	149	568	106	102	490	10166	7528	10426	727	2374	0	20	2924	1097
382	221	351	1522	1839	608	224	0	2153	1735	1168	0	163	0	2329	2190	34
721	148	531	75	425	0	0	691	176	400	0	0	0	7585	1808	470	1131
722	633	3221	907	1159	848	0	76	0	580	0	288	1176	160	210	473	470
723	979	406	585	627	372	93	804	752	0	839	2050	822	2988	846	473	1901
724	255	1524	1219	288	8355	3205	3264	0	521	0	895	531	422	1267	366	0
725	28	408	381	432	200	191	138	4643	3250	7666	2086	205	339	484	256	0
726	n.s.	19	64	697	95	238	0	0	0	263	152	47	2806	518	143	0
727	324	578	272	56	61	293	9282	975	726	0	1014	815	10704	2769	892	540
728	113	365	383	144	129	521	1344	210	0	103	1002	127	4194	434	0	940
752	557	7680	293	157	1170	64	24019	0	0	95	0	0	0	0	0	0
753	1871	554	2364	416	1809	1780	1102	0	0	0	0	0	0	n.s.	0	0
754	8158	20205	2999	9892	17777	107217	602	0	0	0	0	0	0	0	0	0
755	n.s.	3018	0	1054	54	0	0	486	0	0	0	0	0	0	0	0
756	1404	6429	1637	373	711	945	13449	0	0	1	0	0	248	175	0	0
757	3334	6873	1096	5661	1540	158	713	0	0	52	0	0	0	0	0	0
758	5201	23361	11632	5531	18263	3213	424	0	0	0	0	0	0	0	0	0
759	n.s.	14493	54	5317	627	470	494	0	0	0	n.s.	0	0	0	0	384
760	0	1037	1417	1997	996	291	4725	0	682	0	254	0	450	416	0	0
761	10133	3013	121	1745	11389	2035	0	459	0	0	0	0	0	479	0	821
762	10763	1111	1756	1174	0	0	634	243	0	306	n.s.	0	0	0	0	0
763	n.s.	0	0	0	0	0	0	0	0	0	n.s.	0	n.s.	n.s.	0	0
764	1484	1247	0	0	245	0	4205	435	0	790	0	0	0	n.s.	0	680
765	1845	1498	0	168	128	88	277	0	0	546	485	211	0	0	0	114
766	2193	74	0	0	0	0	0	96	0	0	n.s.	0	0	0	0	0
767	n.s.	447	0	0	0	0	178	380	0	0	n.s.	0	n.s.	n.s.	0	0
TOTAL	108029	211054	421902	598341	405693	348466	230330	511557	472557	577201	265282	298009	219305	205468	121098	337630
\bar{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	21.22	11.71	32.65
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	4.11	1.32	3.38

TABLE 10.- Survey estimates (by the swept area method) of thorny skate biomass (t) and SD by stratum and year in NAFO Div. 3NO. n.s. means stratum not surveyed. 1997-2000 data are transformed from C/V *Playa de Menduña* data. 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

Stratum	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
353	139	603	7159	3397	8321	8050	1895	1284	938	1049	515	1301	922	781	503	388
354	25	1413	457	1708	1479	1860	882	3154	1009	1264	1074	2721	1174	437	486	1098
355	173	23	80	211	127	17	126	162	117	9	126	40	69	168	180	71
356	11	3	6	9	1	6	22	69	44	75	16	41	126	90	93	187
357	20	23	41	0	32	27	32	660	732	381	96	149	1305	31	118	58
358	31	19	54	306	79	224	423	864	1396	111	1396	348	344	432	305	137
359	273	287	460	2577	567	2663	963	1734	1634	1564	965	1007	1347	887	803	816
360	2399	4307	15392	30696	15548	5010	8775	22537	14197	16855	10867	9680	6666	8293	4271	13707
374	42	7	104	13	13	6	0	35	50	178	0	33	0	36	108	0
375	20	46	151	77	12	32	56	249	287	768	800	220	125	32	26	423
376	1789	2779	8312	7653	2618	1473	1277	10257	17559	20092	4583	8279	4852	4782	1334	10564
377	11	3	9	5	50	10	4	67	253	520	9	278	22	61	67	138
378	27	25	101	66	2	0	37	324	75	68	89	366	144	336	224	241
379	6	15	7	10	0	51	0	117	293	1627	298	108	142	39	195	62
380	12	38	32	10	13	38	34	1035	560	926	617	791	87	466	934	257
381	80	96	13	48	9	9	43	904	648	912	61	208	0	2	252	99
382	19	31	126	147	52	20	0	187	152	100	0	14	0	200	195	3
721	13	52	6	36	0	0	61	16	35	0	0	0	663	161	41	97
722	59	301	79	107	73	0	7	0	50	0	26	114	14	19	42	43
723	93	35	51	51	31	8	70	66	0	71	171	73	266	75	43	169
724	23	148	108	25	711	285	290	0	46	0	77	48	36	111	31	0
725	3	47	33	41	17	17	12	413	275	659	185	18	30	42	21	0
726	n.s.	2	6	63	8	22	0	0	0	23	13	4	245	45	13	0
727	35	50	23	5	5	25	853	84	63	0	84	74	951	231	79	46
728	11	35	33	14	11	46	119	23	0	9	89	11	367	36	0	82
752	51	671	25	15	111	6	2100	0	0	8	0	0	0	0	0	0
753	175	51	207	38	169	156	96	0	0	0	0	0	0	n.s.	0	0
754	742	1924	291	1015	1822	9374	55	0	0	0	0	0	0	0	0	0
755	n.s.	293	0	98	5	0	0	46	0	0	0	0	0	0	0	0
756	129	571	145	37	62	83	1216	0	0	0	0	0	0	22	16	0
757	329	666	94	530	132	14	64	0	0	5	0	0	0	0	0	0
758	487	2148	1088	527	1679	286	38	0	0	0	0	0	0	0	0	0
759	n.s.	1356	5	506	57	42	44	0	0	0	n.s.	0	0	0	0	35
760	0	97	126	190	87	25	434	0	60	0	22	0	39	37	0	0
761	965	292	12	158	1012	181	0	42	0	0	0	0	0	42	0	74
762	1050	108	167	116	0	0	56	21	0	26	n.s.	0	0	0	0	0
763	n.s.	0	0	0	0	0	0	0	0	0	n.s.	0	n.s.	0	0	0
764	144	115	0	0	20	0	380	38	0	68	0	0	0	n.s.	0	60
765	179	143	0	17	12	7	25	0	0	46	43	20	0	0	0	10
766	214	8	0	0	0	0	0	9	0	0	n.s.	0	0	0	0	0
767	n.s.	40	0	0	0	0	16	35	0	0	n.s.	0	n.s.	0	0	0
TOTAL	9779	18875	35004	50521	34948	30072	20508	44429	40473	47415	22223	25946	19959	17887	10365	28867
S.D.	1544	3114	3736	7991	10687	9699	2371	5281	6171	9207	2898	2641	2745	3539	1193	3010

TABLE 11.- Length weight relationships used for the estimation of thorny skate biomass. The equation is $Weight = a(l + 0.5)^b$. Spanish Spring Surveys in NAFO Div. 3NO: 1997-2012. The parameters for indeterminate individuals were estimated from the total number of individuals (males + females + indeterminate individuals). E means Error.

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Males	a	0.0069 E = 0.202	0.0064 E = 0.259	0.0250 E = 0.456	0.0506 E = 0.192	0.0085 E = 0.091	0.0075 E = 0.086	0.0079 E = 0.101	0.0060 E = 0.0978	0.0066 E = 0.0954	0.0079 E = 0.1133	0.0091 E = 0.0916	0.0167 E = 0.2359	0.0104 E = 0.1092	0.0083 E = 0.0793	0.0025 E = 0.4129	0.0088 E = 0.1202
	b	3.0921 E = 0.052	3.1161 E = 0.075	2.769 E = 0.124	2.5954 E = 0.049	3.0171 E = 0.022	3.0566 E = 0.022	3.0414 E = 0.026	3.1122 E = 0.0251	3.0882 E = 0.0246	3.0399 E = 0.0292	3.0106 E = 0.0232	2.8671 E = 0.0605	2.9701 E = 0.0274	3.0370 E = 0.0206	3.3262 E = 0.1021	3.0111 E = 0.0299
		$R^2 = 0.987$ N = 107	$R^2 = 0.986$ N = 67	$R^2 = 0.967$ N = 33	$R^2 = 0.983$ N = 199	$R^2 = 0.998$ N = 104	$R^2 = 0.996$ N = 374	$R^2 = 0.995$ N = 426	$R^2 = 0.996$ N = 368	$R^2 = 0.996$ N = 360	$R^2 = 0.997$ N = 7492	$R^2 = 0.996$ N = 346	$R^2 = 0.985$ N = 350	$R^2 = 0.995$ N = 185	$R^2 = 0.997$ N = 279	$R^2 = 0.957$ N = 186	$R^2 = 0.997$ N = 363
Females	a	0.0072 E = 0.182	0.0098 E = 0.169	0.0294 E = 0.268	0.0313 E = 0.223	0.0073 E = 0.119	0.0061 E = 0.074	0.0067 E = 0.101	0.0071 E = 0.1072	0.0036 E = 0.2213	0.0104 E = 0.2042	0.0082 E = 0.0952	0.0062 E = 0.1131	0.0103 E = 0.2201	0.0076 E = 0.0807	0.0090 E = 0.1255	0.0076 E = 0.0967
	b	3.0927 E = 0.046	2.9904 E = 0.046	2.7383 E = 0.072	2.7247 E = 0.058	3.0509 E = 0.031	3.1115 E = 0.019	3.0887 E = 0.026	3.0752 E = 0.0281	3.2435 E = 0.0575	2.9798 E = 0.0534	3.0399 E = 0.0246	3.1108 E = 0.0294	2.9806 E = 0.0563	3.0677 E = 0.0213	3.0157 E = 0.0309	3.0157 E = 0.0246
		$R^2 = 0.991$ N = 113	$R^2 = 0.992$ N = 89	$R^2 = 0.985$ N = 53	$R^2 = 0.977$ N = 245	$R^2 = 0.996$ N = 77	$R^2 = 0.997$ N = 425	$R^2 = 0.996$ N = 477	$R^2 = 0.994$ N = 442	$R^2 = 0.980$ N = 396	$R^2 = 0.990$ N = 583	$R^2 = 0.996$ N = 423	$R^2 = 0.997$ N = 368	$R^2 = 0.982$ N = 193	$R^2 = 0.997$ N = 276	$R^2 = 0.995$ N = 176	$R^2 = 0.998$ N = 354
Indet.	a	0.0068 E = 0.144	0.0072 E = 0.166	0.0267 E = 0.205	0.0423 E = 0.174	0.0077 E = 0.079	0.0066 E = 0.068	0.0075 E = 0.095	0.0071 E = 0.0091	0.0057 E = 0.1146	0.0091 E = 0.1258	0.0081 E = 0.0800	0.0110 E = 0.1796	0.0093 E = 0.1144	0.0082 E = 0.0674	0.0035 E = 0.3269	0.0919 E = 0.0919
	b	3.099 E = 0.037	3.073 E = 0.046	2.7618 E = 0.055	2.6472 E = 0.045	3.0411 E = 0.020	3.0887 E = 0.018	3.0552 E = 0.025	3.0730 E = 0.0237	3.1287 E = 0.0298	3.0086 E = 0.0326	3.0385 E = 0.0206	2.9684 E = 0.0468	3.0029 E = 0.0293	3.0418 E = 0.0176	3.2437 E = 0.0827	3.0083 E = 0.0234
		$R^2 = 0.993$ N = 220	$R^2 = 0.991$ N = 156	$R^2 = 0.990$ N = 86	$R^2 = 0.984$ N = 444	$R^2 = 0.998$ N = 181	$R^2 = 0.998$ N = 800	$R^2 = 0.995$ N = 903	$R^2 = 0.996$ N = 810	$R^2 = 0.993$ N = 756	$R^2 = 0.995$ N = 1075	$R^2 = 0.997$ N = 769	$R^2 = 0.991$ N = 178	$R^2 = 0.994$ N = 378	$R^2 = 0.997$ N = 555	$R^2 = 0.964$ N = 362	$R^2 = 0.998$ N = 717

TABLE 12.- Thorny skate length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Menduña*. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	1997				1998				1999				2000				2001				2002			
	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	0.035	0.021	0.000	0.056
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	0.089	0.192	0.005	0.285
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	0.125	0.181	0.000	0.305
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	0.094	0.320	0.000	0.415
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	0.049	0.096	0.000	0.146
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	0.034	0.074	0.000	0.109
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	0.014	0.027	0.000	0.041
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	0.023	0.047	0.000	0.070
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	0.021	0.044	0.000	0.065
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	0.060	0.056	0.000	0.115
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	0.059	0.105	0.000	0.164
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	0.082	0.336	0.000	0.419
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	0.180	0.151	0.000	0.331
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	0.344	0.333	0.000	0.677
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	0.733	0.617	0.000	1.350
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	0.811	0.913	0.000	1.724
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	0.763	0.887	0.000	1.650
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	0.849	0.920	0.000	1.769
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	0.651	1.024	0.000	1.675
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	0.773	0.698	0.000	1.471
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	0.551	0.711	0.000	1.261
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	0.482	0.452	0.000	0.934
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	0.244	0.389	0.000	0.633
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	0.487	0.325	0.000	0.812
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	0.179	0.196	0.000	0.375
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	0.438	0.000	0.656	0.279	0.187	0.000	0.466
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	0.221	0.212	0.000	0.433
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	0.171	0.334	0.000	0.505
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	0.387	0.000	1.008	0.228	0.580	0.000	0.808	0.155	0.254	0.000	0.409
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	0.240	0.292	0.000	0.532
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	0.142	0.437	0.000	0.580
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	0.195	0.305	0.000	0.501
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	0.210	0.086	0.000	0.296
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	0.152	0.092	0.000	0.245
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	0.164	0.035	0.000	0.199
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	0.135	0.157	0.000	0.292
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	0.048	0.013	0.000	0.062
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	0.015	0.008	0.000	0.023
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	0.041	0.013	0.000	0.054
90	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	0.000	0.000	0.000	0.000	
92	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	0.000	0.000	0.000	0.000	
94	0.000	0.000	0.000	0.00																				

TABLE 12 (cont.).- Thorny skate length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Mendoña*. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	2003				2004				2005				2006				2007			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.007	0.000	0.000	0.007	0.038	0.019	0.000	0.057	0.030	0.015	0.000	0.045	0.009	0.005	0.000	0.014	0.000	0.000	0.000	0.000
14	0.026	0.043	0.000	0.069	0.090	0.076	0.000	0.166	0.030	0.039	0.000	0.070	0.036	0.022	0.000	0.059	0.035	0.000	0.000	0.035
16	0.016	0.011	0.000	0.027	0.036	0.058	0.000	0.094	0.034	0.013	0.000	0.047	0.014	0.013	0.000	0.027	0.006	0.006	0.000	0.012
18	0.040	0.035	0.000	0.075	0.061	0.059	0.000	0.120	0.085	0.070	0.000	0.155	0.025	0.010	0.000	0.036	0.000	0.006	0.000	0.006
20	0.059	0.008	0.000	0.067	0.076	0.062	0.000	0.138	0.053	0.045	0.000	0.098	0.041	0.085	0.000	0.126	0.012	0.013	0.000	0.024
22	0.050	0.056	0.000	0.106	0.078	0.057	0.000	0.135	0.066	0.064	0.000	0.130	0.090	0.078	0.000	0.168	0.006	0.039	0.000	0.045
24	0.007	0.020	0.000	0.027	0.095	0.048	0.000	0.143	0.116	0.117	0.000	0.233	0.039	0.113	0.000	0.153	0.015	0.067	0.000	0.082
26	0.027	0.000	0.000	0.027	0.085	0.042	0.000	0.127	0.128	0.089	0.000	0.217	0.054	0.049	0.000	0.103	0.006	0.040	0.000	0.046
28	0.040	0.019	0.000	0.059	0.064	0.047	0.000	0.111	0.123	0.120	0.000	0.243	0.066	0.154	0.000	0.220	0.052	0.072	0.000	0.124
30	0.038	0.023	0.000	0.061	0.129	0.133	0.000	0.263	0.149	0.115	0.000	0.264	0.059	0.173	0.000	0.232	0.060	0.067	0.000	0.127
32	0.145	0.095	0.000	0.239	0.217	0.133	0.000	0.349	0.158	0.247	0.000	0.405	0.086	0.260	0.000	0.346	0.040	0.065	0.000	0.105
34	0.096	0.078	0.000	0.174	0.200	0.244	0.000	0.444	0.180	0.136	0.000	0.316	0.142	0.211	0.000	0.353	0.087	0.098	0.000	0.185
36	0.175	0.137	0.000	0.312	0.295	0.284	0.000	0.579	0.241	0.338	0.000	0.579	0.194	0.219	0.000	0.413	0.111	0.165	0.000	0.277
38	0.209	0.172	0.000	0.382	0.332	0.422	0.000	0.755	0.266	0.255	0.000	0.521	0.226	0.164	0.000	0.390	0.080	0.085	0.000	0.165
40	0.295	0.399	0.000	0.694	0.373	0.402	0.000	0.776	0.286	0.306	0.000	0.592	0.296	0.351	0.000	0.647	0.072	0.156	0.000	0.227
42	0.358	0.323	0.000	0.681	0.709	0.681	0.000	1.390	0.455	0.554	0.000	1.009	0.328	0.401	0.000	0.729	0.162	0.111	0.000	0.273
44	0.382	0.400	0.000	0.782	0.760	0.744	0.000	1.504	0.454	0.534	0.000	0.987	0.239	0.635	0.000	0.874	0.168	0.101	0.000	0.268
46	0.309	0.374	0.000	0.683	0.575	0.672	0.000	1.247	0.541	0.592	0.000	1.134	0.484	0.494	0.000	0.977	0.212	0.159	0.000	0.371
48	0.320	0.456	0.000	0.776	0.653	0.759	0.000	1.413	0.693	0.575	0.000	1.268	0.456	0.608	0.000	1.064	0.201	0.222	0.000	0.423
50	0.283	0.377	0.000	0.660	0.469	0.627	0.000	1.096	0.711	0.680	0.000	1.390	0.638	0.680	0.000	1.318	0.134	0.151	0.000	0.285
52	0.257	0.372	0.000	0.630	0.824	0.621	0.000	1.444	0.686	0.615	0.000	1.302	0.872	1.205	0.000	2.077	0.168	0.298	0.000	0.466
54	0.324	0.394	0.000	0.718	0.419	0.576	0.000	0.995	0.531	0.581	0.000	1.112	0.932	0.929	0.000	1.861	0.230	0.189	0.000	0.419
56	0.256	0.285	0.000	0.541	0.498	0.899	0.000	1.398	0.741	0.696	0.000	1.436	0.700	0.939	0.000	1.640	0.227	0.349	0.000	0.576
58	0.284	0.342	0.000	0.626	0.511	0.781	0.000	1.293	0.576	0.525	0.000	1.100	0.644	0.724	0.000	1.367	0.278	0.348	0.000	0.626
60	0.247	0.330	0.000	0.578	0.424	0.680	0.000	1.104	0.527	0.586	0.000	1.114	0.707	0.692	0.000	1.398	0.234	0.243	0.000	0.477
62	0.186	0.257	0.000	0.443	0.449	0.735	0.000	1.184	0.375	0.640	0.000	1.016	0.549	0.776	0.000	1.325	0.208	0.296	0.000	0.505
64	0.083	0.259	0.000	0.342	0.383	0.655	0.000	1.038	0.469	0.394	0.000	0.863	0.472	0.780	0.000	1.252	0.205	0.406	0.000	0.611
66	0.187	0.203	0.000	0.390	0.349	0.562	0.000	0.911	0.398	0.586	0.000	0.984	0.448	0.669	0.000	1.117	0.282	0.343	0.000	0.625
68	0.152	0.332	0.000	0.484	0.343	0.418	0.000	0.761	0.252	0.664	0.000	0.916	0.344	0.766	0.000	1.111	0.317	0.500	0.000	0.817
70	0.144	0.221	0.000	0.365	0.503	0.492	0.000	0.994	0.324	0.433	0.000	0.757	0.429	0.858	0.000	1.287	0.342	0.266	0.000	0.608
72	0.136	0.159	0.000	0.295	0.245	0.461	0.000	0.705	0.248	0.523	0.000	0.771	0.230	0.829	0.000	1.059	0.247	0.379	0.000	0.626
74	0.134	0.274	0.000	0.408	0.360	0.392	0.000	0.752	0.254	0.377	0.000	0.631	0.270	0.519	0.000	0.789	0.324	0.277	0.000	0.601
76	0.091	0.150	0.000	0.240	0.392	0.299	0.000	0.692	0.242	0.186	0.000	0.428	0.377	0.300	0.000	0.677	0.257	0.208	0.000	0.465
78	0.096	0.111	0.000	0.207	0.259	0.164	0.000	0.423	0.263	0.168	0.000	0.431	0.282	0.196	0.000	0.478	0.245	0.133	0.000	0.378
80	0.073	0.040	0.000	0.113	0.226	0.117	0.000	0.342	0.193	0.178	0.000	0.371	0.312	0.077	0.000	0.389	0.165	0.045	0.000	0.210
82	0.074	0.014	0.000	0.088	0.121	0.073	0.000	0.194	0.190	0.004	0.000	0.194	0.234	0.000	0.000	0.234	0.128	0.023	0.000	0.151
84	0.020	0.033	0.000	0.053	0.180	0.003	0.000	0.183	0.062	0.034	0.000	0.096	0.187	0.000	0.000	0.187	0.103	0.025	0.000	0.129
86	0.023	0.000	0.000	0.023	0.076	0.018	0.000	0.094	0.074	0.020	0.000	0.094	0.075	0.017	0.000	0.092	0.039	0.000	0.000	0.039
88	0.000	0.000	0.000	0.000	0.055	0.014	0.000	0.069	0.026	0.000	0.000	0.026	0.058	0.000	0.000	0.058	0.033	0.006	0.000	0.039
90	0.009	0.000	0.000	0.009	0.028	0.000	0.000	0.028	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.005	0.006	0.000	0.000	0.006
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.005	0.000	0.000	0.005	0.003	0.006	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	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	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	0.012	0.000	0.000	0.012	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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</td																

TABLE 12 (cont.).- Thorny skate length distribution per sex and year. Estimated numbers per haul stratified mean catches. Spanish Spring Survey in NAFO 3NO: 1997-2012. Indet. means indeterminate. 1997-2000 data are transformed from C/V *Playa de Mendoña*. 2002-2012 data are original R/V *Vizconde de Eza* data. For 2001 there are data from the two vessels. (*) indicates untransformed data.

Length (cm.)	2008				2009				2010				2011				2012			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
12	0.000	0.005	0.000	0.005	0.000	0.005	0.000	0.005	0.047	0.060	0.000	0.107	0.000	0.000	0.000	0.000	0.002	0.005	0.000	0.007
14	0.013	0.000	0.000	0.013	0.013	0.000	0.000	0.013	0.142	0.166	0.000	0.308	0.026	0.000	0.000	0.026	0.009	0.011	0.000	0.021
16	0.025	0.019	0.000	0.044	0.020	0.018	0.000	0.038	0.106	0.063	0.000	0.169	0.000	0.000	0.000	0.000	0.004	0.048	0.000	0.052
18	0.031	0.006	0.000	0.037	0.000	0.010	0.000	0.010	0.124	0.025	0.000	0.149	0.000	0.005	0.000	0.005	0.013	0.000	0.000	0.013
20	0.013	0.024	0.000	0.037	0.025	0.014	0.000	0.040	0.203	0.163	0.000	0.366	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.007
22	0.063	0.032	0.000	0.096	0.013	0.015	0.000	0.029	0.071	0.178	0.000	0.249	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.034
24	0.024	0.043	0.000	0.067	0.033	0.036	0.000	0.069	0.198	0.209	0.000	0.407	0.022	0.000	0.000	0.022	0.000	0.027	0.000	0.027
26	0.042	0.059	0.000	0.100	0.000	0.006	0.000	0.006	0.165	0.126	0.000	0.291	0.000	0.016	0.000	0.016	0.014	0.013	0.000	0.027
28	0.051	0.062	0.000	0.112	0.035	0.045	0.000	0.080	0.113	0.066	0.000	0.179	0.005	0.000	0.000	0.005	0.009	0.000	0.000	0.009
30	0.019	0.073	0.000	0.092	0.058	0.021	0.000	0.079	0.053	0.186	0.000	0.239	0.011	0.000	0.000	0.011	0.041	0.069	0.000	0.110
32	0.099	0.083	0.000	0.182	0.045	0.028	0.000	0.073	0.229	0.279	0.000	0.508	0.028	0.021	0.000	0.049	0.053	0.045	0.000	0.098
34	0.086	0.085	0.000	0.170	0.015	0.098	0.000	0.113	0.161	0.290	0.000	0.451	0.000	0.012	0.000	0.012	0.018	0.082	0.000	0.100
36	0.087	0.084	0.000	0.171	0.117	0.054	0.000	0.171	0.144	0.214	0.000	0.358	0.000	0.000	0.000	0.000	0.060	0.164	0.000	0.223
38	0.171	0.153	0.000	0.324	0.059	0.068	0.000	0.127	0.240	0.300	0.000	0.540	0.011	0.008	0.000	0.020	0.101	0.115	0.000	0.215
40	0.112	0.121	0.000	0.233	0.058	0.115	0.000	0.173	0.147	0.234	0.000	0.381	0.026	0.057	0.000	0.083	0.205	0.182	0.000	0.387
42	0.064	0.171	0.000	0.235	0.082	0.015	0.000	0.097	0.167	0.152	0.000	0.319	0.021	0.000	0.000	0.021	0.198	0.242	0.000	0.440
44	0.109	0.118	0.000	0.227	0.079	0.094	0.000	0.173	0.223	0.144	0.000	0.367	0.011	0.021	0.000	0.032	0.156	0.182	0.000	0.338
46	0.117	0.170	0.000	0.288	0.065	0.064	0.000	0.129	0.218	0.193	0.000	0.411	0.025	0.023	0.000	0.048	0.114	0.165	0.000	0.279
48	0.147	0.121	0.000	0.269	0.088	0.075	0.000	0.164	0.116	0.177	0.000	0.293	0.006	0.013	0.000	0.019	0.139	0.164	0.000	0.303
50	0.098	0.152	0.000	0.250	0.115	0.117	0.000	0.233	0.045	0.098	0.000	0.143	0.068	0.000	0.000	0.068	0.180	0.144	0.000	0.324
52	0.154	0.246	0.000	0.400	0.051	0.105	0.000	0.156	0.083	0.139	0.000	0.222	0.045	0.032	0.000	0.077	0.157	0.161	0.000	0.318
54	0.127	0.185	0.000	0.312	0.135	0.110	0.000	0.245	0.125	0.147	0.000	0.272	0.000	0.032	0.000	0.032	0.197	0.198	0.000	0.395
56	0.208	0.298	0.000	0.506	0.142	0.110	0.000	0.251	0.165	0.242	0.000	0.407	0.038	0.015	0.000	0.053	0.120	0.251	0.000	0.371
58	0.260	0.282	0.000	0.542	0.153	0.133	0.000	0.286	0.156	0.079	0.000	0.234	0.031	0.031	0.000	0.062	0.258	0.086	0.000	0.344
60	0.119	0.294	0.000	0.412	0.224	0.257	0.000	0.480	0.113	0.253	0.000	0.366	0.083	0.023	0.000	0.106	0.109	0.102	0.000	0.211
62	0.302	0.272	0.000	0.574	0.173	0.117	0.000	0.290	0.091	0.254	0.000	0.345	0.049	0.087	0.000	0.136	0.207	0.134	0.000	0.341
64	0.260	0.271	0.000	0.531	0.108	0.336	0.000	0.444	0.157	0.343	0.000	0.500	0.075	0.062	0.000	0.137	0.179	0.289	0.000	0.469
66	0.334	0.342	0.000	0.676	0.149	0.130	0.000	0.279	0.168	0.140	0.000	0.308	0.096	0.180	0.000	0.276	0.193	0.266	0.000	0.459
68	0.164	0.365	0.000	0.528	0.299	0.372	0.000	0.671	0.169	0.165	0.000	0.333	0.061	0.112	0.000	0.173	0.180	0.359	0.000	0.539
70	0.210	0.431	0.000	0.642	0.160	0.463	0.000	0.623	0.358	0.151	0.000	0.509	0.038	0.185	0.000	0.223	0.168	0.470	0.000	0.638
72	0.290	0.343	0.000	0.633	0.223	0.434	0.000	0.657	0.158	0.179	0.000	0.337	0.192	0.156	0.000	0.348	0.317	0.411	0.000	0.728
74	0.349	0.303	0.000	0.652	0.348	0.165	0.000	0.513	0.191	0.221	0.000	0.412	0.218	0.219	0.000	0.437	0.331	0.290	0.000	0.621
76	0.364	0.206	0.000	0.570	0.351	0.209	0.000	0.559	0.155	0.231	0.000	0.386	0.141	0.085	0.000	0.226	0.484	0.370	0.000	0.855
78	0.274	0.145	0.000	0.419	0.222	0.119	0.000	0.341	0.260	0.072	0.000	0.333	0.193	0.055	0.000	0.248	0.473	0.171	0.000	0.644
80	0.342	0.063	0.000	0.405	0.277	0.011	0.000	0.287	0.067	0.064	0.000	0.131	0.095	0.080	0.000	0.175	0.240	0.117	0.000	0.357
82	0.164	0.058	0.000	0.222	0.155	0.012	0.000	0.167	0.174	0.027	0.000	0.202	0.084	0.020	0.000	0.104	0.316	0.081	0.000	0.397
84	0.106	0.000	0.000	0.106	0.083	0.002	0.000	0.086	0.067	0.000	0.000	0.067	0.019	0.019	0.000	0.037	0.232	0.041	0.000	0.273
86	0.052	0.008	0.000	0.060	0.021	0.014	0.000	0.036	0.024	0.000	0.000	0.024	0.079	0.016	0.000	0.095	0.088	0.009	0.000	0.096
88	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.008	0.072	0.000	0.000	0.072	0.000	0.013	0.000	0.013	0.071	0.000	0.000	0.071
90	0.021	0.005	0.000	0.026	0.000	0.000	0.000	0.000	0.020	0.005	0.000	0.025	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.024
92	0.009	0.005	0.000	0.013	0.014	0.002	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	0.005	0.000	0.057
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.008	0.000	0.000	0.008	0.013	0.000	0.000	0.013
96	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006	0.020	0.000	0.000	0.020
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	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	0.013	0.000	0.000	0.013
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</td																

TABLE 13.- White hake mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2001-2012. Swept area in square miles. n.s. means strata not surveyed.

Stratum	2001		2002		2003		2004		2005		2006	
	White hake Mean catch	SD	White hake Mean catch	SD	White hake Mean catch	SD	White hake Mean catch	SD	White hake Mean catch	SD	White hake Mean catch	SD
353	1.04	1.180	0.05	0.100	0.00	0.000	0.00	0.000	0.01	0.023	1.87	3.245
354	76.70	117.298	0.07	0.115	0.00	0.000	23.15	32.074	54.33	91.362	34.59	33.056
355	131.95	135.128	156.75	55.649	31.24	26.955	14.95	15.203	41.75	40.489	2.17	3.062
356	23.95	12.092	85.90	90.651	14.83	9.935	4.15	5.869	12.32	6.795	0.80	1.131
357	1.75	2.475	0.00	0.000	2.25	3.182	0.90	1.273	0.00	0.000	0.00	0.000
358	0.43	0.751	0.17	0.289	0.40	0.693	12.02	20.597	30.64	53.008	1.69	2.923
359	16.50	41.790	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	6.29	10.192
360	0.01	0.022	0.00	0.000	0.00	0.000	0.07	0.172	0.00	0.007	0.00	0.000
374	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
375	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
376	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.01	0.019	0.00	0.000
377	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
378	0.03	0.042	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
379	0.00	0.000	0.02	0.033	0.00	0.000	0.00	-	0.07	0.099	0.10	0.141
380	n.s.	n.s.	0.00	0.000	0.00	0.000	0.04	0.049	0.53	0.049	0.15	0.212
381	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
382	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
721	10.90	2.828	50.00	6.223	23.69	27.280	3.50	0.544	0.00	0.000	6.18	6.901
722	21.75	30.759	18.20	23.624	28.08	24.911	1.29	1.824	0.00	0.000	0.00	0.000
723	1.60	2.263	0.00	0.000	0.00	0.000	1.05	1.485	1.51	2.128	1.84	2.496
724	1.34	1.404	2.05	0.071	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
725	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.51	0.714
726	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000	0.00	-	0.00	0.000
727	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
728	n.s.	n.s.	0.00	0.000	0.00	0.000	0.06	0.078	0.00	-	0.00	0.000
752	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
753	n.s.	n.s.	0.00	0.000	0.00	0.000	0.73	1.025	0.00	0.000	0.00	0.000
754	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
755	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
756	0.00	-	0.00	0.006	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
757	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
758	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
759	n.s.	n.s.	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000
760	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
761	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
762	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000	0.01	0.014	0.00	0.000
763	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
764	0.00	0.000	0.00	0.000	3.78	4.236	0.00	0.000	0.00	0.000	0.00	0.000
765	0.00	-	1.65	2.333	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000
766	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
767	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	-	0.00	0.000

TABLE 13 (cont.).- White hake mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2001-2012. Swept area in square miles. n.s. means strata not surveyed.

Stratum	2007		2008		2009		2010		2011		2012	
	White hake Mean catch	White hake SD										
353	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.04	0.072	1.54	2.397
354	14.76	5.726	0.00	0.000	9.30	3.736	0.02	0.026	20.45	28.282	0.13	0.219
355	0.00	0.000	5.86	8.280	24.45	1.344	4.89	4.962	24.11	6.208	47.52	42.398
356	0.00	0.000	6.03	8.521	6.13	6.329	7.90	0.277	9.58	5.063	29.95	33.022
357	4.02	6.957	0.72	1.011	6.08	2.967	5.96	8.429	0.00	0.000	0.00	0.000
358	1.54	2.662	0.00	0.000	2.16	3.748	2.34	3.309	3.99	6.917	0.00	0.000
359	0.04	0.090	0.00	0.000	0.00	0.000	0.01	0.020	1.48	2.527	6.08	14.906
360	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.02	0.042
374	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
375	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
376	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
377	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
378	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	1.82	2.567
379	0.00	0.000	0.04	0.057	0.00	0.000	0.00	0.000	0.00	0.000	0.30	0.429
380	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.68	0.962
381	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
382	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
721	6.10	-	0.00	0.000	1.80	2.546	11.48	12.891	0.00	0.000	0.49	0.693
722	2.56	3.620	0.00	0.000	0.00	0.000	0.00	0.001	1.70	2.397	0.00	0.000
723	0.10	0.134	0.00	0.000	0.00	0.000	2.01	2.843	3.03	4.285	3.75	5.303
724	0.00	0.000	0.00	0.000	0.01	0.011	0.00	0.000	0.00	0.000	0.00	0.000
725	0.04	0.055	0.00	0.000	0.16	0.226	0.00	0.000	0.00	0.000	0.00	0.000
726	0.14	0.193	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
727	0.00	0.000	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	0.11	0.162
728	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
752	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
753	0.00	0.000	0.00	0.000	0.00	-	n.s.	n.s.	0.00	0.000	0.00	0.000
754	0.00	0.000	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000
755	0.00	0.000	0.00	0.000	0.00	-	0.00	-	0.00	0.000	0.00	0.000
756	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
757	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
758	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
759	n.s.	n.s.	0.00	0.000	0.00	-	0.00	0.000	0.00	0.000	0.00	0.000
760	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
761	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
762	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
763	n.s.	n.s.	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.00	0.000	0.00	0.000
764	0.00	0.000	0.00	0.000	0.00	-	n.s.	n.s.	0.29	0.404	0.00	0.000
765	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
766	n.s.	n.s.	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
767	n.s.	n.s.	0.00	0.000	n.s.	n.s.	n.s.	n.s.	0.00	0.000	0.00	0.000

TABLE 14.- Stratified mean catches (Kg) by stratum and year and annual SD for white hake (2001-2012). n.s. means strata not surveyed.

Stratum	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
353	279.76	13.45	0.00	0.00	3.59	503.93	0.00	0.00	0.00	0.00	11.12	413.72
354	18868.20	16.40	0.00	5694.08	13365.18	8509.96	3631.37	0.00	2288.46	4.55	5030.54	31.16
355	9764.30	11599.50	2311.76	1106.30	3089.50	160.21	0.00	433.27	1809.30	361.75	1784.14	3516.48
356	1125.65	4037.30	696.78	195.05	578.81	37.60	0.00	283.18	287.88	371.11	450.26	1407.65
357	287.00	0.00	369.00	147.60	0.00	0.00	658.73	117.26	996.79	977.44	0.00	0.00
358	97.50	37.50	90.00	2703.75	6894.98	379.73	345.75	0.00	486.83	526.50	898.50	0.00
359	6946.50	0.00	0.00	0.00	0.00	2648.25	18.28	0.00	0.00	3.51	622.60	2557.88
360	13.92	0.00	0.00	201.77	6.26	0.00	0.00	0.00	0.00	0.00	0.00	44.53
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
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
376	0.00	0.00	0.00	0.00	8.14	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	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	0.00	0.00	252.29
379	0.00	2.44	0.00	0.00	7.42	10.55	0.00	4.29	0.00	0.00	0.00	32.12
380	n.s.	0.00	0.00	3.36	50.40	14.40	0.00	0.00	0.00	0.00	0.00	65.28
381	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
382	n.s.	0.00	0.00	0.00	0.00	0.00	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	745.88	0.00	31.85
722	1827.00	1528.38	2358.30	108.36	0.00	0.00	215.04	0.00	0.00	0.08	142.38	0.00
723	248.00	0.00	0.00	162.75	233.28	284.43	14.73	0.00	0.00	311.55	469.65	581.25
724	166.16	254.20	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00
725	0.00	0.00	0.00	0.00	0.00	53.03	4.10	0.00	16.80	0.00	0.00	0.00
726	0.00	0.00	0.00	0.00	0.00	0.00	9.83	0.00	0.00	0.00	0.00	0.00
727	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.99
728	n.s.	0.00	0.00	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
752	n.s.	0.00	0.00	0.00	0.00	0.00	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	n.s.	0.00	0.00
754	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	n.s.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	n.s.	0.00	0.00	0.00	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	0.00	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	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	0.00	0.00	0.00
763	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.	0.00	n.s.	n.s.	0.00	0.00
764	0.00	0.00	377.50	0.00	0.00	0.00	0.00	0.00	0.00	n.s.	28.55	0.00
765	0.00	204.60	0.00	0.00	0.00	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	0.00	0.00	0.00
767	n.s.	0.00	0.00	0.00	0.00	0.00	n.s.	0.00	n.s.	n.s.	0.00	0.00
TOTAL (\bar{Y})	40337	20944	7743	10655	24240	13004	5294	838	6004	3302	9438	8945.19
S.D.	5.13	2.03	0.75	1.03	2.34	1.26	0.56	0.08	0.61	0.34	0.91	0.86
	1.87	0.43	0.24	0.52	1.44	0.48	0.12	0.05	0.08	0.14	0.40	0.34

TABLE 15.- Survey estimates (by the swept area method) of white hake biomass (t) and SD by stratum and year in NAFO Div. 3NO. n.s. means stratum not surveyed.

Stratum	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
353	25	1	0	0	0	41	0	0	0	0	1	37
354	1677	1	0	495	1137	702	299	0	203	0	437	3
355	814	982	202	97	275	13	0	39	156	32	153	307
356	94	347	62	18	50	3	0	24	25	33	39	125
357	24	0	32	13	0	0	55	10	171	87	0	0
358	8	3	8	246	593	33	28	0	43	47	78	0
359	606	0	0	0	0	217	1	0	0	0	54	222
360	1	0	0	17	1	0	0	0	0	0	0	4
374	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
376	0	0	0	0	1	0	0	0	0	0	0	0
377	0	0	0	0	0	0	0	0	0	0	0	0
378	0	0	0	0	0	0	0	0	0	0	0	22
379	0	0	0	0	1	1	0	0	0	0	0	3
380	0	0	0	0	4	1	0	0	0	0	0	6
381	0	0	0	0	0	0	0	0	0	0	0	0
382	0	0	0	0	0	0	0	0	0	0	0	0
721	57	280	137	21	0	34	34	0	10	66	0	3
722	157	129	213	10	0	0	19	0	0	0	13	0
723	21	0	0	14	20	24	1	0	0	28	43	52
724	15	23	0	0	0	0	0	0	0	0	0	0
725	0	0	0	0	0	5	0	0	1	0	0	0
726	0	0	0	0	0	0	1	0	0	0	0	0
727	0	0	0	0	0	0	0	0	0	0	0	1
728	0	0	0	0	0	0	0	0	0	0	0	0
752	0	0	0	0	0	0	0	0	0	0	0	0
753	0	0	0	9	0	0	0	0	0	n.s.	0	0
754	0	0	0	0	0	0	0	0	0	0	0	0
755	0	0	0	0	0	0	0	0	0	0	0	0
756	0	0	0	0	0	0	0	0	0	0	0	0
757	0	0	0	0	0	0	0	0	0	0	0	0
758	0	0	0	0	0	0	0	0	0	0	0	0
759	0	0	0	0	0	0	n.s.	0	0	0	0	0
760	0	0	0	0	0	0	0	0	0	0	0	0
761	0	0	0	0	0	0	0	0	0	0	0	0
762	0	0	0	0	0	0	n.s.	0	0	0	0	0
763	0	0	0	0	0	0	n.s.	0	n.s.	n.s.	0	0
764	0	0	34	0	0	0	0	0	0	n.s.	3	0
765	0	17	0	0	0	0	0	0	0	0	0	0
766	0	0	0	0	0	0	n.s.	0	0	0	0	0
767	0	0	0	0	0	0	n.s.	0	n.s.	n.s.	0	0
TOTAL	3498	1784	688	940	2082	1073	440	74	610	293	822	784
S.D.	1107	389	224	464	1270	407	94	46	73	117	361	308

TABLE 16.- Length weight relationships used for the estimation of white hake biomass. The equation is $Weight = a(l + 0.5)^b$. Spanish Spring Surveys in NAFO Div. 3NO: 2002-2012. The parameters for indeterminate individuals were estimated from total number of individuals (males + females + indeterminate individuals). White hake was not sexed in 2011.

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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	0.0031 E = 0.2034	---	0.0034 E = 0.2635
	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	3.2186 E = 0.0543	---	3.2060 E = 0.0682
		R ² = 0.991 N = 107	R ² = 0.992 N = 73	R ² = 0.992 N = 41	R ² = 0.995 N = 108	R ² = 0.965 N = 75	R ² = 0.992 N = 14	R ² = 0.999 N = 7	R ² = 0.978 N = 26	R ² = 0.997 N = 13	---	R2 = 0.995 N= 42
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	0.0019 E = 0.1809	---	0.0019 E = 0.4467
	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 E = 0.5170	3.2053 E = 0.0493	3.3734 E = 0.0446	---	3.3623 E = 0.1162
		R ² = 0.992 N = 61	R ² = 0.977 N = 51	R ² = 0.995 N = 32	R ² = 0.997 N = 80	R ² = 0.998 N = 28	R ² = 0.997 N = 18	R ² = 0.997 N = 4	R ² = 0.996 N = 19	R ² = 0.998 N = 16	---	R2 = 0.991 N= 27
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	0.0020 E = 0.1566	0.0034 E = 0.1448	0.0033 E = 0.2547
	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	3.3506 E = 0.0400	3.2151 E = 0.0382	3.2191 E = 0.0649
		R ² = 0.995 N = 168	R ² = 0.989 N = 125	R ² = 0.997 N = 91	R ² = 0.997 N = 188	R ² = 0.980 N = 103	R ² = 0.995 N = 32	R ² = 0.997 N = 11	R ² = 0.992 N = 49	R ² = 0.997 N = 29	R2 = 0.994 N= 122	R2 = 0.994 N= 69

TABLE 17.- White hake length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Spring Survey in NAFO 3NO: 2001-2012. Indet. means indeterminate. White hake was not sexed in 2011.

Length (cm.)	2001				2002				2003				2004				2005				2006			
	Males	Females	Indet.	Total	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	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	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	0.040	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000
16	0.034	0.009	0.000	0.043	0.014	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.025	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000
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	0.000	0.000	0.000	0.000
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	0.000	0.000	0.000	0.000
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	0.005	0.000	0.000	0.005
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	0.000	0.000	0.000	0.000
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	0.005	0.000	0.000	0.005
28	0.229	0.154	0.000	0.383	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.007	0.000	0.000	0.000	0.000	0.013	0.000	0.013	0.013	0.000	0.000	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	0.013	0.005	0.000	0.017	0.000	0.011	0.000	0.011	0.011
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	0.016	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000
34	1.019	0.873	0.000	1.892	0.007	0.004	0.000	0.011	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.007	0.038	0.000	0.045	0.000	0.011	0.000	0.011	0.011
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	0.046	0.012	0.000	0.000	0.012
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	0.023	0.023	0.000	0.046	0.012	0.000	0.000	0.012	
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	0.016	0.000	0.016	0.012	0.004	0.000	0.015	
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	0.008	0.019	0.000	0.027	0.015	0.008	0.000	0.023	
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	0.008	0.007	0.000	0.015	0.000	0.000	0.000	0.000	
46	0.098	0.110	0.000	0.208	0.093	0.162	0.000	0.256	0.080	0.012	0.000	0.092	0.000	0.000	0.000	0.007	0.000	0.000	0.007	0.016	0.000	0.000	0.016	
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	0.008	0.000	0.000	0.008	0.009	0.008	0.000	0.017	
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	0.016	0.020	0.000	0.000	0.020	
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	0.028	0.000	0.028	
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	0.005	0.010	0.000	0.016
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	0.028	0.008	0.000	0.036
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	0.031	0.000	0.000	0.031
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	0.075	0.013	0.000	0.089
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	0.066	0.000	0.000	0.066
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	0.076	0.000	0.000	0.076
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	0.024	0.000	0.000	0.024
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	0.021	0.000	0.000	0.021
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	0.016	0.008	0.000	0.024
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	0.032	0.000	0.032	0.016	0.021	0.000	0.037	
74	0.000	0.015	0.000	0.015	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	0.000	0.005	0.000	0.005	
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	0.015	0.000	0.015	0.008	0.026	0.000	0.034	
78	0.000	0.015	0.000	0.015	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	0.000	0.020	0.000	0.020	
80	0.000	0.016	0.000	0.016	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	0.000	0.000	0.013	0.000	0.013	
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	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	0.008	0.000	0.008	0.000	0.000	0.000	0.000	
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	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	0.512	0.172	0.000	0.684
Nº samples (*):																								
Nº Ind. (*):	427	328	1	756	329	222	0	551	102	79	0	181	59	59	0	1								

TABLE 17 (cont.).- White hake length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Spring Survey in NAFO 3NO: 2001-2012. Indet. means indeterminate. White hake was not sexed in 2011.

Length (cm.)	2007				2008				2009				2010				2011	2012				
	Males	Females	Indet.	Total		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	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	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	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	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	0.000	0.000	0.000	0.000	0.000	
20	0.006	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.007	0.018	0.017	0.026	0.000	0.044	
22	0.000	0.006	0.000	0.006	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.009	0.008	0.000	0.017	0.022	0.009	0.000	0.000	0.009	
24	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.003	0.000	0.003	0.000	0.004	0.000	0.000	0.004	0.025	0.026	0.000	0.000	0.026	
26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.044	0.000	0.017	0.000	0.017	
28	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.007	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.037	0.000	0.000	0.000	0.000	
30	0.008	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.047	0.000	0.005	0.000	0.005	
32	0.009	0.023	0.000	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.059	0.011	0.000	0.000	0.011	
34	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.007	0.008	0.000	0.014	0.000	0.000	0.000	0.000	0.069	0.012	0.018	0.000	0.030	
36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.076	0.044	0.032	0.000	0.076	
38	0.000	0.000	0.000	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	0.046	0.083	0.041	0.000	0.124	
40	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.008	0.007	0.000	0.014	0.000	0.000	0.000	0.000	0.074	0.088	0.054	0.000	0.142	
42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.003	0.000	0.011	0.000	0.000	0.000	0.000	0.036	0.098	0.068	0.000	0.166	
44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007	0.003	0.000	0.000	0.003	0.005	0.082	0.054	0.000	0.136	
46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.011	0.000	0.018	0.004	0.002	0.000	0.006	0.021	0.021	0.018	0.000	0.039	
48	0.017	0.017	0.000	0.034	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.013	0.003	0.000	0.000	0.003	0.007	0.054	0.021	0.000	0.075	
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.014	0.008	0.000	0.000	0.008	0.012	0.018	0.009	0.000	0.028	
52	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.018	0.007	0.000	0.024	0.000	0.000	0.000	0.000	0.020	0.014	0.004	0.000	0.017	
54	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.000	0.014	0.000	0.014	0.000	0.002	0.000	0.002	0.004	0.008	0.007	0.000	0.015	
56	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.010	0.011	0.008	0.000	0.019	0.000	0.006	0.000	0.006	0.020	0.009	0.015	0.000	0.025	
58	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.014	0.000	0.002	0.016	0.003	0.000	0.000	0.003	0.029	0.013	0.002	0.000	0.015	
60	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.028	0.016	0.000	0.044	0.004	0.003	0.000	0.007	0.049	0.009	0.004	0.000	0.013	
62	0.017	0.000	0.000	0.017	0.000	0.002	0.000	0.002	0.010	0.003	0.000	0.014	0.000	0.000	0.000	0.000	0.028	0.013	0.002	0.000	0.015	
64	0.014	0.000	0.000	0.014	0.000	0.002	0.000	0.002	0.003	0.086	0.000	0.089	0.032	0.000	0.000	0.032	0.015	0.010	0.006	0.000	0.016	
66	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.011	0.000	0.008	0.000	0.008	0.028	0.006	0.000	0.000	0.006	
68	0.009	0.006	0.000	0.014	0.000	0.000	0.000	0.000	0.008	0.011	0.000	0.019	0.000	0.000	0.000	0.000	0.010	0.005	0.002	0.000	0.007	
70	0.009	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.024	0.012	0.004	0.000	0.015	
72	0.000	0.009	0.000	0.009	0.002	0.000	0.000	0.002	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.020	0.006	0.002	0.000	0.008	
74	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.008	0.008	0.000	0.015	0.000	0.011	0.000	0.011	0.008	0.004	0.000	0.000	0.004	
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	0.003	0.000	0.003	0.000	0.008	0.000	0.000	0.000	0.000	
78	0.000	0.012	0.000	0.012	0.000	0.004	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007	0.000	0.002	0.000	0.002	
80	0.000	0.012	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	0.000	0.002	0.000	0.000	0.002	
82	0.000	0.009	0.000	0.009	0.000	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	0.000	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	0.017	0.000	0.017	0.000	0.015	0.000	0.000	0.000	0.000	
86	0.000	0.000	0.000	0.000	0.004	0.000	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	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	0.000	0.000	0.008	0.000	0.008	
Total	0.115	0.161	0.000	0.275	0.025	0.012	0.000	0.037	0.184	0.208	0.002	0.394	0.078	0.085	0.000	0.162	0.882	0.676	0.418	0.000	1.094	
Nº samples (*):					11				4				9				10	14				12
Nº Ind. (*):	14	21	0	35	7	4	0	11	38	25	1	64	14	16	0	30	156	156	98	0	254	
Sampled catch:					727				25				100				562	149				217
Range (*):					21-83				22-86				24-75				20-84	20-84				20-89
Total catch:					73				25				112				69	161				217
Total hauls (*):					110				122				109				95	122				122

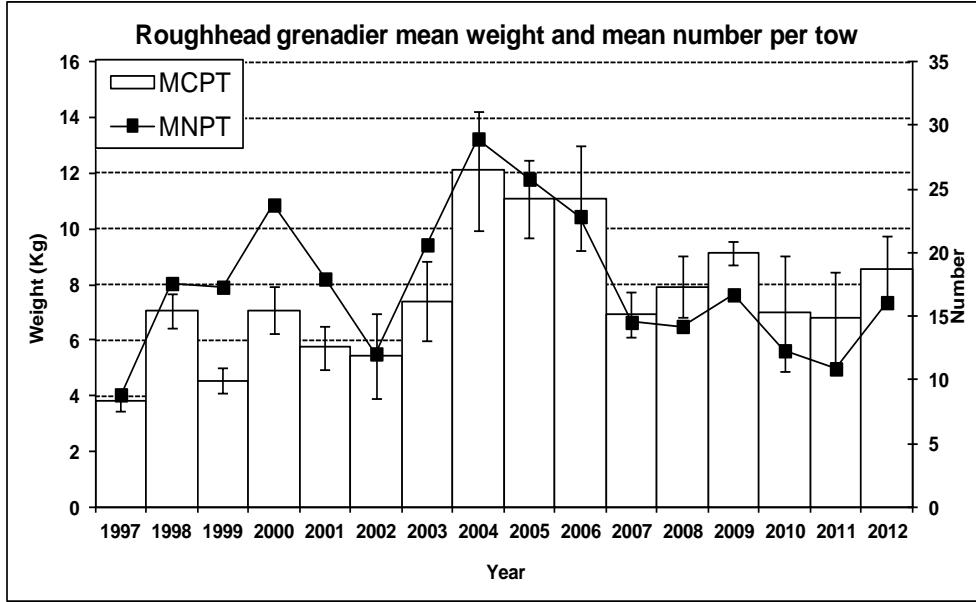


FIGURE 1.- Roughhead grenadier stratified mean catches in Kg and \pm SD and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2012 (1997-2000 transformed data from C/V *Playa de Menduña*; 2002-2012 original data from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels).

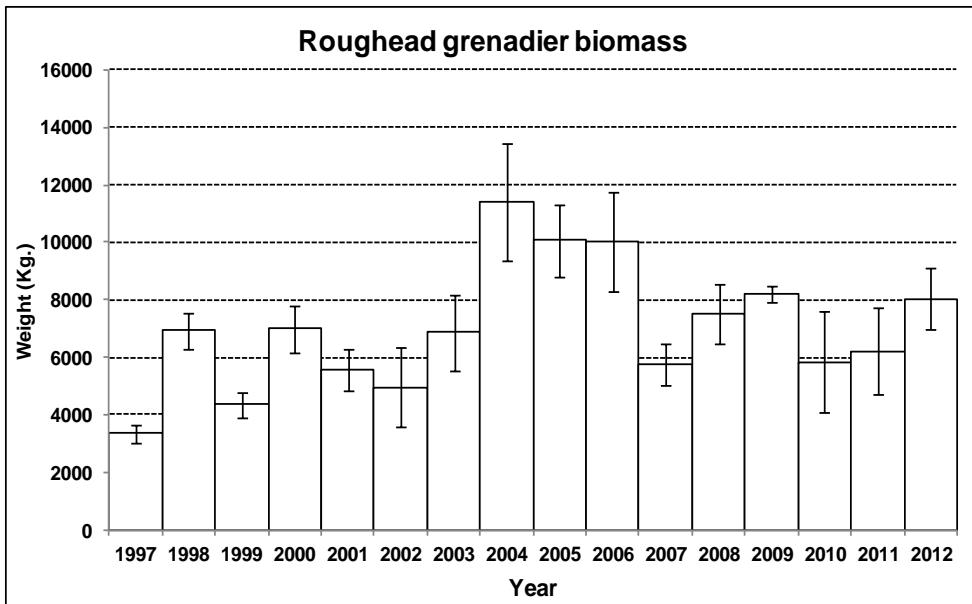


FIGURE 2.- Roughhead grenadier biomass calculated by the swept area method in tons and \pm SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2012 (1997-2000 transformed data from C/V *Playa de Menduña*; 2002-2012 original data from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels).

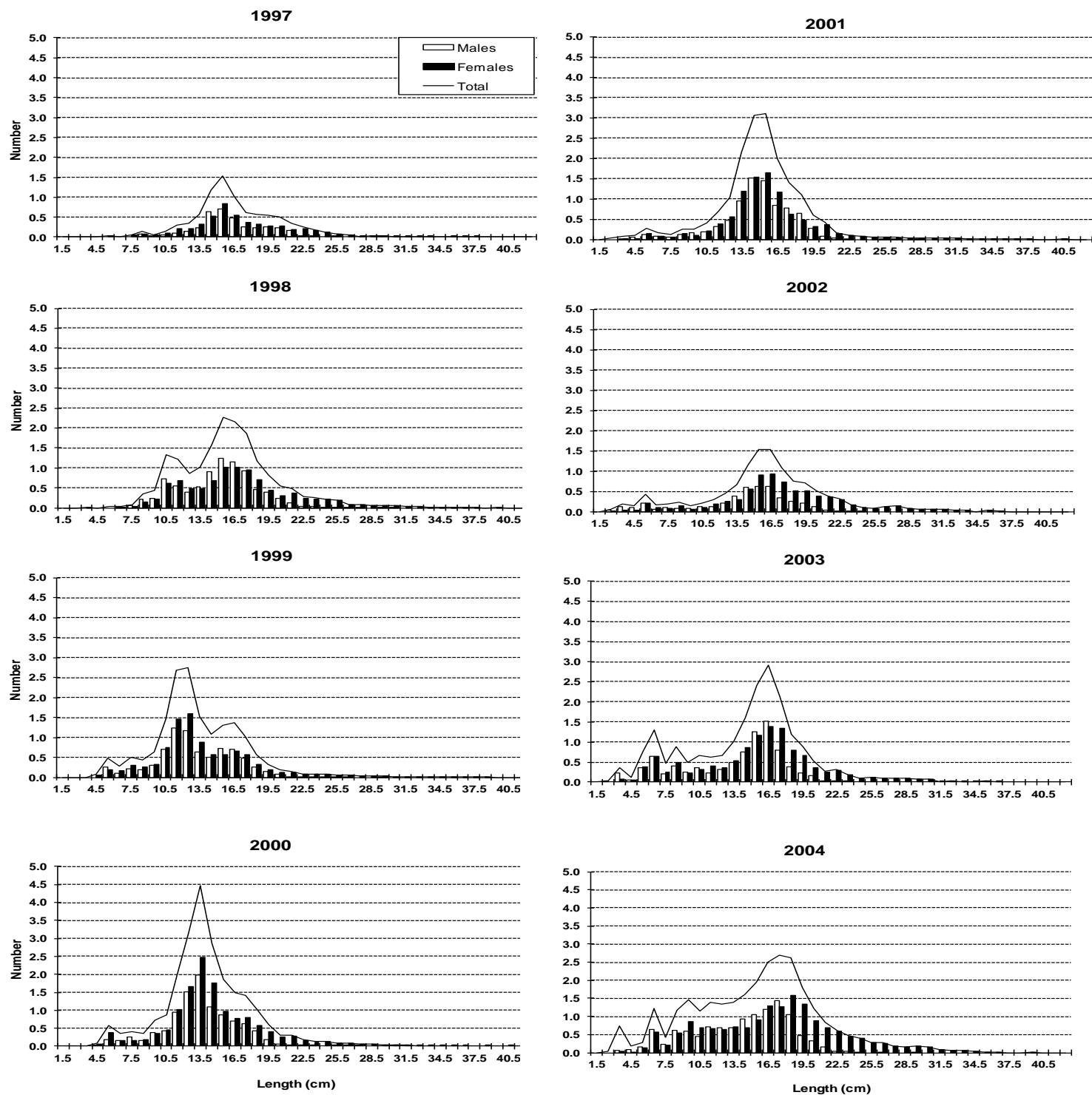


FIGURE 3.- Roughhead grenadier length distribution (cm) by sex in NAFO 3NO: 1997-2012. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduña*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

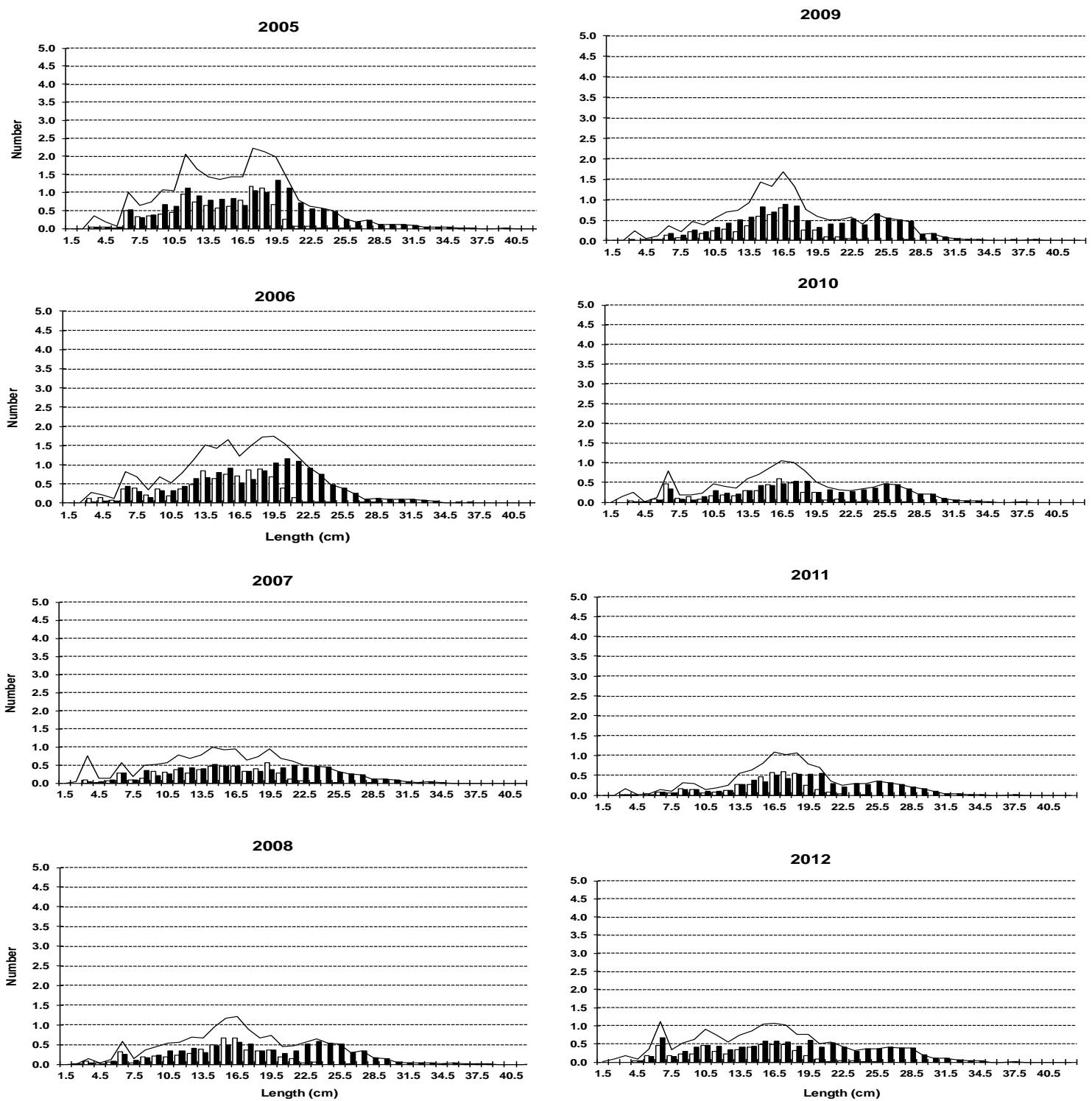


FIGURE 3 (cont.).- Roughhead grenadier length distribution (cm) by sex in NAFO 3NO: 1997-2012. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduña*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels.

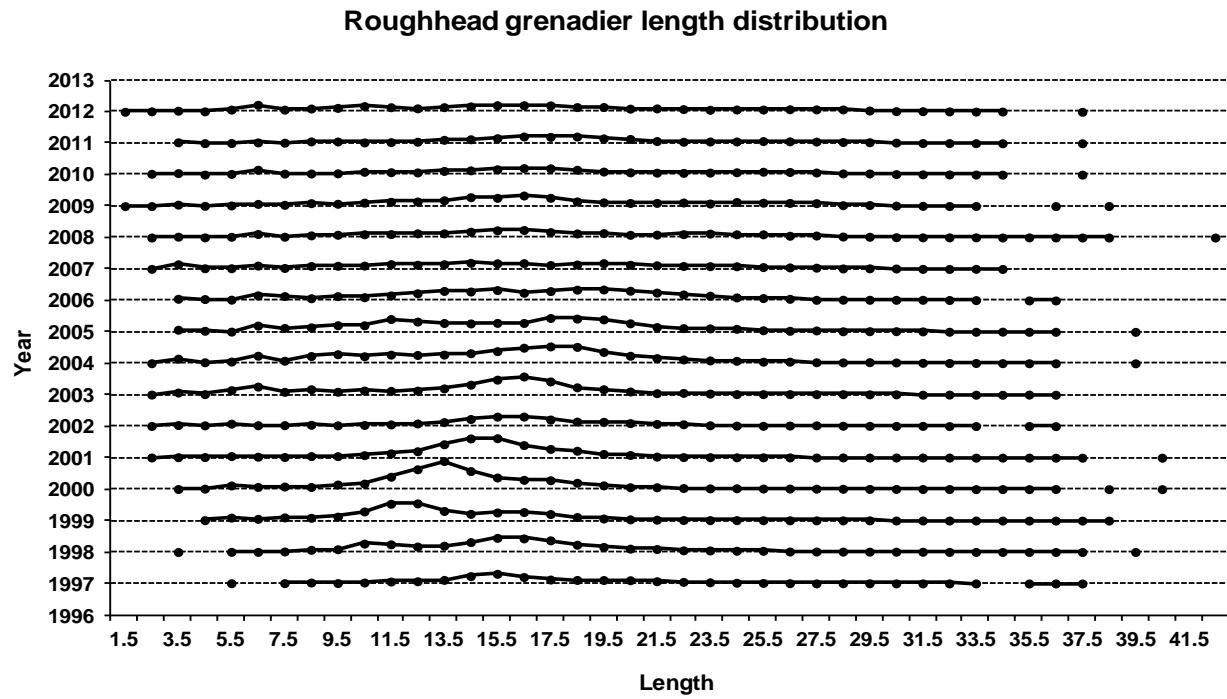


FIGURE 4.- Roughhead grenadier mean catches per tow length distribution (cm) in NAFO 3NO: 1997-2012.

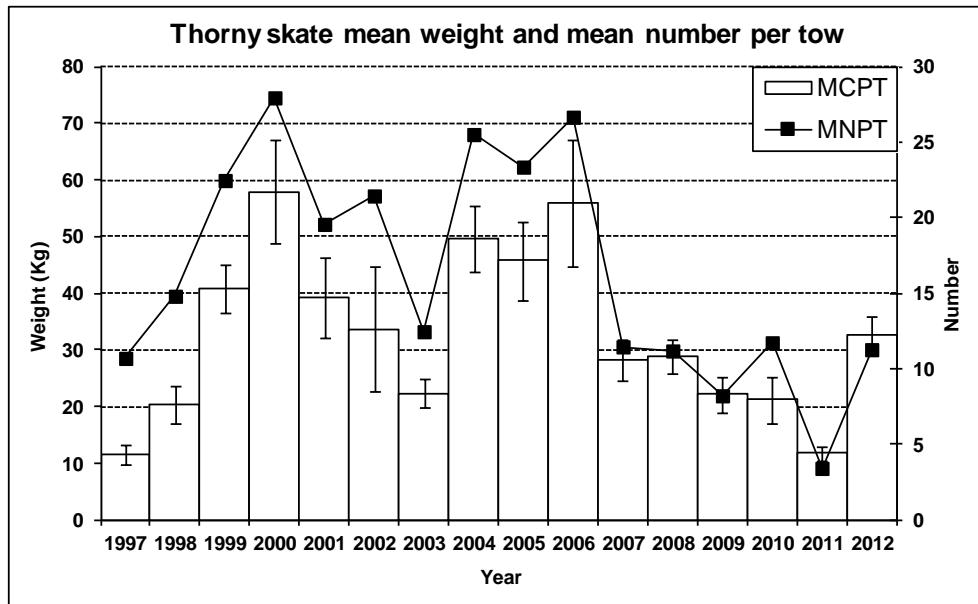


FIGURE 5.- Thorny skate stratified mean catches in Kg and \pm SD and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2012 (1997-2000 transformed data from C/V *Playa de Menduiña*; 2002-2012 original data from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels).

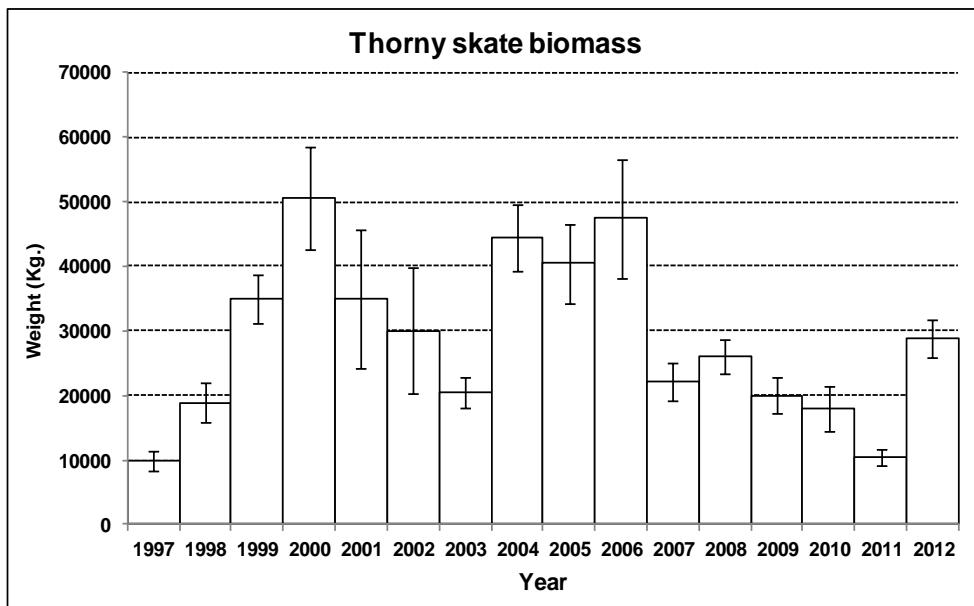


FIGURE 6.- Thorny skate biomass calculated by the swept area method in tons and \pm SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2012 (1997-2000 transformed data from C/V *Playa de Menduiña*; 2002-2012 original data from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels).

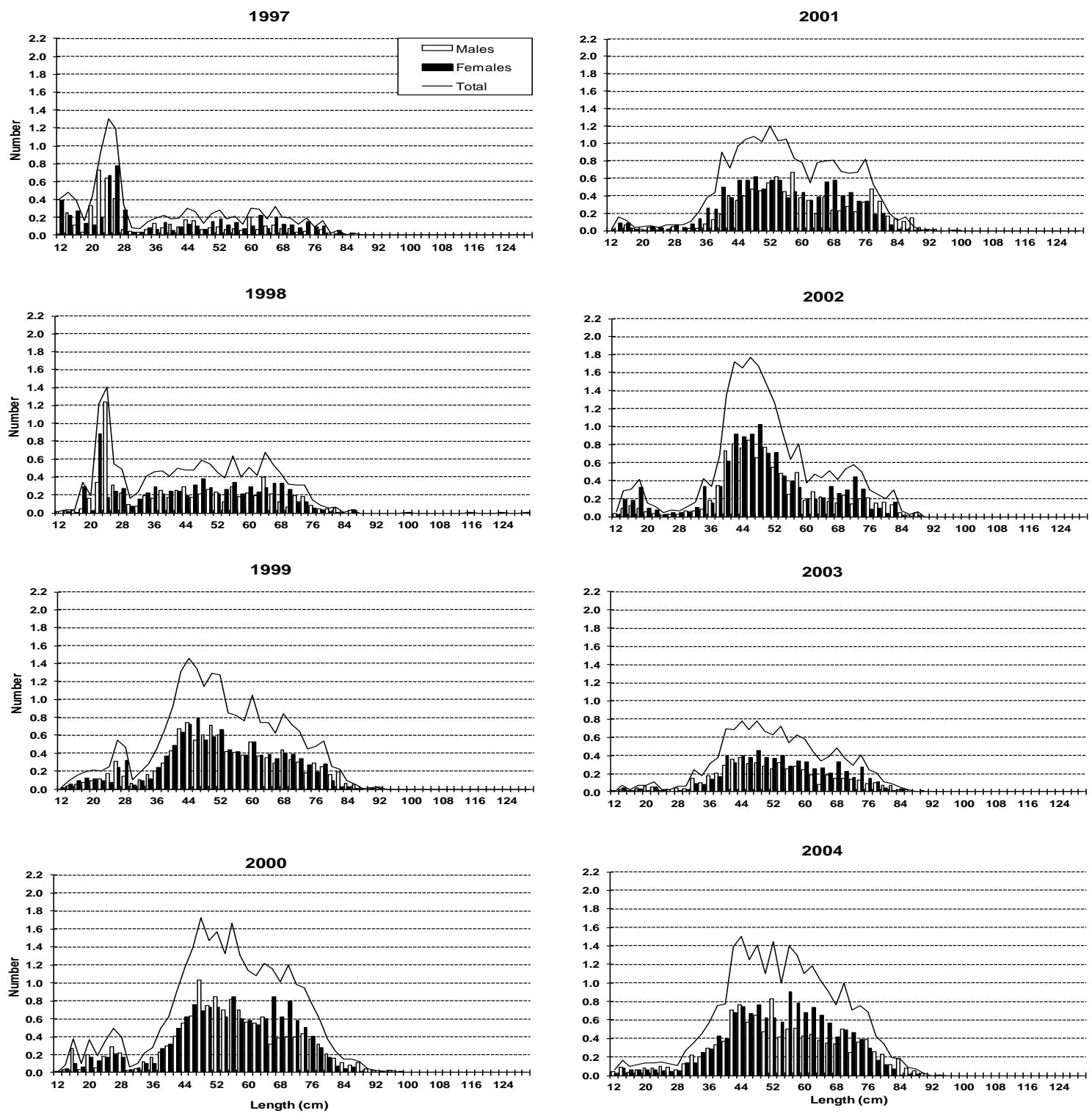


FIGURE 7.- Thorny skate length distribution (cm) by sex in NAFO 3NO: 1997-2012. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Mendumá*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels

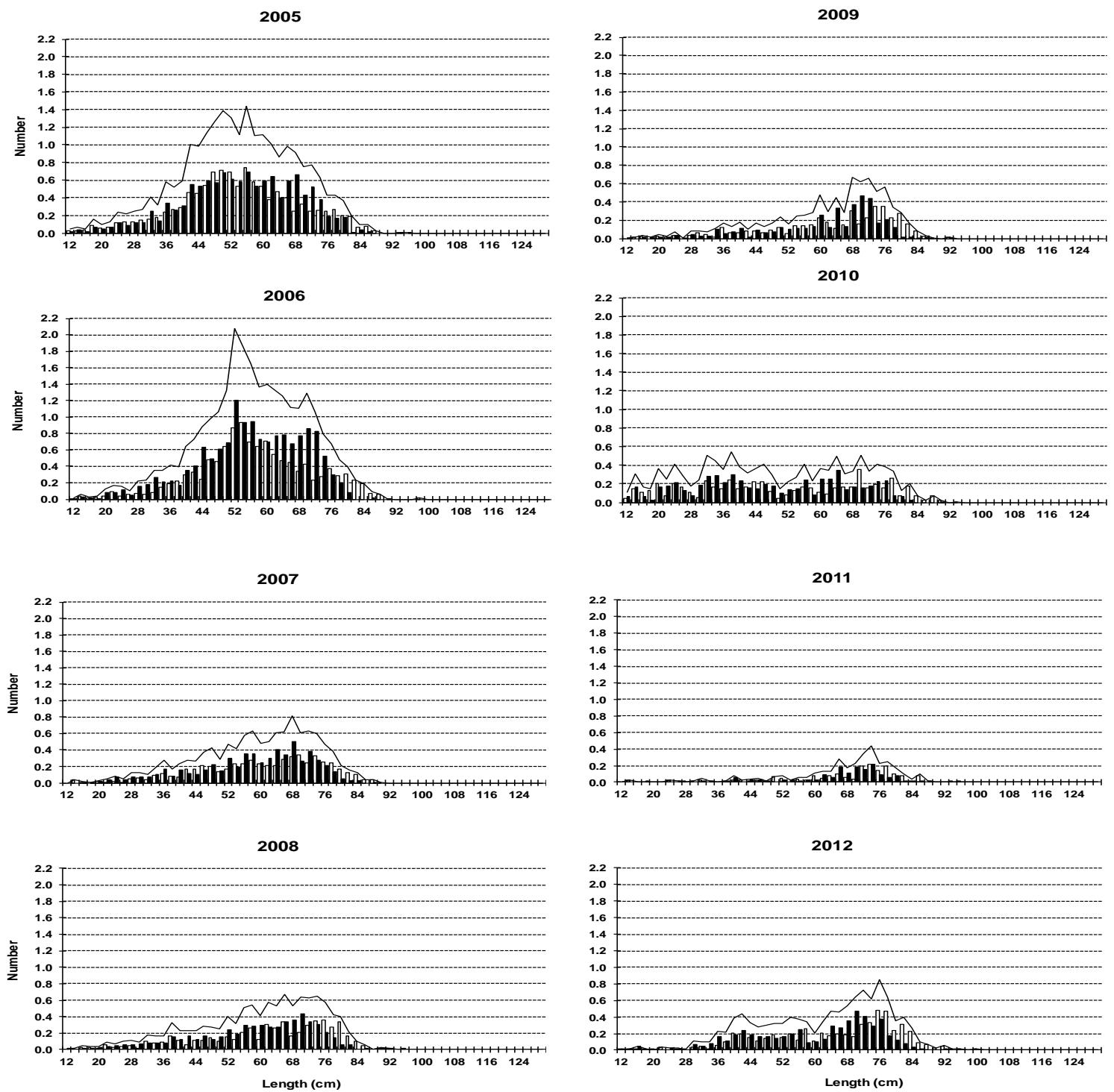


FIGURE 7 (cont.).- Thorny skate length distribution (cm) by sex in NAFO 3NO: 1997-2012. Estimated numbers per haul stratified mean catches. 1997-2000 data are transformed data from C/V *Playa de Menduña*, and 2002-2012 data are original from R/V *Vizconde de Eza*. For 2001 there are data from the two vessels

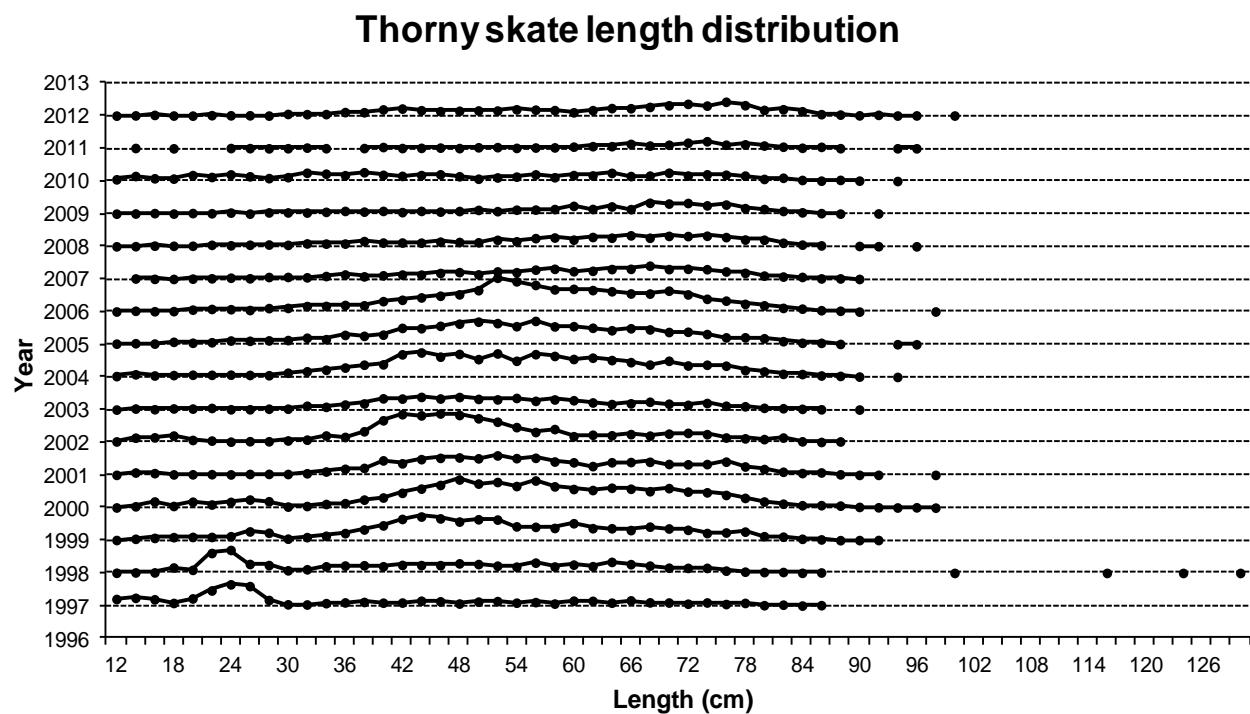


FIGURE 8.- Thorny skate mean catches per tow length distribution (cm) in NAFO 3NO: 1997-2012.

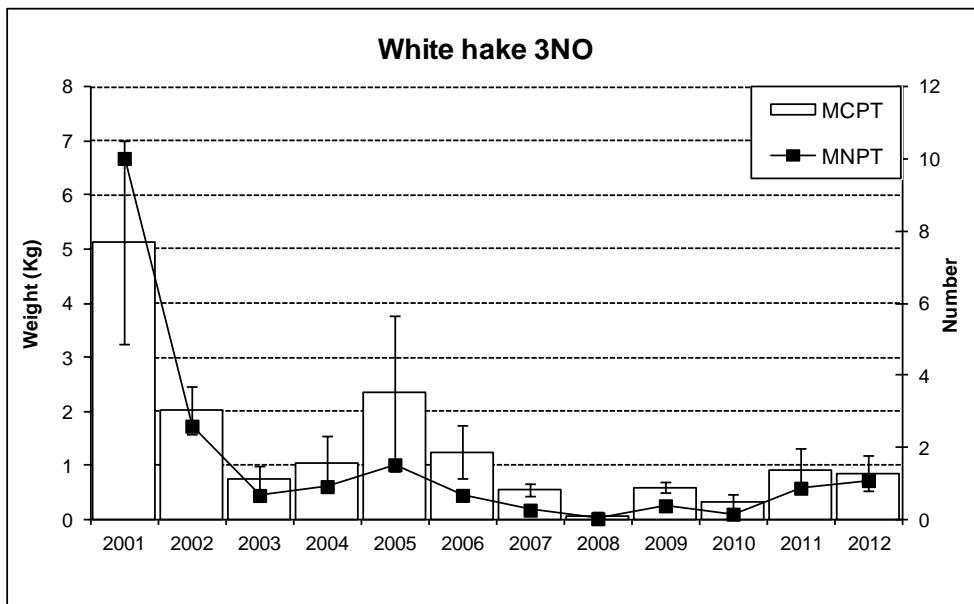


FIGURE 9.- White hake stratified mean catches in Kg and \pm SD and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 2001-2012.

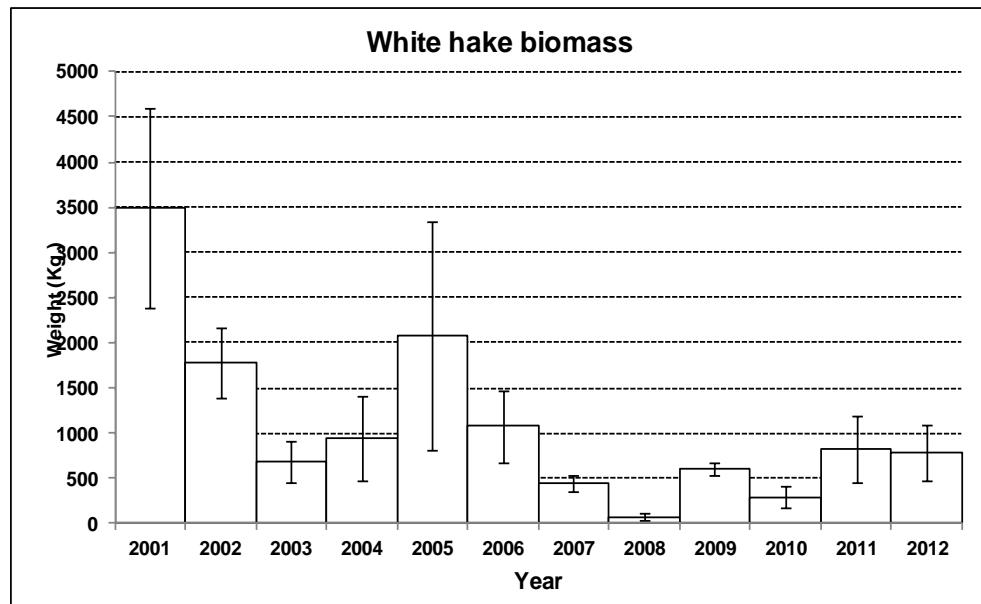


FIGURE 10.- White hake biomass calculated by the swept area method in tons and \pm SD by year. Spanish Spring surveys in NAFO Div. 3NO: 2001-2012.

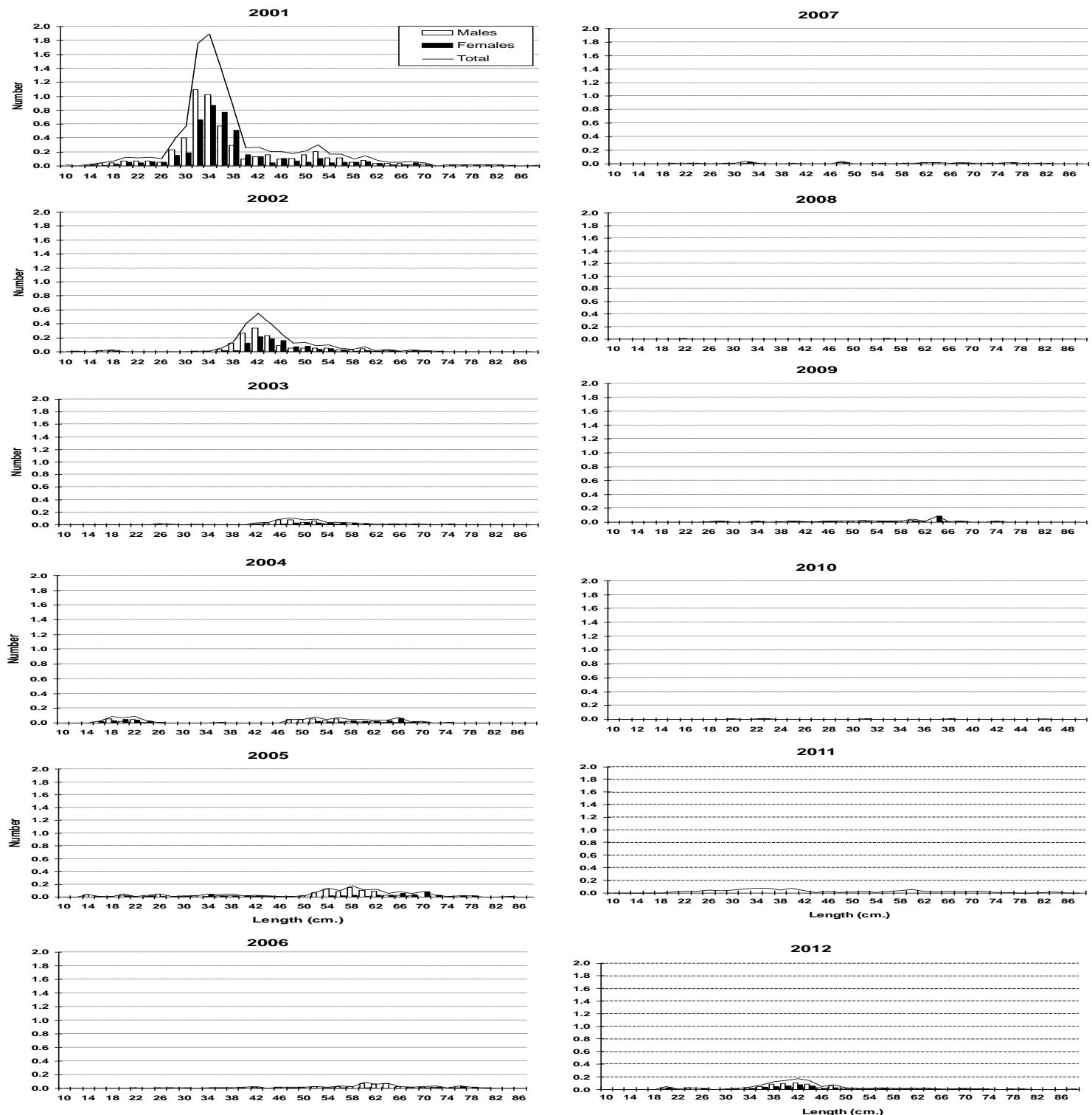


FIGURE 11.- White hake length distribution (cm) in NAFO 3NO: 2001-2012. Number per stratified mean catches.

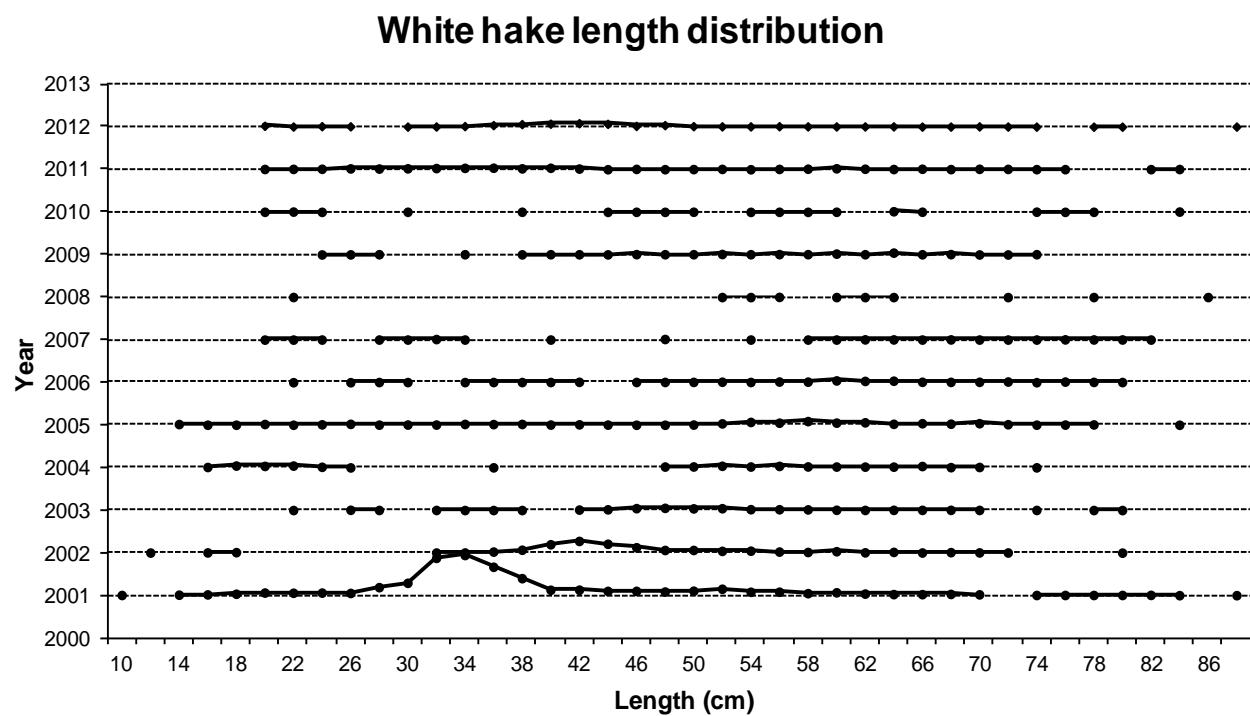


FIGURE 12.- White hake mean catches per tow length distribution (cm) on NAFO 3NO: 2001-2012.

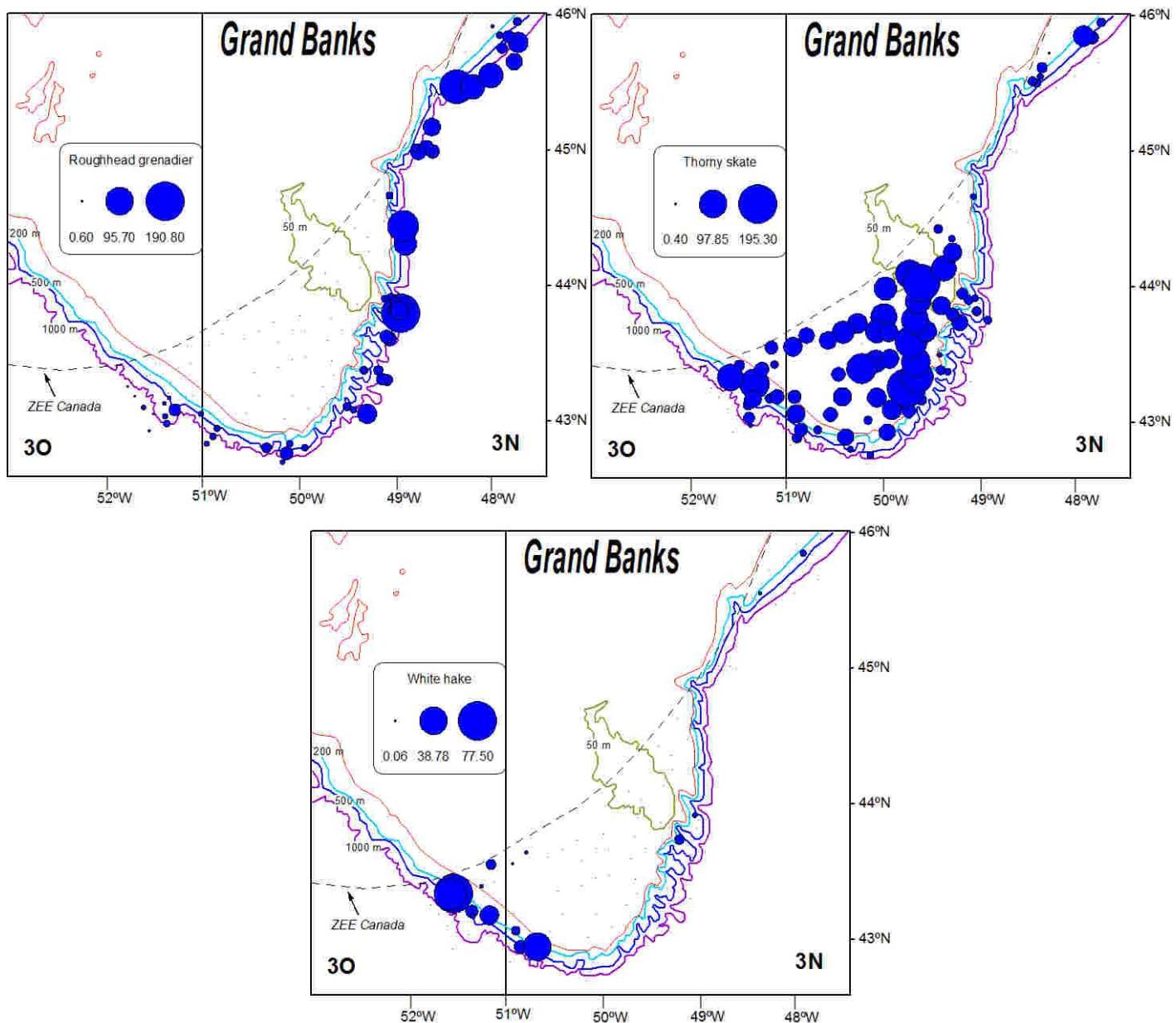


FIGURE 13.- Position of the hauls and the catch of roughhead grenadier, thorny skate and white hake during the 2012 Spanish 3NO survey