

**SCIENTIFIC COUNCIL MEETING – JUNE 2010****Spanish Research Report for 2009**

by

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All effort and catch information in this Report are based on information from NAFO observers on board. In 2009 information from 1459 days was available while total effort of the Spanish fleet in NAFO Regulatory Area was 1470 days (99% coverage). Spanish catches by species and Division in 2009 collected by NAFO Observers are presented in Table 1. The split by species of grenadiers were calculated based upon the percentage observed by the IEO scientific observers.

In addition to NAFO observers, IEO scientific observers were on board 241 fishing days that it means 16.5 % of the Spanish total effort. All length, age and biological information presented in this paper are based on sampling carried out by IEO observers: in 2009, 233 samples were taken, with 30 418 individuals of different species examined.

SUBAREA 1 and 2**A. Status of the fisheries**

There was not Spanish fishing activity in these Subareas during 2008.

SUBAREA 3**A. Status of the fisheries**

A total of 15 Spanish trawlers operated in NAFO Regulatory Area, Div. 3LMNO, during 2009, amounting to 1 440 days (21 250 hours) of fishing effort, a effort level very similar to the 2008 (1 406 days, 21 408 hours). This implies a decrease of 80 % in 2009 effort compared to 2003 effort (Table 2). Total catches (Table 1) for all species combined in Div. 3LMNO were 17 497 tons in 2009, compared to 17 364 tons in 2008.

Table 3 shows the effort (hours) by quarter and Division and their percentage. Table 4 presents the percentage of the effort by Division and mesh size and Figure 1 shows the holes position made with the different mesh sizes (footprint).

These tables and figure illustrate that the Spanish fleet has, at least, four different fisheries in NAFO Subarea 3 characterized by different mesh size, target species, depth and fishing area. The Spanish fleet effort in NAFO area is mainly directed to Greenland halibut (mostly in Div. 3LM) using 135 mm cod-end mesh size at more than 700 m depth, alternating with the skate fishery in the second half of the year (Div. 3NO) using 280 mm cod-end mesh size at less than 200 m depth, shrimp fishery (Div. 3LM) using 40 mm cod-end mesh size at 200-600 m depth, and in less degree redfish (Div. 3O and Div. 3M) using 135 mm cod-end mesh size at 200-700 m depth. In Div. 3L, most of the effort was performed using cod-end mesh size of 135 mm, indicating that the fleet targeted Greenland halibut. In the first half of the year a small part of the effort was directed to the shrimp fishery. Regarding Div. 3M, most of the effort was carried out using 135 mm cod-end mesh size at more than 700 m depth targeting Greenland halibut and in

less degree at less than 700 m depth targeting redfish. The 24% of the fishing effort in this Division was carried out using 40 mm cod-end mesh size directed to the shrimp fishery. In Div. 3N and during the first quarter of the year, fishing was performed using 135 and 280 mm cod-end mesh size, which indicates that the fleet targeted Greenland halibut in depth more than 700 m. and skate in depth less than 200 m. in similar proportion. However, during the others quarters most part of the effort moved to depths less than 200 m where the skate fishery took place using 280 mm mesh size. Fishing effort in Div. 3O was limited (6 %) and targeted redfish, using mainly 135 mm mesh size (64%) and in less proportion skates using mainly 280 mm mesh size (36%).

In addition to NAFO observers (NAFO Observers Program), 5 IEO scientific observers were onboard the Spanish vessels, comprising a total of 241 observed fishing days, around 17% coverage of the total Spanish effort. Besides recording catches, discards, and effort, these observers carried out biological sampling of the main species taken in the catch. For Greenland halibut, roughhead grenadier and American plaice this includes recording weight at length, sex-ratio, maturity stages, performing stomach contents analyses, and collecting material for reproductive studies. Otoliths of these three species were also taken for age determination. In 2009, 200 length samples were taken, with 27 256 individuals of different species examined to obtain the length distributions (Table 5). Length and age distributions presented in this paper are based on sampling carried out by these observers. Parameters used for the length-weight relationships are shown by species in Table 6.

The Spanish activity en NAFO Regulatory Area (NRA) Subarea 3 in 2009 stock by stock was the following:

Cod

Div. 3NO: In Div. 3N, the most important part of the catches of this species were taken as by-catch in the skate fishery and in less degree in Greenland halibut fishery. Few catches were taken in Div. O. Table 7 shows the catch length distribution for Div. 3NO cod. The number of individuals by sample was not very high and due to that the length distribution could not be representatives.

Div. 3M: Catches in Div. 3M were around 100 tons and were taken as by-catch of the redfish and Greenland halibut fisheries. There is not available length distributions for Division 3M.

Redfish

Div. 3LN: Most of the catches in Div. 3LN were taken as by-catch in the Greenland halibut fishery. Table 8 shows the length distribution for Div. 3LN based on only two samples.

3M: In Div. 3M the redfish catches in 2009 have been 1318 tons. In this Division a small part of the catches were taken as by-catch in the shrimp fishery. There is not available length distributions for redfish Division 3M.

Div. 3O: A directed fishery for this species took place in Div. 3O mostly in the second half of this year. Catches have reached 1395 ton in this Division. Catches length distribution for Div. 3O are presented in Table 9.

American plaice

Div. 3LNO: Most catches were taken in Div. 3LNO as by-catch of the skate and Greenland halibut fisheries. Length distributions for Div. 3LNO are presented in Table 10.

Div. 3M: Catches in Div. 3M only amounted 12 tons and were taken as by-catch of the Greenland halibut fishery. There is not available length distributions for Division 3M.

Witch flounder

Div. 2J and 3KL; Div. 3NO; Div. 3M: This species is taken as by-catch in the Greenland halibut fishery in Divisions 3LMNO. This year, there was only length distribution for Witch flounder Division 3NO (Table 11) based on samples with not very good number of sampled fish and due to that the length distribution could not be representatives..

Yellowtail flounder

Div. 3LNO: Most of the catches were taken in Div. 3N as by-catch in the skate fishery. Length distributions for Yellowtail flounder Div. 3LNO are presented in Table 12, all samples were taken in Division 3N.

Greenland halibut

Subareas 2 and Div. 3KLMNO: Greenland halibut continues to be one of the main target species for the Spanish fleet in NAFO area. A great reduction of effort in this fishery has been carried out in the last years by the Spanish fleet to adapt to the NAFO Greenland halibut recovery plan. Most of the catches have been taken in the Flemish Pass area (Div. 3LM) at depths more than 700 meters. The mesh size used for this fishery was equal to or greater than 130 mm. In 2009 only samples in Div. 3L and 3M were available. Table 13 shows the length distributions of Spanish catches by Division (3L and 3M) and Table 14 shows the total length distributions of Spanish catches in Divisions 3LMNO. Total age composition based in the Spanish Age Length Key (ALK), mean weight and mean length at age for Div. 3LMNO are presented in Table 15. Most of the Greenland halibut catches corresponds to ages 5 to 8, with a peak at ages 7.

Figure 2 presents the Spanish fleet standardized CPUE update with the 2009 data presented by Gonzalez-Costas and Gonzalez-Troncoso (2009). Results shows that the 2009 CPUE is in the level of the last years values and in maximums of the historical series.

Thorny skate

Commercial catches of skates comprise a mix of skate species (*Raja radiata*, *Bathyrāja spinicauda*, *Raja hyperborean*, *Raja senta*, etc). Thus the catch of skate in Table 1 refers to *Raja* spp. However, thorny skate dominates, comprising about 95% of the skate taken in the Spanish catches.

Div. 3LNO: Most of the catches were taken in Div. 3N at depths less than 200 meters, where a fishery directed to thorny skate took place mainly in the second semester of the year, using 280 mm mesh size. Skate catches in Div. 3L were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut fishery (135 mm cod-end). Table 16 shows the total catches length distributions of Div. 3LNO, all samples were taken in Division 3NO.

Div. 3M: Skate catches in Div. 3M were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut and redfish fisheries. There is not available length distributions for Division 3M.

Roughhead grenadier

Subarea 2 and 3: Roughhead grenadier is the main species taken as by-catch in the Greenland halibut fishery. Most of the 2009 catches and all of the length distribution samples were taken in Div. 3LM. Individuals were measured from tip of snout to base of first anal-fin ray (AFL). Table 17 shows the AFL length distributions, in 1 cm intervals, of Spanish catches for Div. 3LMNO. Age distributions based on the Spanish Commercial and Flemish Cap Survey Age Length Key (ALK), mean weight and mean length (AFL) at age of the total catch for Div. 3LMNO are presented in Table 18. Most of the Roughhead grenadier catches in 2009 were based on ages 6 to 12 with a mode in 8 years old.

White hake

Div. 3LMNO: Catches in the last years are in the same level as before 2000. Catches of this species in 2009 were a small by-catch of different fisheries. In Div. 3LMN they are by-catch of the Greenland halibut fishery and in Div. 3O by-catch of the redfish fishery. There were not length distribution samplings available in 2009.

(B) Research studies

The Spanish bottom trawl survey in NAFO Regulatory area Div. 3NO was conducted from 31 May to 18 June 2009 on board R/V Vizconde de Eza using Campelen gear with a stratified design. A total of 111 hauls were carried out to a depth between 41 and 1 424 m, two of those which were null. The results of the Spanish 3NO bottom trawl survey, including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Greenland halibut, American plaice, Atlantic cod, Yellowtail flounder, Thorny skate, White hake and Roughhead grenadier are presented as Scientific Council Research documents. As in the years 1995 and 1996 few deeper strata were surveyed, the data obtained in those surveys are not representative for most of the species, so the data is presented since 1997 to 2009 for all the species, except for Yellowtail flounder, whose data are presented for the whole period, and for White hake, presented for the period 2001-2009 because before 2001 there are no data available.

A total of 95 hydrographic profile samplings were made, but 17 of them were null. The depth of the valid profiles ranged between 41 and 1 348 m

Feeding habit studies on the main species were not made in the year 2009. These samplings are carried out bi-annually. Material for histological maturity, fecundity and growth studies of Cod, American plaice and Greenland halibut were taken.

In 2003 it was decided to extend the Spanish 3NO survey toward Div. 3L (Flemish Pass). In 2009, the bottom trawl survey in Flemish Pass (Div. 3L) was carry out on board R/V *Vizconde de Eza* using the usual survey gear (Campelen 1800) from July 25th to August 12th. The area surveyed was Flemish Pass to depths up 800 fathoms (1463 m) following the same procedure as in previous years. The number of hauls was 103 and 5 of them were nulls. Survey results including abundance indices and length distributions of the main commercial species are presented as Scientific Council Research documents. Survey results for Div. 3LNO of the northern shrimp (*Pandalus borealis*) were presented in SCR 09/55.

Samples for histological (Greenland halibut, American plaice) and aging (Greenland halibut, American plaice, roughhead grenadier and cod) studies were taken. Ninety five hydrographic profile samplings were made in a depth range of 106-1366 m.

In 2007 the Spanish administration obtained a license from Canadian Authorities to carry out a research survey inside of the Canadian waters in 3L Division. In 2009 this survey was made by the R/V *Vizconde de Eza*, covering 14 strata in the north of Div. 3L, using a Campelen survey gear up to 1420 meters depth and following the same procedures as in 3NO survey. Like previous years, the original plan could not be completed and only 37 valid fishing operations, instead of the 44 initially planned, were carried out (Figure 3). Total biomass, calculated by swept area method, for the main species is shown in the Table 19. Due to the low number of hauls these results should be considered with caution. This year there was no participation of Canadian scientific staff.

The EU bottom trawl survey in Flemish Cap (Div. 3M) was carried out on board R/V *Vizconde de Eza* using the usual survey gear (Lofoten) from June 21th to July 23th 2009. The area surveyed was Flemish Cap Bank to depths up to 800 fathoms (1 460 m) following the same procedure as in previous years. The number of hauls was 184 and six of them were nulls. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, roughhead grenadier and Greenland halibut are presented as Scientific Council Research documents. Flemish Cap survey results for northern shrimp (*Pandalus borealis*) were presented in SCR 09/54.

Samples for histological assessment of sexual maturity of cod, redfish, Greenland halibut and Roughhead grenadier were taken.

Oceanography studies continued to take place

NEREIDA Project: The main objective of NEREIDA project is focused on the implementation of the Ecosystem Approach to the fisheries management in order to identify Vulnerable Marine Ecosystems (VMEs) paying special attention to the cold water corals and sponges. The study is centered in NAFO Regulated Area and tries to give an answer to the urgent request in order to define in a precise way those areas which are candidate to become VMEs. This demarcation is a necessary step in the decision making process for the protection of these areas. Participation of various countries members of the NAFO contracting parties will provide to the NEREIDA project a multidisciplinary approach as well as the application of technologies and working protocols which will mean an active collaboration between institutions and organisms involved (Instituto Español de Oceanografía, Secretaría General del Mar, Consejo Superior de Investigaciones Científicas, Polar Research Institute of Marine Fisheries and Oceanography, Centre for Environment Fisheries & Aquaculture Science, Geological Survey of Canada, Canadian Hydrographic Service and Ecosystem Research Division-Fisheries and Oceans Canada (Bedford Institute of Oceanography)).

Geographically, the study area covers between the 200 miles of the Canadian EEZ and the 700-2000 m isobaths in High Seas of the Atlantic Northwestern. Total survey area during 2009 was divided into three parts, each part covered by a different survey:

- 1st Survey (NEREIDA 0509) covered east of Flemish Cap
- 2nd Survey (NEREIDA 0609) covered west and north of Flemish Cap

- 3rd Survey (NEREIDA 0709) covered the Flemish Pass

Table 20 shows a summary of all the activities carried out during the NEREIDA 2009 surveys. It also shows the total prospected area in square kilometres.

In June 2010 it is scheduled the continuation of the historic series (NEREIDA 0610, NEREIDA 0710 y NEREIDA 0810) which began in summer 2009 on board the R/V Miguel Oliver owned by the Secretaría General del Mar. Information derived from these surveys will be very useful to adopt solutions that guarantee the development and sustainable use of fisheries resources as well as the location and identification of sensible and vulnerable zones within the NAFO Regulated Area.

SUBAREA 6

A. Status of the fisheries

One Spanish trawler operated in NAFO Regulatory Area, Div. 6G using a midwater trawl gear, during 2009, amounting to 28 days (167 hours) of fishing effort. The most important species in catches was the *Beryx splendens* with more than 96% of the total catches in this Division. Table 21 presents the Spanish catches length distribution in Division 6G for *Beryx splendens*. Other species present in catches were *Epigonus telescopus*, *Ruvettus pretiosus* and *Mustelus mustelus* (Table 1).

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González-Costas, F. and D. González-Troncoso, 2009. Spanish 2006-2008 Fisheries Footprint, scientific Observers and surveys coverage and update of the Standardized CPUE Indices for Greenland Halibut. NAFO SCR Doc. 09/022, Serial Number N5657.

Table 1. Spanish Catches (ton) in NAFO Area in 2009 by Division, based on NAFO Observers information.

Code	English_name	Scientific_name	3L	3M	3N	3O	6G	Total
SKA	Raja rays nei	Raja spp	58	38	5151	431		5678
GHL	Greenland halibut	Reinhardtius hippoglossoides	3391	1128	371	14		4904
RED	Atlantic redfishes nei	Sebastes spp	76	1318	44	1408		2846
PRA	Northern prawn	Pandalus borealis	281	562				843
PLA	Amer. Plaice	Hippoglossoides platessoides	51	12	440	100		603
COD	Atlantic cod	Gadus morhua	43	99	299	40		480
BYS	Splendid alfonso	Beryx splendens					474	474
RHG	Roughhead grenadier	Macrourus berglax	381	207	25	3		410
RNG	Roundnose grenadier	Coryphaenoides rupestris	62	120	12	2		403
YEL	Yellowtail flounder	Limanda ferruginea	1		333	47		382
WIT	Witch flounder	Glyptocephalus cynoglossus	43	77	92	98		310
CAT	Wolffishes	Anarhichas spp	78	24	22	9		132
ROL	Rocklings nei	Gaidropsarus ensis	93	25	1	1		121
HKW	White hake	Urophycis tenuis	44	12	6	39		101
SQI	Northern shortfin squid	Illex illecebrosus		1		52		53
HAL	Atlantic halibut	Hippoglossus hippoglossus	7	3	8	11		29
ANT	Blue antimora	Antimora rostrata	8	13	4	0		25
ANG	American angler	Lophius americanus	0		17	4		21
CAS	Spotted wolffish	Anarhichas minor	3	2	6	2		12
GPE	Longfin hake	Phycis blennoides	3	1	0	1		5
CAP	Capelin	Mallotus villosus	4		0			4
EPI	Black cardinal fish	Epigonus telescopus					2	2
CFB	Black dogfish	Centroscyllium fabricii	1	1				2
CAB	Northern wolffish	Anarhichas denticulatus	1	1	0	0		2
OIL	Oilfish	Ruvettus pretiosus					2	2
CAA	Atlantic wolffish	Anarhichas lupus	1	0	0	1		2
BYS	Boreal Shark	Somniosus microcephalus	1			0		1
SDV	Mooth-hounds nei	Mustelus mustelus					1	1
NZB	Marlin-spike grenadier	Nezumia bairdi	0	0	0	0		0
Others	Others	Others	71	29	16	12	12	193
Total (tons)			4701	3673	6848	2276	490	18040

Table 2. Fishing effort (hours) of the Spanish fleet in 2009 in Divisions 3LMNO by year, as well as percentage of effort reduction compare with 2003.

3LMNO	2003	2004	2005	2006	2007	2008	2009
Effort (Hours)	106821	76028	60128	44044	25163	21408	21250
Effort reduction	0%	29%	44%	59%	76%	80%	80%

Table 3. Fishing effort (hours) of the Spanish fleet in 2009, by quarter and Division, as well as percentage of effort by quarter and Division.

Division	units	1st Q	2nd Q	3rd Q	4th Q	Total	%
3L	Hours	2582	2636	2859	791	8868	42%
3M	Hours	1519	1758	1159	501	4936	23%
3N	Hours	728	446	2740	2346	6260	29%
3O	Hours	383	323	387	92	1185	6%
	Total Hours	5212	5163	7146	3729	21250	100%
	%	25%	24%	34%	18%	100%	

Table 4-. Percentage of the effort in SA 3 by mesh size, quarter and Division.

Div.	Mesh Size	1st Q	2nd Q	3rd Q	4th Q	Total
3L	<90 mm	7%	3%	5%	0%	4%
	100-200 mm	93%	97%	95%	100%	96%
	>200 mm					
3M	<90 mm	40%	12%	17%	32%	24%
	100-200 mm	60%	88%	83%	68%	76%
	>200 mm					
3N	<90 mm					
	100-200 mm	42%	33%	28%	6%	22%
	>200 mm	58%	67%	72%	94%	78%
3O	<90 mm					
	100-200 mm	68%	62%	60%	70%	64%
	>200 mm	32%	38%	40%	30%	36%

Table 5. Length distribution samples and individuals sampled by Division, species and gear (mesh size) in 2009.

Species	Division	Gear	Samples	Ind. Sampled
Amer. Plaice	3L	135 mm	1	40
Atlantic cod	3L	135 mm	2	75
Atlantic redfishes nei	3L	135 mm	1	26
Greenland halibut	3L	135 mm	53	9497
Rocklings nei	3L	135 mm	1	14
Roughhead grenadier	3L	135 mm	8	929
Blue antimora	3M	280 mm	1	25
Greenland halibut	3M	135 mm	11	1751
Rocklings nei	3M	135 mm	1	35
Roughhead grenadier	3M	135 mm	3	271
Roundnose grenadier	3M	135 mm	1	96
Amer. Plaice	3N	135 mm	4	900
Amer. Plaice	3N	280 mm	25	2790
American angler	3N	280 mm	1	9
Atlantic cod	3N	135 mm	4	543
Atlantic cod	3N	280 mm	3	60
Atlantic redfishes nei	3N	135 mm	1	106
Greenland halibut	3N	280 mm	1	50
Skates	3N	135 mm	1	87
Skates	3N	280 mm	36	5973
Witch flounder	3N	135 mm	1	38
Yellowtail flounder	3N	135 mm	1	185
Yellowtail flounder	3N	280 mm	14	1299
Amer. Plaice	3O	135 mm	4	474
Amer. Plaice	3O	280 mm	1	50
Atlantic cod	3O	135 mm	2	58
Atlantic cod	3O	280 mm	1	38
Atlantic redfishes nei	3O	135 mm	10	1405
Atlantic redfishes nei	3O	280 mm	1	50
Skates	3O	135 mm	1	176
Witch flounder	3O	135 mm	3	115
Witch flounder	3O	280 mm	1	46
Yellowtail flounder	3O	280 mm	1	45
Centrolophidae	6G	OTM	1	8
Splendid alfonsino	6G	135 mm	10	833
Splendid alfonsino	6G	OTM	22	2321

Table 6. Parameters of the length-weight relationship ($W(g) = a \cdot L(cm)^b$) by species.

Species	a	b
Greenland halibut	0.00740	3.0310
Redfish	0.01900	2.9060
Roughhead grenadier	0.11390	2.8921
Witch flounder	0.00220	3.2995
American plaice	0.00600	3.1127
Cod	0.00800	3.0400
Roundnose grenadier	0.20400	2.9636
Yellowtail Flounder	0.00710	3.0903
Skate	0.01115	2.9471
<i>S. mentella</i>	0.02473	2.8376
White Hake	0.00540	3.0938

Table 7. Length distribution of 3NO Spanish cod catches.

Cod Length (cm)	Division 3NO			Total
	Males	Females	Ind.	
26	110	55	0	165
27	210	55	0	265
28	165	275	0	439
29	165	275	0	440
30	221	385	0	606
31	155	330	0	484
32	112	211	0	322
33	424	324	0	748
34	291	313	0	604
35	2315	1414	0	3728
36	685	808	0	1493
37	1041	1709	0	2750
38	592	1361	0	1953
39	2462	2529	0	4991
40	596	2638	0	3234
41	823	1198	0	2022
42	1014	313	0	1328
43	1462	1317	0	2778
44	327	293	0	620
45	696	223	0	919
46	268	214	0	482
47	435	223	0	659
48	735	279	0	1014
49	223	667	0	890
50	1070	731	0	1801
51	821	1004	0	1826
52	496	661	0	1157
53	674	787	0	1461
54	325	680	0	1005
55	737	1545	0	2282
56	908	722	0	1630
57	212	771	0	983
58	649	680	0	1329
59	279	649	0	928
60	705	1504	0	2209
61	760	395	0	1156
62	167	158	0	325
63	112	388	0	500
64	695	398	0	1093
65	168	340	0	508
66	821	202	0	1023
67	58	651	0	710
68	340	769	0	1109
69	56	0	0	56
70	56	45	0	101
71	329	56	0	385

72	537	1133	0	1670
73	0	0	0	0
74	537	0	0	537
75	0	778	0	778
76	0	778	0	778
77	0	0	0	0
78	778	778	0	1557
79	1557	0	0	1557
80	0	0	0	0
81	778	0	0	778
82	537	0	0	537
83	0	1557	0	1557
84	0	0	0	0
85	652	45	0	697
86	778	778	0	1557
87	0	596	0	596
88	778	0	0	778
89	0	834	0	834
90	0	596	0	596
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	596	1557	0	2152
95	45	0	0	45
96	778	834	0	1612
97	1250	0	0	1250
98	778	596	0	1374
99	0	0	0	0
100	0	0	0	0
101	0	0	0	0
102	0	596	0	596
103	537	0	0	537
104	778	0	0	778
105	0	0	0	0
106	537	0	0	537
107	537	834	0	1371
108	0	537	0	537
109	0	0	0	0
110	0	0	0	0
111	537	596	0	1133
112	1192	596	0	1787
113	0	0	0	0
114	0	596	0	596
115	0	0	0	0
116	0	0	0	0
117	0	0	0	0
118	537	596	0	1133
119	0	0	0	0
120	0	0	0	0
121	0	537	0	537

122	0	0	0	0
123	0	0	0	0
124	0	0	0	0
125	0	596	0	596
126	0	0	0	0
127	0	0	0	0
128	0	0	0	0
129	0	0	0	0
130	0	0	0	0
131	0	0	0	0
132	0	0	0	0
133	0	0	0	0
134	0	0	0	0
135	0	596	0	596
Ind. Sampled				609
Samples				10
Catch (ton)				609

Table 8. Length distribution of 3LN Spanish redfish catches by Division.

Redfish Length (cm)	Males	3LN Females	Ind.	Total
15	0	0	0	0
16	77000	22000	0	99000
17	154000	49500	0	203500
18	137500	33000	0	170500
19	27500	49500	0	77000
20	5500	0	0	5500
21	0	0	0	0
22	0	0	0	0
23	5500	11000	0	16500
24	5500	0	0	5500
25	0	0	0	0
26	5500	0	0	5500
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	3354	0	3354
31	6708	3354	0	10063
32	0	3354	0	3354
33	6708	0	0	6708
34	6708	0	0	6708
35	6708	3354	0	10063
36	0	3354	0	3354
37	0	0	0	0
38	0	3354	0	3354
39	3354	6708	0	10063
40	0	0	0	0
41	0	0	0	0
42	0	6708	0	6708
43	0	0	0	0
44	0	3354	0	3354
45	3354	3354	0	6708
46	0	3354	0	3354
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	3354	0	3354
51	0	0	0	0
52	0	0	0	0
53	0	3354	0	3354
54	0	0	0	0
55	0	3354	0	3354
TOTAL	451542	218667	0	670209
Ind. Sampled				132
Samples				2
Catch (ton)				119

Table 9. Redfish 3O stock Spanish catches length distribution.

Redfish	3M			
Length (cm)	Males	Females	Ind.	Total
15	2894	0	0	2894
16	2099	8319	0	10417
17	304900	174974	0	479874
18	1807514	1047742	0	2855256
19	1805217	1764539	0	3569756
20	654651	1493247	0	2147899
21	369924	387075	0	756999
22	188503	187995	0	376498
23	346002	242499	0	588500
24	200770	303671	0	504441
25	159217	427057	0	586273
26	52431	304981	0	357412
27	12300	147012	0	159312
28	14639	137949	0	152588
29	5809	66765	0	72574
30	886	36905	0	37791
31	0	26990	0	26990
32	0	10019	0	10019
33	0	6709	0	6709
34	0	4923	0	4923
35	0	6709	0	6709
36	0	886	0	886
37				
38				
39				
40				
TOTAL	5927756	6786080	0	12713836
Ind. Sampled				1455
Samples				11
Catch (ton)				1408

Table 10. American plaice 3LNO stock Spanish catches length distribution.

American Plaice Length (cm)	Division 3LNO			Total
	Males	Females	Ind.	
10				
11	0	0	0	0
12	0	0	0	0
13	702	0	0	702
14	0	702	0	702
15	0	0	0	0
16	439	0	0	439
17	2985	172	0	3156
18	5687	1659	0	7347
19	1733	515	0	2248
20	687	1046	0	1733
21	1393	702	554	2649
22	782	681	0	1463
23	3705	259	0	3964
24	12266	1118	0	13384
25	8464	7193	0	15657
26	41277	8487	0	49764
27	60789	16497	0	77286
28	52197	23287	0	75485
29	51573	26996	0	78569
30	48654	49591	0	98245
31	40682	42362	0	83044
32	37496	37880	0	75376
33	22475	26245	0	48721
34	32580	13920	0	46500
35	12914	17234	0	30149
36	7186	18307	0	25493
37	9772	17839	0	27611
38	5130	15113	0	20243
39	7673	18850	0	26523
40	3171	26815	0	29986
41	5025	29812	0	34837
42	3223	21253	0	24476
43	1912	28285	0	30197
44	2738	24398	0	27137
45	1411	21728	0	23139
46	1704	17343	0	19047
47	1325	14352	0	15677
48	474	14899	0	15373
49	281	5770	0	6052
50	753	7802	0	8554
51	170	7687	0	7857
52	39	9990	0	10028
53	285	6625	0	6911
54	198	13291	0	13489
55	132	10046	0	10178
56	268	12997	0	13264

57	39	14292	0	14331
58	364	14414	0	14778
59	39	11260	0	11299
60	39	12261	0	12299
61	0	4846	0	4846
62	39	2825	0	2864
63	0	4159	0	4159
64	0	3913	0	3913
65	0	1510	0	1510
66	0	2450	0	2450
67	0	371	0	371
68	0	1336	0	1336
69	0	833	0	833
70	0	483	0	483
71	0	244	0	244
72	0	42	0	42
73	0	116	0	116
74	0	0	0	0
75	0	0	0	0
76	0	244	0	244
Total	492869	695351	554	1188773

Ind. Sampled	4254
Samples	35
Catch (ton)	592

Table 11. Witch flounder Spanish catches length distribution for Div. 3NO.

Witch flounder Length (cm)	3NO			Total
	Males	Females	Ind.	
24	3095	0	0	3095
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	5596	0	0	5596
31	0	0	0	0
32	389	0	0	389
33	389	0	0	389
34	6228	0	0	6228
35	816	3172	0	3988
36	11266	0	0	11266
37	32786	6266	0	39053
38	41818	7808	0	49626
39	22899	2951	0	25850
40	39368	3249	0	42616
41	61814	9234	0	71048
42	46902	43755	0	90657
43	12397	12756	0	25153
44	5985	11658	0	17643
45	11581	14676	0	26257
46	389	12359	0	12747
47	3872	466	0	4338
48	0	3133	0	3133
49	0	38	0	38
50	0	5596	0	5596
51	0	0	0	0
52	0	38	0	38
53	0	5596	0	5596
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
TOTAL	307590	142751	0	450341
Ind. Sampled				199
Samples				5
Catch (ton)				191

Table 12. Yellowtail flounder Spanish catches length distribution for Div. 3LNO.

Yellowtail flounder Length (cm)	3LNO			Total
	Males	Females	Ind.	
18	0	906	0	906
19	0	0	0	0
20	0	623	0	623
21	98	0	0	98
22	1677	91	0	1768
23	1774	800	0	2574
24	1246	91	0	1337
25	0	1879	0	1879
26	5496	4942	0	10438
27	7440	12020	0	19460
28	13310	8058	0	21368
29	22253	14636	0	36889
30	17284	15383	0	32667
31	13583	23172	0	36755
32	24127	28160	0	52287
33	26149	27220	0	53369
34	26953	37131	0	64084
35	16417	54663	0	71080
36	11184	65395	0	76579
37	6327	56385	0	62712
38	14886	44490	0	59376
39	7130	38832	0	45962
40	7957	31301	0	39258
41	6814	29495	0	36309
42	5137	24789	0	29926
43	2303	22661	0	24964
44	3068	14506	0	17575
45	623	16772	0	17395
46	32	8758	0	8790
47	0	10318	0	10318
48	2335	7837	0	10172
49	0	2335	0	2335
50	32	1822	0	1854
51	0	420	0	420
52	0	11	0	11
53	0	11	0	11
54	0	0	0	0
55	0	0	0	0
Total	245637	605913	0	851550
Ind. Sampled				1484
Samples				15
Catch (ton)				381

Table 13. Greenland halibut Spanish catches length distribution for Div. 3L and 3M.

Greenland halibut Length (cm)	3L				3M			
	Males	Females	Ind.	Total	Males	Females	Ind.	Total
25				0				0
26				0				0
27	492	0	0	492	0	0	0	0
28	0	526	0	526	0	0	0	0
29	854	498	0	1352	0	0	0	0
30	908	0	0	908	0	0	0	0
31	1017	1346	0	2363	0	0	0	0
32	1931	2397	0	4328	0	0	0	0
33	4699	3492	0	8191	494	0	0	494
34	7754	5018	0	12773	0	0	0	0
35	9405	7496	0	16901	267	188	0	454
36	13133	11433	0	24566	0	267	0	267
37	15317	13981	0	29298	188	2083	0	2270
38	24395	22584	0	46978	0	1090	0	1090
39	28402	32103	0	60505	673	1294	0	1967
40	39629	46726	0	86355	1253	1105	0	2358
41	44096	62704	0	106800	4918	6107	0	11025
42	65998	80455	0	146453	4982	10239	0	15221
43	60441	89818	0	150259	4084	8554	0	12639
44	68794	125001	0	193795	3058	13369	0	16427
45	63801	110446	0	174247	11067	15204	0	26271
46	86611	141276	0	227887	13502	13300	0	26802
47	87002	156887	0	243889	15583	18691	0	34273
48	96966	175005	0	271971	22782	29444	0	52225
49	86338	188763	0	275100	16298	24348	0	40645
50	77780	155469	0	233248	19258	30950	0	50209
51	54690	173855	0	228545	19314	36531	0	55845
52	42997	153778	0	196775	18815	37130	0	55945
53	29144	142662	0	171806	11101	34813	0	45914
54	24574	111181	0	135756	13539	38075	0	51614
55	16531	93288	0	109818	12095	45839	0	57934
56	8855	74224	0	83079	5315	35673	0	40987
57	7750	49607	0	57356	3070	33540	0	36609
58	6843	48365	0	55208	1394	28589	0	29983
59	6373	44815	0	51187	267	30892	0	31159
60	4732	33324	0	38056	0	27050	0	27050
61	2572	17356	0	19928	3136	17962	0	21098
62	3565	18156	0	21722	1048	12925	0	13973
63	2352	15493	0	17844	267	11152	0	11418
64	661	12029	0	12690	0	11788	0	11788
65	0	9560	0	9560	0	6459	0	6459
66	0	5785	0	5785	0	8306	0	8306
67	0	4380	0	4380	0	10302	0	10302
68	313	7264	0	7577	0	4739	0	4739
69	190	7520	0	7710	0	3492	0	3492

70	0	3820	0	3820	0	2549	0	2549
71	4825	2933	0	7758	0	1758	0	1758
72	0	2175	0	2175	0	681	0	681
73	0	3472	0	3472	0	1995	0	1995
74	0	533	0	533	0	188	0	188
75	0	0	0	0	0	407	0	407
76	0	0	0	0	0	712	0	712
77	0	0	0	0	0	1314	0	1314
78	0	135	0	135	0	782	0	782
79	0	377	0	377	0	828	0	828
80	0	667	0	667	0	0	0	0
81	0	246	0	246	0	188	0	188
82	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0
85	0	246	0	246	0	0	0	0
86	0	246	0	246	0	0	0	0
87	0	0	0	0	0	493	0	493
88	0	0	0	0	0	188	0	188
89	0	246	0	246	0	0	0	0
90				0				0
Total	1102731	2471162	0	3572875	207764	623568	0	831332
Ind. Sampled				9497				1751
Samples				53				11
Catch (ton)				3391				1128

Table 14. Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches length distribution.

Greenland halibut Length (cm)	3LMNO			Total
	Males	Females	Ind.	
25	0	0	0	0
26	0	0	0	0
27	534	0	0	534
28	0	571	0	571
29	927	540	0	1467
30	985	0	0	985
31	1103	1460	0	2563
32	2095	2600	0	4695
33	5633	3788	0	9421
34	8411	5444	0	13855
35	10491	8335	0	18826
36	14246	12691	0	26937
37	16819	17425	0	34244
38	26462	25681	0	52143
39	31539	36227	0	67766
40	44347	51885	0	96232
41	53168	74643	0	127811
42	76996	98380	0	175376
43	69994	106710	0	176704
44	77941	150098	0	228039
45	81214	136299	0	217513
46	108598	167677	0	276274
47	111279	190458	0	301737
48	129897	221776	0	351673
49	111334	231172	0	342506
50	105263	202218	0	307481
51	80276	228217	0	308493
52	67051	207088	0	274138
53	43656	192517	0	236173
54	41343	161906	0	203250
55	31052	150918	0	181970
56	15371	119211	0	134581
57	11736	90193	0	101929
58	8935	83477	0	92412
59	7202	82123	0	89325
60	5133	65491	0	70624
61	6192	38311	0	44503
62	5004	33716	0	38720
63	2840	28902	0	31742
64	717	25836	0	26553
65	0	17377	0	17377
66	0	15285	0	15285
67	0	15926	0	15926
68	340	13020	0	13359
69	206	11945	0	12151
70	0	6908	0	6908
71	5234	5089	0	10323

72	0	3099	0	3099
73	0	5930	0	5930
74	0	781	0	781
75	0	441	0	441
76	0	772	0	772
77	0	1425	0	1425
78	0	995	0	995
79	0	1308	0	1308
80	0	724	0	724
81	0	471	0	471
82	0	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	267	0	267
86	0	267	0	267
87	0	534	0	534
88	0	203	0	203
89	0	267	0	267
90	0	0	0	0
Total	1421563	3357019	0	4778582

Ind. Sampled	11298
Samples	65
Catch (ton)	4902

Table 15. Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches ages distribution, mean weight (g) and mean length (cm) by age.

Abundance				Mean Weight (g)			
Age	Males	Females	Total	Age	Males	Females	Total
1				1			
2				2			
3	534	571	1104	3	146	170	158
4	11594	14560	26154	4	298	377	342
5	170705	229177	399882	5	502	538	523
6	510121	796001	1306122	6	717	764	746
7	568778	1384570	1953348	7	1038	1129	1102
8	114116	448762	562878	8	1330	1448	1424
9	9768	162254	172023	9	1827	1691	1698
10	22972	170876	193848	10	1756	1997	1969
11	6801	66036	72837	11	2088	2366	2340
12	1438	44768	46206	12	2800	2719	2722
13	2990	16300	19290	13	3266	2935	2986
14	1163	12534	13698	14	3274	3403	3392
15		6088	6088	15		3860	3860
16	582	2765	3346	16	3274	4421	4221
17		1121	1121	17		5888	5888
18		369	369	18		6774	6774
19		267	267	19		6360	6360
20+				20+			

Mean Length (cm)			
Age	Males	Females	Total
1			
2			
3	28	28.5	28.0
4	34	36.2	35.2
5	40	40.5	40.3
6	45	45.3	45.0
7	50	51.1	50.8
8	54	55.3	55.0
9	60	58.0	58.1
10	59	61.1	60.8
11	62	64.3	64.1
12	68	67.2	67.2
13	71	68.8	69.2
14	72	72.0	71.9
15		74.9	74.9
16	72	78.0	76.9
17		85.3	85.3
18		89.2	89.2
19		87.5	87.5
20+			

Table 16. Skates Spanish catches length distribution for Div. 3LNO.

Skates Length (cm)	3LNO			Total
	Males	Females	Ind.	
21	0	0	0	0
22	0	374	0	374
23	0	0	0	0
24	0	0	0	0
25	0	236	0	236
26	0	234	0	234
27	0	0	0	0
28	546	106	0	652
29	234	234	0	468
30	1585	0	0	1585
31	0	2682	0	2682
32	742	1315	0	2057
33	2474	2207	0	4681
34	3322	2773	0	6095
35	12265	9550	0	21815
36	15755	18150	0	33905
37	17356	8472	0	25828
38	16941	11414	0	28354
39	19396	28584	0	47980
40	29581	33645	0	63226
41	21341	35305	0	56646
42	26473	26252	0	52725
43	38677	46685	0	85362
44	31765	35141	0	66906
45	33875	37629	0	71504
46	26502	32692	0	59194
47	37274	49679	0	86953
48	33436	38357	0	71793
49	41950	42450	0	84400
50	37205	44174	0	81379
51	46891	36201	0	83092
52	31834	39012	0	70847
53	23154	32884	0	56038
54	24670	37976	0	62646
55	24882	41472	0	66354
56	25546	36645	0	62191
57	26155	51230	0	77384
58	23914	38980	0	62894
59	27905	40501	0	68405
60	25922	21009	0	46931
61	19023	25905	0	44928
62	13865	30908	0	44773
63	27051	31626	0	58677
64	32001	43833	0	75835
65	31629	35275	0	66903
66	28535	24397	0	52932
67	26501	19985	0	46486

68	29134	35848	0	64982
69	15211	32810	0	48021
70	46528	33377	0	79905
71	29190	29571	0	58761
72	26565	29503	0	56068
73	32996	36498	0	69493
74	31749	15705	0	47453
75	21347	16030	0	37377
76	23311	12926	0	36237
77	18520	7439	0	25959
78	21543	8515	0	30058
79	32069	4328	0	36397
80	16979	7383	0	24363
81	15454	10190	0	25644
82	21895	5944	0	27839
83	17905	4458	0	22363
84	13443	2943	0	16386
85	9393	4344	0	13737
86	4835	615	0	5451
87	1600	0	0	1600
88	4029	0	0	4029
89	0	0	0	0
90	0	0	0	0
91	113	0	0	113
92	265	0	0	265
93	0	0	0	0
94	0	2176	0	2176
95	342	0	0	342
Total	1342590	1396783	0	2739373

Ind. Sampled	6236
Samples	38
Catch (ton)	5640

Table 17. Roughhead grenadier Spanish catches length distribution measured as preanal fin lengths (AFL) for Divisions 3LMNO.

Roughhead G. Length (cm)	3LMNO			Total
	Males	Females	Ind.	
7	0	0	0	0
8	0	0	0	0
9	1341	2937	0	4278
10	3195	6561	0	9757
11	5781	10202	0	15984
12	11489	24248	0	35737
13	19236	39251	0	58487
14	26973	41143	0	68115
15	30891	56185	0	87077
16	25585	44605	0	70190
17	19593	32728	0	52321
18	26832	46728	0	73559
19	22250	31088	0	53337
20	5752	21447	0	27199
21	3770	9811	0	13581
22	5024	16480	0	21504
23	1532	10526	0	12058
24	1337	12452	0	13788
25	1867	15346	0	17213
26	670	18317	0	18987
27	557	11611	0	12168
28	670	10857	0	11527
29	670	7115	0	7786
30	670	7096	0	7767
31	0	5687	0	5687
32	0	7564	0	7564
33	0	3373	0	3373
34	0	2919	0	2919
35	0	4172	0	4172
36	0	0	0	0
37	0	1117	0	1117
38	0	195	0	195
39	0	0	0	0
40	0	0	0	0
Total	215688	501761	0	717449
Ind. Sampled				1200
Samples				11
Catch (ton)				410

Table 18. Roughhead grenadier Div. 3LMNO Spanish catches ages distribution, mean weight (g) and mean length (AFL cm) by age.

Abundance				Mean Weight (g)			
Age	Males	Females	Total	Age	Males	Females	Total
3	0	823	823	3		77	77
4	2026	5718	7744	4	92	103	100
5	5831	9543	15375	5	159	160	160
6	24885	53141	78026	6	192	198	196
7	38191	58958	97149	7	282	269	274
8	52937	118668	171605	8	390	394	393
9	33310	42440	75750	9	466	545	510
10	18402	23241	41642	10	549	658	610
11	11565	36551	48116	11	669	800	769
12	8131	23698	31829	12	892	1118	1060
13	5560	28108	33668	13	1017	1341	1288
14	2565	23753	26318	14	1343	1569	1547
15	701	10786	11487	15	1641	1630	1630
16	682	9895	10577	16	1749	1926	1915
17	278	8314	8592	17	2052	2314	2306
18	80	3726	3806	18	2235	2452	2447
19	195	7467	7662	19	1978	2590	2574
20	40	3407	3447	20	2235	2840	2833
21	0	4249	4249	21		3467	3467
22	0	454	454	22		3467	3467
23	0	2597	2597	23		3120	3120
24	0	1903	1903	24		2872	2872

Mean Length (AFL cm)			
Age	Males	Females	Total
3		9.5	9.5
4	10.1	10.5	10.4
5	12.1	12.1	12.1
6	13.0	13.1	13.1
7	14.8	14.6	14.7
8	16.5	16.6	16.6
9	17.7	18.7	18.2
10	18.7	19.9	19.3
11	20.0	21.2	20.9
12	22.0	23.8	23.3
13	23.0	25.4	25.0
14	25.4	26.9	26.8
15	27.2	27.2	27.2
16	27.9	28.9	28.8
17	29.6	30.7	30.7
18	30.5	31.5	31.4
19	29.2	31.9	31.9
20	30.5	33.1	33.0
21		35.4	35.4
22		35.5	35.5
23		34.1	34.1
24		33.2	33.2

Table 19. Total biomass (t.) of the Spanish 3L Survey (inside Canadian Waters) in 2009, calculated by the swept area method, by species and stratum. (R/V “*Vizconde de Eza*”).

Stratum	Area (sq. Miles)	Area inside EEZ	Greenland Halibut	Redfish	Roughhead Grenadier	Witch Flounder	American Plaice	Cod	Thorny Skate	Northern Shrimp
368	334	334	769	58037	1550	0	48	209	218	5179
387	718	462	996	7912	1553	76	130	272	534	12692
733	468	234	970	3216	420	166	12	0	656	1451
734	228	75	518	411	389	43	0	0	0	3
735	272	272	1164	13281	942	240	0	0	371	19
736	175	175	1961	263	374	466	0	0	71	1
737	227	227	2062	0	550	3	0	0	21	0
738	221	221	658	0	1263	0	0	0	0	0
739	254	254	576	0	1414	0	0	0	0	0
740	264	264	466	0	1439	0	0	0	0	0
741	223	123	680	7	474	0	0	0	0	1
742	206	142	832	0	215	0	0	0	0	0
743	211	160	623	0	464	0	0	0	0	0
744	280	214	1440	0	1179	0	0	0	0	0
Total	4081	3157	13715	83126	12226	994	190	481	1871	19345

Table 20. Summary of all the activities carried out during the NEREIDA 2009 surveys. It also shows the total prospected area in square kilometres.

	Box-Corer		Rock-Dredge		CTD	Geology	Prospected Area (km ²)
	Valid	Null	Valid	Null			
1 st Survey NEREIDA 0509	43	5	18*	6**	62	171 lines (112 multibeam + 59 transits)	12114
	48		24				
2 nd Survey NEREIDA 0609	57	11	16	4	76	160 lines (109 multibeam + 51 transits)	15227
	68		20				
3 rd Survey NEREIDA 0709	59	5	15	1	78	179 lines (135 multibeam + 44 transits)	10965
	64		16				
TOTAL	180		60		216	510 lines	38306

* 7 Scallop gear

** 1 Scallop gear

Table 21. *Beryx splendens* catches length distribution in Division 6G.

<i>Beryx splendens</i>	6G			
Length (cm)	Males	Females	Ind.	Total
25				0
26	88	88	0	177
27	0	88	0	88
28	0	318	0	318
29	0	90	0	90
30	117	0	0	117
31	119	74	0	193
32	164	991	0	1155
33	2075	207	0	2282
34	5044	2346	0	7391
35	10264	5413	0	15677
36	25939	8883	0	34823
37	30731	13000	0	43731
38	40401	19106	0	59507
39	33793	25555	0	59349
40	34391	21893	0	56284
41	39701	29763	0	69464
42	30295	28038	0	58333
43	20869	29559	0	50428
44	15819	21958	0	37777
45	12693	18534	0	31228
46	9971	13243	0	23215
47	4862	6893	0	11754
48	4059	6272	0	10331
49	1697	2976	0	4672
50	586	2727	0	3313
51	1631	824	0	2456
52	31	476	0	508
53	0	816	0	816
54	0	88	0	88
55	0	0	0	0
56	0	991	0	991
TOTAL	17872	9617	0	27488
Ind. Sampled				3127
Samples				31
Catch (ton)				474

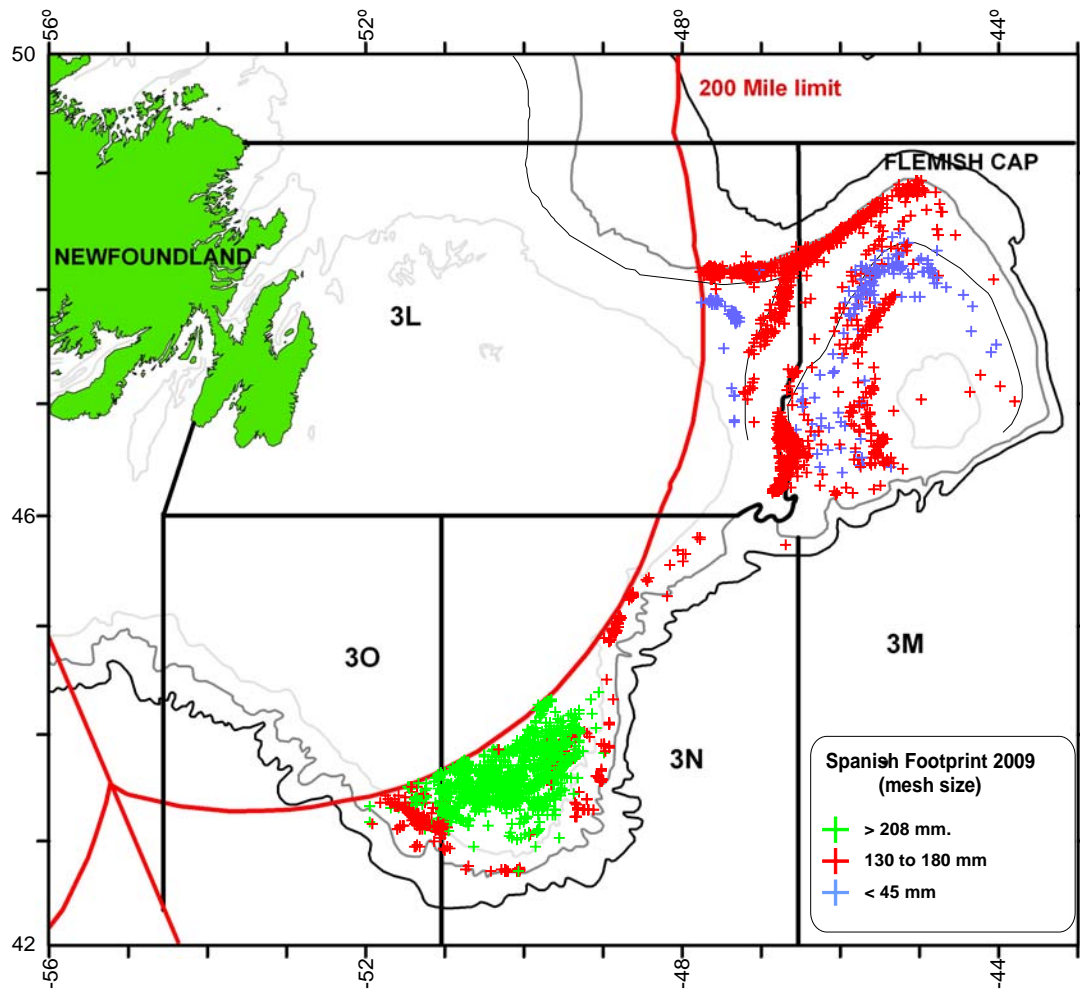


Figure 1. Spanish Fishery 2009 footprint by mesh size based in NAFO Observers data.

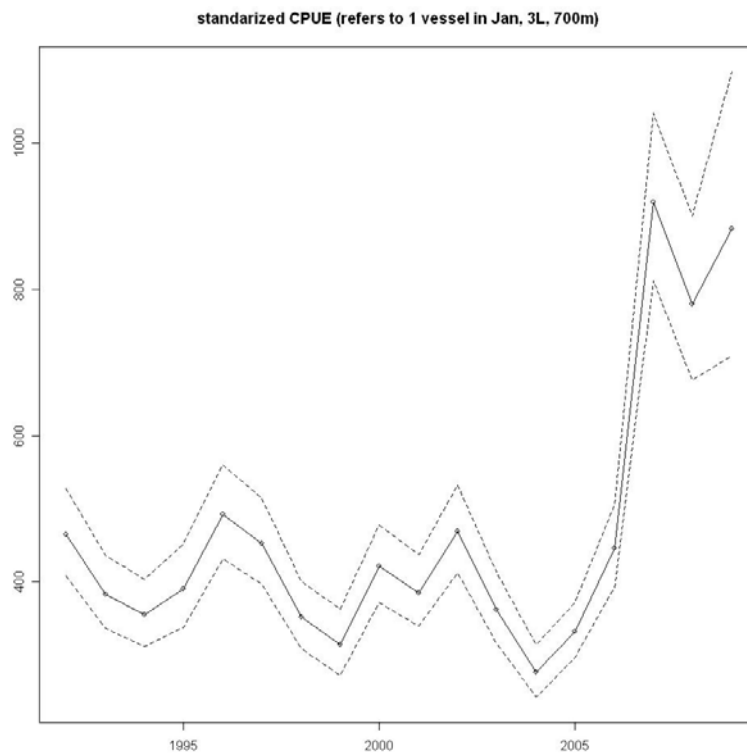


Figure 2. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2009 data.

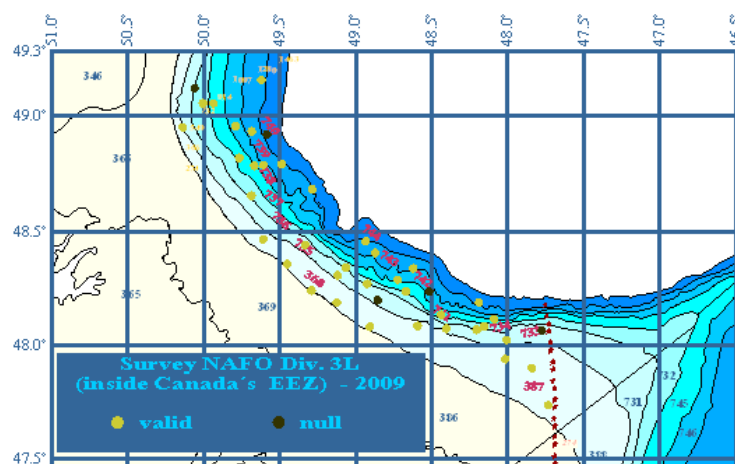


Figure 3. Haul positions made of the Spanish 3L Survey (inside Canadian Waters) in 2009. (R/V "Vizconde de Eza").