

**SCIENTIFIC COUNCIL MEETING – JUNE 2023****Spanish Research Report for 2022**

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 2022 was available haul by haul. Total effort of the Spanish fleet in 2022 was 1,117 fishing days. Table 1 presents the preliminary Spanish catches by species and Division in 2022 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 2022, IEO scientific observers were on board 344 fishing days that it means 31 % 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 2022, 482 samples were taken with 62875 individuals of different species examined (Table 2).

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

A total of 8 Spanish trawlers operated in Div. 3LMNO NAFO Regulatory Area (NRA) during 2022, amounting to 1,117 days (16,592 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 15,101 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.

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) A redfish fishery in Divisions 3LMNO, mainly in Div 3O and 3M with demersal 130 mm mesh size gear in the 200-600 strata. 3) A skate fishery in Divisions 3NO with 280 mm mesh size at less than 200 meters depth. 4) Cod fishery in Division 3M at depth between 150-550 meters with 130 mm mesh size gear. In addition to these main fisheries, and depending on the annual availability of resources, other targeted fisheries are carried out by the Spanish commercial fleet: shrimp fishery in Division 3M with 40 mm cod-end mesh size gear, a fishery targeted squid in Div. 3O, mainly during the third quarter in 400-100 meters depth with a 60 mm mesh size trawl gear and in the silver hake fishery in Div. 3O with a 130 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 2022 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, all effort was performed using 130 mm cod-end mesh size, part was carried out 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 63% and with 135 mm cod-end mesh size was 37%, 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 21% 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. A directed fishery for silver hake has been in place since 2020 in Div. 3O with a 130 mm mesh size trawl gear.

Eight IEO scientific observer was onboard Spanish vessels during 2022, comprising a total of 344 observed fishing days, around 31% 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, 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 2022, 482 length samples were taken, with 62,875 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 2022, stock by stock, was the following:

Cod (*Gadus morhua*)

Div. 3L: In Div. 3L, the few catches of this species (1 tons) were taken mainly as by-catch in the redfish fishery. In 2022, 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 (47 tons) and in less degree in fisheries with 130mm mesh size (10 tons). It should be noted that in 2022 there were only available two length samples of the catches with 128 fish measured. These samples could be not representative of the total catches length distributions of this stock (Table 7).

Div. 3M: Catches in Div. 3M were 412 tons and most of them were taken in the direct fishery. In 2022, 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 trawl gear in the Cod fishery is 130 mm using a sorting with a minimum bar spacing of the sorting grid shall be 55 mm and a minimum landing size (MLZ) 41 cm. Cod Div. 3M 2022 catches length distributions are presented in Table 8. It can be observed that most of the catches length distributions are in the 50-68 cm range. The mode in 2022 was 55 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 2022 have been 1768 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 30-39 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. Highlight the mode of small individuals observed between 21-25 cm.

Div. 3LN: Spanish catches were 414 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 24-34 cm range.

Div. 3O: A directed fishery for this species took place in Div. 3O. Catches have reached 880 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 21-30 cm range. Highlight the mode of small individuals

observed this year between 13-18 cm. These length distributions catches are smaller than the observed in Divisions 3LN and 3M.

American plaice (*Hippoglossoides platessoides*)

Div. 3LNO: Spanish catches in 2022 in Div. 3LNO were 72 tons. Most of the catches were taken with 280 mm mesh size (50 tons) as by-catch of the skate fishery and in less degree with 130 mm mesh size (22 tons). Table 12 presents the total length distribution for Div. 3LNO. The bulk of catches were in the range of 24-48 cm with a mode around 28 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 10 tons and most of them were taken as by-catch of the cod and redfish fisheries. In 2022, there was only one sample with three measured specimens that do not represent the distribution of the catches of this stock.

Witch flounder (*Glyptocephalus cynoglossus*)

Div. 2J and 3KL: Spanish catches for this stock in 2022 were 16 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 2022, 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 18 tons. This species in this Division was taken as by-catch in the Cod and redfish fishery. In 2022, there were no available sample length distributions of this species in this Division.

Div. 3NO: Spanish catches for this stock in 2022 were 26 tons. Most of the catches were taken with 130 mm cod end gear as by-catch of the Redfish and Greenland halibut fisheries (17 tons) and in less degree in the skate fishery (8 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 27-45 cm. Females reach larger sizes than males.

Yellowtail flounder (*Limanda ferruginea*)

Div. 3LNO: In 2022 the yellowtail flounder Spanish catches were 88 tons. Almost all of the catches were taken in Div. 3NO as by-catch of the skate fishery. Length distributions for yellowtail flounder in Div. 3LNO are presented in Table 14. Most of the catches are in the 28-42 cm length range with a mode between 34-36 cm. 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 2022 Spanish catches were 4,385 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 38-60 cm length range and the mode of the length distribution was in 45-47 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 16. Most of the Greenland halibut catches corresponds to ages 5 to 8 with a peak at ages 6.

Figure 2 presents the Spanish fleet standardised CPUE (Gonzalez-Costas and Gonzalez-Troncoso, 2009) updated with the 2022 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 (2018-2022) 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 2022 were 2,455 tons. Most of the catches were taken in Div. 3N at depths less than 200 meters (2165 tons), where a fishery directed to thorny skate took place using 280 mm mesh size. Skate catches in Div. 3L (27 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 2022, 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 35-82 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 (22 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 2022 catches were taken in Div. 3LMN. Spanish catches in 2022 were 80 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 11-20 AFL length range, with a mode in 15-16 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 2022 were based on ages 5 to 10 with a mode in 7 years old.

White hake (*Urophycis tenuis*)

Div. 3NO: Catches of this species in 2022 in Div 3NO (249 tons) were a by-catch of different fisheries. In Division 3NO a small part of the catches (5 tons) were taken with the 280 mesh size. Catches in Div. 3NO take with 130 mm mesh size (244 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 24-38 cm length range.

Capelin (*Mallotus villosus*)

Div. 3NO: Catches of this species are occasional. In 2022 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 2022 squid catches in Div 3NO by the Spanish fleet were occasional. There are 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. In 2022 the shrimp fishery in Div. 3M was closed.

Silver hake (*Merluccius bilinearis*)

Div. 3NO: Catches of this species in Div. 3NO were quite sporadic until 2018. Since 2019, the presence of this resource has been confirmed in the NRA Div. 30 and a directed fishery has been carried out with trawl gear with a 130 mm mesh size. Spanish total catches have been 4030 tons in 2022. Most of which (3754 tons) have been caught in Div. 30. 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 and in 2022 it could not be carried out due to technical problems with the research vessel.

The Spanish bottom trawl survey in NAFO Regulatory Area Div. 3NO was conducted from 5th of June to the 4th of July 2022 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 40-1410 m according to a stratified random design and 114 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 Atlantic cod and American plaice 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 4th to August 25th 2022. 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 182 and one of them was 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 22/052. 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 2022 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 2022 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. 3MNO). 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.

Due to logistical issues during 2022, R/V Vizconde de Eza only carried out two surveys, one in Division 3M (Flemish Cap) sampling between 128 -1470 m, with a total of 183 tows (182 valid; 1 no valid) and other in Divisions 3NO (Grand Banks of Newfoundland) sampling between 40 - 1460 m depth with a total of 114 tows (113 valid; 1 no valid). In total there were 297 bottom trawl tows, two of them considered invalid due to technical problems during the fishing operation. 110 hauls out of 295 valid tows have shown zero catches (i.e. no presence) of VME indicator species groups. This represents the 37.3% of the total valid hauls. A brief description of the survey methodology can be found in Durán Muñoz et al., (2020).

Sponges were recorded, with non-significant concentrations (< 100 kg/tow), in 81 of the 295 valid tows (27.5% of the valid tows analyzed), with depths ranging between 128 - 1460 m. One of the valid tows was found to have a significant concentration of sponges (\geq 100 kg/tow).

Large gorgonians were recorded, with non-significant concentrations (< 0.6 kg/tow), in 9 of the 295 valid tows (3% of valid tows analyzed), with depths ranging between 607- 1405 m. One of the valid tows had a significant concentration of large gorgonians (\geq 0.6 kg/tow).

Small gorgonians were recorded, with non-significant concentrations (< 0.2 kg/tow), in 39 of the 295 valid tows (13.2% of valid tows analyzed), with depths ranging between 482- 1470 m. One of the valid tows had a significant concentration of small gorgonians (≥ 0.2 kg/tow).

Sea pens were recorded, with non-significant concentrations (< 1.3 kg/tow), in 101 tows (34.2% of valid tows analyzed), with depths ranging between 221 - 1470 m. One significant concentration (≥ 1.3 kg/tow) was recorded.

Black corals were recorded, with non-significant concentrations (< 0.4 kg/tow), in 18 tows (6.1% of valid tows analyzed), with depths ranging between 281 - 1336 m. One significant concentration (≥ 0.4 kg/tow) was recorded.

Sea squirts (*Boltenia ovifera*) was recorded, with non-significant concentrations (< 0.35 kg/tow), in 1 tow (0.3% of valid tows analyzed), at a depth of 562 m. Three significant concentrations (≥ 0.35 kg/tow) were recorded.

Bryozoans were recorded, with non-significant concentrations (< 0.2 kg/tow), in 25 tows (8.5% of valid tows analyzed), with depths ranging between 49 - 1377 m. Two significant concentrations (≥ 0.2 kg/tow) were recorded.

Above information, including distribution maps of VME species groups, is further detailed in SCR Doc. 22/054 (Sacau et al., 2022).

NEREIDA

A new NEREIDA Grant Proposal “Research in support of the reassessment of NAFO bottom fisheries in 2022 (NAFO)” was approved with a financing of 149.000 euros. The project has a duration of 18 months, starting on 1st January 2023. 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 of the geographical location of oil and gas activities in NAFO Divs. 3LNM was presented to the 2022 WGESA. New spatial data (licences and wells) was available this year from publicly available data sources. In comparison with the information assessed previously reported by the WGESA (SCR 21/051), there are two new “exploration wells” in Division 3L, one of them located inside NAFO fishing grounds. The 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 No. 2 and 10). Moreover, a set of detailed maps was produced showing the evolution over time of the degree of overlap between oil and gas activities, VMEs and VME Area closure No. 10 (period 2018 -2022). There has been an increase in overlap due to both the increase in the number of “significant discovery licenses” and the expansion of Area closure No 10. In addition, the map showing the overlap between oil and gas activities and NAFO groundfish surveys, in Div 3LM was also presented, based on survey stratification and the start position of survey hauls (EU and EU Spain: 1988-2021). This is a matter of concern in terms of possible future restrictions on the area and depth of sampling.

SUBAREA 6

A. Status of the fisheries

During 2022 there was no fishing activity of the Spanish fleet in this Division.

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Table1. Spanish Catches (tons) in NAFO Area in 2022 by species and Division, based on the provisional Logbook data.

Code	English_name	Scientific_name	Provisional STATLANT 21A 2022				
			3L	3M	3N	3O	Total
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	2633	1222	528	2	4385
HKS	Silver hake	<i>Merluccius bilinearis</i>	0	0	276	3754	4030
RED	Atlantic redfishes nei	<i>Sebastes spp</i>	290	1768	124	880	3062
SKA	Raja rays nei	<i>Raja spp</i>	27	22	2181	247	2477
COD	Atlantic cod	<i>Gadus morhua</i>	1	412	45	12	469
HKW	White hake	<i>Urophycis tenuis</i>	0	0	8	241	249
YEL	Yellowtail flounder	<i>Limanda ferruginea</i>	0	0	86	3	88
PLA	American plaice	<i>Hippoglossoides platessoides</i>	2	10	50	20	82
RHG	Roughhead grenadier	<i>Macrourus berglax</i>	26	31	22	0	80
HAL	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	10	13	30	23	76
WIT	Witch flounder	<i>Glyptocephalus cynoglossus</i>	16	17	15	10	59
ANG	American angler	<i>Lophius americanus</i>	0	0	8	24	32
HAD	Haddock	<i>Melanogrammus aeglefinus</i>	0	0	8	2	9
RNG	Roundnose grenadier	<i>Coryphaenoides rupestris</i>	0	2	0	0	2
SQI	Northern shortfin squid	<i>Illex illecebrosus</i>	0	0	0	0	0
		Total tons	3005	3497	3382	5217	15101

Table 2. Samples and individuals sampled by the IEO Scientific Observers by species, mesh size and NAFO Division in 2022. In red, samples conducted in the cod Div. 3M directed fishery. In bold, discard sampling conducted.

Code	Species	English_name	Catch/Disc.	Division	Mesh size	Samples	Ind.
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3M	130 mm	1	3
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	130 mm	2	161
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	280 mm	5	370
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	130 mm	5	567
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	280 mm	1	20
COD	<i>Gadus morhua</i>	Atlantic cod	C	3M	130 mm	16	2553
COD	<i>Gadus morhua</i>	Atlantic cod	C	3M	130 mm	9	325
COD	<i>Gadus morhua</i>	Atlantic cod	C	3N	280 mm	2	128
COD	<i>Gadus morhua</i>	Atlantic cod	C	3O	130 mm	1	11
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3L	130 mm	1	22
ANT	<i>Antimora rostrata</i>	Blue antimora	C	3L	130 mm	1	101
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3L	130 mm	83	11461
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3M	130 mm	19	2087
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3N	130 mm	17	1908
NZB	<i>Nezumia bairdii</i>	Marlin-spike grenadier	C	3L	130 mm	2	343
NZB	<i>Nezumia bairdii</i>	Marlin-spike grenadier	C	3N	130 mm	1	111
NZB	<i>Nezumia bairdii</i>	Marlin-spike grenadier	C	3O	130 mm	1	152
RED	<i>Sebastes spp</i>	Redfish	C	3L	130 mm	13	1375
RED	<i>Sebastes spp</i>	Redfish	C	3M	131 mm	30	3238
RED	<i>Sebastes spp</i>	Redfish	C	3M	130 mm	4	633
RED	<i>Sebastes spp</i>	Redfish	C	3N	130 mm	3	315
RED	<i>Sebastes spp</i>	Redfish	C	3O	130 mm	12	1522
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3L	130 mm	47	6426
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3M	130 mm	9	1142
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3N	130 mm	10	1170
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3L	130 mm	3	479
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3N	130 mm	7	1149
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3O	130 mm	49	7023
RJR	<i>Raja radiata</i>	Starry ray	C	3N	280 mm	51	8846
RJR	<i>Raja radiata</i>	Starry ray	C	3O	280 mm	8	1067
GDE	<i>Gaidropsarus ensis</i>	Threadfin rockling	C	3L	130 mm	1	95
HKW	<i>Urophycis tenuis</i>	White hake	C	3N	130 mm	2	295
HKW	<i>Urophycis tenuis</i>	White hake	C	3O	130 mm	11	1419
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	130 mm	2	302
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3O	130 mm	6	848
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	280 mm	23	2889
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3O	280 mm	3	339

GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	D	3L	130 mm	2	143
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	D	3N	130 mm	1	94
RED	<i>Sebastes spp</i>	Redfish	D	3M	130 mm	5	448
RED	<i>Sebastes spp</i>	Redfish	D	3O	130 mm	1	53
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3M	130 mm	1	99
RJR	<i>Raja radiata</i>	Starry ray	D	3N	280 mm	4	338
RJR	<i>Raja radiata</i>	Starry ray	D	3O	280 mm	2	210
HKW	<i>Urophycis tenuis</i>	White hake	D	3O	130 mm	1	100
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	D	3O	130 mm	1	154
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	D	3N	280 mm	3	341

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	16592				

Table 4. Fishing effort (hours) of the Spanish fleet in 2022 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	1435	672	1189	1540	4836	29%
3M	876	459	2038	594	3967	24%
3N	868	1124	1230	1095	4316	26%
3O	659	1159	833	823	3474	21%
Total Hours	3839	3413	5290	4051	16592	100%
%	23%	21%	32%	24%	100%	

Table 5. Spanish 2022 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	1435	672	1189	1540	4836
	>200 mm					
3M	<90 mm					
	100-200 mm	876	459	2038	594	3967
	>200 mm					
3N	<90 mm					
	100-200 mm	315	530	341	423	1609
	>200 mm	553	594	889	672	2708
3O	<90 mm					
	100-200 mm	463	1092	808	767	3130
	>200 mm	196	67	25	56	344

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	FC Survey	0.003376	3.213650	1.01	119	15456
Redfish 3O	3NO Survey	0.008280	3.141902	1.01	12	1522
Redfish 3LN	Commercial	0.003137	3.432867	1.08	16	1690
Redfish 3M	Commercial	0.006256	3.207344	1.04	34	3871
Roughhead grenadier	FC Survey	0.076526	3.013790	0.99	66	8738
Witch flounder	3NO Survey	0.001451	3.405612	0.98	8	1150
American plaice 3LNO	3NO Survey	0.004308	3.180134	1.04	13	1118
American plaice 3M	FC Survey	0.003223	3.308791		1	3
Cod 3NO	3NO Survey	0.005339	3.104051	1.42	2	128
Cod 3M	FC Survey	0.006350	3.075832	1.05	25	2878
Yellowtail Flounder	Commercial	0.008748	2.972746	1.00	26	3228
Skate	3NO Survey	0.005430	3.138918	0.95	59	9913
White Hake	3NO Survey	0.003893	3.153574	1.02	13	1714
Silver Hake	3NO Survey	0.003893	3.153574	0.96	56	8172

Table 7. Cod 3NO stock Spanish catches length distribution (2022).

Cod Length (cm)	3NO			Total
	Males	Females	Ind.	
30	0	0	0	0
31	0	0	0	0
32	0	101	0	101
33	0	0	0	0
34	0	0	0	0
35	0	101	0	101
36	0	0	0	0
37	0	0	0	0
38	101	0	0	101
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	101	101	0	201
48	0	0	0	0
49	0	101	0	101
50	101	0	0	101
51	0	101	0	101
52	101	101	0	201
53	101	0	0	101
54	0	302	0	302
55	0	0	0	0
56	0	101	0	101
57	0	101	0	101
58	0	0	0	0
59	52	101	0	153
60	0	101	0	101
61	101	0	0	101
62	0	0	0	0
63	0	101	0	101
64	153	0	0	153
65	52	201	0	254
66	0	101	0	101
67	101	254	0	354
68	0	254	0	254
69	153	101	0	254
70	402	402	0	805
71	0	201	0	201
72	52	306	0	358
73	201	201	0	402
74	809	101	0	909
75	354	603	0	957
76	201	302	0	503
77	101	101	0	201
78	354	354	0	708

79	101	302	0	402
80	101	101	0	201
81	0	302	0	302
82	101	52	0	153
83	101	153	0	254
84	0	153	0	153
85	52	0	0	52
86	354	101	0	455
87	101	101	0	201
88	0	0	0	0
89	101	0	0	101
90	52	153	0	205
91	101	0	0	101
92	52	0	0	52
93	52	0	0	52
94	52	0	0	52
95	0	0	0	0
96	101	0	0	101
97	52	0	0	52
98	0	52	0	52
99	0	0	0	0
100	0	0	0	0
101	0	52	0	52
102	0	0	0	0
103	0	0	0	0
104	0	52	0	52
105	0	0	0	0
Total	5062	6461	0	11524

Samples	2
Ind. Sampled	128
Catch (tons)	58
SOP	1.42

Table 8. Cod 3M stock Spanish catches length distribution (2022).

Cod Length (cm)	3M			Total
	Males	Females	Ind.	
30	0	0	0	0
31	130	0	0	130
32	0	0	0	0
33	130	0	0	130
34	0	0	0	0
35	0	0	0	0
36	0	56	0	56
37	0	54	0	54
38	0	149	0	149
39	16	16	0	32
40	36	0	0	36
41	22	115	0	137
42	55	187	0	242
43	0	132	0	132
44	138	422	0	561
45	74	62	0	136
46	317	341	0	657
47	441	306	0	747
48	1986	847	0	2833
49	1749	889	0	2638
50	3008	1564	0	4572
51	4112	2758	0	6870
52	6784	5108	0	11892
53	8104	6924	0	15027
54	8573	6575	0	15149
55	8411	9714	0	18126
56	7689	6448	0	14138
57	4918	7187	0	12105
58	4268	5441	0	9710
59	4407	3207	0	7614
60	3087	2572	0	5659
61	3349	3397	0	6746
62	2623	1872	0	4495
63	2734	2073	0	4807
64	1689	2522	0	4210
65	2056	1514	0	3570
66	1848	1377	0	3225
67	1484	2622	0	4106
68	2122	1966	0	4088
69	1869	1315	0	3184
70	768	1302	0	2070
71	2015	1134	0	3149
72	2148	1560	0	3708
73	1555	546	0	2101
74	942	1160	0	2102
75	732	667	0	1400
76	901	1194	0	2095
77	1152	1158	0	2310
78	585	1141	0	1727

79	636	984	0	1621
80	406	679	0	1085
81	296	826	0	1122
82	479	625	0	1104
83	520	259	0	779
84	141	308	0	449
85	472	626	0	1098
86	104	375	0	479
87	90	288	0	379
88	162	75	0	237
89	299	379	0	678
90	54	270	0	324
91	16	34	0	50
92	22	58	0	80
93	22	62	0	84
94	22	78	0	100
95	0	103	0	103
96	0	0	0	0
97	0	146	0	146
98	0	0	0	0
99	0	0	0	0
100	0	136	0	136
101	0	130	0	130
102	16	0	0	16
103	0	126	0	126
104	0	3	0	3
105	0	20	0	20
106	0	130	0	130
Total	102787	96316	0	199102

Samples	25
Ind. Sampled	2878
Catch (tons)	412
SOP	1.05

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

Redfish Length (cm)	Division 3M			Total
	Males	Females	Ind.	
16				0
17				0
18				0
19	701	200	0	901
20	23008	47	0	23055
21	45440	15359	32199	92998
22	112733	48409	29864	191006
23	114595	90752	41788	247135
24	122292	57206	12374	191872
25	35608	25980	0	61587
26	13547	36458	0	50005
27	9867	30212	0	40079
28	19704	22839	0	42543
29	22448	30374	0	52823
30	85546	39452	0	124997
31	85322	19188	0	104510
32	164116	42708	0	206823
33	209495	60396	0	269891
34	173622	79095	2699	255416
35	133309	127080	0	260389
36	77120	183147	0	260267
37	20968	197810	0	218778
38	10885	200166	0	211051
39	5131	118900	0	124031
40	6545	77350	0	83895
41	12596	51737	0	64333
42	10340	35505	0	45845
43	11616	10833	0	22449
44	9136	7311	0	16447
45	6964	4772	0	11736
46	2372	4422	0	6794
47	3115	6026	0	9141
48	727	5581	0	6308
49	391	7876	0	8267
50	0	7820	0	7820
51	782	4840	0	5623
52	90	4328	0	4417
53	555	2465	0	3020
54	0	739	0	739
55	0	47	0	47
56	0	211	0	211
Total	1550687	1657640	118925	3327252
Samples				34
Ind. Sampled				3871
Catch (tons)				1768
SOP				1.04

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	191	0	0	191
13	381	0	0	381
14	572	0	0	572
15	762	0	0	762
16	953	0	1476	2429
17	381	0	0	381
18	1905	0	0	1905
19	4822	381	6977	12180
20	7739	191	0	7930
21	13653	0	0	13653
22	12417	3870	0	16286
23	10208	7549	0	17757
24	31336	2214	0	33550
25	70700	35394	0	106094
26	67183	79869	0	147052
27	52340	106072	0	158412
28	44826	55019	1476	101321
29	41179	52535	0	93714
30	32348	59679	0	92028
31	13582	34660	0	48242
32	11225	26991	0	38216
33	2036	31902	0	33937
34	1011	35036	0	36047
35	809	31560	0	32369
36	607	27061	0	27667
37	405	18117	0	18521
38	202	17845	0	18047
39	202	7513	0	7715
40	0	6493	0	6493
41	0	1325	0	1325
42	0	202	0	202
43	0	0	0	0
44	0	202	0	202
45	0	0	0	0
Total	423975	641678	9929	1075582
Samples				16
Ind. Sampled				1690
Catch (tons)				414
SOP				1.08

Table 11. Redfish 30 stock Spanish catches length distribution.

Redfish Length (cm)	Males	30 Females	Ind.	Total
10	0	0	0	0
11	0	0	0	0
12	0	0	149	149
13	52263	0	157533	209797
14	287419	156755	287820	731994
15	522779	156755	261911	941445
16	236083	182904	78503	497491
17	108912	133520	26126	268557
18	137512	52786	0	190298
19	63781	4378	0	68159
20	19679	39817	0	59497
21	105174	40892	0	146066
22	133860	26197	0	160057
23	183241	173435	0	356676
24	287480	148959	0	436438
25	242217	202497	0	444714
26	198680	239722	0	438401
27	107140	313038	0	420178
28	44380	137873	0	182253
29	5538	90544	0	96082
30	0	162532	0	162532
31	0	74369	0	74369
32	0	25128	0	25128
33	0	25499	0	25499
34	0	0	0	0
35	0	12812	0	12812
36	0	3629	0	3629
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
Total	2736138	2404040	812042	5952221
Samples				12
Ind. Sampled				1522
Catch (tons)				880
SOP				1.01

Table 12. American plaice 3LNO stock Spanish catches length distribution (2022).

American Plaice Length (cm)	Division 3LNO			Total
	Males	Females	Ind.	
15	0	0	0	0
16	0	0	0	0
17	0	81	0	81
18	0	0	0	0
19	0	0	0	0
20	0	81	0	81
21	0	112	112	223
22	94	112	0	205
23	671	677	0	1347
24	2846	2187	0	5033
25	1937	1745	0	3683
26	5013	4611	0	9624
27	4241	6477	0	10718
28	5749	7114	0	12862
29	3340	7794	0	11134
30	2578	4172	0	6750
31	2810	4408	0	7217
32	2310	3544	0	5854
33	1884	1221	0	3105
34	1931	1368	0	3299
35	1381	1125	0	2505
36	2111	335	0	2446
37	913	1279	0	2192
38	1001	978	0	1980
39	299	2156	0	2455
40	556	2433	0	2990
41	94	2281	0	2375
42	94	2718	0	2812
43	141	2658	0	2799
44	94	3668	0	3762
45	0	2648	0	2648
46	98	1598	0	1696
47	0	2544	0	2544
48	0	3890	0	3890
49	0	1719	0	1719
50	0	1488	0	1488
51	0	1980	0	1980
52	0	1688	0	1688
53	81	1949	0	2030
54	0	1622	0	1622
55	0	1475	0	1475
56	0	1094	0	1094
57	0	1656	0	1656
58	0	179	0	179
59	0	433	0	433
60	0	932	0	932

61	0	501	0	501
62	0	339	0	339
63	0	438	0	438
64	0	197	0	197
65	0	580	0	580
66	0	0	0	0
67	0	81	0	81
68	0	98	0	98
69	0	265	0	265
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	0	0	0
Total	42267	94727	112	137106

Samples	13
Ind. Sampled	1118
Catch (tons)	72
SOP	1.04

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

Witch flounder Length (cm)	3NO			Total
	Males	Females	Ind.	
19	0	0	0	0
20	0	0	0	0
21	57	250	0	307
22	251	962	0	1213
23	57	1928	0	1985
24	502	559	0	1062
25	198	481	0	678
26	116	465	0	581
27	885	824	0	1709
28	2118	1975	0	4094
29	2401	6003	0	8404
30	2393	5229	0	7622
31	2329	6030	0	8358
32	1123	3703	0	4826
33	1346	2607	0	3953
34	923	1814	0	2737
35	1054	1796	0	2850
36	1632	1329	0	2962
37	1276	1435	0	2711
38	2570	953	0	3522
39	2689	1945	0	4634
40	1942	2367	0	4308
41	2729	2061	0	4790
42	1344	2524	0	3868
43	660	2662	0	3322
44	223	1699	0	1922
45	339	2244	0	2583
46	102	523	0	625
47	0	489	0	489
48	0	534	0	534
49	22	192	0	214
50	0	406	0	406
51	0	285	0	285
52	0	0	0	0
53	0	14	0	14
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	23	0	23
59	0	0	0	0
60	0	0	0	0
Total	31281	56309	0	87589
Samples				8
Ind. Sampled				1150
Catch (tons)				26
SOP				0.98

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

Yellowtail flounder Length (cm)	3LNO			Total
	Males	Females	Ind.	
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	10	10
16	0	0	62	62
17	91	91	207	389
18	181	157	90	428
19	338	372	117	826
20	576	691	0	1267
21	539	1425	0	1964
22	1167	1311	0	2479
23	2036	1949	0	3985
24	1434	1096	0	2530
25	3137	2350	0	5487
26	1748	1263	0	3011
27	1937	719	0	2656
28	1905	3601	0	5506
29	2378	2317	0	4695
30	3211	2059	0	5270
31	6816	4072	0	10888
32	7458	5584	0	13042
33	10967	5977	0	16944
34	14571	8837	0	23409
35	9868	12772	0	22640
36	7150	14569	0	21719
37	3566	11662	0	15228
38	2118	15555	0	17673
39	1243	13539	0	14783
40	1096	11153	0	12249
41	73	10846	0	10918
42	0	5769	0	5769
43	0	3404	0	3404
44	0	3155	0	3155
45	91	1150	0	1241
46	0	1378	0	1378
47	0	824	0	824
48	0	1305	0	1305
49	0	654	0	654
50	0	374	0	374
Total	85696	151980	486	238162
Samples				26
Ind. Sampled				3228
Catch (tons)				88
SOP				1.00

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
18	0	0	0	0	0	0	339	339
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	339	0	339
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	281	0	0	281	0	0	0	0
27	724	0	0	724	0	0	0	0
28	510	249	0	759	560	0	0	560
29	1218	548	121	1887	0	0	0	0
30	2200	547	0	2747	0	0	0	0
31	600	1186	332	2119	339	0	0	339
32	884	1520	121	2525	0	0	0	0
33	1339	1097	0	2436	898	0	0	898
34	3227	2163	332	5722	677	1013	0	1690
35	5183	3565	0	8748	1132	2867	0	3999
36	10118	4590	0	14709	1218	2608	0	3826
37	10471	9334	0	19805	3268	3546	0	6814
38	22036	16469	0	38505	9410	5953	0	15363
39	26632	25084	332	52049	11964	11350	0	23314
40	39136	46696	0	85832	13955	15788	0	29743
41	61302	49941	0	111244	17195	16371	0	33566
42	64466	66214	0	130681	16480	21628	0	38108
43	74170	94631	0	168801	19739	29041	0	48780
44	80776	109836	0	190612	23104	30817	0	53922
45	100904	120940	332	222175	28393	39096	0	67490
46	86210	132133	0	218343	28501	42737	0	71239
47	72790	141386	0	214177	29275	51531	0	80806
48	66913	129621	0	196534	23362	39340	0	62702
49	68906	108597	0	177503	22305	37163	0	59468
50	35572	89627	0	125199	13130	34181	0	47310
51	31052	82306	0	113358	24970	31368	0	56338
52	27008	70439	0	97447	16508	39792	0	56300
53	19490	64975	0	84465	13001	30437	0	43438
54	13375	57569	0	70943	13544	52325	0	65869
55	10279	54697	0	64976	6183	35470	0	41652
56	9207	43354	0	52561	2181	29925	0	32106
57	5363	39403	0	44766	900	33785	0	34686
58	2195	39178	0	41373	109	21006	0	21116
59	2954	41130	0	44084	0	19652	0	19652
60	2142	29159	0	31301	900	25428	0	26328
61	441	25080	0	25522	109	14533	0	14642
62	650	22553	0	23203	109	10328	0	10438
63	497	21364	0	21860	0	20282	0	20282
64	88	15727	0	15815	0	8262	0	8262

65	198	12897	0	13095	237	4797	0	5034
66	0	9154	0	9154	0	9742	0	9742
67	0	9585	0	9585	0	1316	0	1316
68	0	4399	0	4399	0	820	0	820
69	0	3989	0	3989	0	1447	0	1447
70	0	3734	0	3734	0	2176	0	2176
71	0	2519	0	2519	0	1481	0	1481
72	0	1109	0	1109	0	2074	0	2074
73	0	1067	0	1067	0	1598	0	1598
74	0	1077	0	1077	0	858	0	858
75	0	1329	0	1329	0	666	0	666
76	0	421	0	421	0	807	0	807
77	0	1048	0	1048	0	221	0	221
78	0	411	0	411	0	109	0	109
79	0	99	0	99	0	506	0	506
80	0	347	0	347	0	264	0	264
81	0	0	0	0	0	485	0	485
82	0	569	0	569	0	0	0	0
83	0	0	0	0	0	0	0	0
84	0	0	0	0	0	132	0	132
85	0	408	0	408	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	609	0	609	0	557	0	557
91	0	0	0	0	0	353	0	353
92	0	0	0	0	0	0	0	0
93	0	384	0	384	0	0	0	0
Total	961506	1818065	1572	2781144	343659	788372	339	1132370
Samples				83				19
Ind. Sampled				11461				2087
Catch (tons)				2633				1222

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

Length (cm)	Division 3NO			Total
	Males	Females	Ind.	
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	327	0	0	327
22	0	0	0	0
23	0	294	0	294
24	0	0	0	0
25	0	158	0	158
26	327	0	0	327
27	0	516	0	516
28	800	0	0	800
29	632	243	0	874
30	762	0	0	762
31	316	980	1067	2363
32	1391	443	534	2368
33	1706	5828	534	8068
34	2976	1571	534	5081
35	2859	1780	1556	6194
36	2290	1877	715	4881
37	4434	4511	0	8945
38	5002	6451	0	11453
39	9841	11736	715	22292
40	5532	10500	0	16032
41	22968	24376	0	47344
42	10808	16388	0	27196
43	12889	17086	0	29975
44	12594	25103	0	37697
45	25010	24919	0	49929
46	19670	23071	0	42741
47	13894	31323	0	45217
48	6270	19673	0	25944
49	13730	30817	0	44546
50	4062	9690	0	13752
51	3828	17419	0	21247
52	4199	10454	0	14654
53	4851	10107	0	14958
54	2792	9523	0	12315
55	2357	9852	0	12209
56	1485	6933	0	8418
57	2434	8639	0	11073
58	540	5092	0	5632
59	0	4408	0	4408
60	0	5598	0	5598
61	191	8947	0	9138
62	0	5330	0	5330
63	0	4334	0	4334

64	308	3043	0	3351
65	0	1605	0	1605
66	0	1723	0	1723
67	0	1971	0	1971
68	0	534	0	534
69	0	1565	0	1565
70	0	1734	0	1734
71	0	1277	0	1277
72	0	611	0	611
73	0	77	0	77
74	0	0	0	0
75	0	0	0	0
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	77	0	77
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	77	0	77
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
Total	364622	737816	0	1102438

Samples	17
Ind Sampled	1908
Catch (tons)	530

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

Length (cm)	Division 3LMNO			Total
	Males	Females	Indter.	
18	0	0	339	339
19	0	0	0	0
20	0	0	0	0
21	327	0	0	327
22	0	339	0	339
23	0	294	0	294
24	0	0	0	0
25	0	158	0	158
26	608	0	0	608
27	724	516	0	1240
28	1870	249	0	2119
29	1849	790	121	2761
30	2963	547	0	3510
31	1255	2167	1399	4821
32	2275	1963	655	4893
33	3943	6925	534	11402
34	6880	4747	866	12493
35	9174	8212	1556	18941
36	13626	9075	715	23416
37	18173	17391	0	35564
38	36448	28873	0	65321
39	48438	48169	1047	97654
40	58623	72985	0	131608
41	101466	90688	0	192154
42	91754	104231	0	195985
43	106798	140758	0	247557
44	116475	165756	0	282231
45	154307	184955	332	339594
46	134381	197941	0	332322
47	115959	224241	0	340200
48	96545	188635	0	285180
49	104940	176577	0	281517
50	52763	133498	0	186261
51	59849	131093	0	190942
52	47716	120685	0	168401
53	37342	105520	0	142862
54	29711	119416	0	149127
55	18819	100019	0	118837
56	12873	80212	0	93085
57	8697	81827	0	90524
58	2844	65276	0	68121
59	2954	65189	0	68144
60	3042	60185	0	63227
61	742	48560	0	49301
62	759	38211	0	38971
63	497	45979	0	46476
64	396	27033	0	27429

65	436	19299	0	19734
66	0	20618	0	20618
67	0	12872	0	12872
68	0	5752	0	5752
69	0	7002	0	7002
70	0	7644	0	7644
71	0	5278	0	5278
72	0	3793	0	3793
73	0	2742	0	2742
74	0	1936	0	1936
75	0	1995	0	1995
76	0	1229	0	1229
77	0	1269	0	1269
78	0	521	0	521
79	0	605	0	605
80	0	611	0	611
81	0	562	0	562
82	0	569	0	569
83	0	0	0	0
84	0	132	0	132
85	0	408	0	408
86	0	0	0	0
87	0	77	0	77
88	0	0	0	0
89	0	0	0	0
90	0	1166	0	1166
91	0	353	0	353
92	0	0	0	0
93	0	384	0	384
Total	2099790	3508645	787	5609222

Samples	119
Ind Sampled	15456
Catch (tons)	4385
SOP	1.01

Table 17. Skates Spanish 2022 catches length distribution by sex for Div. 3LNO.

Skates Length (cm)	3LNO			Total
	Males	Females	Ind.	
13	452	0	0	452
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	334	0	0	334
18	0	289	0	289
19	0	0	0	0
20	1330	569	0	1899
21	0	1610	0	1610
22	1782	0	0	1782
23	364	2617	0	2981
24	1169	352	0	1521
25	1984	1610	0	3594
26	0	376	0	376
27	935	173	0	1108
28	3310	778	0	4088
29	3797	5110	0	8907
30	2931	6108	0	9039
31	4037	4039	0	8076
32	5278	3246	0	8523
33	3537	5391	0	8928
34	9262	5958	0	15220
35	6120	9001	0	15121
36	7350	9248	0	16598
37	8089	10918	0	19008
38	7668	11026	0	18694
39	8958	8143	0	17101
40	10555	10692	0	21247
41	11017	10134	0	21151
42	10883	8052	0	18935
43	7991	8947	0	16939
44	9793	10661	0	20454
45	12050	13230	0	25281
46	5959	9411	0	15371
47	14468	9776	0	24244
48	16878	12357	0	29235
49	16483	9309	0	25792
50	14271	13850	0	28121
51	11320	12121	0	23442
52	15678	15103	0	30781
53	19221	15085	0	34306
54	13007	18231	0	31238
55	15133	17442	0	32575
56	14053	15584	0	29636
57	15031	10247	0	25278
58	14078	15820	0	29899

59	9978	14027	0	24005
60	11569	7150	0	18719
61	13757	15363	0	29120
62	15798	14005	0	29803
63	11045	13487	0	24533
64	11569	7169	0	18739
65	14574	17240	0	31814
66	12341	10220	0	22562
67	10270	8098	0	18368
68	11422	10430	0	21852
69	8519	9664	0	18183
70	9990	9967	0	19956
71	8068	9121	0	17189
72	9886	8457	0	18343
73	10276	11266	0	21543
74	10298	9440	0	19738
75	12764	8938	0	21702
76	10819	7144	0	17963
77	10872	3801	0	14673
78	10617	5598	0	16215
79	9885	4742	0	14627
80	10963	2037	0	12999
81	11014	1029	0	12044
82	8602	1530	0	10132
83	5259	1105	0	6363
84	4339	1130	0	5469
85	8357	254	0	8611
86	4777	142	0	4919
87	5000	977	0	5977
88	5554	398	0	5952
89	2378	31	0	2409
90	1895	32	0	1927
91	1023	0	0	1023
92	692	5	0	697
93	431	0	0	431
94	151	5	0	156
95	945	0	0	945
96	120	0	0	120
97	55	0	0	55
98	214	0	0	214
99	5	0	0	5
100	0	0	0	0
Total	670284	566642	0	1236925

Samples	59
Ind. Sampled	9913
Catch (ton)	2455
SOP	0.95

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.	
3	0	0	3	3
4	0	0	6	6
5	0	0	3	3
6	24	28	4	56
7	147	171	14	332
8	1362	596	0	1958
9	1483	838	22	2343
10	1346	594	90	2029
11	3882	2192	75	6149
12	4715	3144	82	7941
13	7012	3901	31	10944
14	11826	4491	31	16348
15	17448	6329	19	23796
16	16588	9059	56	25703
17	14102	6464	0	20566
18	9318	6017	0	15335
19	7491	4029	0	11521
20	2499	3769	0	6269
21	781	3723	0	4504
22	651	3342	0	3993
23	309	1064	0	1373
24	29	1437	0	1466
25	0	1950	0	1950
26	28	1695	0	1723
27	6	1668	0	1674
28	0	1076	0	1076
29	0	1270	0	1270
30	4	197	0	201
31	0	258	0	258
32	5	437	0	442
33	0	459	0	459
34	0	25	0	25
35	0	253	0	253
36	0	133	0	133
37	0	12	0	12
38	0	4	0	4
39	0	18	0	18
40	0	0	0	0
41	0	0	0	0
42	0	31	0	31
Total	101057	70674	435	172167
Samples				66
Ind. Sampled				8738
Catch (tons)				80
SOP				0.99

Table 20. White hake 2022 Spanish catches length distribution by sex for Div. 3NO.

White hake Length (cm)	3NO			Total
	Males	Females	Ind.	
13	0	0	0	0
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	1440	0	1440
20	0	0	0	0
21	1002	716	0	1719
22	505	112	0	617
23	1484	1266	0	2750
24	6820	2737	0	9557
25	25040	5020	0	30060
26	27565	14398	0	41963
27	23505	18564	0	42069
28	26722	28716	0	55438
29	19125	34135	0	53260
30	9896	35325	0	45220
31	10440	34285	0	44725
32	6955	50323	0	57278
33	8554	22752	0	31306
34	7125	24064	0	31189
35	1806	17814	0	19620
36	5213	23356	0	28569
37	2189	18425	0	20614
38	2158	9252	0	11410
39	1530	7837	0	9366
40	421	5591	0	6012
41	6728	4299	0	11027
42	1950	3504	0	5454
43	3823	2763	0	6586
44	9124	1879	0	11003
45	2513	2069	0	4582
46	7045	1190	0	8235
47	2178	1786	0	3964
48	3372	2264	0	5635
49	2253	1892	0	4145
50	3456	645	0	4101
51	4471	1748	0	6219
52	3592	1587	0	5180
53	5634	2076	0	7710
54	5297	3663	0	8961
55	1964	2674	0	4638
56	1966	7043	0	9009
57	758	3703	0	4461
58	228	5566	0	5794

59	0	4963	0	4963
60	0	2971	0	2971
61	82	1641	0	1723
62	64	2579	0	2643
63	82	1411	0	1493
64	0	343	0	343
65	0	548	0	548
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	242	0	242
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	82	0	82
75	0	0	0	0
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	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	0	0	0
86	0	64	0	64
Total	254638	421319	0	675957

Samples	13
Ind. Sampled	1714
Catch (ton)	249
SOP	1.02

Table 21. Silver hake 2022 Spanish catches length distribution by sex for Div. 3NO.

Silver hake Length (cm)	3NO			Total
	Males	Females	Ind.	
12	0	0	969	969
13	0	0	3929	3929
14	0	0	114	114
15	0	0	14364	14364
16	0	0	4972	4972
17	4235	0	15430	19665
18	4422	0	23578	28000
19	51031	46226	34754	132012
20	62187	65318	2569	130074
21	89988	174590	11741	276318
22	154299	168056	0	322354
23	364071	269806	0	633877
24	821029	542138	0	1363167
25	1119832	809031	0	1928863
26	1632089	985026	0	2617115
27	2582909	1010349	0	3593258
28	2404115	1469054	0	3873169
29	1463206	1585955	0	3049161
30	809402	1518994	0	2328396
31	483136	1209222	0	1692358
32	178911	813322	0	992233
33	55046	817635	0	872680
34	21602	500087	0	521689
35	221	327482	0	327703
36	4068	211789	0	215857
37	10810	133118	0	143928
38	0	63557	0	63557
39	0	80359	0	80359
40	0	38326	0	38326
41	0	34715	0	34715
42	0	21634	0	21634
43	0	27509	0	27509
44	0	5057	0	5057
45	0	6684	0	6684
46	0	9205	0	9205
47	0	2344	0	2344
48	0	21393	0	21393
49	0	5224	0	5224
50	0	5546	0	5546
51	0	4999	0	4999
52	0	678	0	678
53	0	0	0	0
54	0	5637	0	5637
55	0	547	0	547
56	0	945	0	945
57	0	0	0	0

58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
Total	12316607	12991557	112419	25420583

Samples	56
Ind. Sampled	8172
Catch (ton)	4030
SOP	0.96

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	
21	1																				1
22																					0
23		1																			1
24																					0
25																					0
26			2																		2
27			2	1																	3
28			4	1																	5
29			1	3																	4
30			2	3																	5
31				3																	3
32				4																	4
33				7	1																8
34				5	6																11
35				3	7																10
36				2	16	1															19
37				1	18	4															23
38					28	2															30
39				2	22	6															30
40					19	14															33
41					18	24															42
42					16	26															42
43					9	34	1														44
44					4	41	1														46
45					3	49															52
46						37	10														47
47						45	12														57
48						24	21														45
49						20	33														53
50						8	27	1													36
51						3	28	4													35
52							25	9	1												35
53							1	13	16	3											33
54							1	12	3	1											17
55								12	7	5											24
56								6	10	8	2										26
57								2	12	10	2										26
58								2	13	7	3										25
59									3	10	5										18
60										6	9	4	1								20
61										5	9	6									20
62										2	10	3	2								17
63											6	6	2								14
64										1	4	9	2	1							17
65											1	7	1	1							10
66											1	7	1	4	2						15
67											1	3	5		1						10
68												1		2	3	1					7
69													3	4	1						8
70														2	3	1	3				9
71														2	2	4	1		1		10
72															1	3	2		1		7
73															1	2	1				4
74															2	2	1				5
75															1	2	3	1	1		8
76																1			1		3
77																2		1			3
78																1					1
79																1	1		1		3
80																	2			1	3
81																1	2		2		5
82																	1	2	1		4
83																		1			1
84																	1	1		1	3
85																	1				1
86																			1		1
87																	1				1
88																					0
89																	1	1			2
90																		1	1	3	5
91																			3		3
92																		1			1
93																					1
TOTAL	1	2	11	35	167	340	205	78	59	53	46	21	23	26	16	11	11	7	5	1	1118



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	
21		1																			1
22																					0
23																					0
24																					0
25																					0
26			2																		2
27			2	1																	3
28			4	1																	5
29			1	3																	4
30			2	2																	4
31				1																	1
32				3																	3
33				3																	3
34				1	5																6
35				3	4																7
36				1	8	1															10
37				1	11	2															14
38					14	2															16
39					14	4															18
40					8	4															12
41					10	13															23
42					7	15															22
43					6	18															24
44					3	19															22
45					2	24															26
46						17	3														20
47						17	4														21
48						11	10														21
49						13	16														29
50						4	10														14
51						2	7	3													12
52							11	2													13
53						1	3	4													8
54							5	1													6
55							3	3	1												7
56							1	4	1	1											7
57								5	2												7
58								2	1												3
59								1	2	1											4
60										1											1
61										1	1										2
62											1										1
63											1										1
64												1									1
65												1									1
TOTAL	0	1	11	20	92	167	73	25	8	6	1	1	0	0	0	0	0	0	0	0	405

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	
23	1																				1	
24																						0
25		1	1																			2
26																						0
27				2	1																	3
28				4	1																	5
29				1	3																	4
30					1																	1
31					2																	2
32					1																	1
33				4	1																	5
34				4	1																	5
35					3																	3
36				1	8																	9
37					7	2																9
38					14																	14
39				2	8	2																12
40					11	10																21
41					8	11																19
42					9	11																20
43					3	16	1															20
44					1	22	1															24
45					1	25																26
46						20	7															27
47						28	8															36
48						13	11															24
49						7	17															24
50						4	17	1														22
51						1	21	1														23
52							14	7	1													22
53							10	12	3													25
54						1	7	2	1													11
55							9	4	4													17
56							5	6	7	1												19
57							2	7	8	2												19
58							2	11	6	3												22
59								2	8	4												14
60									6	8	4	1										19
61									4	8	6											18
62									2	9	3	2										16
63										5	6	2										13
64									1	4	9	1	1									16
65										1	6	1	1									9
66										1	7	1	4	2								15
67										1	3	5	1									10
68											1		2	3	1							7
69												3	4	1								8
70												2	3	1	3							9
71												2	2	4	1			1				10
72													1	3	2			1				7
73													1	2	1							4
74													2	2	1							5
75													1	2	3	1	1					8
76													1			1			1			3
77														2		1						3
78														1								1
79														1	1				1			3
80																2				1		3
81														1	2			2				5
82															1	2		1				4
83																		1				1
84																1	1			1		3
85																1						1
86																		1				1
87																1						1
88																						0
89																1	1					2
90																	1	1	1	3		5
91																		3				3
92																		1				1
93																					1	1
TOTAL	0	3	8	20	75	173	132	53	51	47	45	20	23	26	16	11	11	7	5	1	727	



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

Length cm	Ages																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
4	2																					2
5																						0
6		2																				2
7		3																				3
8		1	5																			6
9		3	10	2																		15
10			11	6																		17
11			1	16	7																	24
12				4	25	3																32
13				3	25	12																40
14					7	25	7															39
15					3	18	15	6														42
16						4	23	15	1													43
17							11	23	4													38
18							7	11	22	3												43
19							1	5	13	11	2											32
20									6	18	3											27
21										10	10	7										27
22										3	11	4										18
23										3	6	5	1									15
24											2	5	5									12
25												1	2	4		1						8
26													4	5	3	3						15
27													2	4	4							10
28														4	1	3		1				9
29														1	4	4	3					12
30															2	3	3	2				10
31																2	6	1	1			10
32																	1	1	1			3
33																1	1	2	1			5
34																			1			1
35																			1		1	2
36																	1		1			2
37																					1	1
38																						0
39																					2	2
Total	2	9	27	31	67	62	64	60	46	48	34	22	14	18	14	17	15	7	6	2	2	567

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

Length cm	Ages																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
6	1																					1
7	1																					1
8	1	3																				4
9	1	8	2																			11
10		7	4																			11
11			8	5																		13
12			1	16	3																	20
13				15	5																	20
14				3	17	7																27
15				2	11	12	2															27
16					2	14	10															26
17						7	11	4														22
18						4	6	11	2													23
19						1	2	7	4	2												16
20								1	10	2												13
21									1	3	5											9
22									1		1											2
23										2	1											3
24																						
25																						
26												1										1
Total	4	18	15	41	38	45	31	23	18	9	7	1										250

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

Length cm	Ages																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
6	1																					1
7	1																					1
8		2																				2
9	2	2																				4
10		4	2																			6
11		1	8	2																		11
12			3	9																		12
13			3	10	7																	20
14				4	8																	12
15				1	7	3	4															15
16					2	9	5	1														17
17						4	12															16
18						3	5	11	1													20
19							3	6	7													16
20								5	8	1												14
21									9	7	2											18
22									2	11	3											16
23									3	4	4	1										12
24										2	5	5										12
25											1	2	4		1							8
26												3	5	3	3							14
27												2	4	4								10
28													4	1	3		1					9
29													1	4	4	3						12
30														2	3	3	2					10
31															2	6	1	1				10
32																1	1	1				3
33															1	1	2	1				5
34																		1				1
35																		1		1		2
36																1		1				2
37																				1		1
38																						
39																				2		2
Total general	4	9	16	26	24	19	29	23	30	25	15	13	18	14	17	15	7	6	2	2	314	

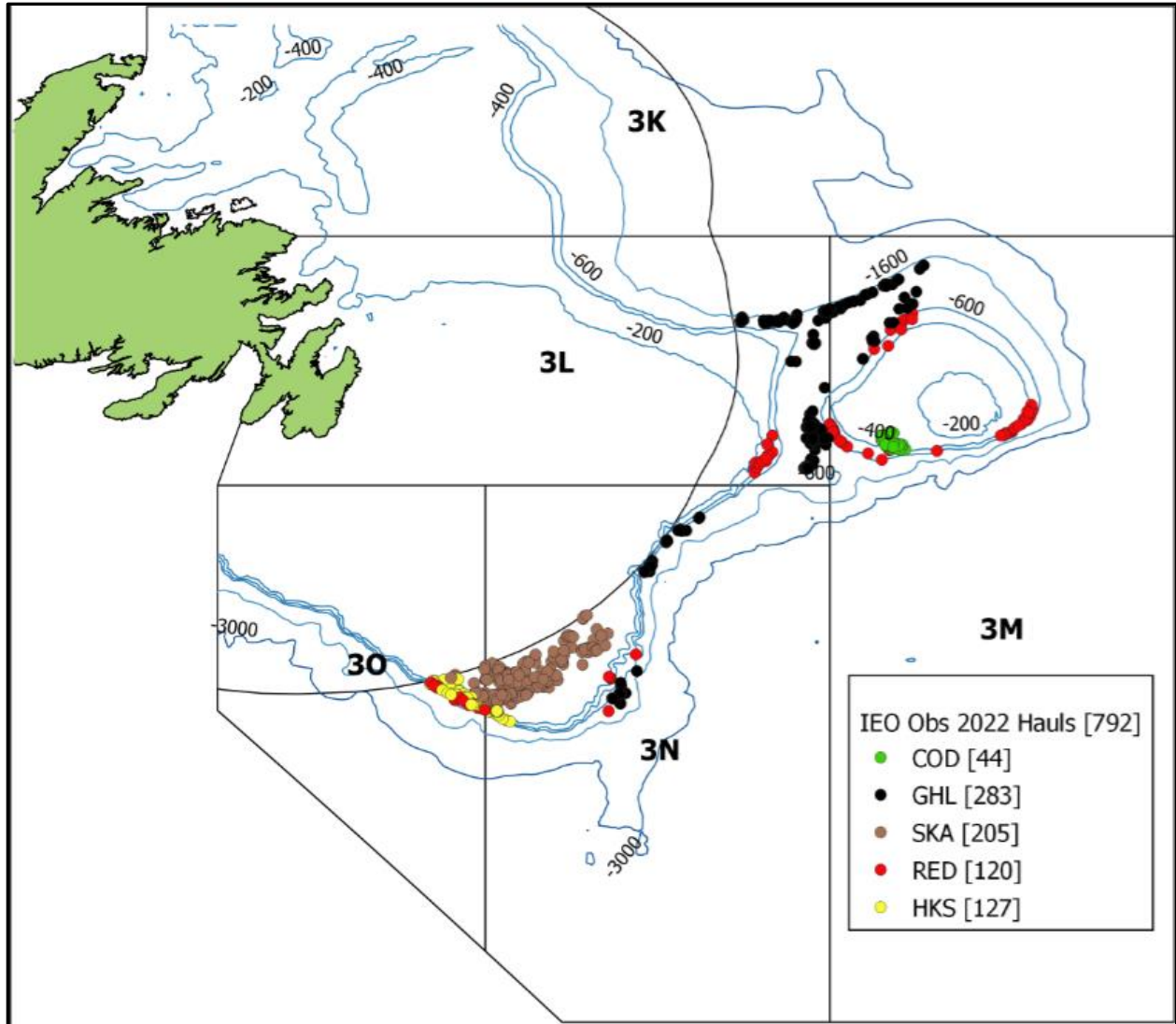


Figure 1. IEO Scientific Observers sampled commercial hauls position depending on the target species.

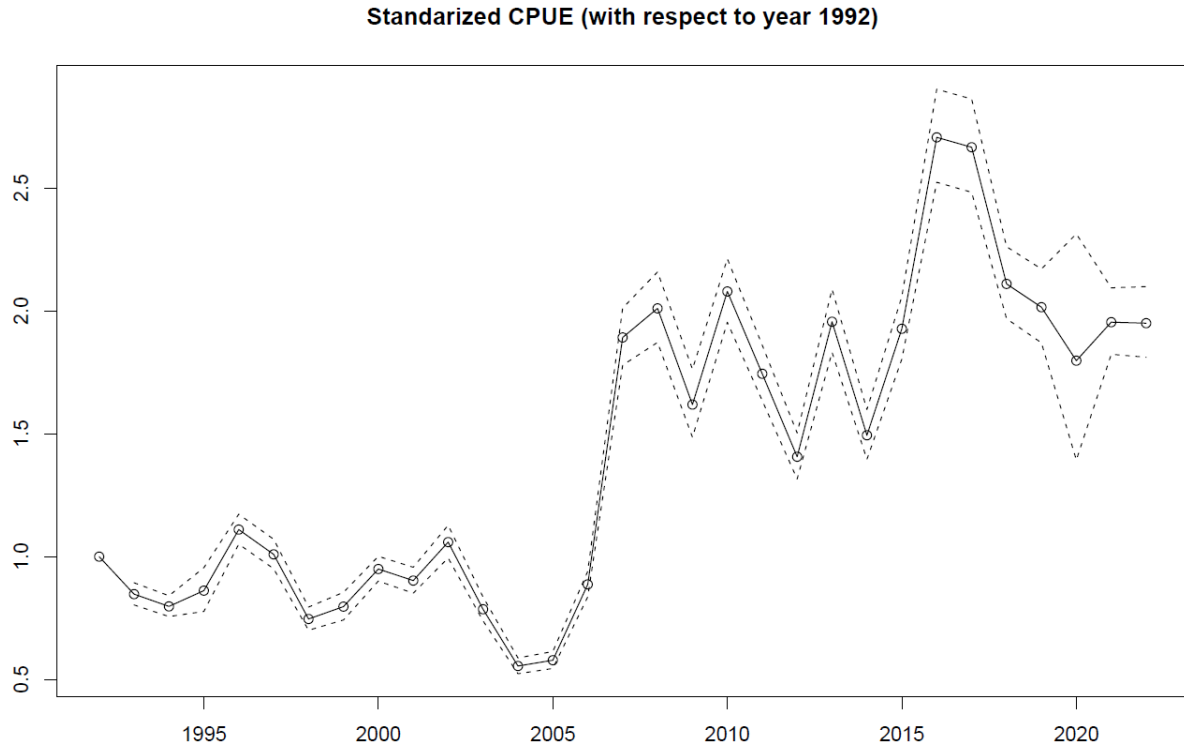


Figure 2. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2022 data.