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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 1995-2016, for redfish (*Sebastes spp.*) for the period 1997-2016 and for witch flounder (*Glyptocephalus cynoglossus*) for the period 2002-2016. Detailed indices are presented from 2012. 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 2014-2016. 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. 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 in the last two years. 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 Menduíña* 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 planed 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 boostrap, 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 2016 was 115. 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 (2012-2016). 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 2014 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 1995-2016 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 (2012-2016). 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 2016 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 2015 survey indices are not considered to indicate a significant change in the status of the stock. Recent recruitment appears to be lower than average (NAFO, 2016).

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 2012-2016 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 1995-2016. Table 6 presents the parameters *a* and *b* for the calculation of the length-weight relationship for years 2012-2016.

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 2014-2016 (Table 5; Figures 2 and 3).

Length Distribution

The mean number per haul by year is presented in Table 7 and Figure 2 for 1995-2016 and Table 8 presents the same index by length, sex and year besides the sampled size and catch for the period 2012-2016. 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 2012-2016 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. 3O 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. 3O. 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 (NAFO, 2016).

Mean Catches and Biomass

Redfish mean catches and SD are presented in Table 9 and biomass in Table 10 by stratum for 2012-2016. Annual biomass and stratified mean catch and SD per haul for years 1997-2016 are presented in Table 11 by Division. The length-weight relationship parameters *a* and *b* are presented in Table 12 for years 2012-2016.

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 (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 3O (Figure 8), although the percentage is very spread over the time. However, the mean catch per tow was higher in Division 3O until 2004. Since 2005, more than 83% of redfish catches have occurred in Division 3N. In 2010, mean catch per tow in 3O 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 three years indices fluctuated. In 2014 all indices decreased, increased again in 2015, then declined, in 2016, in both Divisions.

Length Distribution

Mean number per haul by year is presented in Table 13 and Figure 6 for 1997-2016. Table 14 presents this index per length with sample size and catch for the period 2012-2016. 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 2009-2016. The last good year class was recorded in 2004 and this cohort can be tracked until 2016. 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 2014-2016 in 22-23 cm.

Witch flounder

This stock occurs mainly in Div. 3O, 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 from 2012 to 2015.

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. The stock size has steadily increased since 1999 and is now at 81% B_{msy}. There is very low risk (<1%) of the stock being below B_{lim} or 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, 2016).

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 2012-2016. In Table 17 and Figures 11 and 12 the annual stratified mean catch per tow and biomass with SD are presented for the period 2002-2016. The length-weight relationship parameters *a* and *b* are presented in Table 18 for 2012-2016.

Witch flounder indices fluctuated throughout the period 2002-2016 reaching a depressed level in 2014, following by an increasing trend from 2015-2016. Highest values were found in 2003, 2004 and 2010 (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 2002-2016, and Table 20 the same index by length with sample size and catch for the period 2012-2016. 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 them in 2015 and 2016.

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Table 1. Spanish spring bottom trawl surveys in NAFO Div. 3NO: 1995-2016.

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1995	C/V *Playa de Menduíña*	77	42-684	May 18-May 29
1996	C/V *Playa de Menduíña*	112	41-1135	May 07-May 24
1997	C/V *Playa de Menduíña*	128	42-1263	April 26-May 18
1998	C/V *Playa de Menduíña*	124	42-1390	May 06-May 26
1999	C/V *Playa de Menduíña*	114	41-1381	May 07-May 26
2000	C/V *Playa de Menduíña*	118	42-1401	May 07-May 28
2001(*)	R/V *Vizconde de Eza*	83	36-1156	May 03-May 24
	C/V *Playa de Menduíña*	121	40-1500	May 05-May 23
2002	R/V *Vizconde de Eza*	125	38-1540	April 29-May 19
2003	R/V *Vizconde de Eza*	118	38-1666	May 11-June 02
2004	R/V *Vizconde de Eza*	120	43-1539	June 06–June 24
2005	R/V *Vizconde de Eza*	119	47-1485	June 10–June 29
2005	R/V *Vizconde de Eza*	119	47-1485	June 10–June 29
2006	R/V *Vizconde de Eza*	120	45-1480	June 7–June 27
2007	R/V *Vizconde de Eza*	110	45-1374	May 29–June 19
2008	R/V *Vizconde de Eza*	122	45-1374	May 27–June 16
2009	R/V *Vizconde de Eza*	109	45-1374	May 31–June 18
2010	R/V *Vizconde de Eza*	95	45-1374	May 30–June 18
2011	R/V *Vizconde de Eza*	122	44-1450	June 5–June 24
2012	R/V *Vizconde de Eza*	122	44-1450	June 3–June 21
2013	R/V Vizconde de Eza	122	44-1450	June 1–June 21
2014	R/V Vizconde de Eza	122	44-1450	June 2–June 21
2015	R/V Vizconde de Eza	122	44-1450	May 31-June 19
2016	R/V *Vizconde de Eza*	115	44-1450	May 30-June 18

(*)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: 2012-2016. Swept area in square miles. n.s. means stratum not surveyed.

	2012		2013		2014		2015		2016	
Stratum	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number
353	0.0338	3	0.0349	3	0.0379	3	0.0401	3	0.0356	3
354	0.0338	3	0.0338	3	0.0394	3	0.0390	3	0.0345	3
355	0.0229	2	0.0225	2	0.0263	2	0.0263	2	0.0233	2
356	0.0225	2	0.0225	2	0.0266	2	0.0255	2	0.0225	2
357	0.0229	2	0.0236	2	0.0263	2	0.0233	2	0.0233	2
358	0.0330	3	0.0338	3	0.0390	3	0.0349	3	0.0338	3
359	0.0806	7	0.0829	7	0.0908	7	0.0855	7	0.0593	5
360	0.2344	20	0.2231	19	0.2629	20	0.2363	20	0.1995	17
374	0.0229	2	0.0233	2	0.0259	2	0.0229	2	0.0233	2
375	0.0349	3	0.0360	3	0.0390	3	0.0341	3	0.0360	3
376	0.1181	10	0.1305	11	0.1324	10	0.1159	10	0.0945	8
377	0.0229	2	0.0236	2	0.0259	2	0.0233	2	0.0233	2
378	0.0229	2	0.0225	2	0.0263	2	0.0225	2	0.0225	2
379	0.0225	2	0.0240	2	0.0255	2	0.0225	2	0.0229	2
380	0.0229	2	0.0229	2	0.0263	2	0.0229	2	0.0236	2
381	0.0221	2	0.0244	2	0.0259	2	0.0236	2	0.0229	2
382	0.0454	4	0.0484	4	0.0521	4	0.0458	4	0.0465	4
721	0.0233	2	0.0225	2	0.0266	2	0.0240	2	0.0225	2
722	0.0221	2	0.0221	2	0.0259	2	0.0259	2	0.0229	2
723	0.0225	2	0.0221	2	0.0259	2	0.0233	2	0.0225	2
724	0.0225	2	0.0225	2	0.0255	2	0.0236	2	0.0233	2
725	0.0225	2	0.0229	2	0.0255	2	0.0229	2	0.0229	2
726	0.0221	2	0.0221	2	0.0248	2	0.0229	2	0.0225	2
727	0.0233	2	0.0229	2	0.0259	2	0.0225	2	0.0225	2
728	0.0229	2	0.0233	2	0.0248	2	0.0225	2	0.0229	2
752	0.0229	2	0.0233	2	0.0240	2	0.0225	2	0.0236	2
753	0.0221	2	0.0236	2	0.0240	2	0.0233	2	0.0229	2
754	0.0221	2	0.0240	2	0.0225	2	0.0225	2	0.0225	2
755	0.0446	4	0.0454	4	0.0454	4	0.0450	4	0.0458	4
756	0.0221	2	0.0229	2	0.0229	2	0.0229	2	0.0225	2
757	0.0214	2	0.0240	2	0.0244	2	0.0229	2	0.0225	2
758	0.0221	2	0.0225	2	0.0221	2	0.0221	2	0.0221	2
759	0.0221	2	0.0225	2	0.0229	2	0.0229	2	0.0229	2
760	0.0225	2	0.0229	2	0.0364	3	0.0225	2	0.0229	2
761	0.0221	2	0.0225	2	0.0240	2	0.0240	2	0.0225	2
762	0.0225	2	0.0218	2	0.0229	2	0.0229	2	0.0225	2
763	0.0330	3	0.0341	3	0.0233	2	0.0341	3	0.0338	3
764	0.0225	2	0.0214	2	0.0259	2	0.0251	2	0.0225	2
765	0.0229	2	0.0221	2	0.0240	2	0.0236	2	0.0229	2
766	0.0225	2	0.0221	2	0.0221	2	0.0236	2	0.0229	2
767	0.0203	2	0.0218	2	0.0221	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: 2012-2016. n.s. means stratum not surveyed.

	2012		2013		2014		2015		2016	
Stratum	Y. flounder Mean catch	Y. flounder SD	Y. flounder Mean catch	Y. flounder SD	Y. flounder Mean catch	Y. flounder SD	Y. flounder Mean catch	Y. flounder SD	Y. flounder Mean catch	Y. flounder SD
353	8.95	11.40	34.81	57.68	1.09	1.19	34.18	48.09	7.82	13.54
354	0.70	0.72	0.77	0.69	0.00	0.00	2.28	3.94	0.00	0.00
355	0.38	0.53	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	0.33	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
359	119.95	124.26	181.82	196.72	40.18	93.34	2.27	2.92	0.24	0.36
360	488.22	421.61	483.74	388.87	229.47	190.61	286.35	205.84	277.57	501.85
374	866.88	184.87	464.43	48.88	489.57	33.19	220.08	96.88	227.62	23.37
375	208.41	145.08	355.94	244.38	400.78	131.27	195.40	124.81	84.61	24.64
376	428.35	131.41	430.94	166.13	694.93	899.49	553.63	422.74	722.38	520.54
377	405.96	79.05	75.45	106.70	10.85	14.79	7.53	10.64	0.76	1.07
378	0.00	0.00	0.00	0.00	0.26	0.37	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	0.00	0.00	12.83	18.14	0.00	0.00	0.00	0.00	0.00	0.00
382	67.41	80.33	7.30	14.60	0.00	0.00	0.00	0.00	0.33	0.48
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: 2012-2016. n.s. means stratum not surveyed.

Strata	2012	2013	2014	2015	2016	Strata	2012	2013	2014	2015	2016
353	214	806	23	688	177	**725**	0	0	0	0	0
354	15	17	0	43	0	**726**	0	0	0	0	0
355	2	0	0	0	0	**727**	0	0	0	0	0
356	0	0	0	0	0	**728**	0	0	0	0	0
357	0	0	0	0	0	**752**	0	0	0	0	0
358	7	0	0	0	0	**753**	0	0	0	0	0
359	4384	6466	1305	78	9	**754**	0	0	0	0	0
360	115943	114639	48586	67463	65826	**755**	0	0	0	0	0
374	16220	8549	8098	4118	4190	**756**	0	0	0	0	0
375	4858	8038	8355	4655	1911	**757**	0	0	0	0	0
376	48374	48457	70031	63736	81580	**758**	0	0	0	0	0
377	3549	639	84	65	6	**759**	0	0	0	0	0
378	0	0	3	0	0	**760**	0	0	0	0	0
379	0	0	0	0	0	**761**	0	0	0	0	0
380	0	0	0	0	0	**762**	0	0	0	0	0
381	0	152	0	0	0	**763**	0	0	0	0	0
382	2038	207	0	0	10	**764**	0	0	0	0	0
721	0	0	0	0	0	**765**	0	0	0	0	0
722	0	0	0	0	0	**766**	0	0	0	0	0
723	0	0	0	0	0	**767**	0	0	0	0	0
724	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: 1995-2016.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Biomass	9264	43349	38697	122601	197012	144685	182704	148487	136775	169978	156472
SD	2484	6032	8527	31359	22938	19097	25847	23368	19287	18869	15271
MCPT	16.22	59.54	47.74	137.32	232.41	167.76	210.84	164.28	148.92	190.05	176.42
SD	4.37	8.41	10.69	34.70	27.41	22.21	30.58	24.92	20.84	21.27	17.06

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Biomass	160145	160731	160146	183412	189687	203833	195606	187969	136484	140845	153708
SD	16458	18852	17297	25736	22611	30743	23679	22493	29519	18915	34788
MCPT	189.32	202.64	178.27	209.43	224.54	231.22	221.33	214.17	173.79	159.25	175.03
SD	19.83	23.61	19.00	29.75	26.30	35.18	26.27	25.35	38.52	21.37	40.46

Table 6. Yellowtail flounder length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. 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**
2012	**0.00940**	**2.94448**	0.3281	0.1018	0.984	417	**0.0047**	**3.1527**	0.2378	0.0712	0.992	494	**0.0048**	**3.1471**	0.2299	0.0699	0.992	914
2013	**0.00147**	**3.47842**	0.8688	0.2588	0.866	436	**0.0110**	**2.9156**	0.1599	0.0463	0.991	588	**0.0055**	**3.1012**	0.2729	0.0839	0.968	1039
2014	**0.01661**	**2.81259**	0.1442	0.0449	0.993	354	**0.0119**	**2.9123**	0.1445	0.0428	0.992	506	**0.0162**	**2.8240**	0.1218	0.0383	0.993	861
2015	**0.00491**	**3.16089**	0.2087	0.0646	0.988	506	**0.0069**	**3.0678**	0.0797	0.0233	0.998	611	**0.0066**	**3.0784**	0.0242	0.0383	0.997	1144
2016	**0.01051**	**2.94093**	0.0867	0.027	0.998	311	**0.0086**	**3.0047**	0.0584	0.0175	0.999	441	**0.0110**	**2.9338**	0.074	0.0225	0.998	756

Table 7. Yellowtail flounder mean number per tow by year in Spanish Spring surveys in NAFO Div. 3NO: 1995-2016. Indet. means indeterminate.

	1995				1996				1997				1998				1999				2000			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	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	Males	Females	Indet.	Total	Males	Females	Indet.	Total	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	Males	Females	Indet.	Total	Males	Females	Indet.	Total	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			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	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

Table 8 Yellowtail flounder mean number per tow by length class and year. Spanish Spring Survey on NAFO 3NO: 2012-2016. Indet. means indeterminate.

	2012				2013				2014				2015				2016			
Lenght (cm.)	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	0.000	0.000	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	0.000	0.000	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
8	0.000	0.000	0.066	0.066	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
10	0.000	0.000	0.096	0.096	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
12	0.294	0.096	0.085	0.475	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
14	0.683	0.292	0.210	1.185	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
16	0.548	0.507	0.000	1.055	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
18	0.845	0.663	0.289	1.797	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
20	2.130	2.825	0.000	4.955	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
22	7.317	6.789	0.000	14.106	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
24	11.515	10.017	0.000	21.532	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
26	29.809	19.368	0.000	49.177	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
28	69.232	42.103	0.000	111.335	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
30	81.097	64.012	0.000	145.109	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
32	66.077	63.104	0.000	129.181	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
34	33.748	73.592	0.000	107.340	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
36	8.716	67.450	0.000	76.166	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
38	2.711	49.593	0.000	52.305	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
40	0.432	23.634	0.000	24.066	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
42	0.181	9.291	0.000	9.472	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
44	0.166	3.726	0.000	3.893	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
46	0.000	1.032	0.000	1.032	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
48	0.000	0.242	0.000	0.242	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
50	0.000	0.051	0.000	0.051	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
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	0.000	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
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	0.096	0.000	0.096	0.000	0.000	0.000	0.000	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	315.502	438.483	0.746	754.732	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
Nº samples:				52				48				45				44				34
Nº Ind.:	4523	6150	10	10683	5314	6587	16	11917	3004	3975	1	6980	3831	4834	4	8669	1595	2466	1	4062
Sampled catch:				3104				3504				2217				3023				1489
Range:				8-58				6-54				8-48				6-50				10-48
Total catch:				18359				17513				14027				12				11234
Total hauls:				122				122				122				122				115

Table 9. Redfish mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. n.s. means stratum not surveyed.

	2012		2013		2014		2015		2016	
	Redfish	Redfish	Redfish	Redfish	Redfish	Redfish	Redfish	Redfish	Redfish	Redfish
Stratum	Mean catch	SD	Mean catch	SD	Mean catch	SD	Mean catch	SD	Mean catch	SD
353	0.72	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
354	619.75	1060.35	431.90	381.59	25.50	40.21	972.97	883.47	482.34	791.85
355	1623.62	2024.90	1105.03	988.99	302.90	220.62	1954.04	1984.34	513.80	79.20
356	743.76	412.94	2279.44	1078.20	1974.78	1028.04	707.30	62.72	210.70	127.84
357	1854.81	578.30	3014.35	399.30	435.45	75.73	3886.69	2152.38	835.95	247.78
358	3834.12	2560.26	6128.11	4776.40	2333.82	689.93	16765.95	10954.46	3706.23	3517.46
359	39.35	71.61	485.72	916.88	1181.28	1710.64	356.78	723.22	1.55	1.46
360	0.00	0.00	0.13	0.56	0.03	0.14	0.00	0.00	0.37	1.37
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	1.20
377	0.00	0.00	8.10	11.46	0.00	0.00	0.00	0.00	0.00	0.00
378	7654.12	6271.87	16064.18	4986.26	4448.60	6291.27	6175.36	8441.67	164.55	220.41
379	1554.75	1041.50	612.35	167.09	2629.50	2732.39	3080.27	3492.78	611.70	12.55
380	1702.30	1955.07	1342.03	1381.01	1781.93	178.80	1175.26	110.17	607.60	758.98
381	632.95	300.81	3.41	1.80	0.03	0.01	25.28	28.59	0.03	0.04
382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
721	280.40	107.48	506.51	347.74	687.85	800.66	445.63	481.01	106.80	1.27
722	6.14	2.96	2.86	2.62	40.18	50.43	5.07	7.17	14.68	16.72
723	1769.92	622.99	1666.69	1188.21	844.10	439.25	576.35	407.93	437.23	319.80
724	101.05	23.12	113.34	157.35	71.34	33.14	72.34	86.36	1.71	1.07
725	287.95	8.56	516.20	347.61	86.50	33.52	633.76	720.63	1138.33	1230.83
726	24.80	14.99	15.72	3.99	6.34	4.33	35.40	29.27	18.44	1.68
727	16.30	0.71	338.35	442.58	31.90	19.80	207.30	73.40	208.40	230.66
728	12.54	6.45	31.05	34.15	5.82	7.75	10.11	13.28	9.40	1.98
752	0.66	0.06	2.22	3.14	0.12	0.17	0.00	0.00	0.25	0.35
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	0.46	0.64	0.00	0.00	0.00	0.00	0.00	0.00
755	0.00	0.00	0.19	0.38	0.00	0.00	0.00	0.00	0.00	0.00
756	0.66	0.01	0.00	0.00	0.60	0.11	0.73	0.00	1.62	2.28
757	0.00	0.00	0.38	0.53	0.44	0.62	0.38	0.54	1.74	2.46
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	2.42	3.42
760	0.00	0.00	1.56	1.65	0.50	0.86	0.00	0.00	0.07	0.09
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	0.07	0.10	0.00	0.00	0.00	0.00
765	0.00	0.00	0.00	0.00	0.00	0.00	1.02	1.44	0.00	0.00
766	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.30	4.67
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: 2012-2016. n.s. means stratum not surveyed.

Strata	2012	2013	2014	2015	2016
353	17	0	0	0	0
354	13552	9444	478	18412	10318
355	10505	7269	1708	11017	3271
356	3107	9523	6972	2607	880
357	26596	41850	5441	54832	11793
358	78425	122562	40393	324502	74125
359	1438	17272	38361	12297	55
360	0	30	7	0	87
374	0	0	0	0	0
375	0	0	0	0	0
376	0	0	0	0	56
377	0	69	0	0	0
378	93021	198482	47113	76300	2033
379	14649	5409	21861	29023	5669
380	14288	11264	13034	9864	4938
381	8239	40	0	308	0
382	0	0	0	0	0
721	1568	2926	3359	2414	617
722	47	22	261	33	108
723	24386	23352	10113	7685	6024
724	1114	1249	694	759	18
725	2688	4739	712	5818	10450
726	161	102	37	223	118
727	135	2840	237	1769	1778
728	86	208	37	70	64
752	8	25	1	0	3
753	0	0	0	0	0
754	0	7	0	0	0
755	0	6	0	0	0
756	6	0	5	6	14
757	0	3	4	3	16
758	0	0	0	0	0
759	0	0	0	0	27
760	0	21	6	0	1
761	0	0	0	0	0
762	0	0	0	0	0
763	0	0	0	0	0
764	0	0	1	0	0
765	0	0	0	11	0
766	0	0	0	0	42
767	0	0	0	0	0

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: 1997-2016.

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

Div	Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
3NO	Biomass	98805	74172	763980	431296	487655	294033	458716	190832	557954	132505
	SD	15893	26168	145765	69575	107982	62954	76825	54478	143611	44195
	MCPT	125.66	82.20	670.46	506.43	543.17	320.52	502.58	240.24	628.14	145.51
	SD	20.19	29.14	172.93	81.06	124.68	72.27	79.94	69.17	164.37	46.90
	Nº Strata	36	41	39	37	41	41	41	41	41	41
3N	Biomass	87602	68059	735743	359536	418305	265238	429532	178055	523461	117270
	SD	15364	25890	143334	58306	99454	60304	76128	54133	143235	43583
	MCPT	124.79	86.51	721.67	473.94	533.85	330.89	539.18	256.34	669.86	147.23
	SD	22.09	33.12	194.48	76.53	132.71	80.20	91.06	79.00	187.34	52.24
	Nº Strata	28	31	30	29	31	31	31	31	31	31
3O	Biomass	11203	6113	28238	71760	69350	28795	29184	12778	34493	15235
	SD	3362	3258	16762	37821	41858	16754	7503	3927	12527	10014
	MCPT	132.90	52.55	280.98	772.76	607.40	249.04	250.43	129.36	340.74	133.66
	SD	39.93	28.27	163.87	402.81	362.85	140.90	64.52	39.61	125.38	85.91
	Nº Strata	8	10	9	8	10	10	10	10	10	10
3N/Total (%) Biomass		89	92	96	83	86	90	94	93	94	89

Table 12. Redfish length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. 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**
2012	**0.01148**	**0.12340**	2.9031	0.0371	0.998	341	**0.0167**	**0.1631**	2.94082	0.049	0.996	418	**0.0158**	**0.1171**	2.95433	0.0351	0.998	759
2013	**0.01306**	**0.13360**	2.98309	0.0409	0.994	482	**0.0149**	**0.1068**	2.95412	0.0312	0.997	479	**0.0106**	**0.0838**	3.04983	0.0263	0.997	1017
2014	**0.01117**	**3.05050**	0.0736	0.0234	0.998	424	**0.0136**	**2.9921**	0.1084	0.0318	0.997	387	**0.0113**	**3.0464**	0.0625	0.0199	0.998	821
2015	**0.00757**	**3.17016**	0.1274	0.0387	0.995	517	**0.0087**	**3.1206**	0.1057	0.0315	0.997	502	**0.0073**	**3.1798**	0.092	0.0283	0.997	1095
2016	**0.01212**	**3.01441**	0.0982	0.0308	0.997	339	**0.0100**	**3.0707**	0.0981	0.0307	0.997	382	**0.0128**	**2.9877**	0.2684	0.0892	0.967	751

Table 13. Redfish mean number per tow by year in Spanish Spring surveys in NAFO Div. 3NO: 1997-2016. 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
	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	46.49	37.53	1.05	85.06	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
	2007				2008				2009				2010				2011			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	368.68	313.47	3.01	685.15	329.78	259.80	2.00	591.59	3754.48	2846.50	3.64	6604.62	2009.91	1807.51	0.23	3817.65	2385.24	1906.21	9.10	4300.55
	2012				2013				2014				2015				2016			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	1184.89	981.01	0.31	2166.20	2034.96	1542.08	0.38	3577.42	742.09	639.39	0.41	1381.88	2120.95	1721.56	11.42	3853.93	475.14	409.51	0.26	884.92

Table 14. Redfish mean number per tow by length class and year. Spanish Spring Survey on NAFO 3NO: 2012-2016. Indet. means indeterminate.

	2012				2013				2014				2015				2016			
Lenght (cm.)	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	0.000	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
6	0.000	0.000	0.039	0.039	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
8	0.000	0.000	0.182	0.182	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
10	0.000	0.000	0.077	0.077	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
12	0.004	0.036	0.008	0.049	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
14	1.181	1.981	0.000	3.162	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
16	23.574	5.428	0.000	29.001	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
18	191.476	74.149	0.000	265.624	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
20	715.886	393.611	0.000	1109.497	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
22	167.953	303.957	0.000	471.910	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
24	50.679	80.796	0.000	131.475	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
26	23.257	40.965	0.000	64.222	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
28	7.073	43.349	0.000	50.422	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
30	1.459	23.110	0.000	24.569	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
32	0.653	6.588	0.000	7.241	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
34	0.567	3.613	0.000	4.179	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
36	0.629	2.010	0.000	2.639	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
38	0.368	0.495	0.000	0.863	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
40	0.119	0.056	0.000	0.175	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
42	0.007	0.006	0.000	0.013	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
44	0.000	0.000	0.000	0.000	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
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	0.860	0.000	0.860	0.000	0.000	0.000	0.000	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	0.000	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
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	0.000	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
Total	1184.885	981.008	0.306	2166.200	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
Nº samples:				43				51				46				43				49
Nº Ind.:	4019	3986	40	8045	4182	4210	34	8426	2851	3000	27	5878	3508	4328	1318	9154	1614	2108	22	3744
Sampled catch:				1517				1726				1230				1977				1162
Range:				7-49				6-45				5-54				5-44				5-43
Total catch:				50184				78332				42046				93699				22361
Total hauls:				122				122				122				122				115

Table 15. Witch flounder mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. n.s. means stratum not surveyed.

	2012		2013		2014		2015		2016	
	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder	W. flounder
Stratum	Mean catch	SD	Mean catch	SD	Mean catch	SD	Mean catch	SD	Mean catch	SD
353	16.99	26.78	11.01	10.52	4.03	0.67	3.83	3.32	9.04	12.20
354	4.02	1.78	9.32	9.37	1.89	0.86	2.15	2.69	7.07	7.52
355	3.16	1.89	0.05	0.07	0.64	0.07	2.05	0.06	1.74	0.52
356	0.42	0.60	0.85	0.78	0.45	0.64	3.85	5.35	1.26	0.79
357	1.08	1.52	0.42	0.59	0.63	0.88	0.96	0.25	5.13	5.30
358	7.32	7.14	2.61	1.01	3.97	3.83	4.60	4.48	50.02	55.56
359	10.55	10.81	10.92	16.98	1.91	2.51	18.27	21.53	4.01	6.05
360	3.93	9.01	1.36	2.90	0.17	0.37	0.35	0.63	0.00	0.00
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.26	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.01	0.04	0.11	0.23	0.00	0.00	0.00	0.00	0.00	0.00
377	0.00	0.00	0.45	0.63	0.00	0.00	0.78	1.10	0.00	0.00
378	0.18	0.25	0.52	0.74	1.06	1.49	2.83	2.07	0.28	0.40
379	0.64	0.48	0.00	0.00	0.92	0.14	0.29	0.40	0.58	0.82
380	0.72	1.01	0.38	0.53	1.41	1.99	0.73	0.10	1.20	0.65
381	3.38	4.78	1.12	0.93	0.00	0.00	1.24	1.18	0.00	0.00
382	0.00	0.00	0.56	0.74	0.21	0.42	0.00	0.00	0.00	0.00
721	0.75	0.42	0.91	0.17	0.61	0.86	0.76	0.22	1.18	0.99
722	0.60	0.78	2.69	0.22	1.66	0.52	1.19	0.08	1.22	0.08
723	1.55	0.04	2.39	1.88	5.32	3.26	4.71	1.86	2.77	3.72
724	14.94	19.04	8.61	7.74	4.17	0.64	8.16	4.06	7.20	4.53
725	1.48	0.46	5.05	3.16	2.58	2.07	7.12	5.54	10.09	12.18
726	3.51	2.07	18.48	15.11	4.89	2.10	2.95	0.26	6.17	6.54
727	6.47	9.15	10.31	1.20	3.00	4.24	0.78	0.52	11.86	10.24
728	17.53	3.19	8.38	9.72	11.94	9.54	11.70	7.50	22.92	21.46
752	1.80	1.98	4.85	6.86	7.85	11.10	9.88	5.51	14.46	12.22
753	0.00	0.00	0.70	0.99	1.20	0.26	0.81	1.13	0.00	0.00
754	0.00	0.00	0.01	0.01	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	4.73	6.24	5.21	7.37	9.31	6.52	5.15	3.29	16.99	22.22
757	1.60	1.81	5.29	1.22	5.92	8.37	3.29	4.65	0.40	0.56
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	7.82	10.16	6.63	7.71	3.42	4.30	16.15	20.72	3.04	2.14
761	5.99	5.46	2.30	2.61	0.93	0.18	2.61	0.94	0.91	1.28
762	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.64	0.89	1.26
763	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
764	0.99	0.45	5.16	3.17	0.58	0.23	0.68	0.14	1.10	0.85
765	0.16	0.22	0.26	0.02	0.76	0.82	0.37	0.24	0.17	0.03
766	0.27	0.06	0.00	0.00	0.12	0.16	0.25	0.35	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 16. Witch flounder survey biomass (t) by stratum in NAFO Div. 3NO: 2012-2016. n.s. means stratum not surveyed.

Strata	2012	2013	2014	2015	2016	Strata	2012	2013	2014	2015	2016
353	406	255	86	77	205	**725**	14	46	21	65	93
354	88	204	35	41	151	**726**	23	120	28	19	40
355	20	0	4	12	11	**727**	53	86	22	7	101
356	2	4	2	14	5	**728**	120	56	75	81	156
357	15	6	8	13	72	**752**	21	55	86	115	160
358	150	52	69	89	1000	**753**	0	8	14	10	0
359	386	388	62	630	142	**754**	0	0	0	0	0
360	933	323	36	82	0	**755**	0	0	0	0	0
374	0	0	0	0	0	**756**	43	46	82	46	152
375	6	0	0	0	0	**757**	15	45	50	29	4
376	1	12	0	0	0	**758**	0	0	0	0	0
377	0	4	0	7	0	**759**	0	0	0	0	0
378	2	6	11	35	3	**760**	107	89	43	221	41
379	6	0	8	3	5	**761**	93	35	13	37	14
380	6	3	10	6	10	**762**	0	0	0	8	17
381	44	13	0	15	0	**763**	0	0	0	0	0
382	0	16	6	0	0	**764**	9	48	4	5	10
721	4	5	3	4	7	**765**	2	3	8	4	2
722	5	20	11	8	9	**766**	3	0	1	3	0
723	21	33	64	63	38	**767**	0	0	0	0	0
724	165	95	41	86	77						

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: 2002-2016.

Year	2002	2003	2004	2005	2006	2007	2008	2009
Biomass	1784	3145	3348	2633	2570	1480	2118	1872
SD	426	690	523	488	629	229	481	423
MCPT	2.00	3.42	3.66	2.95	3.01	1.84	2.32	2.13
SD	0.49	0.75	0.56	0.56	0.73	0.28	0.52	0.48

Year	2010	2011	2012	2013	2014	2015	2016
Biomass	3239	1428	2763	2078	903	1834	2526
SD	777	248	648	367	134	376	737
MCPT	3.82	1.58	3.06	2.32	1.09	2.11	2.79
SD	0.91	0.28	0.74	0.41	0.16	0.42	0.78

Table 18. Witch flounder length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. 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**
2012	**0.00202**	**3.31917**	0.1945	0.0557	0.996	199	**0.00147**	**3.39880**	0.1746	0.0484	0.997	281	**0.00162**	**3.38866**	0.1171	0.0346	0.998	487
2013	**0.00108**	**3.48692**	0.1785	0.0532	0.994	286	**0.00109**	**3.48450**	0.0815	0.0234	0.998	563	**0.00220**	**3.28882**	0.1559	0.0480	0.991	864
2014	**0.00060**	**3.65925**	0.2494	0.0709	0.991	134	**0.00096**	**3.52772**	0.1025	0.0286	0.998	278	**0.00217**	**3.30510**	0.1540	0.0440	0.994	415
2015	**0.00103**	**3.51249**	0.1701	0.0489	0.995	306	**0.00154**	**3.39857**	0.0807	0.0230	0.998	440	**0.00206**	**3.31598**	0.1112	0.0329	0.996	762
2016	**0.00102**	**3.49955**	0.1145	0.0327	0.998	222	**0.00147**	**3.40745**	0.1089	0.0314	0.997	354	**0.00209**	**3.30679**	0.2052	0.0610	0.985	584

Table 19. Witch flounder mean number per tow by year in Spanish Spring Surveys in NAFO Div. 3NO: 2002-2016. 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

	2007				2008				2009				2010				2011			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	1.952	3.050	0.061	5.063	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

	2012				2013				2014				2015				2016			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	3.350	4.078	0.056	7.483	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

Table 20. Witch flounder mean number per tow by length class and year. Spanish Spring Surveys in NAFO Div. 3NO: 2012-2016. Indet. means indeterminate.

	2012				2013				2014				2015				2016			
Lenght (cm.)	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	0.000	0.000	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	0.005	0.005	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
8	0.000	0.000	0.000	0.000	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
10	0.000	0.000	0.014	0.014	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
12	0.000	0.000	0.011	0.011	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
14	0.000	0.000	0.020	0.020	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
16	0.009	0.006	0.006	0.021	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
18	0.004	0.002	0.000	0.007	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
20	0.013	0.013	0.000	0.025	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
22	0.009	0.031	0.000	0.039	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
24	0.024	0.030	0.000	0.054	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
26	0.070	0.022	0.000	0.092	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
28	0.116	0.125	0.000	0.241	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
30	0.262	0.138	0.000	0.400	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
32	0.345	0.222	0.000	0.567	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
34	0.431	0.323	0.000	0.755	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
36	0.474	0.324	0.000	0.798	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
38	0.556	0.437	0.000	0.993	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
40	0.514	0.570	0.000	1.085	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
42	0.358	0.610	0.000	0.969	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
44	0.148	0.582	0.000	0.730	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
46	0.012	0.433	0.000	0.445	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
48	0.004	0.142	0.000	0.146	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
50	0.000	0.053	0.000	0.053	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
52	0.000	0.006	0.000	0.006	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
54	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.012	0.000	0.012	0.000	0.035	0.000	0.035
56	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007	0.000	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	0.006	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
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	3.350	4.078	0.056	7.483	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
Nº samples:				67				67				53				69				50
Nº Ind.:	392	541	11	944	315	592	25	932	131	271	3	405	304	443	21	768	330	513	8	851
Sampled catch:				398				330				188				336				401
Range:				7-55				6-58				8-57				7-54				6-59
Total catch:				398				356				189				346				442
Total hauls:				122				122				122				122				115

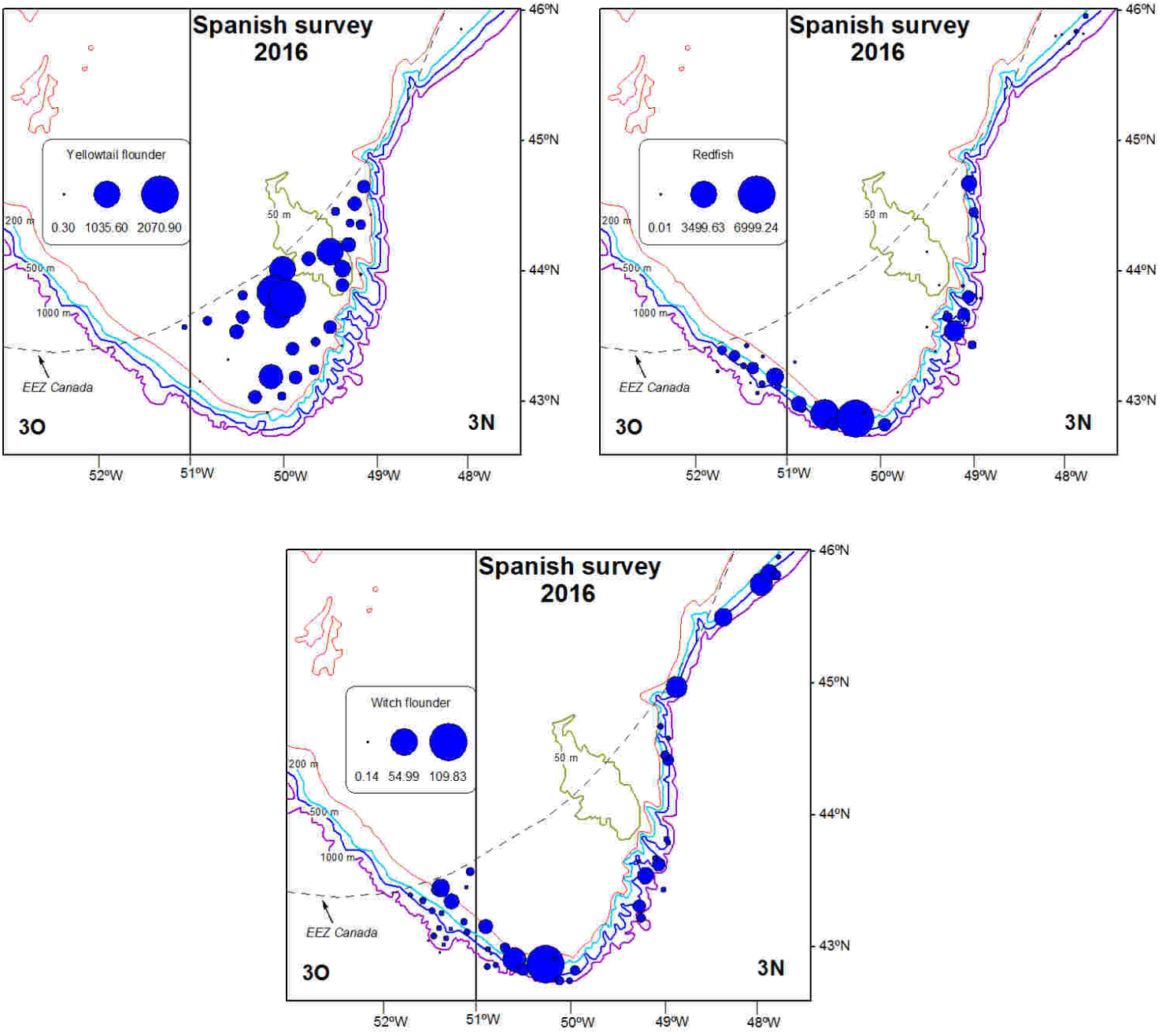

Fig. 1. Position of the hauls and the catch of yellowtail flounder, redfish and witch flounder during the 2016 Spanish 3NO survey. Note that the scale is different in the three graphs.

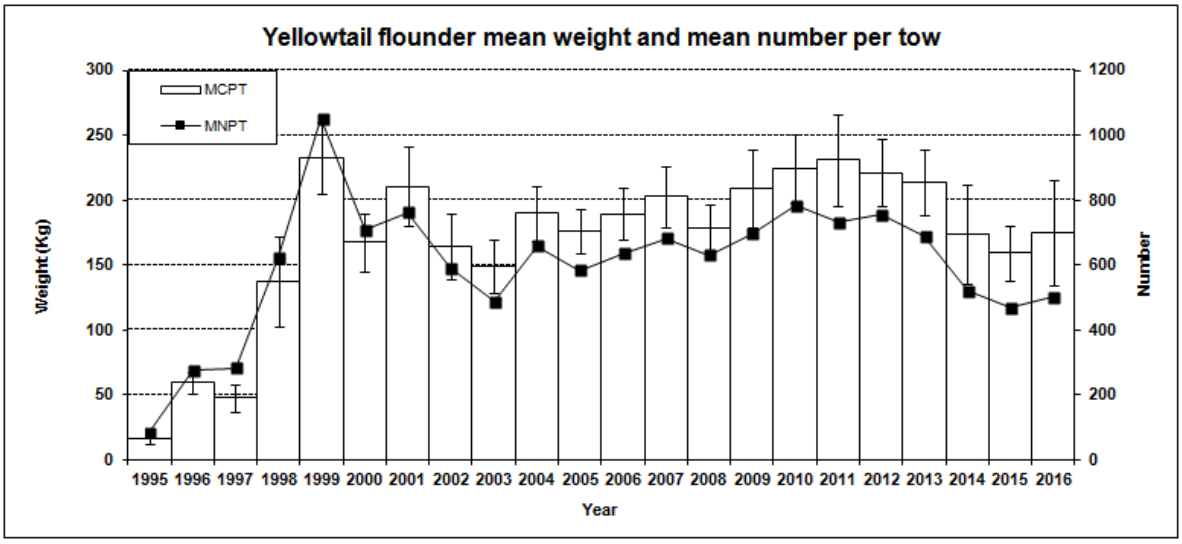

Fig. 2. Yellowtail flounder stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1995-2016.

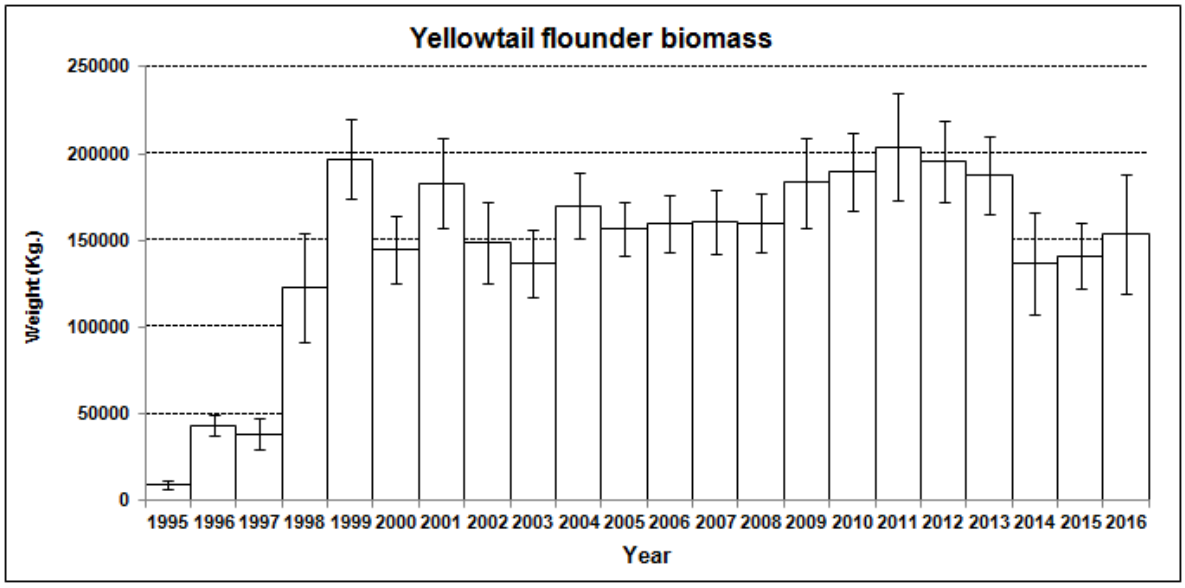

Fig. 3. Yellowtail flounder biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1995-2016.

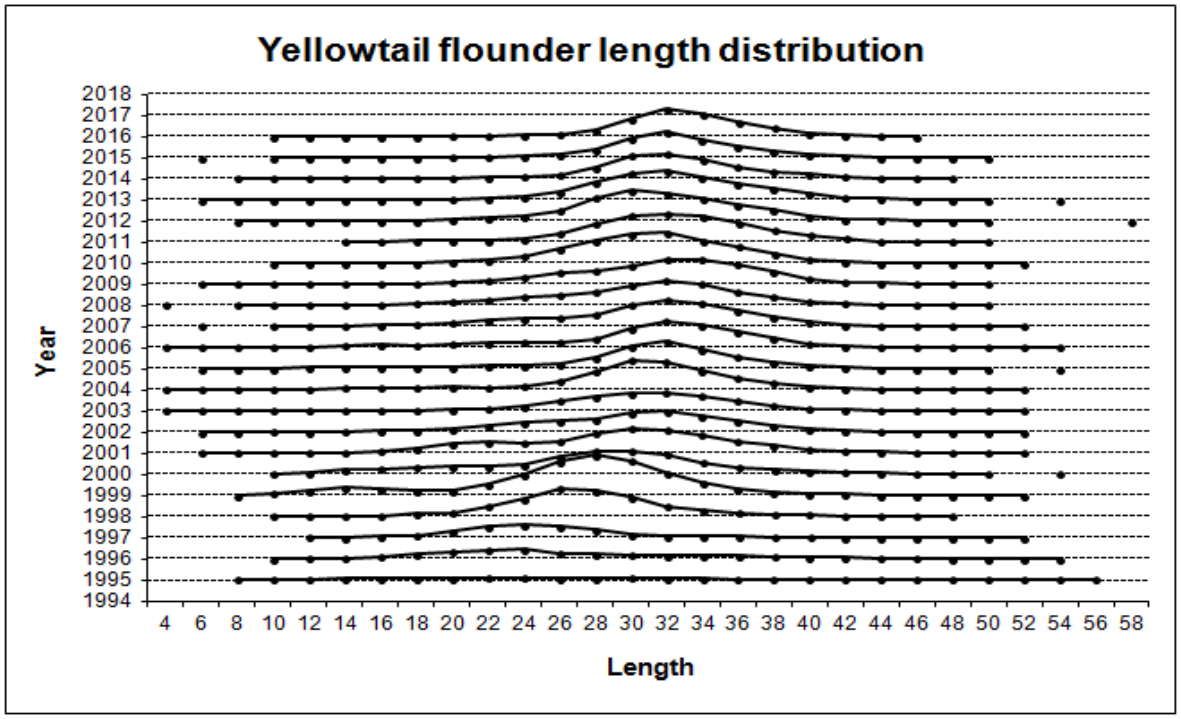

Fig. 4. Yellowtail flounder mean catches per tow length distribution (cm) on NAFO 3NO: 1995-2016. Data from 2012 to 2016 are in Table 8; data for 1995-2011 can be seen in SCR Doc 13/11.

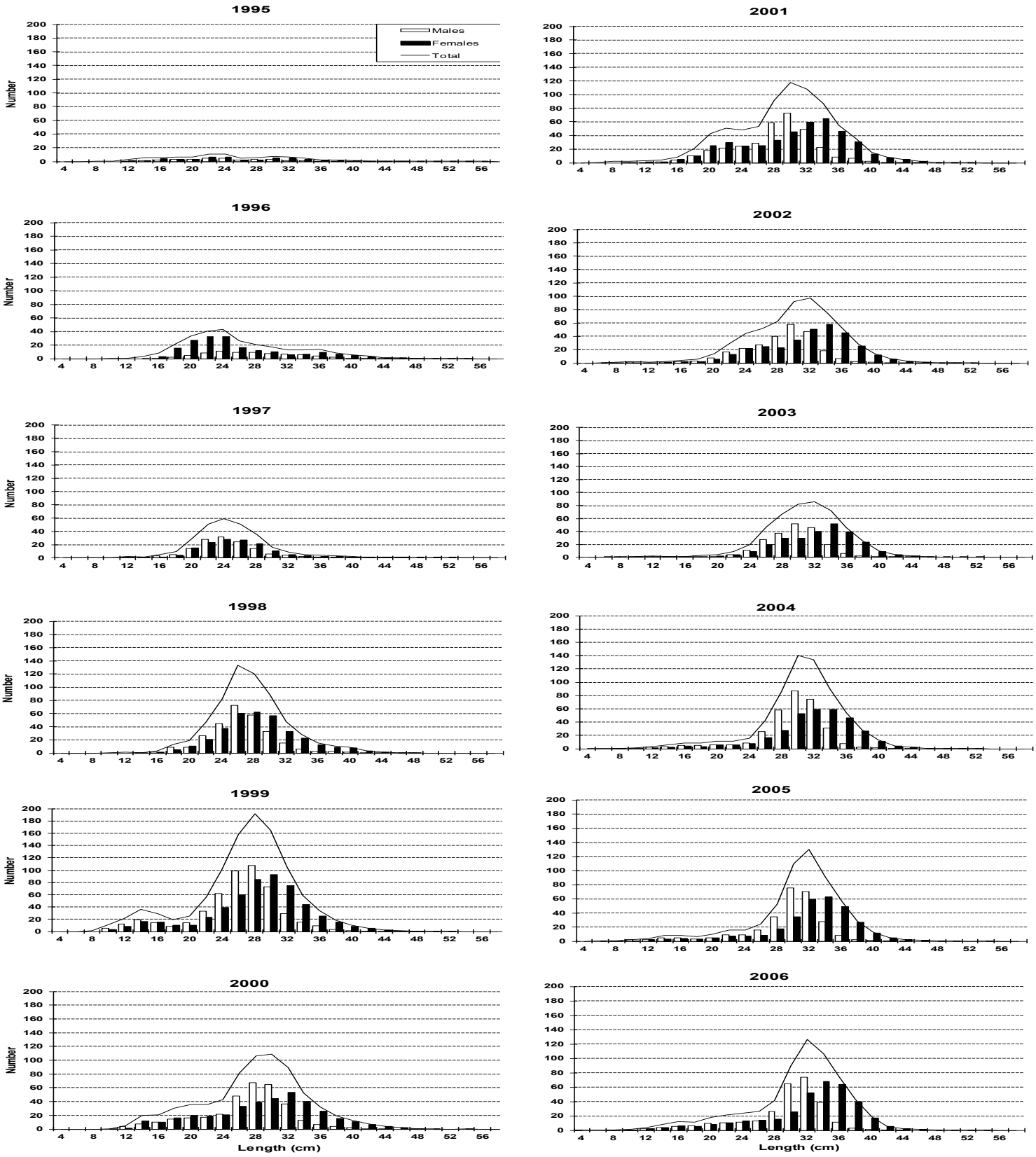

Fig. 5. Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2016. Mean catches per tow number. Data from 2012 to 2016 are in Table 8; data for 1995-2011 can be seen in SCR Doc 13/11.

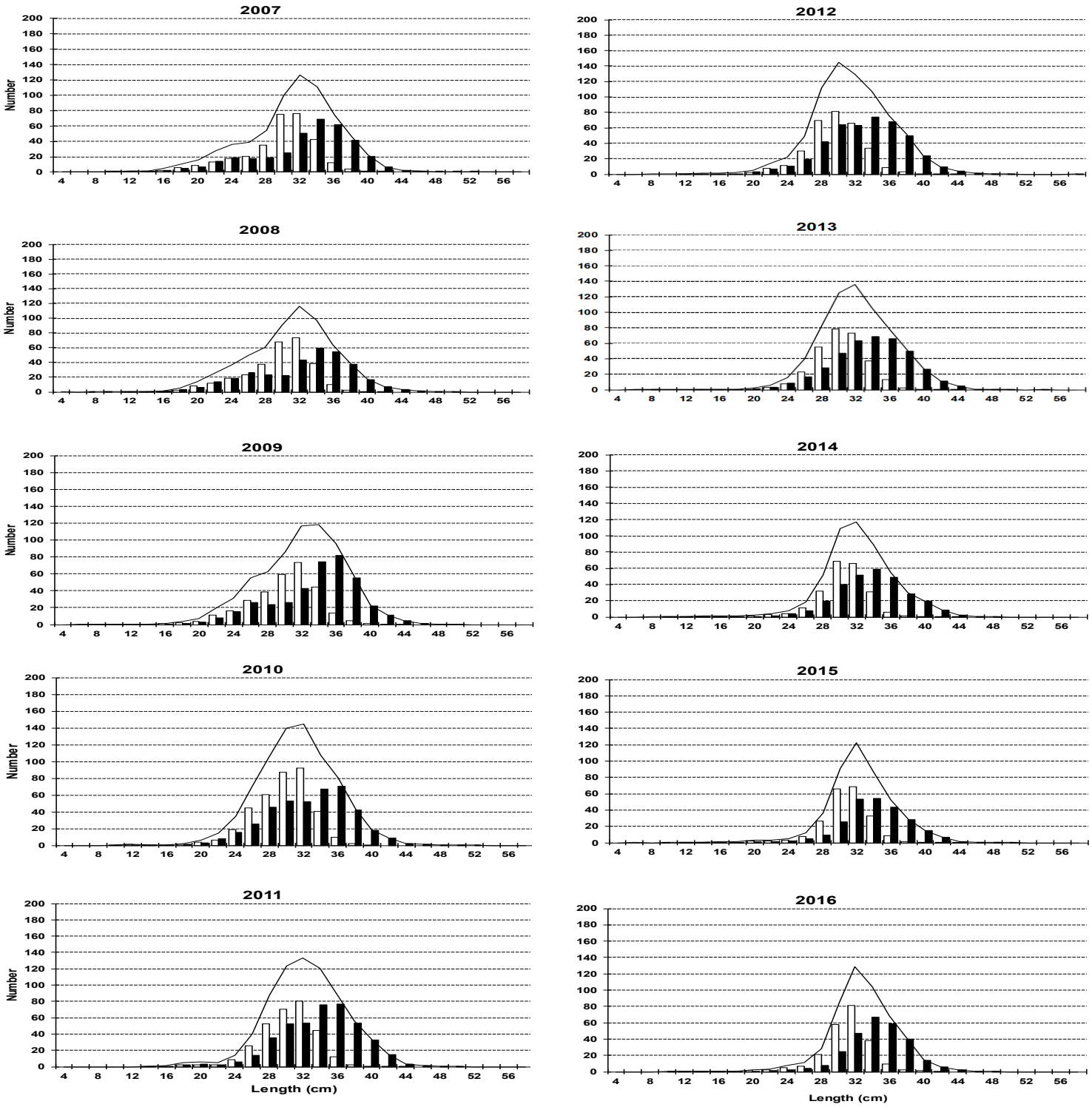

Fig. 5 (cont.). Yellowtail flounder length distribution (cm) on NAFO 3NO: 1995-2016. Mean catches per tow number. Data from 2012 to 2016 are in Table 8; data for 1995-2011 can be seen in SCR Doc 13/11.

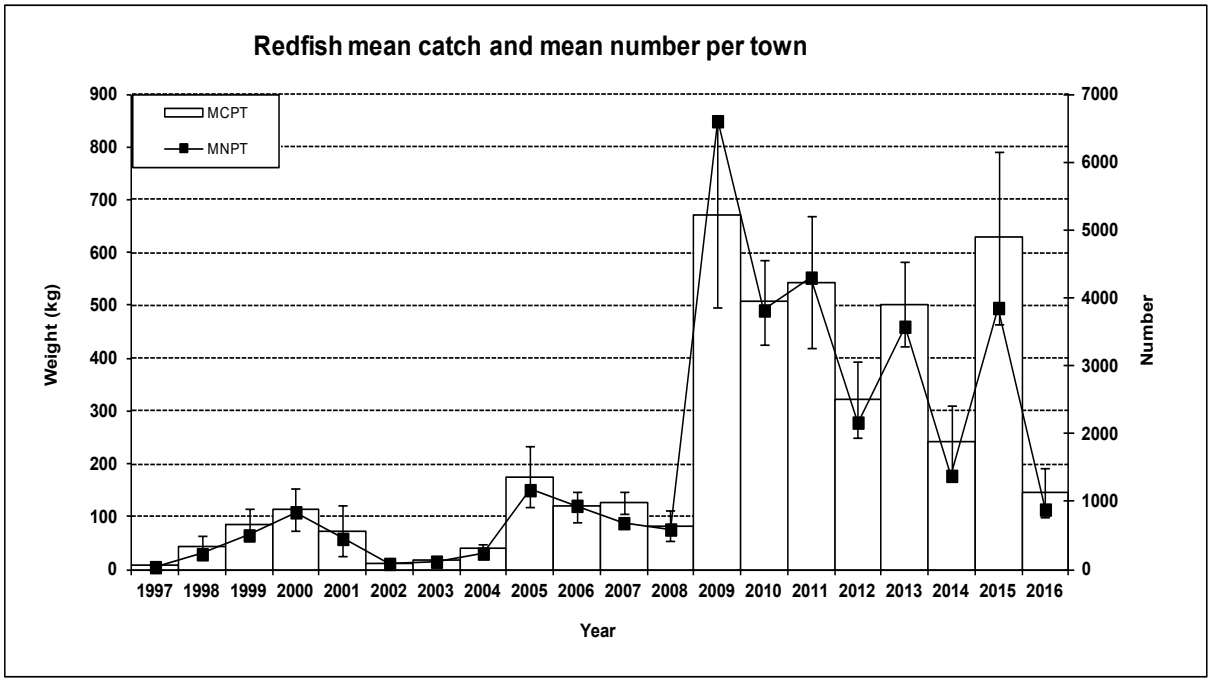

Fig. 6. Redfish stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2016.

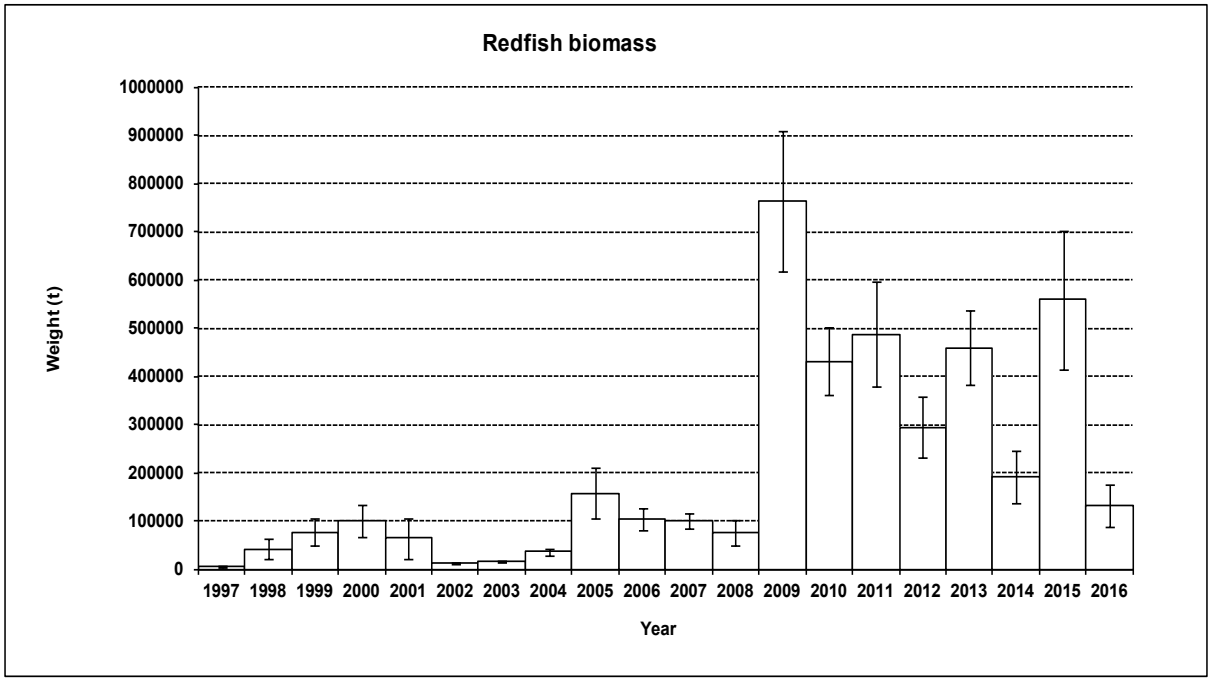

Fig. 7. Redfish biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2016.

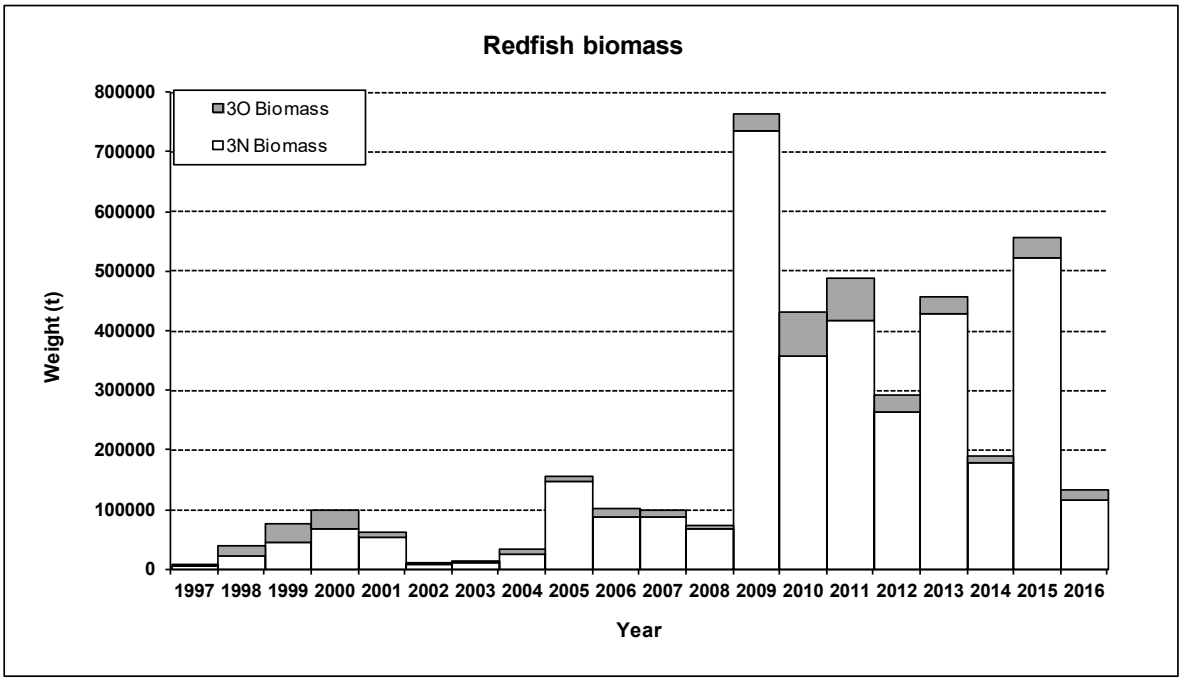

Fig. 8. Redfish biomass calculated by the swept area method in tons by year and Division. Spanish Spring surveys in NAFO Div. 3NO: 1997-2016.

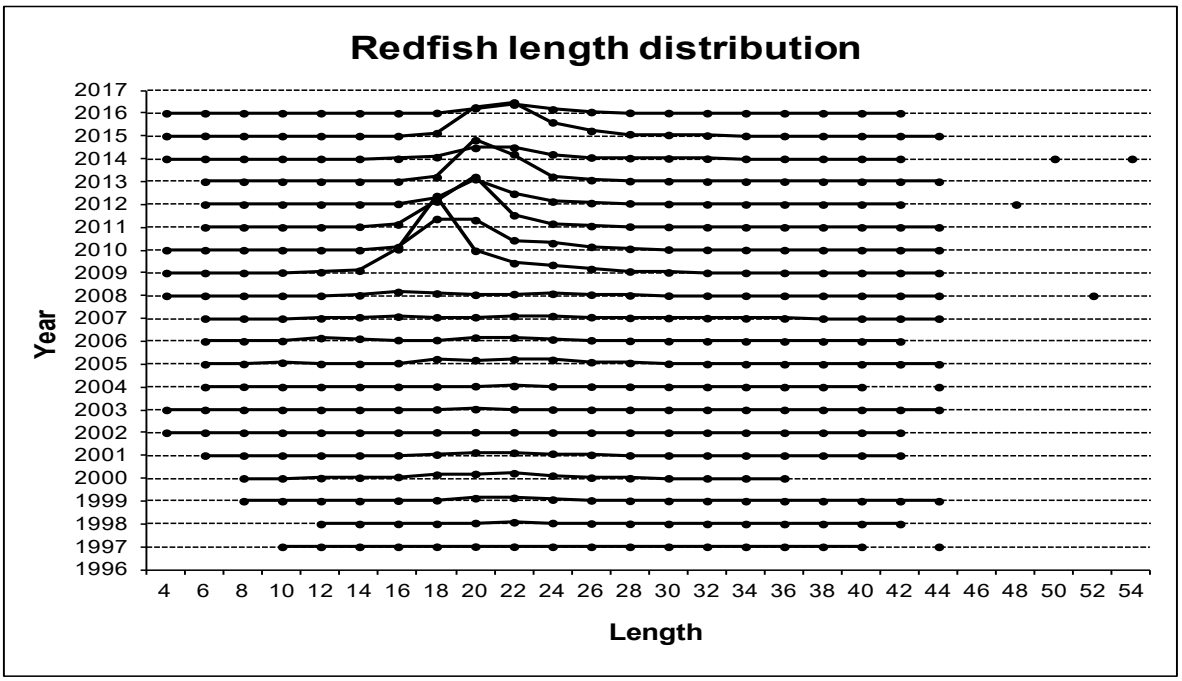

Fig. 9. Redfish mean catches per tow length distribution (cm) on NAFO 3NO: 1997-2016. Data from 2012 to 2016 are in Table 14; the data for 1997-2011 can be seen in SCR Doc 13/11.

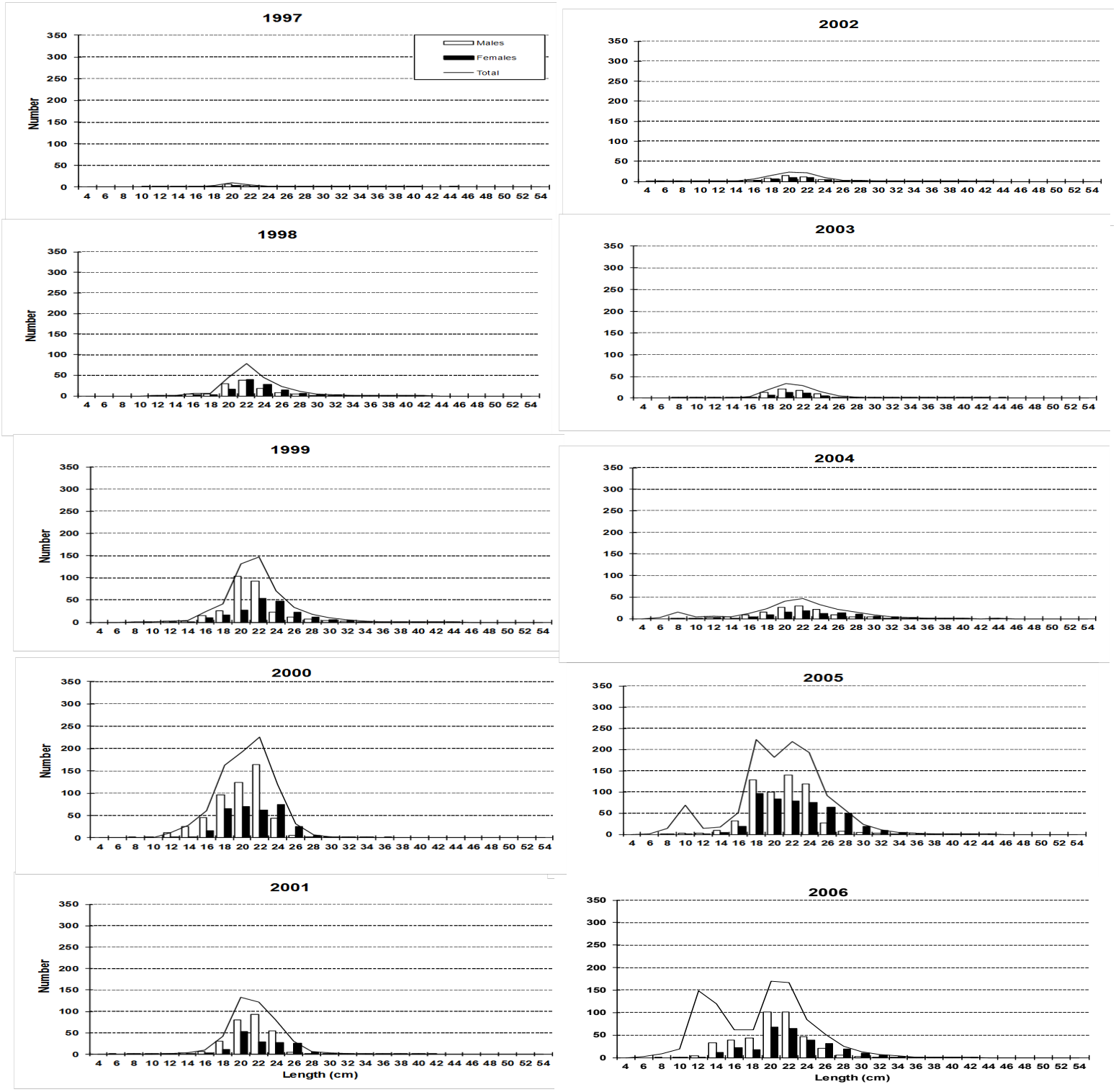

Fig. 10. Redfish length distribution (cm) on NAFO 3NO: 1997-2016. Mean catches per tow number. Data from 2012 to 2016 are in Table 14; the data for 1997-2011 can be seen in SCR Doc 13/11.

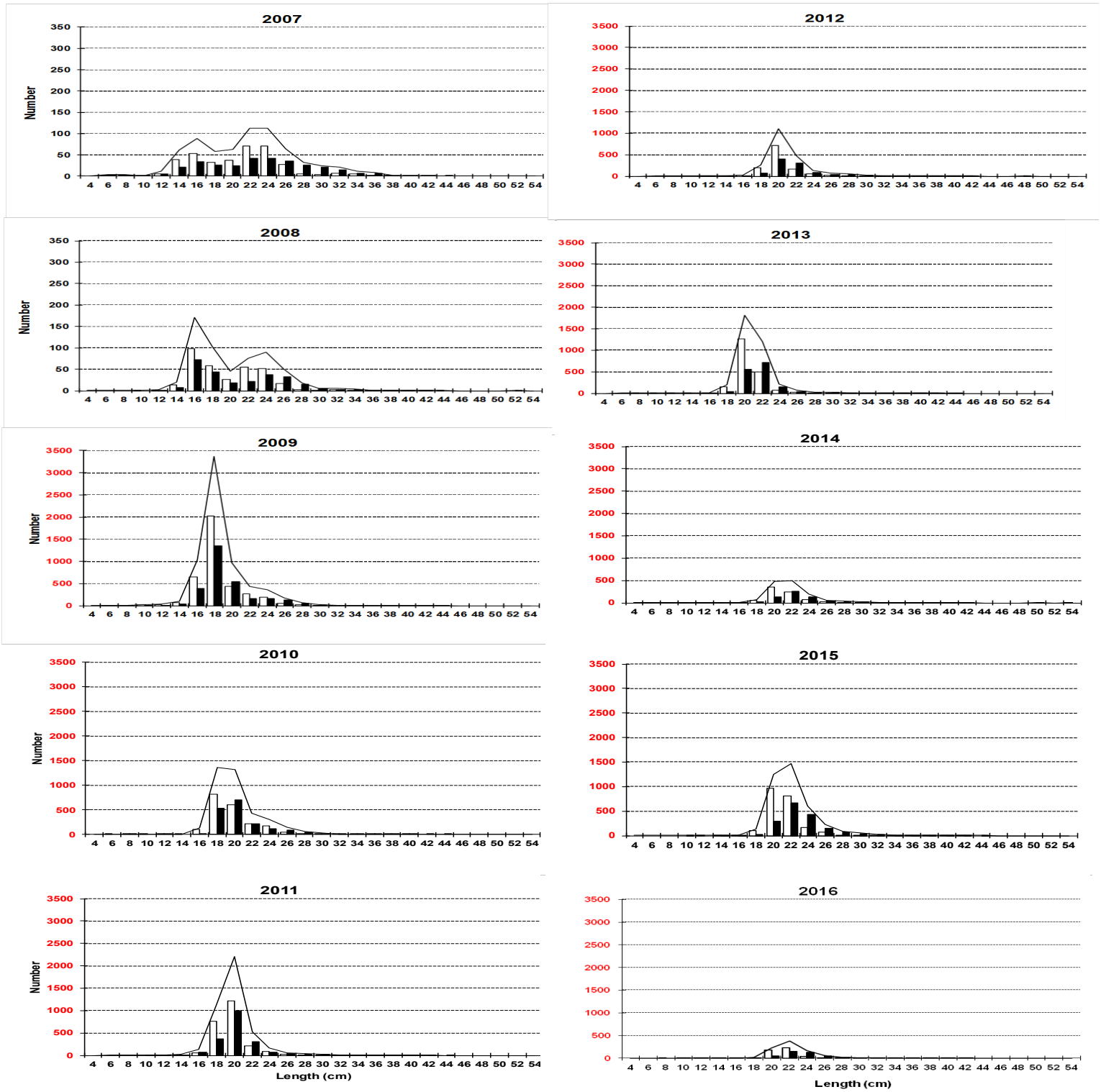

Fig. 10 (cont.). Redfish length distribution (cm) on NAFO 3NO: 1997-2016. Mean catches per tow number. The data from 2012 to 2016 is in Table 8; the data for 1997-2011 can be seen in SCR Doc 13/11. The 2009-2016 graphs have a different y-axis upper limit.

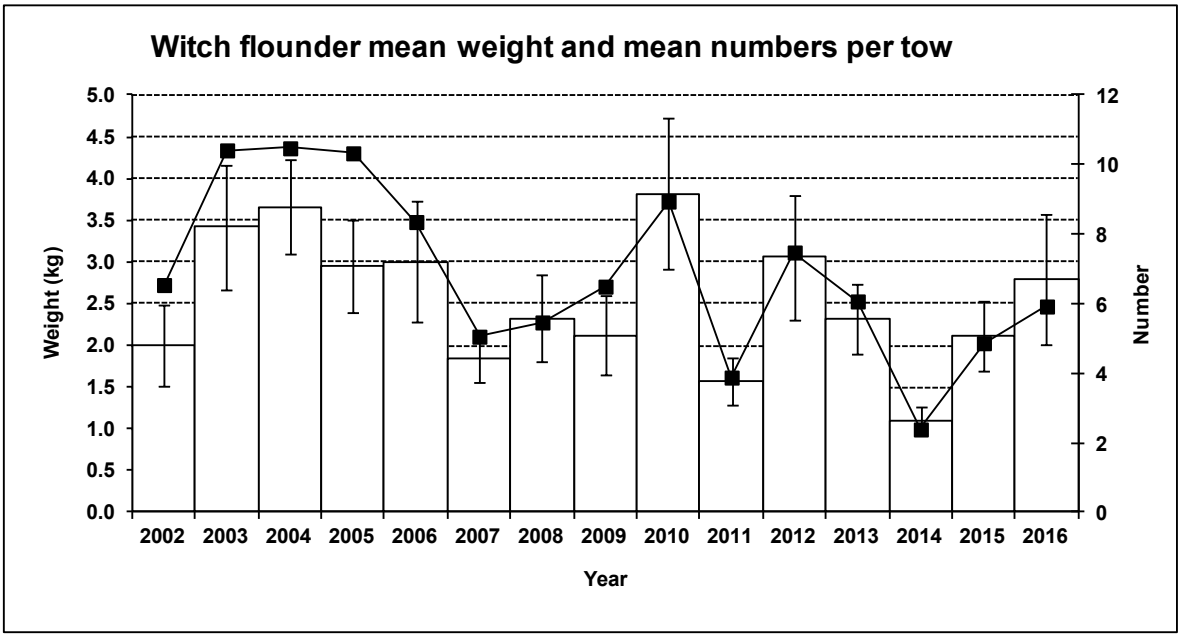

Fig. 11. Witch flounder stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 2002-2016.

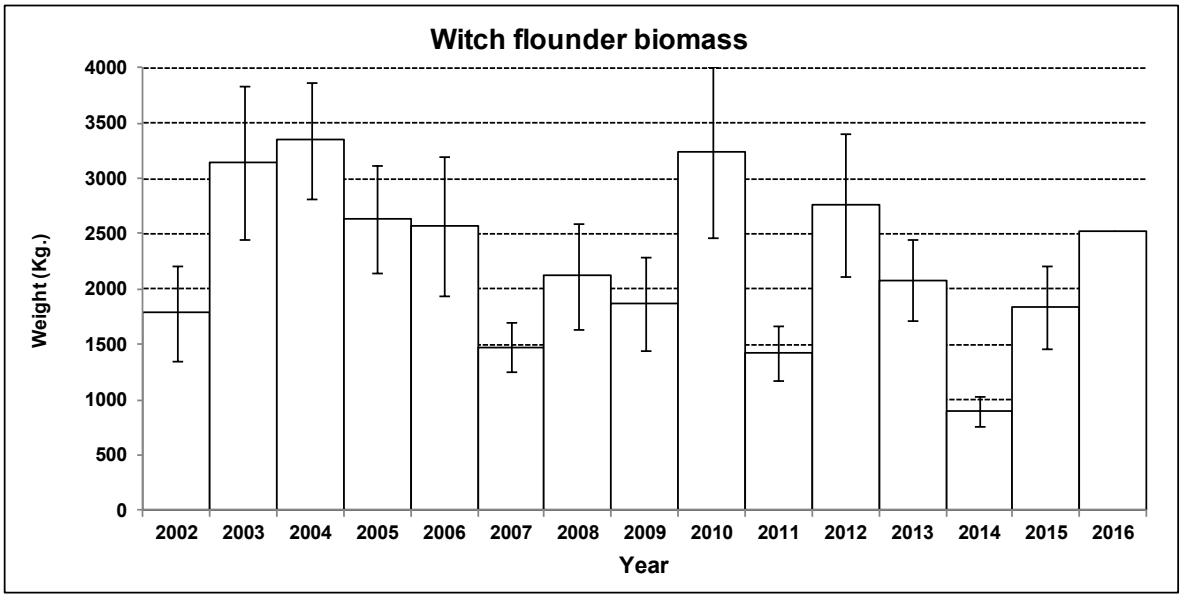

Fig. 12. Witch flounder biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 2002-2016.

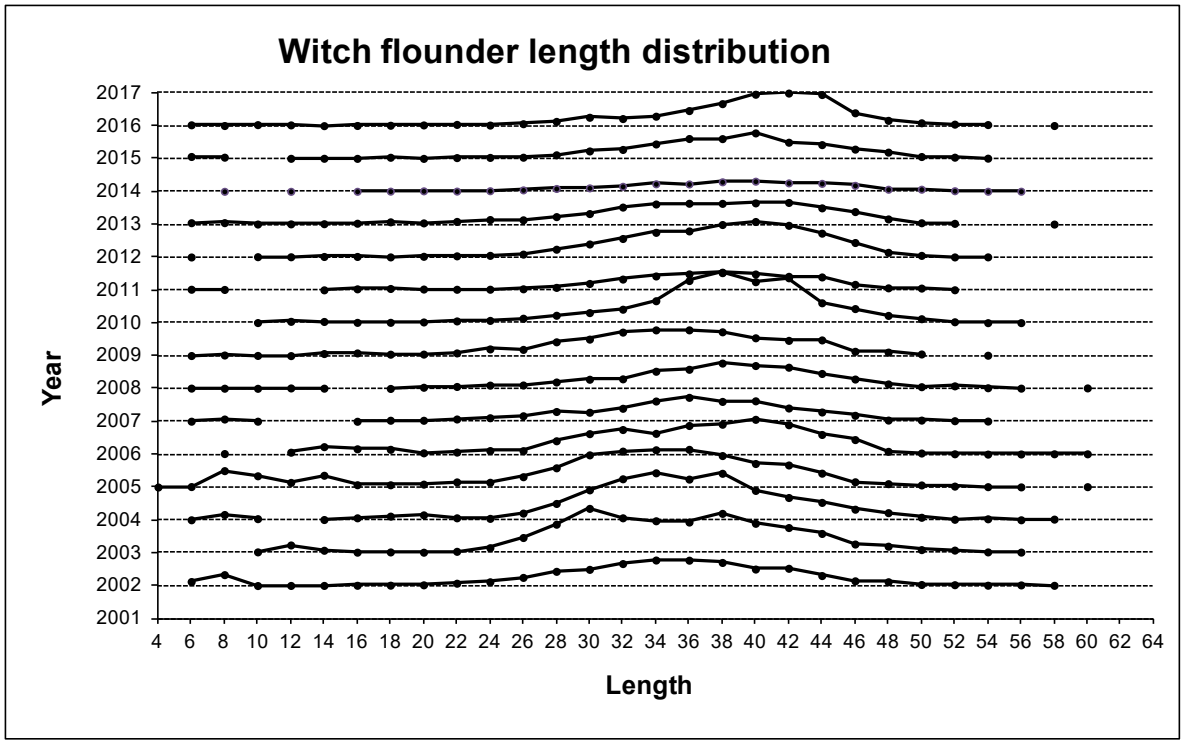

Fig. 13. Witch flounder mean catches per tow length distribution (cm) on NAFO 3NO: 2002-2016. Data from 2012 to 2016 are in Table 20; data for 2002-2011 can be seen in SCR Doc 13/11.

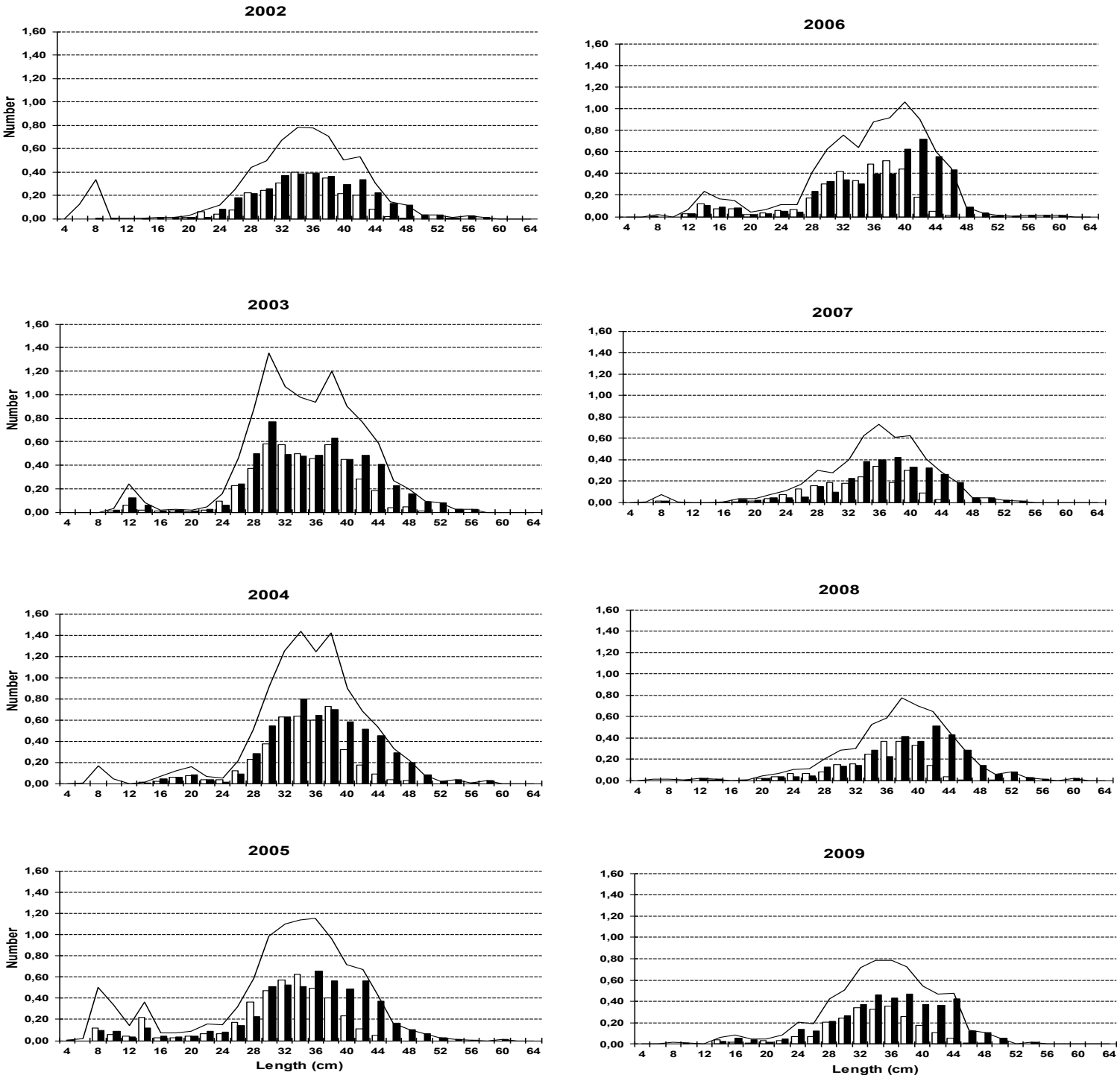

Fig. 14. Witch flounder length distribution (cm) on NAFO 3NO: 2002-2016. Mean catches per tow numbers. Data from 2012 to 2016 are in Table 20; data for 2002-2011 can be seen in SCR Doc 13/11.

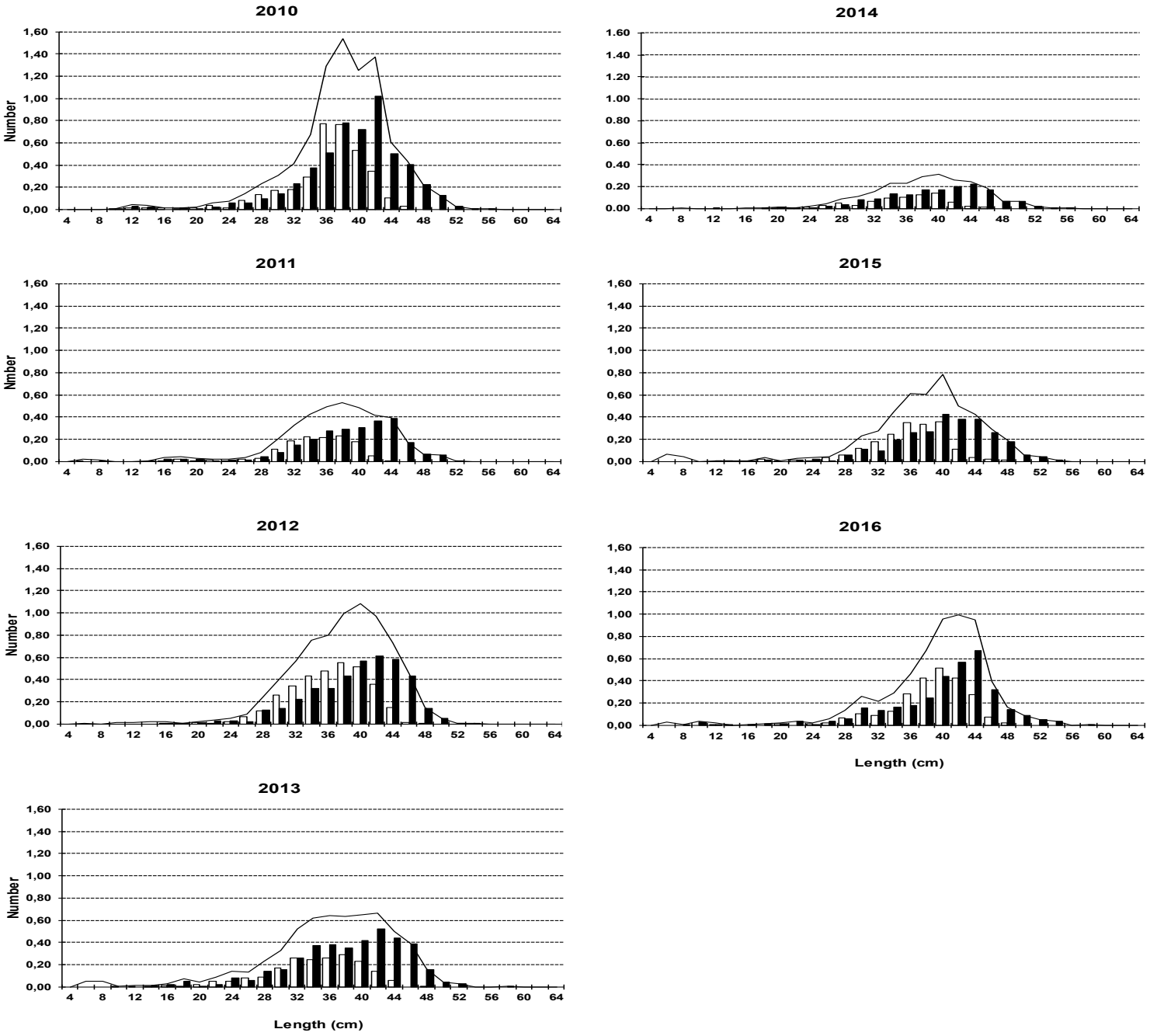

Fig. 14 (cont.). Witch flounder length distribution (cm) on NAFO 3NO: 2002-2016. Mean catches per tow numbers. Data from 2012 to 2016 are in Table 20; data for 2002-2011 can be seen in SCR Doc 13/11.