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Yellowtail flounder, redfish (*Sebastes spp.*) and witch flounder indices from the Spanish Survey  
conducted in Divisions 3NO of the NAFO Regulatory Area

by

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### **Abstract**

Since 1995, Spain carries out a spring stratified random bottom trawl survey in Div. 3NO of the NAFO Regulatory Area. Total mean catches, biomass and mean numbers for yellowtail flounder (*Limanda ferruginea*) are presented for the period 1995-2017, for redfish (*Sebastes spp.*) for the period 1997-2017 and for witch flounder (*Glyptocephalus cynoglossus*) for the period 2002-2017. Detailed indices are presented from 2013. Yellowtail flounder indices do not show a clear trend. Biomass increased from 1997 to 1999 and then remained almost constant throughout all the period, decreasing slightly in 2014-2017. The 2017 value is the lowest since 1998. Redfish indices oscillate greatly over time, probably because the gear does not sample adequately aggregating pelagic species. There was a sharp increase in 2009 and since then until 2015, biomass fluctuated maintaining higher values than before 2009. In 2016 biomass dropped and increase again in 2017 to the 2012 level. The 3N division comprises around the 90% of the total biomass in the last years. Good year classes have not been registered recently. Witch flounder is very scarce and its indices fluctuated throughout the series reaching the minimum value in 2014 and increasing since 2015. 2017 value is among the highest in the series. Recruitment was quite good at the beginning of the series but poor in recent years.

### **Material and methods**

The Spanish Spring (May/June) survey in Div. 3NO of NAFO Regulatory Area was initiated by Spain in 1995. Until 2001, the survey was carried out on board the Spanish vessel C/V *Playa de Menduiña* (338 GT and 800 HP) using a *Pedreira* type bottom trawl. The R/V *Vizconde de Eza* replaced the C/V *Playa de Menduiña* in 2001, and the *Campelen 1800* was implemented as survey gear. The main specifications and geometry of these gears, their rigging profile and the net plan, and the survey technical information are described in Walsh *et al.* (2001). The survey area was stratified following the standard stratification schemes (Bishop, 1994). Set number was allocated proportionally to the area of the strata, with a minimum of two planned hauls per stratum, and trawl positions were



chosen at random (Doubleday, 1981). The effect of reducing the number of hauls to improve the biological sampling in each haul was investigated via bootstrap, concluding that 7 hauls from the larger strata could be removed with any hardly difference in the indices estimates or their variance. The total number of valid hauls in 2017 was 114. Biomass indices were calculated by the swept area method (Cochran, 1997), assuming catchability factor of 1. Table 1 presents the number of valid tows, the depth strata covered and the dates of the total survey series. Table 2 shows the swept area and number of hauls by stratum for the last five years (2013-2017). To know the results of the rest of the years, see González-Troncoso *et al.*, 2013.

In each haul, all the individuals caught were sorted by species and weighted. Random samples of the catch of each species were length measured (total length) to the nearest lower cm. The obtained length distribution was aggregated into 2 cm intervals (beginning with the pair number) and raised to the catch of each species.

The redfish series for total biomass and total mean catches and mean number per tow start in 1997 because sampling depth in 1995 and 1996 was shallower than 1000 meters so the data are not representative for this species. As all strata where the yellowtail flounder is caught were well surveyed, the series for this species are presented since 1995. As calibration for witch flounder data has not been done yet, only data from 2002 to 2017 are presented. Data for yellowtail flounder and redfish were calibrated for the period 1995-2000 and no-transformed from 2002 onwards, to create a combined 1995-2017 time-series. Regarding 2001, there are both calibrated (from the former vessel) and non-transformed data (from the new vessel). More information on the calibration method can be found in González-Troncoso *et al.* (2004) and Paz *et al.* (2004).

Mean catch and variance per haul, biomass and length distribution by strata are presented for each species for the last five years (2013-2017). To see the results of the rest of the years, see González-Troncoso *et al.*, 2013. Total biomass and mean catch per tow with SD and mean number per tow by year are presented for the total period series.

Figure 1 presents the maps with the distribution of the catches of the three species during the 2017 Spanish 3NO survey.

## Results

### Yellowtail flounder

After a moratorium between 1994 and 1997, the yellowtail flounder fishery has been under TAC. According to the Report of NAFO Scientific Council Meeting, stock size reached a minimum in the mid 1990's, but since 1994 has steadily increased and is now well above  $B_{msy}$ . There is very low risk of the stock being below  $B_{msy}$  or  $F$  being above  $F_{msy}$ . Overall, the 2016 survey indices are not considered to indicate a significant change in the status of the stock, although concerns were noted in the decline in biomass index and change in distribution shown in the Canadian Spring survey. Recent recruitment appears to be lower than average (NAFO, 2017).

### Mean Catches and Biomass

Table 3 shows mean catch and SD per haul and stratum and Table 4 the biomass estimates by the swept area method and their SD by stratum for years 2013-2017 for yellowtail flounder. Total biomass (t) and stratified mean catch per tow (kg) and SD by year for the entire series are presented in Table 5 for 1995-2017. Table 6 presents the parameters  $a$  and  $b$  for the calculation of the length-weight relationship for years 2013-2017.

Yellowtail flounder biomass index shows no clear trend throughout the study period. It increased substantially from 1997 to 1999, has maintained almost constant values until 2013 and then decreased in 2014-2017. The 2017 value is the lowest since 1998 (Table 5; Figures 2 and 3).

### **Length Distribution**

The mean number per haul by year is presented in Table 7 and Figure 2 for 1995-2017 and Table 8 presents the same index by length, sex and year besides the sampled size and catch for the period 2013-2017. Figures 4 and 5 present theses indices for the entire period. The mean numbers are in concordance with the mean catches (Figure 2). There has not been good recruitment in recent years. In Figure 4, we can follow a length modal value since the beginning of the series, but the presence of juveniles is very low. This mode can be seen until 2009 when it reached 34-35 cm, and since 2010 the mode of the length distribution was about 30-34 cm. In 2013-2017 the mode was at 34-35 cm for females, and at 30-33 cm for males.

### **Redfish**

There are two species of redfish that have been commercially fished in Div. 3NO; the deep-sea redfish (*Sebastes mentella*) and the Acadian redfish (*Sebastes fasciatus*). Due to the difficulty to distinguish the two species, the catches are usually reported by genus as "redfish" (*Sebastes spp.*) in the commercial fishery statistics.

This stock in Div. 30 has been under TAC regulation since 1974. In September 2004, the Fisheries Commission adopted an annual TAC of 20 000 t in the entire area of Div. 30. The stock appears to have increased since the early 2000s. Catches were stable from 2009 to 2014. Survey index values have declined from those observed in 2012 when values were near time-series highs. The year class born in the early 2000's remains dominant in 2015 at 22-23 cm confirming initial observations of a relatively large pulse at 17cm in 2007 surveys. Subsequent recruitment appears to be lower.

In 3N (the stock is 3LN) a moratorium was implemented from 1998 to 2009. The fishery was reopened in 2010 with the resultant increase of catches but the perception of the stock given by the available surveys has not been altered. At the beginning of 2016, the probability of being below  $B_{msy}$  was less than 1%. The probability of being above  $F_{msy}$  is very low. There are signs of recent recruitment (2008 – 2015) of above average year classes to the exploitable stock.

There is nothing to indicate a change in the status of the stock in 2016. The general increase of the catch since reopening of the fishery in 2010, have not altered the perception of the stock given by the available surveys and by the last assessment in 2015 (NAFO, 2017).

### **Mean Catches and Biomass**

Redfish mean catches and SD are presented in Table 9 and biomass in Table 10 by stratum for 2013-2017. Annual biomass and stratified mean catch and SD per haul for years 1997-2017 are presented in Table 11 by Division. The length-weight relationship parameters  $a$  and  $b$  are presented in Table 12 for years 2013-2017.

Redfish indices oscillate greatly over time, probably because the gear does not sample adequately aggregating pelagic species. They showed a quick increase from 1997 to 2000, followed by a sudden drop until 2002, after which they have increased to the levels of the early years of the time series. The index increased nearly fivefold in 2009 in comparison with 2005. This was not just due to very

large catches in few hauls, as redfish catch was over 1 ton in 11 of the 43 hauls in which redfish was caught. Furthermore, redfish catch was over 15 tons in three hauls. In 2015, an increase allowed biomass to reach the second highest value of the series. In this case, redfish catch was over 10 tons in 3 hauls. Then biomass dropped fourfold in 2016 and increased again in 2017 to the 2012 level (Table 10; Figures 6 and 7).

Biomass and mean catch per haul and Division, the number of strata covered in each case, and the percentage of biomass in 3N respect to the total are presented in Table 11. Biomass is always larger in 3N than in 30 (Figure 8), although the percentage is very spread over the time. However, the mean catch per tow was higher in Division 30 until 2004. Since 2005, more than 83% of redfish catches have occurred in Division 3N. In 2010, mean catch per tow in 30 was almost three times higher than in 2009, whereas in 3N was lower than in 2009. In 2013 and 2015, the increase in the total biomass was due to the increase in Division 3N. Last four years indices fluctuated. In 2014 all indices decreased, increased again in 2015, then declined in 2016 and increased again in 2017, in both Divisions.

### **Length Distribution**

Mean number per haul by year is presented in Table 13 and Figure 6 for 1997-2017. Table 14 presents this index per length with sample size and catch for the period 2013-2017. Figures 9 and 10 show the trend of the mean abundance per tow by length class. The y-axis upper limit of Figure 10 has been changed for years 1997-2008 to see the length distribution despite the large catches registered in the period 2009-2017. The last good year class was recorded in 2004 and this cohort can be tracked until 2017. In recent years there was only a discrete presence of juveniles. The clear 18 cm mode in 2009 (20 cm in 2011) seems to be a consequence of the 2004 recruitment. In 2012 and 2013 the mode is in 20-21 cm and from 2014-2017 in 22-23 cm.

### **Witch flounder**

This stock occurs mainly in Div. 30, along the South-western slopes of the Grand Bank, but it seems to migrate seasonally onto the shallow banks. It has been fished mainly in winter and springtime, targeting the spawning concentrations. The Div. 3NO estimates of biomass index for the Canadian surveys, although variable, have shown a general decreasing trend from 1985 to 1998 followed by an increase from 1998 to 2003. From 2012 to 2015 biomass indices indicated a downward trend. Biomass values increased slightly in 2016.

Recruitment (fish less than 21 cm) has been low since 2002, although there were above average peaks indicated for spring recruitment in 2009 and 2013. Recruitment in spring and fall surveys in 2016 approached the lowest of the time series. The stock size increased since 1999 to about 2010 and then declined after 2012 and is now at 52%  $B_{msy}$ . There is 15% risk of the stock being below  $B_{lim}$  and a 19% risk of  $F$  being above  $F_{lim}$ . The stock is in the safe zone of the NAFO Precautionary Approach Framework. The stock was reopened to fishery in 2015 with a very low TAC (1 000 tons), that was duplicated for 2016 and 2017 (2 172 t and 2 225 t respectively) (NAFO, 2017).

### **Mean Catches and Biomass**

Witch flounder mean catches and SD by stratum are presented in Table 15 and biomass per stratum in Table 16 for 2013-2017. In Table 17 and Figures 11 and 12 the annual stratified mean catch per tow and biomass with SD are presented for the period 2002-2017. The length-weight relationship parameters  $a$  and  $b$  are presented in Table 18 for 2013-2017.

Witch flounder indices fluctuated throughout the period 2002-2017 reaching a depressed level in 2014, following by an increasing trend from 2015-2017. Highest values were found in 2004, 2010 and 2017 (Table 15; Figures 11 and 12).

### **Length Distribution**

Table 19 and Figures 13 and 14 present witch flounder mean number per tow and sex by year for 2002-2017, and Table 20 the same index by length with sample size and catch for the period 2013-2017. The best recruitment occurred in the period 2002-2005 and has been very poor since 2008. Some modes can be tracked in Figure 13, probably due to the recruitments at the beginning of the series. In 2012 and 2013 there was a quite good presence of individuals of lengths 34-42 cm, poorly found in 2014, but that we can follow in 2015-2017.

### **Acknowledges**

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**Table 1.** Spanish spring bottom trawl surveys in NAFO Div. 3NO: 1995-2017.

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1995	C/V <i>Playa de Menduíña</i>	77	42-684	May 18-May 29
1996	C/V <i>Playa de Menduíña</i>	112	41-1135	May 07-May 24
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 <sup>(*)</sup>	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
2013	R/V <i>Vizconde de Eza</i>	122	44-1450	June 1-June 21
2014	R/V <i>Vizconde de Eza</i>	122	44-1450	June 2-June 21
2015	R/V <i>Vizconde de Eza</i>	122	44-1450	May 31-June 19
2016	R/V <i>Vizconde de Eza</i>	115	44-1450	May 30-June 18
2017	R/V <i>Vizconde de Eza</i>	113	44-1450	May 23-June 11

(\*)For the calculation of the series, 83 hauls were taken from the R/V *Vizconde de Eza* and 40 hauls from the C/V *Playa de Menduíña* (123 hauls in total)

**Table 2.**Swept area and number of hauls by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. Swept area in square miles. n.s. means stratum not surveyed.

Stratum	2013		2014		2015		2016		2017	
	Swept area	Tow number								
353	0.0349	3	0.0379	3	0.0401	3	0.0356	3	0.0360	3
354	0.0338	3	0.0394	3	0.0390	3	0.0345	3	0.0356	3
355	0.0225	2	0.0263	2	0.0263	2	0.0233	2	0.0225	2
356	0.0225	2	0.0266	2	0.0255	2	0.0225	2	0.0233	2
357	0.0236	2	0.0263	2	0.0233	2	0.0233	2	0.0233	2
358	0.0338	3	0.0390	3	0.0349	3	0.0338	3	0.0364	3
359	0.0829	7	0.0908	7	0.0855	7	0.0593	5	0.0596	5
360	0.2231	19	0.2629	20	0.2363	20	0.1995	17	0.2044	17
374	0.0233	2	0.0259	2	0.0229	2	0.0233	2	0.0236	2
375	0.0360	3	0.0390	3	0.0341	3	0.0360	3	0.0364	3
376	0.1305	11	0.1324	10	0.1159	10	0.0945	8	0.0975	8
377	0.0236	2	0.0259	2	0.0233	2	0.0233	2	0.0251	2
378	0.0225	2	0.0263	2	0.0225	2	0.0225	2	0.0236	2
379	0.0240	2	0.0255	2	0.0225	2	0.0229	2	0.0244	2
380	0.0229	2	0.0263	2	0.0229	2	0.0236	2	0.0236	2
381	0.0244	2	0.0259	2	0.0236	2	0.0229	2	0.0229	2
382	0.0484	4	0.0521	4	0.0458	4	0.0465	4	0.0360	3
721	0.0225	2	0.0266	2	0.0240	2	0.0225	2	0.0229	2
722	0.0221	2	0.0259	2	0.0259	2	0.0229	2	0.0233	2
723	0.0221	2	0.0259	2	0.0233	2	0.0225	2	0.0229	2
724	0.0225	2	0.0255	2	0.0236	2	0.0233	2	0.0240	2
725	0.0229	2	0.0255	2	0.0229	2	0.0229	2	0.0244	2
726	0.0221	2	0.0248	2	0.0229	2	0.0225	2	0.0233	2
727	0.0229	2	0.0259	2	0.0225	2	0.0225	2	0.0229	2
728	0.0233	2	0.0248	2	0.0225	2	0.0229	2	0.0229	2
752	0.0233	2	0.0240	2	0.0225	2	0.0236	2	0.0236	2
753	0.0236	2	0.0240	2	0.0233	2	0.0229	2	0.0233	2
754	0.0240	2	0.0225	2	0.0225	2	0.0225	2	0.0218	2
755	0.0454	4	0.0454	4	0.0450	4	0.0458	4	0.0338	3
756	0.0229	2	0.0229	2	0.0229	2	0.0225	2	0.0229	2
757	0.0240	2	0.0244	2	0.0229	2	0.0225	2	0.0225	2
758	0.0225	2	0.0221	2	0.0221	2	0.0221	2	0.0229	2
759	0.0225	2	0.0229	2	0.0229	2	0.0229	2	0.0225	2
760	0.0229	2	0.0364	3	0.0225	2	0.0229	2	0.0236	2
761	0.0225	2	0.0240	2	0.0240	2	0.0225	2	0.0236	2
762	0.0218	2	0.0229	2	0.0229	2	0.0225	2	0.0229	2
763	0.0341	3	0.0233	2	0.0341	3	0.0338	3	0.0353	3
764	0.0214	2	0.0259	2	0.0251	2	0.0225	2	0.0229	2
765	0.0221	2	0.0240	2	0.0236	2	0.0229	2	0.0225	2
766	0.0221	2	0.0221	2	0.0236	2	0.0229	2	0.0225	2
767	0.0218	2	0.0221	2	0.0229	2	0.0229	2	0.0229	2



**Table 3.** Yellowtail flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Stratum	2013		2014		2015		2016		2017	
	Y. flounder Mean catch	SD								
353	34.81	57.68	1.09	1.19	34.18	48.09	7.82	13.54	27.50	23.33
354	0.77	0.69	0.00	0.00	2.28	3.94	0.00	0.00	0.00	0.00
355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
356	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
357	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
358	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
359	181.82	196.72	40.18	93.34	2.27	2.92	0.24	0.36	0.05	0.11
360	483.74	388.87	229.47	190.61	286.35	205.84	277.57	501.85	260.47	349.29
374	464.43	48.88	489.57	33.19	220.08	96.88	227.62	23.37	3.49	4.50
375	355.94	244.38	400.78	131.27	195.40	124.81	84.61	24.64	45.17	54.99
376	430.94	166.13	694.93	899.49	553.63	422.74	722.38	520.54	309.79	234.89
377	75.45	106.70	10.85	14.79	7.53	10.64	0.76	1.07	0.36	0.51
378	0.00	0.00	0.26	0.37	0.00	0.00	0.00	0.00	0.00	0.00
379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
381	12.83	18.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
382	7.30	14.60	0.00	0.00	0.00	0.00	0.33	0.48	0.25	0.43
721	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
722	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
723	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
725	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
726	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
727	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
728	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
752	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
753	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
754	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
762	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
763	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
765	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
766	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
767	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



**Table 4.** Yellowtail flounder survey biomass (t) by stratum in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Strata	2013	2014	2015	2016	2017	Strata	2013	2014	2015	2016	2017
<b>353</b>	806	23	688	177	616	<b>725</b>	0	0	0	0	0
<b>354</b>	17	0	43	0	0	<b>726</b>	0	0	0	0	0
<b>355</b>	0	0	0	0	0	<b>727</b>	0	0	0	0	0
<b>356</b>	0	0	0	0	0	<b>728</b>	0	0	0	0	0
<b>357</b>	0	0	0	0	0	<b>752</b>	0	0	0	0	0
<b>358</b>	0	0	0	0	0	<b>753</b>	0	0	0	0	0
<b>359</b>	6466	1305	78	9	2	<b>754</b>	0	0	0	0	0
<b>360</b>	114639	48586	67463	65826	60296	<b>755</b>	0	0	0	0	0
<b>374</b>	8549	8098	4118	4190	63	<b>756</b>	0	0	0	0	0
<b>375</b>	8038	8355	4655	1911	1010	<b>757</b>	0	0	0	0	0
<b>376</b>	48457	70031	63736	81580	33908	<b>758</b>	0	0	0	0	0
<b>377</b>	639	84	65	6	3	<b>759</b>	0	0	0	0	0
<b>378</b>	0	3	0	0	0	<b>760</b>	0	0	0	0	0
<b>379</b>	0	0	0	0	0	<b>761</b>	0	0	0	0	0
<b>380</b>	0	0	0	0	0	<b>762</b>	0	0	0	0	0
<b>381</b>	152	0	0	0	0	<b>763</b>	0	0	0	0	0
<b>382</b>	207	0	0	10	7	<b>764</b>	0	0	0	0	0
<b>721</b>	0	0	0	0	0	<b>765</b>	0	0	0	0	0
<b>722</b>	0	0	0	0	0	<b>766</b>	0	0	0	0	0
<b>723</b>	0	0	0	0	0	<b>767</b>	0	0	0	0	0
<b>724</b>	0	0	0	0	0						

**Table 5.** Yellowtail flounder survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by year in NAFO Div. 3NO: 1995-2017.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Biomass</b>	9264	43349	38697	122601	197012	144685	182704	148487	136775	169978	156472	160145
<b>SD</b>	2484	6032	8527	31359	22938	19097	25847	23368	19287	18869	15271	16458
<b>MCPT</b>	16.22	59.54	47.74	137.32	232.41	167.76	210.84	164.28	148.92	190.05	176.42	189.32
<b>SD</b>	4.37	8.41	10.69	34.70	27.41	22.21	30.58	24.92	20.84	21.27	17.06	19.83
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
<b>Biomass</b>	160731	160146	183412	189687	203833	195606	187969	136484	140845	153708	95905	
<b>SD</b>	18852	17297	25736	22611	30743	23679	22493	29519	18915	34788	22868	
<b>MCPT</b>	202.64	178.27	209.43	224.54	231.22	221.33	214.17	173.79	159.25	175.03	112.03	
<b>SD</b>	23.61	19.00	29.75	26.30	35.18	26.27	25.35	38.52	21.37	40.46	25.20	

**Table 6.** Yellowtail flounder length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. E(x) means Error of the parameter x.

Year	Males					Females					Total							
	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N
2013	<b>0.00147</b>	<b>3.47842</b>	0.8688	0.2588	0.866	436	<b>0.0110</b>	<b>2.9156</b>	0.1599	0.0463	0.991	588	<b>0.0055</b>	<b>3.1012</b>	0.2729	0.0839	0.968	1039
2014	<b>0.01661</b>	<b>2.81259</b>	0.1442	0.0449	0.993	354	<b>0.0119</b>	<b>2.9123</b>	0.1445	0.0428	0.992	506	<b>0.0162</b>	<b>2.8240</b>	0.1218	0.0383	0.993	861
2015	<b>0.00491</b>	<b>3.16089</b>	0.2087	0.0646	0.988	506	<b>0.0069</b>	<b>3.0678</b>	0.0797	0.0233	0.998	611	<b>0.0066</b>	<b>3.0784</b>	0.0242	0.0383	0.997	1144
2016	<b>0.01051</b>	<b>2.94093</b>	0.0867	0.027	0.998	311	<b>0.0086</b>	<b>3.0047</b>	0.0584	0.0175	0.999	441	<b>0.0110</b>	<b>2.9338</b>	0.074	0.0225	0.998	756
2017	<b>0.00720</b>	<b>3.03484</b>	0.1616	0.0513	0.993	284	<b>0.0056</b>	<b>3.1206</b>	0.084	0.0249	0.998	402	<b>0.0063</b>	<b>3.0871</b>	0.0838	0.0256	0.997	689

**Table 7.** Yellowtail flounder mean number per tow by year in Spanish Spring surveys in NAFO Div. 3NO: 1995-2017. Indet. means indeterminate.

	1995				1996				1997				1998				1999				2000			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total																
MNPT	31.12	47.36	6.14	84.62	73.11	188.83	13.23	275.17	134.85	147.98	0.00	282.83	279.83	343.35	1.61	624.79	508.72	539.70	4.48	1052.90	332.06	376.36	0.00	708.42
	2001				2002				2003				2004				2005				2006			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total																
MNPT	328.27	428.33	6.98	763.57	256.56	333.09	0.81	590.46	215.96	271.49	0.72	488.17	322.91	336.03	1.19	660.14	275.52	308.25	0.30	584.07	281.15	354.69	0.60	636.44
	2007				2008				2009				2010				2011				2012			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total																
MNPT	317.34	365.53	0.10	682.97	295.11	335.10	0.15	630.35	298.01	398.88	0.48	697.37	368.83	414.09	0.00	782.92	305.92	426.42	0.00	732.34	315.50	438.48	0.75	754.73
	2013				2014				2015				2016				2017							
	Males	Females	Indet.	Total																				
MNPT	294.58	394.06	0.79	689.43	226.69	293.78	0.03	520.50	219.81	248.70	0.11	468.62	227.23	274.70	0.02	501.95	154.84	179.89	0.02	334.75				



**Table 8.** Yellowtail flounder mean number per tow by length class and year. Spanish Spring Survey on NAFO 3NO: 2013-2017. Indet. means indeterminate.

Length (cm.)	2013				2014				2015				2016				2017					
	Males	Females	Indet.	Total																		
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
6	0.000	0.000	0.297	0.297	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
8	0.000	0.043	0.076	0.119	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	0.066	0.012	0.078		
10	0.000	0.000	0.076	0.076	0.090	0.027	0.000	0.117	0.065	0.000	0.023	0.088	0.000	0.048	0.024	0.071	0.009	0.000	0.012	0.021		
12	0.000	0.000	0.078	0.078	0.027	0.027	0.000	0.054	0.393	0.168	0.000	0.561	0.290	0.111	0.000	0.401	0.256	0.282	0.000	0.538		
14	0.071	0.097	0.147	0.314	0.471	0.458	0.000	0.929	0.429	0.083	0.000	0.512	0.242	0.174	0.000	0.417	0.674	0.638	0.000	1.312		
16	0.328	0.071	0.060	0.458	0.724	0.584	0.000	1.308	0.171	0.746	0.000	0.918	0.087	0.024	0.000	0.110	1.004	1.284	0.000	2.288		
18	0.253	0.253	0.060	0.565	0.883	0.362	0.000	1.245	0.566	0.407	0.000	0.973	0.322	0.329	0.000	0.651	1.132	1.845	0.000	2.977		
20	0.891	1.003	0.000	1.894	1.621	0.831	0.000	2.452	2.428	1.127	0.000	3.555	1.779	0.121	0.000	1.900	4.426	4.100	0.000	8.526		
22	2.740	3.140	0.000	5.879	2.910	1.182	0.000	4.093	2.189	1.347	0.000	3.536	1.926	1.404	0.000	3.330	2.020	2.289	0.000	4.309		
24	7.487	8.263	0.000	15.749	3.649	3.951	0.000	7.600	2.731	2.106	0.000	4.837	4.847	2.475	0.000	7.321	2.101	1.182	0.000	3.283		
26	23.234	16.665	0.000	39.898	10.794	7.617	0.000	18.410	7.828	4.621	0.000	12.449	6.958	4.266	0.000	11.224	4.675	2.929	0.000	7.604		
28	54.912	27.949	0.000	82.861	31.696	19.603	0.000	51.299	26.388	9.768	0.000	36.156	20.890	7.345	0.000	28.235	11.436	5.626	0.000	17.062		
30	78.158	46.704	0.000	124.862	69.017	39.870	0.000	108.887	65.705	25.661	0.000	91.366	58.091	25.110	0.000	83.201	35.663	7.758	0.000	43.421		
32	73.177	62.970	0.000	136.146	65.608	51.680	0.000	117.289	68.516	53.570	0.000	122.086	81.325	46.999	0.000	128.323	54.496	27.290	0.000	81.785		
34	37.376	68.287	0.000	105.662	30.734	58.923	0.000	89.656	32.700	54.184	0.000	86.884	37.685	66.522	0.000	104.207	29.456	42.583	0.000	72.039		
36	12.654	65.653	0.000	78.307	6.218	49.180	0.000	55.398	8.310	43.816	0.000	52.126	9.676	58.832	0.000	68.507	6.127	40.587	0.000	46.715		
38	2.544	49.874	0.000	52.418	1.728	28.656	0.000	30.384	1.097	27.918	0.000	29.014	2.072	39.605	0.000	41.677	1.238	23.231	0.000	24.469		
40	0.522	26.657	0.000	27.179	0.377	19.238	0.000	19.615	0.218	14.529	0.000	14.747	1.008	13.539	0.000	14.547	0.124	10.879	0.000	11.002		
42	0.173	10.849	0.000	11.022	0.069	8.649	0.000	8.718	0.027	6.371	0.000	6.399	0.037	5.483	0.000	5.520	0.000	5.154	0.000	5.154		
44	0.062	4.626	0.000	4.688	0.069	2.164	0.000	2.233	0.048	1.564	0.000	1.612	0.000	1.819	0.000	1.819	0.000	1.644	0.000	1.644		
46	0.000	0.746	0.000	0.746	0.000	0.706	0.000	0.706	0.000	0.532	0.000	0.532	0.000	0.454	0.000	0.454	0.000	0.432	0.000	0.432		
48	0.000	0.114	0.000	0.114	0.000	0.075	0.000	0.075	0.000	0.154	0.000	0.154	0.000	0.037	0.000	0.037	0.000	0.028	0.000	0.028		
50	0.000	0.032	0.000	0.032	0.000	0.000	0.000	0.000	0.000	0.027	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.066	0.000	0.066		
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
54	0.000	0.061	0.000	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	294.581	394.056	0.794	689.431	226.685	293.784	0.027	520.497	219.809	248.701	0.113	468.623	227.233	274.697	0.024	501.954	154.837	179.893	0.024	334.754		
Nº samples:					48				45				44				34				35	
Nº Ind.:	5314	6587	16	11917	3004	3975	1	6980	3831	4834	4	8669	1595	2466	1	4062	1675	2234	2	3911		
Sampled catch:					3504				2217				3023				1489				1387	
Range:					6-54				8-48				6-50				10-48				9-51	
Total catch:					17513				14027				12				11234				7133	
Total hauls:					122				122				122				115				113	



**Table 9.** Redfish mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Stratum	2013		2014		2015		2016		2017	
	Redfish Mean catch	SD	Redfish Mean catch	SD	Redfish Mean catch	SD	Redfish Mean catch	SD	Redfish Mean catch	SD
353	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
354	431.90	381.59	25.50	40.21	972.97	883.47	482.34	791.85	540.03	923.90
355	1105.03	988.99	302.90	220.62	1954.04	1984.34	513.80	79.20	708.98	623.84
356	2279.44	1078.20	1974.78	1028.04	707.30	62.72	210.70	127.84	1146.51	193.97
357	3014.35	399.30	435.45	75.73	3886.69	2152.38	835.95	247.78	2502.83	2277.84
358	6128.11	4776.40	2333.82	689.93	16765.95	10954.46	3706.23	3517.46	6005.13	4962.78
359	485.72	916.88	1181.28	1710.64	356.78	723.22	1.55	1.46	1379.60	3054.66
360	0.13	0.56	0.03	0.14	0.00	0.00	0.37	1.37	0.00	0.00
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.63	3.71
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.00	0.00	0.00	0.00	0.00	0.00	0.49	1.20	0.00	0.00
377	8.10	11.46	0.00	0.00	0.00	0.00	0.00	0.00	1.30	1.84
378	16064.18	4986.26	4448.60	6291.27	6175.36	8441.67	164.55	220.41	3472.11	4099.57
379	612.35	167.09	2629.50	2732.39	3080.27	3492.78	611.70	12.55	318.93	10.01
380	1342.03	1381.01	1781.93	178.80	1175.26	110.17	607.60	758.98	3.91	1.82
381	3.41	1.80	0.03	0.01	25.28	28.59	0.03	0.04	0.29	0.38
382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
721	506.51	347.74	687.85	800.66	445.63	481.01	106.80	1.27	148.93	42.46
722	2.86	2.62	40.18	50.43	5.07	7.17	14.68	16.72	5.92	2.66
723	1666.69	1188.21	844.10	439.25	576.35	407.93	437.23	319.80	1544.42	1811.07
724	113.34	157.35	71.34	33.14	72.34	86.36	1.71	1.07	40.04	6.88
725	516.20	347.61	86.50	33.52	633.76	720.63	1138.33	1230.83	391.65	321.52
726	15.72	3.99	6.34	4.33	35.40	29.27	18.44	1.68	50.81	37.60
727	338.35	442.58	31.90	19.80	207.30	73.40	208.40	230.66	195.29	45.17
728	31.05	34.15	5.82	7.75	10.11	13.28	9.40	1.98	4.30	1.85
752	2.22	3.14	0.12	0.17	0.00	0.00	0.25	0.35	1.74	1.84
753	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
754	0.46	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	0.19	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.00	0.60	0.11	0.73	0.00	1.62	2.28	0.00	0.00
757	0.38	0.53	0.44	0.62	0.38	0.54	1.74	2.46	0.41	0.58
758	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	0.00	0.00	0.00	0.00	0.00	0.00	2.42	3.42	0.00	0.00
760	1.56	1.65	0.50	0.86	0.00	0.00	0.07	0.09	0.36	0.51
761	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	0.00	0.00	0.00	0.00	0.00	0.00
763	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.15
764	0.00	0.00	0.07	0.10	0.00	0.00	0.00	0.00	0.07	0.09
765	0.00	0.00	0.00	0.00	1.02	1.44	0.00	0.00	0.35	0.49
766	0.00	0.00	0.00	0.00	0.00	0.00	3.30	4.67	0.00	0.00
767	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



**Table 10.** Redfish survey biomass (t) by stratum in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Strata	2013	2014	2015	2016	2017	Strata	2013	2014	2015	2016	2017
<b>353</b>	0	0	0	0	0	<b>725</b>	4739	712	5818	10450	3374
<b>354</b>	9444	478	18412	10318	11187	<b>726</b>	102	37	223	118	315
<b>355</b>	7269	1708	11017	3271	4663	<b>727</b>	2840	237	1769	1778	1639
<b>356</b>	9523	6972	2607	880	4635	<b>728</b>	208	37	70	64	29
<b>357</b>	41850	5441	54832	11793	35309	<b>752</b>	25	1	0	3	19
<b>358</b>	122562	40393	324502	74125	111435	<b>753</b>	0	0	0	0	0
<b>359</b>	17272	38361	12297	55	48706	<b>754</b>	7	0	0	0	0
<b>360</b>	30	7	0	87	0	<b>755</b>	6	0	0	0	0
<b>374</b>	0	0	0	0	48	<b>756</b>	0	5	6	14	0
<b>375</b>	0	0	0	0	0	<b>757</b>	3	4	3	16	4
<b>376</b>	0	0	0	56	0	<b>758</b>	0	0	0	0	0
<b>377</b>	69	0	0	0	10	<b>759</b>	0	0	0	27	0
<b>378</b>	198482	47113	76300	2033	40857	<b>760</b>	21	6	0	1	5
<b>379</b>	5409	21861	29023	5669	2774	<b>761</b>	0	0	0	0	0
<b>380</b>	11264	13034	9864	4938	32	<b>762</b>	0	0	0	0	0
<b>381</b>	40	0	308	0	4	<b>763</b>	0	0	0	0	2
<b>382</b>	0	0	0	0	0	<b>764</b>	0	1	0	0	1
<b>721</b>	2926	3359	2414	617	846	<b>765</b>	0	0	11	0	4
<b>722</b>	22	261	33	108	43	<b>766</b>	0	0	0	42	0
<b>723</b>	23352	10113	7685	6024	20930	<b>767</b>	0	0	0	0	0
<b>724</b>	1249	694	759	18	414						

**Table 11.** Redfish survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by year and Division in NAFO Div. 3NO: 1997-2017.

Div	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
3NO	<b>Biomass</b>	5947	40909	76564	99226	63350	11172	15714	35275	157716	103029	98805
	<b>SD</b>	988	20512	27740	33453	41460	2374	3224	7332	52646	23332	15893
	<b>MCPT</b>	6.79	43.25	85.45	112.71	73.14	12.43	17.21	38.60	175.79	118.76	125.66
	<b>SD</b>	1.15	19.50	29.56	40.03	48.13	2.60	3.55	8.05	58.86	27.83	20.19
	<b>Nº Strata</b>	36	41	41	41	41	41	41	41	41	41	36
3N	<b>Biomass</b>	4753	22540	46459	68928	53855	7620	11031	27016	146918	87830	87602
	<b>SD</b>	353	17632	25022	33109	41371	2106	3199	7174	52267	22675	15364
	<b>MCPT</b>	6.14	26.32	58.78	90.12	71.16	9.62	13.83	33.95	187.61	115.44	124.79
	<b>SD</b>	0.46	18.33	30.08	45.16	55.00	2.61	4.05	9.06	67.31	30.96	22.09
	<b>Nº Strata</b>	27	31	31	31	31	31	31	31	31	31	28
3O	<b>Biomass</b>	1194	18369	30105	30298	9494	3552	4684	8259	10797	15199	11203
	<b>SD</b>	922	10490	12129	6073	2702	1117	369	1326	2728	5279	3362
	<b>MCPT</b>	11.41	159.86	269.16	268.32	86.80	31.74	40.55	70.63	94.35	141.64	132.90
	<b>SD</b>	8.68	87.87	107.03	54.27	24.47	9.78	3.10	11.68	24.19	52.04	39.93
	<b>Nº Strata</b>	9	10	10	10	10	10	10	10	10	10	8
<b>3N/Total (%) Biomass</b>		80	55	61	69	85	68	70	77	93	85	89

Div	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3NO	<b>Biomass</b>	74172	763980	431296	487655	294033	458716	190832	557954	132505	287284
	<b>SD</b>	26168	145765	69575	107982	62954	76825	54478	143611	44195	84550
	<b>MCPT</b>	82.20	670.46	506.43	543.17	320.52	502.58	240.24	628.14	145.51	330.49
	<b>SD</b>	29.14	172.93	81.06	124.68	72.27	79.94	69.17	164.37	46.90	98.46
	<b>Nº Strata</b>	41	39	37	41	41	41	41	41	41	41
3N	<b>Biomass</b>	68059	735743	359536	418305	265238	429532	178055	523461	117270	265904
	<b>SD</b>	25890	143334	58306	99454	60304	76128	54133	143235	43583	83567
	<b>MCPT</b>	86.51	721.67	473.94	533.85	330.89	539.18	256.34	669.86	147.23	350.85
	<b>SD</b>	33.12	194.48	76.53	132.71	80.20	91.06	79.00	187.34	52.24	111.75
	<b>Nº Strata</b>	31	30	29	31	31	31	31	31	31	31
3O	<b>Biomass</b>	6113	28238	71760	69350	28795	29184	12778	34493	15235	21379
	<b>SD</b>	3258	16762	37821	41858	16754	7503	3927	12527	10014	12196
	<b>MCPT</b>	52.55	280.98	772.76	607.40	249.04	250.43	129.36	340.74	133.66	190.25
	<b>SD</b>	28.27	163.87	402.81	362.85	140.90	64.52	39.61	125.38	85.91	103.27
	<b>Nº Strata</b>	10	9	8	10	10	10	10	10	10	10
<b>3N/Total (%) Biomass</b>		92	96	83	86	90	94	93	94	89	93



**Table 12.** Redfish length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. E(x) means Error of the parameter x.

Males						Females						Total						
Year	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N
2013	<b>0.01306</b>	<b>0.13360</b>	2.98309	0.0409	0.994	482	<b>0.0149</b>	<b>0.1068</b>	2.95412	0.0312	0.997	479	<b>0.0106</b>	<b>0.0838</b>	3.04983	0.0263	0.997	1017
2014	<b>0.01117</b>	<b>3.05050</b>	0.0736	0.0234	0.998	424	<b>0.0136</b>	<b>2.9921</b>	0.1084	0.0318	0.997	387	<b>0.0113</b>	<b>3.0464</b>	0.0625	0.0199	0.998	821
2015	<b>0.00757</b>	<b>3.17016</b>	0.1274	0.0387	0.995	517	<b>0.0087</b>	<b>3.1206</b>	0.1057	0.0315	0.997	502	<b>0.0073</b>	<b>3.1798</b>	0.092	0.0283	0.997	1095
2016	<b>0.01212</b>	<b>3.01441</b>	0.0982	0.0308	0.997	339	<b>0.0100</b>	<b>3.0707</b>	0.0981	0.0307	0.997	382	<b>0.0128</b>	<b>2.9877</b>	0.2684	0.0892	0.967	751
2017	<b>0.01640</b>	<b>2.93220</b>	0.0997	0.0306	0.998	283	<b>0.0156</b>	<b>2.9555</b>	0.1401	0.0434	0.997	265	<b>0.0140</b>	<b>2.9828</b>	0.0516	0.0167	0.999	668

**Table 13.** Redfish mean number per tow by year in Spanish Spring surveys in NAFO Div. 3NO: 1997-2017. Indet. means indeterminate.

1997				1998				1999				2000				2001				
Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	
MNPT	22.38	14.94	0.00	37.32	108.36	114.09	0.02	222.47	289.50	200.84	0.39	490.73	518.31	326.79	0.00	845.10	279.45	158.85	1.10	439.41
2003										2004										
MNPT	71.00	46.21	0.82	118.03	122.61	94.97	19.57	237.15	573.80	502.15	95.21	1171.16	398.90	293.94	247.70	940.54	368.68	313.47	3.01	685.15
2009										2010										
MNPT	3754.48	2846.50	3.64	6604.62	2009.91	1807.51	0.23	3817.65	2385.24	1906.21	9.10	4300.55	2385.24	1906.21	9.10	4300.55	1184.89	981.01	0.31	2166.20
2014										2015										
MNPT	742.09	639.39	0.41	1381.88	2120.95	1721.56	11.42	3853.93	475.14	409.51	0.26	884.92	475.14	409.51	0.26	884.92	964.13	853.43	15.02	1832.58
2016										2017										



**Table 14.** Redfish mean number per tow by length class and year. Spanish Spring Survey on NAFO 3NO: 2013-2017. Indet. means indeterminate.

Length (cm.)	2013				2014				2015				2016				2017			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
4	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.000	0.000	0.174	0.174	0.000	0.000	0.051	0.051	0.000	0.000	0.522	0.522
6	0.000	0.000	0.327	0.327	0.064	0.000	0.085	0.150	0.000	0.000	9.091	9.091	0.000	0.000	0.068	0.068	0.000	0.000	1.414	1.414
8	0.427	0.000	0.056	0.482	0.021	0.000	0.106	0.127	0.000	0.000	2.003	2.003	0.654	0.000	0.030	0.684	0.103	0.000	2.273	2.376
10	0.247	0.000	0.000	0.247	0.010	0.000	0.201	0.211	0.000	0.094	0.046	0.140	2.414	0.108	0.017	2.539	2.049	0.017	2.794	4.860
12	0.207	0.000	0.000	0.207	0.034	0.008	0.000	0.042	0.010	0.000	0.065	0.075	3.306	0.205	0.096	3.607	0.521	0.394	2.895	3.810
14	0.329	0.000	0.000	0.329	0.147	0.000	0.000	0.147	0.729	0.061	0.036	0.826	0.024	0.104	0.000	0.129	1.928	3.715	4.102	9.745
16	4.075	1.763	0.000	5.838	2.111	3.014	0.000	5.125	1.054	0.190	0.000	1.244	1.001	0.096	0.000	1.097	3.574	0.280	1.024	4.878
18	152.717	45.982	0.000	198.698	57.245	17.786	0.000	75.031	97.663	29.361	0.000	127.025	5.055	9.300	0.000	14.355	13.894	5.673	0.000	19.567
20	1266.873	551.383	0.000	1818.256	353.948	126.173	0.000	480.121	960.679	291.918	0.000	1252.597	178.277	46.371	0.000	224.648	224.661	62.895	0.000	287.556
22	496.753	707.239	0.000	1203.992	242.008	252.294	0.000	494.302	803.867	668.544	0.000	1472.411	232.550	148.387	0.000	380.938	524.060	265.947	0.000	790.006
24	71.268	143.489	0.000	214.758	63.344	135.739	0.000	199.083	171.811	428.572	0.000	600.384	40.976	126.419	0.000	167.396	163.745	346.359	0.000	510.104
26	24.290	44.182	0.000	68.472	18.428	42.912	0.000	61.340	72.813	151.935	0.000	224.748	6.659	47.352	0.000	54.011	24.377	123.100	0.000	147.476
28	3.186	23.874	0.000	27.060	2.230	31.128	0.000	33.358	3.194	78.432	0.000	81.626	2.794	17.318	0.000	20.112	3.004	32.317	0.000	35.321
30	5.827	16.799	0.000	22.626	0.866	18.874	0.000	19.740	1.919	46.678	0.000	48.597	0.547	8.397	0.000	8.944	0.866	8.863	0.000	9.729
32	2.200	4.369	0.000	6.569	0.468	8.424	0.000	8.891	3.066	18.828	0.000	21.894	0.267	3.708	0.000	3.975	0.380	2.558	0.000	2.938
34	1.655	1.804	0.000	3.459	0.483	1.840	0.000	2.324	2.027	4.225	0.000	6.252	0.251	1.081	0.000	1.332	0.393	0.749	0.000	1.142
36	4.402	0.781	0.000	5.183	0.456	0.877	0.000	1.332	0.944	1.598	0.000	2.542	0.121	0.442	0.000	0.563	0.226	0.290	0.000	0.516
38	0.291	0.293	0.000	0.584	0.138	0.203	0.000	0.340	0.760	0.756	0.000	1.516	0.104	0.159	0.000	0.263	0.243	0.140	0.000	0.383
40	0.126	0.070	0.000	0.196	0.060	0.084	0.000	0.144	0.391	0.198	0.000	0.590	0.132	0.041	0.000	0.174	0.077	0.074	0.000	0.151
42	0.085	0.046	0.000	0.131	0.015	0.018	0.000	0.033	0.024	0.112	0.000	0.137	0.012	0.020	0.000	0.032	0.027	0.047	0.000	0.073
44	0.004	0.004	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.054	0.000	0.054	0.000	0.000	0.000	0.000	0.004	0.010	0.000	0.014
46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	2034.960	1542.077	0.383	3577.420	742.086	639.385	0.414	1381.885	2120.954	1721.558	11.415	3853.927	475.144	409.509	0.262	884.915	964.130	853.427	15.025	1832.582
Nº samples:				51				46				43				49				46
Nº Ind.:	4182	4210	34	8426	2851	3000	27	5878	3508	4328	1318	9154	1614	2108	22	3744	3013	3302	221	6536
Sampled catch:				1726				1230				1977				1162				1460
Range:				6-45				5-54				5-44				5-43				5-45
Total catch:				78332				42046				93699				22361				47617
Total hauls:				122				122				122				115				114



**Table 15.** Witch flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Stratum	2013		2014		2015		2016		2017	
	W. flounder Mean catch	SD								
353	11.01	10.52	4.03	0.67	3.83	3.32	9.04	12.20	0.00	23.33
354	9.32	9.37	1.89	0.86	2.15	2.69	7.07	7.52	27.83	0.00
355	0.05	0.07	0.64	0.07	2.05	0.06	1.74	0.52	6.48	0.00
356	0.85	0.78	0.45	0.64	3.85	5.35	1.26	0.79	1.90	0.00
357	0.42	0.59	0.63	0.88	0.96	0.25	5.13	5.30	1.91	0.00
358	2.61	1.01	3.97	3.83	4.60	4.48	50.02	55.56	8.29	0.00
359	10.92	16.98	1.91	2.51	18.27	21.53	4.01	6.05	37.44	0.11
360	1.36	2.90	0.17	0.37	0.35	0.63	0.00	0.00	0.00	349.29
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.99
376	0.11	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	234.89
377	0.45	0.63	0.00	0.00	0.78	1.10	0.00	0.00	0.00	0.51
378	0.52	0.74	1.06	1.49	2.83	2.07	0.28	0.40	3.25	0.00
379	0.00	0.00	0.92	0.14	0.29	0.40	0.58	0.82	1.69	0.00
380	0.38	0.53	1.41	1.99	0.73	0.10	1.20	0.65	0.00	0.00
381	1.12	0.93	0.00	0.00	1.24	1.18	0.00	0.00	0.00	0.00
382	0.56	0.74	0.21	0.42	0.00	0.00	0.00	0.00	0.23	0.43
721	0.91	0.17	0.61	0.86	0.76	0.22	1.18	0.99	0.55	0.00
722	2.69	0.22	1.66	0.52	1.19	0.08	1.22	0.08	0.58	0.00
723	2.39	1.88	5.32	3.26	4.71	1.86	2.77	3.72	4.26	0.00
724	8.61	7.74	4.17	0.64	8.16	4.06	7.20	4.53	1.84	0.00
725	5.05	3.16	2.58	2.07	7.12	5.54	10.09	12.18	6.89	0.00
726	18.48	15.11	4.89	2.10	2.95	0.26	6.17	6.54	2.60	0.00
727	10.31	1.20	3.00	4.24	0.78	0.52	11.86	10.24	34.08	0.00
728	8.38	9.72	11.94	9.54	11.70	7.50	22.92	21.46	10.18	0.00
752	4.85	6.86	7.85	11.10	9.88	5.51	14.46	12.22	8.53	0.00
753	0.70	0.99	1.20	0.26	0.81	1.13	0.00	0.00	1.14	0.00
754	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
756	5.21	7.37	9.31	6.52	5.15	3.29	16.99	22.22	5.87	0.00
757	5.29	1.22	5.92	8.37	3.29	4.65	0.40	0.56	4.96	0.00
758	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	6.63	7.71	3.42	4.30	16.15	20.72	3.04	2.14	5.15	0.00
761	2.30	2.61	0.93	0.18	2.61	0.94	0.91	1.28	2.27	0.00
762	0.00	0.00	0.00	0.00	0.45	0.64	0.89	1.26	0.00	0.00
763	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764	5.16	3.17	0.58	0.23	0.68	0.14	1.10	0.85	1.45	0.00
765	0.26	0.02	0.76	0.82	0.37	0.24	0.17	0.03	0.97	0.00
766	0.00	0.00	0.12	0.16	0.25	0.35	0.00	0.00	0.00	0.00
767	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00



**Table 16.** Witch flounder survey biomass (t) by stratum in NAFO Div. 3NO: 2013-2017. n.s. means stratum not surveyed.

Strata	2013	2014	2015	2016	2017	Strata	2013	2014	2015	2016	2017
<b>353</b>	255	86	77	205	0	<b>725</b>	46	21	65	93	59
<b>354</b>	204	35	41	151	576	<b>726</b>	120	28	19	40	16
<b>355</b>	0	4	12	11	43	<b>727</b>	86	22	7	101	286
<b>356</b>	4	2	14	5	8	<b>728</b>	56	75	81	156	69
<b>357</b>	6	8	13	72	27	<b>752</b>	55	86	115	160	95
<b>358</b>	52	69	89	1000	154	<b>753</b>	8	14	10	0	13
<b>359</b>	388	62	630	142	1322	<b>754</b>	0	0	0	0	0
<b>360</b>	323	36	82	0	0	<b>755</b>	0	0	0	0	0
<b>374</b>	0	0	0	0	0	<b>756</b>	46	82	46	152	52
<b>375</b>	0	0	0	0	0	<b>757</b>	45	50	29	4	45
<b>376</b>	12	0	0	0	0	<b>758</b>	0	0	0	0	0
<b>377</b>	4	0	7	0	0	<b>759</b>	0	0	0	0	0
<b>378</b>	6	11	35	3	38	<b>760</b>	89	43	221	41	67
<b>379</b>	0	8	3	5	15	<b>761</b>	35	13	37	14	33
<b>380</b>	3	10	6	10	0	<b>762</b>	0	0	8	17	0
<b>381</b>	13	0	15	0	0	<b>763</b>	0	0	0	0	0
<b>382</b>	16	6	0	0	7	<b>764</b>	48	4	5	10	13
<b>721</b>	5	3	4	7	3	<b>765</b>	3	8	4	2	11
<b>722</b>	20	11	8	9	4	<b>766</b>	0	1	3	0	0
<b>723</b>	33	64	63	38	58	<b>767</b>	0	0	0	0	1
<b>724</b>	95	41	86	77	19						

**Table 17.** Witch flounder survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by year and Division in NAFO Div. 3NO: 2002-2017.

Year	2002	2003	2004	2005	2006	2007	2008	2009
<b>Biomass</b>	1784	3145	3348	2633	2570	1480	2118	1872
<b>SD</b>	426	690	523	488	629	229	481	423
<b>MCPT</b>	2.00	3.42	3.66	2.95	3.01	1.84	2.32	2.13
<b>SD</b>	0.49	0.75	0.56	0.56	0.73	0.28	0.52	0.48
Year	2010	2011	2012	2013	2014	2015	2016	2017
<b>Biomass</b>	3239	1428	2763	2078	903	1834	2526	3033
<b>SD</b>	777	248	648	367	134	376	737	1199
<b>MCPT</b>	3.82	1.58	3.06	2.32	1.09	2.11	2.79	3.47
<b>SD</b>	0.91	0.28	0.74	0.41	0.16	0.42	0.78	1.35



**Table 18.** Witch flounder length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. E(x) means Error of the parameter x.

Year	Males					Females					Total							
	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N	a	b	E(a)	E(b)	R2	N
2013	<b>0.00108</b>	<b>3.48692</b>	0.1785	0.0532	0.994	286	<b>0.00109</b>	<b>3.48450</b>	0.0815	0.0234	0.998	563	<b>0.00220</b>	<b>3.28882</b>	0.1559	0.0480	0.991	864
2014	<b>0.00060</b>	<b>3.65925</b>	0.2494	0.0709	0.991	134	<b>0.00096</b>	<b>3.52772</b>	0.1025	0.0286	0.998	278	<b>0.00217</b>	<b>3.30510</b>	0.1540	0.0440	0.994	415
2015	<b>0.00103</b>	<b>3.51249</b>	0.1701	0.0489	0.995	306	<b>0.00154</b>	<b>3.39857</b>	0.0807	0.0230	0.998	440	<b>0.00206</b>	<b>3.31598</b>	0.1112	0.0329	0.996	762
2016	<b>0.00102</b>	<b>3.49955</b>	0.1145	0.0327	0.998	222	<b>0.00147</b>	<b>3.40745</b>	0.1089	0.0314	0.997	354	<b>0.00209</b>	<b>3.30679</b>	0.2052	0.0610	0.985	584
2017	<b>0.00104</b>	<b>3.49803</b>	0.1432	0.0405	0.997	247	<b>0.00120</b>	<b>3.45370</b>	0.0990	0.0286	0.998	299	<b>0.00173</b>	<b>3.35493</b>	0.0907	0.0263	0.998	595

**Table 19.** Witch flounder mean number per tow by year in Spanish Spring Surveys in NAFO Div. 3NO: 2002-2017. Indet. means indeterminate.

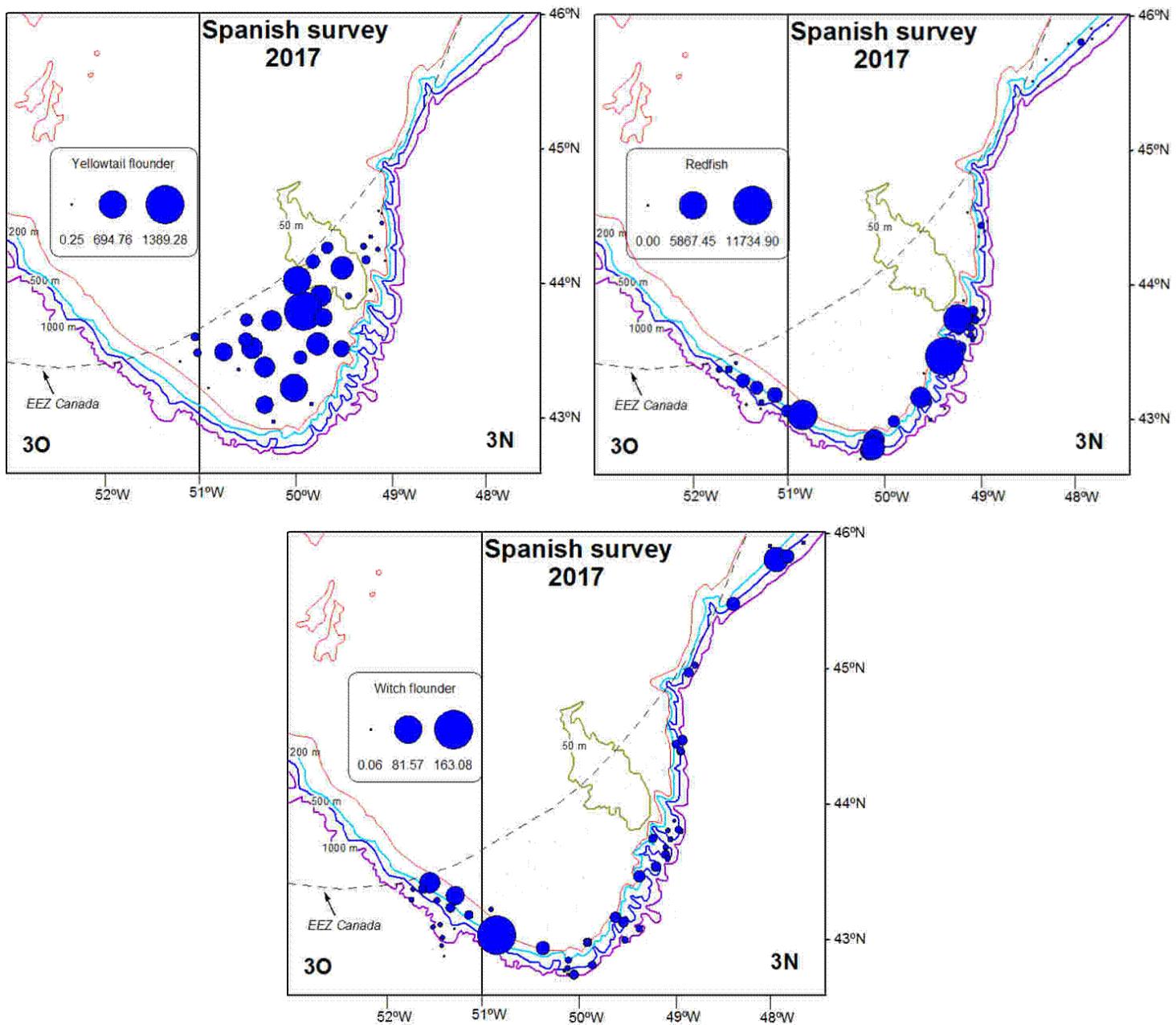
2002				2003				2004				2005				2006				
Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	
MNPT	2.602	3.488	0.459	6.548	4.499	5.864	0.057	10.420	4.182	6.088	0.211	10.480	4.160	5.570	0.605	10.336	3.384	4.937	0.040	8.360
<hr/>																				
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	
MNPT	2.061	3.384	0.027	5.472	2.352	4.107	0.043	6.502	3.538	5.411	0.000	8.949	1.326	2.529	0.033	3.887	3.350	4.078	0.056	7.483
<hr/>																				
2014				2015				2016				2017				2013				
Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	
MNPT	0.756	1.626	0.012	2.395	1.941	2.810	0.125	4.875	2.466	3.419	0.046	5.931	3.611	3.773	0.034	7.418	2.009	3.908	0.159	6.076



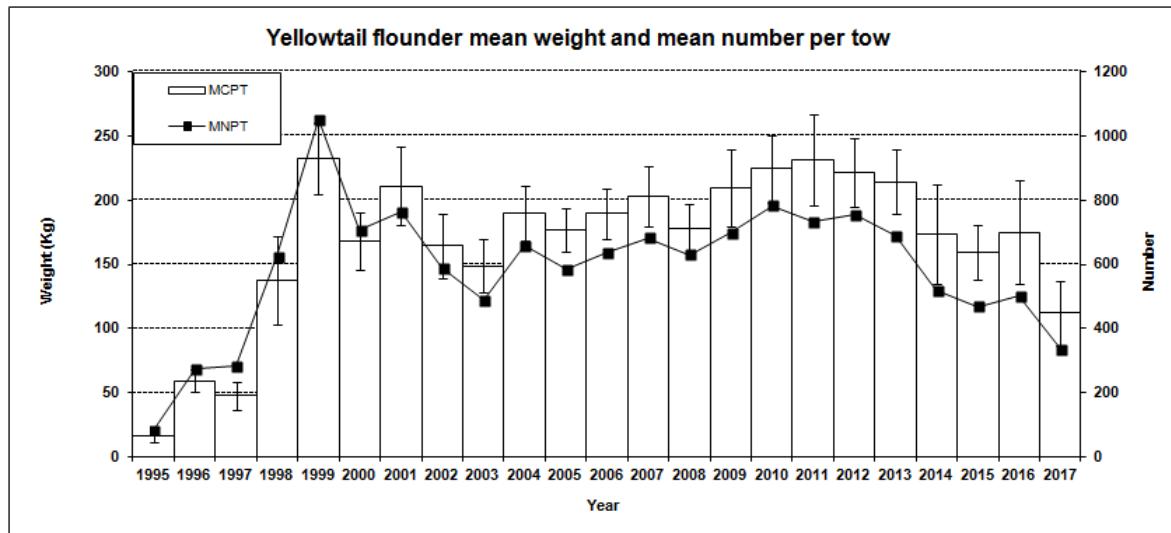
**Table 20.** Witch flounder mean number per tow by length class and year. Spanish Spring Surveys in NAFO Div. 3NO: 2013-2017. Indet. means indeterminate.

Length (cm.)	2013				2014				2015				2016				2017				
	Males	Females	Indet.	Total																	
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6	0.000	0.000	0.048	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.064	0.064	0.000	0.000	0.028	0.028	0.000	0.000	0.000	0.000	
8	0.000	0.000	0.050	0.050	0.000	0.000	0.004	0.004	0.000	0.000	0.042	0.042	0.000	0.006	0.000	0.006	0.000	0.000	0.008	0.008	
10	0.008	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.008	0.033	0.000	0.000	0.019	0.019	
12	0.005	0.000	0.008	0.012	0.000	0.003	0.000	0.003	0.000	0.008	0.000	0.008	0.007	0.008	0.010	0.025	0.000	0.000	0.000	0.000	
14	0.002	0.015	0.000	0.017	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.009	0.002	0.000	0.000	0.002	0.000	0.000	0.007	0.007	
16	0.011	0.021	0.000	0.032	0.000	0.000	0.004	0.004	0.000	0.007	0.000	0.007	0.000	0.007	0.000	0.007	0.003	0.008	0.000	0.011	
18	0.010	0.049	0.016	0.074	0.000	0.004	0.004	0.009	0.022	0.018	0.000	0.040	0.000	0.014	0.000	0.014	0.010	0.012	0.000	0.022	
20	0.024	0.002	0.016	0.042	0.004	0.014	0.000	0.018	0.006	0.000	0.000	0.006	0.012	0.012	0.000	0.024	0.006	0.030	0.000	0.036	
22	0.052	0.025	0.011	0.087	0.003	0.007	0.000	0.010	0.016	0.014	0.000	0.030	0.000	0.040	0.000	0.040	0.000	0.028	0.000	0.028	
24	0.055	0.078	0.011	0.144	0.014	0.008	0.000	0.022	0.010	0.025	0.000	0.036	0.016	0.004	0.000	0.020	0.008	0.028	0.000	0.036	
26	0.079	0.057	0.000	0.136	0.027	0.020	0.000	0.047	0.037	0.004	0.000	0.042	0.025	0.037	0.000	0.061	0.024	0.044	0.000	0.069	
28	0.093	0.141	0.000	0.233	0.054	0.036	0.000	0.090	0.057	0.058	0.000	0.115	0.070	0.062	0.000	0.132	0.108	0.050	0.000	0.158	
30	0.168	0.158	0.000	0.326	0.030	0.078	0.000	0.108	0.118	0.114	0.000	0.232	0.105	0.153	0.000	0.257	0.129	0.112	0.000	0.241	
32	0.263	0.260	0.000	0.524	0.066	0.090	0.000	0.156	0.179	0.099	0.000	0.278	0.086	0.132	0.000	0.218	0.105	0.128	0.000	0.233	
34	0.245	0.372	0.000	0.617	0.096	0.136	0.000	0.232	0.245	0.196	0.004	0.445	0.127	0.163	0.000	0.290	0.210	0.104	0.000	0.314	
36	0.261	0.379	0.000	0.640	0.103	0.124	0.000	0.227	0.352	0.259	0.000	0.611	0.280	0.181	0.000	0.461	0.341	0.125	0.000	0.466	
38	0.289	0.348	0.000	0.637	0.125	0.168	0.000	0.293	0.339	0.268	0.000	0.607	0.428	0.244	0.000	0.672	0.790	0.344	0.000	1.134	
40	0.234	0.417	0.000	0.652	0.141	0.170	0.000	0.311	0.358	0.423	0.000	0.781	0.518	0.440	0.000	0.958	1.029	0.629	0.000	1.658	
42	0.143	0.522	0.000	0.665	0.056	0.204	0.000	0.260	0.110	0.384	0.004	0.497	0.423	0.571	0.000	0.994	0.617	0.643	0.000	1.260	
44	0.058	0.442	0.000	0.500	0.025	0.220	0.000	0.246	0.040	0.377	0.007	0.425	0.276	0.673	0.000	0.949	0.111	0.628	0.000	0.739	
46	0.000	0.386	0.000	0.386	0.012	0.174	0.000	0.186	0.026	0.262	0.000	0.287	0.072	0.322	0.000	0.394	0.100	0.379	0.000	0.479	
48	0.009	0.154	0.000	0.163	0.000	0.067	0.000	0.067	0.016	0.176	0.004	0.196	0.019	0.144	0.000	0.164	0.020	0.256	0.000	0.276	
50	0.000	0.046	0.000	0.046	0.000	0.067	0.000	0.067	0.000	0.063	0.000	0.063	0.000	0.090	0.000	0.090	0.000	0.143	0.000	0.143	
52	0.000	0.029	0.000	0.029	0.000	0.022	0.000	0.022	0.000	0.042	0.000	0.042	0.000	0.048	0.000	0.048	0.000	0.048	0.000	0.048	
54	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.012	0.000	0.012	0.000	0.035	0.000	0.035	0.000	0.033	0.000	0.033	
56	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
58	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	0.006	0.000	0.006	0.000	0.000	0.000	0.000	
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
62	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
64	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	2.009	3.908	0.159	6.076	0.756	1.626	0.012	2.395	1.941	2.810	0.125	4.875	2.466	3.419	0.046	5.931	3.611	3.773	0.034	7.418	
Nº samples:					67				53				69				50				51
Nº Ind.:	315	592	25	932	131	271	3	405	304	443	21	768	330	513	8	851	360	455	6	821	
Sampled catch:									188				336				401				387
Range:					6-58				8-57				7-54				6-59				8-55
Total catch:					356				189				346				442				509
Total hauls:					122				122				122				115				113

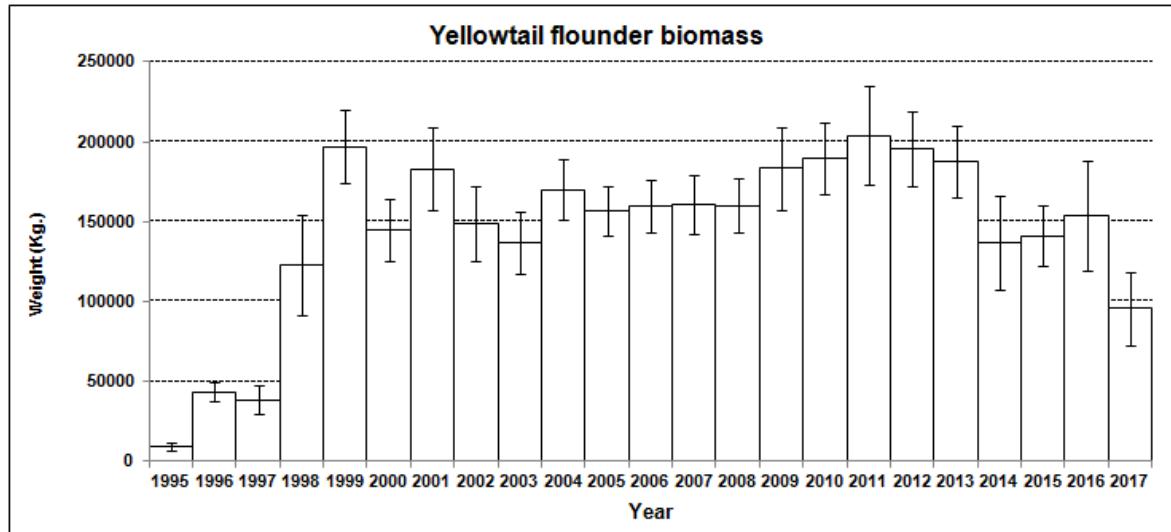




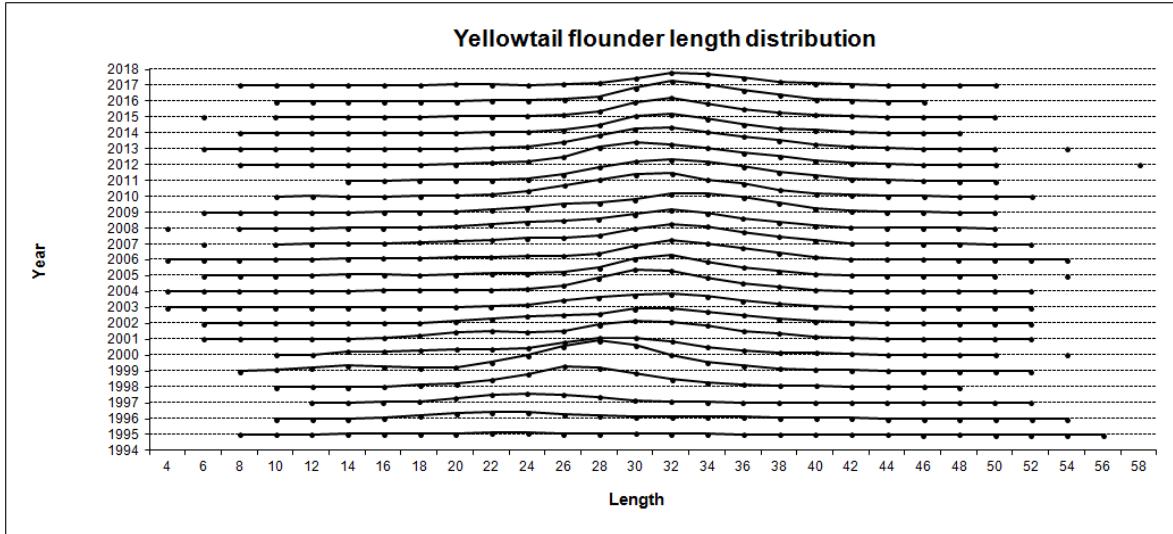
**Fig. 1.** Position of the hauls and the catch of yellowtail flounder, redfish and witch flounder during the 2017 Spanish 3NO survey. Note that the scale is different in the three graphs.



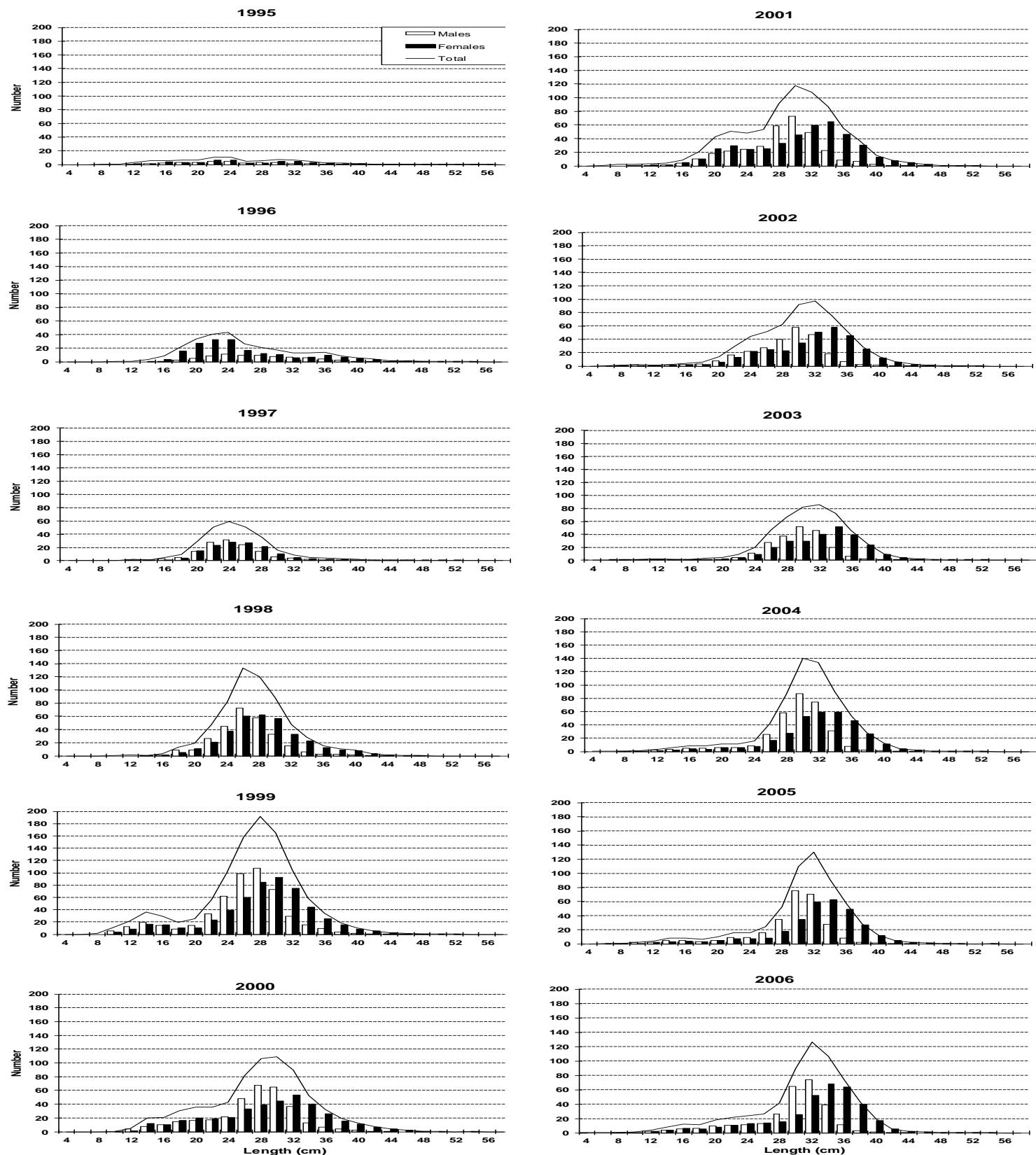
**Fig. 2.** Yellowtail flounder stratified mean catches in Kg and  $\pm$ SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1995-2017.



**Fig. 3.** Yellowtail flounder biomass calculated by the swept area method in tons and  $\pm$ SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1995-2017.

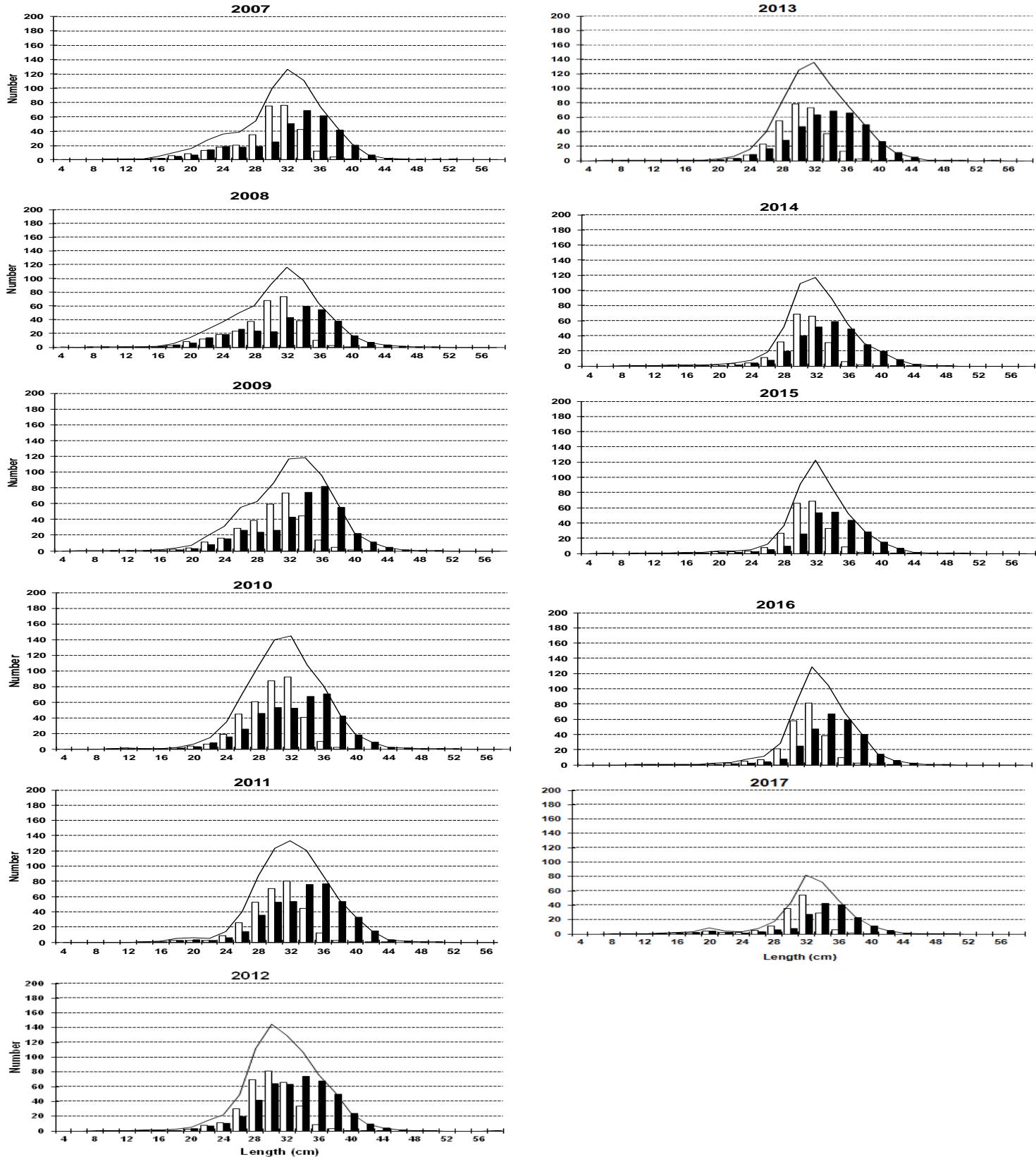


**Fig. 4.** Yellowtail flounder mean catches per tow length distribution (cm) on NAFO 3NO: 1995-2017. Data from 2013 to 2017 are in Table 8; data for 1995-2012 can be seen in SCR Doc 13/11.

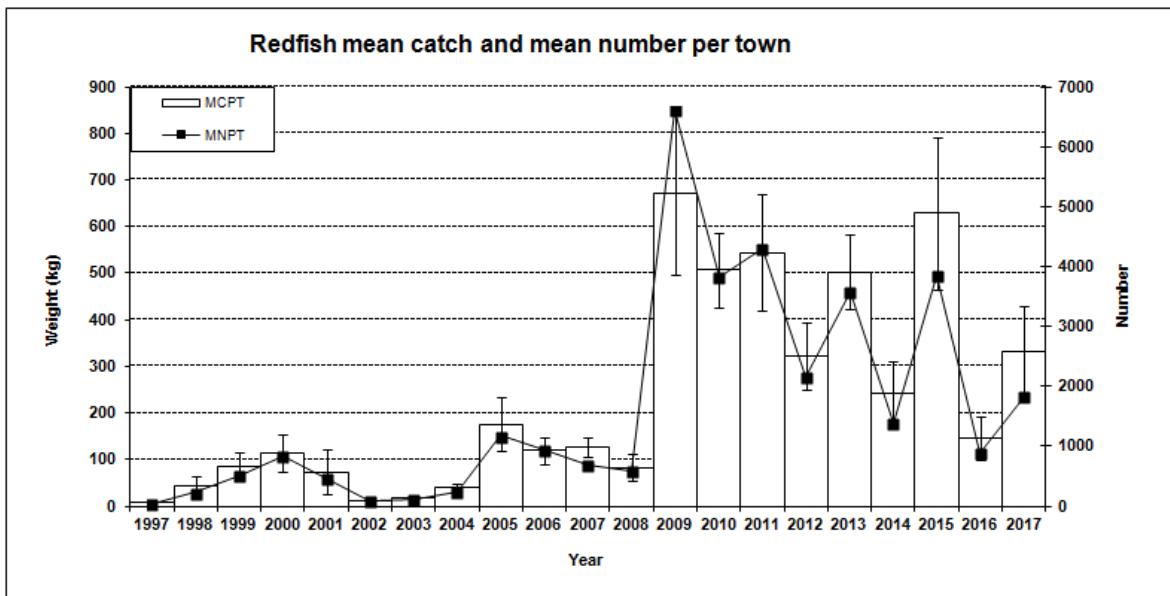


**Fig.5.** Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2017. Mean catches per tow number. Data from 2013 to 2017 are in Table 8; data for 1995-2012 can be seen in SCR Doc 13/11.

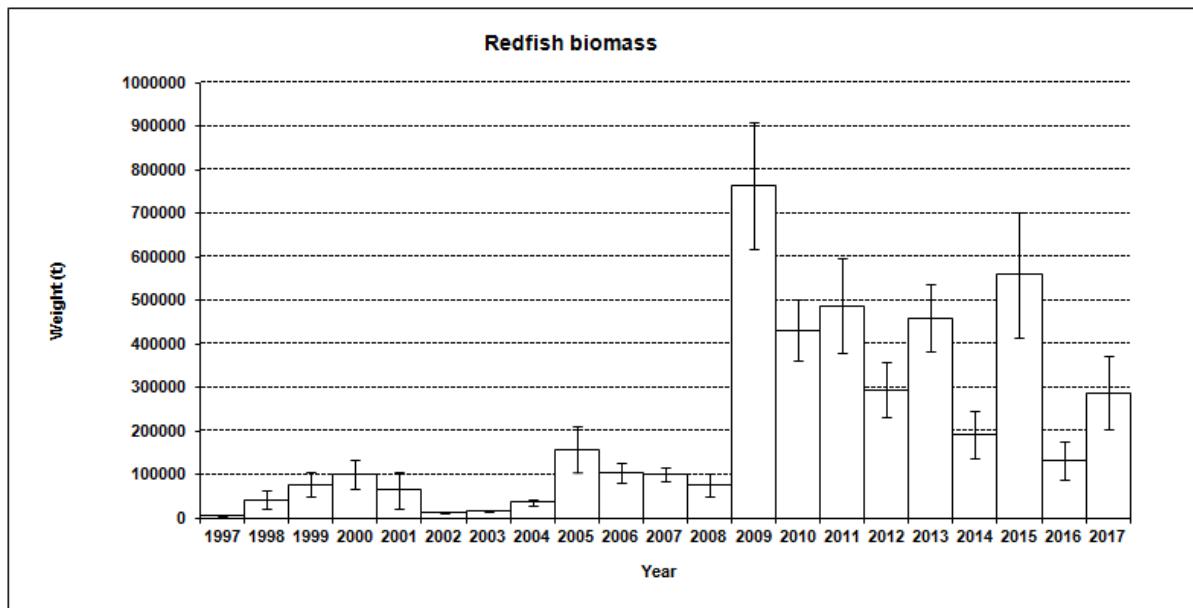




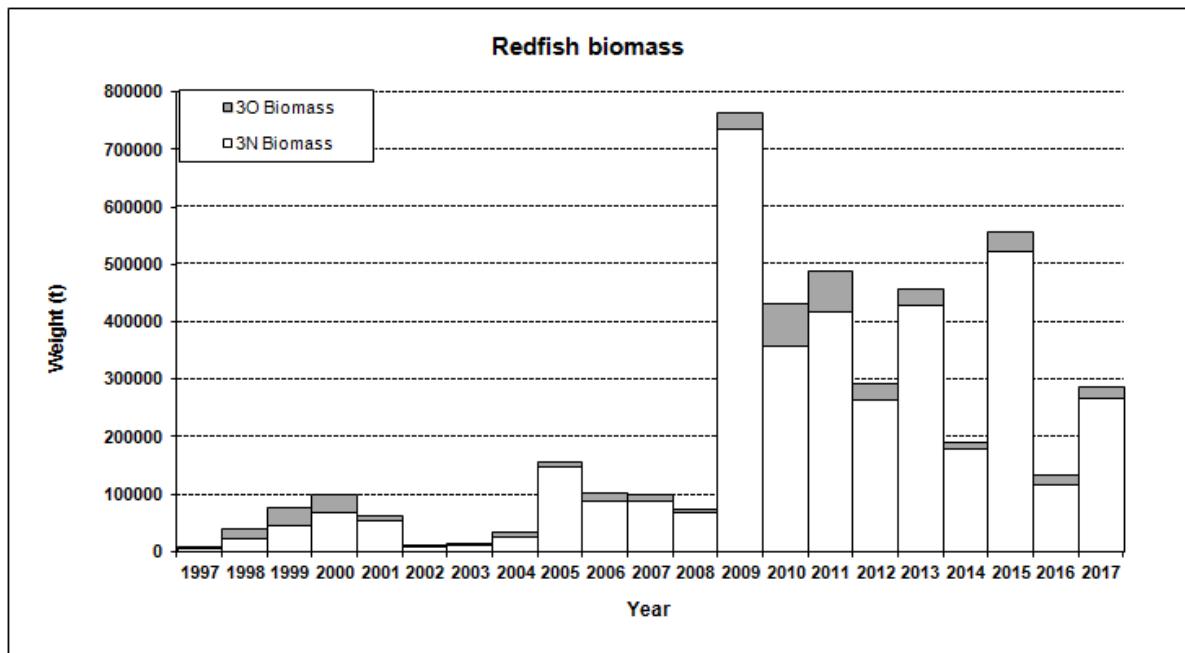
**Fig.5 (cont.).** Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2017. Mean catches per tow number. Data from 2013 to 2017 are in Table 8; data for 1995-2012 can be seen in SCR Doc 13/11.



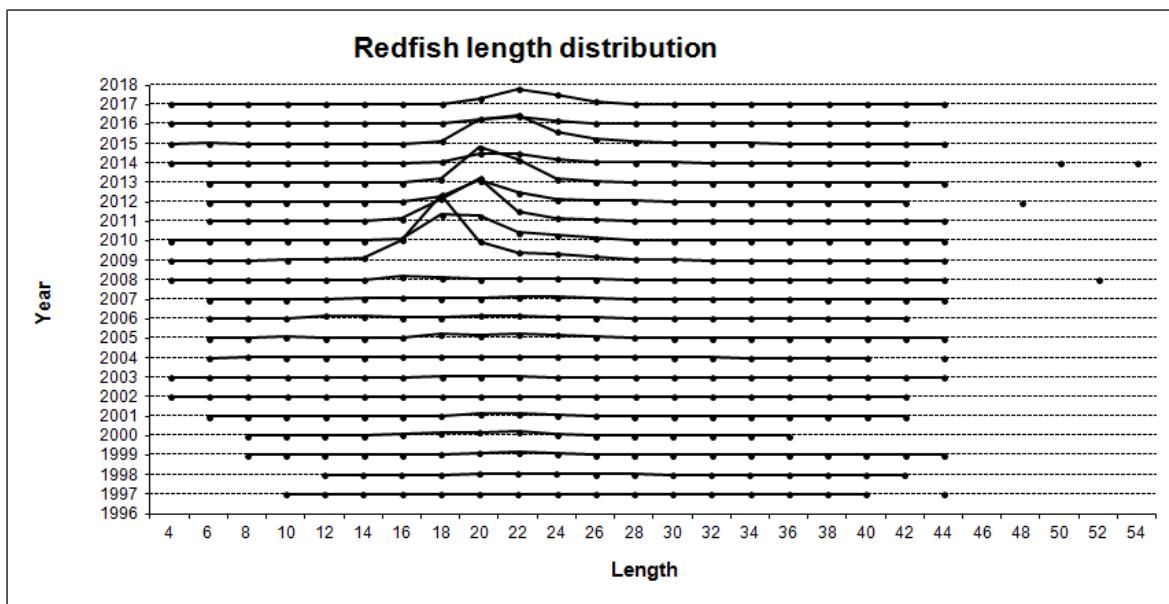
**Fig. 6.** Redfish stratified mean catches in Kg and  $\pm$ SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2017.



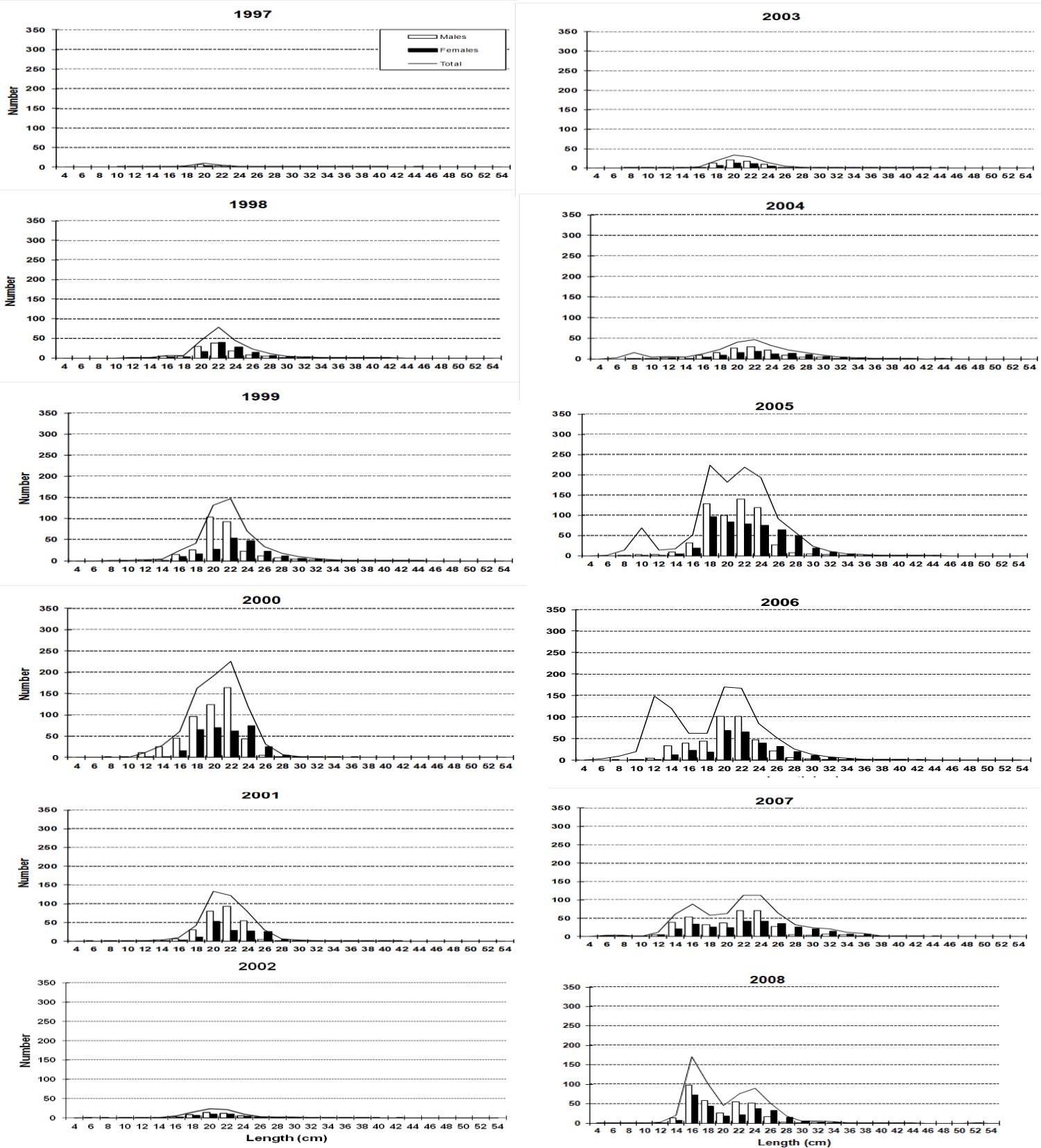
**Fig. 7.** Redfish biomass calculated by the swept area method in tons and  $\pm$ SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2017.



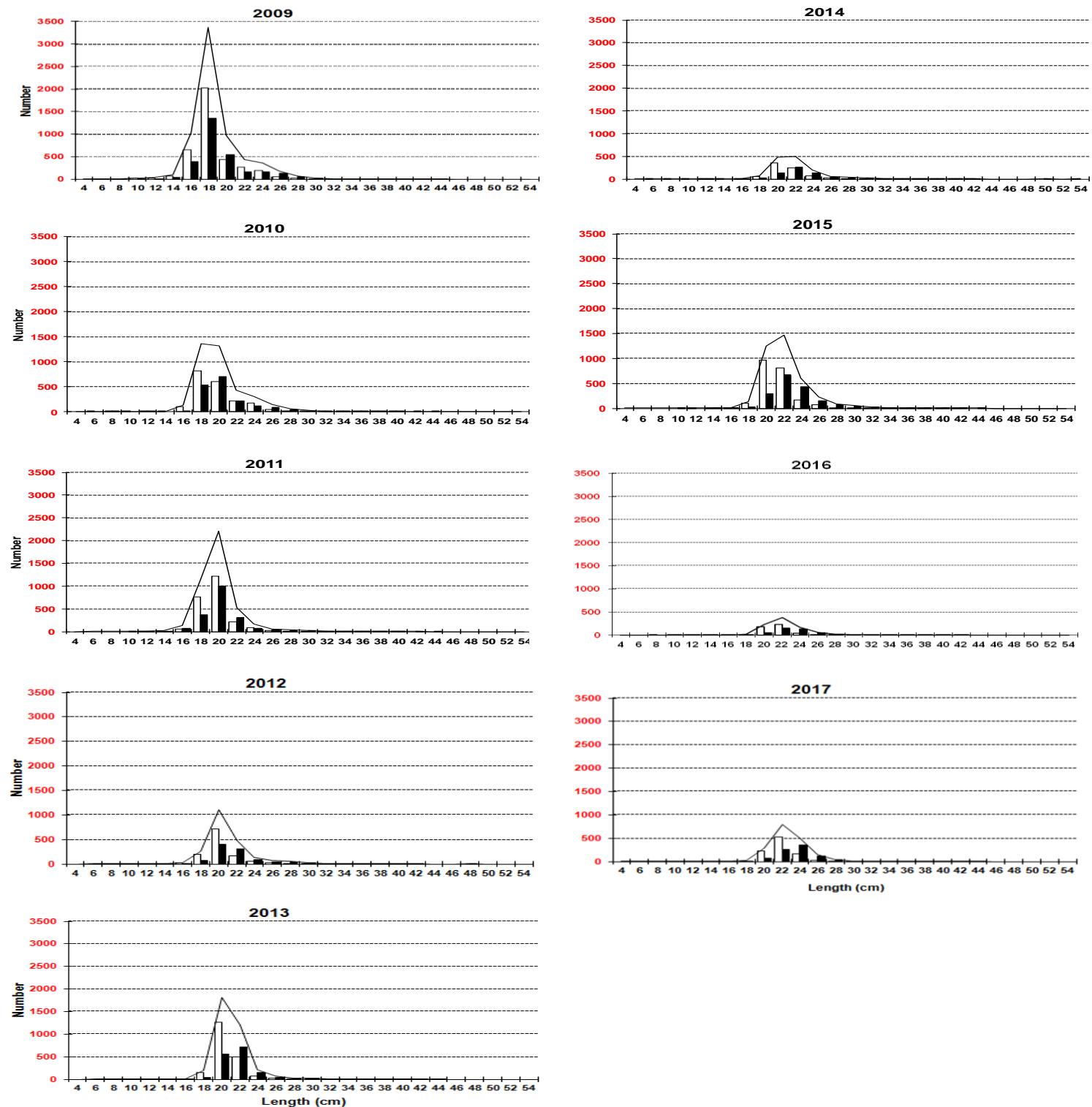
**Fig. 8.** Redfish biomass calculated by the swept area method in tons by year and Division. Spanish Spring surveys in NAFO Div. 3NO: 1997-2017.



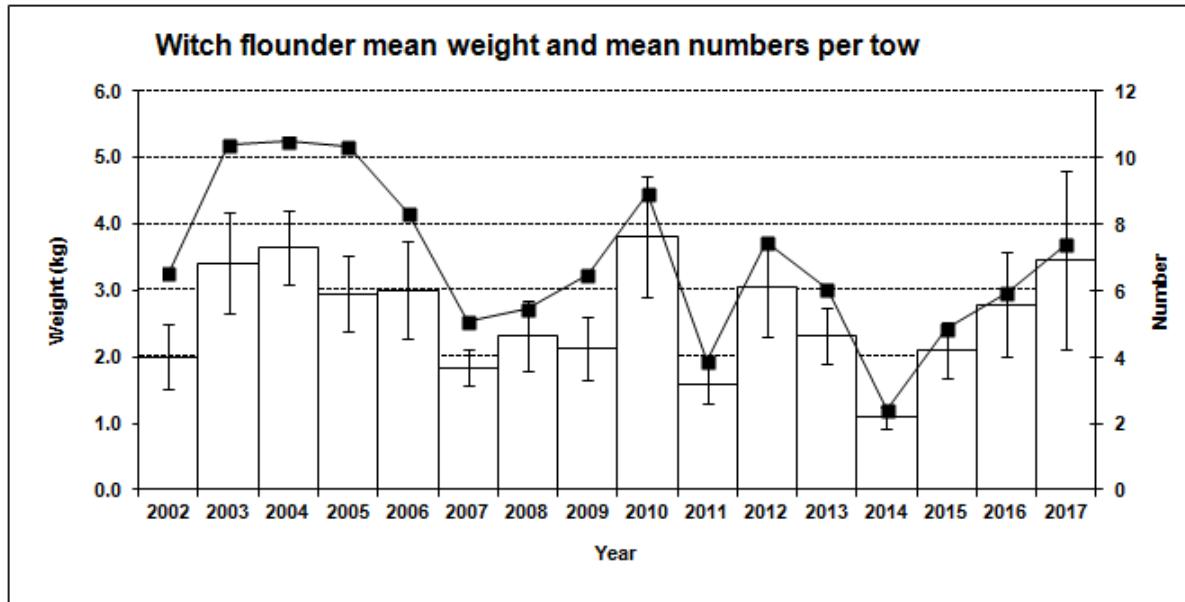
**Fig. 9.** Redfish mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2017. Data from 2013 to 2017 are in Table 14; the data for 1997-2012 can be seen in SCR Doc 13/11.



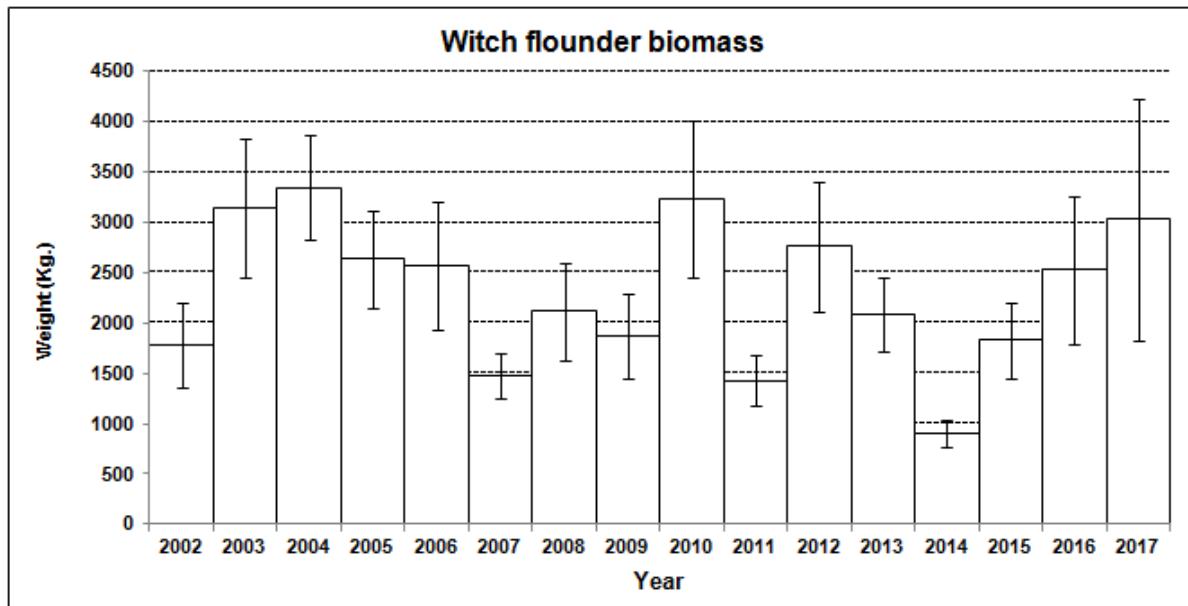
**Fig. 10.** Redfish length distribution (cm) on NAFO 3NO: 1997-2017. Mean catches per tow number. Data from 2013 to 2017 are in Table 14; the data for 1997-2012 can be seen in SCR Doc 13/11. The 2009-2017 graphs have a different y-axis upper limit.



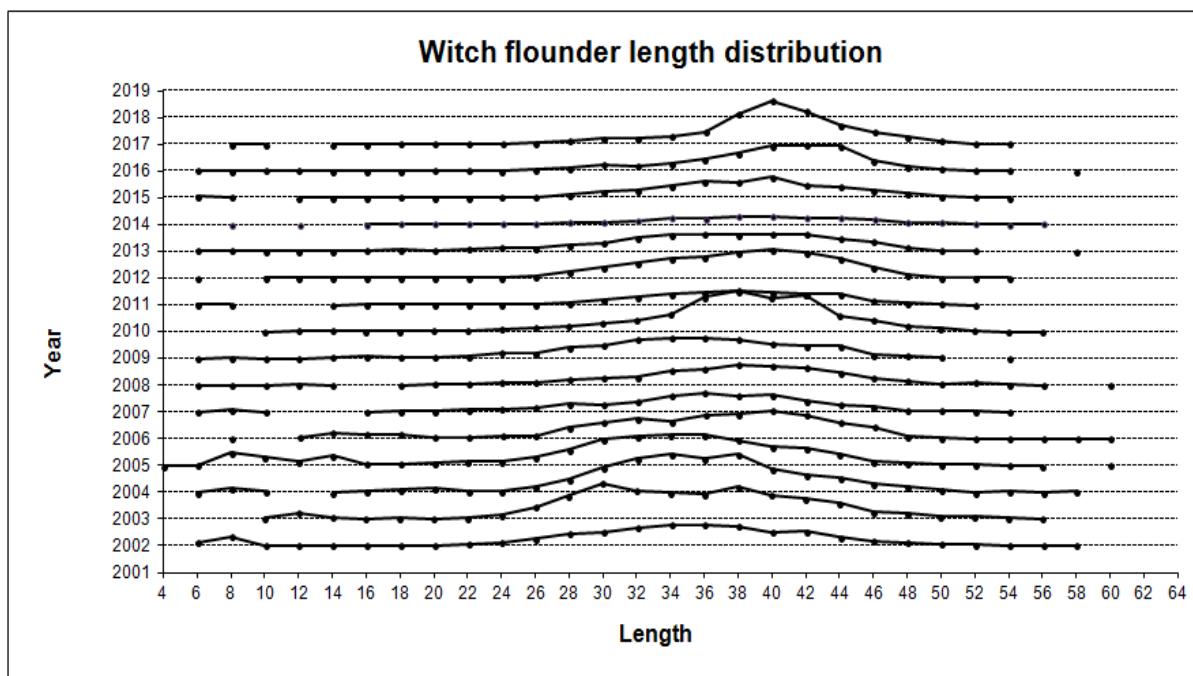
**Fig. 10 (cont.).** Redfish length distribution (cm) on NAFO 3NO: 1997-2017. Mean catches per tow number. The data from 2013 to 2017 is in Table 8; the data for 1997-2012 can be seen in SCR Doc 13/11. The 2009-2017 graphs have a different y-axis upper limit.



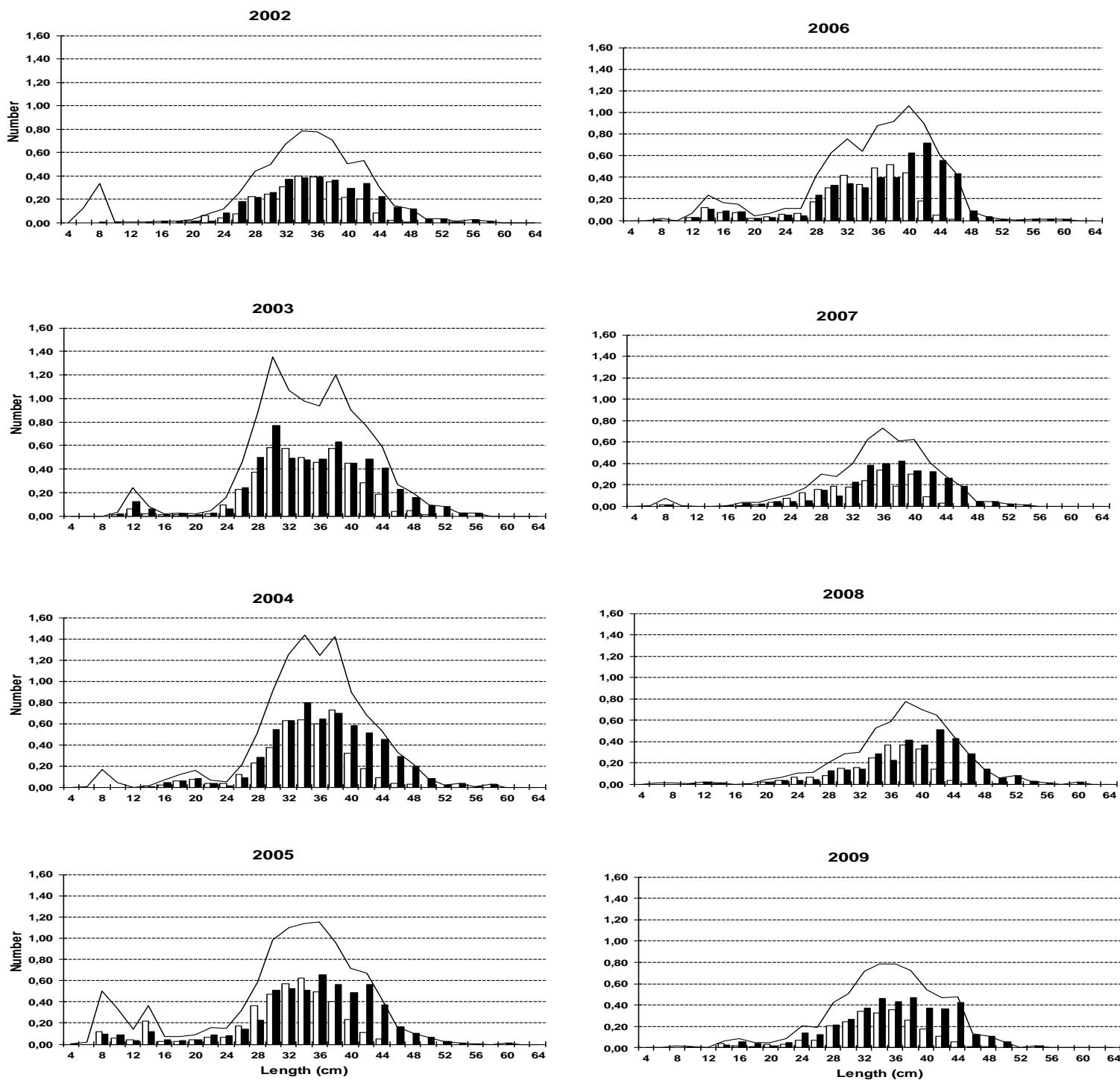
**Fig. 11.** Witch flounder stratified mean catches in Kg and  $\pm$ SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 2002-2017.



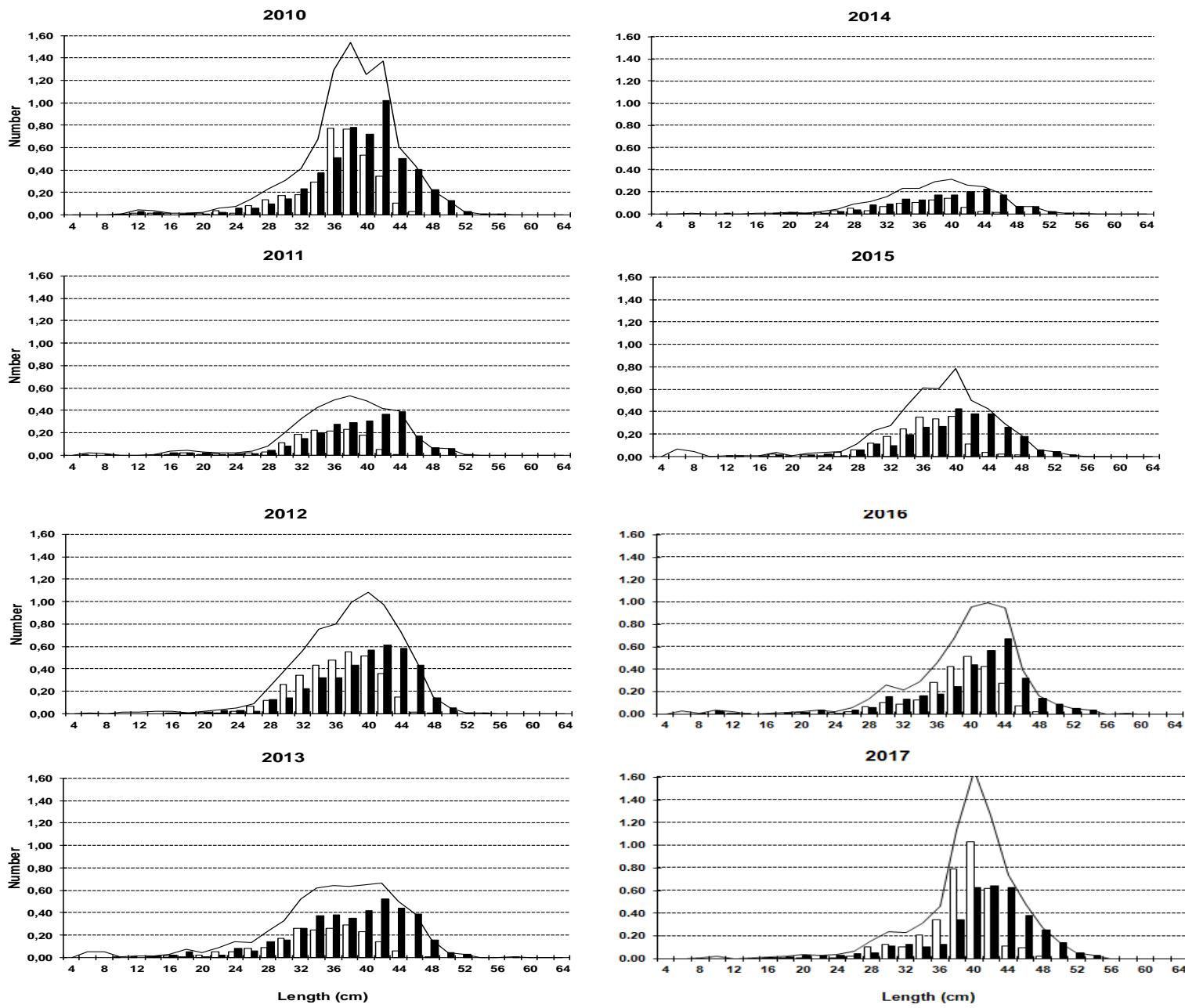
**Fig. 12.** Witch flounder biomass calculated by the swept area method in tons and  $\pm$ SD by year. Spanish Spring surveys in NAFO Div. 3NO: 2002-2017.



**Fig.13.** Witch flounder mean catches per tow length distribution (cm) on NAFO 3NO: 2002-2017.  
Data from 2013 to 2017 are in Table 20; data for 2002-2012 can be seen in SCR Doc 13/11.



**Fig. 14.** Witch flounder length distribution (cm) on NAFO 3NO: 2002-2017. Mean catches per tow numbers. Data from 2013 to 2017 are in Table 20; data for 2002-2012 can be seen in SCR Doc 13/11.



**Fig.14 (cont.).** Witch flounder length distribution (cm) on NAFO 3NO: 2002-2017. Mean catches per tow numbers. Data from 2013 to 2017 are in Table 20; data for 2002-2012 can be seen in SCR Doc 13/11.