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Spanish Research Report for 2023

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 2023 was available haul by haul. Total effort of the Spanish fleet in 2023 was 1,292 fishing days. Table 1 presents the preliminary Spanish catches by species and Division in 2023 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 2023, IEO scientific observers were on board 357 fishing days that it means 27 % 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 2023, 511 samples were taken with 62632 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 2023, amounting to 1,270 days (19,651 hours) of fishing effort. Table 3 presents the Spanish effort (fishing hours) since 2003 in NRA Subarea 3. Total catches (Table 1) for all species combined in Div. 3LMNO were 16,929 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 2023 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 57% and with 135 mm cod-end mesh size was 43%, which indicates that the fleet targeted mainly skate in depth less than 200 m. with trawl gear with 280 mm, redfish in 200-600 meters depth and Greenland halibut in depth more than 600 m with trawl gear with 130 mm. Fishing effort in Div. 3O was around the 30% 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 130 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 2023, comprising a total of 357 observed fishing days, around 28% 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 2023, 511 length samples were taken, with 68,632 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 2023, 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 2023, there were no sample length distributions of this stock.
Div. 3NO: Catches of this species were taken as by-catch in the skate fishery with 280 mm mesh size (29 tons) and in fisheries with 130m mm mesh size (31 tons). It should be noted that in 2023 there were only available three length samples of the catches with 455 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 607 tons and most of them were taken in the direct fishery. In 2023, 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 2023 catches length distributions are presented in Table 8. It can be observed that most of the catches length distributions are in the 51-64 cm range. The mode in 2023 was 54 cm. Highlight that 13% of all the captured specimens are smaller than MLZ (41 cm).

Redfish (*Sebastes mentella* and *Sebastes fasciatus*)
3M: In Div. 3M the redfish catches in 2023 have been 1853 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 23-28 cm range. This length distribution is quite different from that observed in previous years where the bulk of the catches were larger. This may indicate the incorporation of an important recruitment that was already indicated in last year's length distributions. Males are much more abundant than females in smaller sizes and females than males in larger sizes.
Div. 3LN: Spanish catches were 855 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 25-36 cm range. Similar to that observed in previous years. Males are much more abundant than females in smaller sizes and females than males in larger sizes.

Div. 3O: A directed fishery for this species took place in Div. 3O. Catches have reached 1840 tons in this Division in 2023, 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 20-27 cm range. These length distributions catches normally are smaller than the observed in Divisions 3LN and 3M.

American plaice (*Hippoglossoides platessoides*)
Div. 3LNO: Spanish catches in 2023 in Div. 3LNO were 125 tons. Catches taken with 280 mm mesh size as by-catch of the skate fishery were 59 tons and with 130 mm mesh size were 66 tons. Table 12 presents the total length distribution for Div. 3LNO. The bulk of catches were in the range of 27-50 cm with a mode around 33 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 13 tons and most of them were taken as by-catch of the cod and redfish fisheries. In 2023, there was no length distribution samples of these catches.

Witch flounder (*Glyptocephalus cynoglossus*)
Div. 2J and 3KL: Spanish catches for this stock in 2022 were 22 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 2023, 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 28 tons. This species in this Division was taken as by-catch in the Cod and redfish fishery. In 2023, there were no available sample length distributions of this species in this Division.
Div. 3NO: Spanish catches for this stock in 2023 were 18 tons. Most of the catches were taken with 130 mm cod end gear as by-catch of the redfish and Greenland halibut fisheries (15 tons) and in less degree in the skate fishery (3 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 31-46 cm with a mode in 39 cm. Females reach larger sizes than males.

Yellowtail flounder (*Limanda ferruginea*)
Div. 3LNO: In 2023 the yellowtail flounder Spanish catches were 71 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 31-41 cm length range with a mode between 34-35 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 2023 Spanish catches were 4.667 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 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 7 with a peak at ages 6.

Figure 2 presents the Spanish fleet standardised CPUE (Gonzalez-Costas and Gonzalez-Troncoso, 2009) updated with the 2023 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 (2018-2023) 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, Bathyraja spinicauda, Raja hyperborean, Raja senta,* etc). Thus the catch of skate in Table 1 refers to Raja spp. However, thorny skate

dominates, comprising about 90% of the skate taken in the Spanish catches base on 2014-2016 data from the EU Spanish 3NO Survey.

Div. 3LNO: Spanish 3LNO skate catches in 2023 were 1,806 tons. Most of the catches were taken in Div. 3N at depths less than 200 meters (1404 tons), where a fishery directed to thorny skate took place using 280 mm mesh size. Skate catches in Div. 3L (39 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 2023, 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 41-81 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 (20 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 2023 catches were taken in Div. 3LMN. Spanish catches in 2023 were 69 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 12-21 AFL length range, with a mode in 16-18 cm and a clear length difference between sexes, males reach smaller sizes than females. To note the peak observed in the length distributions around 8-9 cm AFL that it may be a signal of a good recruitment.

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 2023 were based on ages 3 to 10 with two modes, one in 3-4 years old and other in 7-8 years old.

White hake (*Urophycis tenuis*)
Div. 3NO: Catches of this species in 2023 in Div 3NO (330 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 (326 tons) are by-catch of the redfish fishery and silver hake fishery. Table 20 shows the total catches length distributions by sex of Div. 3NO. Most of the catches were in the 28-39 cm length range.

Capelin (*Mallotus villosus*)
Div. 3NO: Catches of this species are occasional. In 2023 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 2023 there is no record of squid catches by the Spanish fleet.

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 2023 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. 3O and a directed fishery has been carried out with trawl gear with a 130 mm mesh size. Spanish total catches have been 4320 tons in 2023. Most of which (4297 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 26-34 cm length range. It can be observed a clear different length between sexes, females reach larger sizes than males.

(B) Research studies

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 6th 2023. The area surveyed was Flemish Cap Bank to depths up to 800 fathoms (1460 m) following the same procedure as in previous years. The number of hauls was 184 and three of them were null. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, roughhead grenadier and Greenland halibut are presented as a Scientific Council Research document. Flemish Cap survey results for Northern shrimp (Pandalus borealis) were presented in SCR 23/052 and SCR 23/053. Samples for histological assessment of sexual maturity of cod, redfish, Greenland halibut and roughhead grenadier were taken. Oceanography studies continued to take place.

The Spanish bottom trawl survey in NAFO Regulatory Area Div. 3NO was conducted from 5th of June to the 4th of July 2023 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 103 valid hauls were taken within a depth range of 41-1461 m according to a stratified random design and 83 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.

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 2023, the bottom trawl survey in Flemish Pass (Div. 3L) was carry out on board R/V Vizconde de Eza using the usual survey gear (Campelen 1800) from August 9 to 27. The area surveyed was Flemish Pass to depths up 800 fathoms (1463 m) following the same procedure as in previous years. The number of hauls was 100 and 5 of them were nulls. Survey results, including abundance indices and length distributions of the main commercial species, are presented as Scientific Council Research documents. Survey results for Div. 3LNO of the northern shrimp (Pandalus borealis) were presented in SCR 23/054. Samples for histological (Greenland halibut, and roughhead grenadier) and aging (Greenland halibut, American plaice, roughhead grenadier and cod) studies were taken. Ninety-seven hydrographic profile samplings were made in a depth range of 122-1380 m.

VME data from the 2023 EU; EU-Spain and Portugal bottom trawl groundfish surveys in NAFO Regulatory Area (Divs. 3LMNO):

New data on deep-water corals and sponges were presented from the 2023 EU-Spain and Portugal bottom trawl groundfish survey. The data was made available to the NAFO WGESA to improve mapping of Vulnerable Marine Ecosystems (VMEs) 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.

During 2023, R/V Vizconde de Eza carried out three surveys, one in Division 3M (Flemish Cap) sampling between 137 -1455 m, with a total of 184 tows (181 valid; 3 no valid); other in Divisions 3NO (Grand Banks of Newfoundland) sampling between 43 - 1430 m depth with a total of 106 tows (103 valid; 3 no valid); and other in Division 3L, sampling between 129 -1481 m, with a total of 100 tows (95 valid; 5 no valid). In total there were 390 bottom trawl tows, 11 of them considered invalid due to technical problems during the fishing operation. 166 hauls out of 379 valid tows have shown zero catches (i.e. no presence) of VME indicator species. This represents 43.8% of the total valid hauls. A brief description of the survey methodology can be found in Durán Muñoz et al., (2020).

Sponges were recorded in 111 of the 379 valid tows (29.3% of valid tows analyzed), at mean depths between 51 and 1481 m (Figure 2A). There were two significant catches of sponges (≥ 100 kg/tow) in these tows, both of which fell within the VME polygons for sponges.

Large gorgonians were recorded in 9 of the 379 valid tows (2.4 % of valid tows analyzed), at mean depths between 463 and 959 m. There was one significant catch of large gorgonians (≥ 0.6 kg/tow) in these tows, which fell outside the VME polygons for large gorgonians.

Small gorgonians were recorded in 42 of the 379 valid tows (11.08% of valid tows analyzed), at mean depths between 227 and 1481 m. There were no significant catches of small gorgonians (≥ 0.2 kg/tow) in these tows.

Sea pens were recorded in 133 of the 379 valid tows (35.1% of valid tows analyzed), at mean depths between 63 and 1444 m. There was one significant catch of sea pens (≥ 1.3 kg/tow) in these tows, which fell within the VME polygons for sea pens.

Black corals were recorded in 15 of the 379 valid tows (4.0% of valid tows analyzed), at mean depths between 468 and 1187 m. There were two significant catches of black corals (≥ 0.4 kg/tow) in these tows, both of which fell outside the VME polygons for black corals.

Sea squirts were recorded in 7 of the 379 valid tows (1.85% of valid tows analyzed), at mean depths between 43 and 228 m. There was one significant catch of sea squirts (Boltenia ovifera) (≥ 0.35 kg/tow) in these tows, which fell within the VME polygons for sea squirts.

Bryozoans were recorded in 31 of the 379 valid tows (8.18% of valid tows analyzed), at mean depths between 43 and 1225 m. There were no significant catches of bryozoans (≥ 0.2 kg/tow) in these tows.

Above information, including distribution maps of VME species groups, is further detailed in SCR Doc. 23/0XX (Abalo-Morla et al., 2023).

NEREIDA

The NEREIDA study is funded by the European Union through the NAFO Secretariat. The proposed activities under NEREIDA are specifically designed to address several NAFO Commission Requests.

Update on the analysis of VMS and Logbook data to study the bottom fishing footprint: Data gathered through the IEO Scientific Observer Program on board fishing vessels were used to assess both the coverage and accuracy of the data employed in studying fishing effort and footprint. The findings reveal that both NAFO's VMS and logbook databases contain errors, and the effects of misreporting are enhanced when these datasets are merged. Data from scientific observers allowed the measurement of these errors. Despite the merging approach is widely considered an improvement in relation to the former method (i.e. simple speed filter) and a powerful tool for describing the spatial distribution of fishing activity, this improvement relies on the coverage and quality of the available information. On those hauls recorded by the Spanish Scientific Observers that are also recorded on the logbook, this merging approach has proved to characterize the effort with a difference of less than 20%.

Activities other than fishing: The ultimate goal of the NEREIDA tasks related to activities other than fishing is to understand some of these activities taking place in the NRA (i.e. seabed marine litter and offshore oil and gas), in relation to their potential impact on: (i) the fishery resources, (ii) the ecosystem and (iii) the fishing activity regulated by NAFO, in order to develop approaches related to tackling such impacts. Regarding oil and gas, a preliminary updated map of the geographic location of oil and gas activities in NAFO Divisions 3LM was presented, based on new spatial data from public sources. It was noted that there has been an increase in the spatial overlap between Significant Discovery Licenses (oil and gas) and NAFO fisheries in Div. 3L, due to the recent increase in the number of such licenses in this area. New results are expected to be presented during 2024.

SUBAREA 6

A. Status of the fisheries

During 2023 there was no fishing activity of the Spanish fleet in this Division.

Acknowledgements

REFERENCES

Abalo-Morla, S., Neves, B.M., Hayes, V., Sacau, M., Command, R.J., Durán-Muñoz, P. (2023): New preliminary data on VME encounters in NAFO Regulatory Area (Divs. 3LMNO) from EU; EU-Spain and Portugal Groundfish Surveys (2023) and Canadian surveys (Fall 2022 & Spring 2023). SCR Doc. 23/0XX. Serial No. NXXX.

Casas, J.M. and R. Manuel. 2023. Northern Shrimp (*Pandalus borealis*) on Flemish Cap Surveys 2023. Serial No. N7452 NAFO SCR Doc.23/052.

Casas, J.M. 2023. Division 3M Northern shrimp (*Pandalus borealis*) – Interim Monitoring Update. Serial No. N7453 NAFO SCR Doc. 23/053.

Casas, J. M., E. Román and M. Alvarez. 2023. Northern Shrimp (*Pandalus borealis, Krøyer*) from Spanish Bottom Trawl Survey 2023 in NAFO Div. 3LNO. NAFO SCR Doc. 054. Serial No. N7454, 14 p.

Durán Muñoz, P., Sacau, M., García-Alegre, A. and Román, E. (2020) Cold-water corals and deep-sea sponges by-catch mitigation: Dealing with groundfish survey data in the management of the northwest Atlantic Ocean high seas fisheries, Marine Policy. Volume 116, June 2020, 103712, DOI: 10.1016/j.marpol.2019.103712.

González-Costas, F. and D. González-Troncoso. 2009. Spanish 2006-2008 Fisheries Footprint, scientific Observers and surveys coverage and update of the Standardized CPUE Indices for Greenland Halibut. Serial No N5657 NAFO SCR Doc. 09/22.

Table 1.   Spanish Catches (tons) in NAFO Area in 2023 by species and Division, based on the provisional Logbook data.

Code	English_name	Scientific_name	Provisional STATLANT 21A 2023				
			3L	3M	3N	3O	Total
GHL	Greenland halibut	*Reinhardtius hippoglossoides*	2476	1517	673	1	4667
RED	Atlantic redfishes nei	*Sebastes spp*	719	1853	136	1840	4547
HKS	Silver hake	*Merluccius bilinearis*	0	0	21	4298	4320
SKA	Raja rays nei	*Raja spp*	39	20	1404	363	1826
COD	Atlantic cod	*Gadus morhua*	7	607	24	36	674
HKW	White hake	*Urophycis tenuis*	0	0	3	327	330
PLA	American plaice	*Hippoglossoides platessoides*	14	13	54	58	138
HAL	Atlantic halibut	*Hippoglossus hippoglossus*	16	15	29	69	129
YEL	Yellowtail flounder	*Limanda ferruginea*	0	0	66	5	71
RHG	Roughhead grenadier	*Macrourus berglax*	18	19	31	0	69
WIT	Witch flounder	*Glyptocephalus cynoglossus*	22	28	8	10	67
ANG	American angler	*Lophius americanus*	0	0	2	57	59
HAD	Haddock	*Melanogrammus aeglefinus*	0	0	1	28	29
RNG	Roundnose grenadier	*Coryphaenoides rupestris*	2	2	0	0	4
		Total tons	3313	4074	2451	7090	16929

Table 2. Samples and individuals sampled by the IEO Scientific Observers by species, mesh size and NAFO Division in 2023. In red, samples conducted in the cod Div. 3M directed fishery. In bold, discard sampling conducted.

Code	Species	English_name	Catch/Disc.	Division	Gear	Samples	Ind.
ANT	*Antimora rostrata*	Blue antimora	C	3L	130 mm	2	169
ANT	*Antimora rostrata*	Blue antimora	C	3N	130 mm	1	101
CFB	*Centroscyllium fabricii*	Black dogfish	C	3M	130 mm	2	80
CFB	*Centroscyllium fabricii*	Black dogfish	C	3N	130 mm	1	100
RNG	*Coryphaenoides rupestris*	Roundnose grenadier	C	3M	130 mm	1	170
COD	*Gadus morhua*	Atlantic cod	C	3M	130 mm	7	447
COD	*Gadus morhua*	Atlantic cod	C	3O	130 mm	3	455
COD	*Gadus morhua*	Atlantic cod	C	3M	130 mm	7	1032
GDE	*Gaidropsarus ensis*	Threadfin rockling	C	3O	130 mm	1	30
WIT	*Glyptocephalus cynoglossus*	Witch flounder	C	3O	130 mm	10	1595
PLA	*Hippoglossoides platessoides*	American plaice	C	3N	280 mm	3	284
PLA	*Hippoglossoides platessoides*	American plaice	C	3L	130 mm	2	200
PLA	*Hippoglossoides platessoides*	American plaice	C	3O	130 mm	11	1774
YEL	*Limanda ferruginea*	Yellowtail flounder	C	3N	280 mm	9	1046
YEL	*Limanda ferruginea*	Yellowtail flounder	C	3O	280 mm	1	55
ANG	*Lophius americanus*	American angler	C	3O	130 mm	1	100
ELZ	*Lycodes sp*	Eelpout	C	3L	130 mm	3	302
	Lycodes vahlii	Vahl's Eelpout	C	3L	130 mm	1	101
	Lycodes vahlii	Vahl's Eelpout	C	3O	130 mm	1	100
	Lycodes vahlii	Vahl's Eelpout	C	3N	280 mm	1	100
RHG	*Macrourus berglax*	Roughhead grenadier	C	3L	130 mm	20	2826
RHG	*Macrourus berglax*	Roughhead grenadier	C	3M	130 mm	17	2583
RHG	*Macrourus berglax*	Roughhead grenadier	C	3N	130 mm	8	1116
HKS	*Merluccius bilineares*	Silver hake	C	3N	130 mm	1	109
HKS	*Merluccius bilineares*	Silver hake	C	3O	130 mm	80	11800
NZB	*Nezumia bairdii*	Marlin-spike grenadier	C	3L	130 mm	4	298
NZB	*Nezumia bairdii*	Marlin-spike grenadier	C	3M	130 mm	1	100
NZB	*Nezumia bairdii*	Marlin-spike grenadier	C	3N	130 mm	1	102
NZB	*Nezumia bairdii*	Marlin-spike grenadier	C	3O	130 mm	2	202
GPE	*Phycis chesteri*	Longfin hake	C	3O	130 mm	2	137

RJR	*Raja radiata*	Starry ray	C	3M	130 mm	1	100
RJR	*Raja radiata*	Starry ray	C	3O	130 mm	1	100
RJR	*Raja radiata*	Starry ray	C	3N	280 mm	38	4479
RJR	*Raja radiata*	Starry ray	C	3O	280 mm	2	184
GHL	*Reinhardtius hippoglossoides*	Greenland halibut	C	3L	130 mm	60	8884
GHL	*Reinhardtius hippoglossoides*	Greenland halibut	C	3M	130 mm	50	7252
GHL	*Reinhardtius hippoglossoides*	Greenland halibut	C	3N	130 mm	22	2585
RED	*Sebastes spp*	Redfish	C	3L	130 mm	7	733
RED	*Sebastes spp*	Redfish	C	3M	130 mm	34	4637
RED	*Sebastes spp*	Redfish	C	3N	280 mm	1	100
RED	*Sebastes spp*	Redfish	C	3O	130 mm	34	5169
HKW	*Urophycis tenuis*	White hake	C	3O	130 mm	11	1408
CAA	***Anarhichas lupus***	**Atlantic wolffish**	**D**	**3L**	**130 mm**	**1**	**73**
COD	***Gadus morhua***	**Atlantic cod**	**D**	**3O**	**130 mm**	**1**	**174**
WIT	***Glyptocephalus cynoglossus***	**Witch flounder**	**D**	**3O**	**130 mm**	**1**	**101**
PLA	***Hippoglossoides platessoides***	**American plaice**	**D**	**3L**	**130 mm**	**1**	**100**
PLA	***Hippoglossoides platessoides***	**American plaice**	**D**	**3M**	**130 mm**	**1**	**100**
PLA	***Hippoglossoides platessoides***	**American plaice**	**D**	**3O**	**130 mm**	**5**	**745**
YEL	***Limanda ferruginea***	**Yellowtail flounder**	**D**	**3N**	**280 mm**	**6**	**664**
RHG	***Macrourus berglax***	**Roughhead grenadier**	**D**	**3L**	**130 mm**	**8**	**1084**
RHG	***Macrourus berglax***	**Roughhead grenadier**	**D**	**3M**	**130 mm**	**3**	**260**
RJR	***Raja radiata***	**Starry ray**	**D**	**3M**	**130 mm**	**1**	**49**
RJR	***Raja radiata***	**Starry ray**	**D**	**3N**	**280 mm**	**8**	**1009**
GHL	***Reinhardtius hippoglossoides***	**Greenland halibut**	**D**	**3N**	**130 mm**	**1**	**165**
RED	***Sebastes spp***	**Redfish**	**D**	**3L**	**130 mm**	**2**	**200**
RED	***Sebastes spp***	**Redfish**	**D**	**3M**	**130 mm**	**1**	**99**
RED	***Sebastes spp***	**Redfish**	**D**	**3O**	**130 mm**	**3**	**302**
HKW	***Urophycis tenuis***	**White hake**	**D**	**3O**	**130 mm**	**3**	**362**
	Total					511	68632

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	19651			

Table 4. Fishing effort (hours) of the Spanish fleet in 2023 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	881	1413	1285	1705	5284	27%
3M	1078	1095	1859	729	4761	24%
3N	900	797	1308	903	3908	20%
3O	1306	1949	1760	683	5698	29%
Total Hours	4165	5254	6212	4021	19651	100%
%	21%	27%	32%	20%	100%	

Table 5. Spanish 2023 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	881	1413	1285	1705	5284
	>200 mm					
3M	<90 mm					
	100-200 mm	1078	1095	1859	729	4761
	>200 mm					
3N	<90 mm					
	100-200 mm	496	637	429	134	1695
	>200 mm	403	160	879	770	2212
3O	<90 mm					
	100-200 mm	1141	1783	1568	648	5141
	>200 mm	165	165	192	35	558

Table 6. Parameters of the length-weight relationship (W(g) = a*L(cm)^b) by species (2023).

Species	Source	a	b	Nº indiv
Greenland halibut	3NO Survey	0.0036	3.1950	1031
Redfish 3O - 3LN	3NO Survey	0.0100	3.0826	824
Redfish 3M	Commercial	0.0100	3.0662	1625
Roughhead grenadier	FC Survey	0.0746	3.0168	827
Witch flounder	3NO Survey	0.0009	3.5372	274
American plaice 3LNO	3NO Survey	0.0033	3.2620	970
Cod 3NO	Commercial	0.0014	3.4341	472
Cod 3M	FC Survey	0.0074	3.0236	1415
Yellowtail Flounder	3NO Survey	0.0050	3.1345	670
Skate	Commercial	0.0154	2.8831	1212
Silver Hake	Commercial	0.0013	3.4412	3167
White Hake	Commercial	0.0024	3.2499	167

Table 7. Cod 3NO stock Spanish catches length distribution (2023).

Cod Length (cm)	Males	3NO Females	Ind.	Total
29	100	0	0	100
30	100	0	0	100
31	159	80	0	239
32	259	0	0	259
33	159	159	0	318
34	518	498	0	1016
35	598	997	0	1595
36	658	1356	0	2014
37	977	1276	0	2253
38	2014	1495	0	3509
39	1395	2256	0	3651
40	1813	1675	0	3489
41	1516	1866	0	3382
42	1016	1148	0	2164
43	938	2137	0	3074
44	1128	1757	0	2885
45	1948	3578	0	5527
46	1188	1449	0	2638
47	699	980	0	1678
48	1859	1170	0	3029
49	749	3479	0	4227
50	780	1950	0	2730
51	390	880	0	1270
52	1270	2599	0	3869
53	0	390	0	390
54	390	2730	0	3120
55	0	880	0	880
56	0	880	0	880
57	0	880	0	880
58	0	2730	0	2730
59	0	2440	0	2440
60	390	1170	0	1560
61	0	299	0	299
62	0	390	0	390
63	100	299	0	399
64	780	0	0	780
65	0	780	0	780
66	0	0	0	0
67	0	490	0	490
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	0	0	0	0
72	0	390	0	390
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
Total	23891	47531	0	71422

Samples	3
Ind. Sampled	455
Catch (tons)	60
SOP	0.92

Table 8.   Cod 3M stock Spanish catches length distribution (2023).

Cod Length (cm)	Males	3M Females	Ind.	Total
28	0	233	0	233
29	0	0	0	0
30	0	0	0	0
31	0	831	0	831
32	0	233	0	233
33	1814	1057	0	2871
34	1225	3332	0	4558
35	1518	2453	0	3971
36	1894	3646	0	5540
37	3035	2540	0	5575
38	5367	3242	0	8609
39	1459	5155	0	6613
40	1751	2695	0	4446
41	4553	4028	0	8580
42	2984	2880	0	5864
43	3817	4405	0	8222
44	3513	1365	0	4878
45	3300	4341	0	7641
46	3333	3916	0	7249
47	2509	2446	0	4955
48	4076	2446	0	6521
49	3477	2639	0	6116
50	3067	3393	0	6460
51	2796	5008	0	7804
52	6463	3588	0	10052
53	7602	5273	0	12874
54	8300	6365	0	14665
55	6473	5819	0	12291
56	4762	6332	0	11095
57	4132	6086	0	10218
58	7042	4059	0	11101
59	7015	6476	0	13491
60	2146	9101	0	11247
61	5301	4358	0	9658
62	5808	4500	0	10308
63	3987	4444	0	8431
64	3628	3321	0	6948
65	3709	2259	0	5968
66	3627	1703	0	5330
67	2369	1948	0	4317
68	1392	2595	0	3987
69	6172	2937	0	9110
70	1546	1518	0	3064
71	3001	282	0	3282
72	1109	1226	0	2335
73	3145	359	0	3504
74	2326	1641	0	3968
75	1974	1260	0	3235

76	2030	896	0	2926
77	1955	1076	0	3031
78	345	466	0	811
79	788	899	0	1687
80	293	1359	0	1652
81	1129	1138	0	2267
82	391	1096	0	1488
83	1008	742	0	1751
84	86	452	0	538
85	191	306	0	497
86	0	335	0	335
87	170	1915	0	2085
88	0	1609	0	1609
89	244	317	0	562
90	0	72	0	72
91	233	500	0	733
92	0	32	0	32
93	0	43	0	43
94	181	149	0	330
95	149	11	0	160
96	0	0	0	0
97	0	160	0	160
98	22	0	0	22
99	0	149	0	149
100	0	0	0	0
101	0	22	0	22
102	0	33	0	33
103	0	0	0	0
104	0	0	0	0
105	0	0	0	0
106	0	948	0	948
107	0	149	0	149
108	0	799	0	799
109	0	149	0	149
110	0	0	0	0
111	0	0	0	0
112	0	0	0	0
113	0	0	0	0
114	0	0	0	0
115	0	0	0	0
116	0	0	0	0
117	0	0	0	0
118	0	149	0	149
119	0	0	0	0
120	0	149	0	149
Total	167732	165853	0	333585

Samples	14
Ind. Sampled	1479
Catch (tons)	607
SOP	1.05

Table 9. Redfish 3M stock Spanish catches length distribution 2023.

Redfish Length (cm)	Males	Division 3M Females	Ind.	Total
16	6245	0	0	6245
17	5793	344	0	6137
18	3329	0	0	3329
19	5252	2826	374	8451
20	12031	2237	0	14268
21	16160	11858	0	28018
22	46426	28634	0	75059
23	137990	103941	0	241931
24	302740	258148	0	560888
25	603750	439420	0	1043170
26	505598	480370	0	985968
27	362343	272987	0	635330
28	171721	155796	0	327516
29	85061	69039	0	154100
30	100145	78524	0	178669
31	133574	45086	0	178660
32	144458	76087	0	220546
33	230727	74310	0	305037
34	159579	71632	0	231211
35	100505	87854	0	188359
36	48436	111177	0	159613
37	27524	78608	0	106133
38	4194	74920	0	79114
39	1921	52067	0	53988
40	3032	33454	0	36486
41	0	30900	0	30900
42	0	21541	0	21541
43	0	5244	0	5244
44	0	8589	0	8589
45	0	4268	0	4268
46	0	6231	0	6231
47	0	4281	0	4281
48	0	438	0	438
49	0	0	0	0
50	0	1315	0	1315
51	0	438	0	438
52				0
53				0
54				0
55				0
56				0
Total	3218536	2692563	374	5911472

Samples	34
Ind. Sampled	4637
Catch (tons)	1853
SOP	0.98

Table 10. Redfish 3LN stock Spanish catches length distribution 2023.

Redfish Length (cm)	Division 3LN Males	Females	Ind.	Total
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	0	0
16	0	0	0	0
17	0	0	0	0
18	2246	0	0	2246
19	15190	10323	0	25513
20	26986	3441	0	30427
21	10968	0	0	10968
22	37172	0	0	37172
23	22726	10968	0	33694
24	17164	2246	0	19411
25	52952	13214	0	66166
26	90850	15460	0	106310
27	90649	30681	0	121330
28	116993	76758	0	193751
29	159589	81604	0	241194
30	159308	177692	0	337001
31	112922	135635	0	248557
32	39241	166417	0	205658
33	43175	150258	0	193433
34	3481	99962	0	103442
35	0	57507	0	57507
36	4069	76576	0	80645
37	0	40554	0	40554
38	0	27611	0	27611
39	0	12384	0	12384
40	0	13810	0	13810
41	0	12384	0	12384
42	0	2852	0	2852
43	0	1426	0	1426
44	0	0	0	0
45	0	0	0	0
Total	1005682	1219766	0	2225448

Samples	7
Ind. Sampled	733
Catch (tons)	855
SOP	0.96

Table 11.   Redfish 3O stock Spanish catches length distribution 2023.

Redfish Length (cm)	Males	3O Females	Ind.	Total
10	251	0	0	251
11	0	251	0	251
12	1056	0	0	1056
13	4063	4278	0	8341
14	888	0	0	888
15	2790	2259	0	5049
16	6235	7752	36	14023
17	14639	9390	72	24101
18	95050	28769	0	123819
19	133267	61228	14785	209280
20	286961	190409	44246	521616
21	413324	361824	88528	863675
22	687501	461022	58995	1207518
23	877539	662034	117989	1657563
24	884623	774242	95866	1754731
25	545869	562431	132738	1241037
26	163634	572862	66369	802865
27	77282	369262	44246	490790
28	15339	274601	22123	312064
29	4811	211692	22123	238627
30	393	116340	7374	124107
31	0	50509	14749	65258
32	2857	19922	7374	30154
33	393	5209	0	5601
34	1424	3262	0	4686
35	0	0	0	0
36	0	0	0	0
37	0	1367	0	1367
38				0
39				0
40				0
41				0
42				0
43				0
44				0
45				0
Total	4220190	4750916	737612	9708718

Samples	34
Ind. Sampled	5169
Catch (tons)	1840
SOP	0.99

Table 12.   American plaice 3LNO stock Spanish catches length distribution (2023).

Amernican Plaice Length (cm)	Males	Division 3LNO Females	Ind.	Total
15	0	27	77	104
16	0	0	0	0
17	0	562	0	562
18	54	612	0	666
19	48	226	0	274
20	142	210	0	352
21	493	301	0	794
22	135	294	0	429
23	27	583	0	610
24	81	802	0	883
25	297	552	0	849
26	1881	297	0	2179
27	3643	265	0	3909
28	4795	538	0	5332
29	6823	1732	0	8555
30	6442	2798	0	9240
31	5807	5765	0	11572
32	3884	7809	0	11693
33	4555	9557	0	14112
34	2249	7282	0	9531
35	1377	6771	0	8149
36	1891	5953	0	7844
37	1421	4859	0	6280
38	781	6530	0	7312
39	904	6050	0	6954
40	529	4878	0	5407
41	92	4930	0	5022
42	33	7198	0	7232
43	33	5809	0	5842
44	0	7466	0	7466
45	0	6377	0	6377
46	33	5529	0	5563
47	33	6099	0	6132
48	110	4321	0	4431
49	66	3562	0	3628
50	33	3575	0	3608
51	33	1572	0	1605
52	33	1807	0	1841
53	33	2357	0	2390
54	33	2089	0	2123
55	0	2189	0	2189
56	66	1223	0	1290
57	33	860	0	893
58	0	707	0	707
59	33	1526	0	1559

60	66	1887	0	1953
61	0	757	0	757
62	0	1331	0	1331
63	0	504	0	504
64	0	585	0	585
65	0	0	0	0
66	0	535	0	535
67	0	195	0	195
68	0	109	0	109
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	0	0	0
Total	49027	150355	77	199460

Samples	16
Ind. Sampled	2258
Catch (tons)	125
SOP	1.02

Table 13.   Witch flounder Spanish catches length distribution for Div. 3NO (2023).

| Witch flounder | 3NO | | | |
Length (cm)	Males	Females	Ind.	Total
14	0	22	0	22
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	14	22	0	35
23	22	0	0	22
24	14	27	0	41
25	14	0	0	14
26	89	149	0	238
27	194	136	0	331
28	71	97	0	167
29	263	222	0	485
30	555	127	0	682
31	1202	588	0	1790
32	1693	989	0	2681
33	1255	1148	0	2403
34	1013	1363	0	2376
35	961	1105	0	2066
36	1724	1214	0	2938
37	1406	1337	0	2743
38	1930	1064	0	2994
39	2723	1615	0	4337
40	2059	1329	0	3389
41	1979	1922	0	3901
42	1351	1593	0	2943
43	932	1364	0	2296
44	377	1915	0	2292
45	283	1293	0	1575
46	207	1243	0	1451
47	91	787	0	878
48	57	295	0	352
49	48	101	0	149
50	0	69	0	69
51	0	6	0	6
Total	22524	23141	0	45665

Samples	10
Ind. Sampled	1595
Catch (tons)	17
SOP	0.95

Table 14.   Yellowtail flounder Spanish catches length distribution for Div. 3LNO (2023).

Yellowtail flounder	3LNO			
Length (cm)	Males	Females	Ind.	Total
18	0	0	0	0
19	62	0	0	62
20	0	0	0	0
21	385	62	0	447
22	302	177	0	479
23	0	0	0	0
24	333	379	0	712
25	482	590	0	1071
26	1113	576	0	1689
27	872	303	0	1175
28	1130	964	0	2093
29	1204	1324	0	2527
30	1797	1267	0	3063
31	3832	3812	605	8249
32	6754	3057	0	9811
33	6354	3347	0	9701
34	8773	8572	0	17345
35	7156	10557	302	18016
36	5902	8497	302	14702
37	2703	10076	0	12779
38	1787	10152	0	11939
39	1285	11199	0	12485
40	803	12425	0	13228
41	0	7586	0	7586
42	114	3661	0	3775
43	159	3924	0	4083
44	114	3488	0	3602
45	0	2256	0	2256
46	114	321	0	435
47	0	820	0	820
48	114	758	0	872
49	0	0	0	0
50	0	0	0	0
Total	53642	110150	1210	165002
Samples				10
Ind. Sampled				1101
Catch (tons)				71
SOP				1.03

Table 15. Greenland halibut Spanish catches length distribution for Div. 3L and 3M (2023).

Length (cm)	Division 3L				Division 3M			
	Males	**Females**	**Ind.**	**Total**	**Males**	**Females**	**Ind.**	**Total**
18	0	0	0	0	0	0	0	0
19	0	153	0	153	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	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	182	0	0	182
25	0	0	0	0	254	0	0	254
26	172	0	0	172	0	0	0	0
27	462	0	0	462	0	0	0	0
28	1327	493	0	1821	0	0	0	0
29	2822	386	0	3208	123	0	0	123
30	1522	1165	0	2687	819	0	0	819
31	1984	1974	0	3958	418	0	0	418
32	6180	2018	0	8199	2565	1715	0	4280
33	6855	2870	0	9725	2295	2313	0	4608
34	8143	3925	0	12068	4351	3691	0	8042
35	12136	7774	0	19910	4038	4538	0	8576
36	12209	11565	0	23774	12523	7390	0	19913
37	25871	15374	0	41246	23976	10507	0	34483
38	25793	28500	0	54293	18999	16789	0	35788
39	33572	36852	0	70423	24941	23697	0	48637
40	51943	42523	0	94466	24508	25332	0	49841
41	57654	50067	0	107721	29971	30098	0	60069
42	66966	69249	0	136215	35228	42168	0	77396
43	63569	71830	0	135398	31483	54457	0	85940
44	78679	90627	0	169306	37333	55348	0	92681
45	74093	108317	0	182409	35444	61438	0	96883
46	67332	108606	153	176091	33173	60212	0	93385
47	66058	108574	0	174632	34699	65908	0	100607
48	60239	94430	0	154669	32785	67866	0	100651
49	47944	93805	0	141749	30617	55758	0	86375
50	42449	88675	0	131124	23148	62876	0	86024
51	36509	89806	0	126315	21568	50575	0	72143
52	30259	80476	0	110735	13914	53263	0	67177
53	25249	70930	0	96179	9542	34682	0	44224
54	14734	62479	0	77213	12045	44102	0	56147
55	12629	53623	0	66252	5850	33553	0	39404
56	8227	54426	0	62652	3925	27425	0	31350
57	8074	37233	0	45306	3987	24363	0	28350
58	4142	27704	0	31845	2519	28846	0	31365
59	2904	35265	0	38169	3617	21939	0	25556
60	2332	29782	0	32114	314	14626	0	14939
61	2125	32210	0	34335	236	12010	0	12246
62	642	23348	0	23990	302	9106	0	9408
63	1724	14265	0	15989	288	8218	0	8507

64	1488	20595	0	22084	212	8710	0	8922
65	400	12382	0	12782	0	4626	0	4626
66	400	10936	0	11336	109	4665	0	4774
67	0	11937	0	11937	0	4128	0	4128
68	0	9836	0	9836	0	3971	0	3971
69	0	5027	0	5027	0	2219	0	2219
70	0	2994	0	2994	0	2694	0	2694
71	0	4304	0	4304	0	1491	0	1491
72	493	3346	0	3839	146	1940	0	2086
73	0	2064	0	2064	126	2337	0	2464
74	0	2306	0	2306	0	1826	0	1826
75	0	701	0	701	0	1937	0	1937
76	0	486	0	486	0	1148	0	1148
77	0	0	0	0	0	592	0	592
78	0	0	0	0	0	513	0	513
79	0	0	0	0	0	764	0	764
80	0	114	0	114	0	456	0	456
81	0	816	0	816	0	148	0	148
82	0	155	0	155	0	227	0	227
83	0	0	0	0	0	0	0	0
84	0	0	0	0	0	137	0	137
85	0	155	0	155	0	81	0	81
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	530	0	530	0	0	0	0
90	0	0	0	0	0	0	0	0
91	0	0	0	0	0	227	0	227
92	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0
94					0	0	0	0
95					0	0	0	0
96					0	0	0	0
97					0	0	0	0
98					0	0	0	0
99					0	0	0	0
100					0	198	0	198
Total	968304	1739983	153	2708440	522573	1059846	0	1582419
Samples				60				50
Ind. Sampled				8884				7252
Catch (tons)				2476				1517

Table 15 (cont.). Greenland halibut Spanish catches length distribution for Div. 3NO (2023).

Length (cm)	Males	Females	Ind.	Total
18	0	0	0	0
19	0	0	0	0
20	263	0	0	263
21	0	519	0	519
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	519	0	0	519
28	348	665	0	1014
29	1386	144	0	1531
30	1288	1140	0	2428
31	1961	2889	0	4849
32	2380	4072	0	6452
33	6292	2569	0	8861
34	16389	8738	0	25127
35	16452	13910	0	30363
36	17207	19272	0	36479
37	16138	17705	0	33843
38	22708	22794	0	45502
39	16664	37339	0	54003
40	19841	26043	0	45884
41	24921	32411	0	57332
42	24932	32048	0	56979
43	19173	27528	0	46700
44	19756	36133	0	55889
45	18438	34171	0	52609
46	22270	39312	0	61582
47	19537	38393	0	57930
48	10843	34660	0	45504
49	13936	31451	0	45386
50	7598	22953	0	30551
51	7001	15045	0	22046
52	4780	21913	0	26693
53	2286	10070	0	12357
54	1944	13902	0	15847
55	1789	8780	0	10569
56	1579	5065	0	6644
57	151	3090	0	3241
58	151	2353	0	2504
59	521	1605	0	2126
60	762	2652	0	3415
61	519	5177	0	5696
62	0	3775	0	3775
63	0	1237	0	1237

64	0	1585	0	1585
65	0	2092	0	2092
66	0	564	0	564
67	0	1752	0	1752
68	0	196	0	196
69	0	665	0	665
70	0	0	0	0
71	0	189	0	189
72	0	0	0	0
73	0	0	0	0
74	0	45	0	45
75	0	144	0	144
76	0	144	0	144
77	0	45	0	45
78	0	0	0	0
79	0	0	0	0
80	0	0	0	0
81	0	0	0	0
82	0	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
Total	342723	588946	0	931670
Samples				22
Ind Sampled				2585
Catch (tons)				674

Table 15 (cont.).   Greenland halibut Spanish catches length distribution for Div. 3LMNO (2023).

	Division 3LMNO			
Length (cm)	Males	Females	Indter.	Total
18	0	0	0	0
19	0	153	0	153
20	263	0	0	263
21	0	519	0	519
22	0	0	0	0
23	0	0	0	0
24	182	0	0	182
25	254	0	0	254
26	172	0	0	172
27	981	0	0	981
28	1676	1159	0	2835
29	4331	531	0	4861
30	3629	2305	0	5934
31	4362	4863	0	9225
32	11126	7805	0	18931
33	15442	7753	0	23195
34	28883	16355	0	45237
35	32626	26222	0	58848
36	41939	38227	0	80166
37	65986	43586	0	109572
38	67500	68083	0	135582
39	75176	97887	0	173064
40	96293	93898	0	190191
41	112547	112576	0	225123
42	127125	143465	0	270591
43	114224	153815	0	268039
44	135768	182108	0	317876
45	127975	203925	0	331900
46	122775	208130	153	331058
47	120295	212875	0	333169
48	103867	196957	0	300823
49	92496	181014	0	273510
50	73195	174504	0	247700
51	65078	155426	0	220504
52	48953	155652	0	204605
53	37077	115683	0	152760
54	28723	120484	0	149207
55	20269	95956	0	116225
56	13731	86916	0	100646
57	12212	64686	0	76898
58	6811	58903	0	65714
59	7042	58809	0	65851
60	3408	47060	0	50468
61	2880	49397	0	52277
62	944	36228	0	37173
63	2012	23721	0	25733

64	1700	30890	0	32590
65	400	19100	0	19500
66	508	16166	0	16674
67	0	17818	0	17818
68	0	14003	0	14003
69	0	7910	0	7910
70	0	5688	0	5688
71	0	5984	0	5984
72	640	5285	0	5925
73	126	4402	0	4528
74	0	4176	0	4176
75	0	2782	0	2782
76	0	1778	0	1778
77	0	637	0	637
78	0	513	0	513
79	0	764	0	764
80	0	569	0	569
81	0	964	0	964
82	0	382	0	382
83	0	0	0	0
84	0	137	0	137
85	0	236	0	236
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	530	0	530
90	0	0	0	0
91	0	227	0	227
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	198	0	198
Total	1833601	3388775	153	5222529

Samples	132
Ind Sampled	18721
Catch (tons)	4667
SOP	0.98

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	263	672	0	934	**2**	57	62		60
3	3677	1110	0	4787	**3**	155	171		159
4	76000	57902	0	133902	**4**	308	305		307
5	416801	413507	0	830309	**5**	457	473		465
6	878872	1240428	130	2119430	**6**	705	725	775	717
7	349096	901847	22	1250966	**7**	1014	1056	775	1044
8	55952	293876	0	349828	**8**	1255	1317		1307
9	32577	128079	0	160657	**9**	1418	1561		1532
10	15284	148397	0	163681	**10**	1735	1772		1768
11	3106	83956	0	87063	**11**	2141	2120		2121
12	1044	47449	0	48494	**12**	2431	2348		2350
13	321	38744	0	39064	**13**	2407	2525		2524
14	223	18039	0	18262	**14**	3244	2946		2950
15	16	8411	0	8426	**15**	3347	3343		3343
16	367	2808	0	3175	**16**	3222	3890		3812
17	0	2264	0	2264	**17**		4058		4058
18	0	862	0	862	**18**		5714		5714
19	0	227	0	227	**19**		6739		6739
20	0	198	0	198	**20**		9094		9094

	Mean Length (cm)			
Age	**Males**	**Females**	**Ind.**	**Total**
1				
2	20.5	21.0		20.9
3	28.0	29.0		28.2
4	34.6	34.6		34.6
5	39.2	39.7		39.5
6	45.0	45.4	46.5	45.2
7	50.5	51.1	46.5	50.9
8	54.0	54.8		54.7
9	56.1	57.8		57.5
10	59.8	60.1		60.1
11	63.9	63.6		63.6
12	66.4	65.7		65.7
13	66.3	67.1		67.1
14	72.8	70.4		70.4
15	73.5	73.2		73.2
16	72.6	76.9		76.4
17		77.9		77.9
18		86.7		86.7
19		91.5		91.5
20		100.5		100.5

Table 17.   Skates Spanish 2023 catches length distribution by sex for Div. 3LNO.

Skates Length (cm)	3LNO Males	Females	Ind.	Total
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	431	0	431
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	449	0	0	449
24	0	431	0	431
25	0	0	0	0
26	0	0	0	0
27	0	862	0	862
28	0	0	0	0
29	152	862	0	1014
30	671	657	0	1328
31	1199	938	148	2285
32	801	911	0	1712
33	608	337	148	1093
34	1395	2163	444	4001
35	2560	1517	0	4078
36	1190	1547	148	2885
37	1806	2980	0	4786
38	3154	2602	296	6052
39	3785	2598	148	6531
40	2636	2332	436	5404
41	4148	4569	280	8998
42	4833	6957	444	12233
43	5932	5581	1876	13390
44	5714	8125	724	14563
45	9475	9444	568	19487
46	11141	9690	1440	22270
47	9494	10732	1440	21666
48	12775	12360	1276	26412
49	9763	9707	1315	20785
50	12174	10606	1027	23807
51	8035	10151	1012	19198
52	15120	14172	1035	30327
53	11670	10694	1315	23679
54	15995	12252	1759	30006
55	14527	11870	1884	28280
56	10386	10842	1168	22396
57	11180	11577	1588	24346
58	9373	7218	1580	18170

59	10852	8228	1168	20247
60	8667	12846	724	22237
61	7572	10213	444	18229
62	10762	9275	880	20916
63	14205	9576	436	24217
64	7910	9364	724	17998
65	6104	8018	436	14557
66	8233	8791	576	17600
67	5251	6382	1020	12653
68	6997	10134	296	17427
69	4896	9782	716	15394
70	5468	9574	716	15758
71	7689	8574	280	16543
72	6171	6883	436	13490
73	6382	6351	428	13162
74	8682	6483	280	15445
75	8203	6269	996	15468
76	7941	5209	428	13578
77	7881	2777	560	11218
78	7492	3547	288	11328
79	7175	2142	0	9318
80	8026	2209	436	10670
81	8029	1932	280	10241
82	5228	310	0	5538
83	4766	380	148	5294
84	2695	31	288	3014
85	3973	320	0	4293
86	1219	0	0	1219
87	2320	118	0	2438
88	3142	0	0	3142
89	2026	1073	0	3100
90	326	0	0	326
91	833	682	0	1515
92	795	0	0	795
93	1424	0	0	1424
94	1968	0	0	1968
95	682	0	0	682
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
Total	414123	365188	36483	815794

Samples	40
Ind. Sampled	4663
Catch (ton)	1806
SOP	0.97

Table 18. Roughhead grenadier Spanish catches length distribution measured as preanal fin lengths (AFL) for Divisions 3LMNO (2023).

Roughhead G. Length (cm)	3LMNO Males	Females	Ind.	Total
3	0	15	0	15
4	0	15	0	15
5	445	781	56	1282
6	3151	610	0	3761
7	4894	867	0	5761
8	7007	5234	0	12241
9	2626	8521	0	11146
10	3784	4810	0	8594
11	3387	1988	0	5375
12	4250	3151	0	7401
13	4729	2742	0	7471
14	7567	3975	0	11542
15	9856	5453	0	15309
16	11508	6242	0	17750
17	12263	4780	0	17043
18	11131	5478	0	16609
19	8229	5021	0	13250
20	2841	3347	0	6188
21	2575	3259	0	5834
22	593	2648	0	3241
23	139	2268	0	2407
24	35	1988	0	2022
25	0	1054	0	1054
26	0	1165	0	1165
27	7	503	0	510
28	0	743	0	743
29	58	551	0	609
30	0	354	0	354
31	0	237	0	237
32	0	164	0	164
33	0	257	0	257
34	0	96	0	96
35	0	153	0	153
36	0	22	0	22
37	0	17	0	17
38	0	0	0	0
39	0	0	0	0
40	0	6	0	6
41	0	0	0	0
42	0	0	0	0
Total	101073	78518	56	179646
Samples				45
Ind. Sampled				6525
Catch (tons)				69
SOP				1.01

Table 19. Roughhead grenadier Div. 3LMNO Spanish catches distribution, mean weight (g) and mean length (AFL cm) by age.

Age	Males	Females	Ind.	Total		Age	Males	Females	Ind.	Total
	Abundance						**Mean Weight (g)**			
1	0	15	0	15		**1**		3		3
2	3596	1407	56	5059		**2**	20	16	13	19
3	10146	11784	0	21930		**3**	46	59		53
4	11365	9613	0	20978		**4**	84	86		85
5	11033	6518	0	17551		**5**	190	186		188
6	11683	6438	0	18121		**6**	272	259		267
7	15316	8206	0	23522		**7**	349	342		347
8	16548	6826	0	23374		**8**	433	451		438
9	10190	7865	0	18055		**9**	516	546		529
10	6275	5947	0	12221		**10**	586	657		621
11	3637	4028	0	7665		**11**	724	862		797
12	898	2781	0	3679		**12**	800	1018		965
13	327	2377	0	2703		**13**	869	1220		1177
14	12	1495	0	1508		**14**	1970	1529		1533
15	13	1197	0	1210		**15**	1954	1649		1652
16	12	704	0	717		**16**	1970	1894		1895
17	16	796	0	812		**17**	2013	2360		2353
18	5	305	0	311		**18**	2027	2690		2679
19	0	88	0	88		**19**		3226		3226
20	0	99	0	99		**20**		3402		3402
21	0	22	0	22		**21**		2471		2471
22	0	0	0	0		**22**				
23	0	6	0	6		**23**		5274		5274
24	0	0	0	0		**24**				

Age	Males	Females	Ind.	Total
	Mean Length (cm)			
1		3.5		3.5
2	6.4	5.9	5.5	6.2
3	8.3	9.0		8.7
4	10.1	10.3		10.2
5	13.4	13.3		13.3
6	15.1	14.9		15.0
7	16.4	16.3		16.4
8	17.6	17.8		17.7
9	18.7	19.0		18.9
10	19.5	20.2		19.9
11	20.9	22.2		21.6
12	21.6	23.4		23.0
13	22.2	24.9		24.5
14	29.2	26.6		26.7
15	29.1	27.4		27.4
16	29.2	28.8		28.8
17	29.4	30.8		30.8
18	29.5	32.2		32.2
19		34.2		34.2
20		35.0		35.0
21		31.5		31.5
22				
23		40.5		40.5
24				

Table 20.   White hake 2023 Spanish catches length distribution by sex for Div. 3NO.

| White hake | | 3NO | | |
Length (cm)	Males	Females	Ind.	Total
20	0	0	0	0
21	142	0	0	142
22	0	0	0	0
23	0	1300	0	1300
24	0	585	0	585
25	0	457	0	457
26	2513	270	0	2783
27	8375	1388	0	9763
28	9241	3395	0	12636
29	24433	7398	0	31831
30	26811	10340	0	37151
31	38903	26546	0	65449
32	28895	52257	0	81152
33	13873	57962	0	71835
34	10958	53048	0	64006
35	2665	67155	0	69819
36	3109	67932	0	71041
37	3172	32644	0	35816
38	5088	13087	0	18175
39	3874	16469	0	20342
40	1717	5832	0	7548
41	1276	3657	0	4933
42	1142	4468	0	5610
43	2028	1544	0	3573
44	2424	4264	0	6688
45	1179	680	0	1858
46	848	1267	0	2115
47	3235	2152	0	5387
48	1398	335	0	1733
49	680	891	0	1570
50	5844	550	0	6395
51	5531	1468	0	6999
52	3112	0	0	3112
53	3680	550	0	4230
54	5327	2167	0	7494
55	12394	4911	0	17305
56	7020	4013	0	11033
57	5824	746	0	6570
58	1616	1179	0	2795
59	3842	1230	0	5072
60	2457	957	0	3414
61	2448	550	0	2998
62	621	2097	0	2717
63	1066	1140	0	2206
64	589	3419	0	4008
65	238	589	0	828

66	0	1378	0	1378
67	589	1230	0	1819
68	0	2834	0	2834
69	238	2830	0	3068
70	0	1179	0	1179
71	0	1179	0	1179
72	0	2947	0	2947
73	0	0	0	0
74	0	0	0	0
75	0	238	0	238
76	589	0	0	589
77	0	1179	0	1179
78	589	589	0	1179
79	0	589	0	589
80	0	589	0	589
81	0	0	0	0
82	0	828	0	828
83	0	0	0	0
84	0	1179	0	1179
85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	589	0	589
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	1179	0	1179
93	0	0	0	0
Total	261595	483420	0	745015

Samples	11
Ind. Sampled	1408
Catch (ton)	330
SOP	0.98

Table 21. Silver hake 2023 Spanish catches length distribution by sex for Div. 3NO.

Silver hake Length (cm)	3NO Males	Females	Ind.	Total
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	340	0	0	340
18	0	0	0	0
19	0	0	0	0
20	0	6289	0	6289
21	25764	25767	0	51531
22	92878	74392	0	167271
23	175352	122123	0	297475
24	373702	165943	0	539645
25	576781	199061	0	775842
26	1099464	325837	0	1425301
27	1541500	429593	0	1971092
28	1983049	848528	0	2831576
29	1681158	1484179	0	3165337
30	1288324	1981517	0	3269842
31	660639	2034590	0	2695230
32	391575	1909546	0	2301121
33	207671	1538693	0	1746364
34	55425	1034016	0	1089441
35	23411	702915	0	726326
36	16842	482505	0	499347
37	6712	354266	1558	362536
38	1420	204168	0	205589
39	6371	128308	0	134679
40	1420	112560	0	113980
41	0	54644	0	54644
42	0	32154	0	32154
43	0	33705	0	33705
44	0	21335	0	21335
45	0	9972	0	9972
46	0	17056	0	17056
47	0	12197	0	12197
48	0	18564	0	18564
49	0	923	0	923
50	0	36273	0	36273
51	0	2575	0	2575
52	0	7085	0	7085
53	0	12132	0	12132
54	0	627	0	627
55	0	0	0	0
56	0	1917	0	1917
57	0	0	0	0

58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
Total	10209798	14425959	1558	24637315

Samples	81
Ind. Sampled	11909
Catch (ton)	4320
SOP	1.03

Table 22. Greenland halibut Spanish 2023 Commercial Total Age Length key (ALK).

CLAVE LENGTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	TOTAL
20		1																			1
21																					0
22																					0
23																					0
24																					0
25			1																		1
26																					0
27			1																		1
28			4	3																	7
29			2	3																	5
30				7																	7
31				12																	12
32				14	1																15
33				13	4																17
34				18	9																27
35				9	27																36
36				4	34																38
37				4	34	1															39
38				4	53	4															61
39				1	46	12															59
40				1	37	20															58
41					31	43															74
42					17	57															74
43					10	64															74
44					8	78															86
45						82	1														83
46						70	12														82
47						56	19														75
48						21	30														51
49						24	33														57
50						7	42	4													53
51						3	52	8													63
52						1	35	9													45
53						2	23	13	1	2											41
54							24	20	10												54
55							15	16	9												40
56							6	14	5	2											27
57							8	8	8	6											30
58								7	9	7	1										24
59								4	17	10	1										32
60									3	11	3										17
61									2	10	5	1	1								19
62										8	7	2									17
63										4	4	7	4	1							20
64										4	7	4	1								16
65											3	4	5	1	1						14
66										1	6	5	4	1							17
67											3	1	4	1							9
68										1	3	5	1	1							11
69											3	2	2	1							8
70												3	5	1							9
71												4		7	1						12
72												3	1	3							7
73												1	4	2	2	1					10
74												2	3	2							7
75												1	3	2	1	1					8
76												1	1		1	1					4
77														1		1					2
78															1						1
79														1							1
80														1	1	1					3
81														1	1	1	1				4
82													1		1						2
83																					0
84																					0
85																					0
86																					0
87																					0
88																					0
89																		1			1
90																					0
91																			1		1
92																					0
93																					0
94																					0
95																					0
96																					0
97																					0
98																					0
99																					0
100																				1	1
TOTAL	0	1	8	93	311	545	300	103	64	66	46	38	35	27	15	8	6	2	1	1	1670

Table 22 (Cont.).   Greenland halibut Spanish 2023 Commercial males Age Length key (ALK).

CLAVE LENGTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	TOTAL
20		1																			1
21																					0
22																					0
23																					0
24			1																		1
25			1																		1
26			1																		1
27			1																		1
28			3	2																	5
29			1	3																	4
30				5																	5
31				5																	5
32				7	1																8
33				6	4																10
34				7	4																11
35				4	17																21
36				2	18																20
37				2	20																22
38				2	30	3															35
39				1	18	6															25
40				1	18	9															28
41					13	24															37
42					6	25															31
43					6	29															35
44					4	28															32
45						32															32
46						28	6														34
47						30	8														38
48						7	10														17
49						10	10														20
50						2	11	1													14
51						2	21	2													25
52						1	9	2													12
53						1	8	6	1												16
54							6	3	6												15
55							6	4	3												13
56							3	5	3	1											12
57							2	3	2	1											8
58									3	2											5
59								1	3	2											6
60										2											2
61										1											1
62										1											1
63											1										1
64										2	6	3									11
65											5	5	2								12
66												1	1								2
67																					0
68																					0
69																					0
70																					0
71																					0
72												1		1		2					4
73														4	1	3					8
74																					0
75																					0
TOTAL	0	1	8	47	159	237	100	27	21	12	12	10	3	5	1	5	0	0	0	0	648

Table 22 (Cont.). Greenland halibut Spanish 2023 Commercial females Age Length key (ALK).

CLAVE LENGTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+	TOTAL
19		1																			1
20																					0
21		1																			1
22																					0
23																					0
24																					0
25																					0
26																					0
27																					0
28			1	1																	2
29			1																		1
30				2																	2
31				7																	7
32				7																	7
33				7																	7
34				11	5																16
35				5	10																15
36				2	16																18
37				2	14	1															17
38				2	23	1															26
39					28	6															34
40					19	11															30
41					18	19															37
42					11	32															43
43					4	35															39
44					4	50															54
45						50	1														51
46						42	6														48
47						26	11														37
48						14	20														34
49						14	23														37
50						5	31	3													39
51						1	31	6													38
52							26	7													33
53						1	15	7		2											25
54							18	17	4												39
55							9	12	6												27
56							3	9	2	1											15
57							6	5	6	5											22
58								7	6	5	1										19
59								3	14	8	1										26
60									3	9	3										15
61									2	9	5	1	1								18
62										8	7	2									17
63										4	3	7	4	1							19
64										4	7	4	1								16
65											3	4	5	1	1						14
66										1	6	4	3	1							15
67											3	1	4	1							9
68										1	3	5	1	1							11
69											3	2	2	1							8
70												3	5	1							9
71												4		7	1						12
72													3	1	3						7
73													1	4	2	2	1				10
74													2	3	2						7
75													1	3	2	1	1				8
76													1	1		1	1				4
77															1		1				2
78																1					1
79															1						1
80															1	1	1				3
81															1	1	1	1			4
82														1		1					2
83																					0
84																	1	2			3
85																1					1
86																					0
87																					0
88																					0
89																		1			1
90																					0
91																			1		1
92																					0
93																					0
94																					0
95																					0
96																					0
97																					0
98																					0
99																					0
100																				1	1
TOTAL	0	1	2	46	152	308	200	76	43	57	45	37	33	25	11	3	2	0	0	0	1041

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

Length cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
																									Ages
3																									
4																									
5		2																							2
6																									0
7			2																						2
8			4	1																					5
9			3	4																					7
10			5	15	1																				21
11			1	23	6																				30
12			5	24	3																				32
13				30	6	1																			37
14				13	24	8																			45
15				6	44	24	3																		77
16					4	44	23	1																	72
17					2	26	44	18	3																93
18						5	41	42	14																102
19							12	33	22	5															72
20							2	15	26	8	2														53
21								2	14	22	3	1													42
22									3	10	9	2	1												25
23										9	10	5	1												25
24										2	7	13													22
25											1	2	3	3			1								10
26												1	5	4	4	1									15
27													1	3	4	3	1								12
28														4	2	3									9
29													1	2	2	2	3	1							11
30															1	1	1	1							4
31															1	3	2	3	1		1				11
32															1		4		1						6
33																	2								2
34															1					1					2
35																									0
36																			2						2
37																									0
38																									0
39																									0
40																							1		1
Total		2	15	48	80	83	108	125	111	82	56	33	30	19	18	13	14	5	4	1	1	0	1	0	849

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	22	23	24	
3																									0
4																									0
5		1																							1
6		1																							1
7			2																						2
8			1	1																					2
9			1	2																					3
10			3	9	1																				13
11				17	4																				21
12			3	13	1																				17
13				20	4	1																			25
14				8	13	6																			27
15				4	30	12	2																		48
16					2	27	17	1																	47
17					2	20	30	11	1																64
18						3	30	21	8																62
19							3	15	13	4															35
20							1	4	10	4	2														21
21									1	11	2	1													15
22									1	3	3	2													9
23										1	1														2
24											1	1													2
25																									0
26																									0
27													1	3	4	3	1								12
28																									0
29													1	2	2	2	3	1							11
30																									0
Total	0	2	7	32	50	52	69	83	52	34	23	9	6	5	6	5	4	1	0	0	0	0	0	0	440

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

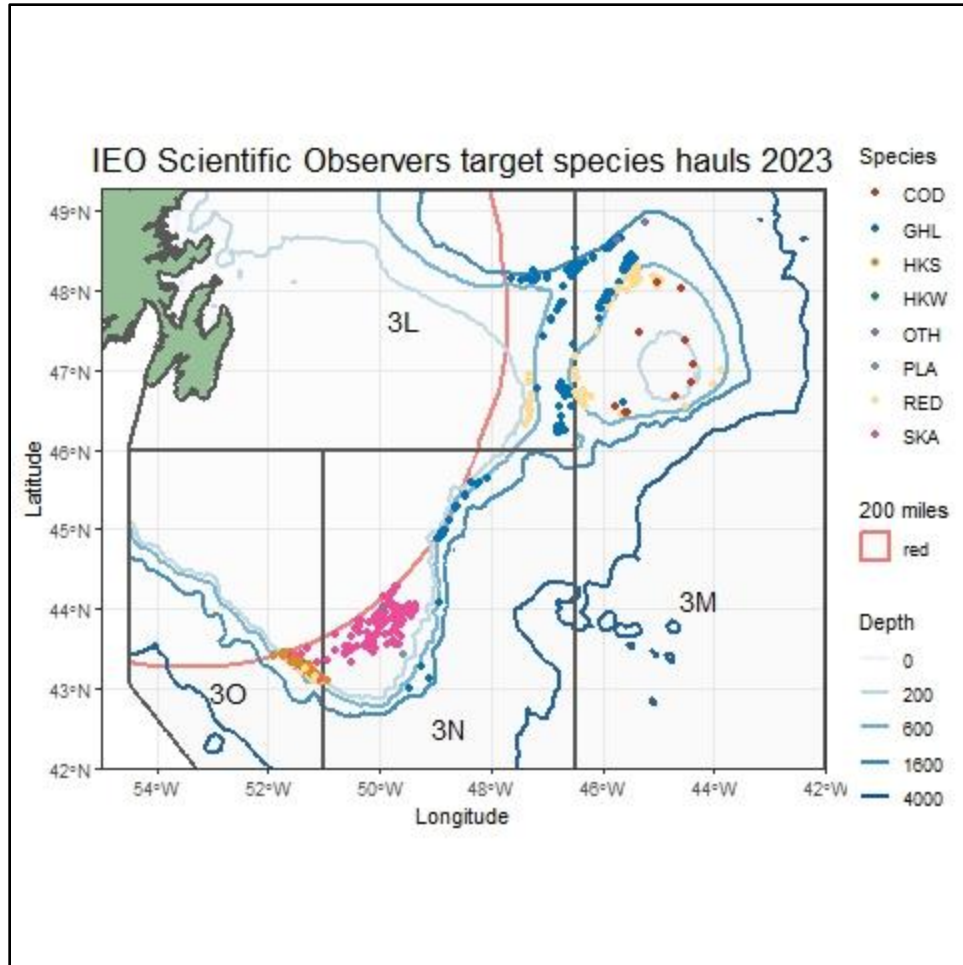| Length cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
													Ages												
3	2																								2
4		2																							2
5		9																							9
6		11																							11
7			2																						2
8			3																						3
9			2	2																					4
10			2	6																					8
11			1	6	2																				9
12				2	11	2																			15
13					10	2																			12
14					5	11	2																		18
15					2	14	12	1																	29
16						2	17	6																	25
17							6	14	7	2															29
18							2	11	21	6															40
19								9	18	9	1														37
20								1	11	16	4														32
21									2	13	11	1													27
22										2	7	6		1											16
23											8	9	5	1											23
24											2	6	12												20
25												1	2	3	3		1								10
26												1	5	4	4	1									15
27													1	3	4	3	1								12
28														4	2	3									9
29													1	2	2	2	3	1							11
30															1	1	1	1							4
31															1	3	2	3	1		1				11
32															1		4		1						6
33																	2								2
34															1					1					2
35																		2		1					3
36																			2						2
37																			1						1
38																									0
39																									0
40																							1		1
Total	2	22	10	16	30	31	39	42	59	48	33	24	26	19	18	13	14	7	5	2	1	0	1	0	462

Figure 1. IEO Scientific Observers sampled commercial hauls position depending on the target species.
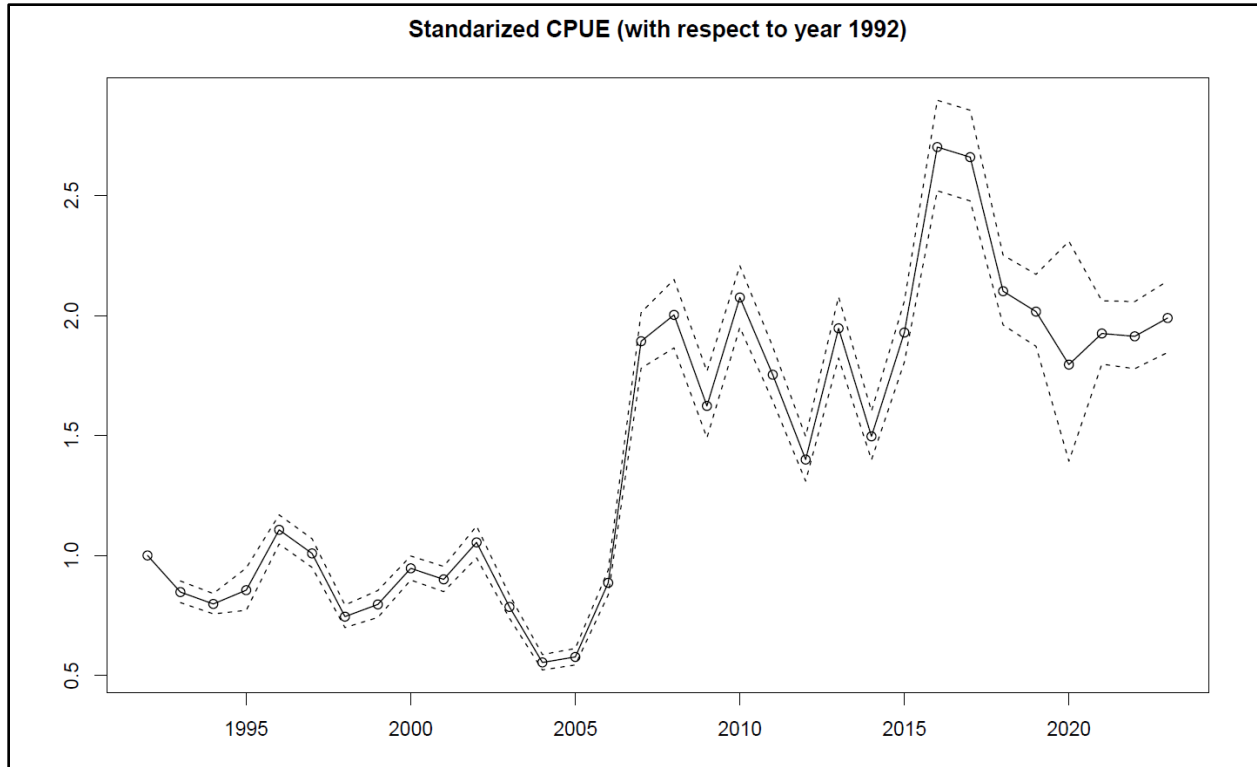
Figure 2. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2023 data.