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Results for the Atlantic cod, roughhead grenadier, redfish, thorny skate and black dogfish of the Spanish Survey in the NAFO Div. 3L for the period 2003-2007

by

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Abstract

Since 2003, a stratified random spring bottom trawl survey in the NAFO Regulatory Area of Division 3L (Flemish Pass) was conducted by Spain. The surveys were carried out by the R/V “*Vizconde de Eza*” using bottom trawl net type *Campelen*. Entire series of mean catches, biomass and length distribution for Atlantic cod, roughhead grenadier, redfish, thorny skate and black dogfish are presented for the period 2003-2007.

KEYWORDS: Survey, Flemish Pass, Atlantic Cod, Roughhead grenadier, Redfish, Thorny skate, Black dogfish.

Material and Methods

The surveys on NAFO Regulatory Area of Div. 3L (Flemish Pass) were initiated by Spain in 2003. The Research vessel “*Vizconde de Eza*” carried out the surveys following the same procedures and using the same bottom trawl gear *Campelen*. In 2003, the survey was carried out in spring (June) and it did not cover all strata adequately (69% of the total area prospected in 2006-2007). In 2004, the survey was carried out in August, for a period of nine days, and it covered only the 96%. In 2005, it was not possible to perform the survey due to problems with the winch of the ship; and in 2006, for the first time, an adequate prospecting survey was conducted in Division 3L with over 100 valid hauls. Table 1 shows the number of valid tows, the depth and number of covered strata and the dates of the survey series. To know more details about the technical specifications of the surveys, see Román *et al.*, 2008.

The catch from each haul was sorted out and weighted by species and a sample of each species was taken in order to measure it and obtain the length distribution. In 2003 and 2004 the Atlantic cod samples were not sorted out by sex. There are two species of redfish in Division 3L (*Sebastes mentella* and *S. fasciatus*); the external characteristics of both species are very similar, which makes it difficult to distinguish between them and, as a result, they are treated together.

For Atlantic cod, redfish, thorny skate and black dogfish each individual of the sample was measured to the total length to the nearest lower cm and data are given in 2 cm intervals. However, roughhead grenadier individuals were measured from tip of snout to base of first anal-fin ray to the lower ½ cm., in 0.5 cm intervals, as adopted by NAFO in June 1980 (Atkinson, 1991) as a standard measurement for roundnose and roughhead grenadiers; length is presented as pre-anal-fin length (AFL) and data are given in 1 cm intervals.

We present the mean catch per haul, the stratified mean catch per haul and the biomass with their variance per year in the period 2003-2007. Length distribution in number per haul stratified mean catches per length, sex and year for these species are presented too. To obtain the biomass from length distribution, the following formula was used: $Weight=a(\text{Length}+0.5)^b$.

Results

Atlantic Cod (*Gadus morhua* Linnaeus, 1758)

NAFO manages 3 cod stocks in 3L, 3M and 3NO and a moratorium is in place for all 3 stocks. Cod had a dramatic decline during the eighties and nineties and fishing bans were imposed in the 1990s. All stocks remain at a very low level (NAFO, 2007).

Mean catches and biomass

Table 2 shows the swept area, the tow number, the mean catches and their variance per haul and year for Atlantic cod. Table 3 and Figure 1 present the stratified mean catches per stratum with the total variance per year. Table 4 and Figure 2 present the biomass per swept area per stratum and their total variance per year. Table 5 presents the length-weight relationships.

Atlantic cod indices show no clear trend along the whole period. Stratified mean catch and biomass decreased from 2003 to 2004; then, the values of these indices increased in 2006 and declined briefly again in 2007. The highest values in the estimated biomass have been observed in the shallow strata, in a range of depth from 185 to 366 meters.

Length distribution

Table 6 presents the stratified mean catches per haul length distribution for this species, by sex and year, with the number of samples in which there were length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met, as well as the total catch of this species and the total hauls made in the survey. In Figures 3 and 4 the evolution along the years can be followed.

In this period, individuals between 12 and 25 cm can be seen in 2003, 2006 and 2007. In 2004 there is no presence of individuals below 24 cm.

Roughhead grenadier (*Macrourus berglax* Lacépède, 1802)

Roughhead grenadier is not a regulated species. There is no directed fishery for this species and most catches are taken as by-catch in Greenland halibut fishery in Subareas 2 and 3. Roughhead grenadier is taken mainly in Div. 3LMN Regulatory Area. The highest level of observed catches was reached in 1998. The catches decreased in 2004, and further in 2005 and 2006 (NAFO, 2007).

Mean catches and biomass

Roughhead grenadier haul mean catches by stratum are presented in Table 7; swept area, number of hauls and SD are shown in this table too. Stratified mean catches per tow by stratum and year and their variance are presented in Table 8. The entire time series (2003-2007) of biomass and their SD estimates of American plaice are shown in Table 9 and length-weight relationships are shown in Table 5.

Roughhead grenadier indices remain stable with a slight decrease in the last year. Biomass presents the same trend as mean catches since the year 2004 (Fig. 5 and 6).

Length distribution

Table 10 presents the stratified mean catches per haul length distribution, for roughhead grenadier, by sex and year, with the number of samples in which there was length measures, the total number of individuals measured in these

samples, the sampled catch and the range of lengths met. The total catch of this species and the total hauls made in the survey are shown too. In Figures 7 and 8 the evolution along the years can be followed.

In the period 2003-2007 it can be seen a slight recruitment. Females attain larger lengths than males in all years.

Redfish (*Sebastes spp.* Cuvier, 1829)

There are two species of redfish, *Sebastes mentella* (deepwater redfish) and *Sebastes fasciatus* (Acadian redfish), which occur in Div. 3LN and are managed together. These are very similar in appearance and are reported collectively. Catches are reported by genus only (*Sebastes spp.*). There is a moratorium on 3LN stocks (no directed fishery) since 1998.

The stock biomass, female spawning biomass and abundance is higher in 2006 than in the early 1990s (NAFO, 2007).

Mean catches and biomass

Table 11 shows the swept area, the tow number, the mean catches and their variance per haul and year for redfish. Table 12 and Figure 9 present the stratified mean catches per stratum with the total variance per year.

Table 13 and Figure 10 show the biomass estimate per swept area per stratum and their total variance by year. Redfish shows a great annual variability probably due to its pelagic habitat. Biomass indices decreased in 2004 and 2007. The length-weight relationships are presented in Table 5.

Length distribution

Table 14 presents the stratified mean catches per haul length distribution, for redfish, by sex and year, with the number of samples in which there was length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met. The total catch of this species and the total hauls made in the survey are shown too. In Figures 11 and 12 the evolution along the years can be followed.

The highest proportion of small redfish in the catches (less than 20 cm) was in 2007.

Thorny skate (*Amblyraja radiata* Donovan, 1808)

NAFO started to regulate skates, under a 3-year plan, in 2004. The biomass has remained relatively constant since the mid-1990s to 2005. Since then the catches have declined (NAFO, 2007).

Mean catches and biomass

Table 15 shows the swept area, the tow number, the mean catches and their variance per haul and year for thorny skate. Table 16 presents the length-weight relationships. Table 17 and Figure 13 present the stratified mean catches per stratum with the total variance per year. Table 18 and Figure 14 present the biomass per swept area per stratum and their total variance per year. The biomass indices have increased since 2004, in the prospected area, along the whole period. The biomass presents the same trend as mean catches.

Length distribution

Table 19 presents the stratified mean catches per haul length distribution for this specie, by sex and year, with the number of samples in which there was length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met, as the total catch of this species and the total hauls made in the survey. In Figures 15 and 16 we can follow the evolution along the years.

The highest proportion of small thorny skate in the catches was in 2007.

Black dogfish (*Centroscyllium fabricii* Reinhardt, 1825)

Black dogfish is present in all Divisions, but is more abundant in Div. 3NO and in depths of more than 900 m. Black dogfish is not a regulated species and commercial catches of this species are mainly a by-catch of the Greenland halibut fishery in Div. 3LMNO (González-Costas *et al.*, 2006).

Mean catches and biomass

Black dogfish haul mean catches by stratum are presented in Table 20, including swept area, number of hauls and SD. Stratified mean catches per tow by stratum and year and their variance are presented in Table 21. The entire time series (2003-2007) of biomass and their SD estimates of American plaice are shown in Table 22. Length-weight relationships are presented in Table 16.

The biomass presents the same trend as mean catches. Biomass estimated from the 3L survey displays an increasing trend over the last three years (Fig. 17 and 18). In 2003, the catches occurred only in two strata (745 and 749), in which the catches were much different, that is why the variance in this year is so large.

Length distribution

Table 23 presents the stratified mean catches per haul length distribution, for black dogfish, by sex and year, with the number of samples in which there was length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met. The total catch of this species and the total hauls made in the survey are shown too. In Figures 19 and 20 the evolution along the years can be followed.

There is no presence of small individual (less than 40 cm). Size compositions are mainly between 50 and 80 cm of length.

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TABLE 1.- Spanish bottom trawl surveys in NAFO Division 3L for the period 2003-2007.

| Year | Vessel | Valid tows | Depth strata covered (m) | Surveyed strata (no.) | Dates |
|------|-----------------------|------------|--------------------------|-----------------------|--------------------------|
| 2003 | R/V "Vizconde de Eza" | 39 | 118-1100 | 17 | June 2 - June 6, June 29 |
| 2004 | R/V "Vizconde de Eza" | 50 | 141-1452 | 23 | August 7 - August 15 |
| 2005 | - | - | - | - | - |
| 2006 | R/V "Vizconde de Eza" | 100 | 116-1449 | 24 | July 31 - August 18 |
| 2007 | R/V "Vizconde de Eza" | 94 | 119-1449 | 24 | July 23 - August 11 |

TABLE 2.- Swept area, number of hauls and **Atlantic cod** mean catch (Kg) and SD (**) by stratum. Spanish Survey on NAFO Div. 3L in the period 2003-2007, on board the R/V "Vizconde de Eza". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|---------|------------|---------|------------|--------|------------|---------|------------|--------|------------|---------|------------|--------|------------|---------|------------|--------|
| | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD |
| 385 | 0.0225 | 2 | 0.062 | 0.040 | 0.0229 | 2 | 0.450 | 0.636 | 0.0229 | 2 | 1.783 | 2.521 | 0.0225 | 2 | 0.835 | 1.181 |
| 387 | 0.0229 | 2 | 4.390 | 1.004 | 0.0214 | 2 | 1.885 | 1.888 | 0.0225 | 2 | 0.395 | 0.559 | 0.0225 | 2 | 1.992 | 1.105 |
| 388 | 0.0334 | 3 | 7.870 | 6.987 | 0.0105 | 1 | 1.313 | - | 0.0566 | 5 | 7.028 | 5.142 | 0.0563 | 5 | 7.434 | 7.400 |
| 389 | 0.0454 | 4 | 0.844 | 1.573 | 0.0225 | 2 | 0.510 | 0.721 | 0.0795 | 7 | 10.582 | 14.986 | 0.0900 | 8 | 4.162 | 4.621 |
| 390 | 0.0563 | 5 | 0.000 | 0.000 | 0.0345 | 3 | 0.000 | 0.000 | 0.1249 | 11 | 0.081 | 0.249 | 0.1350 | 12 | 1.369 | 1.251 |
| 391 | 0.0338 | 3 | 0.167 | 0.289 | 0.0218 | 2 | 0.000 | 0.000 | 0.0450 | 4 | 14.338 | 13.278 | 0.0450 | 4 | 11.183 | 15.378 |
| 392 | 0.0116 | 1 | 0.400 | - | 0.0214 | 2 | 13.219 | 17.991 | 0.0229 | 2 | 2.045 | 1.506 | 0.0225 | 2 | 13.985 | 7.779 |
| 729 | 0.0210 | 2 | 1.260 | 1.782 | 0.0221 | 2 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 730 | 0.0221 | 2 | 0.000 | 0.000 | 0.0221 | 2 | 0.000 | 0.000 | 0.0326 | 3 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 731 | 0.0229 | 2 | 22.405 | 13.329 | 0.0233 | 2 | 0.496 | 0.530 | 0.0341 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.510 | 0.883 |
| 732 | 0.0113 | 1 | 0.000 | - | 0.0210 | 2 | 0.000 | 0.000 | 0.0334 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 733 | n.s. | n.s. | n.s. | n.s. | 0.0330 | 3 | 0.000 | 0.000 | 0.0454 | 4 | 0.000 | 0.000 | 0.0338 | 3 | 0.427 | 0.739 |
| 734 | n.s. | n.s. | n.s. | n.s. | 0.0304 | 3 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 741 | 0.0113 | 1 | 0.000 | - | 0.0323 | 3 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 742 | 0.0116 | 1 | 0.000 | - | 0.0120 | 1 | 0.000 | - | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 743 | n.s. | n.s. | n.s. | n.s. | 0.0188 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 744 | n.s. | n.s. | n.s. | n.s. | 0.0101 | 1 | 0.000 | - | 0.0229 | 2 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 |
| 745 | 0.0341 | 3 | 0.000 | 0.000 | 0.0319 | 3 | 0.000 | 0.000 | 0.0686 | 6 | 0.000 | 0.000 | 0.0675 | 6 | 0.000 | 0.000 |
| 746 | 0.0446 | 4 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 | 0.0675 | 6 | 0.000 | 0.000 | 0.0664 | 6 | 0.000 | 0.000 |
| 747 | n.s. | n.s. | n.s. | n.s. | 0.0308 | 3 | 0.000 | 0.000 | 0.1230 | 11 | 0.000 | 0.000 | 0.1238 | 11 | 0.000 | 0.000 |
| 748 | 0.0109 | 1 | 0.000 | - | 0.0199 | 2 | 0.000 | 0.000 | 0.0326 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 749 | 0.0221 | 2 | 0.000 | 0.000 | 0.0221 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0113 | 1 | 0.000 | - |
| 750 | n.s. | n.s. | n.s. | n.s. | 0.0180 | 2 | 0.000 | 0.000 | 0.1005 | 9 | 0.000 | 0.000 | 0.0679 | 6 | 0.000 | 0.000 |
| 751 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.0454 | 4 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 3.- Stratified mean catches (Kg) and SD of **Atlantic cod** by stratum and year (2003-2007). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|-------------|---------|---------|------|----------|----------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 7.26 | 53.10 | - | 210.34 | 98.53 |
| 387 | 1123.84 | 482.56 | - | 101.12 | 509.82 |
| 388 | 2809.59 | 468.74 | - | 2509.00 | 2653.87 |
| 389 | 429.34 | 259.59 | - | 5386.31 | 2118.59 |
| 390 | 0.00 | 0.00 | - | 65.94 | 1115.80 |
| 391 | 47.00 | 0.00 | - | 4043.18 | 3153.47 |
| 392 | 58.00 | 1916.68 | - | 296.53 | 2027.75 |
| 729 | 234.36 | 0.00 | - | 0.00 | 0.00 |
| 730 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 731 | 4839.48 | 107.03 | - | 0.00 | 110.16 |
| 732 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 733 | n.s | 0.00 | - | 0.00 | 99.84 |
| 734 | n.s | 0.00 | - | 0.00 | 0.00 |
| 741 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 742 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 743 | n.s | 0.00 | - | 0.00 | 0.00 |
| 744 | n.s | 0.00 | - | 0.00 | 0.00 |
| 745 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 746 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 747 | n.s | 0.00 | - | 0.00 | 0.00 |
| 748 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 749 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 750 | n.s | 0.00 | - | 0.00 | 0.00 |
| 751 | n.s | n.s | - | 0.00 | 0.00 |
| TOTAL | 9548.87 | 3287.70 | - | 12612.40 | 11887.83 |
| (\bar{y}) | 2.13 | 0.53 | - | 1.94 | 1.83 |
| SD | 0.57 | 0.30 | - | 0.55 | 0.42 |

TABLE 4.- Survey estimates (by the swept area method) of **Atlantic cod** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V “*Vizconde de Eza*”). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------|--------|------|------|------|------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 1 | 5 | - | 18 | 9 |
| 387 | 98 | 45 | - | 9 | 45 |
| 388 | 253 | 45 | - | 222 | 236 |
| 389 | 38 | 23 | - | 474 | 188 |
| 390 | 0 | 0 | - | 6 | 99 |
| 391 | 4 | 0 | - | 359 | 280 |
| 392 | 5 | 179 | - | 26 | 180 |
| 729 | 22 | 0 | - | 0 | 0 |
| 730 | 0 | 0 | - | 0 | 0 |
| 731 | 423 | 9 | - | 0 | 10 |
| 732 | 0 | 0 | - | 0 | 0 |
| 733 | n.s. | 0 | - | 0 | 9 |
| 734 | n.s. | 0 | - | 0 | 0 |
| 741 | 0 | 0 | - | 0 | 0 |
| 742 | 0 | 0 | - | 0 | 0 |
| 743 | n.s. | 0 | - | 0 | 0 |
| 744 | n.s. | 0 | - | 0 | 0 |
| 745 | 0 | 0 | - | 0 | 0 |
| 746 | 0 | 0 | - | 0 | 0 |
| 747 | n.s. | 0 | - | 0 | 0 |
| 748 | 0 | 0 | - | 0 | 0 |
| 749 | 0 | 0 | - | 0 | 0 |
| 750 | n.s. | 0 | - | 0 | 0 |
| 751 | n.s. | n.s. | - | 0 | 0 |
| TOTAL | 844 | 306 | - | 1114 | 1057 |
| SD | 222 | 180 | - | 315 | 245 |

Table 5.- Length-weight relationships in the calculation of biomass, for Division 3L (out ZEE Canada), 2003-2007 for Atlantic cod, roughhead grenadier and redfish. The equation is $Weight=a(Length+0.5)^b$. To calculate the parameters for the indeterminate individuals, we used the total data (males+females+indeterminate individuals).

| Year | Sex | Length-Weight Equations | N | r ² |
|----------------------------|---------|-------------------------|------|----------------|
| Atlantic cod | | | | |
| 2003 | All | $W = 0.0059 L^{3.0965}$ | 161 | 0.9875 |
| | Males | - | - | - |
| | Females | - | - | - |
| 2004 | All | $W = 0.0045 L^{3.2037}$ | 58 | 0.9805 |
| | Males | - | - | - |
| | Females | - | - | - |
| 2006 | All | $W = 0.0057 L^{3.3142}$ | 308 | 0.9854 |
| | Males | $W = 0.0043 L^{3.2188}$ | 142 | 0.9808 |
| | Females | $W = 0.0069 L^{3.0874}$ | 166 | 0.9896 |
| 2007 | All | $W = 0.0055 L^{3.1370}$ | 225 | 0.9830 |
| | Males | $W = 0.0061 L^{3.1114}$ | 107 | 0.9910 |
| | Females | $W = 0.0047 L^{3.1750}$ | 118 | 0.9735 |
| Roughhead grenadier | | | | |
| 2003 | All | $W = 0.0766 L^{3.0029}$ | 478 | 0.9872 |
| | Males | $W = 0.0482 L^{3.1908}$ | 172 | 0.9772 |
| | Females | $W = 0.0824 L^{2.9761}$ | 290 | 0.9913 |
| 2004 | All | $W = 0.0791 L^{3.0113}$ | 1066 | 0.9896 |
| | Males | $W = 0.0085 L^{2.9868}$ | 458 | 0.9866 |
| | Females | $W = 0.0788 L^{3.0119}$ | 597 | 0.9906 |
| 2006 | All | $W = 0.0773 L^{3.0264}$ | 1645 | 0.9817 |
| | Males | $W = 0.0664 L^{3.0810}$ | 655 | 0.9748 |
| | Females | $W = 0.0893 L^{2.9794}$ | 975 | 0.9860 |
| 2007 | All | $W = 0.0885 L^{2.9691}$ | 1950 | 0.9895 |
| | Males | $W = 0.0946 L^{2.9435}$ | 754 | 0.9859 |
| | Females | $W = 0.0877 L^{2.9727}$ | 1165 | 0.9897 |
| Redfish | | | | |
| 2003 | All | $W = 0.0037 L^{3.3842}$ | 238 | 0.9902 |
| | Males | $W = 0.0103 L^{3.0686}$ | 95 | 0.9787 |
| | Females | $W = 0.0060 L^{3.2380}$ | 90 | 0.9930 |
| 2004 | All | $W = 0.0083 L^{3.1377}$ | 237 | 0.9808 |
| | Males | $W = 0.0161 L^{2.9333}$ | 97 | 0.9877 |
| | Females | $W = 0.0190 L^{2.8927}$ | 117 | 0.9881 |
| 2006 | All | $W = 0.0096 L^{3.1034}$ | 920 | 0.9835 |
| | Males | $W = 0.0100 L^{3.0871}$ | 444 | 0.9843 |
| | Females | $W = 0.0091 L^{3.1221}$ | 471 | 0.9811 |
| 2007 | All | $W = 0.0080 L^{3.1588}$ | 881 | 0.9842 |
| | Males | $W = 0.0140 L^{2.9836}$ | 432 | 0.9858 |
| | Females | $W = 0.0133 L^{3.0115}$ | 392 | 0.9868 |

TABLE 6.- Atlantic cod length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V “*Vizconde de Eza*”). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Lenght (cm.) | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|----------------|----------|---------|--------|-------|-------|---------|--------|-------|-------|---------|--------|-------|-------|---------|--------|-------|
| | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total |
| 12 | 0.000 | 0.000 | 0.029 | 0.029 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.011 |
| 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 | 0.011 | 0.000 | 0.000 | 0.011 |
| 16 | 0.000 | 0.000 | 0.095 | 0.095 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.021 | 0.000 | 0.000 | 0.021 |
| 18 | 0.000 | 0.000 | 0.060 | 0.060 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.033 | 0.000 | 0.033 | 0.040 | 0.029 | 0.000 | 0.070 |
| 20 | 0.000 | 0.000 | 0.095 | 0.095 | 0.000 | 0.000 | 0.000 | 0.000 | 0.033 | 0.000 | 0.000 | 0.033 | 0.042 | 0.000 | 0.000 | 0.042 |
| 22 | 0.000 | 0.000 | 0.182 | 0.182 | 0.000 | 0.000 | 0.000 | 0.000 | 0.055 | 0.022 | 0.000 | 0.076 | 0.022 | 0.011 | 0.000 | 0.032 |
| 24 | 0.000 | 0.000 | 0.339 | 0.339 | 0.000 | 0.000 | 0.016 | 0.016 | 0.077 | 0.099 | 0.000 | 0.176 | 0.011 | 0.010 | 0.000 | 0.021 |
| 26 | 0.000 | 0.000 | 0.380 | 0.380 | 0.000 | 0.000 | 0.033 | 0.033 | 0.088 | 0.165 | 0.000 | 0.252 | 0.011 | 0.000 | 0.000 | 0.011 |
| 28 | 0.000 | 0.000 | 0.242 | 0.242 | 0.000 | 0.000 | 0.058 | 0.058 | 0.087 | 0.186 | 0.000 | 0.273 | 0.020 | 0.040 | 0.000 | 0.060 |
| 30 | 0.000 | 0.000 | 0.303 | 0.303 | 0.000 | 0.000 | 0.152 | 0.152 | 0.131 | 0.186 | 0.000 | 0.317 | 0.049 | 0.020 | 0.000 | 0.069 |
| 32 | 0.000 | 0.000 | 0.271 | 0.271 | 0.000 | 0.000 | 0.033 | 0.033 | 0.196 | 0.109 | 0.000 | 0.305 | 0.051 | 0.065 | 0.000 | 0.116 |
| 34 | 0.000 | 0.000 | 0.283 | 0.283 | 0.000 | 0.000 | 0.047 | 0.047 | 0.152 | 0.098 | 0.000 | 0.250 | 0.074 | 0.064 | 0.000 | 0.138 |
| 36 | 0.000 | 0.000 | 0.372 | 0.372 | 0.000 | 0.000 | 0.085 | 0.085 | 0.120 | 0.109 | 0.000 | 0.229 | 0.072 | 0.134 | 0.000 | 0.206 |
| 38 | 0.000 | 0.000 | 0.350 | 0.350 | 0.000 | 0.000 | 0.147 | 0.147 | 0.109 | 0.119 | 0.000 | 0.229 | 0.137 | 0.171 | 0.000 | 0.308 |
| 40 | 0.000 | 0.000 | 0.196 | 0.196 | 0.000 | 0.000 | 0.102 | 0.102 | 0.054 | 0.118 | 0.000 | 0.172 | 0.107 | 0.139 | 0.000 | 0.245 |
| 42 | 0.000 | 0.000 | 0.382 | 0.382 | 0.000 | 0.000 | 0.098 | 0.098 | 0.117 | 0.065 | 0.000 | 0.182 | 0.103 | 0.139 | 0.000 | 0.243 |
| 44 | 0.000 | 0.000 | 0.096 | 0.096 | 0.000 | 0.000 | 0.056 | 0.056 | 0.131 | 0.097 | 0.000 | 0.228 | 0.106 | 0.074 | 0.000 | 0.179 |
| 46 | 0.000 | 0.000 | 0.124 | 0.124 | 0.000 | 0.000 | 0.035 | 0.035 | 0.108 | 0.131 | 0.000 | 0.239 | 0.020 | 0.134 | 0.000 | 0.155 |
| 48 | 0.000 | 0.000 | 0.128 | 0.128 | 0.000 | 0.000 | 0.012 | 0.012 | 0.033 | 0.087 | 0.000 | 0.120 | 0.073 | 0.042 | 0.000 | 0.115 |
| 50 | 0.000 | 0.000 | 0.077 | 0.077 | 0.000 | 0.000 | 0.035 | 0.035 | 0.032 | 0.052 | 0.000 | 0.084 | 0.020 | 0.030 | 0.000 | 0.051 |
| 52 | 0.000 | 0.000 | 0.117 | 0.117 | 0.000 | 0.000 | 0.000 | 0.000 | 0.022 | 0.054 | 0.000 | 0.076 | 0.021 | 0.052 | 0.000 | 0.073 |
| 54 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.012 | 0.000 | 0.041 | 0.000 | 0.041 | 0.050 | 0.021 | 0.000 | 0.071 |
| 56 | 0.000 | 0.000 | 0.027 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.019 | 0.041 | 0.000 | 0.060 |
| 58 | 0.000 | 0.000 | 0.024 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.000 | 0.011 | 0.032 | 0.030 | 0.000 | 0.062 |
| 60 | 0.000 | 0.000 | 0.024 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.011 | 0.000 | 0.020 |
| 62 | 0.000 | 0.000 | 0.027 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.011 | 0.000 | 0.022 |
| 64 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 |
| 66 | 0.000 | 0.000 | 0.024 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 68 | 0.000 | 0.000 | 0.024 | 0.024 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.010 | 0.000 | 0.010 |
| 70 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 72 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 74 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 76 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 |
| 78 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 |
| 80 | 0.000 | 0.000 | 0.027 | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total | 0.000 | 0.000 | 4.300 | 4.300 | 0.000 | 0.000 | 0.920 | 0.920 | 1.566 | 1.816 | 0.000 | 3.382 | 1.132 | 1.300 | 0.000 | 2.432 |
| N° samples: | | | | | | | | | | | | | | | | |
| N° Ind.: | | | | 14 | | | | 9 | | | | 22 | | | | 32 |
| Sampled catch: | - | - | 160 | 160 | - | - | 55 | 55 | 143 | 167 | 0 | 310 | 107 | 119 | 0 | 226 |
| Range: | | | | 84 | | | | 34 | | | | 176 | | | | 168 |
| Total catch: | | | | 13-81 | | | | 24-55 | | | | 13-79 | | | | 12-76 |
| Total hauls: | | | | 84 | | | | 34 | | | | 176 | | | | 168 |

TABLE 7.- Swept area, number of hauls and **roughhead grenadier** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V "Vizconde de Eza". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|---------|------------|---------|------------|--------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|
| | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD |
| 385 | 0.0225 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 387 | 0.0229 | 2 | 0.000 | 0.000 | 0.0214 | 2 | 59.987 | 23.598 | 0.0225 | 2 | 34.790 | 20.520 | 0.0225 | 2 | 45.990 | 51.746 |
| 388 | 0.0334 | 3 | 0.000 | 0.000 | 0.0105 | 1 | 43.300 | | 0.0566 | 5 | 26.406 | 7.803 | 0.0563 | 5 | 37.663 | 22.136 |
| 389 | 0.0454 | 4 | 0.000 | 0.000 | 0.0225 | 2 | 1.875 | 2.652 | 0.0795 | 7 | 1.426 | 2.642 | 0.0900 | 8 | 3.075 | 8.697 |
| 390 | 0.0563 | 5 | 0.560 | 1.252 | 0.0345 | 3 | 0.007 | 0.012 | 0.1249 | 11 | 0.000 | 0.000 | 0.1350 | 12 | 0.000 | 0.000 |
| 391 | 0.0338 | 3 | 0.017 | 0.029 | 0.0218 | 2 | 0.018 | 0.025 | 0.0450 | 4 | 178.123 | 304.579 | 0.0450 | 4 | 86.525 | 171.255 |
| 392 | 0.0116 | 1 | 3.900 | - | 0.0214 | 2 | 200.650 | 255.195 | 0.0229 | 2 | 118.025 | 159.347 | 0.0225 | 2 | 129.950 | 138.805 |
| 729 | 0.0210 | 2 | 37.750 | 4.596 | 0.0221 | 2 | 29.475 | 17.501 | 0.0338 | 3 | 25.164 | 23.944 | 0.0338 | 3 | 26.490 | 13.222 |
| 730 | 0.0221 | 2 | 101.050 | 37.972 | 0.0221 | 2 | 33.715 | 0.544 | 0.0326 | 3 | 53.270 | 7.021 | 0.0225 | 2 | 81.378 | 33.061 |
| 731 | 0.0229 | 2 | 3.510 | 1.824 | 0.0233 | 2 | 10.450 | 5.162 | 0.0341 | 3 | 10.512 | 3.252 | 0.0338 | 3 | 14.333 | 7.365 |
| 732 | 0.0113 | 1 | 34.400 | - | 0.0210 | 2 | 39.490 | 7.594 | 0.0334 | 3 | 22.164 | 9.200 | 0.0338 | 3 | 11.151 | 3.253 |
| 733 | n.s. | n.s. | n.s. | n.s. | 0.0330 | 3 | 15.553 | 5.137 | 0.0454 | 4 | 23.450 | 16.806 | 0.0338 | 3 | 19.104 | 14.162 |
| 734 | n.s. | n.s. | n.s. | n.s. | 0.0304 | 3 | 65.850 | 106.305 | 0.0225 | 2 | 39.315 | 9.638 | 0.0225 | 2 | 23.400 | 8.202 |
| 741 | 0.0113 | 1 | 8.7 | - | 0.0323 | 3 | 1.055 | 1.342 | 0.0218 | 2 | 17.557 | 23.112 | 0.0225 | 2 | 4.650 | 6.166 |
| 742 | 0.0116 | 1 | 24.4 | - | 0.0120 | 1 | 4.700 | - | 0.0229 | 2 | 20.933 | 7.015 | 0.0225 | 2 | 14.493 | 2.011 |
| 743 | n.s. | n.s. | n.s. | n.s. | 0.0188 | 2 | 26.245 | 6.017 | 0.0225 | 2 | 10.574 | 6.353 | 0.0225 | 2 | 29.666 | 25.928 |
| 744 | n.s. | n.s. | n.s. | n.s. | 0.0101 | 1 | 2.550 | - | 0.0229 | 2 | 15.365 | 15.111 | 0.0218 | 2 | 33.965 | 0.375 |
| 745 | 0.0341 | 3 | 17.546 | 10.764 | 0.0319 | 3 | 5.800 | 2.722 | 0.0686 | 6 | 8.238 | 5.438 | 0.0675 | 6 | 3.624 | 1.509 |
| 746 | 0.0446 | 4 | 63.8 | 71.784 | 0.0338 | 3 | 26.205 | 21.151 | 0.0675 | 6 | 41.767 | 29.972 | 0.0664 | 6 | 34.607 | 22.333 |
| 747 | n.s. | n.s. | n.s. | n.s. | 0.0308 | 3 | 43.627 | 13.999 | 0.1230 | 11 | 42.307 | 40.112 | 0.1238 | 11 | 62.510 | 26.732 |
| 748 | 0.0109 | 1 | 55.98 | - | 0.0199 | 2 | 22.515 | 18.547 | 0.0326 | 3 | 67.920 | 73.796 | 0.0338 | 3 | 33.533 | 16.455 |
| 749 | 0.0221 | 2 | 145.2 | 23.193 | 0.0221 | 2 | 45.900 | 51.336 | 0.0229 | 2 | 25.930 | 31.919 | 0.0113 | 1 | 28.700 | - |
| 750 | n.s. | n.s. | n.s. | n.s. | 0.0180 | 2 | 56.750 | 36.416 | 0.1005 | 9 | 16.866 | 18.117 | 0.0679 | 6 | 19.516 | 24.114 |
| 751 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.0454 | 4 | 4.253 | 3.543 | 0.0225 | 2 | 24.445 | 7.983 |

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 8.- Stratified mean catches (Kg) and SD of **roughhead grenadier** year (2003-2007).
n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|-------------|----------|-----------|------|-----------|-----------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 387 | 0.00 | 15356.54 | - | 8906.24 | 11773.44 |
| 388 | 0.00 | 15458.10 | - | 9426.94 | 13445.76 |
| 389 | 0.00 | 954.38 | - | 725.69 | 1565.18 |
| 390 | 456.40 | 5.43 | - | 0.00 | 0.00 |
| 391 | 4.70 | 4.94 | - | 50230.55 | 24400.05 |
| 392 | 565.50 | 29094.25 | - | 17113.63 | 18842.75 |
| 729 | 7021.50 | 5482.35 | - | 4680.44 | 4927.20 |
| 730 | 17178.50 | 5731.55 | - | 9055.90 | 13834.26 |
| 731 | 758.16 | 2257.20 | - | 2270.52 | 3095.93 |
| 732 | 7946.40 | 9122.19 | - | 5119.88 | 2575.96 |
| 733 | n.s | 3639.48 | - | 5487.30 | 4470.26 |
| 734 | n.s | 10075.05 | - | 6015.20 | 3580.20 |
| 741 | 870.00 | 105.53 | - | 1755.70 | 465.00 |
| 742 | 1561.60 | 300.80 | - | 1339.68 | 927.55 |
| 743 | n.s | 1338.50 | - | 539.27 | 1512.97 |
| 744 | n.s | 168.30 | - | 1014.09 | 2241.69 |
| 745 | 6106.24 | 2018.40 | - | 2866.88 | 1261.09 |
| 746 | 25009.60 | 10272.36 | - | 16372.53 | 13565.94 |
| 747 | n.s | 31585.71 | - | 30630.47 | 45257.17 |
| 748 | 8900.82 | 3579.89 | - | 10799.28 | 5331.80 |
| 749 | 18295.20 | 5783.40 | - | 3267.18 | 3616.20 |
| 750 | n.s | 31553.00 | - | 9377.25 | 10850.99 |
| 751 | n.s | n.s | - | 973.82 | 5597.91 |
| TOTAL | 94674.62 | 183887.34 | - | 197968.44 | 193139.30 |
| (\bar{y}) | 21.16 | 29.38 | - | 30.52 | 29.77 |
| SD | 3.38 | 5.27 | - | 7.41 | 4.86 |

TABLE 9.- Survey estimates (by the swept area method) of **roughhead grenadier** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V “*Vizconde de Eza*”). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------|--------|-------|------|-------|-------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0 | 0 | - | 0 | 0 |
| 387 | 0 | 1437 | - | 792 | 1047 |
| 388 | 0 | 1472 | - | 832 | 1195 |
| 389 | 0 | 85 | - | 64 | 139 |
| 390 | 41 | 0 | - | 0 | 0 |
| 391 | 0 | 0 | - | 4465 | 2169 |
| 392 | 49 | 2722 | - | 1496 | 1675 |
| 729 | 669 | 496 | - | 416 | 438 |
| 730 | 1553 | 518 | - | 833 | 1230 |
| 731 | 66 | 194 | - | 200 | 275 |
| 732 | 706 | 869 | - | 460 | 229 |
| 733 | n.s | 331 | - | 484 | 397 |
| 734 | n.s | 995 | - | 535 | 318 |
| 741 | 77 | 10 | - | 161 | 41 |
| 742 | 134 | 25 | - | 117 | 82 |
| 743 | n.s | 143 | - | 48 | 134 |
| 744 | n.s | 17 | - | 89 | 206 |
| 745 | 537 | 190 | - | 251 | 112 |
| 746 | 2242 | 913 | - | 1455 | 1226 |
| 747 | n.s | 3082 | - | 2739 | 4023 |
| 748 | 818 | 360 | - | 993 | 474 |
| 749 | 1654 | 523 | - | 286 | 321 |
| 750 | n.s | 3506 | - | 840 | 959 |
| 751 | n.s | n.s | - | 86 | 498 |
| TOTAL | 8546 | 17887 | - | 17641 | 17190 |
| SD | 1340 | 3240 | - | 4271 | 2799 |

TABLE 10.- Roughhead grenadier length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V “*Vizconde de Eza*”). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Lenght (cm.) | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|----------------|---------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|
| | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total |
| 1.5 | 0.000 | 0.000 | 0.025 | 0.025 | 0.000 | 0.000 | 0.024 | 0.024 | 0.000 | 0.000 | 0.040 | 0.040 | 0.000 | 0.020 | 0.010 | 0.030 |
| 2.5 | 0.371 | 0.161 | 0.670 | 1.201 | 0.018 | 0.019 | 0.060 | 0.097 | 0.070 | 0.040 | 0.024 | 0.134 | 0.000 | 0.041 | 0.148 | 0.188 |
| 3.5 | 0.175 | 0.107 | 0.197 | 0.478 | 0.767 | 0.207 | 0.179 | 1.153 | 0.612 | 0.156 | 0.141 | 0.910 | 0.398 | 0.168 | 0.696 | 1.262 |
| 4.5 | 0.183 | 0.203 | 0.000 | 0.386 | 0.088 | 0.073 | 0.000 | 0.162 | 0.145 | 0.000 | 0.000 | 0.145 | 0.082 | 0.062 | 0.020 | 0.164 |
| 5.5 | 1.679 | 1.701 | 0.000 | 3.380 | 0.356 | 0.416 | 0.000 | 0.772 | 0.124 | 0.151 | 0.000 | 0.274 | 0.341 | 0.209 | 0.018 | 0.569 |
| 6.5 | 0.941 | 0.881 | 0.000 | 1.822 | 0.724 | 1.077 | 0.000 | 1.801 | 0.912 | 0.713 | 0.000 | 1.625 | 0.939 | 0.754 | 0.000 | 1.693 |
| 7.5 | 0.545 | 0.339 | 0.000 | 0.884 | 0.320 | 0.393 | 0.000 | 0.713 | 0.619 | 0.477 | 0.000 | 1.096 | 0.282 | 0.329 | 0.000 | 0.612 |
| 8.5 | 0.598 | 0.857 | 0.000 | 1.455 | 0.802 | 0.923 | 0.000 | 1.725 | 0.461 | 0.504 | 0.000 | 0.965 | 0.538 | 0.683 | 0.012 | 1.233 |
| 9.5 | 0.530 | 0.683 | 0.000 | 1.213 | 1.053 | 1.117 | 0.000 | 2.170 | 0.954 | 0.866 | 0.000 | 1.820 | 0.604 | 0.812 | 0.000 | 1.416 |
| 10.5 | 1.171 | 1.102 | 0.000 | 2.273 | 0.870 | 0.550 | 0.000 | 1.421 | 0.868 | 0.977 | 0.000 | 1.845 | 0.837 | 0.549 | 0.000 | 1.386 |
| 11.5 | 0.899 | 0.943 | 0.000 | 1.841 | 1.032 | 1.129 | 0.000 | 2.161 | 1.361 | 1.258 | 0.000 | 2.620 | 1.208 | 1.116 | 0.000 | 2.324 |
| 12.5 | 1.481 | 0.844 | 0.000 | 2.325 | 1.467 | 1.273 | 0.000 | 2.740 | 1.826 | 1.776 | 0.005 | 3.607 | 1.126 | 1.222 | 0.000 | 2.348 |
| 13.5 | 1.869 | 1.396 | 0.000 | 3.265 | 1.640 | 1.047 | 0.000 | 2.687 | 1.661 | 1.746 | 0.005 | 3.412 | 1.463 | 1.452 | 0.000 | 2.915 |
| 14.5 | 2.953 | 2.525 | 0.000 | 5.478 | 2.354 | 1.696 | 0.000 | 4.050 | 1.906 | 1.766 | 0.000 | 3.673 | 1.888 | 1.712 | 0.000 | 3.600 |
| 15.5 | 3.443 | 2.537 | 0.000 | 5.979 | 3.427 | 2.571 | 0.000 | 5.998 | 2.205 | 1.641 | 0.000 | 3.846 | 1.541 | 1.469 | 0.000 | 3.009 |
| 16.5 | 2.937 | 3.107 | 0.000 | 6.044 | 4.598 | 3.436 | 0.000 | 8.034 | 2.186 | 1.856 | 0.000 | 4.042 | 1.737 | 1.557 | 0.000 | 3.294 |
| 17.5 | 1.758 | 2.939 | 0.000 | 4.697 | 3.980 | 3.202 | 0.000 | 7.182 | 3.447 | 1.882 | 0.010 | 5.339 | 1.967 | 1.448 | 0.000 | 3.415 |
| 18.5 | 0.825 | 1.668 | 0.000 | 2.492 | 3.589 | 2.730 | 0.000 | 6.320 | 2.995 | 2.030 | 0.000 | 5.025 | 1.853 | 1.378 | 0.000 | 3.231 |
| 19.5 | 0.630 | 1.364 | 0.000 | 1.994 | 1.981 | 2.897 | 0.000 | 4.878 | 1.729 | 2.935 | 0.000 | 4.664 | 1.569 | 1.574 | 0.000 | 3.143 |
| 20.5 | 0.177 | 1.101 | 0.000 | 1.279 | 1.090 | 1.730 | 0.000 | 2.820 | 0.910 | 2.505 | 0.000 | 3.415 | 0.976 | 1.695 | 0.000 | 2.671 |
| 21.5 | 0.068 | 1.070 | 0.000 | 1.137 | 0.133 | 1.129 | 0.000 | 1.262 | 0.507 | 2.602 | 0.000 | 3.110 | 0.405 | 2.379 | 0.000 | 2.784 |
| 22.5 | 0.027 | 0.763 | 0.000 | 0.790 | 0.222 | 0.747 | 0.000 | 0.969 | 0.095 | 1.732 | 0.000 | 1.827 | 0.148 | 2.176 | 0.000 | 2.324 |
| 23.5 | 0.014 | 0.607 | 0.000 | 0.621 | 0.000 | 0.569 | 0.000 | 0.569 | 0.032 | 1.439 | 0.000 | 1.471 | 0.052 | 1.897 | 0.000 | 1.949 |
| 24.5 | 0.000 | 0.409 | 0.000 | 0.409 | 0.000 | 0.687 | 0.000 | 0.687 | 0.010 | 0.935 | 0.000 | 0.945 | 0.000 | 1.489 | 0.000 | 1.489 |
| 25.5 | 0.000 | 0.581 | 0.000 | 0.581 | 0.014 | 0.435 | 0.000 | 0.449 | 0.000 | 0.839 | 0.000 | 0.839 | 0.015 | 1.181 | 0.000 | 1.196 |
| 26.5 | 0.000 | 0.474 | 0.000 | 0.474 | 0.000 | 0.604 | 0.000 | 0.604 | 0.000 | 0.629 | 0.000 | 0.629 | 0.004 | 1.049 | 0.000 | 1.053 |
| 27.5 | 0.000 | 0.465 | 0.000 | 0.465 | 0.000 | 0.150 | 0.000 | 0.150 | 0.000 | 0.248 | 0.000 | 0.248 | 0.000 | 0.691 | 0.000 | 0.691 |
| 28.5 | 0.000 | 0.346 | 0.000 | 0.346 | 0.000 | 0.302 | 0.000 | 0.302 | 0.000 | 0.308 | 0.000 | 0.308 | 0.010 | 0.373 | 0.000 | 0.384 |
| 29.5 | 0.000 | 0.263 | 0.000 | 0.263 | 0.000 | 0.241 | 0.000 | 0.241 | 0.000 | 0.196 | 0.000 | 0.196 | 0.011 | 0.354 | 0.000 | 0.365 |
| 30.5 | 0.000 | 0.227 | 0.000 | 0.227 | 0.000 | 0.209 | 0.000 | 0.209 | 0.000 | 0.102 | 0.000 | 0.102 | 0.000 | 0.283 | 0.000 | 0.283 |
| 31.5 | 0.000 | 0.087 | 0.000 | 0.087 | 0.000 | 0.236 | 0.000 | 0.236 | 0.000 | 0.132 | 0.000 | 0.132 | 0.000 | 0.212 | 0.000 | 0.212 |
| 32.5 | 0.000 | 0.071 | 0.000 | 0.071 | 0.000 | 0.040 | 0.000 | 0.040 | 0.000 | 0.088 | 0.000 | 0.088 | 0.000 | 0.069 | 0.000 | 0.069 |
| 33.5 | 0.000 | 0.063 | 0.000 | 0.063 | 0.000 | 0.010 | 0.000 | 0.010 | 0.000 | 0.038 | 0.000 | 0.038 | 0.000 | 0.026 | 0.000 | 0.026 |
| 34.5 | 0.000 | 0.028 | 0.000 | 0.028 | 0.000 | 0.085 | 0.000 | 0.085 | 0.000 | 0.031 | 0.000 | 0.031 | 0.000 | 0.082 | 0.000 | 0.082 |
| 35.5 | 0.000 | 0.027 | 0.000 | 0.027 | 0.000 | 0.080 | 0.000 | 0.080 | 0.000 | 0.010 | 0.000 | 0.010 | 0.000 | 0.049 | 0.000 | 0.049 |
| 36.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.010 | 0.000 | 0.051 | 0.000 | 0.051 | 0.000 | 0.036 | 0.000 | 0.036 |
| 37.5 | 0.000 | 0.036 | 0.000 | 0.036 | 0.000 | 0.058 | 0.000 | 0.058 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.021 | 0.000 | 0.021 |
| 38.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.000 | 0.010 | 0.000 | 0.010 |
| 39.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 40.5 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.000 | 0.021 |
| Total | 23.273 | 29.977 | 0.892 | 54.141 | 30.527 | 32.075 | 0.263 | 62.865 | 25.636 | 32.682 | 0.226 | 58.544 | 19.995 | 30.647 | 0.903 | 51.545 |
| N° samples: | | | | | | | | | | | | | | | | |
| N° Ind.: | | | | 22 | | | | 43 | | | | 83 | | | | 71 |
| Sampled catch: | 943 | 1268 | 37 | 2248 | 1188 | 1359 | 17 | 2564 | 2107 | 2423 | 25 | 4555 | 1589 | 2246 | 69 | 3904 |
| Range: | | | | 1013 | | | | 1579 | | | | 2985 | | | | 2712 |
| Total catch: | | | | 2-38 | | | | 2-37.5 | | | | 1.5-39 | | | | 2-41 |
| Total hauls: | | | | 1013 | | | | 1579 | | | | 2985 | | | | 2712 |

TABLE 11.- Swept area, number of hauls and **redfish** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V "Vizconde de Eza". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|---------|------------|---------|------------|----------|------------|---------|------------|----------|------------|---------|------------|----------|------------|---------|------------|---------|
| | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD |
| 385 | 0.0225 | 2 | 0.001 | 0.001 | 0.0229 | 2 | 0.005 | 0.007 | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.041 | 0.027 |
| 387 | 0.0229 | 2 | 1.715 | 1.110 | 0.0214 | 2 | 56.000 | 51.619 | 0.0225 | 2 | 113.685 | 116.171 | 0.0225 | 2 | 80.400 | 34.083 |
| 388 | 0.0334 | 3 | 6.453 | 6.142 | 0.0105 | 1 | 11.800 | - | 0.0566 | 5 | 66.040 | 32.355 | 0.0563 | 5 | 162.078 | 100.787 |
| 389 | 0.0454 | 4 | 0.801 | 0.912 | 0.0225 | 2 | 33.050 | 44.901 | 0.0795 | 7 | 46.008 | 84.876 | 0.0900 | 8 | 10.723 | 18.542 |
| 390 | 0.0563 | 5 | 0.580 | 1.242 | 0.0345 | 3 | 0.000 | 0.000 | 0.1249 | 11 | 0.188 | 0.318 | 0.1350 | 12 | 0.173 | 0.473 |
| 391 | 0.0338 | 3 | 0.087 | 0.085 | 0.0218 | 2 | 1.435 | 1.718 | 0.0450 | 4 | 7.135 | 5.793 | 0.0450 | 4 | 6.013 | 6.351 |
| 392 | 0.0116 | 1 | 46.300 | - | 0.0214 | 2 | 1222.320 | 1712.075 | 0.0229 | 2 | 4367.190 | 5741.976 | 0.0225 | 2 | 959.650 | 350.230 |
| 729 | 0.0210 | 2 | 88.800 | 73.963 | 0.0221 | 2 | 310.250 | 239.780 | 0.0338 | 3 | 202.167 | 262.943 | 0.0338 | 3 | 128.889 | 184.792 |
| 730 | 0.0221 | 2 | 231.080 | 64.389 | 0.0221 | 2 | 55.550 | 72.761 | 0.0326 | 3 | 145.923 | 148.390 | 0.0225 | 2 | 367.737 | 518.964 |
| 731 | 0.0229 | 2 | 39.365 | 8.252 | 0.0233 | 2 | 79.550 | 68.236 | 0.0341 | 3 | 19.053 | 7.921 | 0.0338 | 3 | 37.100 | 28.646 |
| 732 | 0.0113 | 1 | 72.200 | - | 0.0210 | 2 | 42.025 | 55.119 | 0.0334 | 3 | 5.638 | 7.067 | 0.0338 | 3 | 12.115 | 13.539 |
| 733 | n.s. | n.s. | n.s. | n.s. | 0.0330 | 3 | 111.667 | 109.389 | 0.0454 | 4 | 72.600 | 47.167 | 0.0338 | 3 | 115.667 | 70.383 |
| 734 | n.s. | n.s. | n.s. | n.s. | 0.0304 | 3 | 5.383 | 7.029 | 0.0225 | 2 | 12.328 | 3.921 | 0.0225 | 2 | 24.728 | 28.585 |
| 741 | 0.0113 | 1 | 2240 | - | 0.0323 | 3 | 0.255 | 0.255 | 0.0218 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 742 | 0.0116 | 1 | 0 | - | 0.0120 | 1 | 0.331 | - | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.300 | 0.424 |
| 743 | n.s. | n.s. | n.s. | n.s. | 0.0188 | 2 | 2.090 | 2.956 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 744 | n.s. | n.s. | n.s. | n.s. | 0.0101 | 1 | 0.000 | - | 0.0229 | 2 | 0.000 | 0.000 | 0.0218 | 2 | 0.479 | 0.677 |
| 745 | 0.0341 | 3 | 1753.1 | 3028.407 | 0.0319 | 3 | 0.000 | 0.000 | 0.0686 | 6 | 0.119 | 0.221 | 0.0675 | 6 | 0.380 | 0.450 |
| 746 | 0.0446 | 4 | 0 | 0 | 0.0338 | 3 | 0.000 | 0.000 | 0.0675 | 6 | 0.118 | 0.185 | 0.0664 | 6 | 0.000 | 0.000 |
| 747 | n.s. | n.s. | n.s. | n.s. | 0.0308 | 3 | 0.200 | 0.346 | 0.1230 | 11 | 0.000 | 0.000 | 0.1238 | 11 | 0.000 | 0.000 |
| 748 | 0.0109 | 1 | 2.7 | - | 0.0199 | 2 | 0.440 | 0.622 | 0.0326 | 3 | 0.130 | 0.225 | 0.0338 | 3 | 0.830 | 1.050 |
| 749 | 0.0221 | 2 | 0 | 0 | 0.0221 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0113 | 1 | 0.000 | - |
| 750 | n.s. | n.s. | n.s. | n.s. | 0.0180 | 2 | 0.000 | 0.000 | 0.1005 | 9 | 0.000 | 0.000 | 0.0679 | 6 | 0.000 | 0.000 |
| 751 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.0454 | 4 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |

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

TABLE 12.- Stratified mean catches (Kg) and SD of **redfish** by stratum and year (2003-2007). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------------|-----------|-----------|------|-----------|-----------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0.12 | 0.59 | - | 0.00 | 4.84 |
| 387 | 439.04 | 14336.00 | - | 29103.36 | 20582.40 |
| 388 | 2303.84 | 4212.60 | - | 23576.28 | 57861.85 |
| 389 | 407.58 | 16822.45 | - | 23418.22 | 5458.01 |
| 390 | 472.70 | 0.00 | - | 153.59 | 141.00 |
| 391 | 24.44 | 404.67 | - | 2012.07 | 1695.53 |
| 392 | 6713.50 | 177236.40 | - | 633242.55 | 139149.25 |
| 729 | 16516.80 | 57706.50 | - | 37603.00 | 23973.29 |
| 730 | 39283.60 | 9443.50 | - | 24806.97 | 62515.29 |
| 731 | 8502.84 | 17182.80 | - | 4115.52 | 8013.60 |
| 732 | 16678.20 | 9707.78 | - | 1302.46 | 2798.49 |
| 733 | n.s | 26130.00 | - | 16988.40 | 27066.00 |
| 734 | n.s | 823.65 | - | 1886.11 | 3783.31 |
| 741 | 224000.00 | 25.50 | - | 0.00 | 0.00 |
| 742 | 0.00 | 21.18 | - | 0.00 | 19.20 |
| 743 | n.s | 106.59 | - | 0.00 | 0.00 |
| 744 | n.s | 0.00 | - | 0.00 | 31.58 |
| 745 | 610078.80 | 0.00 | - | 41.47 | 132.24 |
| 746 | 0.00 | 0.00 | - | 46.39 | 0.00 |
| 747 | n.s | 144.80 | - | 0.00 | 0.00 |
| 748 | 429.30 | 69.96 | - | 20.67 | 131.97 |
| 749 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 750 | n.s | 0.00 | - | 0.00 | 0.00 |
| 751 | n.s | n.s | - | 0.00 | 0.00 |
| TOTAL | 925850.76 | 334374.97 | | 798317.04 | 353357.83 |
| (\bar{y}) | 206.94 | 53.43 | | 123.06 | 54.47 |
| SD | 136.03 | 28.87 | | 90.99 | 11.94 |

TABLE 13.- Survey estimates (by the swept area method) of **redfish** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V “*Vizconde de Eza*”). n.s. means stratum not surveyed. In 2003: the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------|--------|-------|------|-------|-------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0 | 0 | - | 0 | 0 |
| 387 | 38 | 1341 | - | 2587 | 1830 |
| 388 | 207 | 401 | - | 2082 | 5143 |
| 389 | 36 | 1495 | - | 2062 | 485 |
| 390 | 42 | 0 | - | 14 | 13 |
| 391 | 2 | 37 | - | 179 | 151 |
| 392 | 578 | 16584 | - | 55365 | 12369 |
| 729 | 1573 | 5216 | - | 3342 | 2131 |
| 730 | 3551 | 854 | - | 2281 | 5557 |
| 731 | 743 | 1478 | - | 362 | 712 |
| 732 | 1483 | 925 | - | 117 | 249 |
| 733 | n.s | 2375 | - | 1498 | 2406 |
| 734 | n.s | 81 | - | 168 | 336 |
| 741 | 19911 | 2 | - | 0 | 0 |
| 742 | 0 | 2 | - | 0 | 2 |
| 743 | n.s | 11 | - | 0 | 0 |
| 744 | n.s | 0 | - | 0 | 3 |
| 745 | 53633 | 0 | - | 4 | 12 |
| 746 | 0 | 0 | - | 4 | 0 |
| 747 | n.s | 14 | - | 0 | 0 |
| 748 | 39 | 7 | - | 2 | 12 |
| 749 | 0 | 0 | - | 0 | 0 |
| 750 | n.s | 0 | - | 0 | 0 |
| 751 | n.s | n.s | - | 0 | 0 |
| TOTAL | 81837 | 30825 | | 70066 | 31410 |
| SD | 50717 | 17163 | | 50718 | 6885 |

TABLE 14.- Redfish length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V “*Vizconde de Eza*”). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Lenght (cm.) | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|----------------|---------------|---------------|-------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|
| | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total |
| 4 | 0.000 | 0.000 | 0.195 | 0.195 | 0.000 | 0.000 | 0.044 | 0.044 | 0.000 | 0.012 | 0.000 | 0.012 | 0.000 | 0.000 | 0.044 | 0.044 |
| 6 | 0.000 | 0.000 | 7.290 | 7.290 | 0.000 | 0.000 | 3.677 | 3.677 | 0.099 | 0.049 | 2.832 | 2.980 | 0.000 | 0.000 | 17.446 | 17.446 |
| 8 | 0.032 | 0.092 | 1.641 | 1.765 | 0.244 | 0.087 | 5.055 | 5.386 | 0.898 | 1.282 | 13.679 | 15.859 | 0.010 | 0.187 | 26.862 | 27.060 |
| 10 | 1.237 | 0.697 | 0.706 | 2.640 | 3.475 | 2.031 | 1.693 | 7.199 | 2.184 | 1.277 | 1.817 | 5.278 | 1.451 | 2.169 | 1.641 | 5.261 |
| 12 | 2.752 | 1.188 | 0.000 | 3.940 | 4.862 | 3.304 | 4.929 | 13.094 | 3.000 | 3.275 | 0.121 | 6.395 | 4.450 | 3.714 | 0.530 | 8.693 |
| 14 | 3.744 | 28.780 | 0.000 | 32.524 | 3.923 | 1.826 | 2.164 | 7.912 | 11.245 | 8.431 | 0.000 | 19.676 | 3.435 | 1.800 | 0.011 | 5.246 |
| 16 | 3.177 | 1.411 | 0.000 | 4.588 | 8.873 | 5.168 | 0.262 | 14.303 | 20.688 | 19.489 | 0.000 | 40.177 | 5.966 | 3.806 | 0.000 | 9.771 |
| 18 | 4.389 | 27.403 | 0.000 | 31.791 | 11.871 | 12.090 | 0.000 | 23.961 | 14.289 | 13.658 | 0.000 | 27.947 | 11.847 | 13.077 | 0.000 | 24.924 |
| 20 | 6.001 | 4.175 | 0.000 | 10.176 | 23.037 | 20.029 | 0.000 | 43.067 | 23.653 | 11.009 | 0.000 | 34.662 | 25.500 | 15.852 | 0.000 | 41.353 |
| 22 | 5.981 | 5.110 | 0.000 | 11.091 | 19.463 | 18.469 | 0.000 | 37.932 | 41.880 | 31.008 | 0.000 | 72.888 | 36.002 | 30.404 | 0.000 | 66.406 |
| 24 | 65.488 | 63.971 | 0.000 | 129.459 | 30.922 | 12.776 | 0.000 | 43.698 | 40.394 | 44.208 | 0.000 | 84.602 | 19.885 | 32.599 | 0.000 | 52.484 |
| 26 | 11.519 | 141.787 | 0.000 | 153.306 | 35.905 | 14.433 | 0.000 | 50.339 | 9.497 | 58.297 | 0.000 | 67.794 | 7.338 | 11.292 | 0.000 | 18.630 |
| 28 | 52.415 | 5.791 | 0.000 | 58.206 | 16.796 | 12.423 | 0.000 | 29.219 | 8.686 | 64.054 | 0.000 | 72.740 | 4.692 | 6.693 | 0.000 | 11.385 |
| 30 | 54.149 | 82.477 | 0.000 | 136.626 | 5.362 | 5.646 | 0.000 | 11.008 | 6.121 | 47.610 | 0.000 | 53.730 | 4.327 | 5.569 | 0.000 | 9.896 |
| 32 | 56.440 | 29.715 | 0.000 | 86.155 | 0.521 | 2.704 | 0.000 | 3.225 | 4.127 | 23.729 | 0.000 | 27.856 | 5.484 | 7.420 | 0.000 | 12.903 |
| 34 | 1.451 | 29.513 | 0.000 | 30.965 | 0.163 | 0.593 | 0.000 | 0.756 | 0.724 | 3.743 | 0.000 | 4.467 | 2.656 | 2.821 | 0.000 | 5.477 |
| 36 | 0.180 | 0.649 | 0.000 | 0.829 | 0.295 | 0.367 | 0.000 | 0.662 | 0.124 | 2.145 | 0.000 | 2.269 | 0.203 | 0.962 | 0.000 | 1.165 |
| 38 | 0.088 | 0.000 | 0.000 | 0.088 | 0.125 | 0.046 | 0.000 | 0.171 | 0.079 | 1.046 | 0.000 | 1.124 | 0.051 | 0.134 | 0.000 | 0.185 |
| 40 | 0.000 | 0.034 | 0.000 | 0.034 | 0.000 | 0.000 | 0.000 | 0.000 | 0.020 | 0.014 | 0.000 | 0.034 | 0.022 | 0.034 | 0.000 | 0.056 |
| 42 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.010 | 0.013 | 0.026 | 0.000 | 0.038 |
| 44 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.000 | 0.000 | 0.012 |
| 46 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.026 | 0.000 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 |
| 48 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.000 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 |
| 50 | 0.000 | 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 |
| 52 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.010 |
| Total | 269.04 | 422.79 | 9.83 | 701.67 | 165.84 | 111.99 | 17.82 | 295.65 | 187.71 | 334.38 | 18.45 | 540.54 | 133.36 | 138.57 | 46.53 | 318.46 |
| N° samples: | | | | | | | | | | | | | | | | |
| N° Ind.: | | | | 22 | | | | 28 | | | | 48 | | | | 51 |
| Sampled catch: | 965 | 799 | 304 | 2068 | 1903 | 1662 | 409 | 3974 | 3205 | 3089 | 1205 | 7499 | 2669 | 2360 | 2016 | 7045 |
| Range: | | | | 8366 | | | | 3970 | | | | 11080 | | | | 4675 |
| Total catch: | | | | 5-40 | | | | 5-39 | | | | 5-48 | | | | 5-53 |
| Total hauls: | | | | 8368 | | | | 3970 | | | | 11080 | | | | 4675 |

TABLE 15.- Swept area, number of hauls and **thorny skate** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V "*Vizconde de Eza*". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|---------|------------|---------|------------|--------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|
| | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD |
| 385 | 0.0225 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 7.050 | 9.970 | 0.0229 | 2 | 6.044 | 4.588 | 0.0225 | 2 | 30.260 | 11.653 |
| 387 | 0.0229 | 2 | 5.295 | 4.957 | 0.0214 | 2 | 10.700 | 2.263 | 0.0225 | 2 | 16.438 | 16.599 | 0.0225 | 2 | 32.485 | 2.143 |
| 388 | 0.0334 | 3 | 13.273 | 13.347 | 0.0105 | 1 | 16.700 | | 0.0566 | 5 | 44.186 | 24.414 | 0.0563 | 5 | 31.096 | 13.246 |
| 389 | 0.0454 | 4 | 5.984 | 5.117 | 0.0225 | 2 | 10.900 | 13.294 | 0.0795 | 7 | 32.979 | 14.712 | 0.0900 | 8 | 25.861 | 11.704 |
| 390 | 0.0563 | 5 | 0.190 | 0.425 | 0.0345 | 3 | 1.997 | 1.730 | 0.1249 | 11 | 5.529 | 7.479 | 0.1350 | 12 | 7.366 | 7.441 |
| 391 | 0.0338 | 3 | 1.723 | 1.509 | 0.0218 | 2 | 64.250 | 65.125 | 0.0450 | 4 | 151.088 | 51.460 | 0.0450 | 4 | 100.658 | 56.818 |
| 392 | 0.0116 | 1 | 10.050 | - | 0.0214 | 2 | 62.300 | 0.141 | 0.0229 | 2 | 149.500 | 165.604 | 0.0225 | 2 | 330.100 | 170.554 |
| 729 | 0.0210 | 2 | 54.955 | 31.176 | 0.0221 | 2 | 140.375 | 186.712 | 0.0338 | 3 | 49.261 | 27.663 | 0.0338 | 3 | 164.760 | 243.624 |
| 730 | 0.0221 | 2 | 71.400 | 60.670 | 0.0221 | 2 | 0.000 | 0.000 | 0.0326 | 3 | 4.348 | 7.532 | 0.0225 | 2 | 0.000 | 0.000 |
| 731 | 0.0229 | 2 | 38.705 | 25.873 | 0.0233 | 2 | 18.510 | 22.330 | 0.0341 | 3 | 46.757 | 62.791 | 0.0338 | 3 | 57.448 | 64.552 |
| 732 | 0.0113 | 1 | 76.200 | | 0.0210 | 2 | 0.000 | 0.000 | 0.0334 | 3 | 2.015 | 1.851 | 0.0338 | 3 | 0.000 | 0.000 |
| 733 | n.s. | n.s. | n.s. | n.s. | 0.0330 | 3 | 9.363 | 5.299 | 0.0454 | 4 | 14.573 | 8.911 | 0.0338 | 3 | 6.427 | 8.497 |
| 734 | n.s. | n.s. | n.s. | n.s. | 0.0304 | 3 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 741 | 0.0113 | 1 | 0 | - | 0.0323 | 3 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 742 | 0.0116 | 1 | 0 | - | 0.0120 | 1 | 0.000 | | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 743 | n.s. | n.s. | n.s. | n.s. | 0.0188 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 744 | n.s. | n.s. | n.s. | n.s. | 0.0101 | 1 | 0.000 | | 0.0229 | 2 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 |
| 745 | 0.0341 | 3 | 22.077 | 21.917 | 0.0319 | 3 | 0.000 | 0.000 | 0.0686 | 6 | 0.000 | 0.000 | 0.0675 | 6 | 0.000 | 0.000 |
| 746 | 0.0446 | 4 | 2.318 | 3.703 | 0.0338 | 3 | 0.000 | 0.000 | 0.0675 | 6 | 0.000 | 0.000 | 0.0664 | 6 | 0.000 | 0.000 |
| 747 | n.s. | n.s. | | | 0.0308 | 3 | 0.000 | 0.000 | 0.1230 | 11 | 0.000 | 0.000 | 0.1238 | 11 | 0.000 | 0.000 |
| 748 | 0.0109 | 1 | 65.220 | - | 0.0199 | 2 | 0.000 | 0.000 | 0.0326 | 3 | 0.837 | 1.449 | 0.0338 | 3 | 0.000 | 0.000 |
| 749 | 0.0221 | 2 | 8.060 | 6.067 | 0.0221 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0113 | 1 | 0.000 | - |
| 750 | n.s. | n.s. | n.s. | n.s. | 0.0180 | 2 | 1.375 | 1.945 | 0.1005 | 9 | 0.393 | 1.180 | 0.0679 | 6 | 0.000 | 0.000 |
| 751 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.0454 | 4 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

Table 16.- Length-weight relationships in the calculation of biomass, for Division 3L (out ZEE Canada), 2003-2007 for the thorny skate and black dogfish. The equation is $Weight=a(Length+0.5)^b$. To calculate the parameters for the indeterminate individuals, we used the total data (males+females+indeterminate individuals).

| Year | Sex | Length-Weight Equations | N | r ² |
|----------------------|---------|-------------------------|-----|----------------|
| Thorny skate | | | | |
| 2003 | All | $W = 0.0050 L^{3.1712}$ | 305 | 0.9896 |
| | Males | $W = 0.0051 L^{3.1619}$ | 141 | 0.9906 |
| | Females | $W = 0.0048 L^{3.1855}$ | 164 | 0.9888 |
| 2004 | All | $W = 0.0067 L^{3.1187}$ | 186 | 0.9661 |
| | Males | $W = 0.0054 L^{3.1684}$ | 94 | 0.9700 |
| | Females | $W = 0.0086 L^{3.0629}$ | 92 | 0.9639 |
| 2006 | All | $W = 0.0084 L^{3.0587}$ | 491 | 0.9830 |
| | Males | $W = 0.0103 L^{3.0011}$ | 210 | 0.9847 |
| | Females | $W = 0.0061 L^{3.1402}$ | 281 | 0.9814 |
| 2007 | All | $W = 0.0080 L^{3.0609}$ | 539 | 0.9848 |
| | Males | $W = 0.0091 L^{3.0242}$ | 255 | 0.9868 |
| | Females | $W = 0.0072 L^{3.0929}$ | 284 | 0.9839 |
| Black dogfish | | | | |
| 2003 | All | $W = 0.0081 L^{2.8882}$ | 20 | 0.9637327 |
| | Males | $W = 0.1143 L^{2.2194}$ | 5 | 0.9381904 |
| | Females | $W = 0.0072 L^{2.9265}$ | 15 | 0.9782095 |
| 2004 | All | $W = 0.0025 L^{3.1608}$ | 113 | 0.9592316 |
| | Males | $W = 0.0272 L^{2.5776}$ | 58 | 0.8969346 |
| | Females | $W = 0.0013 L^{3.3314}$ | 55 | 0.9808791 |
| 2006 | All | $W = 0.0011 L^{3.3758}$ | 283 | 0.9215765 |
| | Males | $W = 0.0071 L^{2.9000}$ | 99 | 0.923292 |
| | Females | $W = 0.0008 L^{3.4608}$ | 184 | 0.9363115 |
| 2007 | All | $W = 0.0008 L^{3.4421}$ | 362 | 0.9154611 |
| | Males | $W = 0.0099 L^{2.8281}$ | 147 | 0.9028648 |
| | Females | $W = 0.0006 L^{3.5445}$ | 215 | 0.9372968 |

TABLE 17.- Stratified mean catches (Kg) and SD of **thorny skate** by stratum and year (2003-2007).
n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area
prospected in 2006-2007.

| Stratum | Survey | | | | |
|-------------|----------|----------|------|-----------|-----------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0.00 | 831.90 | - | 713.19 | 3570.68 |
| 387 | 1355.52 | 2739.20 | - | 4208.00 | 8316.16 |
| 388 | 4738.58 | 5961.90 | - | 15774.40 | 11101.27 |
| 389 | 3045.60 | 5548.10 | - | 16786.09 | 13163.25 |
| 390 | 154.85 | 1627.28 | - | 4506.21 | 6003.36 |
| 391 | 485.98 | 18118.50 | - | 42606.68 | 28385.42 |
| 392 | 1457.25 | 9033.50 | - | 21677.50 | 47864.50 |
| 729 | 10221.63 | 26109.75 | - | 9162.48 | 30645.36 |
| 730 | 12138.00 | 0.00 | - | 739.22 | 0.00 |
| 731 | 8360.28 | 3998.16 | - | 10099.44 | 12408.84 |
| 732 | 17602.20 | 0.00 | - | 465.47 | 0.00 |
| 733 | n.s | 2191.02 | - | 3410.14 | 1503.84 |
| 734 | n.s | 0.00 | - | 0.00 | 0.00 |
| 741 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 742 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 743 | n.s | 0.00 | - | 0.00 | 0.00 |
| 744 | n.s | 0.00 | - | 0.00 | 0.00 |
| 745 | 7682.68 | 0.00 | - | 0.00 | 0.00 |
| 746 | 908.46 | 0.00 | - | 0.00 | 0.00 |
| 747 | n.s | 0.00 | - | 0.00 | 0.00 |
| 748 | 10369.98 | 0.00 | - | 133.03 | 0.00 |
| 749 | 1015.56 | 0.00 | - | 0.00 | 0.00 |
| 750 | n.s | 764.50 | - | 218.69 | 0.00 |
| 751 | n.s | n.s | - | 0.00 | 0.00 |
| TOTAL | 79536.57 | 76923.81 | | 130500.54 | 162962.67 |
| (\bar{y}) | 17.78 | 12.29 | | 20.12 | 25.12 |
| SD | 2.41 | 4.54 | | 3.27 | 5.19 |

TABLE 18.- Survey estimates (by the swept area method) of **thorny skate** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V “*Vizconde de Eza*”). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------|--------|------|------|-------|-------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0 | 73 | - | 62 | 317 |
| 387 | 119 | 256 | - | 374 | 739 |
| 388 | 426 | 568 | - | 1393 | 987 |
| 389 | 268 | 493 | - | 1478 | 1170 |
| 390 | 14 | 142 | - | 397 | 534 |
| 391 | 43 | 1666 | - | 3787 | 2523 |
| 392 | 125 | 845 | - | 1895 | 4255 |
| 729 | 973 | 2360 | - | 814 | 2724 |
| 730 | 1097 | 0 | - | 68 | 0 |
| 731 | 731 | 344 | - | 888 | 1103 |
| 732 | 1565 | 0 | - | 42 | 0 |
| 733 | n.s | 199 | - | 301 | 134 |
| 734 | n.s | 0 | - | 0 | 0 |
| 741 | 0 | 0 | - | 0 | 0 |
| 742 | 0 | 0 | - | 0 | 0 |
| 743 | n.s | 0 | - | 0 | 0 |
| 744 | n.s | 0 | - | 0 | 0 |
| 745 | 675 | 0 | - | 0 | 0 |
| 746 | 81 | 0 | - | 0 | 0 |
| 747 | n.s | 0 | - | 0 | 0 |
| 748 | 954 | 0 | - | 12 | 0 |
| 749 | 92 | 0 | - | 0 | 0 |
| 750 | n.s | 85 | - | 20 | 0 |
| 751 | n.s | n.s | - | 0 | 0 |
| TOTAL | 7164 | 7031 | | 11531 | 14486 |
| SD | 942 | 2642 | | 1887 | 2993 |

TABLE 19.- Thorny skate length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V “Vizconde de Eza”). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Length (cm.) | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|----------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total |
| 10 | 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 |
| 12 | 0.089 | 0.065 | 0.000 | 0.154 | 0.000 | 0.000 | 0.000 | 0.000 | 0.041 | 0.009 | 0.000 | 0.050 | 0.161 | 0.079 | 0.000 | 0.239 |
| 14 | 0.190 | 0.076 | 0.000 | 0.266 | 0.040 | 0.000 | 0.000 | 0.040 | 0.087 | 0.000 | 0.000 | 0.087 | 0.084 | 0.123 | 0.000 | 0.207 |
| 16 | 0.000 | 0.030 | 0.000 | 0.030 | 0.000 | 0.000 | 0.000 | 0.000 | 0.042 | 0.029 | 0.000 | 0.071 | 0.054 | 0.098 | 0.000 | 0.151 |
| 18 | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 | 0.000 | 0.000 | 0.023 | 0.034 | 0.022 | 0.000 | 0.056 | 0.132 | 0.122 | 0.000 | 0.254 |
| 20 | 0.000 | 0.030 | 0.000 | 0.030 | 0.000 | 0.024 | 0.000 | 0.024 | 0.029 | 0.031 | 0.000 | 0.060 | 0.175 | 0.101 | 0.000 | 0.276 |
| 22 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.031 | 0.000 | 0.031 | 0.155 | 0.189 | 0.000 | 0.344 |
| 24 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.034 | 0.011 | 0.000 | 0.045 | 0.131 | 0.143 | 0.000 | 0.274 |
| 26 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.133 | 0.163 | 0.000 | 0.296 |
| 28 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 | 0.011 | 0.000 | 0.034 | 0.100 | 0.056 | 0.000 | 0.156 |
| 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.033 | 0.000 | 0.033 | 0.075 | 0.045 | 0.000 | 0.120 |
| 32 | 0.068 | 0.023 | 0.000 | 0.091 | 0.012 | 0.023 | 0.000 | 0.035 | 0.034 | 0.011 | 0.000 | 0.046 | 0.077 | 0.055 | 0.000 | 0.132 |
| 34 | 0.049 | 0.083 | 0.000 | 0.132 | 0.015 | 0.000 | 0.000 | 0.015 | 0.012 | 0.035 | 0.000 | 0.046 | 0.089 | 0.034 | 0.000 | 0.123 |
| 36 | 0.191 | 0.201 | 0.000 | 0.392 | 0.012 | 0.000 | 0.000 | 0.012 | 0.023 | 0.011 | 0.000 | 0.034 | 0.056 | 0.054 | 0.000 | 0.110 |
| 38 | 0.233 | 0.403 | 0.000 | 0.636 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 | 0.000 | 0.035 | 0.055 | 0.056 | 0.000 | 0.111 |
| 40 | 0.138 | 0.431 | 0.000 | 0.569 | 0.044 | 0.052 | 0.000 | 0.097 | 0.045 | 0.034 | 0.000 | 0.079 | 0.021 | 0.011 | 0.000 | 0.032 |
| 42 | 0.348 | 0.653 | 0.000 | 1.000 | 0.068 | 0.067 | 0.000 | 0.135 | 0.000 | 0.033 | 0.000 | 0.033 | 0.034 | 0.056 | 0.000 | 0.090 |
| 44 | 0.315 | 0.610 | 0.000 | 0.925 | 0.099 | 0.253 | 0.000 | 0.351 | 0.011 | 0.034 | 0.000 | 0.045 | 0.042 | 0.042 | 0.000 | 0.085 |
| 46 | 0.229 | 0.462 | 0.000 | 0.691 | 0.141 | 0.142 | 0.000 | 0.283 | 0.092 | 0.082 | 0.000 | 0.174 | 0.051 | 0.086 | 0.000 | 0.137 |
| 48 | 0.422 | 0.514 | 0.000 | 0.936 | 0.174 | 0.121 | 0.000 | 0.296 | 0.103 | 0.078 | 0.000 | 0.181 | 0.053 | 0.086 | 0.000 | 0.139 |
| 50 | 0.347 | 0.340 | 0.000 | 0.687 | 0.259 | 0.239 | 0.000 | 0.498 | 0.133 | 0.172 | 0.000 | 0.305 | 0.119 | 0.132 | 0.000 | 0.251 |
| 52 | 0.569 | 0.364 | 0.000 | 0.933 | 0.350 | 0.256 | 0.000 | 0.606 | 0.219 | 0.134 | 0.000 | 0.353 | 0.094 | 0.146 | 0.000 | 0.240 |
| 54 | 0.321 | 0.319 | 0.000 | 0.640 | 0.328 | 0.143 | 0.000 | 0.471 | 0.267 | 0.370 | 0.000 | 0.637 | 0.207 | 0.237 | 0.000 | 0.443 |
| 56 | 0.557 | 0.434 | 0.000 | 0.991 | 0.324 | 0.231 | 0.000 | 0.555 | 0.218 | 0.237 | 0.000 | 0.455 | 0.191 | 0.340 | 0.000 | 0.531 |
| 58 | 0.246 | 0.388 | 0.000 | 0.634 | 0.321 | 0.240 | 0.000 | 0.562 | 0.216 | 0.459 | 0.000 | 0.675 | 0.303 | 0.272 | 0.000 | 0.575 |
| 60 | 0.172 | 0.263 | 0.000 | 0.435 | 0.410 | 0.200 | 0.000 | 0.610 | 0.363 | 0.385 | 0.000 | 0.748 | 0.270 | 0.591 | 0.000 | 0.862 |
| 62 | 0.363 | 0.141 | 0.000 | 0.504 | 0.111 | 0.152 | 0.000 | 0.264 | 0.221 | 0.535 | 0.000 | 0.756 | 0.462 | 0.758 | 0.000 | 1.220 |
| 64 | 0.278 | 0.171 | 0.000 | 0.449 | 0.177 | 0.193 | 0.000 | 0.371 | 0.410 | 0.537 | 0.000 | 0.948 | 0.419 | 0.624 | 0.000 | 1.042 |
| 66 | 0.104 | 0.019 | 0.000 | 0.123 | 0.222 | 0.144 | 0.000 | 0.367 | 0.339 | 0.385 | 0.000 | 0.725 | 0.340 | 0.537 | 0.000 | 0.877 |
| 68 | 0.058 | 0.152 | 0.000 | 0.209 | 0.116 | 0.053 | 0.000 | 0.168 | 0.173 | 0.410 | 0.000 | 0.583 | 0.372 | 0.645 | 0.000 | 1.016 |
| 70 | 0.103 | 0.039 | 0.000 | 0.142 | 0.053 | 0.023 | 0.000 | 0.076 | 0.189 | 0.216 | 0.000 | 0.405 | 0.249 | 0.376 | 0.000 | 0.624 |
| 72 | 0.065 | 0.077 | 0.000 | 0.142 | 0.061 | 0.000 | 0.000 | 0.061 | 0.076 | 0.134 | 0.000 | 0.210 | 0.183 | 0.244 | 0.000 | 0.427 |
| 74 | 0.065 | 0.021 | 0.000 | 0.086 | 0.000 | 0.000 | 0.000 | 0.000 | 0.089 | 0.067 | 0.000 | 0.156 | 0.119 | 0.128 | 0.000 | 0.247 |
| 76 | 0.019 | 0.000 | 0.000 | 0.019 | 0.000 | 0.000 | 0.000 | 0.000 | 0.078 | 0.054 | 0.000 | 0.132 | 0.044 | 0.053 | 0.000 | 0.097 |
| 78 | 0.054 | 0.000 | 0.000 | 0.054 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.011 | 0.032 | 0.031 | 0.000 | 0.063 |
| 80 | 0.019 | 0.000 | 0.000 | 0.019 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.011 | 0.000 | 0.023 | 0.010 | 0.000 | 0.000 | 0.010 |
| 82 | 0.000 | 0.019 | 0.000 | 0.019 | 0.077 | 0.000 | 0.000 | 0.077 | 0.000 | 0.000 | 0.000 | 0.000 | 0.011 | 0.000 | 0.000 | 0.011 |
| 84 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 86 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 88 | 0.044 | 0.000 | 0.000 | 0.044 | 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 | 5.657 | 6.353 | 0.000 | 12.010 | 3.438 | 2.556 | 0.000 | 5.994 | 3.611 | 4.663 | 0.000 | 8.275 | 5.101 | 6.711 | 0.000 | 11.811 |
| N° samples: | | | | | | | | | | | | | | | | |
| N° Ind.: | | | | 26 | | | | 18 | | | | 42 | | | | 43 |
| Sampled catch: | 197 | 226 | 0 | 423 | 170 | 135 | 0 | 305 | 312 | 420 | 0 | 732 | 457 | 621 | 0 | 1078 |
| Range: | | | | 648 | | | | 617 | | | | 1832 | | | | 2325 |
| Total catch: | | | | 11-89 | | | | 14-83 | | | | 13-81 | | | | 12-82 |
| Total hauls: | | | | 654 | | | | 682 | | | | 1832 | | | | 2325 |

TABLE 20.- Swept area, number of hauls and **black dogfish** mean catch (Kg) and SD (**) by stratum. Spanish Survey in NAFO Div. 3L for the period 2003-2007, on board the R/V "Vizconde de Ezda". (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|---------|------------|---------|------------|---------|------------|---------|------------|--------|------------|---------|------------|---------|------------|---------|------------|--------|
| | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD | Swept area | Tow No. | Mean catch | SD |
| 385 | 0.0225 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 387 | 0.0229 | 2 | 0.000 | 0.000 | 0.0214 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 388 | 0.0334 | 3 | 0.000 | 0.000 | 0.0105 | 1 | 0.000 | - | 0.0566 | 5 | 0.000 | 0.000 | 0.0563 | 5 | 0.000 | 0.000 |
| 389 | 0.0454 | 4 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0795 | 7 | 0.000 | 0.000 | 0.0900 | 8 | 0.000 | 0.000 |
| 390 | 0.0563 | 5 | 0.000 | 0.000 | 0.0345 | 3 | 0.000 | 0.000 | 0.1249 | 11 | 0.000 | 0.000 | 0.1350 | 12 | 0.000 | 0.000 |
| 391 | 0.0338 | 3 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 | 0.0450 | 4 | 0.000 | 0.000 | 0.0450 | 4 | 0.000 | 0.000 |
| 392 | 0.0116 | 1 | 0.000 | - | 0.0214 | 2 | 0.000 | 0.000 | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 729 | 0.0210 | 2 | 0.000 | 0.000 | 0.0221 | 2 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 730 | 0.0221 | 2 | 0.000 | 0.000 | 0.0221 | 2 | 2.175 | 3.076 | 0.0326 | 3 | 3.690 | 6.391 | 0.0225 | 2 | 19.488 | 26.067 |
| 731 | 0.0229 | 2 | 0.000 | 0.000 | 0.0233 | 2 | 0.000 | 0.000 | 0.0341 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 732 | 0.0113 | 1 | 0.000 | - | 0.0210 | 2 | 0.000 | 0.000 | 0.0334 | 3 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 733 | n.s. | n.s. | n.s. | n.s. | 0.0330 | 3 | 0.000 | 0.000 | 0.0454 | 4 | 0.000 | 0.000 | 0.0338 | 3 | 0.000 | 0.000 |
| 734 | n.s. | n.s. | n.s. | n.s. | 0.0304 | 3 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 741 | 0.0113 | 1 | 0 | - | 0.0323 | 3 | 0.000 | 0.000 | 0.0218 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 742 | 0.0116 | 1 | 0 | - | 0.0120 | 1 | 0.000 | - | 0.0229 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 743 | n.s. | n.s. | n.s. | n.s. | 0.0188 | 2 | 0.626 | 0.862 | 0.0225 | 2 | 0.000 | 0.000 | 0.0225 | 2 | 0.000 | 0.000 |
| 744 | n.s. | n.s. | n.s. | n.s. | 0.0101 | 1 | 0.000 | - | 0.0229 | 2 | 0.725 | 1.025 | 0.0218 | 2 | 1.663 | 0.541 |
| 745 | 0.0341 | 3 | 0.007 | 0.012 | 0.0319 | 3 | 0.000 | 0.000 | 0.0686 | 6 | 0.000 | 0.000 | 0.0675 | 6 | 0.000 | 0.000 |
| 746 | 0.0446 | 4 | 0 | 0 | 0.0338 | 3 | 0.000 | 0.000 | 0.0675 | 6 | 9.033 | 10.572 | 0.0664 | 6 | 9.171 | 6.742 |
| 747 | n.s. | n.s. | n.s. | n.s. | 0.0308 | 3 | 4.067 | 3.591 | 0.1230 | 11 | 3.656 | 2.707 | 0.1238 | 11 | 6.015 | 5.815 |
| 748 | 0.0109 | 1 | 0 | - | 0.0199 | 2 | 36.980 | 52.298 | 0.0326 | 3 | 15.713 | 18.383 | 0.0338 | 3 | 35.817 | 40.266 |
| 749 | 0.0221 | 2 | 219.750 | 310.773 | 0.0221 | 2 | 17.300 | 5.515 | 0.0229 | 2 | 91.125 | 124.599 | 0.0113 | 1 | 229.700 | - |
| 750 | n.s. | n.s. | n.s. | n.s. | 0.0180 | 2 | 2.800 | 3.960 | 0.1005 | 9 | 6.213 | 9.605 | 0.0679 | 6 | 13.979 | 28.671 |
| 751 | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | 0.0454 | 4 | 1.103 | 1.497 | 0.0225 | 2 | 4.405 | 0.191 |

$$(**) SD = \frac{\sum (x_i - \bar{x})}{n-1}$$

TABLE 21.- Stratified mean catches (Kg) and SD of **black dogfish** by stratum and year (2003-2007).
n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------------|----------|----------|------|----------|----------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 387 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 388 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 389 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 390 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 391 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 392 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 729 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 730 | 0.00 | 369.75 | - | 627.30 | 3312.88 |
| 731 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 732 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 733 | n.s | 0.00 | - | 0.00 | 0.00 |
| 734 | n.s | 0.00 | - | 0.00 | 0.00 |
| 741 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 742 | 0.00 | 0.00 | - | 0.00 | 0.00 |
| 743 | n.s | 31.90 | - | 0.00 | 0.00 |
| 744 | n.s | 0.00 | - | 47.85 | 109.73 |
| 745 | 2.32 | 0.00 | - | 0.00 | 0.00 |
| 746 | 0.00 | 0.00 | - | 3541.07 | 3594.84 |
| 747 | n.s | 2944.27 | - | 2646.94 | 4354.53 |
| 748 | 0.00 | 5879.82 | - | 2498.42 | 5694.85 |
| 749 | 27688.50 | 2179.80 | - | 11481.75 | 28942.20 |
| 750 | n.s | 1556.80 | - | 3454.61 | 7772.42 |
| 751 | n.s | n.s | - | 252.47 | 1008.75 |
| TOTAL | 27690.82 | 12962.34 | | 24550.42 | 54790.18 |
| (\bar{y}) | 6.19 | 2.07 | | 3.78 | 8.45 |
| SD | 6.19 | 1.01 | | 1.78 | 1.28 |

TABLE 22.- Survey estimates (by the swept area method) of **black dogfish** biomass (t.) and SD by stratum and year in NAFO Div. 3L (R/V “*Vizconde de Eza*”). n.s. means stratum not surveyed. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Stratum | Survey | | | | |
|---------|--------|------|------|------|------|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| 385 | 0 | 0 | - | 0 | 0 |
| 387 | 0 | 0 | - | 0 | 0 |
| 388 | 0 | 0 | - | 0 | 0 |
| 389 | 0 | 0 | - | 0 | 0 |
| 390 | 0 | 0 | - | 0 | 0 |
| 391 | 0 | 0 | - | 0 | 0 |
| 392 | 0 | 0 | - | 0 | 0 |
| 729 | 0 | 0 | - | 0 | 0 |
| 730 | 0 | 33 | - | 58 | 294 |
| 731 | 0 | 0 | - | 0 | 0 |
| 732 | 0 | 0 | - | 0 | 0 |
| 733 | n.s. | 0 | - | 0 | 0 |
| 734 | n.s. | 0 | - | 0 | 0 |
| 741 | 0 | 0 | - | 0 | 0 |
| 742 | 0 | 0 | - | 0 | 0 |
| 743 | n.s. | 3 | - | 0 | 0 |
| 744 | n.s. | 0 | - | 4 | 10 |
| 745 | 0 | 0 | - | 0 | 0 |
| 746 | 0 | 0 | - | 315 | 325 |
| 747 | n.s. | 287 | - | 237 | 387 |
| 748 | 0 | 592 | - | 230 | 506 |
| 749 | 2503 | 197 | - | 1004 | 2573 |
| 750 | n.s. | 173 | - | 309 | 687 |
| 751 | n.s. | n.s. | - | 22 | 90 |
| TOTAL | 2503 | 1286 | | 2179 | 4872 |
| SD | 2546 | 695 | | 994 | 721 |

TABLE 23.- Black dogfish length distribution per haul mean catches by sex and year. Number per stratified mean catches. Spanish Summer Survey in NAFO 3L: 2003-2007 (R/V “*Vizconde de Eza*”). Indet. means indeterminate. (*) In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

| Lenght (cm.) | 2003 (*) | | | | 2004 | | | | 2006 | | | | 2007 | | | |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total | Males | Females | Indet. | Total |
| 16 | 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 |
| 18 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 20 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 22 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 24 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 26 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 28 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 32 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 34 | 0.000 | 0.000 | 0.000 | 0.000 | 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 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 38 | 0.000 | 0.000 | 0.000 | 0.000 | 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 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 | 0.000 | 0.009 | 0.008 | 0.000 | 0.000 | 0.008 |
| 42 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.000 | 0.000 | 0.013 | 0.009 | 0.009 | 0.000 | 0.018 | 0.000 | 0.030 | 0.000 | 0.030 |
| 44 | 0.000 | 0.056 | 0.000 | 0.056 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.028 | 0.000 | 0.045 | 0.017 | 0.000 | 0.000 | 0.017 |
| 46 | 0.000 | 0.056 | 0.000 | 0.056 | 0.000 | 0.000 | 0.000 | 0.000 | 0.019 | 0.017 | 0.000 | 0.036 | 0.008 | 0.035 | 0.000 | 0.043 |
| 48 | 0.028 | 0.056 | 0.000 | 0.084 | 0.013 | 0.022 | 0.000 | 0.036 | 0.046 | 0.019 | 0.000 | 0.064 | 0.008 | 0.024 | 0.000 | 0.032 |
| 50 | 0.084 | 0.084 | 0.000 | 0.168 | 0.026 | 0.058 | 0.000 | 0.084 | 0.000 | 0.026 | 0.000 | 0.026 | 0.030 | 0.095 | 0.000 | 0.125 |
| 52 | 0.197 | 0.225 | 0.000 | 0.421 | 0.035 | 0.066 | 0.000 | 0.101 | 0.034 | 0.063 | 0.000 | 0.097 | 0.050 | 0.064 | 0.000 | 0.114 |
| 54 | 0.197 | 0.309 | 0.000 | 0.505 | 0.062 | 0.052 | 0.000 | 0.114 | 0.037 | 0.056 | 0.000 | 0.093 | 0.106 | 0.176 | 0.000 | 0.283 |
| 56 | 0.337 | 0.590 | 0.000 | 0.927 | 0.019 | 0.123 | 0.000 | 0.142 | 0.045 | 0.064 | 0.000 | 0.108 | 0.110 | 0.136 | 0.000 | 0.246 |
| 68 | 0.281 | 0.477 | 0.000 | 0.758 | 0.130 | 0.062 | 0.000 | 0.192 | 0.083 | 0.116 | 0.000 | 0.200 | 0.281 | 0.356 | 0.000 | 0.637 |
| 70 | 0.393 | 0.393 | 0.000 | 0.786 | 0.114 | 0.190 | 0.000 | 0.305 | 0.145 | 0.145 | 0.000 | 0.290 | 0.454 | 0.222 | 0.000 | 0.676 |
| 72 | 0.197 | 0.281 | 0.000 | 0.477 | 0.080 | 0.152 | 0.000 | 0.232 | 0.113 | 0.232 | 0.000 | 0.345 | 0.652 | 0.450 | 0.000 | 1.101 |
| 74 | 0.337 | 0.281 | 0.000 | 0.618 | 0.094 | 0.004 | 0.000 | 0.098 | 0.165 | 0.185 | 0.000 | 0.350 | 0.379 | 0.390 | 0.000 | 0.769 |
| 76 | 0.197 | 0.253 | 0.000 | 0.449 | 0.133 | 0.101 | 0.000 | 0.234 | 0.138 | 0.184 | 0.000 | 0.321 | 0.225 | 0.287 | 0.000 | 0.512 |
| 78 | 0.028 | 0.084 | 0.000 | 0.112 | 0.013 | 0.069 | 0.000 | 0.082 | 0.070 | 0.137 | 0.000 | 0.207 | 0.127 | 0.254 | 0.000 | 0.381 |
| 80 | 0.000 | 0.056 | 0.000 | 0.056 | 0.039 | 0.069 | 0.000 | 0.109 | 0.010 | 0.145 | 0.000 | 0.155 | 0.055 | 0.238 | 0.000 | 0.292 |
| 82 | 0.000 | 0.028 | 0.000 | 0.028 | 0.013 | 0.000 | 0.000 | 0.013 | 0.010 | 0.146 | 0.000 | 0.156 | 0.000 | 0.245 | 0.000 | 0.245 |
| 84 | 0.000 | 0.028 | 0.000 | 0.028 | 0.000 | 0.032 | 0.000 | 0.032 | 0.000 | 0.108 | 0.000 | 0.108 | 0.000 | 0.211 | 0.000 | 0.211 |
| Total | 2.275 | 3.314 | 0.000 | 5.588 | 0.784 | 1.006 | 0.000 | 1.790 | 0.941 | 1.766 | 0.000 | 2.707 | 2.510 | 3.410 | 0.000 | 5.921 |
| N° samples: | | | | | | | | | | | | | | | | |
| N° Ind.: | | | | 1 | | | | 8 | | | | 28 | | | | 28 |
| Sampled catch: | 81 | 118 | 0 | 199 | 58 | 55 | 0 | 113 | 99 | 184 | 0 | 283 | 179 | 245 | 0 | 424 |
| Range: | | | | 440 | | | | 127 | | | | 397 | | | | 593 |
| Total catch: | | | | 44-79 | | | | 17-75 | | | | 41-84 | | | | 41-81 |
| Total hauls: | | | | 440 | | | | 132 | | | | 397 | | | | 593 |

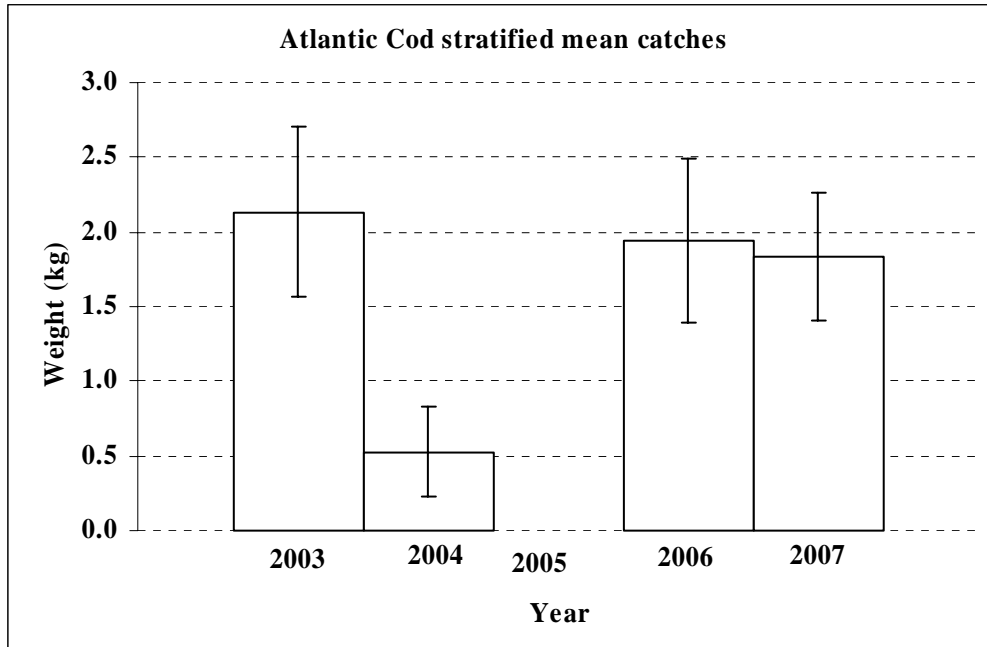


FIGURE 1.- Atlantic cod stratified mean catches in Kg and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

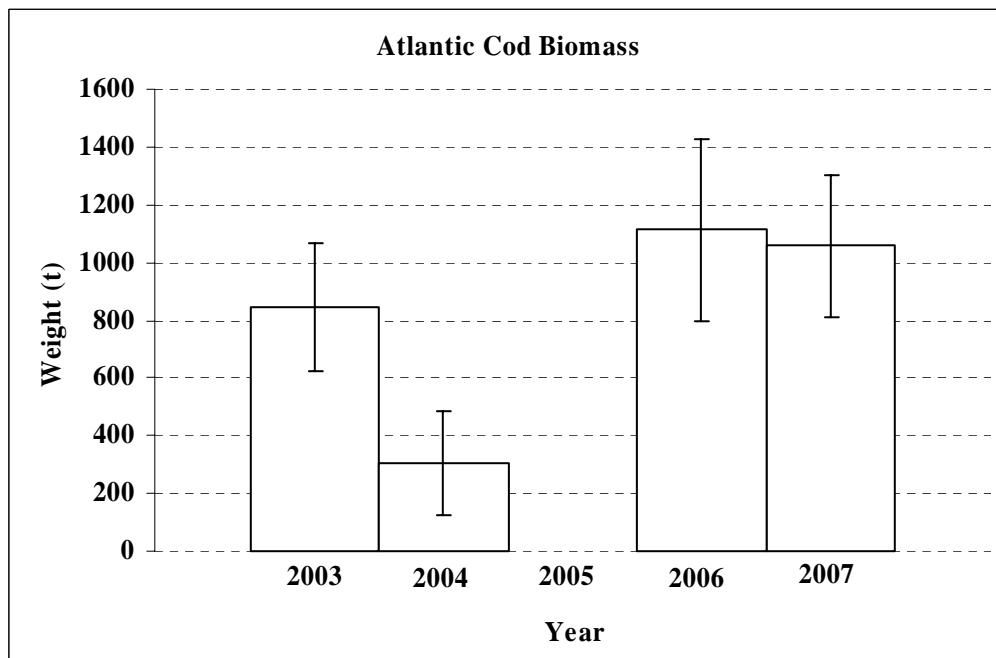


FIGURE 2.- Atlantic cod biomass in tonnes and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

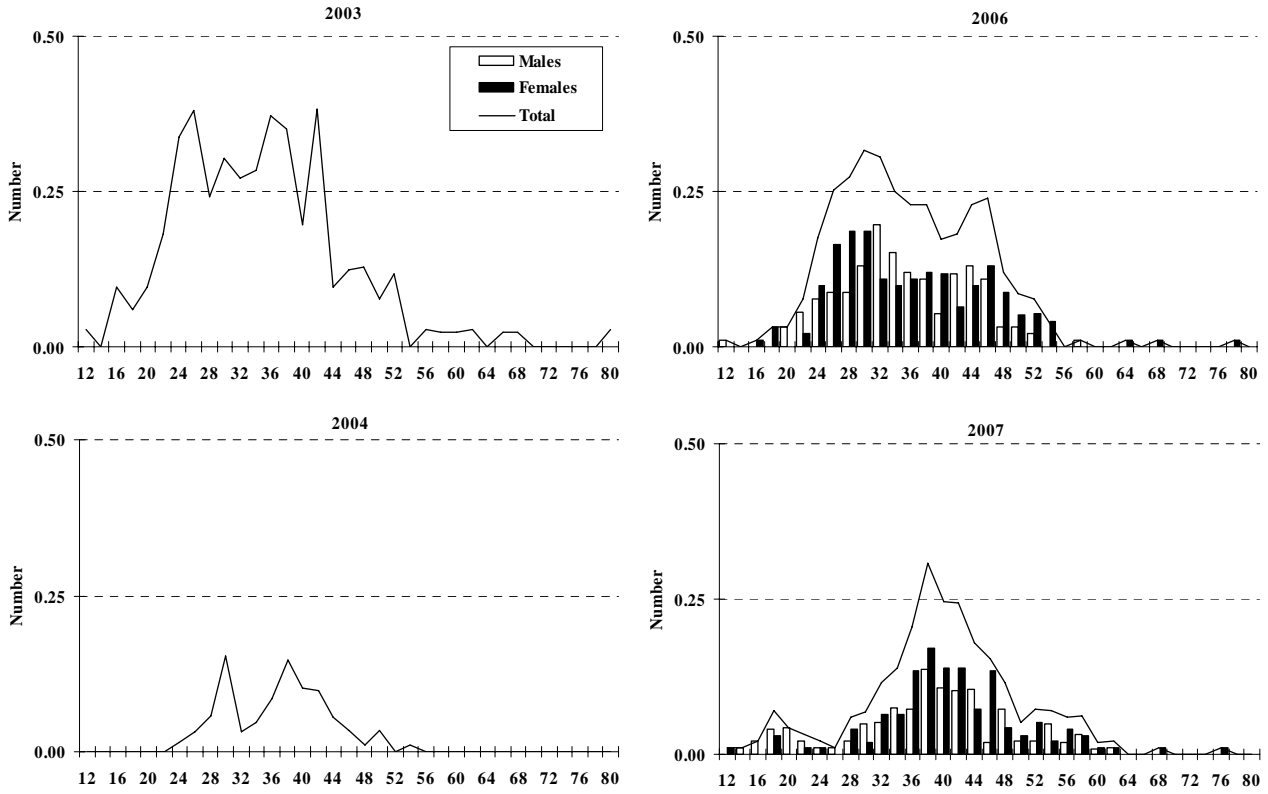


FIGURE 3.- Atlantic cod length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

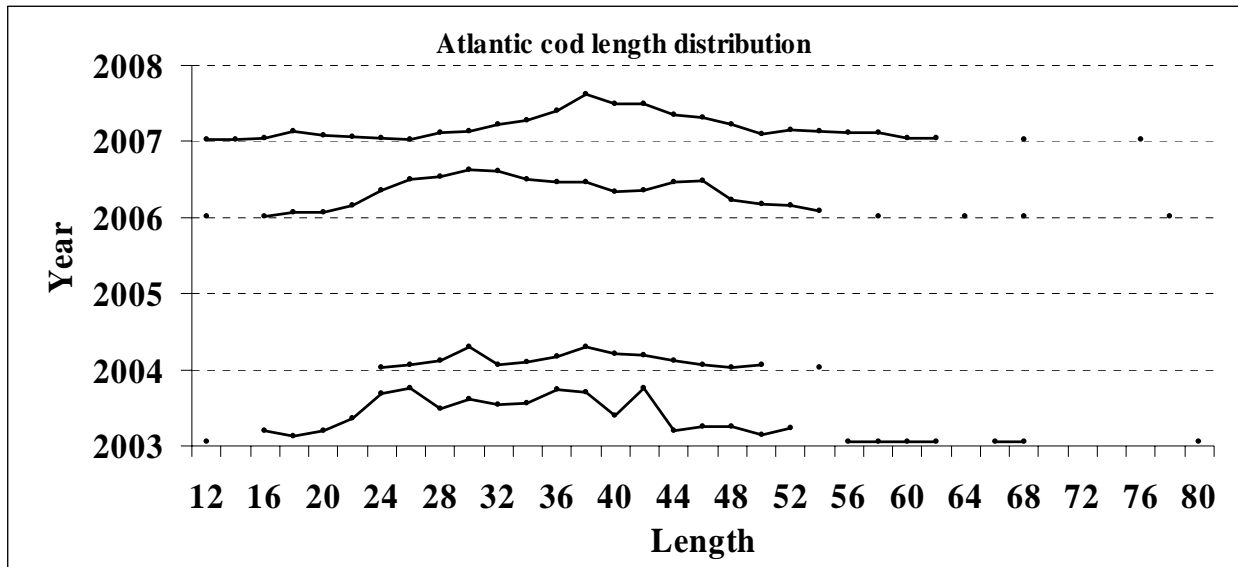


FIGURE 4.- Atlantic cod length distribution (cm) in NAFO 3L: 2003-2007.

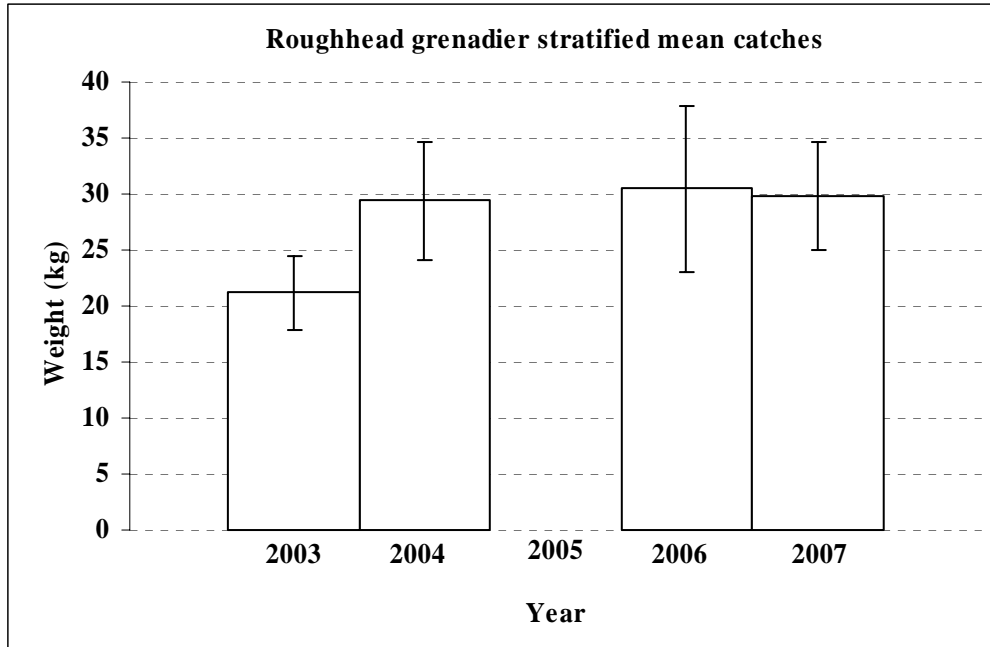


FIGURE 5.- Roughhead grenadier stratified mean catches in Kg and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “*Vizconde de Eza*”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

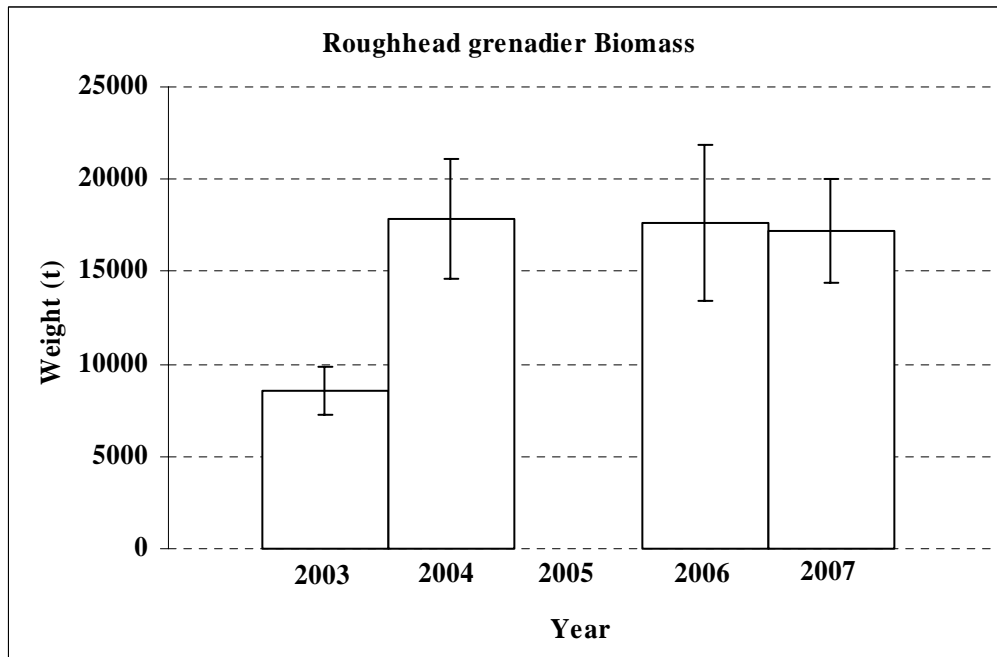


FIGURE 6.- Roughhead grenadier biomass in tonnes and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “*Vizconde de Eza*”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

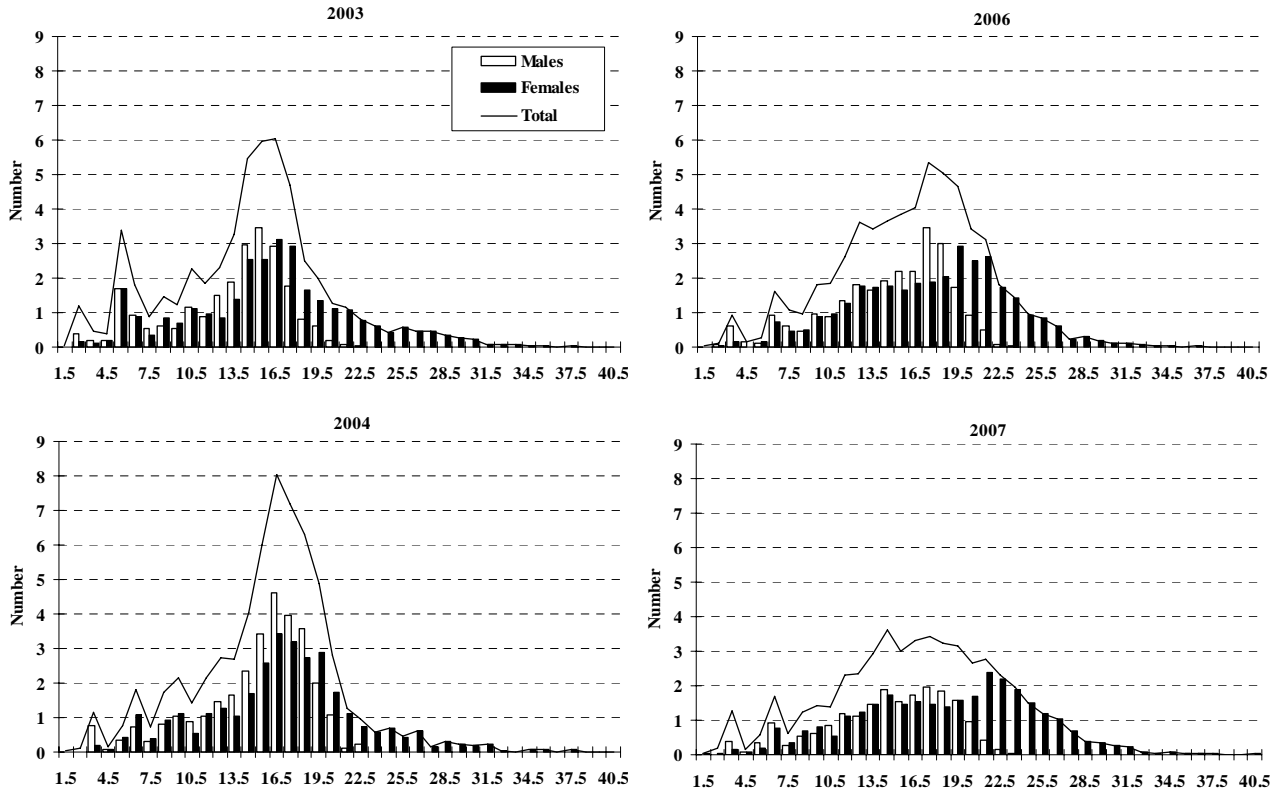


FIGURE 7.- Roughhead grenadier length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

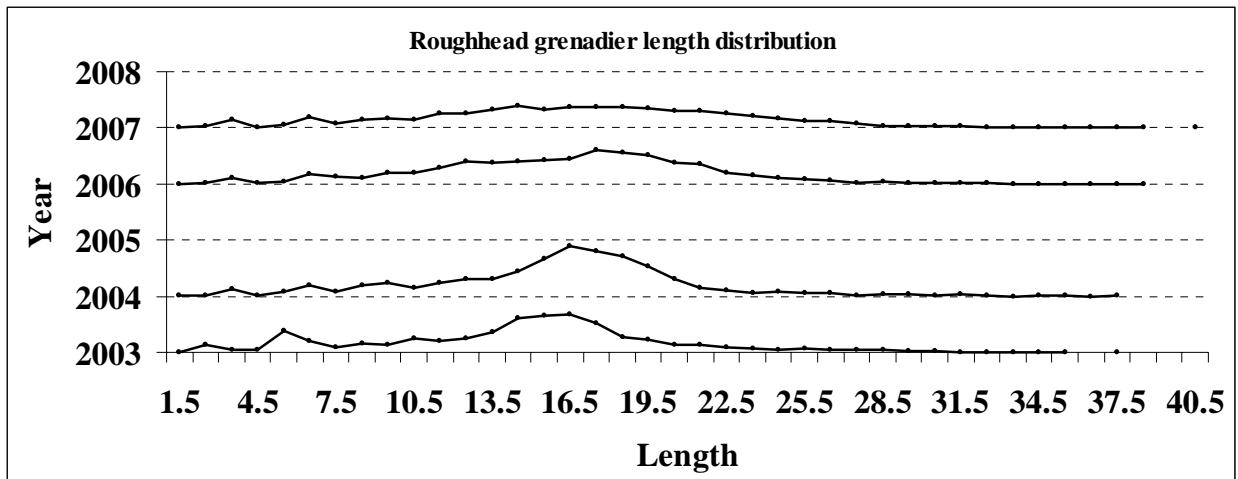


FIGURE 8.- Roughhead grenadier length distribution (cm) in NAFO 3L: 2003-2007.

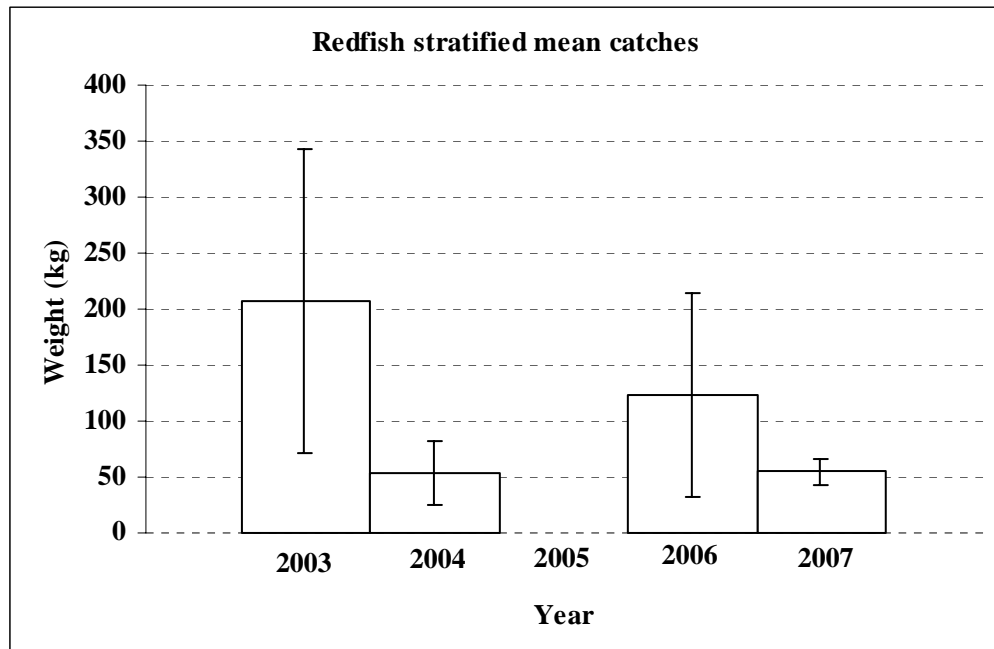


FIGURE 9.- Redfish stratified mean catches in Kg and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

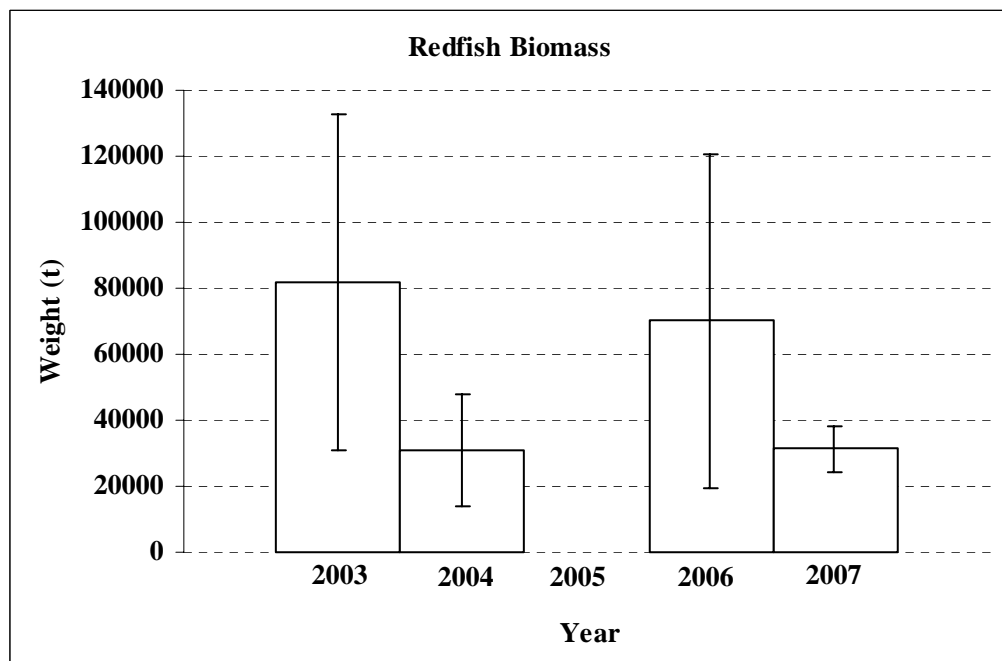


FIGURE 10.- Redfish biomass in tonnes and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

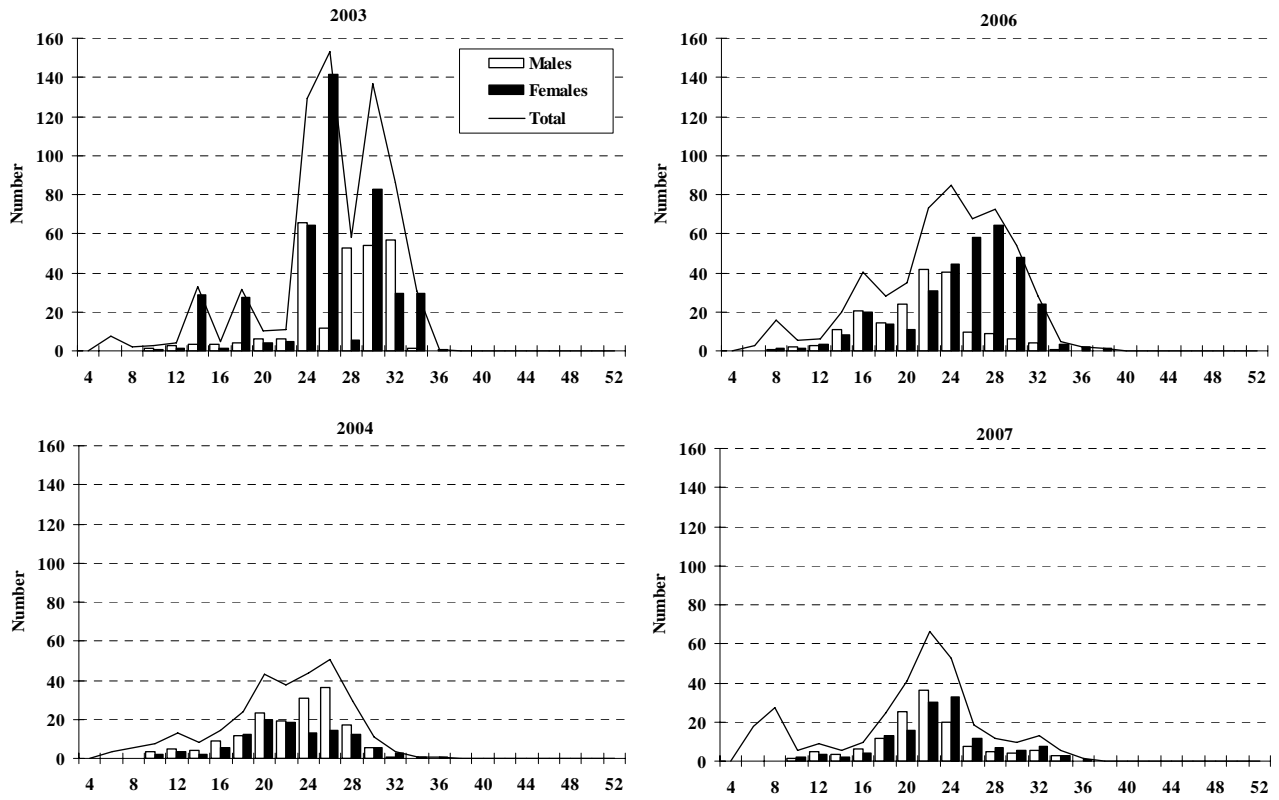


FIGURE 11.- Redfish length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

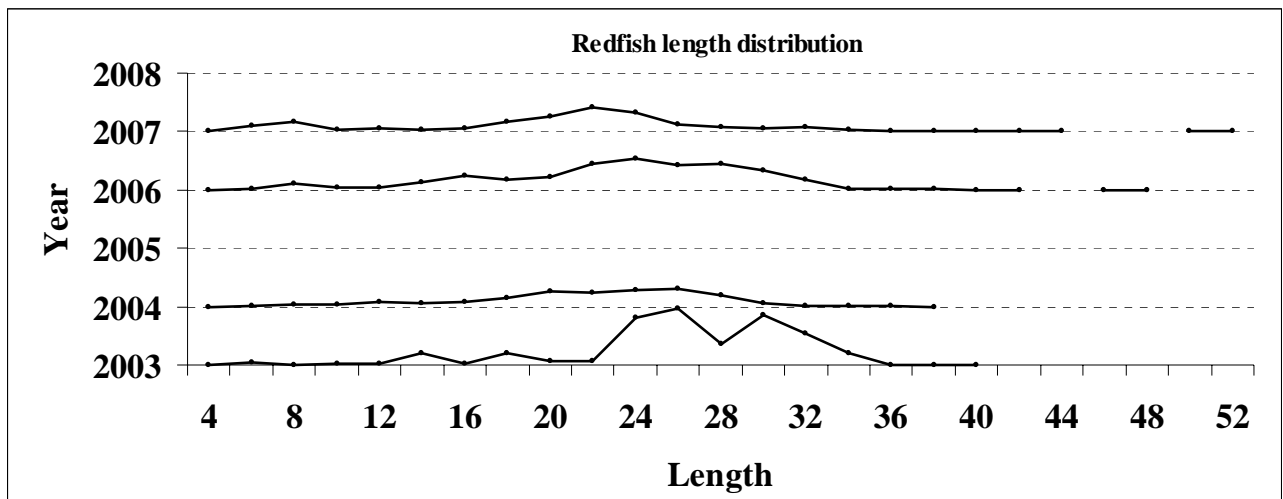


FIGURE 12.- Redfish length distribution (cm) in NAFO 3L: 2003-2007.

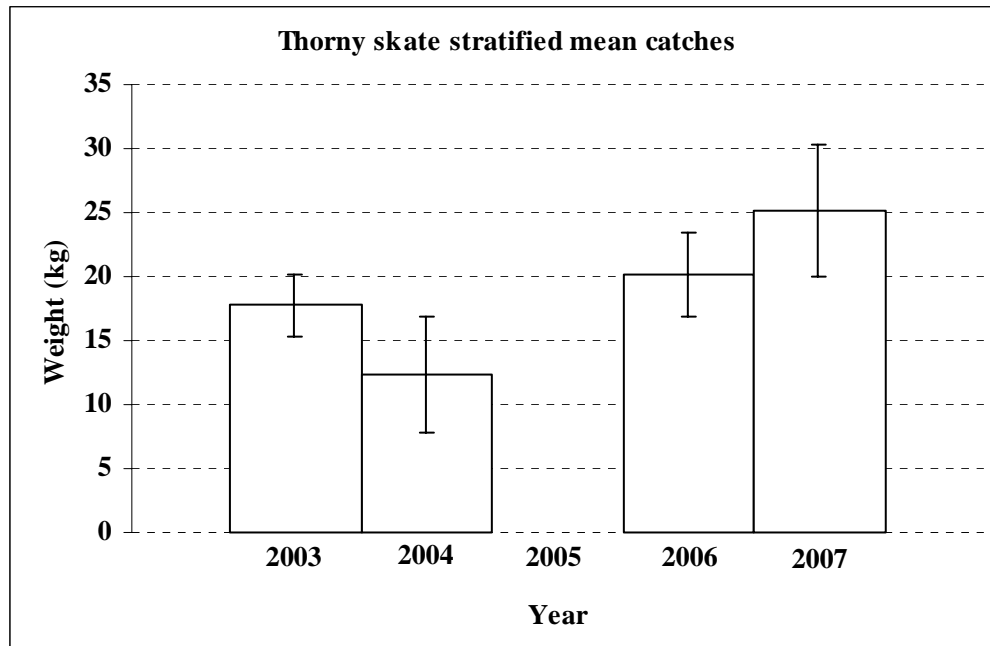


FIGURE 13.- Thorny skate stratified mean catches in Kg and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

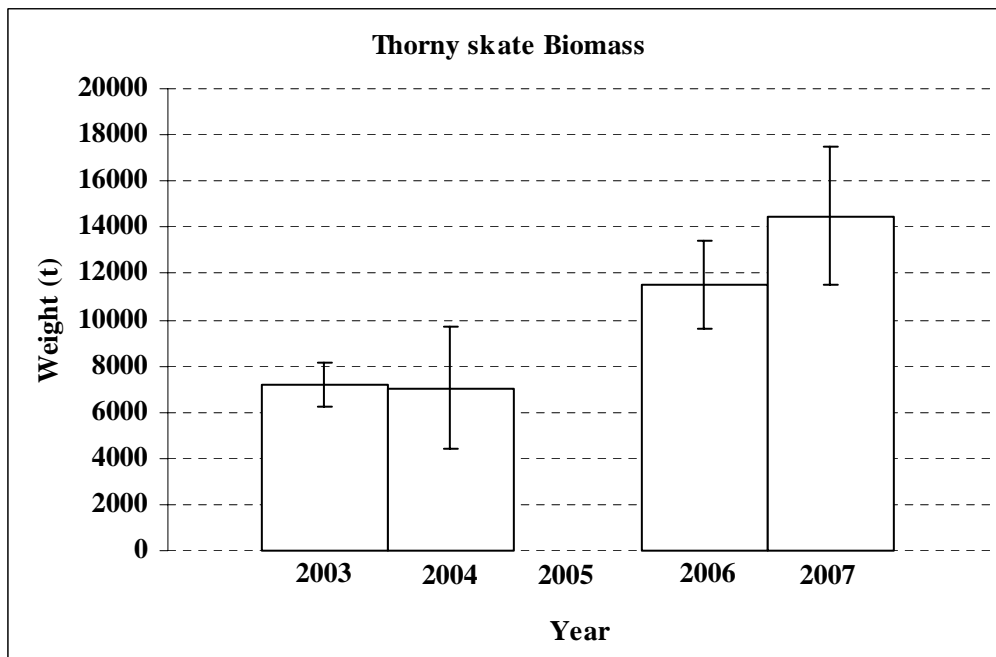


FIGURE 14.- Thorny skate biomass in tonnes and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

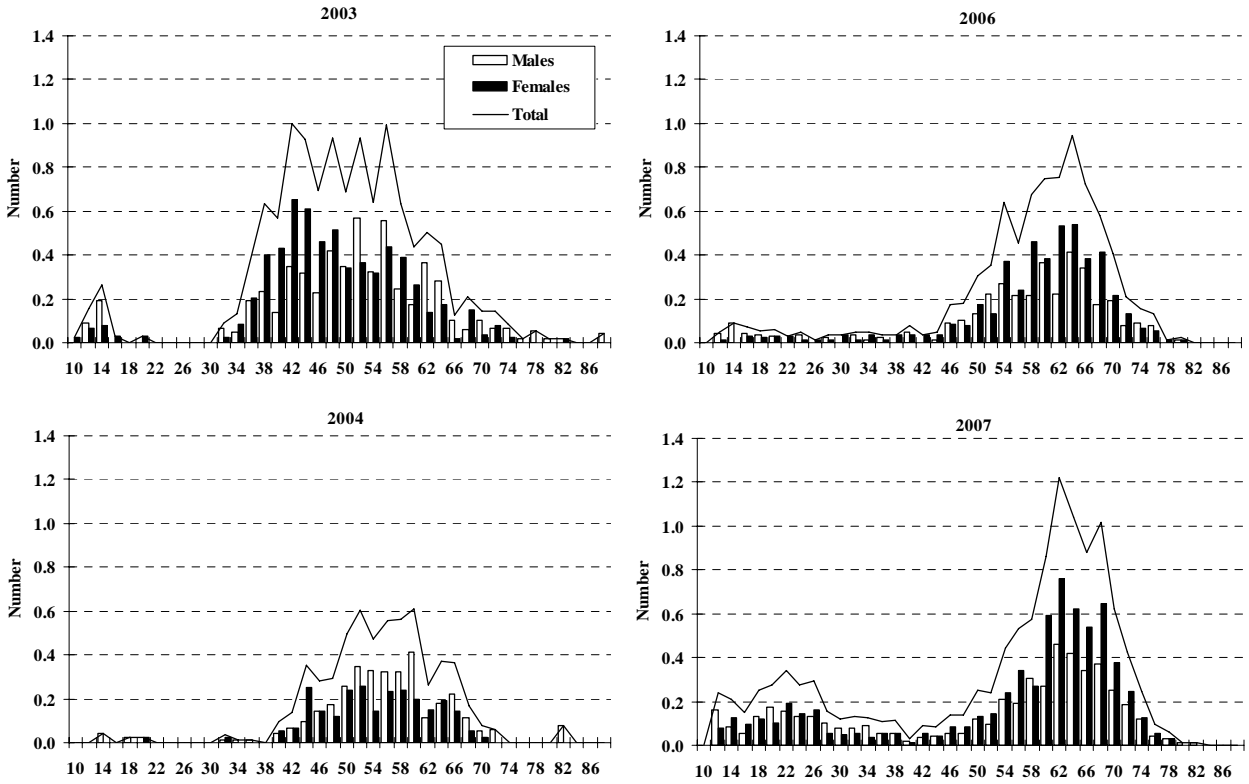


FIGURE 15.- Thorny skate length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

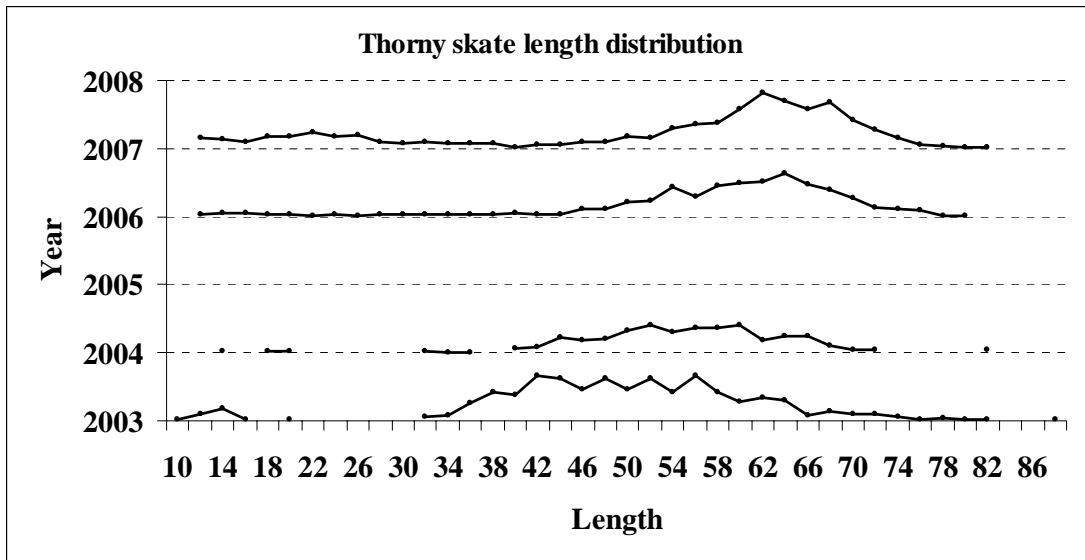


FIGURE 16.- Thorny skate length distribution (cm) in NAFO 3L: 2003-2007.

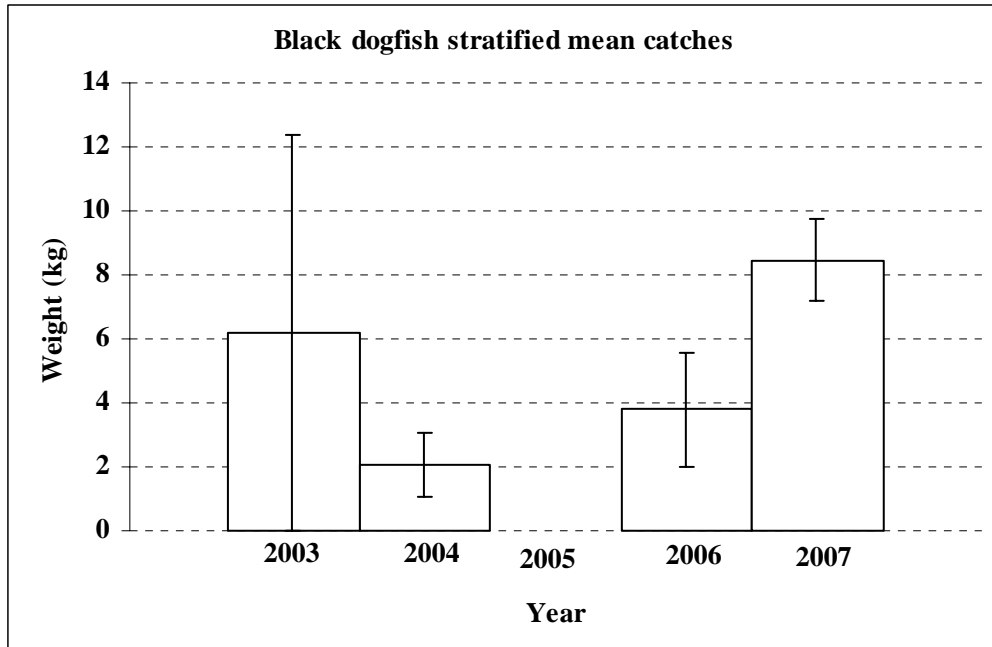


FIGURE 17.- Black dogfish stratified mean catches in Kg and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

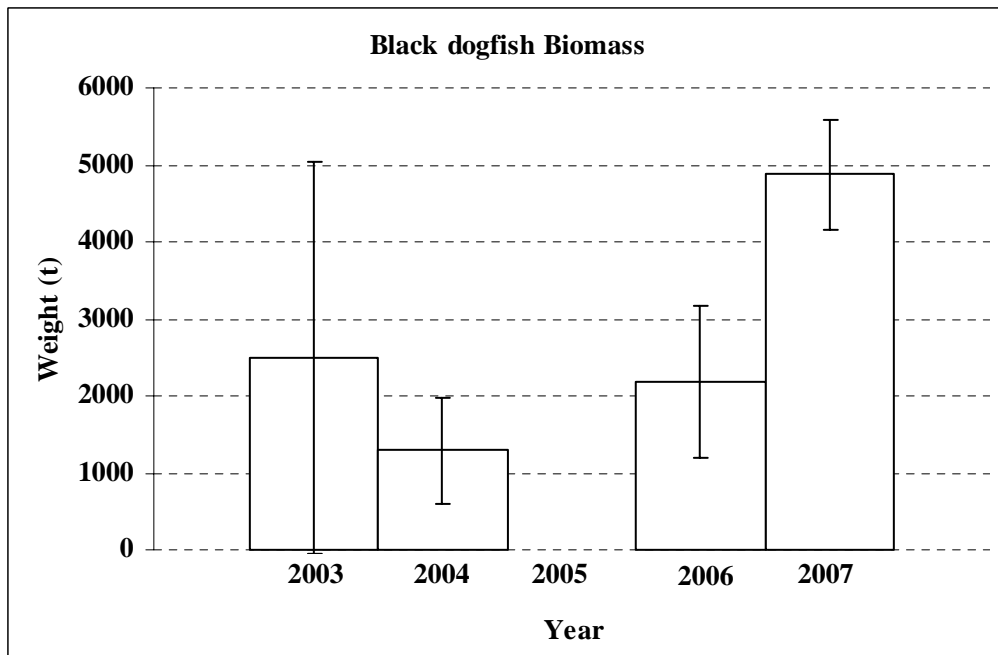


FIGURE 18.- Black dogfish biomass in tonnes and \pm SD by year. Spanish surveys in NAFO Division 3L: 2003 - 2007 (R/V “Vizconde de Eza”). In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

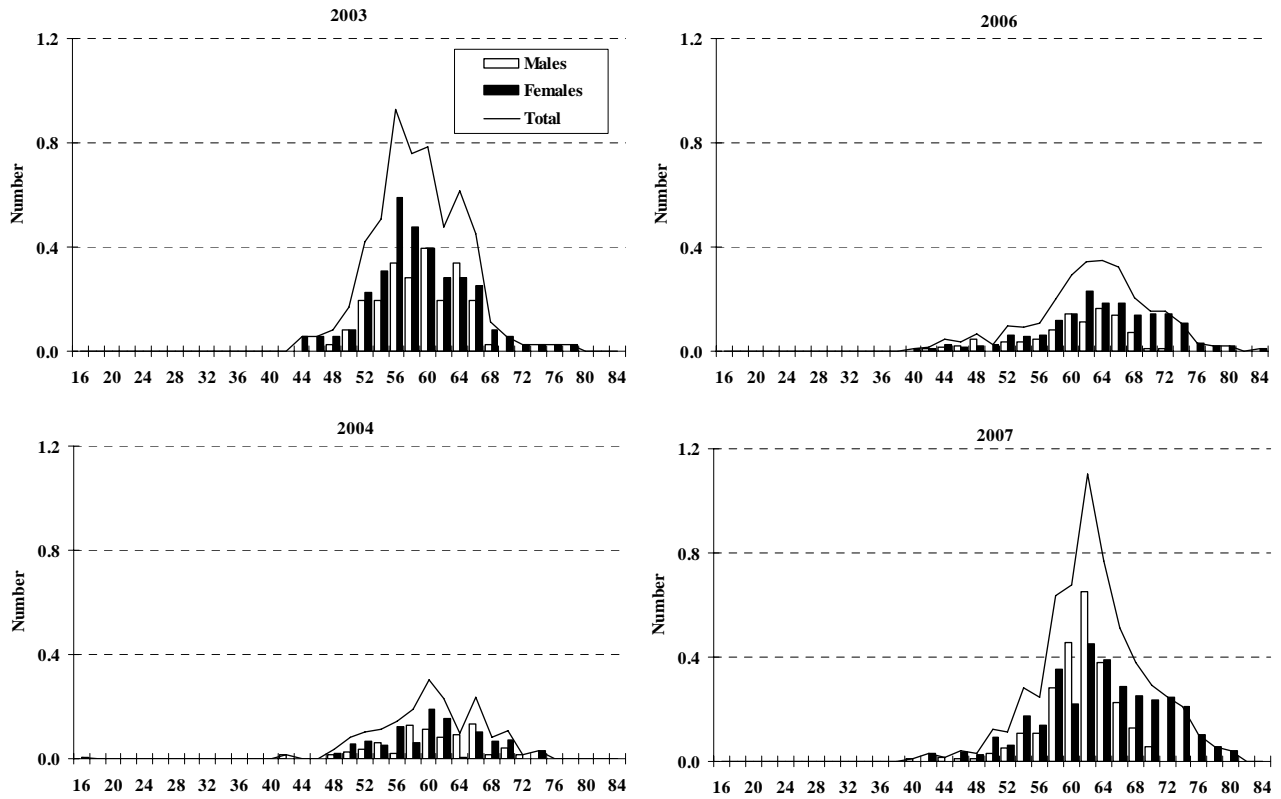


FIGURE 19.- Black dogfish length distribution (cm) in NAFO 3L: 2003-2007. Number per stratified mean catches. In 2003, the data correspond to 69% of the total area prospected in 2006-2007.

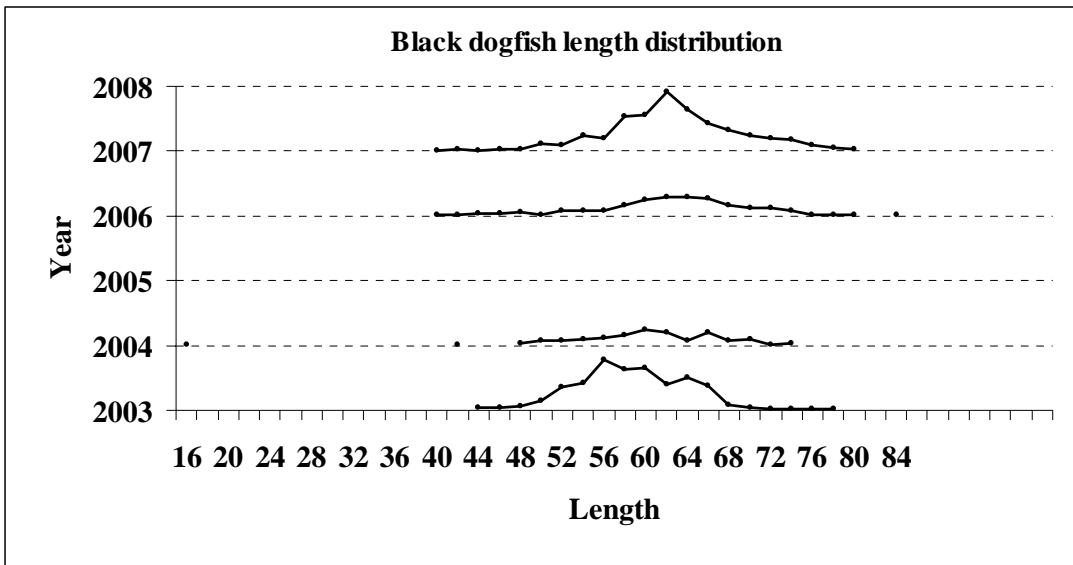


FIGURE 20.- Black dogfish length distribution (cm) in NAFO 3L: 2003-2007.