

**SCIENTIFIC COUNCIL MEETING – JUNE 2019****Spanish Research Report for 2018**

by

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Spanish catch and effort information used in this Report is based on the preliminary logbook data contributed by the Spanish Administration. The logbooks information for 2018 was available haul by haul. Table 1 presents the preliminary Spanish catches by species and Division in 2018 in NAFO Regulatory Area. Total effort of the Spanish fleet in 2018 was 1,082 fishing days.

In 2018, IEO scientific observers were on board 279 fishing days that it means 26 % of the Spanish total effort. All length, age and biological information presented in this paper is based on sampling carried out by IEO scientific observers. In 2018, 425 samples were taken with 44,499 individuals of different species examined (Table 2).

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

A total of 10 Spanish trawlers operated in Div. 3LMNO NAFO Regulatory Area (NRA) during 2018, amounting to 1,074 days (16,608 hours) of fishing effort. Table 3 presents the Spanish effort (fishing hours) since 2003 in NRA Subarea 3. Total catches (Table 1) for all species combined in Div. 3LMNO were 16,674 tons.

Table 4 shows the effort (hours) by quarter and Division. This year it has not been possible to analyze the distribution by depth strata due to the lack of depth information in many records of the Logbooks. Table 5 presents the effort by Division, quarter and mesh size.

These effort tables show that the Spanish fleet carry out different directed fisheries in NAFO Subarea 3 characterized by different mesh size, target species, depth and fishing area: 1) In Divisions 3LMNO at more than 600 meters depth with demersal 130 mm mesh size gear with Greenland halibut as target species. 2) In Divisions 3LMNO, mainly in Div 3O and 3M with demersal 130 mm mesh size gear in the 200-600 strata. The target species is the redfish. 3) In Divisions 3NO with 280 mm mesh size at less than 200 meters depth. The target species is the skates. 4) In Division 3M at depth between 150-550 meters targeting cod with 130 mm mesh size gear. In 2018 there was a directed fishery targeted squid in Div. 3O with a 60 mm mesh size trawl gear.

Effort and fisheries by Division. Based on the information on the distribution of the effort by depth of previous years and on the information presented in tables 4 and 5 with data from 2018, it was possible to conclude the following: In Div. 3L, most of the effort was performed at more than 600 meters depth using cod-end mesh size of 130 mm, indicating that the fleet targeted Greenland halibut. Regarding Div. 3M, around the half of effort was carried out using 130 mm cod-end mesh size at less than 600 m depth targeting redfish and cod and the other half at depths more than 600 m targeting Greenland halibut. In Div. 3N, the effort carried out using 280 mm



was the 59% and with 135 mm cod-end mesh size was 41%, which indicates that the fleet targeted mainly skate in depth less than 200 m., redfish in 200-600 meters depth and Greenland halibut in depth more than 600 m. Fishing effort in Div. 30 was around the 19% of the 3LMNO total effort targeting skates using mainly 280 mm mesh size in depth less than 200 meters and redfish in depth between 200-600 meters using 135 mm mesh size. To remark that in 2018 there was a directed fishery targeted squid in Div. 30 in 400-100 meters depth with a 60 mm mesh size trawl gear.

In addition to NAFO observers (NAFO Observers Program), 8 IEO scientific observers were onboard Spanish vessels, comprising a total of 279 observed fishing days, around 26% 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, American plaice and cod this includes recording weight at length, sex-ratio, maturity stages, performing stomach contents analyses and collecting material for reproductive studies. Otoliths of these four species were also taken for age determination. In 2018, 425 length samples were taken, with 44,499 individuals of different species examined to obtain the length distributions (Table 2). Length and age distributions presented in this paper are based on sampling carried out by these observers. Length-weight relationships parameters used to calculate the Sum Of Products (SOP) of the length distribution are shown by species and stocks in Table 6. These relationships were estimated based on the data collected by the IEO scientific observers and the European Union surveys information carried out in 2018 in the NAFO Regulatory Area (NRA).

The Spanish activity en the NRA Subarea 3 in 2018, stock by stock, was the following:

Cod (*Gadus morhua*)

Div. 3L: In Div. 3L, the few catches of this species (1 tons) were taken as by-catch in the redfish fishery. There were no sample length distributions of this species in this Division.

Div. 3NO: The most important part of the catches of this species was taken as by-catch in the skate fishery and in less degree in the redfish fishery. Table 7 shows the catch length distribution for Div. 3NO cod. The size distributions present a maximum around 47 cm and most of the exemplars are in the 34-65 cm range.

Div. 3M: Catches in Div. 3M were 767 tons and most of them were taken in the direct fishery. In 2018 only trawlers operated in this fishery. A small part was taken as by catch of the redfish fishery. The legal mesh size of the Cod fishery is 130 mm and the minimum landing size (MLZ) 41 cm. The total length distributions of the Spanish catches are presented in Table 8 and we can observe that most of the catches length distributions are in the 60-90 cm range. The mode in 2018 was around 71 cm. Highlight that practically all the captured specimens are larger than MLZ and most of the individuals bigger than 75 cm were females.

Redfish (*Sebastes mestella* and *Sebastes fasciatus*)

3M: In Div. 3M the redfish catches in 2018 have been 3062 tons and most of them were catch in a direct fishery and a small part of them was taken as by-catch in the cod fishery. Table 9 shows the Spanish catches length distribution for redfish Division 3M and it can be observed that the bulk of the catches are in the 26-35 cm range, quite similar to the range observed in previous years. This length distribution of catches in Div. 3M are bigger than the observed in Div 30.

Div. 3LN: Spanish catches were 400 tons. Most of the catches were taken in a direct fishery for this stock. Table 10 shows the Spanish catches length distribution for redfish Division 3LN and it can be observed that the bulk of the catches are in the 21-30 cm range.

Div. 30: A directed fishery for this species took place in Div. 30. Catches have reached 2013 tons in this Division, most of them with 130 mm mesh size. Catches length distribution for Div. 30 are presented in Table 11 and it can be observed that are smaller (21-28 cm) than the observed in Div. 3M.

American plaice (*Hippoglossoides platessoides*)

Div. 3LNO: Spanish catches in 2018 in Div. 3LNO were 185 tons. Most of the catches were taken with 280 mm mesh size (123 tons) as by-catch of the skate fishery and in less degree with 130 mm mesh size (62 tons). Length distributions with 280 mm mesh size have a bigger length range the 130 mm mesh size. Table 12 presents the total length distribution for Div. 3LNO. It can be observed a clear different length between sexes, males are smaller than females. The bulk of catches were in the range of 28-47 cm.

Div. 3M: Catches in Div. 3M only amounted 14 tons and most of them were taken as by-catch of the cod and redfish fisheries. There were no available sample length distributions of this species in this Division.

Witch flounder (*Gluctocephalus cynoglossus*)

Div. 2J and 3KL: Spanish catches for this stock in 2018 were 28 tons and were taken in the small part of NAFO Regulatory Area (NRA) of Div. 3L as by catch of the Greenland halibut and redfish fishery. Table 13 shows the total Spanish length distribution for this species based only in one sample of 90 individuals. The bulk of catches were in the range of 35-50 cm. This length range is a little bigger than the observed in previous years. As in the American plaice case, this species presents a clear different length distribution between sexes, males are smaller than females.

Div. 3M: This species in this Division was taken as by-catch in the Cod and redfish fishery. Catches this year were 102 tons and there is not management stock for this species in this Division. In 2018, there were no available sample length distributions of this species in this Division.

Div. 3NO: Spanish catches for this stock in 2018 were 28 tons. Most of the catches were taken with 130 mm cod end gear in a direct fishery and as by-catch of the Redfish and Greenland halibut fisheries (23 tons) and in less degree in the skate fishery (5 tons) with 280 mm cod end gear. Table 14 shows the total Spanish length distribution for this species. The bulk of catches were in the range of 35-50 cm. Females are bigger than males in the catches.

Yellowtail flounder (*Limanda ferruginea*)

Div. 3LNO: In 2018 the yellowtail flounder Spanish catches were 284 tons. Most of the catches were taken in Div. 3NO in the skate fishery (261 tons) as by-catch. Length distributions for yellowtail flounder in Div. 3LNO are presented in Table 15. Most of the catches are in the 20-41 cm length range. Females are bigger than males in the catches.

Greenland halibut (*Reinhardtius hippoglossoides*)

Subareas 2 and Div. 3KLMNO: Greenland halibut continues to be one of the main target species for the Spanish fleet in NAFO area. In 2018 Spanish catches were 5,930 tons; most of them have been taken in the Flemish Pass area (Div. 3LM) at depths more than 700 m. The mesh size used for this fishery was equal or greater than 130 mm. Table 16 shows the length distributions of Spanish catches by Division (3L, 3M, 3N and 3O) and the total length distributions of Spanish catches in Divisions 3LMNO. Most of the catches were in the 36-66 cm length range and the mode of the length distribution was in 47-56 cm. Total age composition based in the commercial Spanish Age Length Key (Table 22), mean weight and mean length at age for Div. 3LMNO are presented in Table 17. Most of the Greenland halibut catches corresponds to ages 5 to 10 with a peak at ages 6-7. This age catch age distribution is similar to the last years.

Figure 1 presents the Spanish fleet standardised CPUE updated with the 2018 data presented by Gonzalez-Costas and Gonzalez-Troncoso (2009). It can be observed three different periods with different CPUE levels. In these three periods, CPUEs have been increasing, with the last period having the highest CPUE values of the whole series analyzed. To note that in 2018 there has been a decrease in CPUE with respect to the maximum observed in the 2016-2017 period.

Thorny skate (*Amblyraja radiata*)

Commercial catches of skates comprise a mix of skate species (*Amblyraja radiata*, *Bathyraja spinicauda*, *Raja hyperborean*, *Raja senta*, etc). Thus the catch of skate in Table 1 refers to *Raja* spp. However, thorny skate dominates, comprising about 90% of the skate taken in the Spanish catches base on 2014-2016 data from the EU Spanish 3NO Survey.

Div. 3LNO: Spanish skate catches in 2018 were 2,350 tons. Most of the catches were taken in Div. 3N at depths less than 200 meters, where a fishery directed to thorny skate took place using 280 mm mesh size. Skate catches in Div. 3L (24 tons) were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut and redfish fisheries (130 mm cod-end). Table 18 shows the total catches length distributions by sex of Div. 3LNO, all catches length samples were with 280 mm mesh size and they were taken in Division 3NO. Most of

the catches were in the 33-84 cm length range, similar to years before. It can be observed a clear different length between sexes, males are bigger than females.

Div. 3M: Skate catches in Div. 3M (27 tons) were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut, redfish and cod fisheries. There is not available catches length distributions for this species in Division 3M.

Roughhead grenadier (*Macrourus berglax*)

Subarea 2 and 3: Roughhead grenadier is the main species taken as by-catch in the Greenland halibut fishery. Most of the 2018 catches and most 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) to the half centimetre below. Spanish catches in 2018 were 97 tons. Table 19 shows the AFL length distributions, grouping in 1 cm intervals, of Spanish catches for Div. 3LMNO. Most of the catches were in the 10-21 AFL length range, with a mode in 15 cm and a clear length difference between sexes, males are smaller than females.

Age distributions based on the Spanish commercial Age Length Key (Table 23), mean weight and mean length (AFL) at age of the total catch for Div. 3LMNO are presented in Table 20. Most of the Roughhead grenadier catches in 2018 were based on ages 4 to 10 with a mode in 5-6 years old. This age distribution is smaller than the observed in the previous years where the mode was around 8-10 years old.

White hake (*Urophycis tenuis*)

Div. 3NO: Catches of this species in 2018 in Div 3NO (62 tons) were a small by-catch of different fisheries. In Division 3NO a small part of the catches (2 tons) were taken with the 280 mesh size. Catches in Div. 3NO take with 130 mm mesh size (60 tons) are by-catch of the redfish fishery. Table 21 shows the total catches length distributions by sex of Div. 3NO. It was only available two length distribution sample with a small number of measured individuals. Due to this problem, this sample could not be very representative of the catches distributions. Most of the catches were in the 19-50 cm length range.

Capelin (*Mallotus villosus*)

Div. 3NO: Catches of this species are occasional. In 2018 there is no record of capelin catches by the Spanish fleet.

(B) Research studies

The Spanish bottom trawl survey in NAFO Regulatory Area Div. 3NO was conducted from 25th of May to the 23rd of June 2018 on board the R/V Vizconde de Eza. The gear was a Campelen otter trawl with 20 mm mesh size in the cod-end. Following the method used last year, a total of 114 valid hauls were taken within a depth range of 47-1410 m according to a stratified random design. A hydrographic profile was casted in each fishing station. Furthermore, a stratified sampling by length class and sex was used to sample otoliths of Atlantic cod, American plaice and Greenland halibut for growth studies. Also, gonads of Atlantic cod were sampled from histological maturity and fecundity studies. The results of this 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, redfish, witch flounder, roughhead grenadier, thorny skate and white hake are presented as Scientific Council Research Documents. In addition, age distributions are presented for Greenland halibut and Atlantic cod.

In 2003 it was decided to extend the Spanish 3NO survey toward Div. 3L (Flemish Pass). In 2018, 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 30th to August 19th. 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 101 and one 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 18/063. Samples for histological (cod) and aging (Greenland

halibut, American plaice, roughhead grenadier and cod) studies were taken. One hundred hydrographic profile samplings were made in a depth range of 107-1456 m.

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 25th to July 25th 2018. The area surveyed was Flemish Cap Bank to depths up to 800 fathoms (1460 m) following the same procedure as in previous years. The number of hauls was 184 and three of them were null. 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 a Scientific Council Research document. Flemish Cap survey results for Northern shrimp (*Pandalus borealis*) were presented in SCR 18/062. Samples for histological assessment of sexual maturity of cod, redfish, Greenland halibut and roughhead grenadier were taken. Oceanography studies continued to take place.

VME data from the 2018 UE (Spain and Portugal) bottom trawl groundfish surveys in NAFO Regulatory Area (Divs. 3LMNO):

New data on deep-water corals and sponges were presented from the 2018 EU (Spain and Portugal) bottom trawl groundfish surveys. The data was made available to the NAFO WGESA to improve mapping of Vulnerable Marine Ecosystem (VME) species in the NAFO Regulatory Area (Divs. 3LMNO).

“Significant” catches (according to the NAFO definition from groundfish surveys) of deep-water corals and sponges were provided and mapped together with the closed areas. Distribution maps of presence and catches above threshold for RV data of sponges, large gorgonians, small gorgonians and sea pens following the thresholds were presented.

Sponges

For the EU 2018 Data sponges were recorded in 129 of the 397 valid tows (31.7% of the total tows analyzed), with depths ranging between 77 - 1442 m. Significant catches of sponge (≥ 75 kg/tow) were found in three tows. These catches were located in Flemish Pass area inside the KDE sponge polygon. Sponge catches for these tows ranged between 78.65 - 385.35 kg.

Large Gorgonians

For the EU 2018 Data, large gorgonians were recorded in 9 of the 397 valid tows (2.3% of total tows analyzed), with depths ranging between 110 - 1347 m. None of the tows have significant catches of large gorgonians (≥ 0.6 kg/tow).

Small Gorgonians

For the EU 2018 data, small gorgonians were recorded in 44 tows (10.5 % of total tows analyzed), with depths ranging between 331 - 1364 m. Significant catches (> 0.15 kg/tow) were recorded in two tows (0.5% of the total tows) located at the top of closed area 2 in the Flemish Pass and closed area 14 in the eastern part of Flemish Cap, outside of the actual closed areas with depths of 648 and 1152 m.

Sea Pens

For the EU 2018 data, sea pens were recorded in 137 tows (34% of total tows analyzed), with depths ranging between 136 - 1442 m. Significant catches (> 1.4 kg/tow) were recorded in two tows (1.5- 2.6 kg), one located at north of Flemish Cap (723 m - 1.5 kg) and the other located in the southwest part of Flemish Cap (1152 m - 2.6 kg), both of them inside the corresponding VME KDE polygon.

SUBAREA 6

A. Status of the fisheries

One Spanish trawler operated during 2018 in Div. 6G NAFO Regulatory Area using a midwater trawl gear. The fishing effort of this trawler was 8 days (33 hours). The most important species in catches was the *Beryx splendens* (Table 1).

Alfonsino Div. 6G: Catches of this species in 2018 in Div 6G were 3 tons made with a midwater trawl gear. Table 24 shows the total catches length distributions by sex of Div. 6G. Most of the catches were in the 33-43 cm total length range.

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Table 1. Spanish Catches (tons) in NAFO Area in 2018 by species and Division, based on the Logbook data.

Code	English_name	Scientific_name	Provisional STATLANT 21A 2018					Total
			3L	3M	3N	3O	6G	
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	3274	1507	1142	7		5930
RED	Atlantic redfishes nei	<i>Sebastes spp</i>	59	3062	340	2013		5475
SKA	Raja rays nei	<i>Raja spp</i>	24	27	1928	397		2377
COD	Atlantic cod	<i>Gadus morhua</i>	1	767	87	31		886
HKS	Silver hake	<i>Merluccius bilinearis</i>				755		755
YEL	Yellowtail flounder	<i>Limanda ferruginea</i>	0		250	34		284
PLA	American plaice	<i>Hippoglossoides platessoides</i>	9	14	122	54		199
HAL	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	13	14	61	79		167
WIT	Witch flounder	<i>Glyptocephalus cynoglossus</i>	28	102	12	17		158
SQI	Northern shortfin squid	<i>Illex illecebrosus</i>				145		145
RHG	Roughhead grenadier	<i>Macrourus berglax</i>	44	29	25			97
HKW	White hake	<i>Urophycis tenuis</i>	1	6	2	60		67
CAT	Wolffishes (=Catfishes) nei	<i>Anarhichas spp</i>	4	11	40	0		55
RNG	Roundnose grenadier	<i>Coryphaenoides rupestris</i>	2	34	0			36
ANG	American angler	<i>Lophius americanus</i>			1	13		14
MZZ	Diadromous fishes n.e.i.	<i>Osteichthyes</i>	0	1	4	8		13
HKR	Red Hake	<i>Urophycis chuss</i>	3	3	4			10
BYS	Splendid alfonsino	<i>Beryx spp</i>					3	3
HAD	Haddock	<i>Melanogrammus aeglefinus</i>			1	2		3
GPE	Longfin Hake	<i>Phycis chesteri</i>	1	1				2
GDE	Threadfin rockling	<i>Gaidropsarus ensis</i>	1	0				1
OIL	Oilfish	<i>Ruvettus pretiosus</i>					1	1
		Total tons	3464	5577	4019	3614	4	16678

Table 2. Samples and individuals sampled by the IEO Scientific Observers by species, mesh size and NAFO Division in 2018.

Code	Species	English_name	Catch/Disc.	Div.	Mesh size	Samples	Ind.
ANT	<i>Antimora rostrata</i>	Blue antimora	C	3L	130 mm	2	194
BYS	<i>Beryx splendens</i>	Splendid alfonsino	C	6G	OTM	11	761
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3L	130 mm	2	48
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3M	130 mm	1	33
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3N	130 mm	2	129
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3L	130 mm	13	1280
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3M	130 mm	8	734
COD	<i>Gadus morhua</i>	Cod	C	3M	130 mm	9	235
COD	<i>Gadus morhua</i>	Cod	C	3N	130 mm	3	286
COD	<i>Gadus morhua</i>	Cod	C	3O	130 mm	2	64
COD	<i>Gadus morhua</i>	Cod	C	3N	280 mm	2	5
COD	<i>Gadus morhua</i>	Cod	C	3O	280 mm	2	14
GDE	<i>Gaidropsarus ensis</i>	Threadfin rockling	C	3L	130 mm	2	89
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3L	130 mm	1	90
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	130 mm	3	218
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3O	130 mm	9	883
HAL	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	130 mm	4	366
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	130 mm	11	1059
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	280 mm	8	540
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	280 mm	3	277
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	280 mm	9	963
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3L	130 mm	30	3230
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3M	130 mm	21	2134
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3N	130 mm	6	576
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3O	130 mm	8	968
NZB	<i>Nezumia bairdi</i>	Marlin-spike grenadier	C	3L	130 mm	2	119
NZB	<i>Nezumia bairdi</i>	Marlin-spike grenadier	C	3M	130 mm	1	55
NZB	<i>Nezumia bairdi</i>	Marlin-spike grenadier	C	3O	130 mm	1	33
RJR	<i>Raja radiata</i>	Starry ray	C	3O	130 mm	1	62
RJR	<i>Raja radiata</i>	Starry ray	C	3N	280 mm	31	4057
RJR	<i>Raja radiata</i>	Starry ray	C	3O	280 mm	4	277

GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3L	130 mm	75	8491
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3M	130 mm	35	4138
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3N	130 mm	11	1232
RED	<i>Sebastes spp</i>	Redfish	C	3M	130 mm	24	2971
RED	<i>Sebastes spp</i>	Redfish	C	3N	130 mm	13	1660
RED	<i>Sebastes spp</i>	Redfish	C	3O	130 mm	31	4044
HKW	<i>Urophycis tenuis</i>	White hake	C	3O	130 mm	2	299
RED	<i>Sebastes spp</i>	Redfish	D	3M	130 mm	1	161
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3L	130 mm	5	477
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3M	130 mm	1	91
COD	<i>Gadus morhua</i>	Cod	D	3N	130 mm	1	81
COD	<i>Gadus morhua</i>	Cod	D	3N	280 mm	2	3
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3O	130 mm	2	96
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3O	280 mm	3	387
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	D	3N	280 mm	3	213
RJR	<i>Raja radiata</i>	Starry ray	D	3N	280 mm	1	92
RJR	<i>Raja radiata</i>	Starry ray	D	3O	280 mm	3	284

Table 3. Fishing effort (hours) of the Spanish fleet in Divisions 3LMNO by year based on the Logbook data.

3LMNO	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Effort (Hours)	106821	76028	60128	44044	25163	21408	21250	22703	25276	25410	18602	18271
3LMNO	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Effort (Hours)	18031	15577	15101	16608								

Table 4. Fishing effort (hours) of the Spanish fleet in 2018 by quarter and Division, as well as percentage of effort by Division based on the Logbook data.

Division	Depth	1st Q	2nd Q	3rd Q	4th Q	Total	% Div.
3L	<200					0%	
	200-600					0%	
	>600					0%	
	Total	1999	1186	538	794	4516	27%
3M	<200					0%	
	200-600					0%	
	>600					0%	
	Total	1744	520	1775	184	4222	25%
3N	<200					0%	
	200-600					0%	
	>600					0%	
	Total	563	1698	1054	1437	4753	29%
3O	<200					0%	
	200-600					0%	
	>600					0%	
	Total	483	784	927	923	3117	19%
	Total Hours	4788	4188	4293	3338	16608	100%
	%	29%	25%	26%	20%	100%	

Table 5. Percentage of the 2018 Spanish effort in SA 3 by mesh size, quarter and Division based on the Logbook data.

Div.	Mesh Size	1st Q	2nd Q	3rd Q	4th Q	Total
3L	<90 mm					
	100-200 mm	1999	1186	538	794	4516
	>200 mm					
3M	<90 mm					
	100-200 mm	1744	520	1775	184	4222
	>200 mm					
3N	<90 mm					
	100-200 mm	301	778	399	477	1956
	>200 mm	262	921	655	960	2797
3O	<90 mm			362	29	391
	100-200 mm	223	522	562	825	2133
	>200 mm	260	262	2	69	593

Table 6. Parameters of the length-weight relationship ($W(g) = a*L(cm)^b$) by species (2018).

Species	Source	a	b
Greenland halibut	Commercial	0.0052	3.1104
Redfish 3O - 3LN	3NO Survey	0.0100069	3.0804393
Redfish 3M	FC Survey	0.0097	3.1219
Roughhead grenadier	Commercial	0.1178	2.8919
Witch flounder 3NO	3NO Survey	0.0022995	3.2800314
Witch flounder 3L	Commercial	0.0027	3.2533
American plaice 3LNO	3NO Survey	0.0036662	3.2418716
Cod 3NO	Commercial	0.0079	3.0385
Cod 3M	Commercial	0.0121	2.9274
Alfonsino 6G	Commercial	0.0124	2.9957
Yellowtail Flounder	3NO Survey	0.0037916	3.2409346
Skate	Commercial	0.014287	2.8804951
White Hake	Commercial	0.019079	2.7727652
Capelin			

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

Cod Length (cm)	Division 3NO			Total
	Males	Females	Ind.	
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	778	259	0	1037
35	0	898	0	898
36	457	259	0	717
37	260	219	0	479
38	260	519	0	778
39	260	1377	0	1636
40	1895	997	0	2893
41	779	1655	0	2433
42	778	1676	0	2454
43	2155	1614	0	3770
44	2013	1454	0	3468
45	718	1775	0	2494
46	1637	2035	0	3671
47	2794	2293	0	5087
48	1476	1096	0	2572
49	1553	1457	0	3010
50	1056	1875	0	2931
51	818	1917	0	2735
52	1019	1098	0	2117
53	759	860	0	1619
54	1137	2075	0	3212
55	698	978	0	1676
56	519	879	0	1398
57	738	358	0	1096
58	1038	1385	0	2423
59	878	738	0	1616
60	639	519	0	1158
61	1026	899	0	1925
62	358	260	0	618
63	120	519	0	639
64	380	639	0	1019
65	519	380	0	899
66	260	0	0	260
67	0	519	0	519
68	0	500	0	500
69	0	0	0	0
70	260	0	0	260
71	260	260	0	519
72	260	260	0	519
73	99	767	0	866
74	0	198	0	198
75	0	0	0	0

76	240	0	0	240
77	120	0	0	120
78	120	0	0	120
79	0	519	0	519
80	260	0	0	260
81	120	358	0	479
82	260	0	0	260
83	0	0	0	0
84	260	260	0	519
85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
91	0	767	0	767
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
101	0	0	0	0
102	0	0	0	0
103	0	0	0	0
104	0	0	0	0
105	0	0	0	0
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	0	0	0
110	0	0	0	0
111	0	0	0	0
112	0	767	0	767
113	0	0	0	0
114	0	0	0	0
115	0	0	0	0
Total	32031	40136	0	72166

Samples	5
Ind. Sampled	350
Catch (ton)	117
SOP	1.01

Table 8. Length distribution of 3M Spanish Cod catches.

Cod Length (cm)	Division 3M			Total
	Males	Females	Ind.	
40				
41				
42				
43				
44	0	279	0	279
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
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	558	279	0	836
61	836	558	0	1394
62	558	0	0	558
63	279	0	0	279
64	557	279	0	836
65	1115	836	0	1951
66	1115	836	0	1951
67	836	1393	0	2230
68	14769	836	0	15605
69	1950	1393	0	3343
70	14211	8360	0	22571
71	8105	1951	0	10056
72	1393	1952	0	3345
73	1418	9257	0	10674
74	1673	836	0	2510
75	558	1393	0	1951
76	558	1673	0	2231
77	836	14211	0	15047
78	836	9536	0	10372
79	836	1393	0	2230
80	836	1672	0	2508
81	0	1697	0	1697
82	557	558	0	1115
83	279	6967	0	7245
84	0	1115	0	1115
85	0	860	0	860
86	0	836	0	836
87	557	6966	0	7523

88	279	557	0	836
89	279	6688	0	6966
90	279	7802	0	8081
91	279	6688	0	6967
92	0	279	0	279
93	0	279	0	279
94	0	0	0	0
95	0	557	0	557
96	0	836	0	836
97	279	279	0	557
98	279	279	0	557
99	0	279	0	279
100	0	279	0	279
101	0	0	0	0
102	0	340	0	340
103	0	0	0	0
104	558	279	0	836
105	0	279	0	279
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	279	0	279
110	0	0	0	0
111	0	0	0	0
112	0	0	0	0
113	0	0	0	0
114	0	0	0	0
115	0	0	0	0
116	0	279	0	279
117	0	0	0	0
118	0	0	0	0
119	0	0	0	0
120	0	0	0	0
121	0	0	0	0
122	0	0	0	0
123	0	0	0	0
124	0	0	0	0
125	0	0	0	0
126	6688	0	0	6688
127				
128				
129				
130				
Total	64144	104174	0	168318
Samples				9
Ind. Sampled				235
Catch (tons)				767
SOP				0.95

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

Redfish Length (cm)	Division 3M			Total
	Males	Females	Ind.	
20	7094	0	0	7094
21	8011	928	0	8939
22	39560	9861	0	49421
23	34050	11899	0	45949
24	33597	7590	0	41187
25	92034	26717	0	118751
26	113320	38375	0	151695
27	282100	44648	0	326748
28	463411	56452	0	519863
29	835135	183739	0	1018874
30	890359	434527	0	1324886
31	592947	594828	0	1187775
32	246442	727260	0	973703
33	74294	595743	0	670036
34	18273	295623	0	313896
35	4891	198927	0	203818
36	786	122678	0	123464
37	0	79617	0	79617
38	0	50772	0	50772
39	1151	25975	0	27126
40	2604	10383	0	12987
41	928	6424	0	7353
42	291	12777	0	13067
43	1219	786	0	2004
44	0	2448	0	2448
45	705	786	0	1490
46	7094	1409	0	8503
47	0	0	0	0
48	0	0	0	0
49	0	7094	0	7094
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	2258	0	2258
57				0
58				0
Total	3750293	3550526	0	7300819
Samples				24
Ind. Sampled				2971
Catch (tons)				3062
SOP				0.91

Table 10. Redfish 3LN stock Spanish catches length distribution.

Redfish Length (cm)	Division 3LN			Total
	Males	Females	Ind.	
15				0
16				0
17				0
18				0
19	2961	0	0	2961
20	10525	432	0	10957
21	48786	9224	0	58010
22	286822	15371	0	302194
23	415844	41389	0	457234
24	288311	81097	0	369408
25	142395	77338	0	219733
26	79473	106223	0	185696
27	23461	75390	0	98851
28	4398	82118	0	86516
29	4579	42341	0	46920
30	0	31237	0	31237
31	0	31670	0	31670
32	773	7135	0	7908
33	1455	4880	0	6336
34	0	3683	0	3683
35	0	2984	0	2984
36	0	918	0	918
37				0
38				0
39				0
40				0
Total	1309785	613430	0	1923215
Samples				13
Ind. Sampled				1660
Catch (tons)				399
SOP				1.00

Table 11. Redfish 30 stock Spanish catches length distribution.

Redfish Length (cm)	Males	Females	30 Ind.	Total
10	5110	0	0	5110
11	0	0	0	0
12	0	0	0	0
13	0	0	2206	2206
14	0	0	1103	1103
15	2722	0	3309	6031
16	0	0	2206	2206
17	2368	7266	4753	14387
18	7594	668	0	8262
19	17899	5454	0	23353
20	71169	25726	0	96895
21	362855	103675	0	466530
22	956223	348786	0	1305009
23	1071946	736325	0	1808271
24	725712	1409129	0	2134841
25	356312	1431383	0	1787695
26	157444	1018792	0	1176236
27	74824	574314	0	649138
28	14331	227147	0	241478
29	0	124667	0	124667
30	5970	92740	0	98710
31	861	57787	0	58648
32	0	9879	0	9879
33	0	18938	0	18938
34	0	33701	0	33701
35	0	16686	0	16686
36				0
37				0
38				0
39				0
40				0
Total	3833338	6243064	13578	10089979
Samples				31
Ind. Sampled				4044
Catch (tons)				2013
SOP				0.99

Table 12. American plaice 3LNO stock Spanish catches length distribution.

American Plaice Length (cm)	Division 3LNO			Total
	Males	Females	Ind.	
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	64	64
19	0	0	0	0
20	295	0	0	295
21	37	0	0	37
22	1332	114	0	1445
23	275	60	24	359
24	877	653	0	1530
25	520	688	0	1208
26	817	3410	0	4227
27	2036	2125	0	4161
28	1765	3900	0	5665
29	2091	8099	0	10190
30	2544	8363	0	10907
31	4736	12945	0	17681
32	7870	12814	0	20684
33	7442	7847	0	15289
34	11341	6934	0	18275
35	9007	4586	0	13593
36	4200	7914	0	12114
37	2861	6196	0	9057
38	2515	10753	0	13267
39	996	13696	0	14692
40	322	17185	0	17507
41	153	14352	0	14504
42	117	16699	0	16816
43	210	12211	0	12421
44	0	13262	0	13262
45	24	14789	0	14813
46	0	12286	0	12286
47	24	5630	0	5655
48	0	3649	0	3649
49	88	3427	0	3515
50	0	3786	0	3786
51	473	2325	0	2798
52	0	1865	0	1865
53	64	1912	0	1976
54	0	1548	0	1548
55	0	1383	0	1383
56	0	337	0	337
57	0	465	0	465
58	0	642	0	642
59	0	1792	0	1792
60	0	0	0	0

61	88	1129	0	1218
62	0	1495	0	1495
63	0	238	0	238
64	0	269	0	269
65	0	649	0	649
66	0	515	0	515
67	0	223	0	223
68	0	89	0	89
69	0	111	0	111
70	0	0	0	0
71	0	0	0	0
72	0	87	0	87
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
76	0	0	0	0
77	0	0	0	0
Total	65120	245446	88	310654

Samples	30
Ind. Sampled	2850
Catch (tons)	185
SOP	0.99

Table 13. Witch flounder Spanish catches length distribution for Div. 3L.

Witch flounder Length (cm)	Males	3L Females	Ind.	Total
20				0
21				0
22				0
23	0	511	0	511
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	511	0	511
30	0	0	0	0
31	0	0	0	0
32	511	0	0	511
33	511	0	0	511
34	511	0	0	511
35	511	1533	0	2045
36	0	0	0	0
37	0	1533	0	1533
38	1533	2045	0	3578
39	511	2045	0	2556
40	1022	2045	0	3067
41	511	3578	0	4089
42	0	1022	0	1022
43	511	2556	0	3067
44	0	2045	0	2045
45	0	4600	0	4600
46	0	5111	0	5111
47	0	2045	0	2045
48	511	2556	0	3067
49	0	2045	0	2045
50	0	2045	0	2045
51	0	0	0	0
52	0	0	0	0
53	0	511	0	511
54	0	0	0	0
55	0	511	0	511
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
61	0	511	0	511
Total	6645	39357	0	46002
Samples				1
Ind. Sampled				90
Catch (tons)				28
SOP				1.01

Table 14. Witch flounder Spanish catches length distribution for Div. 3NO.

Witch flounder Length (cm)	3NOL			Total
	Males	Females	Ind.	
22	30	0	0	30
23	66	0	0	66
24	0	0	0	0
25	152	0	0	152
26	110	0	0	110
27	235	0	0	235
28	83	30	0	113
29	162	57	0	219
30	124	20	0	144
31	246	202	0	448
32	463	176	0	639
33	539	386	0	925
34	629	302	0	931
35	508	586	0	1094
36	1647	689	0	2336
37	2648	1401	0	4050
38	1980	1859	0	3839
39	2411	2271	0	4682
40	3055	2145	0	5201
41	3239	2476	0	5715
42	1559	2680	0	4239
43	937	3182	0	4118
44	743	2740	0	3482
45	227	2625	0	2852
46	19	2434	0	2453
47	69	1476	0	1545
48	84	1699	0	1783
49	0	1125	0	1125
50	0	932	0	932
51	0	848	0	848
52	0	353	0	353
53	0	253	0	253
54	0	253	0	253
55	0	101	0	101
56	0	133	0	133
Total	21964	33435	0	55399
Samples				12
Ind. Sampled				1101
Catch (tons)				28
SOP				1.02

Table 15. Yellowtail flounder Spanish catches length distribution for Div. 3LNO.

Yellowtail flounder Length (cm)	3LNO			Total
	Males	Females	Ind.	
10	0	0	1200	1200
11	0	0	0	0
12	0	0	0	0
13	0	0	733	733
14	0	0	2551	2551
15	0	0	322	322
16	0	0	0	0
17	0	0	3361	3361
18	1428	0	6591	8019
19	2628	0	733	3361
20	2400	0	14668	17068
21	5028	1521	20948	27497
22	3600	2628	21501	27728
23	2856	8532	12614	24002
24	5647	3177	17109	25934
25	12113	11705	13586	37404
26	9052	11199	1219	21471
27	13818	7371	0	21189
28	10250	22271	486	33007
29	20573	18475	0	39049
30	35995	12740	0	48735
31	37571	24107	0	61679
32	35930	20052	0	55981
33	21322	32674	0	53996
34	25123	47135	0	72258
35	4180	34612	0	38792
36	4700	45751	0	50451
37	5603	29271	0	34874
38	246	37447	0	37693
39	322	26005	0	26326
40	1428	17559	0	18987
41	0	9862	0	9862
42	0	8336	0	8336
43	164	3688	0	3852
44	0	3095	0	3095
45	0	285	0	285
46	0	1838	0	1838
Total	261977	441336	117623	820936
Samples				9
Ind. Sampled				1926
Catch (tons)				283
SOP				1.13

Table 16. Greenland halibut Spanish catches length distribution for Div. 3L and 3M.

Length (cm)	Division 3L					Division 3M			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
25				0					0
26				0					0
27	0	0	0	0		0	0	0	0
28	0	0	0	0		0	0	133	133
29	0	0	0	0		0	0	0	0
30	469	406	0	876		0	0	275	275
31	1280	572	151	2002		0	0	0	0
32	2332	1751	0	4083		0	0	285	285
33	3090	910	0	4000		153	0	0	153
34	3684	2476	0	6160		0	0	646	646
35	4525	4845	0	9370		705	0	268	973
36	4833	6679	0	11513		565	167	1398	2129
37	5418	8781	0	14199		487	780	1112	2378
38	17509	9939	437	27886		936	1375	1722	4033
39	12477	13741	687	26905		622	3006	2725	6352
40	24291	24003	317	48611		1572	2056	2761	6389
41	28171	21330	746	50247		2872	2566	4092	9530
42	25209	38196	936	64341		2241	4296	4272	10809
43	32446	42323	1779	76548		9180	3682	4726	17588
44	31521	55565	1062	88148		6258	6630	2678	15566
45	43043	56842	2084	101969		4820	11566	4389	20775
46	47209	80313	2729	130251		5215	10046	4240	19501
47	61067	83310	2129	146506		6180	14973	4740	25893
48	44020	73028	2747	119795		9616	12499	5297	27413
49	42867	89951	3688	136505		5667	22425	4828	32920
50	37711	105035	0	142746		5606	22875	5015	33496
51	33531	115640	0	149171		11459	23731	281	35471
52	33320	102742	0	136062		11006	30166	0	41172
53	38390	103844	0	142235		8897	29725	0	38621
54	26624	106756	0	133380		12046	37632	0	49678
55	18834	103087	0	121921		7824	39904	0	47728
56	16516	126709	0	143225		7187	48595	0	55782
57	9919	106178	0	116097		6439	39284	0	45722
58	4175	106182	0	110357		1778	55008	0	56786
59	3234	99451	0	102685		1776	52820	0	54596
60	576	80384	0	80960		2016	52725	0	54741
61	1425	65523	0	66948		0	42748	0	42748
62	0	62243	0	62243		1213	37629	0	38841
63	0	37287	0	37287		151	31895	0	32046
64	0	33923	0	33923		0	28842	0	28842
65	0	22983	0	22983		313	24456	0	24769
66	0	17670	0	17670		0	21502	0	21502
67	0	9723	0	9723		0	14739	0	14739
68	0	8371	0	8371		0	12099	0	12099
69	0	11039	0	11039		0	7012	0	7012
70	0	4986	0	4986		0	6300	0	6300

71	0	3351	0	3351	0	3890	0	3890
72	0	2559	0	2559	0	4705	0	4705
73	0	2200	0	2200	0	3175	0	3175
74	0	2435	0	2435	0	2216	0	2216
75	0	1473	0	1473	0	1802	0	1802
76	0	1360	0	1360	0	1180	0	1180
77	0	941	0	941	0	1277	0	1277
78	0	192	0	192	0	1270	0	1270
79	0	727	0	727	0	673	0	673
80	0	599	0	599	0	875	0	875
81	0	1379	0	1379	0	629	0	629
82	0	679	0	679	0	0	0	0
83	0	255	0	255	0	571	0	571
84	0	428	0	428	0	0	0	0
85	0	0	0	0	0	501	0	501
86	0	252	0	252	0	0	0	0
87	0	0	0	0	0	0	0	0
88	0	0	0	0	0	272	0	272
89	0	0	0	0	0	0	0	0
90	0	0	0	0	0	477	0	477
Total	659719	2063545	19491	2742754	134799	779264	55882	969946
Samples				75				35
Ind. Sampled				8491				4138
Catch (tons)				3274				1507

Table 16 (cont.). Greenland halibut Spanish catches length distribution for Div. 3N and 3O.

Length (cm)	Division 3N				Division 3O			
	Males	Females	Ind.	Total	Males	Females	Ind.	Total
25				0				
26				0				
27	0	0	1015	1015				
28	1041	0	0	1041				
29	1981	3411	1981	7374				
30	893	2479	0	3373				
31	7259	3211	1015	11485				
32	5065	4172	1015	10252				
33	5266	5838	1015	12119				
34	9048	12961	0	22008				
35	14114	13308	0	27422				
36	17078	17211	0	34289				
37	14195	27959	0	42154				
38	13762	17963	0	31725				
39	12564	28537	0	41101				
40	14269	26735	0	41004				
41	18640	46620	0	65260				
42	26150	33625	0	59775				
43	32293	45555	0	77848				
44	27328	22405	0	49732				
45	22690	28672	0	51362				
46	15802	35167	0	50969				
47	20958	53751	0	74710				
48	16163	35543	0	51705				
49	8830	59766	0	68596				
50	16174	20072	0	36247				
51	16884	43513	0	60397				
52	14856	33701	0	48557				
53	10438	34053	0	44491				
54	2531	32933	0	35463				
55	5889	38986	0	44875				
56	1429	42747	0	44176				
57	2670	28022	0	30692				
58	1833	27762	0	29595				
59	3428	16947	0	20375				
60	0	28412	0	28412				
61	0	14854	0	14854				
62	0	11833	0	11833				
63	0	10368	0	10368				
64	0	996	0	996				
65	0	4732	0	4732				
66	0	2264	0	2264				
67	0	4401	0	4401				
68	0	969	0	969				
69	0	2176	0	2176				
70	0	0	0	0				

71	0	498	0	498
72	0	0	0	0
73	0	969	0	969
74	0	0	0	0
75	0	0	0	0
76	0	969	0	969
77	0	0	0	0
78	0	0	0	0
79	0	0	0	0
80	0	0	0	0
81	0	0	0	0
82	0	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
Total	381520	927066	6043	1314628
Samples				11
Ind Sampled				1232
Catch (tons)				1149

Table 16 (cont.). Greenland halibut Spanish catches length distribution for Div. 3LMNO.

Length (cm)	Division 3LMNO			Total
	Males	Females	Indter.	
25	0	0	0	0
26	0	0	0	0
27	0	0	1015	1015
28	1041	0	133	1174
29	1981	3411	1981	7374
30	1363	2886	275	4524
31	8538	3783	1166	13487
32	7397	5922	1300	14619
33	8509	6748	1015	16272
34	12732	15437	646	28815
35	19344	18153	268	37765
36	22476	24058	1398	47931
37	20100	37520	1112	58731
38	32207	29278	2159	63643
39	25663	45284	3411	74359
40	40133	52793	3078	96004
41	49683	70515	4839	125037
42	53600	76116	5208	134924
43	73919	91560	6505	171984
44	65107	84600	3739	153446
45	70552	97080	6473	174105
46	68226	125525	6969	200720
47	88205	152034	6869	247108
48	69800	121069	8044	198913
49	57363	172143	8516	238022
50	59492	147982	5015	212489
51	61874	182884	281	245039
52	59182	166609	0	225791
53	57725	167622	0	225347
54	41200	177320	0	218521
55	32547	181977	0	214524
56	25133	218051	0	243184
57	19027	173484	0	192511
58	7786	188952	0	196737
59	8439	169217	0	177656
60	2593	161520	0	164113
61	1425	123124	0	124549
62	1213	111705	0	112917
63	151	79550	0	79701
64	0	63761	0	63761
65	313	52171	0	52484
66	0	41436	0	41436
67	0	28863	0	28863
68	0	21440	0	21440
69	0	20226	0	20226
70	0	11286	0	11286

71	0	7739	0	7739
72	0	7264	0	7264
73	0	6344	0	6344
74	0	4650	0	4650
75	0	3275	0	3275
76	0	3509	0	3509
77	0	2217	0	2217
78	0	1462	0	1462
79	0	1401	0	1401
80	0	1475	0	1475
81	0	2008	0	2008
82	0	679	0	679
83	0	826	0	826
84	0	428	0	428
85	0	501	0	501
86	0	252	0	252
87	0	0	0	0
88	0	272	0	272
89	0	0	0	0
90	0	477	0	477
Total	1176038	3769875	81416	5027329

Samples	121
Ind Sampled	13861
Catch (tons)	5930
SOP	0.98

Table 17. Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches age distribution, mean weight (g) and mean length (cm) by age.

Age	Abundance				Age	Mean Weight (g)			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
1	0	0	0	0	1				
2	0	0	0	0	2				
3	2362	2274	2440	7075	3	185	194	177	185
4	49981	35902	4597	90480	4	316	300	272	307
5	208301	263190	16586	488077	5	519	507	517	512
6	496152	806568	44142	1346863	6	768	789	765	780
7	329218	1021230	13556	1364004	7	1145	1195	951	1181
8	65008	546420	95	611523	8	1355	1430	1049	1422
9	17213	308526	0	325739	9	1482	1619		1612
10	7560	461747	0	469307	10	1845	1932		1931
11	35	178736	0	178771	11	2319	2175		2175
12	174	72382	0	72556	12	2319	2519		2518
13	35	33353	0	33388	13	2319	2796		2796
14	0	17132	0	17132	14		3089		3089
15	0	13269	0	13269	15		3379		3379
16	0	4350	0	4350	16		4384		4384
17	0	2648	0	2648	17		4821		4821
18	0	1911	0	1911	18		4107		4107
19	0	0	0	0	19				
20	0	238	0	238	20		6338		6338
Age	Mean Length (cm)				Age	Mean Length (cm)			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
1					1				
2					2				
3	29.1	29.5	28.6	29.1	3				
4	34.4	33.8	32.7	34.1	4				
5	40.2	39.9	40.2	40.1	5				
6	45.7	46.1	45.7	46.0	6				
7	52.1	52.7	49.2	52.5	7				
8	55.0	56.0	50.7	55.9	8				
9	56.7	58.3		58.2	9				
10	60.8	61.7		61.7	10				
11	65.5	64.1		64.1	11				
12	65.5	67.1		67.1	12				
13	65.5	69.4		69.4	13				
14		71.6		71.6	14				
15		73.8		73.8	15				
16		80.2		80.2	16				
17		82.6		82.6	17				
18		78.6		78.6	18				
19					19				
20		90.5		90.5	20				

Table 18. Skates Spanish catches length distribution by sex for Div. 3LNO.

Skates Length (cm)	3LNO			Total
	Males	Females	Ind.	
19	275	0	0	275
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	222	222	0	443
25	0	0	0	0
26	0	167	0	167
27	546	406	0	952
28	0	401	0	401
29	169	860	0	1029
30	739	234	0	972
31	1474	538	0	2012
32	2026	1613	0	3639
33	2924	2145	0	5069
34	2766	2028	0	4793
35	3675	2963	0	6637
36	5431	4810	0	10241
37	4606	7194	0	11800
38	6544	7373	0	13917
39	7548	5272	0	12820
40	8268	6000	0	14268
41	5667	7050	0	12717
42	9512	15926	0	25438
43	9289	8394	0	17683
44	10473	16316	0	26789
45	8777	13381	0	22158
46	13205	12242	321	25767
47	14946	14042	0	28989
48	17376	15169	0	32545
49	13763	10879	0	24642
50	20178	21614	0	41792
51	10389	15712	0	26101
52	21940	23158	0	45099
53	22551	23632	0	46183
54	16779	27619	0	44398
55	19017	15403	0	34421
56	19795	17814	0	37609
57	14510	17223	0	31733
58	21583	15386	0	36969
59	19522	14767	0	34289
60	14002	19060	0	33062
61	22777	21074	0	43852
62	15550	19527	0	35077
63	15656	13718	0	29374
64	9044	15758	0	24803

65	9762	18264	0	28025
66	16883	12098	0	28980
67	10161	9723	0	19884
68	13241	10541	0	23781
69	10207	10576	0	20783
70	11704	13931	0	25634
71	6843	10547	0	17390
72	8817	10459	0	19275
73	7189	9340	0	16529
74	11339	13809	0	25148
75	7862	10769	0	18631
76	4714	3032	0	7746
77	6499	5848	0	12347
78	12508	3910	0	16418
79	6526	2485	0	9011
80	8457	4848	0	13305
81	7198	788	0	7986
82	5590	1701	0	7291
83	6419	640	0	7059
84	3831	0	0	3831
85	2689	222	0	2911
86	3749	653	0	4402
87	2530	0	0	2530
88	3684	0	0	3684
89	953	596	0	1549
90	481	0	0	481
91	189	0	0	189
92	1174	0	0	1174
93	0	0	0	0
94	0	0	0	0
95	280	0	0	280
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	107	0	0	107
Total	605097	591868	321	1197286

Samples	35
Ind. Sampled	4334
Catch (ton)	35
SOP	1.00

Table 19. Roughhead grenadier Spanish catches length distribution measured as preanal fin lengths (AFL) for Divisions 3LMNO.

Roughhead G. Length (cm)	3LMNO			Total
	Males	Females	Ind.	
5	263	11	0	273
6	129	0	89	218
7	451	125	0	576
8	690	741	0	1431
9	2193	1222	71	3486
10	5645	3951	172	9768
11	8305	4101	430	12836
12	12715	6985	1291	20991
13	13301	9225	1033	23559
14	17028	9232	1807	28067
15	16480	10104	1549	28134
16	18538	6723	1893	27154
17	15779	9328	1033	26139
18	12337	8336	861	21534
19	5316	5216	258	10790
20	2745	4067	344	7156
21	1907	3516	86	5508
22	162	2530	86	2778
23	141	1714	172	2028
24	0	1790	0	1790
25	0	1137	0	1137
26	0	1670	86	1756
27	0	1084	86	1171
28	0	982	0	982
29	0	398	0	398
30	0	543	0	543
31	0	187	0	187
32	0	156	0	156
33	0	90	0	90
34	0	89	0	89
35	0	55	0	55
36	0	139	0	139
37	0	28	0	28
38	0	62	0	62
39	0	0	0	0
40	0	50	0	50
Total	134125	95588	11346	241059
Samples				57
Ind. Sampled				5940
Catch (tons)				98
SOP				0.98

Table 20. Roughhead grenadier Div. 3LMNO Spanish catches distribution, mean weight (g) and mean length (AFL cm) by age.

Age	Abundance				Age	Mean Weight (g)			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
1	0	0	0	0	1				
2	1429	206	124	1759	2	25	37	26	26
3	8406	3795	151	12351	3	85	78	99	83
4	30830	22131	1915	54876	4	135	137	155	136
5	88015	40975	7482	136473	5	211	208	217	211
6	64980	40261	7493	112734	6	291	299	296	294
7	52428	26893	5246	84566	7	401	410	393	403
8	49320	26076	4203	79599	8	463	496	455	474
9	33576	18146	2200	53921	9	526	593	533	549
10	11754	15805	1129	28688	10	653	764	728	717
11	6154	8194	569	14918	11	716	950	835	849
12	1480	5869	261	7610	12	755	1098	1002	1028
13	1474	4176	267	5917	13	865	1173	1069	1091
14	132	3955	188	4275	14	1087	1563	1549	1548
15	0	3448	139	3587	15		1818	1588	1809
16	0	1535	20	1555	16		2044	1712	2039
17	0	2331	62	2393	17		2143	1594	2129
18	0	1159	40	1199	18		2563	1712	2535
19	0	313	0	313	19		3833		3833
20	0	337	0	337	20		2749		2749
21	0	247	0	247	21		4188		4188
22	0	70	0	70	22		5245		5245
23	0	70	0	70	23		5245		5245
24	0	0	0	0	24				
	Mean Length (cm)								
Age	Males	Females	Ind.	Total					
1									
2	6.2	7.2	6.5	6.4					
3	9.6	9.4	10.1	9.5					
4	11.3	11.3	11.9	11.4					
5	13.2	13.2	13.4	13.2					
6	14.8	15.0	14.9	14.9					
7	16.6	16.7	16.5	16.6					
8	17.4	17.9	17.3	17.6					
9	18.2	19.0	18.3	18.5					
10	19.6	20.7	20.4	20.3					
11	20.3	22.3	21.3	21.5					
12	20.7	23.4	22.7	22.9					
13	21.7	24.0	23.3	23.4					
14	23.5	26.5	26.5	26.4					
15		28.0	26.8	27.9					
16		29.1	27.5	29.1					
17		29.5	26.8	29.4					
18		31.3	27.5	31.2					
19		36.3		36.3					
20		32.0		32.0					
21		37.4		37.4					
22		40.5		40.5					
23		40.5		40.5					
24									

Table 21. White hake Spanish catches length distribution by sex for Div. 3NO.

White hake Length (cm)	3NO			Total
	Males	Females	Ind.	
18	0	345	0	345
19	2761	1726	0	4487
20	4487	2071	0	6558
21	2761	4833	0	7594
22	2761	5523	0	8284
23	690	4142	0	4833
24	345	4022	0	4367
25	0	2071	0	2071
26	345	690	0	1036
27	690	690	0	1381
28	345	2416	0	2761
29	0	3107	0	3107
30	0	3797	0	3797
31	0	1726	0	1726
32	0	1036	0	1036
33	915	1831	0	2746
34	0	915	0	915
35	570	1711	0	2281
36	2851	345	0	3196
37	570	1711	0	2281
38	3421	5132	0	8553
39	3421	3421	0	6842
40	3991	2851	0	6842
41	1140	3196	0	4336
42	570	4561	0	5132
43	1140	5132	0	6272
44	1711	4561	0	6272
45	1140	2851	0	3991
46	570	1140	0	1711
47	0	2851	0	2851
48	0	1711	0	1711
49	0	1711	0	1711
50	0	2281	0	2281
51	570	0	0	570
52	1140	0	0	1140
53	0	0	0	0
54	570	0	0	570
55	0	570	0	570
56	570	0	0	570
57	570	0	0	570
58	0	0	0	0
59	0	345	0	345
60	0	0	0	0
61	0	345	0	345
62	0	0	0	0
63	0	0	0	0

64	0	0	0	0
65	570	345	0	915
66	0	570	0	570
67	0	0	0	0
68	0	0	0	0
69	0	345	0	345
70	0	345	0	345
71	0	0	0	0
72	0	345	0	345
73	570	0	0	570
74	0	0	0	0
75	0	345	0	345
76	0	0	0	0
77	0	0	0	0
78	0	0	0	0
79	0	0	0	0
80	0	0	0	0
81	0	0	0	0
82	0	345	0	345
83	0	0	0	0
84	0	345	0	345
85	0	0	0	0
86	0	0	0	0
87	0	345	0	345
88				0
89				0
90				0
Total	41761	90697	0	132458

Samples	2
Ind. Sampled	299
Catch (ton)	62
SOP	0.92

Table 22. Greenland halibut Spanish 2018 catches total Age Length key (ALK).

Length	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	Total
20																				0
21																				0
22																				0
23	1																			1
24		1																		1
25																				0
26																				0
27																				0
28																				0
29																				0
30			4																	4
31			5																	5
32			4	3																7
33			6	3																9
34			11	8																19
35			6	8	1															15
36			7	19	1															27
37			1	21	2															24
38				42	1															43
39			2	30	8															40
40				25	15															40
41				18	25															43
42				21	37															58
43				15	53															68
44				9	51	1														61
45				4	54	2														60
46				1	56	5														62
47				1	61	17														79
48				1	46	24														71
49					27	36														63
50				1	20	48	1													70
51					11	55	6													72
52					3	60	21													84
53					1	63	22	4												90
54						48	23	4												75
55						40	21	10												71
56						26	30	11	2											69
57						18	30	13	3											64
58						12	24	18	2											56
59						3	11	19	19											52
60						1		10	27	4										42
61								5	33	7										45
62								1	24	10	2									37
63									23	13	2									38
64								1	17	10	5									33
65									8	13	5	1	1							28
66									3	9	4	5								21
67									5	4	3	2								14
68										5	7	3								15
69									1	4	7	4		1						17
70										1	4	7	2							14
71											3	2	3	1						9
72											4	1	4	3						12
73												1	2	3	1					7
74											2	3	1	3						9
75												4	2							6
76											1	2	1				2			6
77												1		1		1				3
78												1	1	2	2					6
79										1			1	1						3
80													1	1						2
81													2			2	1			5
82															1		1			2
83															2					2
84																1				1
85																				0
86															1					1
87																	1			1
88																	1			1
89															1	1				2
90																1			1	2
91																				0
92																				0
93																			1	1
94																				0
95																				0
96																				0
97																			1	1
98																				0
99																				0
Total	1	1	46	230	473	459	189	96	167	80	50	31	21	20	10	7	5	0	3	1889



Table 22 (Cont.) Greenland halibut Spanish 2018 catches males Age Length key (ALK).

Length	2	3	4	5	6	7	8	9	10	Total
30			2							2
31			3							3
32			2	1						3
33			3	1						4
34			6	6						12
35			3	2	1					6
36			5	9	1					15
37			1	8	1					10
38				23	1					24
39			2	14	4					20
40				14	6					20
41				11	12					23
42				9	15					24
43				9	26					35
44				4	24					28
45				3	25	1				29
46					28	2				30
47				1	25	6				32
48				1	21	10				32
49					14	13				27
50					9	19				28
51					4	26	3			33
52					2	29	4			35
53					1	24	7			32
54						20	6	2		28
55						19	6	4		29
56						9	6	2		17
57						4	10	2		16
58						5	2	3		10
59						1	1	1	1	4
60									3	3
61									2	2
62									2	2
63									1	1
64										0
65										0
Total	0	0	27	116	220	188	45	14	9	619

Table 22 (Cont.) Greenland halibut Spanish 2018 catches females Age Length key (ALK).

Length	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	Total
20																				0
21																				0
22																				0
23	1																			1
24		1																		1
25																				0
26																				0
27																				0
28																				0
29																				0
30			2																	2
31			2																	2
32			2	2																4
33			3	2																5
34			5	2																7
35			3	6																9
36			2	10																12
37				13	1															14
38				19																19
39				16	4															20
40				11	9															20
41				7	13															20
42				12	22															34
43				6	27															33
44				5	27	1														33
45				1	29	1														31
46				1	28	3														32
47					36	11														47
48					25	14														39
49					13	23														36
50				1	11	29	1													42
51					7	29	3													39
52					1	31	17													49
53						39	15	4												58
54						28	17	2												47
55						21	15	6												42
56						17	24	9	2											52
57						14	20	11	3											48
58						7	22	15	2											46
59						2	10	18	18											48
60						1		10	24	4										39
61								5	31	7										43
62								1	22	10	2									35
63									22	13	2									37
64								1	17	10	5									33
65									8	13	5	1	1							28
66									3	9	4	5								21
67									5	4	3	2								14
68									5	7	3									15
69									1	4	7	4		1						17
70										1	4	7	2							14
71											3	2	3	1						9
72											4	1	4	3						12
73												1	2	3	1					7
74											2	3	1	3						9
75												4	2							6
76											1	2	1				2			6
77												1	1		1					3
78												1	1	2	2					6
79											1		1	1						3
80													1	1						2
81													2			2	1			5
82															1		1			2
83															2					2
84																1				1
85																				0
86															1					1
87																	1			1
88																1				1
89															1	1				2
90																1			1	2
91																				0
92																				0
93																			1	1
94																				0
95																				0
96																				0
97																			1	1
98																				0
99																				0
Total	1	1	19	114	253	271	144	82	158	80	50	31	21	20	10	7	5	0	3	1270



Table 23. Roughhead grenadier Spanish 2018 Commercial Total Age Length key (ALK).

AFL cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total	
7	1	2																						3
8		3	1																					4
9		8	6	2																				16
10		3	23	5																				31
11		2	35	23																				60
12			10	48	9	1																		68
13			7	63	17	3																		90
14			1	30	48	2																		81
15				10	50	25	2																	87
16					14	41	31	5																91
17					5	24	32	18	1															81
18						17	35	25	7	1														85
19							13	38	20	4	2													77
20							2	11	28	16	2	2												62
21							1	3	19	15	6	3												47
22								1	9	8	7	2	1											28
23									4	4	4	8	1											21
24									1	8	6	5	3											23
25										1	5	7	2		1									16
26										1	2		4	7		3								18
27												1	5	2	1	1	2							13
28											1		5	3	3	1								13
29														2	1				1					4
30														1		2								3
31														1	4		2							7
32															1	1	2							4
33																	1							1
34																								
35																1								1
36																		2		1				3
37																	1							1
38																			1	2				3
39																								
40																						1	1	2
Total	1	18	83	181	143	113	116	101	89	58	35	28	21	16	11	9	8	2	2	3	1	1		1040

Table 23 (Cont.) Roughhead grenadier Spanish 2018 Commercial males Age Length key (ALK).

AFL cm	2	3	4	5	6	7	8	9	10	11	12	13	Total
7	1	2											3
8		1											1
9		6	3	2									11
10		2	17	4									23
11		2	17	15									34
12			6	31	7	1							45
13			3	34	7	1							45
14				17	27								44
15				8	22	16	1						47
16					5	21	20	4					50
17					3	12	17	13	1				47
18						9	17	15	4	1			46
19							7	18	10	4	2		41
20								5	12	10		1	28
21							1	1	4	4	2	3	15
22									1	1	1		3
Total	1	13	46	111	71	60	63	56	32	20	5	4	482

Table 23 (Cont.) Roughhead grenadier Spanish 2018 Commercial females Age Length key (ALK).

AFLcm	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total	
8	2	1																					3
9	2	3																					5
10	1	6	1																				8
11		18	8																				26
12		4	17	2																			23
13		4	29	10	2																		45
14		1	13	21	2																		37
15			2	28	9	1																	40
16				9	20	11	1																41
17				2	12	15	5																34
18					8	18	10	3															39
19						6	20	10															36
20						2	6	16	6	2	1												34
21							2	15	11	4													32
22							1	8	7	6	2	1											25
23								4	4	4	8	1											21
24								1	8	6	5	3											23
25									1	5	7	2		1									16
26									1	2		4	7		3								18
27											1	5	2	1	1	2							13
28										1		5	3	3	1								13
29													2	1				1					4
30													1		2								3
31													1	4		2							7
32														1	1	2							4
33																1							1
34															1								1
36																	2			1			3
37																1							1
38																		1	2				3
40																					1	1	2
Total	5	37	70	72	53	53	45	57	38	30	24	21	16	11	9	8	2	2	3	1	1		558

Table 24. Splendid alfonsino Spanish catches length distribution for Div. 6G.

Splendid alfonsino Length (cm)	6G		Ind.	Total
	Males	Females		
20	0	0	2	2
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	7	7
25	2	0	8	10
26	0	0	0	0
27	0	0	8	8
28	2	0	0	2
29	0	0	0	0
30	0	0	0	0
31	6	0	26	32
32	2	0	59	60
33	8	0	122	130
34	4	2	158	164
35	4	10	269	283
36	6	8	400	413
37	12	4	578	594
38	25	4	565	594
39	17	4	559	580
40	12	8	405	425
41	2	4	368	374
42	6	6	270	282
43	4	2	122	129
44	6	0	79	84
45	0	0	66	66
46	0	2	6	8
47	0	0	6	6
48	0	0	7	7
49	0	0	7	7
50	0	2	0	2
51	0	0	0	0
52	0	0	7	7
53	0	0	7	7
54				0
55				0
Total	117	54	4110	4281
Samples				11
Ind. Sampled				761
Catch (tons)				3
SOP				0.96

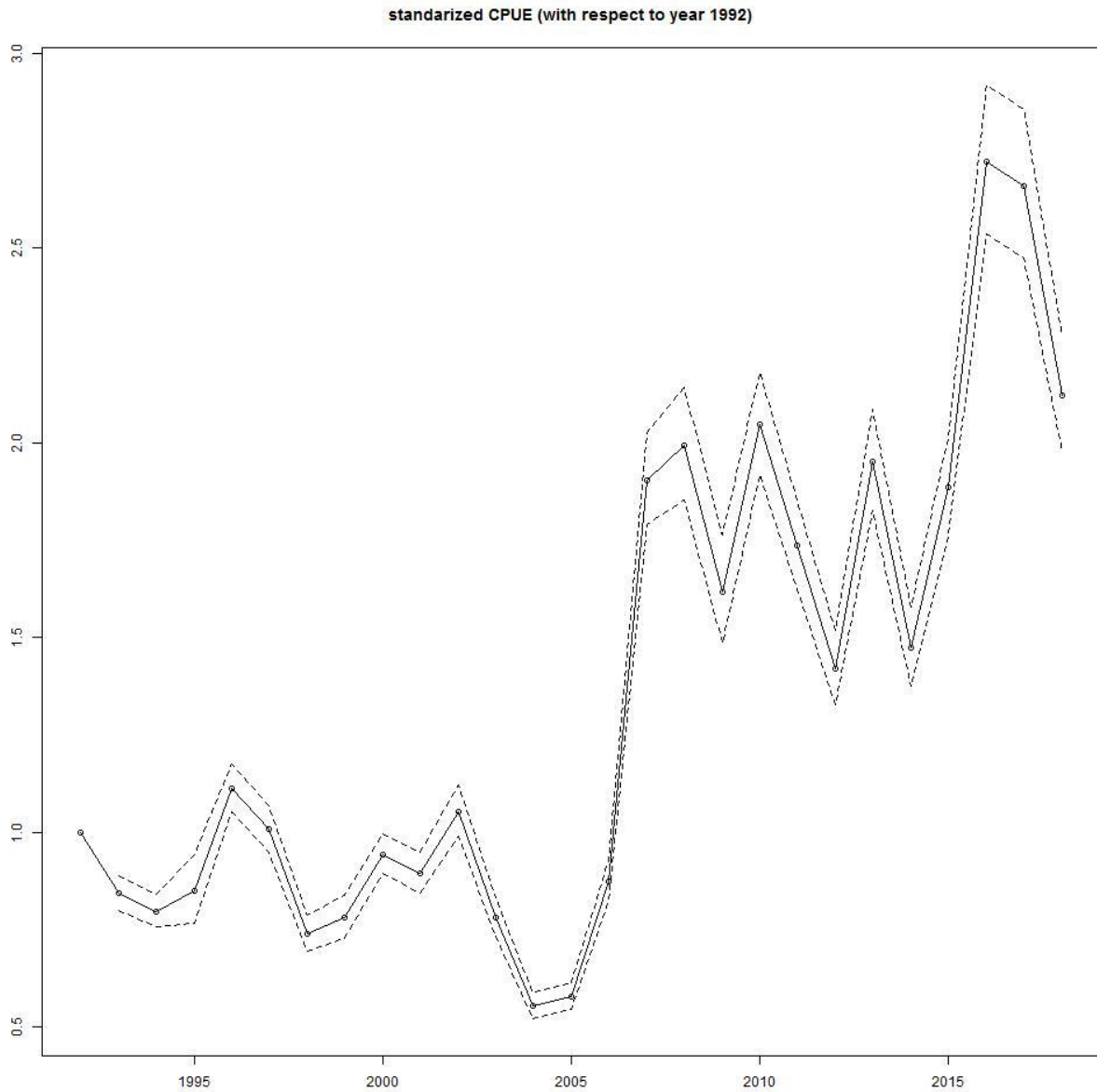


Figure 1. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2018 data.