

**SCIENTIFIC COUNCIL MEETING – JUNE 2022****Spanish Research Report for 2021**

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 2021 was available haul by haul. Total effort of the Spanish fleet in 2021 was 1,170 fishing days. Table 1 presents the preliminary Spanish catches by species and Division in 2021 in NAFO Regulatory Area. These catch figures are preliminary, the final catches to carry out the NAFO assessments will be agreed by the NAFO Joint Commission-Scientific Council Catch Estimation Strategy Advisory Group (CESAG).

In 2021, IEO scientific observers were on board 350 fishing days that it means 30 % 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 2021, 507 samples were taken with 66880 individuals of different species examined (Table 2).

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

A total of 9 Spanish trawlers operated in Div. 3LMNO NAFO Regulatory Area (NRA) during 2021, amounting to 1,170 days (18,296 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 15,260 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. 5) In Division 3M, targeting shrimp with 40 mm cod-end mesh size 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 2021 data, 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, part 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 part 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. 3O was around the 25% 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. In 2021, there was a directed fishery targeted silver hake in Div. 3O with a 130 mm mesh size trawl gear.

Despite the problems planted by the COVID-19 pandemic situation, eight IEO scientific observer was onboard Spanish vessels during 2021, comprising a total of 350 observed fishing days, around 30% coverage of the total Spanish effort. Figure 1 shows the position of the different hauls observed by the IEO Scientific Observers depending on the target species. Besides recording catches, discards and effort, this observer 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 2021, 507 length samples were taken, with 66,880 individuals of different species examined to obtain the length distributions (Table 2). Length 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 the NAFO Regulatory Area (NRA).

The Spanish fishing activity information in the NRA Subarea 3 in 2021, stock by stock, was the following:

Cod (*Gadus morhua*)

Div. 3L: In Div. 3L, the few catches of this species (7 tons) were taken mainly as by-catch in the redfish fishery. In 2021, there were no sample length distributions of this stock.

Div. 3NO: The most important part of the catches of this species was taken as by-catch in the skate fishery with 280 mm mesh size (58 tons) and in less degree in fisheries with 130 mm mesh size (10 tons). It should be noted that in 2021 there were only available one length samples of the catches with 150 fish measured. This sample could be not representative of the total catches length distributions of this stock (Table 7).

Div. 3M: Catches in Div. 3M were 86 tons and most of them were taken in the direct fishery. In 2021, only trawlers operated in this fishery. A small part of the catches were 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. Cod Div. 3N 2021 catches length distributions are presented in Table 8. It can be observed that most of the catches length distributions are in the 55-80 cm range. The mode in 2021 was 74 cm. Highlight that practically all the captured specimens are larger than MLZ (41 cm).

Redfish (*Sebastes mentella* and *Sebastes fasciatus*)

3M: In Div. 3M the redfish catches in 2021 have been 1688 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 28-38 cm range, quite similar to the range observed in previous years. Males are much more abundant than females in smaller sizes and females than males in larger sizes.

Div. 3LN: Spanish catches were 441 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 24-36 cm range. This year length distribution of catches in Div. 3LN are bigger than the observed in previous years.

Div. 3O: A directed fishery for this species took place in Div. 3O. Catches have reached 802 tons in this Division, most of them with 130 mm mesh size. Catches length distribution for Div. 3O are presented in Table 11 and it can be observed that bulk of the catches are in the 21-31 cm range. These length distributions catches are smaller than the observed in Divisions 3LN and 3M.

American plaice (*Hippoglossoides platessoides*)

Div. 3LNO: Spanish catches in 2021 in Div. 3LNO were 140 tons. Most of the catches were taken with 280 mm mesh size (86 tons) as by-catch of the skate fishery and in less degree with 130 mm mesh size (54 tons). Table 12 presents the total length distribution for Div. 3LNO. The bulk of catches were in the range of 21-55 cm. It can be observed a clear different length between sexes, females reach larger sizes than males.

Div. 3M: Catches in Div. 3M only amounted 16 tons and most of them were taken as by-catch of the cod and redfish fisheries. In 2021, there were no sample length distributions of this stock.

Witch flounder (*Glyptocephalus cynoglossus*)

Div. 2J and 3KL: Spanish catches for this stock in 2021 were 29 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. In 2021, there were no available sample length distributions of this species in this Division.

Div. 3M: There is not management stock for this species in this Division. Catches this year were 62 tons. This species in this Division was taken as by-catch in the Cod and redfish fishery. In 2021, there were no available sample length distributions of this species in this Division.

Div. 3NO: Spanish catches for this stock in 2021 were 24 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 (20 tons) and in less degree in the skate fishery (4 tons) with 280 mm cod end gear. Table 13 shows the total Spanish length distribution for this species. The bulk of catches were in the range of 27-49 cm. Females reach larger sizes than males.

Yellowtail flounder (*Limanda ferruginea*)

Div. 3LNO: In 2021 the yellowtail flounder Spanish catches were 174 tons. Most of the catches were taken in Div. 3NO in the skate fishery (167 tons) as by-catch. Length distributions for yellowtail flounder in Div. 3LNO are presented in Table 14. Most of the catches are in the 28-41 cm length range. Females reach larger sizes than males.

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 2021 Spanish catches were 4,514 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. Tables 15 shows the length distributions of Spanish catches in Divisions 3LMNO. Most of the catches were in the 37-56 cm length range and the mode of the length distribution was in 42-46 cm. Total age composition based in the commercial Spanish Age Length Key (Table 22), mean weight and mean length at age for Div. 3KLMNO are presented in Table 16. Most of the Greenland halibut catches corresponds to ages 5 to 9 with a peak at ages 6. is slightly smaller than that observed in previous years.

Figure 2 presents the Spanish fleet standardised CPUE (Gonzalez-Costas and Gonzalez-Troncoso, 2009) updated with the 2020 and 2021 data. The 2020 results are quite uncertain due to the low number of observations available due to COVID 19 issues. It can be observed different periods with different CPUE levels: The first period between 1992-2003 with relative CPUE values around 1; a second period (2007-2015) with values in the region of 2; a third period (2016-2017) with values about 2.5 and the most recent period (2018-2021) with values similar to those observed between 2007-2015.

Thorny skate (*Amblyraja radiata*)

Commercial catches of skates comprise a mix of skate species (*Amblyraja 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 90% of the skate taken in the Spanish catches base on 2014-2016 data from the EU Spanish 3NO Survey.

Div. 3LNO: Spanish 3LNO skate catches in 2021 were 2,860 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 (25 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 17 shows the total catches length distributions by sex of Div. 3LNO. In 2021, there are only available length distributions samples of the catches made with the 280 mm. mesh size cod-end. Most of the catches were in the 36-83 cm length range. It can be observed a clear different length between sexes, males reach larger sizes than females.

Div. 3M: Skate catches in Div. 3M (40 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 2021 catches were taken in Div. 3LMN. Spanish catches in 2021 were 82 tons. Individuals were measured from tip of snout to base of first anal-fin ray (AFL) to the half centimetre below. Table 18 shows the AFL length distributions, grouping in 1 cm intervals, of Spanish catches for Div. 3LMNO. Most of the catches were in the 12-27 AFL length range, with a mode in 16-17 cm and a clear length difference between sexes, males reach smaller sizes 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 19. Most of the Roughhead grenadier catches in 2021 were based on ages 5 to 10 with a mode in 6-9 years old.

White hake (*Urophycis tenuis*)

Div. 3NO: Catches of this species in 2021 in Div 3NO (271 tons) were a 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 (269 tons) are by-catch of the redfish fishery. Table 20 shows the total catches length distributions by sex of Div. 3NO. Most of the catches were in the 24-47 cm length range.

Capelin (*Mallotus villosus*)

Div. 3NO: Catches of this species are occasional. In 2021 there is no record of capelin catches by the Spanish fleet.

Squid (*Illex illecebrosus*)

Div. 3NO: Catches of this species they have been occasional in the past as by-catch of different fisheries, but in the 2018-2020 period there was a directed fishery to this species. In 2021 squid catches in Div 3NO by the Spanish fleet were 17 (ton) captured in Div. 3NO as a by-catch mainly from the redfish fishery. There is not available catches length distributions for this species in Division 3NO.

Shrimp (*Pandalus borealis*)

Div. 3M: The shrimp stock fishery in Div. 3M was closed between 2011-2019. In 2020, activity was resumed in this trawl fishery in which a 40 mm mesh is used. The Spanish catches in the year 2021 of this stock have been 16 tons. Size sampling of these catches is not available.

Silver hake (*Merluccius bilinearis*)

Div. 3NO: Catches of this species in Div. 3NO are sporadic. In the year 2021, the Spanish catches have been the largest observed in the last 50 years and have been caught with trawl gear and 130 mm mesh. Spanish total catches have been 3765 tons in 2021. Most of which (3468 tons) have been caught in Div. 3O. Table 21 shows the total catches length distributions by sex of Div. 3NO. Most of the catches were in the 24-32 cm length range.

(B) Research studies

Since 1995, Spain carries out annually a Spring-Summer survey in the NAFO Regulatory Area of Div. 3NO. In 2003, it was decided to extend the Spanish 3NO survey toward Div. 3L (Flemish Pass). In 2021, the 3L survey could not be carried out due to the exceptional pandemic situation caused by COVID 19.

The Spanish bottom trawl survey in NAFO Regulatory Area Div. 3NO was conducted from 29th of May to the 1st of July 2021 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 113 valid hauls were taken within a depth range of 42-1394 m according to a stratified random design and 115 hydrographic profiles. 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 Greenland halibut 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.

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 July 6th to August 15th 2021. 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 183 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 21/047. 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 2021 EU; EU-Spain and Portugal bottom trawl groundfish surveys in NAFO Regulatory Area (Div. 3MNO):

New data on deep-water corals and sponges were presented from the 2021 EU-Spain and Portugal bottom trawl groundfish survey. 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). Distribution maps of presence and catches above threshold for RV data of sponges (100 kg/tow), large gorgonians (0.6 kg/tow), small gorgonians (0.2 kg/tow), sea pens (1.3 kg/tow), *Boltenia* sea squirts (0.35 kg/tow), bryozoans (0.2 kg/tow) and black corals (0.4 kg/tow) were presented.

Sponges were recorded, with non-significant concentrations, in 85 of the 294 valid tows (28.9% of the valid tows analyzed), with depths ranging between 61 - 1345 m. Two Significant catches of sponges (≥ 100 kg/tow) were found.

Large gorgonians were recorded, with non-significant concentrations, in 8 of the 294 valid tows (2.7% of valid tows analyzed), with depths ranging between 352- 1161 m. One of the tows had significant catches of large gorgonians (≥ 0.6 kg/tow).

Small gorgonians were recorded, with non-significant concentrations, in 40 of the 294 valid tows (13.6% of valid tows analyzed), with depths ranging between 102- 1416 m. None of the valid tows had significant catches of small gorgonians (≥ 0.2 kg/tow).

Sea pens were recorded, with non-significant concentrations, in 92 tows (31.3% of valid tows analyzed), with depths ranging between 61 - 1416 m. One significant catch (> 1.3 kg/tow) was recorded.

Boltenia ovifera sea squirt was recorded, with non-significant concentrations, in 11tows (3.7% of valid tows analyzed), with depths ranging between 50 - 315 m. Four significant catches (> 0.35 kg/tow) were recorded.

Black corals were recorded, with non-significant concentrations, in 9 tows (3% of valid tows analyzed), with depths ranging between 401 - 1221 m. No significant catches (> 0.4 kg/tow) were recorded.

All this information is summarized in an SCR Document (SCR Doc 21/050).

NEREIDA

IEO prepared a new NEREIDA Grant Proposal “Research in support of the reassessment of NAFO bottom fisheries in 2022 (NAFO)” that was sent by NAFO to EU on December 1st 2021. This proposal is now under the evaluation process by CINEA. It is expected to have information on evaluation results this February-March 2022. The proposed action has three specific activities: i) To analyze the methodology to study the bottom-fishing footprint in the NAFO Regulatory Area (NRA); ii) To monitor the spatial and temporal distribution of marine litter and iii) To update available information on spatial distribution of existing and planned activities other than fishing in NRA, particularly oil and gas.

New information on oil and gas activities:

An updated map showing the geographical location of oil and gas activities in NAFO Divs. 3LMN was presented during the 2021 WGESA. This map shows the potential conflicts between oil and gas activities and NAFO fisheries, as well as between oil and gas activities and VME areas closed by NAFO (particularly, Areas 2 and 10). In comparison with the information assessed previously reported by the 2020 WGESA, there are two new “exploration wells” in Division 3L, one of them located inside NAFO fishing grounds. The lists of “wells” and “licences” indicating their spatial location with respect to the NAFO VME closures and/or VME polygons were also presented, as well as a list of offshore oil spills and other relevant environmental incidents. All this information was obtained from publicly available data sources and summarized in a SCR Document (SCR 21/051).

SUBAREA 6

A. Status of the fisheries

During 2021 there was no fishing activity of the Spanish fleet in this Division.

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Table1. Spanish Catches (tons) in NAFO Area in 2021 by species and Division, based on the provisional Logbook data.

Code	English_name	Scientific_name	Provisional STATLANT 21A 2021				
			3L	3M	3N	3O	Total
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	2541	1090	881	2	4515
HKS	Silver hake	<i>Merluccius bilinearis</i>			297	3468	3765
RED	Atlantic redfishes nei	<i>Sebastes spp</i>	330	1688	111	802	2932
SKA	Raja rays nei	<i>Raja spp</i>	25	40	2225	611	2901
HKW	White hake	<i>Urophycis tenuis</i>		14	11	259	285
YEL	Yellowtail flounder	<i>Limanda ferruginea</i>			135	38	173
COD	Atlantic cod	<i>Gadus morhua</i>	7	86	51	17	161
PLA	American plaice	<i>Hippoglossoides platessoides</i>	8	16	84	48	156
WIT	Witch flounder	<i>Glyptocephalus cynoglossus</i>	29	62	11	12	115
HAL	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	11	8	42	23	84
RHG	Roughhead grenadier	<i>Macrourus berglax</i>	27	17	38		82
ANG	American angler	<i>Lophius americanus</i>			5	19	24
SQI	Northern shortfin squid	<i>Illex illecebrosus</i>	0	0	1	15	17
PRA	Northern prawn	<i>Pandalus borealis</i>		16			16
HAD	Haddock	<i>Melanogrammus aeglefinus</i>			2	13	15
GDE	Threadfin rockling	<i>Gaidropsarus ensis</i>	7				7
CAT	Wolffishes (=Catfishes) nei	<i>Anarhichas spp</i>	2	2	1	0	5
GPE	Longfin Hake	<i>Phycis chesteri</i>	4				4
RNG	Roundnose grenadier	<i>Coryphaenoides rupestris</i>	1	1		0	2
		Total tons	2994	3042	3895	5329	15260

Table 2. Samples and individuals sampled by the IEO Scientific Observers by species, mesh size and NAFO Division in 2021

Code	Species	English_name	Catch/Disc.	Division	Mesh size	Samples	Ind.
ALH	<i>Alepocephalus spp</i>		C	3N	130 mm	1	100
ANT	<i>Antimora rostrata</i>	Blue antimora	C	3N	130 mm	1	99
ARU	<i>Argentina silus</i>	Greater argentine	C	3O	130 mm	6	533
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3N	130 mm	1	261
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3L	130 mm	3	423
COD	<i>Gadus morhua</i>	Atlantic cod	C	3M	130 mm	11	897
COD	<i>Gadus morhua</i>	Atlantic cod	C	3N	130 mm	1	150
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	130 mm	2	206
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	280 mm	2	330
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3O	130 mm	3	323
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	130 mm	3	413
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	280 mm	6	321
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	130 mm	6	783
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	130 mm	2	292
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	280 mm	7	955
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3L	130 mm	22	2993
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3M	130 mm	8	864
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3N	130 mm	9	1135
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3N	130 mm	11	1428
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3O	130 mm	50	7630
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3O	280 mm	1	86
NZB	<i>Nezumia bairdii</i>	Marlin-spike grenadier	C	3L	130 mm	1	104
NZB	<i>Nezumia bairdii</i>	Marlin-spike grenadier	C	3N	130 mm	2	214
RJR	<i>Raja radiata</i>	Starry ray	C	3N	280 mm	50	6511
RJR	<i>Raja radiata</i>	Starry ray	C	3O	280 mm	6	731
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3L	130 mm	80	10230
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3M	130 mm	51	6463
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3N	130 mm	34	4661
RED	<i>Sebastes spp</i>	Redfish	C	3L	130 mm	7	1494
RED	<i>Sebastes spp</i>	Redfish	C	3M	130 mm	13	1852
RED	<i>Sebastes spp</i>	Redfish	C	3N	130 mm	6	958
RED	<i>Sebastes spp</i>	Redfish	C	3O	130 mm	40	6330
HKR	<i>Urophycis chuss</i>	Red hake	C	3N	130 mm	1	106
HKR	<i>Urophycis chuss</i>	Red hake	C	3O	130 mm	1	101
HKW	<i>Urophycis tenuis</i>	White hake	C	3N	130 mm	1	174
HKW	<i>Urophycis tenuis</i>	White hake	C	3O	130 mm	10	1866

RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	D	3L	130 mm	1	100
COD	<i>Gadus morhua</i>	Atlantic cod	D	3N	130 mm	1	100
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	D	3O	280 mm	1	126
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3N	130 mm	1	100
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3O	130 mm	5	453
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3O	280 mm	1	118
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	D	3N	280 mm	8	868
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3L	130 mm	1	103
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3M	130 mm	2	108
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3N	130 mm	3	228
RJR	<i>Raja radiata</i>	Starry ray	D	3N	280 mm	8	754
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	D	3M	130 mm	1	94
RED	<i>Sebastes spp</i>	Redfish	D	3L	130 mm	4	430
RED	<i>Sebastes spp</i>	Redfish	D	3N	130 mm	1	102
RED	<i>Sebastes spp</i>	Redfish	D	3O	130 mm	1	112
HKW	<i>Urophycis tenuis</i>	White hake	D	3O	130 mm	9	1067

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	18686	19051	18296					

Table 4. Fishing effort (hours) of the Spanish fleet in 2021 by quarter and Division, as well as percentage of effort by Division based on the Logbook data.

Division	1st Q	2nd Q	3rd Q	4th Q	Total	% Div.
3L	868	939	994	1834	4635	25%
3M	718	311	1890	700	3619	20%
3N	1547	933	1340	1574	5394	29%
3O	1444	1322	656	1226	4649	25%
Total Hours	4576	3505	4881	5335	18296	100%
%	25%	19%	27%	29%	100%	

Table 5. Spanish 2021 effort (hours) 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	868	939	994	1834	4635
	>200 mm					
3M	<90 mm		63			63
	100-200 mm	718	248	1890	700	3556
	>200 mm					
3N	<90 mm					
	100-200 mm	501	645	615	458	2218
	>200 mm	1047	288	725	1116	3176
3O	<90 mm					
	100-200 mm	711	1272	647	1038	3669
	>200 mm	733	50	9	188	980

Table 6. Parameters of the length-weight relationship ($W(g) = a*L(cm)^b$) by species (2021).

Species	Source	a	b	SOP	Samples	Ind Sampled
Greenland halibut	3NO Survey	0.00387346	3.17422	0.92	165	21354
Redfish 3O	3NO Survey	0.00933729	3.10708	0.94	40	6330
Redfish 3LN	3NO Survey	0.00933729	3.10708	0.94	13	2452
Redfish 3M	3M Commercial	0.00370910	3.37581	0.91	13	1852
Roughhead grenadier	3NO Survey	0.10276627	2.90831	0.91	39	4992
Witch flounder	3NO Survey	0.00235140	3.27266	1.03	7	859
American plaice 3LNO	3NO Survey	0.00422645	3.19129	1.05	15	1517
American plaice 3M	FC Survey	0.00315447	3.30474		0	0
Cod 3NO	3NO Survey	0.00608836	3.06987	1.19	1	150
Cod 3M	FC Survey	0.00551194	3.10467	0.97	11	897
Yellowtail Flounder	3NO Survey	0.00573811	3.10824	0.96	9	1247
Skate	3NO Survey	0.00519074	3.14871	0.95	56	7242
White Hake	3NO Survey	0.00379541	3.15339	0.94	11	2040
Silver Hake	3NO Commercial	0.00292170	3.22207	0.99	59	8710

Table 7. Cod 3NO stock Spanish catches length distribution (2021).

Cod Length (cm)	3NO		Ind.	Total
	Males	Females		
30	2038	679	0	2717
31	5435	1359	0	6793
32	2038	6114	0	8152
33	2038	6793	0	8831
34	2717	3397	0	6114
35	4755	4076	0	8831
36	1359	4076	0	5435
37	2038	5435	0	7473
38	2038	2038	0	4076
39	2038	4076	0	6114
40	2038	4755	0	6793
41	2038	1359	0	3397
42	3397	1359	0	4755
43	679	1359	0	2038
44	1359	2717	0	4076
45	0	0	0	0
46	679	1359	0	2038
47	2038	2038	0	4076
48	1359	679	0	2038
49	679	0	0	679
50	1359	0	0	1359
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	679	0	0	679
56	0	0	0	0
57	679	0	0	679
58	0	0	0	0
59	0	0	0	0
60	679	0	0	679
61	1359	0	0	1359
62	0	0	0	0
63	0	0	0	0
64	679	0	0	679
65	0	0	0	0
66	0	0	0	0
67	679	0	0	679
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	679	0	679
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	679	0	679
82	0	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	0	0	0
Total	46874	55026	0	101900

Samples	1
Ind. Sampled	150
Catch (tons)	69
SOP	1.19

Table 8. Cod 3M stock Spanish catches length distribution (2021).

Cod Length (cm)	3NO		Ind.	Total
	Males	Females		
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	48	0	48
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	97	58	0	155
42	48	58	0	106
43	48	0	0	48
44	106	160	0	267
45	48	167	0	215
46	234	240	0	474
47	280	236	0	515
48	314	277	0	591
49	390	190	0	580
50	360	144	0	504
51	172	255	0	427
52	455	155	0	609
53	382	384	0	765
54	477	196	0	673
55	148	98	0	246
56	146	136	0	283
57	213	177	0	391
58	129	214	0	343
59	297	166	0	462
60	359	232	0	591
61	353	270	0	624
62	492	290	0	782
63	481	161	0	641
64	706	336	0	1042
65	356	318	0	674
66	475	774	0	1249
67	895	574	0	1469
68	770	511	0	1280
69	651	637	0	1288
70	480	471	0	950
71	555	475	0	1030
72	668	616	0	1285
73	397	945	0	1342
74	570	1037	0	1607
75	188	674	0	862
76	564	815	0	1379
77	131	438	0	569
78	456	566	0	1022

79	68	324	0	392
80	229	268	0	498
81	148	229	0	377
82	259	229	0	489
83	46	73	0	119
84	52	63	0	116
85	119	84	0	203
86	52	393	0	445
87	77	98	0	175
88	91	31	0	122
89	0	67	0	67
90	15	15	0	30
91	46	30	0	76
92	0	61	0	61
93	22	0	0	22
94	81	0	0	81
95	0	0	0	0
96	46	0	0	46
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
Total	15244	15463	0	30706

Samples	11
Ind. Sampled	897
Catch (tons)	86
SOP	0.97

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

Redfish Length (cm)	Division 3M			Total
	Males	Females	Ind.	
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	5092	0	0	5092
20	11383	5692	0	17075
21	7589	7589	0	15178
22	8887	1897	0	10784
23	5215	1897	0	7112
24	5287	1897	0	7184
25	4283	0	0	4283
26	25652	7589	0	33241
27	35108	5092	0	40201
28	90124	6992	0	97117
29	125825	16580	0	142405
30	187294	36659	0	223952
31	339154	50848	0	390001
32	437506	70046	0	507553
33	345812	111061	0	456873
34	177954	202297	0	380251
35	88046	328450	0	416496
36	43073	261694	0	304767
37	15623	206975	0	222598
38	1493	95487	0	96980
39	6605	54543	0	61148
40	1897	44857	0	46754
41	0	24358	0	24358
42	0	28943	0	28943
43	0	16342	0	16342
44	0	17311	0	17311
45	0	3955	0	3955
46	0	9402	0	9402
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	7909	0	7909
Total	1968902	1626363	0	3595265
Samples				13
Ind. Sampled				1852
Catch (tons)				1688
SOP				0.91

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

Redfish Length (cm)	Division 3LN			Total
	Males	Females	Ind.	
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	71	212	0	283
14	204	338	0	542
15	699	699	0	1398
16	1218	911	0	2129
17	1933	935	0	2867
18	1673	2096	0	3769
19	2733	848	0	3582
20	9742	2977	0	12719
21	5912	1402	0	7314
22	5134	2469	0	7603
23	19951	4165	0	24116
24	55491	8514	0	64006
25	60308	8917	0	69225
26	31425	16552	0	47976
27	23104	27705	0	50809
28	23721	44928	0	68648
29	33497	34594	0	68091
30	71536	27768	0	99305
31	110857	23841	0	134698
32	95399	55143	0	150542
33	50068	70520	0	120588
34	21153	79059	0	100212
35	2703	55926	0	58629
36	573	37720	0	38293
37	569	11268	0	11837
38	0	6789	0	6789
39	0	2710	0	2710
40	0	0	0	0
41	0	381	0	381
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
Total	629673	529388	0	1159061
Samples				13
Ind. Sampled				2452
Catch (tons)				441
SOP				0.94

Table 11. Redfish 30 stock Spanish catches length distribution.

Redfish Length (cm)	30		Ind.	Total
	Males	Females		
10	0	0	0	0
11	0	0	258	258
12	41	0	570	611
13	0	79	1473	1552
14	423	336	2194	2954
15	1443	770	2305	4517
16	2966	3391	1545	7901
17	4447	7773	3199	15419
18	10485	4856	2681	18022
19	21451	15876	2283	39611
20	54839	34475	3251	92566
21	68552	55767	4381	128700
22	126064	92969	5796	224828
23	184171	133174	671	318016
24	203515	174059	0	377573
25	119853	278017	0	397870
26	69033	320632	0	389665
27	58717	340409	0	399126
28	65508	264669	0	330177
29	42404	229317	632	272352
30	35136	207028	0	242165
31	20908	115369	0	136276
32	12595	61291	0	73886
33	3873	26394	0	30267
34	3637	8985	0	12622
35	1719	6293	0	8011
36	2911	0	0	2911
37	1127	0	0	1127
38	355	0	0	355
39	444	0	0	444
40	0	0	0	0
41	0	3107	0	3107
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
Total	1116616	2385034	31240	3532889
Samples				40
Ind. Sampled				6330
Catch (tons)				802
SOP				094

Table 12. American plaice 3LNO stock Spanish catches length distribution (2021).

American Plaice Length (cm)	Division 3LNO			Total
	Males	Females	Ind.	
15	0	0	0	0
16	0	0	0	0
17	0	0	22	22
18	432	733	0	1166
19	1233	684	0	1917
20	757	742	0	1500
21	1656	1995	0	3651
22	2515	4432	0	6947
23	7870	4896	0	12766
24	5637	5434	0	11071
25	6875	7126	0	14000
26	5906	7033	0	12939
27	3260	5483	0	8742
28	3123	3558	0	6681
29	1673	1144	0	2817
30	2718	2046	0	4764
31	2155	1317	0	3473
32	2212	1309	0	3521
33	2166	2438	0	4604
34	2774	3982	0	6756
35	2805	6283	0	9088
36	2978	4870	0	7848
37	2098	4734	0	6832
38	1900	7135	0	9035
39	1119	4873	0	5993
40	374	7641	0	8015
41	126	4871	0	4997
42	0	5676	0	5676
43	63	6997	0	7060
44	63	4587	0	4651
45	0	4616	0	4616
46	0	4034	0	4034
47	0	4773	0	4773
48	0	2720	0	2720
49	0	3852	0	3852
50	0	3230	0	3230
51	0	3216	0	3216
52	0	5119	0	5119
53	0	1693	0	1693
54	0	3052	0	3052
55	0	3702	0	3702
56	0	1075	0	1075
57	0	1572	0	1572
58	0	2665	0	2665
59	0	1494	0	1494

60	0	2299	0	2299
61	0	1606	0	1606
62	0	1923	0	1923
63	0	410	0	410
64	0	331	0	331
65	0	619	0	619
66	0	560	0	560
67	0	288	0	288
68	0	473	0	473
69	0	125	0	125
70	0	63	0	63
71	0	105	0	105
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
Total	64489	167635	22	232146

Samples	15
Ind. Sampled	1517
Catch (tons)	140
SOP	1.05

Table 13. Witch flounder Spanish catches length distribution for Div. 3NO.

Witch flounder Length (cm)	3NO			Total
	Males	Females	Ind.	
19	70	0	0	70
20	0	0	0	0
21	0	0	0	0
22	70	0	0	70
23	189	0	0	189
24	70	0	0	70
25	375	0	0	375
26	453	116	0	569
27	1002	8	0	1010
28	1987	929	0	2916
29	1762	1075	0	2837
30	2471	718	0	3190
31	1512	311	0	1824
32	594	291	0	885
33	1253	784	0	2037
34	1153	167	0	1320
35	1795	1289	0	3084
36	1635	355	0	1990
37	2993	757	0	3750
38	2046	1025	0	3071
39	2340	1194	0	3533
40	2840	798	0	3639
41	1173	1042	0	2214
42	1330	1897	0	3227
43	627	1594	0	2222
44	231	1099	0	1330
45	79	1454	0	1533
46	403	1563	0	1966
47	0	1805	0	1805
48	0	1192	0	1192
49	0	969	0	969
50	0	650	0	650
51	0	597	0	597
52	0	661	0	661
53	0	412	0	412
54	0	519	0	519
55	0	17	0	17
56	0	223	0	223
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	99	0	99
Total	30455	25611	0	56066
Samples				7
Ind. Sampled				859
Catch (tons)				24
SOP				1.03

Table 14. Yellowtail flounder Spanish catches length distribution for Div. 3LNO.

Yellowtail flounder Length (cm)	3LNO			Total
	Males	Females	Ind.	
10	92	0	0	92
11	92	0	0	92
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	862	862
16	1326	0	862	2188
17	1253	877	2536	4666
18	976	1254	541	2771
19	2897	1623	270	4791
20	2123	2730	270	5124
21	6130	3883	0	10013
22	2557	5600	0	8158
23	720	1403	0	2123
24	270	0	0	270
25	2121	99	0	2219
26	4412	1568	0	5980
27	3141	4416	0	7557
28	12134	9301	0	21435
29	11110	10870	0	21980
30	13634	13083	0	26717
31	22342	22839	0	45180
32	24555	20838	0	45393
33	24390	23076	0	47466
34	26367	21798	0	48165
35	18786	17364	0	36150
36	15272	16950	0	32222
37	4060	28707	0	32767
38	2161	30068	0	32230
39	1081	25765	0	26846
40	2858	16282	0	19140
41	1725	16512	0	18237
42	270	4711	0	4982
43	0	2988	0	2988
44	0	2864	0	2864
45	0	1403	0	1403
46	0	2111	0	2111
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
Total	208857	310983	5342	525182

Samples

9

Ind. Sampled	1247
Catch (tons)	174
SOP	0.96



Table 15. 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
20	0	0	0	0		0	0	0	0
21	0	0	0	0		0	0	0	0
22	0	0	0	0		0	0	0	0
23	0	0	0	0		0	0	0	0
24	0	0	0	0		0	0	0	0
25	0	43	0	43		0	0	0	0
26	0	0	0	0		0	0	0	0
27	0	270	0	270		0	0	0	0
28	0	0	0	0		0	0	0	0
29	338	0	0	338		0	0	0	0
30	1469	460	0	1929		0	0	0	0
31	258	957	0	1215		774	0	0	774
32	3366	1803	0	5170		2321	0	0	2321
33	5626	1609	0	7235		774	619	0	1392
34	9943	5480	0	15423		774	307	0	1081
35	12184	6655	0	18839		239	802	0	1041
36	21629	18107	0	39736		2635	2598	0	5234
37	28400	23414	0	51814		2713	2559	0	5272
38	52964	32420	242	85626		4141	5585	0	9727
39	66016	48211	0	114227		7793	10044	0	17837
40	108043	88453	0	196497		11051	17127	0	28178
41	126277	117725	205	244207		8767	9441	151	18359
42	157918	130020	0	287939		14627	15657	0	30283
43	144199	147066	0	291265		10403	17595	0	27998
44	128974	160256	0	289229		19759	17609	0	37368
45	125256	152489	0	277745		13657	22897	0	36554
46	124435	145025	0	269460		14820	22346	0	37166
47	92577	130825	0	223402		15076	23526	0	38603
48	67194	134003	0	201197		16889	28390	0	45279
49	54389	98868	0	153257		12699	29525	0	42224
50	35939	87160	0	123099		23215	41852	0	65067
51	20967	59823	0	80790		11354	36448	0	47801
52	12539	54384	0	66923		11624	44317	0	55941
53	12743	46674	0	59418		11983	37949	0	49931
54	10850	43786	0	54636		9440	35188	0	44628
55	10029	44490	0	54519		14371	43772	0	58143
56	8542	37837	0	46379		6536	33970	0	40505
57	4728	28317	0	33044		6388	30515	0	36902
58	2398	29054	0	31452		3886	31410	0	35297
59	2187	25784	0	27971		3927	25216	0	29143
60	4670	33681	0	38351		2921	27776	0	30697
61	830	18601	0	19431		2618	16663	0	19281
62	732	19290	0	20022		1020	16211	0	17231
63	1002	15165	0	16166		308	10196	189	10693
64	632	10335	0	10967		1044	9177	0	10222
65	0	11920	0	11920		764	9710	0	10474

66	205	8656	0	8861	926	6335	0	7261
67	0	8599	0	8599	620	4884	0	5503
68	0	7505	0	7505	428	6601	0	7029
69	0	3903	0	3903	308	5423	0	5731
70	0	4414	0	4414	389	3832	0	4221
71	0	2815	0	2815	0	2453	0	2453
72	205	3949	0	4154	225	2657	0	2882
73	0	1671	0	1671	154	1114	0	1268
74	0	1434	0	1434	154	1342	0	1497
75	0	1151	0	1151	0	535	0	535
76	0	965	0	965	0	299	0	299
77	0	454	0	454	0	234	0	234
78	0	386	0	386	0	170	0	170
79	0	378	0	378	0	117	0	117
80	0	180	0	180	0	0	0	0
81	0	188	0	188	0	0	0	0
82	0	249	0	249	0	0	0	0
83	0	0	0	0	0	0	0	0
84	0	0	0	0	0	179	0	179
85	0	118	0	118	0	0	0	0
86	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0
90	0	180	0	180	0	0	0	0
Total	1460652	2057657	447	3518755	274517	713172	340	988028
Samples				80				51
Ind. Sampled				10230				6463
Catch (tons)				2541				1090

Table 15 (cont.). Greenland halibut Spanish catches length distribution for Div. 3NO.

Length (cm)	Division 3NO			Total
	Males	Females	Ind.	
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	258	0	258
25	0	0	0	0
26	0	0	0	0
27	642	0	0	642
28	366	0	0	366
29	571	454	0	1025
30	571	892	0	1463
31	6206	930	0	7135
32	3628	5589	0	9218
33	7629	6234	0	13864
34	12718	9338	0	22056
35	12344	13813	0	26157
36	14881	13020	0	27901
37	17595	20058	0	37653
38	23071	25130	0	48201
39	23790	36159	0	59948
40	19167	32797	0	51964
41	26222	39560	0	65782
42	22427	42592	0	65019
43	23507	34242	0	57749
44	16925	38016	0	54941
45	20359	34736	0	55095
46	21229	37145	0	58374
47	15359	35410	0	50770
48	14021	35435	0	49455
49	12805	26913	0	39718
50	12163	29754	0	41918
51	10039	24259	0	34298
52	6851	23335	0	30187
53	5704	19845	0	25549
54	4443	18636	0	23078
55	2326	18323	0	20649
56	1437	10807	0	12244
57	2166	15940	0	18106
58	944	11197	0	12142
59	644	11774	0	12418
60	827	12752	0	13580
61	713	8129	0	8841
62	0	8359	0	8359
63	214	6943	0	7157
64	118	5105	0	5224
65	0	3648	0	3648

66	0	4769	0	4769
67	0	3146	0	3146
68	0	2906	0	2906
69	0	2458	0	2458
70	0	1345	0	1345
71	0	1364	0	1364
72	0	872	0	872
73	0	0	0	0
74	0	1305	0	1305
75	0	547	0	547
76	0	377	0	377
77	0	469	0	469
78	0	66	0	66
79	0	0	0	0
80	0	0	0	0
81	0	202	0	202
82	0	250	0	250
83	0	83	0	83
84	0	66	0	66
85	0	66	0	66
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	364622	737816	0	1102438
Samples				34
Ind Sampled				4661
Catch (tons)				883

Table 15 (cont.). Greenland halibut Spanish catches length distribution for Div. 3LMNO.

Length (cm)	Division 3LMNO			Total
	Males	Females	Indter.	
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	258	0	258
25	0	43	0	43
26	0	0	0	0
27	642	270	0	911
28	366	0	0	366
29	909	454	0	1363
30	2040	1352	0	3392
31	7237	1887	0	9125
32	9316	7393	0	16709
33	14029	8462	0	22490
34	23435	15125	0	38560
35	24767	21270	0	46037
36	39146	33725	0	72871
37	48708	46030	0	94739
38	80176	63136	242	143554
39	97599	94413	0	192012
40	138262	138377	0	276640
41	161266	166726	355	328348
42	194972	188269	0	383241
43	178109	198903	0	377012
44	165658	215881	0	381539
45	159272	210122	0	369394
46	160484	204516	0	365000
47	123012	189762	0	312774
48	98103	197828	0	295931
49	79892	155306	0	235198
50	71318	158766	0	230084
51	42360	120529	0	162889
52	31014	122037	0	153050
53	30430	104468	0	134898
54	24733	97610	0	122342
55	26726	106584	0	133310
56	16514	82615	0	99129
57	13281	74772	0	88053
58	7228	71662	0	78891
59	6757	62775	0	69532
60	8419	74209	0	82628
61	4161	43393	0	47554
62	1753	43859	0	45612
63	1524	32303	189	34016
64	1794	24618	0	26412
65	764	25278	0	26042

66	1131	19761	0	20891
67	620	16629	0	17248
68	428	17012	0	17441
69	308	11785	0	12093
70	389	9590	0	9980
71	0	6633	0	6633
72	429	7478	0	7907
73	154	2785	0	2939
74	154	4081	0	4235
75	0	2233	0	2233
76	0	1641	0	1641
77	0	1156	0	1156
78	0	621	0	621
79	0	495	0	495
80	0	180	0	180
81	0	390	0	390
82	0	499	0	499
83	0	83	0	83
84	0	244	0	244
85	0	184	0	184
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	180	0	180
Total	2099790	3508645	787	5609222
Samples				165
Ind Sampled				21354
Catch (tons)				4514
SOP				0.92

Table 16. Greenland halibut Div. 3LMNO Spanish catches age distribution, mean weight (g) and mean length (AFL cm) by age.

Abundance					Mean Weight (g)				
Age	Males	Females	Ind.	Total	Age	Males	Females	Ind.	Total
1	0	0	0	0	1				
2	0	0	0	0	2				
3	2472	1789	0	4261	3	236	210		225
4	81553	53592	15	135160	4	317	335	418	324
5	527913	593644	445	1122003	5	494	501	479	498
6	1116346	1311241	137	2427724	6	680	713	509	698
7	283552	734904	0	1018456	7	1037	1045		1043
8	49837	285294	0	335131	8	1308	1340		1335
9	21706	180314	33	202053	9	1601	1560	2044	1565
10	7797	148472	90	156359	10	1838	1819	2044	1820
11	6032	114197	25	120253	11	2149	2158	2044	2157
12	1188	38351	25	39563	12	2474	2459	2044	2459
13	782	19533	16	20332	13	2592	2577	2044	2577
14	451	17945	0	18396	14	3005	3136		3133
15	97	4520	0	4617	15	3188	3482		3476
16	26	2964	0	2990	16	3394	3500		3499
17	39	870	0	908	17	3252	3633		3617
18	0	92	0	92	18		5255		5255
19	0	924	0	924	19		4077		4077
20	0	0	0	0	20				
Mean Length (cm)									
Age	Males	Females	Ind.	Total					
1									
2									
3	31.8	30.9		31.4					
4	35.1	35.6	38.5	35.3					
5	40.4	40.6	40.1	40.5					
6	44.7	45.4	40.9	45.1					
7	51.1	51.3		51.2					
8	55.0	55.5		55.4					
9	58.7	58.2	63.5	58.3					
10	61.4	61.1	63.5	61.1					
11	64.4	64.5	63.5	64.5					
12	67.3	67.2	63.5	67.2					
13	68.3	68.2	63.5	68.2					
14	71.6	72.5		72.5					
15	73.0	74.9		74.9					
16	74.5	75.1		75.1					
17	73.5	75.8		75.7					
18		85.5		85.5					
19		78.4		78.4					
20									



Table 17. Skates Spanish 2021 catches length distribution by sex for Div. 3LNO.

Skates Length (cm)	3LNO			Total
	Males	Females	Ind.	
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	124	87	0	211
19	203	366	0	569
20	203	203	0	406
21	183	0	0	183
22	517	554	0	1071
23	87	381	0	469
24	531	937	0	1469
25	494	962	0	1456
26	1295	967	0	2263
27	763	1213	0	1976
28	1666	1604	0	3270
29	2399	1706	0	4105
30	1576	2579	0	4156
31	3962	1881	0	5843
32	3828	4564	0	8391
33	4325	2485	0	6810
34	4063	5131	0	9194
35	3941	4818	0	8759
36	5497	6486	0	11983
37	5199	4440	0	9639
38	5392	7414	0	12806
39	8501	5576	0	14077
40	8630	8902	0	17533
41	6514	7646	0	14159
42	5604	11815	0	17419
43	8753	7270	0	16024
44	9492	10304	0	19795
45	9080	9791	0	18871
46	9126	9849	0	18974
47	12461	13840	0	26301
48	12845	10391	0	23236
49	16839	12179	0	29018
50	18279	14460	0	32739
51	17444	14727	0	32171
52	17789	15623	0	33412
53	18224	11929	0	30153
54	16674	16829	0	33503
55	14707	13286	0	27993
56	11459	16596	0	28055
57	12378	14946	0	27324
58	13251	10167	0	23417
59	14149	12161	0	26310
60	16954	19458	0	36412

61	10774	12065	0	22839
62	15035	14391	0	29426
63	15521	14134	0	29655
64	15032	15547	0	30578
65	14471	13665	0	28136
66	12275	13451	0	25725
67	15974	13158	0	29131
68	13347	10235	0	23582
69	12538	13619	0	26157
70	12539	14920	0	27459
71	15845	15702	0	31547
72	16396	19222	0	35618
73	16893	17886	0	34779
74	10228	15551	0	25779
75	13781	9991	0	23771
76	13412	9733	0	23145
77	14687	10142	0	24829
78	13896	5608	0	19504
79	15237	3307	0	18544
80	9582	2966	0	12548
81	12137	2512	0	14649
82	9519	476	0	9995
83	12983	643	0	13626
84	9272	508	0	9780
85	8448	303	0	8751
86	5000	384	0	5384
87	2842	0	0	2842
88	1697	0	0	1697
89	2581	0	0	2581
90	929	0	0	929
91	789	0	0	789
92	157	0	0	157
93	407	0	0	407
94	140	0	0	140
95	129	0	0	129
96	392	0	0	392
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
Total	670284	566642	0	1236925

Samples	56
Ind. Sampled	7242
Catch (ton)	2860
SOP	095

Table 18. 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	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	340	0	0	340
11	0	1348	0	1348
12	3848	2719	0	6566
13	2379	4066	0	6445
14	3946	5524	0	9469
15	7125	6324	0	13449
16	6203	8911	0	15114
17	6301	8450	0	14751
18	4625	7102	0	11727
19	4953	5063	0	10016
20	680	9032	0	9711
21	680	2598	0	3277
22	449	4856	0	5305
23	0	6860	0	6860
24	340	6301	0	6641
25	0	3375	0	3375
26	0	4055	0	4055
27	0	3934	0	3934
28	0	3145	0	3145
29	0	1129	0	1129
30	0	1238	0	1238
31	0	1238	0	1238
32	0	449	0	449
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
Total	41869	97716	0	139584
Samples				39
Ind. Sampled				4992
Catch (tons)				82
SOP				0.90

Table 19. 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	1					
2	0	0		0	2					
3	0	0		0	3					
4	615	899		1513	4	124	125		125	
5	6066	6608		12673	5	198	194		196	
6	7965	10967		18933	6	263	270		267	
7	9655	9567		19222	7	355	361		358	
8	7846	11570		19416	8	434	426		430	
9	6453	12453		18906	9	539	575		563	
10	2009	7771		9780	10	603	669		655	
11	540	6830		7369	11	811	883		878	
12	409	5843		6252	12	862	1010		1001	
13	259	7182		7441	13	1079	1189		1185	
14	52	8401		8453	14	1127	1374		1372	
15	0	4334		4334	15		1665		1665	
16	0	3936		3936	16		1933		1933	
17	0	1355		1355	17		2101		2101	
18	0	0		0	18					
19	0	0		0	19					
20	0	0		0	20					
21	0	0		0	21					
22	0	0		0	22					
23	0	0		0	23					
24	0	0		0	24					
	Mean Length (cm)									
Age	Males	Females	Ind.	Total						
1										
2										
3										
4	11.4	11.5		11.5						
5	13.4	13.3		13.4						
6	14.8	14.9		14.8						
7	16.4	16.5		16.4						
8	17.6	17.5		17.5						
9	19.0	19.4		19.2						
10	19.7	20.4		20.3						
11	21.9	22.5		22.4						
12	22.3	23.6		23.5						
13	24.1	24.9		24.9						
14	24.5	26.1		26.1						
15		27.9		27.9						
16		29.4		29.4						
17		30.2		30.2						
18										
19										
20										
21										
22										
23										
24										

Table 20. White hake 2021 Spanish catches length distribution by sex for Div. 3NO.

White hake Length (cm)	3NO			Total
	Males	Females	Ind.	
13	0	3073	0	3073
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	317	0	317
20	3073	0	0	3073
21	4486	527	0	5013
22	8613	7559	0	16173
23	3925	5073	0	8998
24	17427	1624	0	19050
25	22438	9586	0	32024
26	18207	3338	0	21544
27	15295	14143	0	29439
28	24081	21461	0	45542
29	14849	9440	0	24289
30	26784	25859	0	52643
31	28676	30762	0	59438
32	14747	39411	0	54158
33	7113	23489	0	30601
34	7441	23242	0	30683
35	5471	30158	0	35629
36	5597	15802	0	21399
37	9399	24428	0	33828
38	11222	12308	0	23530
39	16305	3755	0	20060
40	18961	5729	0	24690
41	9394	6694	0	16089
42	16390	12773	0	29163
43	14588	9340	0	23928
44	11517	10604	0	22122
45	13009	11042	0	24051
46	10776	5024	0	15800
47	9029	11408	0	20438
48	9510	5386	0	14896
49	8522	4497	0	13019
50	5520	3864	0	9384
51	3700	3481	0	7182
52	3312	3849	0	7161
53	1300	1734	0	3034
54	1622	2337	0	3959
55	1014	1146	0	2160
56	2038	346	0	2384
57	804	830	0	1634
58	296	750	0	1046

59	404	347	0	751
60	148	84	0	232
61	135	59	0	194
62	0	135	0	135
63	8	148	0	156
64	0	148	0	148
65	0	429	0	429
66	0	208	0	208
67	135	0	0	135
68	0	429	0	429
69	59	0	0	59
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	148	0	148
76	0	0	0	0
77	8	0	0	8
78	0	0	0	0
79	0	0	0	0
80	0	0	0	0
Total	407350	408325	0	815675

Samples	11
Ind. Sampled	2040
Catch (ton)	271
SOP	0.94

Table 21. Silver hake 2021 Spanish catches length distribution by sex for Div. 3NO.

Silver hake Length (cm)	3NO			Total
	Males	Females	Ind.	
12	0	0	11021	11021
13	0	0	0	0
14	5896	0	7970	13867
15	9507	0	8094	17602
16	28503	2517	12341	43361
17	23374	8281	7173	38827
18	33205	31272	3848	68325
19	34771	26715	9679	71164
20	71100	29454	10556	111110
21	86684	87709	17264	191656
22	147352	113587	30941	291880
23	468876	267800	106342	843017
24	1232208	503581	123097	1858886
25	2032319	1084234	133449	3250002
26	1915622	1575870	116171	3607663
27	1572862	1688140	45345	3306346
28	1037372	1231439	28342	2297154
29	802123	984894	8537	1795554
30	671258	777000	85331	1533589
31	387993	643742	65150	1096884
32	211699	723418	62959	998076
33	122085	649080	82617	853783
34	43958	442677	44765	531399
35	42247	438446	17468	498160
36	33368	257126	24176	314669
37	44091	250991	3587	298668
38	27331	149073	6708	183111
39	32767	161204	3587	197557
40	2238	82543	3587	88368
41	1981	63551	3587	69118
42	6071	24462	0	30532
43	0	30211	0	30211
44	0	31196	0	31196
45	0	17277	0	17277
46	0	5520	0	5520
47	0	2616	0	2616
48	0	11408	0	11408
49	0	563	0	563
50	0	1325	0	1325
51	0	0	0	0
52	0	0	0	0
53	0	5704	0	5704
54	0	7918	0	7918
55	0	0	0	0
56	0	0	0	0
57	0	665	0	665

58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
Total	11128858	12413205	1083690	24625752

Samples	59
Ind. Sampled	8710
Catch (ton)	3765
SOP	0.99

Table 22. Greenland halibut Spanish 2021 Commercial Total Age Length key (ALK).

CLAVE LENGTH	Ages																				TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
24				1																	1
25			1	1																	2
26																					0
27			2																		2
28			1																		1
29				4																	4
30			1	4																	5
31				4																	4
32			1	14	2																17
33				12	3																15
34			1	15	7	1															24
35				10	30	1															41
36				12	24	2															38
37				6	36	3															45
38				3	39	5															47
39				1	33	8															42
40					28	18															46
41					33	15															48
42			1	22	48																71
43				14	42																56
44				5	44	1															50
45				5	63	1															69
46				1	58	2															61
47					59	11															70
48				1	35	28	1														65
49					24	29															53
50					10	41	1														52
51					8	41	5														54
52					1	40	7	2													50
53						28	14	1													43
54						31	10	1													42
55						13	23	6	1												43
56						6	18	8	1												33
57						5	14	10	1												30
58						1	10	9	5												25
59						1	6	21	6												34
60								7	14	3											24
61								6	10	5											21
62								2	10	22											34
63								8	22	6	6	4									46
64									5	8	4										17
65									6	12	4	4									26
66										16	8	2									26
67									2	16	4	2	2								26
68									2	8	6	2	4								22
69										6	12	2	2								22
70										4	4										8
71											4	6	2	2							14
72											4	2	4	2							12
73												2	4				2				8
74												2	6	2	2						12
75												2							1		3
76													1	1	1						3
77													1		1						2
78													1	1							2
79														1							1
80														1							1
81														1	1	1					3
82														1							1
83															1						1
84															1	1	1				3
85																	1	1			2
86																					0
87																					0
88																					0
89																					0
90																				1	1
TOTAL	0	0	7	88	283	445	279	109	81	85	106	52	26	36	12	8	4	1	2	0	1624



Table 22 (Cont.). Greenland halibut Spanish 2021 Commercial males Age Length key (ALK).

CLAVE LENGTH	Ages																				TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
27			1																		1
28			1																		1
29				1																	1
30				3																	3
31				3																	3
32				7	1																8
33				5	2																7
34			1	9	6																16
35				5	15	1															21
36				9	14																23
37				4	20	2															26
38				2	22	2															26
39				1	13	5															19
40					9	11															20
41					15	9															24
42					10	29															39
43					8	20															28
44					2	25															27
45					4	27															31
46						28	1														29
47						29	5														34
48					1	14	11	1													27
49						15	11														26
50						3	16														19
51						5	16	3													24
52						1	16														17
53							10	4													14
54							13	1													14
55							6	2	1												9
56							1	6													7
57							2	3	2												7
58								1	2												3
59								1	2												3
60									3	3											6
61									1	2	1										4
62									1	5	11										17
63									4	11	3	3	2								23
64											1										1
65										3	6	2	2								13
66											8	4	1								13
67										1	8	2	1	1							13
68										1	4	3	1	2							11
69											3	6	1	1							11
70											2		2								4
71												2		3	1	1					7
72												2	1	2	1						6
73													1	2			1				4
74													1	3	1	1					6
75																					0
TOTAL	0	0	3	49	142	226	108	22	16	26	47	24	13	14	3	2	1	0	0	0	696

Table 22 (Cont.). Greenland halibut Spanish 2021 Commercial females Age Length key (ALK).

CLAVE	Ages																				TOTAL
LENGTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
24				1																	1
25			1	1																	2
26																					0
27			1																		1
28																					0
29				3																	3
30			1	1																	2
31				1																	1
32			1	7	1																9
33				7	1																8
34				6	1	1															8
35				5	15																20
36				3	10	2															15
37				2	16	1															19
38				1	17	3															21
39					20	3															23
40					19	7															26
41					18	6															24
42			1	12	19																32
43				6	22																28
44				3	19	1															23
45				1	36	1															38
46				1	30	1															32
47					30	6															36
48					21	17															38
49					9	18															27
50					7	25	1														33
51					3	25	2														30
52						24	7	2													33
53						18	10	1													29
54						18	9	1													28
55						7	21	5	1												34
56						5	12	8	1												26
57						3	11	8	1												23
58						1	9	7	5												22
59						1	5	19	6												31
60								4	11	3											18
61								5	8	4											17
62								1	5	11											17
63								4	11	3	3	2									23
64									5	7	4										16
65									3	6	2	2									13
66										8	4	1									13
67									1	8	2	1	1								13
68									1	4	3	1	2								11
69										3	6	1	1								11
70											2		2								4
71												2		3	1	1					7
72												2	1	2	1						6
73													1	2				1			4
74													1	3	1	1					6
75														2					1		3
76														1	1	1					3
77														1		1					2
78														1	1						2
79															1						1
80															1						1
81															1	1	1				3
82															1						1
83																1					1
84																1	1	1			3
85																		1	1		2
86																					0
87																					0
88																					0
89																					0
90																				1	1
TOTAL	0	0	4	39	141	219	171	87	65	59	59	28	13	22	9	6	3	1	2	0	928

Table 23. Roughhead grenadier Spanish 2021 Commercial Total Age Length key (ALK).

CLAVE LENGTH	Ages																								TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
0																									0	
1																										0
2																										0
3																										0
4																										0
5																										0
6																										0
7			2																							0
8																										2
9																										0
10				2																						2
11				3	1																					4
12				3	2	1																				6
13				1	16	4																				21
14				12	8		1																			21
15				11	11	3																				25
16					22	14																				36
17					6	31	22	1																		60
18						16	30	6																		52
19						5	14	19	4																	42
20							4	17	8																	29
21								16	12	1	1															30
22									8	13	3															24
23									1	2	10	4	2	1												20
24											5	9	1	1												16
25												6	16	4												26
26													5	6	1	2										14
27													1	4	2											7
28													3	10	4	1	1									19
29														2	3	3	1									9
30															4	3										7
31															1	2										3
32																2	2									4
33																3	2									5
34																										0
35																										0
36																										0
37																										0
38																										0
39																										0
40																										0
TOTAL	0	0	2	9	42	52	70	70	60	34	29	23	28	28	15	16	6	1	0	0	0	0	0	0	0	485



Table 23 (Cont.) Roughhead grenadier Spanish 2021 Commercial males Age Length key (ALK).

CLAVE LENGTH	Ages														TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
0																0
1																0
2																0
3																0
4																0
5																0
6																0
7			2													2
8																0
9				1												1
10				1												1
11				1	2											3
12				1	10	3										14
13					6	6	1									13
14					9	5	2									16
15						15	8									23
16						1	24	13								38
17							11	20	3							34
18							2	4	10	1						17
19								3	9	4						16
20									5	4						10
21										2	3	1				6
22									1		4	3	1			9
23												1				1
24												3	8	2		13
25																0
26																0
27																0
28																0
29																0
30																0
TOTAL	0	0	2	4	27	30	48	40	28	11	7	9	9	2		217



Table 23 (Cont.) Roughhead grenadier Spanish 2021 Commercial females Age Length key (ALK).

CLAVE LENGTH	Ages																	TOTAL
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
8																		0
9		1																1
10		2	1															3
11		2		1														3
12			6	1														7
13			6	2														8
14			2	6	1													9
15				7	6													13
16				5	7	9	1											22
17					5	10	3											18
18					3	10	9	3										25
19						1	8	4										13
20								11	8	1								20
21									6	10	2							18
22									2	6	1	1	1					11
23										5	8	1	1					15
24											3	8	2					13
25												5	6	1	2			14
26												1	4	2				7
27												3	10	4	1	1		19
28													2	3	3	1		9
29														4	3			7
30														1	2			3
31															2	2		4
32															3	2		5
33																		0
34																	1	1
35																		0
TOTAL	0	5	15	22	22	30	32	23	22	14	19	26	15	16	6	1	0	268



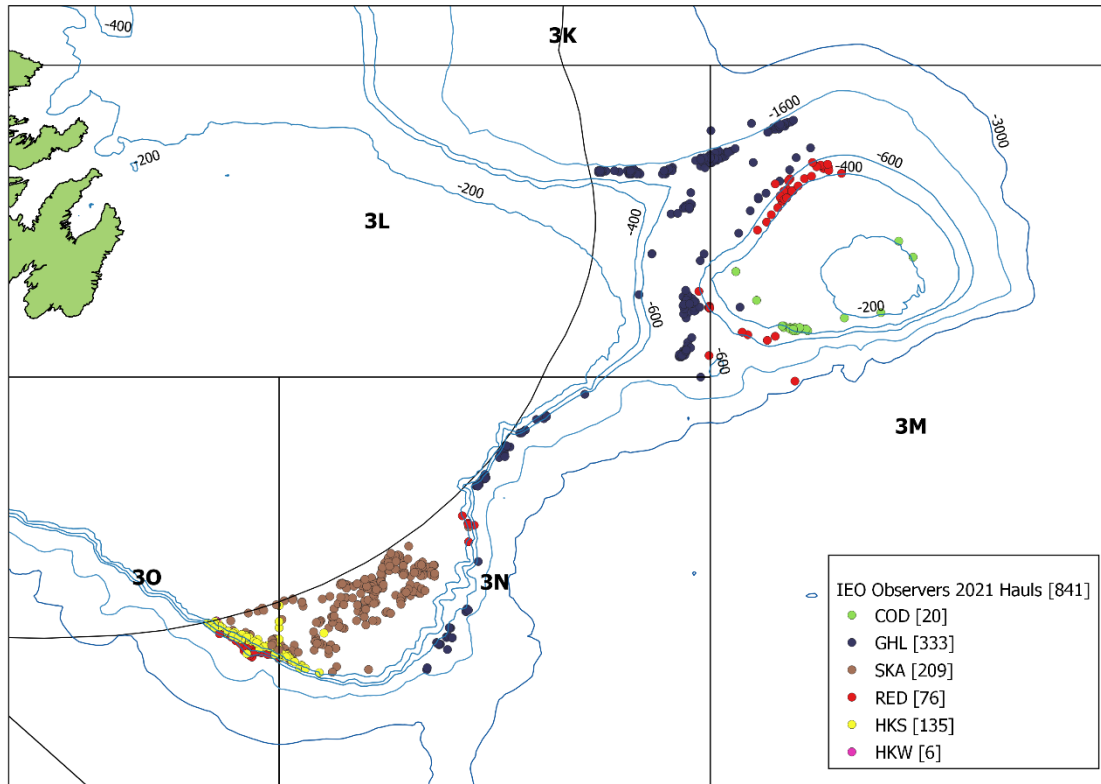


Figure 1. IEO Scientific Observers sampled commercial hauls position depending on the target species.

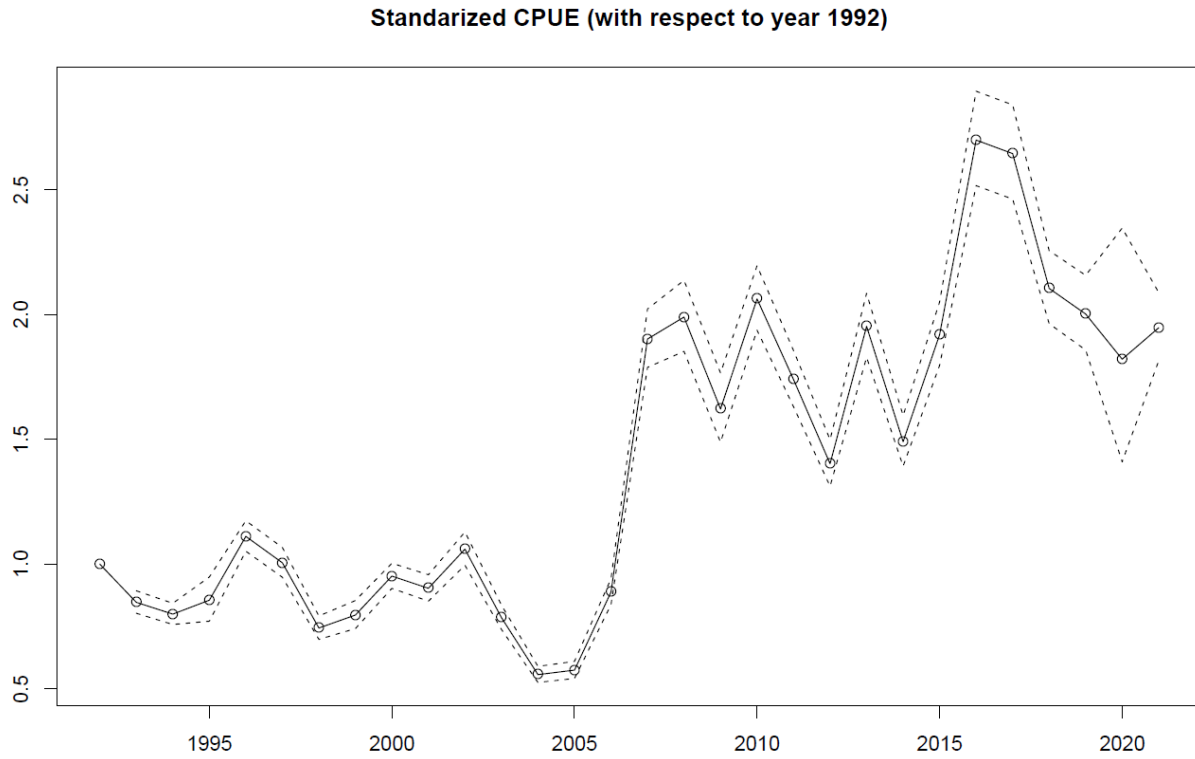


Figure 2. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2020 and 2021 data.