

10 Greater forkbeard (*Phycis blennoides*) in all ecoregions

10.1 The fishery

Greater forkbeard is as a bycatch species in the traditional demersal longline and trawl mixed fisheries targeting species such as hake, megrim, monkfish, ling, and blue ling in Subareas 6, 7, 8 and 9.

Spanish, French, Norwegian and UK trawl and longline are the main fleets involved in this fishery. In the last ten years 67% of landings have come from Subareas 6 and 7. Although it is not a large economic species in the all Northeast Atlantic, however, is locally important for certain fleets (LLS and OTB) fishing in subareas 6 and 7 with base port mainly in the North West of Spain and in France. The Irish mixed deep-water fishery around Porcupine Bank historically landed important quantities of this species but since 2006 the landings of this country have been reduced strongly. Many countries are involved in the fishery in subareas 1, 2, 3, and 4 that accounted the 17% of total landings since 2013, but most of the landings are traditionally reported by the Norwegian fleets. Russian, Swedish, Faroese and the Icelandic fisheries in the Northeast Atlantic (Division 5b) land small and occasional quantities of greater forkbeard as bycatch of the trawler fleet targeting roundnose grenadier, tusk and ling on Hatton and Rockall Banks.

A further 16% of landings in this period come from the French and Spanish trawl and longline fleets in Subareas 8 and 9 (mainly from 8). In Subarea 9 since 2001 small amounts of *Phycis* spp (probably *Phycis phycis*) have been landed in ports of the Strait of Gibraltar by the longliner fleet targeting scabbardfish in Algeciras, Barbate and Conil. Portuguese landings of *P. blennoides* in subarea 9 decreasing every year since 2000 and present a marked seasonal pattern, being particularly higher between March and July. Reasons for this marked seasonality are unknown, but may be related to abundance variations of this species or to seasonality patterns in other fisheries where this species is taken as bycatch (Lagarto *et al.*, 2016).

Minor quantities of *Phycis blennoides* are landed in Subarea 10 with zero catches since 2019 and in Division 5.a. There is no directed fishery for greater forkbeard in Faroese waters (Division 5b) and only small amount is landed as bycatch (Ofstad, 2022). In subarea 12 there are not reported landings since 2012 (only 0.5 t by Norway in 2021). In Subarea 10, the Azores deep-water fishery is a multispecies and multigear fishery dominated by the main target species *Pagellus bogaraveo*. Target species can change seasonally according to abundance and market prices, but *P. blennoides*, representing 0.5% of total deep-water landings in the period 2016-2020, can be considered as bycatch.

10.2 Landings trends

Tables 10.0a–i and Figure 10.1 show landings of greater forkbeard by country and subarea.

In Subareas 1, 2, 3 and 4 only Norwegian landings are significant reaching in total 213 t in 2021, and increasing to 244 t in 2022. The Norwegian longliners which fish in these areas catch *P. blennoides* as a bycatch in the ling fishery and the quantity of this bycatch depends on market price. After eight years without *P. blennoides* records, in 2002 the Norwegian fleet reported 315 t in Subareas 1 and 2 and 561 t in Subareas 3 and 4, since then the landings of this country have been significant but lower than in 2002. Denmark currently is the second country in landings and reported their first landings in subareas 3 and 4 in 2016 reaching 70 t in 2020 and 49 t in 2022.

Although historically seven countries contributed to the landings in 5b the main landings in come from Norway. Total landings reached the highest values in 2001 and 2002 with 102 and 149 t respectively. Data from Norway landings in 2011 (301 t) and 2012 (145 t) have been corrected this year according to the new estimates provided in the Working Document Ofstad (2023), that reduced these landings to 0.31 t and 0.083 t respectively. Since 2003 combined landings in this subdivision dropped to lower levels and landings reported in 2022 by all countries were 26 t.

Traditionally, the most important landings in 6 and 7 come from Spain, France, Norway, UK (EW) and UK (Scot) and Ireland. Historical landings decreased since the peak of 4967 t in 2000 and they were particularly low in 2009 and 2010 due to the low landings reported by Spain in those years. After these two years reported international landings increased marginally to 1802 t in 2012 but decreased in last years to 889 t in 2022 with the majority of landings reported from France (390 t) and Spain (339 t)..

The main landings from subareas 8 and 9 come from Spanish fleets reaching on average are 240 t in the last ten years. In 2010 landings were the lowest of the series mainly due to the reduction of landings reported by Spain. Reported landings increased from 321 t in 2021 to 337 t in 2022.

Historically in Subarea 10 landings come only from Portugal (although France reported 0.2 t in 2014). After the peaks to 136 t in 1994 and 91 t in 2000, the average in this Subarea in the last ten years is 9 t, but since 2017 only 14 t in 2018 were reported in this Subarea

Although since 1991 several countries were involved in the fishery in Subarea 12 only Spain reported significant landings in the period 2002–2009, and since 2013 only Norway reported 0.5 t in 2021.

10.3 ICES Advice

ICES advice applicable to 2019 and 2020

ICES advised that when the precautionary approach is applied, landings should be no more than 1346 tonnes in each of the years 2019 and 2020. ICES cannot quantify the corresponding catches.

ICES advice applicable to 2021 and 2022

ICES advised that when the precautionary approach is applied, landings should be no more than 861 tonnes in each of the years 2021 and 2022. ICES cannot quantify the corresponding catches.

10.4 Management

According to the Council Regulation (EU) 2018/2025, the TACs for greater forkbeard in all ICES subareas was no longer be set for 2020 and 2021. The ICES advice establishes that the absence of TACs would result in no or a low risk of unsustainable exploitation. Landings in subareas 1, 2, 3 and 4 include Norwegian landings.

PHYCIS BLENNOIDES	EU TAC	TOTAL INTERNATIONAL LANDINGS	
Subarea	2021-2022	2021	2022
1, 2, 3, 4	no TAC	213	244
5, 6, 7	no TAC	893	914
8, 9	no TAC	321	337
10, 12	no TAC	1	0
Total	no TAC	1427	1495

10.5 Stock identity

ICES currently considers greater forkbeard as a single stock for the entire ICES area. It is considered probable that the stock structure is more complex; however further studies would be required to justify change to the current perception of stock boundaries.

10.6 Data available

10.6.1 Landings and discard

Landings are presented in Table 10.0a–i and in Figure 10.1.

Landings by fishing gear in 2022 are shown in Table 10.1a for countries reporting landings to InterCatch.

The estimates of the discard/catches available from 2013–2022 were in the range between 13% and 49% (Table 10.2a). In 2022 the main reported discards come from subareas 7 (76%), 6 (12%), 8 (4%), 4 (5%) and 9 (2%) (Table 10.2b). Discards estimates in the first years of the series should be considered with caution because (i) not all countries report discards (ii) the method for estimating discards may not have been the same in all years. Nevertheless, in recent years (2015 onwards) discards of the most important countries in involved in the fishery (except Norway) are reported in InterCatch.

Series of Effort data (kWd) since 2014 of the Denmark, Ireland, Portugal, Spain, UK (England), UK(Scotland), France, Germany, Netherlands, Norway, UK(Northern Ireland), Sweden, have been provided by subarea (Figure 10.2b). The effort for a given year is calculated as the sum of kWd of those fleets/countries reported information in InterCatch. As greater forkbeard is a by-catch for many of the fleets, reporting catches the presented effort could not be representative specifically for this species.

A standardized CPUE was developed for reference fleet within the polyvalent Portuguese fleet, based on fishery dependent data collected from commercial landings for the period 2009–2020, particularly the landed weight (in Kg) by fishing trip. A fishing trip is defined from the moment the vessel leaves the dock to when it returns to the dock (Table 10.3). The standardized CPUE series, based on commercial data, suggest that the status of the greater forkbeard population inhabiting the Portuguese continental waters in recent years has been stable (Farias et al., 2022). For the period between 1997 and 2016, an increasing trend was also observed for the juvenile component of the population, indicating that the fishing pressure over the Portuguese population had not seriously impaired the recruitment (Lagarto et al., 2017).

10.6.2 Length compositions

Figure 10.2a shows the available length frequencies of commercial fleets and indicates that discards in 2015 affected specially individuals smaller than 17 cm of which 100% were discarded. In 2016 and 2017 the length range of discarded greater forkbeard increased affecting in high proportion also individuals smaller than 36 cm and 45 cm respectively, but in 2018 the size of the individual discarded took place in the range from 8 to 33 cm, in 2019 and 2020 the situation is similar to 2016 and mostly of the discarded individuals are smaller than 33 cm. The situation in 2021 and 2022 was similar, and the majority of discarded individuals was between 17 and 40 cm.

The Figures 10.3 to 10.6b present the length–frequency distributions of the following surveys:

Spanish Groundfish Survey in the Porcupine bank in Divisions 7.c and 7.k. from 2001 to 2022 (Figure 10.3).

- Northern Spanish Shelf bottom-trawl in Divisions 9.a and 8.c from 1983 to 2022 (Figure 10.4).
- French EVHOE IBTS until 2020 EVHOE in Divisions 7.f, g, h, j; and 8.a,b,d from 1997 to 2022 (Figure 10.5).
- Portuguese Crustacean Surveys/*Nephrops* TV Surveys (PT-CTS (UWTV (FU 28–29) in Division 9a from 1997 to 2018 (Figure 10.3).
- Faroes deep-water survey in Division 5b from 2014 to 2022 (Figure 10.6b).

10.6.3 Age compositions

Data of age proportion of the commercial Spanish fleets were provided in WGDEEP for subareas 7, 8 and Division 9.a since 2011. The series show that most of greater forkbeard belongs to the age 1 in all subareas, although in 2019 individuals of age 2 reached 50% of the total and in 2016 61% in Subarea 8 and Division 9.a In 2021 and 2022 the high proportion of individuals of age 1 decreased significantly and appears for first time fish with age 0. In Subareas 7 and 6 in 2021 all the ages showed more similar proportion and in 2022 older ages (age 3) reached 40% of the total. In Subareas 8 and 9 in 2021 the higher proportion belongs to age 2 and in 2022 ages 0, 1 and 3 reached values between 33% and 42% (Figure 10.6c).

10.6.4 Weight-at-age

This year the accumulated mean weight-at-length of the international commercial landings and discards reported to InterCatch from 2016 to 2022 was presented (Figure 10.7). The weight of discarded greater forkbeard in 2016, 2018 and 2019 were quite lower than landings weight since overall, the fleets discard the smallest individuals (see Figure 10.2a). In 2021 and 2022 the landings and discard weight patten are very similar with most of the accumulated weight belonged to individuals larger than 30 cm with a peak in the range of 48-50 cm.

10.6.5 Maturity and natural mortality

No new information was provided to the WG in 2023. Updated Life History parameters were provided in the 2021 Data Call by the Spanish fleet:

	Value	Reference	Comments
L_{mat} males	27.5	CV= 2%	n=388; year= 2018+2019+2020; Males

L_{mat} females	47.2	CV= 3.3%	n=1025; year= 2018+2019+2020; Females
L_{inf}	111.1	CV=11%	n=1076; year= 2018+2019+2020; Both sex
K	0.13	CV=15%	n=1075; year= 2018+2019+2020; Both sex

10.6.6 Catch, effort and research vessel data

In 2023 the Faroe Plateau survey was included for first time in the analysis of biomass and abundance indices, completing nine surveys in total of which SWC-IBTS and PT-CTS (UWTV (FU 28–29) two do not take place since 2014 and 2019 respectively. These surveys cover a significant proportion of the all ecoregions in Divisions 3, 4, 5, 6, 7, 8, 9 (Figure 10.8):

- Spanish Groundfish Survey in the Porcupine bank (SP-PorcGFS-(G5768) in Divisions 7.c and 7.k from 170 to 800 m. Biomass and abundance of greater forkbeard from 2001 to 2022 are presented in Figure 10.9.
- French EVHOE IBTS (FR-EVHOE-(G9527) in Divisions 7.f, g, h, j; and 8.a,b,d from 0 to 600 m. Abundance and biomass raised to the total subarea have been provided for a series from 1997 to 2022. This survey did not take place in 2017. (Figure 10.10).
- Irish Groundfish survey (IE-IGFS-(G7212) in Divisions 6.a South and 7.b from 10 to 150 m. Abundance and biomass Indices (n° per hour and kg per hour) from the period 2005 to 2022. This survey provides abundance indices for the total catches and for individuals <32 cm by shelf and slope strata (Figure 10.11).
- Northern Spanish Shelf bottom-trawl survey (SP-NGFS-(G2784) in Divisions 9.a and 8.c from 35 to 700 m. Biomass and abundance (kg/30 min tow and No/30 min tow) of greater forkbeard in the Cantabrian Sea from 1983 to 2022 are presented in Figure 10.12.
- North Sea IBTS survey (NS-IBTS-(G1022-G2829) in Divisions 4.abc, 3.a and 3.c. from 0 to 2000 m. Abundance in number per hour from 1976 to 2022 is presented in Figure 10.13.
- Scottish Western Coast Groundfish IBTS survey (SWC-IBTS-(G1179-G4299) in Divisions 5.b, 6.ab, 7.ab from 20 to 500 m. No new information is available since 2014 onwards. Abundance in number per hour from 1986 to 2014 is presented in Figure 10.14.
- Scottish Deep-water trawler survey in Divisions 6.a (SCOWCGFS-G4748-G4815) from 300 to 1200 m. Biomass and abundance of greater forkbeard from 1998 to 2021 are presented in Figure 10.15. As it is a biennial since 2014 this survey did not take place in 2016, 2018, 2020 and 2022.
- Portuguese crustacean surveys/*Nephrops* TV Survey (PT-CTS (UWTV (FU 28–29)- G2913) in Division 9.a South from 200 to 750 m, Biomass in kg per hour from 1997 to 2018 is presented in Figure 10.16. This survey did not take place in 2019 and 2020.
- Faroe Plateau in spring and summer survey in Division 5b (FO-GFS-Q1-Q3-G1264-G3284) from 70 to 510 m, Biomass in kg per hour from 1994 to 2022 is presented in Figure 10.17.

10.7 Data analyses

In the Spanish Groundfish Survey in the Porcupine bank the biomass and abundance of *P. blennoides* decreased slightly and remained among the lowest values of the time series (Figure 10.9). Biomass patches were widely found in the south, west and east area, but scarcely in the north, as in previous years (Figure 10.18). Most specimens were from 28 cm to 35 cm in this last survey and fewer recruits were found in contrast to the previous year (Figure 10.3) (Ruiz-Pico *et al.* 2023).

The EVHOE IBTS survey in Divisions 7.f,g,h,j and 8.a,b,d abundance shows no clear trend in the series, but has also peaks in 2002, 2007 and 2012. An important decrease was also observed since

this year until 2016. In 2018 and 2019 an important recovery but the abundance decreases again in 2020 and 2021 and increases in 2022.

The historical series indicates an increase in biomass since 1996, with peaks in 2004, 2007 and 2012 and a decrease from 2013 to 2015 and increases again until 2019. In the period 2020-2022 the biomass decreased compared to the values in the 2019 peak. However, landings have decreased from 2012 onwards since the most important peak was in 2011. (Figure 10.10). The mean length has increased since the beginning of the series reaching the highest value in 2005, 2016 and 2020 (Figure 10.5).

Irish GFS indicates an increase in the abundance (No/hour) and biomass (Kg/hour) from 2009 to 2012 and 2013 respectively. From these years onwards a decrease in both parameters is shown to 2017 that is the lowest value of the series. In 2018 a slight recovery in biomass is recorded compared with values in 2017 but since this year the trend decreased. (Figure 10.11).

In Northern Spanish Shelf bottom-trawl survey in 2022, 21% of the hauls where *P. blennoides* was found were additional hauls deeper than 500 m and contained 77% of the biomass. The length distribution in standard hauls was similar to the previous year, with a great recruitment again and a mode in 18 cm. The largest individuals, which ranged from around 24 cm to 66 cm, were found mostly in the additional deeper hauls, with a mode in 38 cm (Figure 10.4). This last year the biomass in standard hauls increased steadily, reaching the highest value of the previous eight years. The biomass in additional deep hauls increased even more compared to the previous year, reaching the highest value of the time series (Figure 10.12). The geographical distribution of *P. blennoides* remained similar to previous years, being widespread in the sampling area (Figure 10.19). (Fernández-Zapico *et al.*, 2023).

The NS-IBTS shows an increase on abundance since 1976 although the average abundance recorded until 2010 (3.1 individuals/hour) was lower than 2011 onwards (22.0 individuals/hour). The abundance recorded in 2012 (40.2 individuals/hour) is the most important of the series although the trend shows a decrease since this year to 2016 (Figure 10.13). In 2017 the survey recovered one of the highest abundance values but dropped to 0.2 individuals/hour in 2022 the lowest value of the series.

No data for 2015 and 2016 have been updated in the DATRAS system for the SWC-IBTS. The trend series of abundance until 2014 is shown in the Figure 10.14.

The Scottish Deep-water trawler survey covers a core area of the continental slope of the Rockall Trough (6.a) from between 55 to 59°N long with the slope stratified by depth at 500, 1000, 1500 and 1800 m. Historical series of biomass index show a tooth saw profile from 1998 to 2015 with a peak in 2017 of 37.2 kg/hour but dropped again in 2019 to 16.5 kg/hour and 15.5 kg/hour in 2021. The abundance shows the same profile of the biomass with an important increase from 2011 to 2013 and also a peak in 2017 (53.6 individuals/hour). In 2019 the abundance decreased slightly to similar values found in the period from 2011 to 2013, reaching in 2021 the lowest value since 2015 (Figure 10.15).

In the Portuguese survey in 9.a south the series of biomass show a decrease trend since 1997 to 2004 but with significant peaks in 1999 and 2002. In recent years *P. blennoides* standardized biomass index estimates are above the overall mean, showing an increasing trend, particularly from 2013 to 2018 (a slight decrease was observed in 2017 in relation to 2016 (Moura *et al* 2019). Values of biomass are in the range of 0 kg/hour to 2.33 kg/hour (Figure 10.16). In the years 2008–2010, catch rates were relatively high in all geographical areas. Length data from specimens caught during held between 1997 and 2016 support that these years were of strong recruitment, particularly the years 2007 and 2008 (Figure 10.6). The size range observed in the Portuguese continental coast, provides evidence that the species is able to complete the life cycle in this area. In 2019 and 2020, the survey was not performed. In 2021, the R/V Mário Ruivo started to operate, but the

survey's spatial coverage was smaller and fishing stations in the area where the species is traditionally more abundant were missing (Moura et al., 2022). Therefore, the standardized biomass index has not been updated since 2021 (Farias et al., 2023).

The Faroe Plateau survey in 5b show low catches near to zero from 1994 to 2006, but a continuous increase was registered from 2007 to 2015 in which the highest value in the combined series was recorded (2.13 kg/h). The biomass dropped strongly in 2016 and recovered again in 2017. Since 2017 and important decrease is observed to 0.45 kg/h in 2022 (Figure 10.17). The spatial distribution of greater forkbeard from the bottom trawl groundfish surveys were mainly on the Faroe Plateau deeper than 200 m (Figure 10.20). In the deepwater survey greater forkbeard was caught around the Banks and on the Wyville-Thomson ridge. In the Faroese 0-group surveys on the Faroe Plateau in June/July there are 26 registrations of greater forkbeard caught pelagic. The length was between 8-54 mm, mainly around 30-40 mm. 11 of there were caught in the period 1991-1999, 14 in the period 2001-2005 and one in 2022 (Ofstad 2023).

Although the data provided by the surveys have increased the area covered in the ecoregion, neither the available surveys nor discard data cover the Subareas 1 and 2.

10.7.1 Exploratory assessment

Following the guidance on application of the rfb rule, possible estimates of the input values were tested in WGDEEP 2022. Given the uncertainties in the input parameters (e.g. life-history), WGDEEP considers that further discussion with ICES WKLIFE would be required before the implementation of the method to provide landings advise for this stock.

10.7.2 Comments on the assessment

An analytical assessment was presented in WGDEEP 2022 for Greater forkbeard. Six surveys are used to produce the stock size indicator. In some years one or more of these surveys is missing (for example SDS; G6642, in 2016 and EVHOE-WIBTS-Q4F; G9527 in 2017); however, the stock size indicator is still considered to be valid in these years. The surveys cover most of the distribution of the stock, except the northern subareas 1 and 2.

Several shelf fisheries have a bycatch of juveniles which is currently poorly estimated. Discard reporting does not cover the entire distributional area of the stock; data are missing, especially in subareas 1–3. In 2022, reported discards were 18%. Given that discards from other fleets are not quantified, ICES cannot fully quantify catches.

10.7.3 Management considerations

As Greater Forkbeard is a bycatch species in both deep-water and shelf fisheries, advice should take account of advice for the targeted species in those fisheries. The life-history traits do not suggest it is particularly vulnerable.

In the subareas 3 and 4 the NS IBTS survey shows an increasing trend since 1976, more noticeable from 2010 onwards, however the trend after 2012 records a continuous and strong decrease. In the areas Subareas 6, and 7 covered by the Porcupine and Irish IGFS surveys and the indices indicate a decrease in the abundance since 2013, and in biomass since 2014 with biomass stabilized at very low values since 2018. However, in the northern area of the Subarea 6 covered by the Scottish deep-water survey it is observed an important increase of the biomass in 2017 perhaps due to the high abundance recorded in 2011 to 2013 but decreasing since then. The trend in Subarea 8 indicated by the Northern Spanish Shelf bottom-trawl (Division 8c) shows a decrease in biomass and abundance since 2011. Data from 2021 and 2022 showed an increase in biomass,

with maximum values since 2017. On the contrary, the French EVHOE (in Divisions 7.f, g, h, j; and 8.a, b, d) shows a decrease from the peak in 2013 to 2016 and a slight increase in biomass and abundance since 2018. In Division 9.a south annual standardized biomass index of the Portuguese survey suggests an increase of biomass and abundance since 2013. The standardized indicator of the combined six survey index indicates an increase in the biomass in last two years (2020-2021 over the period 2017-2019).

On the other hand, landings in all ecoregions have been reduced since 2013 below the biennial TAC established for this period. In this sense, although the TAC increased in 2015 and 2016 to 2856 t landings reported have always been below, especially in 2017 in which landings were only 59% of TAC. It was supposed that the removing of the TAC from 2019 onwards could increase the landings (and discards) but it does not have affected the decreasing trend.

Although greater forkbeard is a bycatch of the traditional demersal trawl and longline mixed fisheries, and it is only locally important for certain fleets fishing in subareas 6 and 7 with base port mainly in the Northwest of Spain, discards of this species are considered high. Many of the countries involved in the fishery report data to InterCatch, and according to the information available, reported discards to catches ratio are high but have decreased from 2013 to 2022 (36%, 34%, 49%, 25%, 13%, 17%, 15%, 13 and 18%). Similarly, the commercial length frequency data is only available from some countries and areas and the historical series is not considered robust to be conclusive on observed trends.

10.8 Application of MSY proxy reference points

A Stochastic Production Model in Continuous Time (SPiCT) was applied in 2017 to the GFB stock using the historical series of landings since 1998 and the standardized biomass indicator (average) from six surveys: IGFS-WIBTS-Q4, EVHOE-WIBTS-Q4F, SpPGFS-WIBTS-Q4, SpGFS-WIBTS-Q4, SDS, PT-CTS (UWTV (FU 28-29) from the period 2005–2016. The model did not converge, so a new model was adjusted, and the series of landings were shortened to the same period of the Index series (from 2005 to 2016), but again the estimation did not converge.

The inputs and results of the first attempt are shown in the Figures 10.21 and 10.22.

10.9 Tables and Figures

Table 10.0a. Greater forkbeard (*Phycis blennoides*) in the Northeast Atlantic. Working group estimates of landings.

YEAR	1+2	3+4	5	6+7	8+9	10	12	TOTAL
1988	0	15	2	1898	533	29	0	2477
1989	0	12	1	1815	663	42	0	2533
1990	23	115	38	1921	814	50	0	2961
1991	39	181	53	1574	681	68	0	2596
1992	33	145	49	1640	702	91	1	2661
1993	1	34	27	1462	828	115	1	2468
1994	0	12	4	1571	742	136	3	2468

YEAR	1+2	3+4	5	6+7	8+9	10	12	TOTAL
1995	0	3	9	2138	747	71	4	2972
1996	0	18	7	3590	814	45	2	4476
1997	0	7	7	2335	753	30	2	3134
1998	0	12	8	3040	1081	38	1	4180
1999	0	31	34	3455	673	41	0	4234
2000	0	11	32	4967	724	91	6	5831
2001	8	27	102	4405	727	83	8	5360
2002	318	585	149	3417	715	57	81	5321
2003	155	233	73	3287	661	45	82	4536
2004	75	143	50	2606	720	37	54	3685
2005	51	83	46	2290	519	22	77	3087
2006	49	139	39	2081	560	15	42	2925
2007	47	239	56	1995	586	17	37	2978
2008	117	245	45	1418	446	18	17	2307
2009	82	149	22	796	203	13	44	1309
2010	132	186	61	824	69	14	0	1287
2011	113	179	319	1257	321	11	0	2201
2012	98	199	169	1802	366	6	0	2641
2013	83	179	11	1588	275	8	0	2143
2014	97	214	24	1566	360	9	0	2269
2015	121	215	34	1471	323	10	0	2174
2016	187	273	13	1265	263	10	0	2012
2017	80	155	9	1073	186	0	0	1503
2018	60	192	12	1264	258	14	0	1801
2019	192	184	18	1242	214	0	0	1850
2020	118	187	31	869	281	0	0	1486
2021	82	131	13	880	321	0	< 1	1427
2022	56	188	26	889	337	0	0	1495

Table 10.0b. Greater forkbeard (*Phycis blennoides*) in Subareas 1 and 2. Working group estimates of landings.

YEAR	NORWAY	FRANCE	RUSSIA	UK (SCOT)	UK (EWN)	GERMANY	FAROE ISLANDS	TOTAL
1988	0							0
1989	0							0
1990	23							23
1991	39							39
1992	33							33
1993	1							1
1994	0							0
1995	0							0
1996	0							0
1997	0							0
1998	0							0
1999	0	0						0
2000	0	0						0
2001	0	1	7					8
2002	315	0		1		2		318
2003	153	0				2		155
2004	72	0	3	0				75
2005	51	0						51
2006	46	0	3					49
2007	41	0	5	1	0			47
2008	112	0	4	1			0	117
2009	76	0	6	0				82
2010	127	4						132
2011	107	6						113
2012	98	0.4						98
2013	83	0.1		0				83
2014	96	0.4						97
2015	121							121

YEAR	NORWAY	FRANCE	RUSSIA	UK (SCOT)	UK (EWNI)	GERMANY	FAROE ISLANDS	TOTAL
2016	187	0.3		0				187
2017	79	0.7		1				80
2018	60	0.1						60
2019	192	0.04						192
2020	118	0.1				0.0		118
2021	81	< 0.5	0	< 0.5	0	0	0	82
2022	56	<0.5		<0.5				56

Table 10.0c. Greater forkbeard (*Phycis blennoides*) in Subareas 3 and 4. Working group estimates of landings.

YEAR	FRANCE	NORWAY	UK (EWNI)	UK (SCOT) ⁽¹⁾	GERMANY	DENMARK	SWEDEN	NETHERLANDS	TOTAL
1988	12	0	3	0					15
1989	12	0	0	0					12
1990	18	92	5	0					115
1991	20	161	0	0					181
1992	13	130	0	2					145
1993	6	28	0	0					34
1994	11			1					12
1995	2			1					3
1996	2	10		6					18
1997	2			5					7
1998	1		0	11					12
1999	3		5	23					31
2000	4		0	7					11
2001	6		1	19	2				27
2002	2	561	1	21	0				585
2003	1	225	0	7					233
2004	2	138		3					143
2005	2	81	0	1					83
2006	1	134	3						139

YEAR	FRANCE	NORWAY	UK (EWNI)	UK (SCOT) ⁽¹⁾	GERMANY	DENMARK	SWEDEN	NETHER- LANDS	TOTAL
2007	1	236	0	2					239
2008	0	244		1					245
2009	4	142		3					149
2010	3	182		1					186
2011	17	160		1					179
2012	1	198							199
2013	1	178	0	0					179
2014	1	210		3					214
2015	1	213		1					215
2016	1	267		2		3			273
2017	1	140		9		5	0		155
2018	1	150		2		37	2		192
2019	3	113		3		65	0		184
2020	3	111		2	0.1	70		0.4	187
2021	3	78	0	3	**	46	0	0	131
2022	4	132	0	3	0	49	0		188

⁽¹⁾ Includes Moridae, in 2005 only data from January to June. *Preliminary landings data. **Negligible landings.

Table 10.0d. Greater forkbeard (*Phycis blennoides*) in Division 5b. Working group estimates of landings.

YEAR	FRANCE	NORWAY	UK (SCOT) ⁽¹⁾	UK (EWNI)	FAROE ISLANDS	RUSSIA	ICELAND	TOTAL
1988	2	0						2
1989	1	0						1
1990	10	28						38
1991	9	44						53
1992	16	33						49
1993	5	22						27
1994	4							4
1995	9							9
1996	7							7
1997	7	0						7

YEAR	FRANCE	NORWAY	UK (SCOT) ⁽¹⁾	UK (EWN)	FAROE ISLANDS	RUSSIA	ICELAND	TOTAL
1998	4	4						8
1999	6	28	0					34
2000	4	26	1	0				32
2001	9	92	1	0				102
2002	10	133	5	0				149
2003	11	55	7	0				73
2004	9	37	2	2				50
2005	7	39		0,3				46
2006	8	26			6			39
2007	11	34	0	0	9	2	0	58
2008	10	20	0		4	11	1	46
2009	0	13	3		3	2	0	24
2010	2	45	3	1	11		2	62
2011	7				310		1	319
2012	6	5			145	7	7	169
2013	7	3	0				0	11
2014	7	14	0		0		2	24
2015	5	27					2	34
2016	7	3	0				3	13
2016	7	3	0				3	13
2017	9		0					9
2018	5	7						12
2019	7	10						18
2020	7	24	0					31
2021*	6	7	0	0	0	0	0	13
2022	4	21	0					26

⁽¹⁾ Includes Moridae in 2005 only data from January to June. *Preliminary landings data.

Table 10.0e. Greater forkbeard (*Phycis blennoides*) in Subareas 6 and 7. Working group estimates of landings.

YEAR	FRANCE	IRE- LAND	NOR- WAY	SPAIN ⁽¹⁾	UK (EWNI)	UK (SCOT) ⁽²⁾	GER- MANY	RUS- SIA	FAROE IS- LANDS	NETH- ER- LANDS	TO- TAL
1988	252	0	0	1584	62	0					1898
1989	342	14	0	1446	13	0					1815
1990	454	0	88	1372	6	1					1921
1991	476	1	126	953	13	5					1574
1992	646	4	244	745	0	1					1640
1993	582	0	53	824	0	3					1462
1994	451	111		1002	0	7					1571
1995	430	163		722	808	15					2138
1996	519	154		1428	1434	55					3590
1997	512	131	5	46	1460	181					2335
1998	357	530	162	530	1364	97					3040
1999	314	686	183	824	929	518	1				3455
2000	671	743	380	1613	731	820	8	2			4967
2001	683	663	536	1332	538	640	10	4			4405
2002	613	481	300	1049	421	545	9	0			3417
2003	469	319	492	1100	245	661	1	1			3287
2004	441	183	165	1131	288	397		1			2606
2005	598	237	128	979	179	164		5			2290
2006	625	68	162	1075	148			2	0		2081
2007	578	56	188	875	117	179		2			1995
2008	711	43	174	236	31	196		27	0		1418
2009	304	7	222	48	31	184		1			796
2010	383	8	219	23	14	173		3	1		824
2011	378	6	309	326	27	210					1257
2012	381	9	225	992	1	194					1802
2013*	451	16	289	583	3.4	246		0			1588
2014	468	25	159	769	9	135					1566

YEAR	FRANCE	IRE- LAND	NOR- WAY	SPAIN ⁽¹⁾	UK (EWNl)	UK (SCOT) ⁽²⁾	GER- MANY	RUS- SIA	FAROE IS- LANDS	NETH- ER- LANDS	TO- TAL
2015	451	37	135	716	26	105					1471
2016	412	13	97	641	13	90					1265
2017	431	6	134	399	14	88					1073
2018	458	10	203	453	20	121					1264
2019	430	18	187	498	13	95					1242
2020	360	18	72	339	18	62				0.5	869
2021	462	12	0	296	13	96	0	0	0.1	0.3	880
2022	390	3	76	339	8	70	0				889

⁽¹⁾ Landings of *Phycis* spp Included from 1988 to 2012.

⁽²⁾Includes Moridae in 2005 only data from January to June.

*Preliminary landings data.

Table 10.0f. Greater forkbeard (*Phycis blennoides*) in Subareas 8 and 9. Working group estimates of landings.

YEAR	FRANCE	PORTUGAL	SPAIN ⁽¹⁾	UK(EWNl)	UK (SCOT)	TOTAL
1988	7	29	74			110
1989	7	42	138			187
1990	16	50	218			284
1991	18	68	108			194
1992	9	91	162			262
1993	0	115	387			502
1994		136	320			456
1995	54	71	330			455
1996	25	45	429			499
1997	4	30	356			390
1998	3	38	656			697
1999	8	41	361			410
2000	36	91	375			502
2001	36	83	453			573
2002	67	57	418			542
2003	28	45	387			461

YEAR	FRANCE	PORTUGAL	SPAIN ⁽¹⁾	UK(EWNI)	UK (SCOT)	TOTAL
2004	44	37	446			527
2005	58	22	312	0		392
2006	54	10	257			321
2007	32	14	510	0		556
2008	41	13	123			178
2009	8	13	183	0		203
2010	10	12	48		0	69
2011	13	13	295			321
2012	46	5	315			366
2013	31	8	234	2		275
2014	38	6	315		0	360
2015	38	8	278			323
2016	30	7	226		0	263
2017	18	9	159		0	186
2018	31	9	218		0	258
2019	29	7	178	0	-	214
2020	38	5	238	0	0	281
2021	46	3	272	0	0	321
2022	50	3	283		0	337

(1) Landings of *Phycis spp* Included from 1988 to 2012. *Preliminary landings data.

Table 10.0g. Greater forkbeard (*Phycis blennoides*) in Subarea 10. Working group estimates of landings.

YEAR	PORTUGAL	FRANCE	TOTAL
1988	29		29
1989	42		42
1990	50		50
1991	68		68
1992	91		91
1993	115		115
1994	136		136

YEAR	PORTUGAL	FRANCE	TOTAL
1995	71		71
1996	45		45
1997	30		30
1998	38		38
1999	41		41
2000	91		91
2001	83		83
2002	57		57
2003	45		45
2004	37		37
2005	22		22
2006	15		15
2007	17		17
2008	18		18
2009	13		13
2010	14		14
2011	11		11
2012	6		6
2013	8		8
2014	9	0	9
2015	10		10
2016	10		10
2017			0
2018	14		14
2019			0
2020			0
2021*	0	0	0
2022			0

*Preliminary landings data.

Table 10.0h. Greater forkbeard (*Phycis blennoides*) in Subarea 12. Working group estimates of landings.

YEAR	FRANCE	UK (SCOT) ⁽¹⁾	NORWAY	UK (EWNI)	SPAIN ⁽²⁾	RUSSIA	TOTAL
1988							0
1989							0
1990							0
1991							0
1992	1						1
1993	1						1
1994	3						3
1995	4						4
1996	2						2
1997	2						2
1998	1						1
1999	0	0					0
2000	2	4					6
2001	0	1	6	1			8
2002	0		2	4	74		81
2003	3		8	0	71		82
2004	3		6		44		54
2005	1	0	0		75		77
2006					42		42
2007					37		37
2008	0				17		17
2009	1		0		37	6	44
2010	0						0
2011	0						0
2012	0						0
2013							0
2014	0						0

YEAR	FRANCE	UK (SCOT) ⁽¹⁾	NORWAY	UK (EWNI)	SPAIN ⁽²⁾	RUSSIA	TOTAL
2015							0
2016							0
2017							0
2018							0
2019							0
2020							0
2021	**	0	0.5	0	0	0	0.5
2022					0		0

⁽¹⁾Includes Moridae in 2005 only data from January to June.

⁽²⁾Landings of *Phycis spp* Included from 1988 to 2012.

*Preliminary landings data. ** Negligible landings data.

Table 10.0i. Greater forkbeard (*Phycis blennoides*). Working group estimates of landings. Catches inside and outside the NEAFC Regulatory Area (RA) as estimated by ICES for the stock in WGDEEP.

WGDEEP Stock gfb.27.nea	Catch Inside NEAFC RA (t)	Catch Out- side NEAFC RA (t)	Total Catches	Proportion of catch inside the NEAFC RA (%)	NEAFC RA areas where caught
2020	0	1486	1486	0%	
2019	0	1850	1850	0%	
2018	0	1801	1801	0%	
2017	0	1503	1503	0%	
2018	0	1801	1801	0%	
2019	0	1850	1850	0%	
2020	0	585	585	0%	
2021	0	1427	1427	0%	
2022	0	1495	1495	0%	

*Preliminary landings data.

Table 10.1a. Greater forkbeard (*Phycis blennoides*). European landings (t) by métier in 2022.

Landings (t)	2022
Denmark	49
GNS_DEF	0.0
OTB_CRU	1.4
OTB_DEF	44.8
SSC_DEF	3.0

OTB_DWS	0.0
Ireland	3
MIS_MIS_0_0_0_HC	0.1
OTB_DEF_>=120_0_0_all	2.4
OTB_DEF_70-99_0_0_all	0.6
Portugal	3
MIS_MIS_0_0_0	3.3
OTB	0.2
Spain	623
MIS_MIS_0_0_0_HC	1.0
OTB_DWS_100-129_0_0	0.0
OTB_DEF_70-99_0_0	3.1
OTB_DEF_100-119_0_0	118.5
OTB_DEF_>=70_0_0	17.0
OTB_MCD_>=55_0_0	10.1
GNS_DEF_80-99_0_0	6.3
PTB_MPD_>=55_0_0	4.7
LLS_DEF_0_0_0	324.2
OTB_MPD_>=55_0_0	10.7
GNS_DEF_>=100_0_0	12.2
OTB_DEF_>=55_0_0	105.6
GNS_DEF_120-219_0_0	6.7
GNS_DEF_60-79_0_0	0.6
LHM_DEF_0_0_0	0.1
GTR_DEF_60-79_0_0	1.3
PS_SPF_0_0_0	0.0
OTB_MPD_>=70_0_0	0.7
LHM_SPF_0_0_0	0.0
UK (England)	7
GNS_DEF	2.3
LLS_DEF	0.4
MIS_MIS_0_0_0_HC	0.2
OTB_DEF	4.0
UK(Scotland)	73
LLS_DEF_0_0_0_all	8.5
MIS_MIS_0_0_0_HC	1.9
OTB_DEF_>=120_0_0_all	61.9
OTB_CRU_70-99_0_0_all	0.8
France	449
LLS_DEF	46.6
MIS_MIS_0_0_0	8.9
OTB_DEF_70-99_0_0	3.6
OTB_DEF_100-119_0_0	48.9
OTT-DWS	1.4
GNS_DEF_100-119_0_0_all	38.1
OTT_DEF_100-119_0_0	49.7

OTT_DEF_>=70_0_0	10.1
OTB_DEF_>=70_0_0	2.8
OTB_DEF_>=120_0_0	130.2
OTB_DWS_>=120_0_0_all	71.5
OTT_CRU_100-119_0_0	0.4
OTT_DEF_70-99_0_0	0.0
GNS_DEF_120-219_0_0_all	0.0
OTB_CRU_100-119_0_0_all	3.1
OTM_DEF_100-119_0_0_all	0.0
OTT_DEF_>=120_0_0_all	33.1
OTB_DEF_32-69_0_0	0.0
OTB_CRU_70-99_0_0_all	0.0
OTT_CRU_70-99_0_0_all	0.0
Germany	0
OTB_DEF	0.0
Netherlands	3
OTM_SPF_32-69_0_0_all	2.5
Norway	286
GNS_DEF	27.3
LLS_DEF	222.5
OTB_DEF	35.9
SDN_DEF	0.1
FPO_DEF	0.4
UK(Northern Ireland)	0
GNS_DEF_100-119_0_0_all	0.4
Sweden	0
MIS_MIS_0_0_0_HC	0.0
OTB_DEF_>=120_0_0_all	0.0
OTB_CRU_32-69_2_22_all	0.0
GNS_DEF_all_0_0_all	0.0
OTB_CRU_90-119_0_0_all	0.0
MIS_MIS_0_0_0_IBC	0.0
LLS_FIF_0_0_0_all	0.0
OTB_CRU_70-89_2_35_all	0.0
OTB_CRU_32-69_0_0_all	0.0
GTR_DEF_all_0_0_all	0.0
FPO_CRU_0_0_0_all	0.0
SDN_DEF_>=120_0_0_all	0.0
Total	1496.2

Table 10.2a. Greater forkbeard (*Phycis blennoides*). Reported of total discards (ton) of *P. blennoides* from 2014 to 2022 and proportion in the catches.

ton	2014	2015	2016	2017	2018	2019	2020	2021	2022
DISCARDS	1166	2068	677	513	263	366	256	215	332
LANDINGS	2269	2175	2012	1503	1801	1850	1486	1427	1495
CATCHES	3435	4243	2689	2016	2064	2216	1742	1642	1827

DISCARDS/CATCHES	34%	49%	25%	25%	13%	17%	15%	13%	18%
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Table 10.2b. Greater forkbeard (*Phycis blennoides*). Reported discards (ton) of *P. blennoides* from 2013 to 2022 by subarea.

subarea	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2								0	0	0
3	0.9	2	0	6	3	10	10	0	1	3
4	334	7	83	99	279	57	42	27	8	18
5			1	7	0	0		0	0	0
6	769	647	1359	225	51	47	45	32	65	38
7			256	301	131	74	245	167	106	254
8	82	510	302	25	39	67	18	30	25	12
9			67	15	10	7	6		10	6
TOTAL	1185	1166	2068	677	513	263	366	256	215	332

Table 10.3. Greater forkbeard (*Phycis blennoides*). Annual mean CPUE (Kg/trip) and GLM estimates, of the Portuguese Reference fleet as well as, upper and lower limits of the 95% CPUE confidence intervals for the period 2013-2020.

year	Observation (kg/trip)	CPUE Upper limit	CPUE Estimate (Kg/trip)	CPUE Lower limit
2013	10.39	13.43	10.39	8.04
2014	11.88	16.07	12.25	9.34
2015	10.83	16.09	12.32	9.43
2016	10.28	13.96	10.74	8.27
2017	9.81	12.72	9.68	7.37
2018	10.59	13.43	10.17	7.7
2019	8.83	12.56	9.57	7.29
2020	8.35	11.66	8.88	6.77

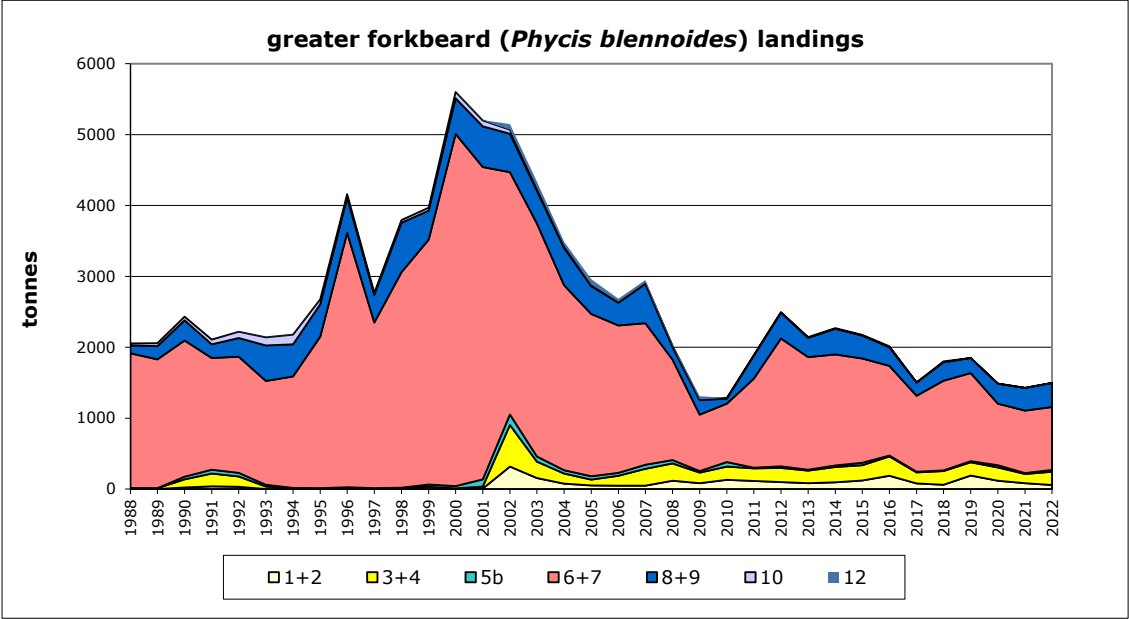


Figure 10.1. Greater forkbeard landing trends in all ICES subareas since 1988.

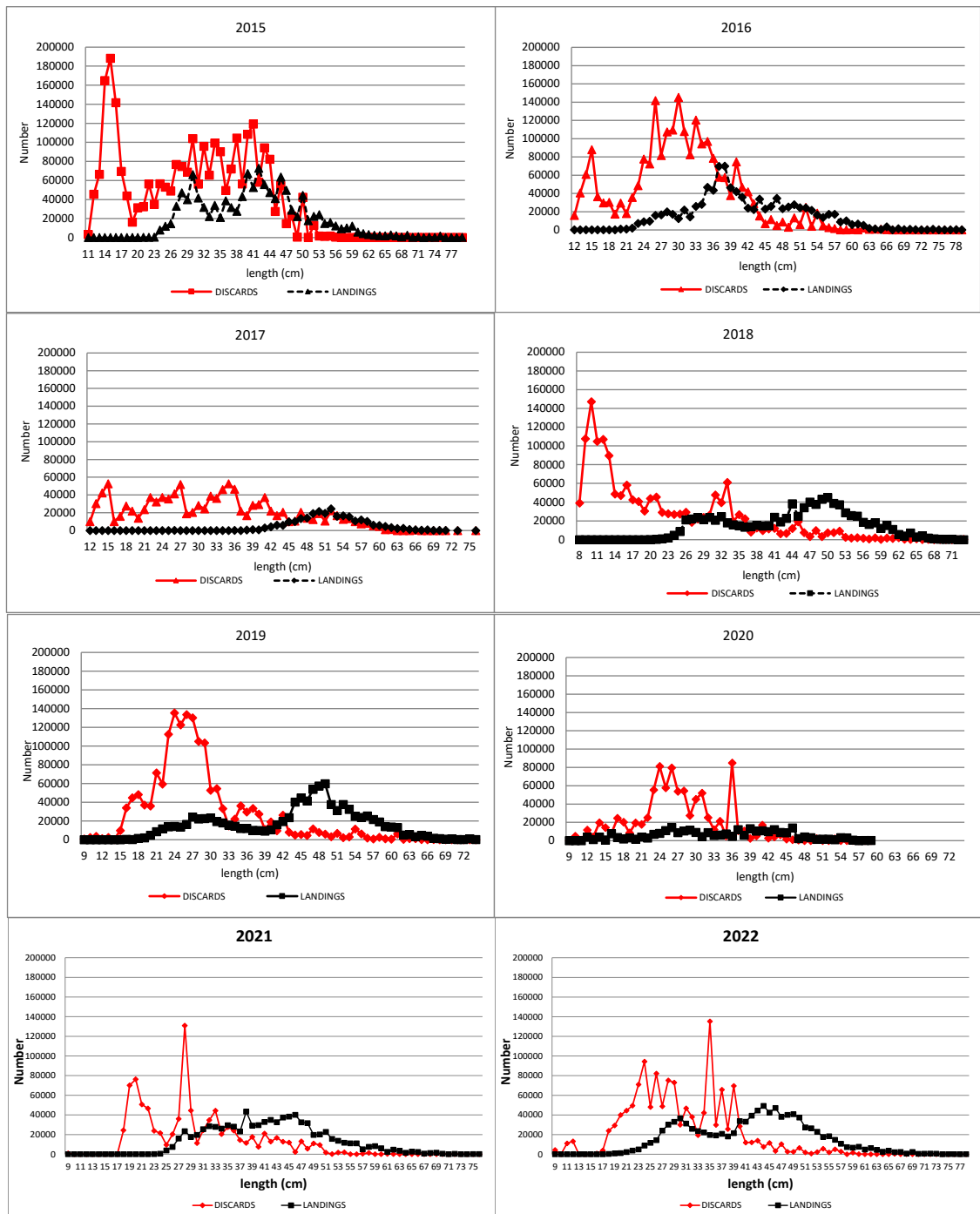


Figure 10.2a. Commercial length frequencies of the greater forkbeard landings and discards from 2015 to 2022 from France, Spain, Ireland, Portugal, Denmark, Sweden, UK (England), and UK (Scotland).

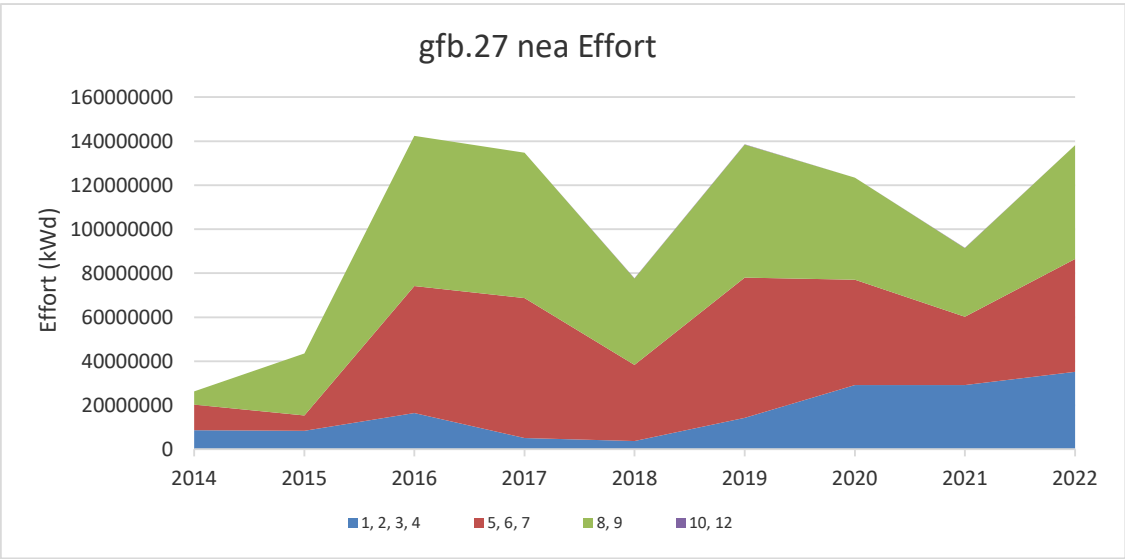


Figure 10.2b. Effort data (kWd) by stock units since 2014 of the Spanish, French, Swedish, UK (Scotland) and Irish fleets.

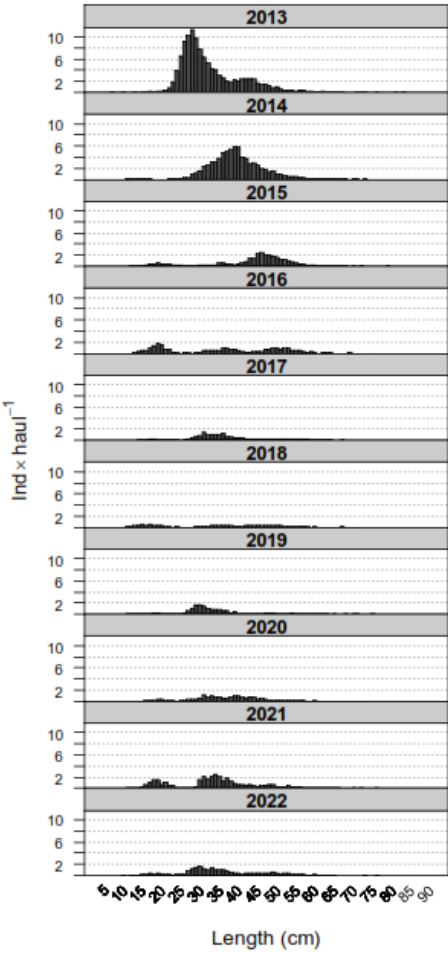


Figure 10.3. Mean stratified length distributions of greater forkbeard (*P. blennoides*) in Porcupine survey (Divisions 7.c and 7.k) time-series (2012–2022).

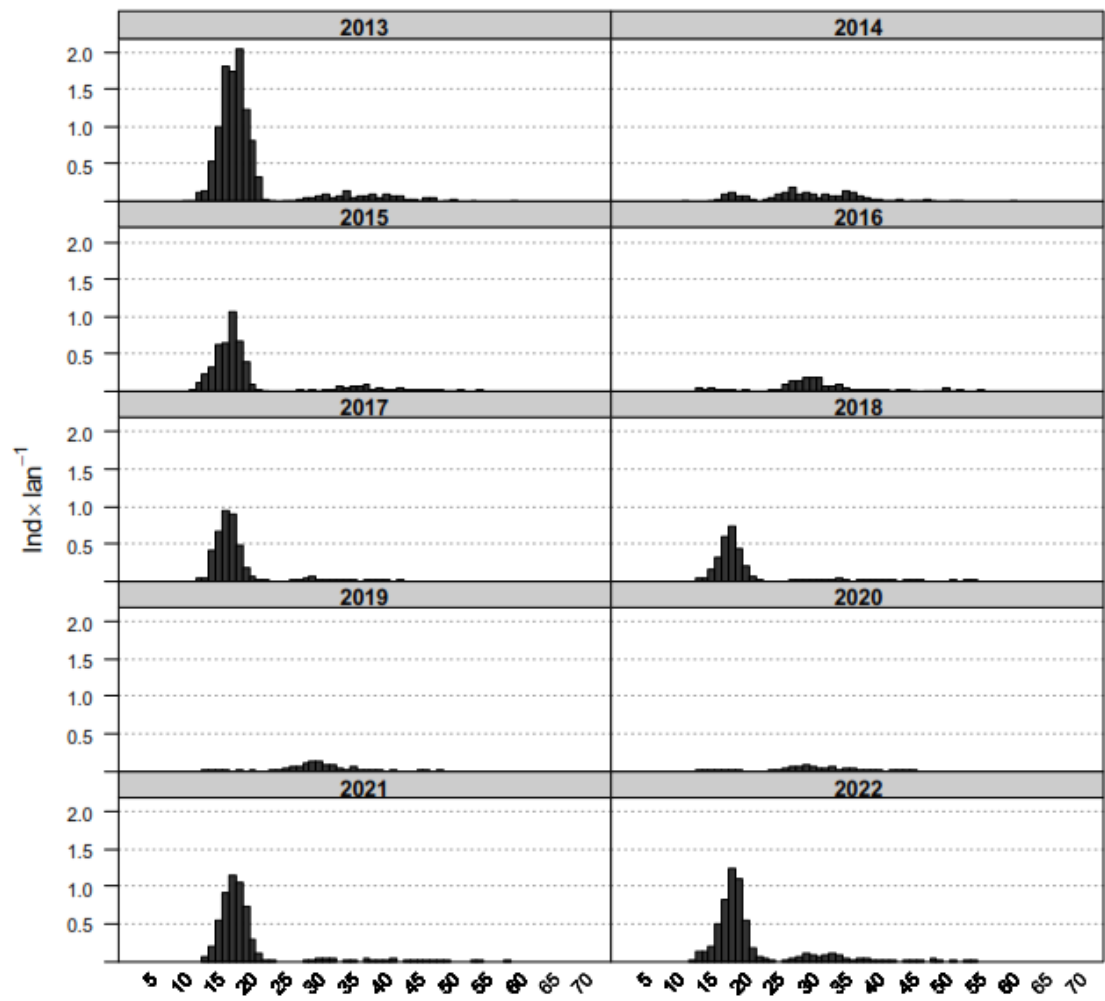


Figure 10. 4. Mean stratified length distributions of greater forkbeard (*P. blennoides*) in Northern Spanish Shelf survey (8.c and 9.a) in the period 2009–2022.

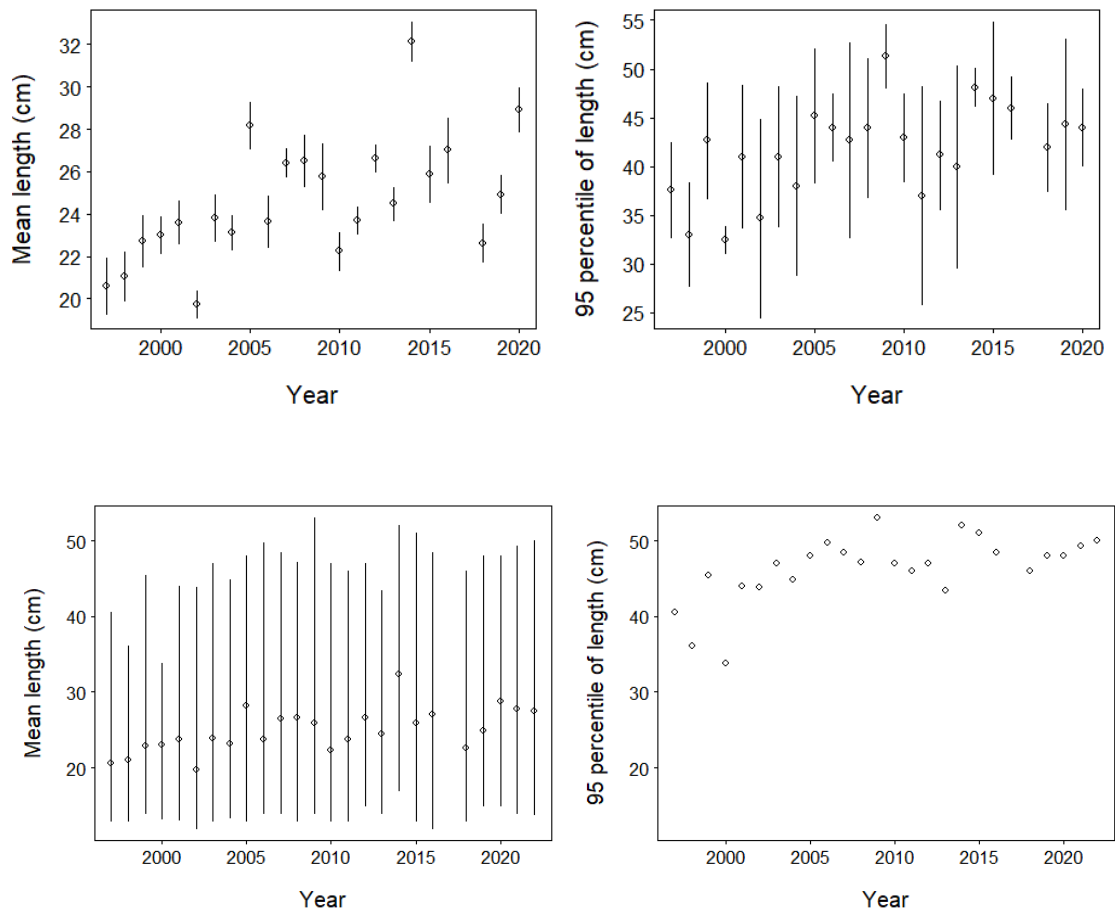


Figure 10.5. Greater forkbeard series of mean length from the French IBTS survey Divisions 7.fghj and 8.abd until 2022.

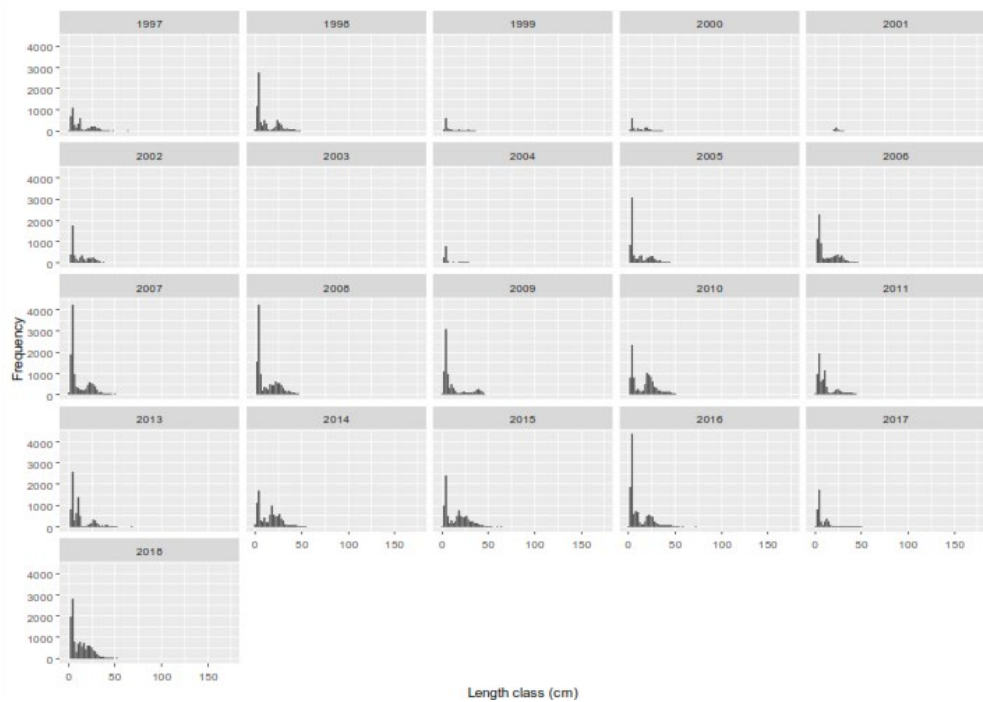


Figure 10.6a. Length frequency distribution of the greater forkbeard in the PT-CTS (UWTV (FU 28-29) until 2018.

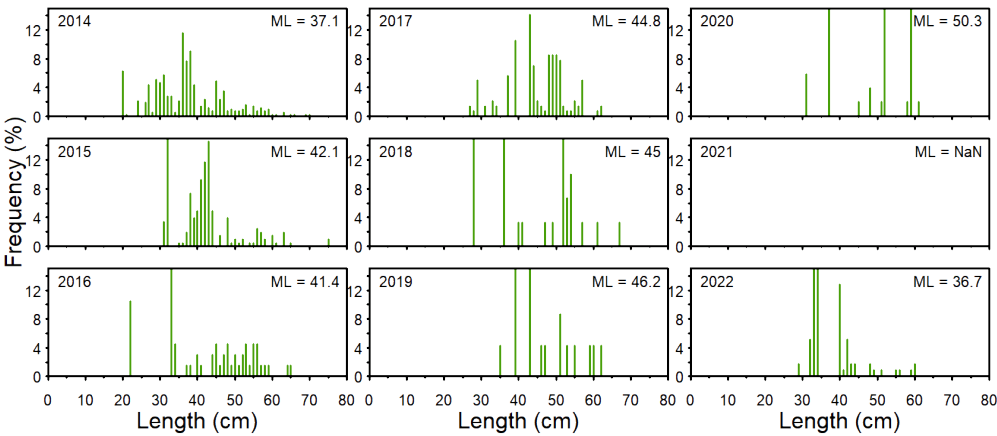


Figure 10.6b. Length-frequency distribution from the deepwater survey in 2014-2022 (no survey in 2021).

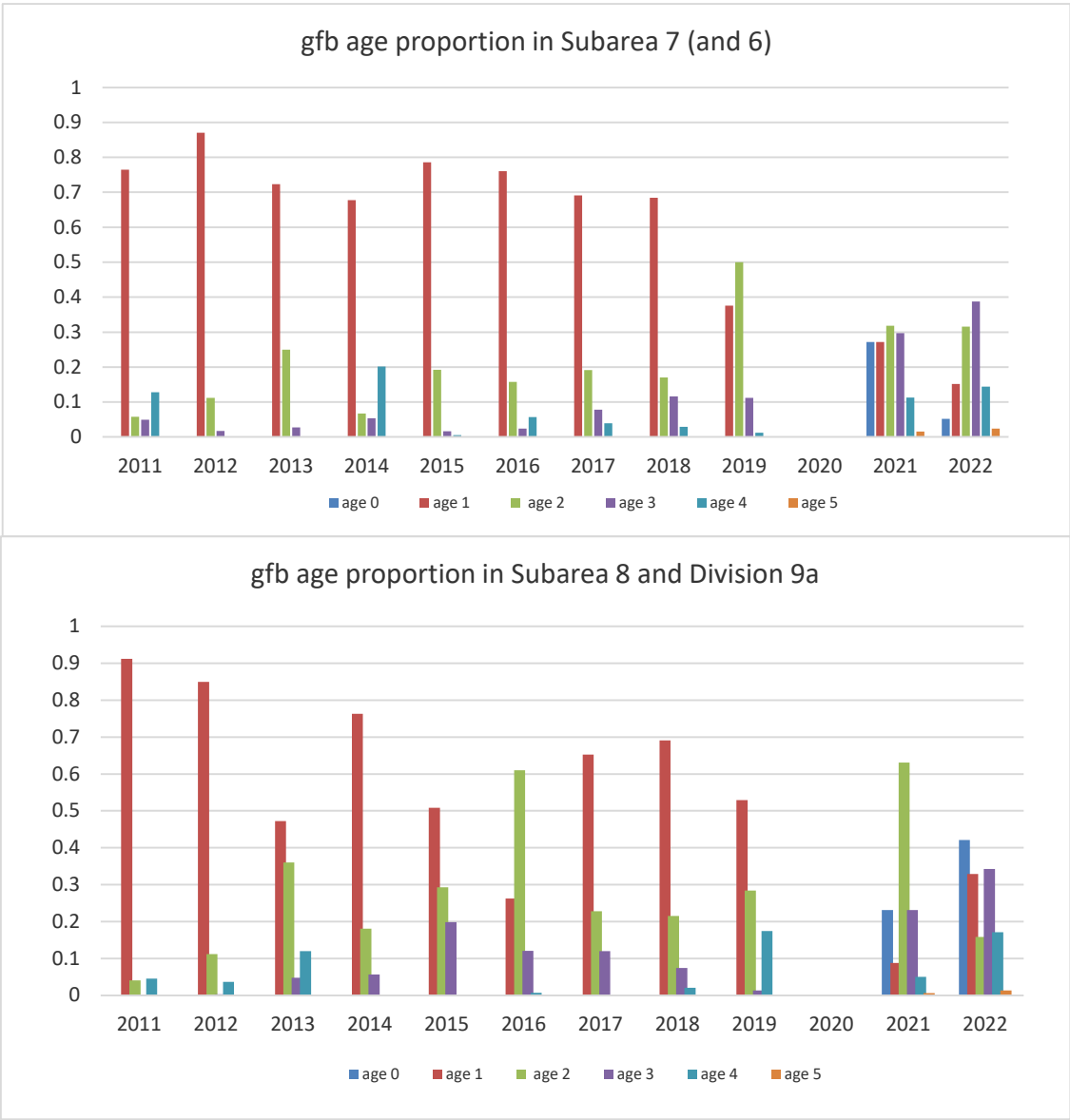


Figure 10.6c. Age proportion of the Spanish commercial fleets from 2011 to 2022 in subareas 7, 8 and Division 9a.

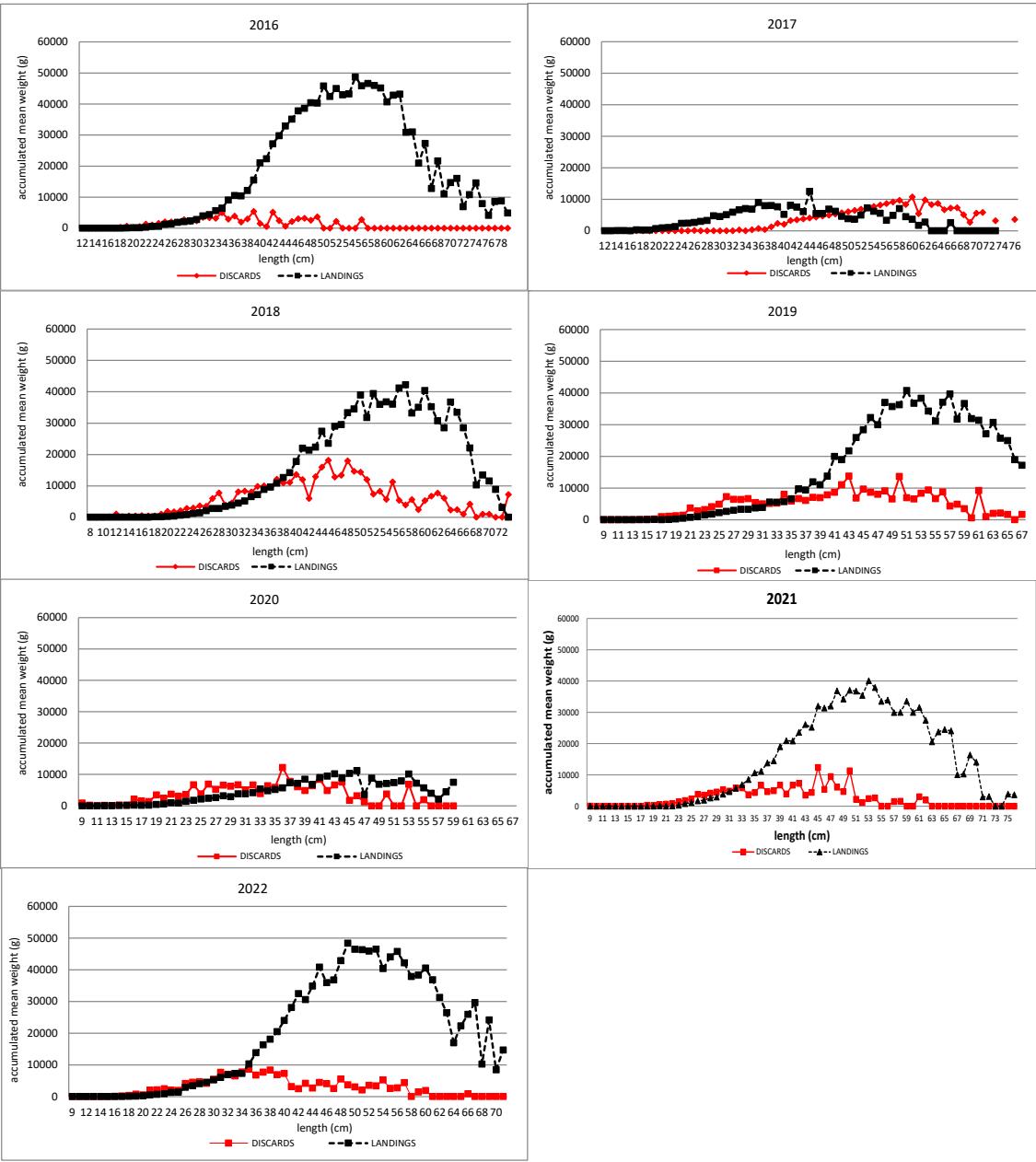


Figure 10.7 Accumulated mean weight at length of the international commercial landings and discards reported to Inter-Catch from 2016 to 2022.

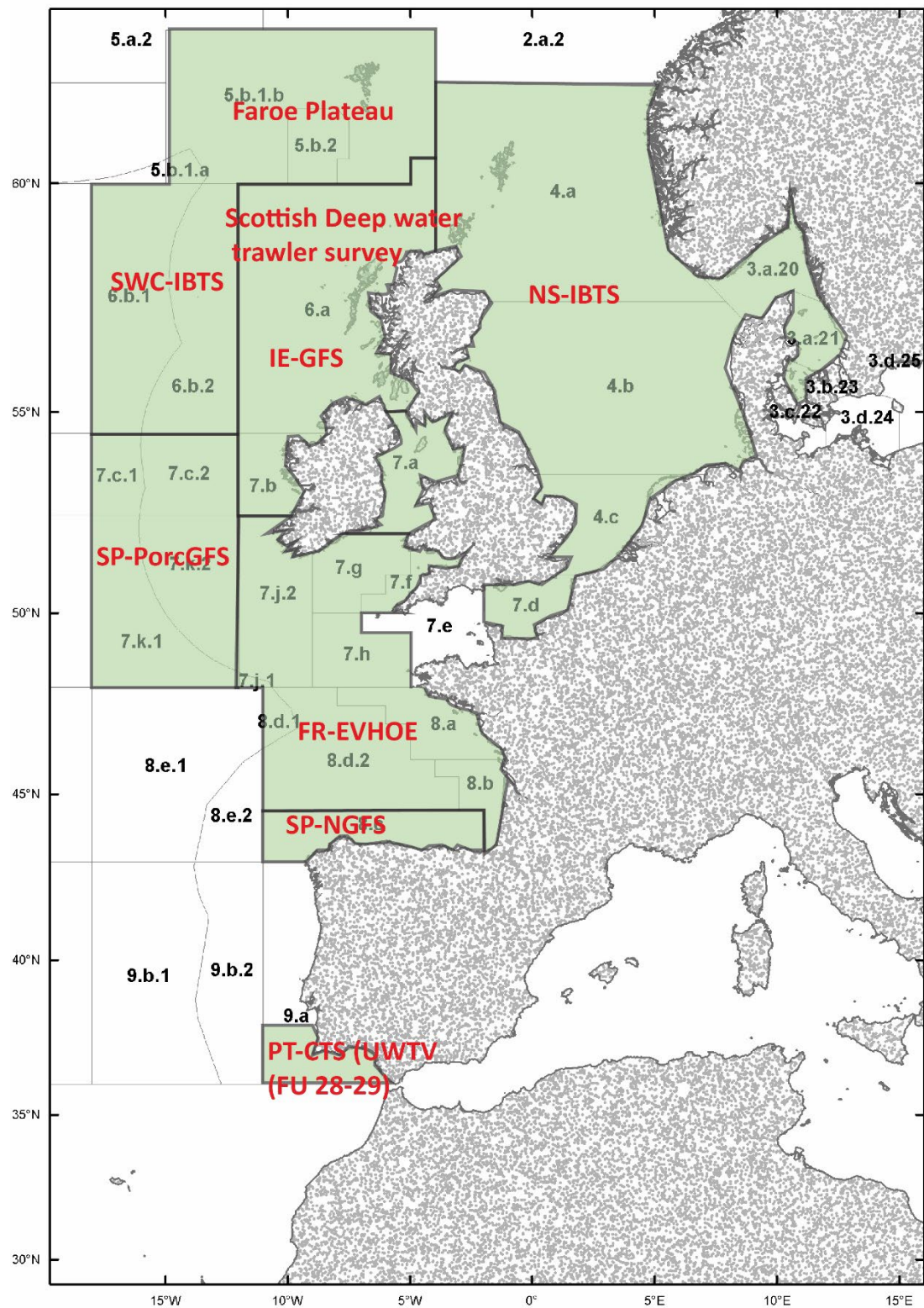


Figure 10.8. Map of the Divisions covered by the nine surveys used in the trend analysis of abundance and biomass of GFB.

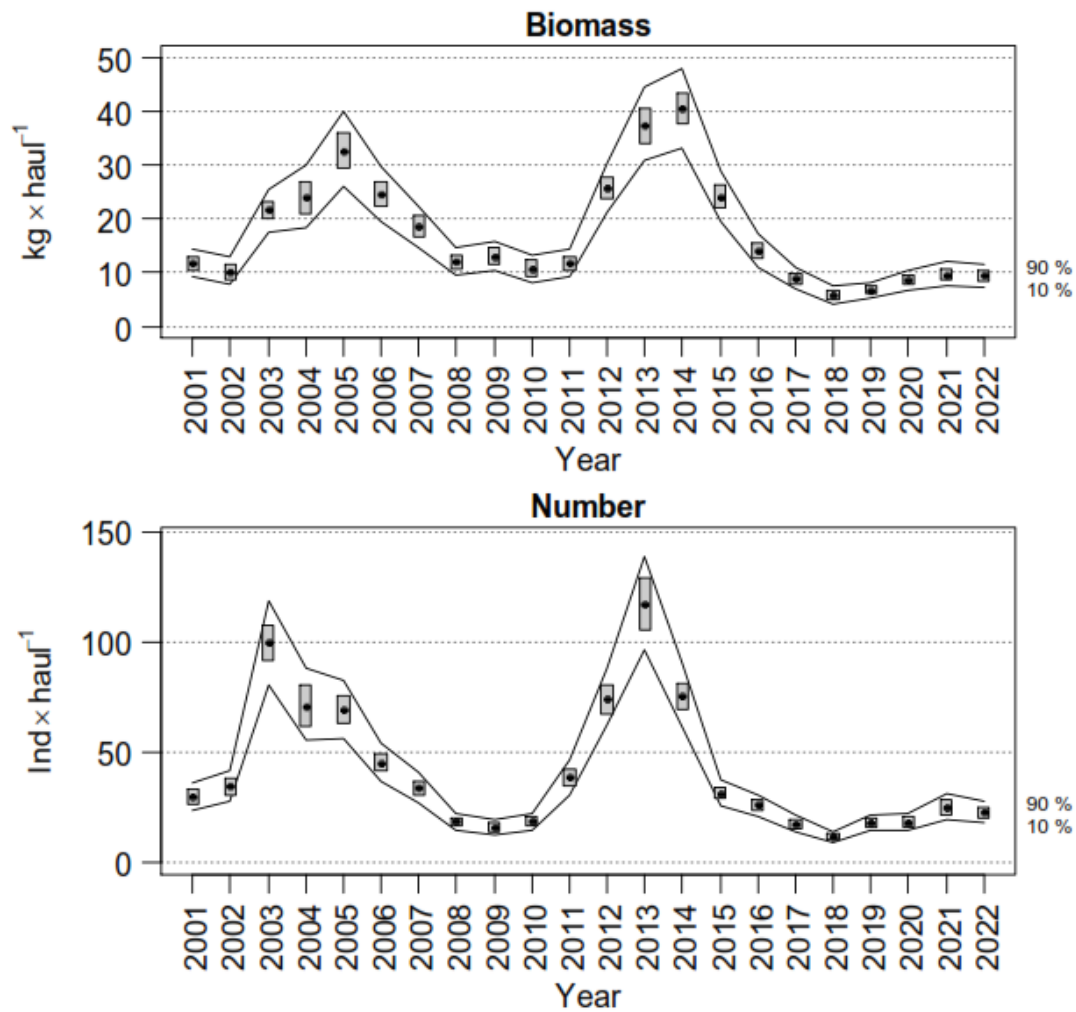


Figure 10.9. Evolution of *Phycis blennoides* biomass and abundance indices during Porcupine Survey time-series (2001–2022) in Divisions 7.c and 7.k. Boxes mark parametric standard error of the stratified abundance index. Lines mark bootstrap confidence intervals ($\alpha=0.80$, bootstrap iterations = 1000).

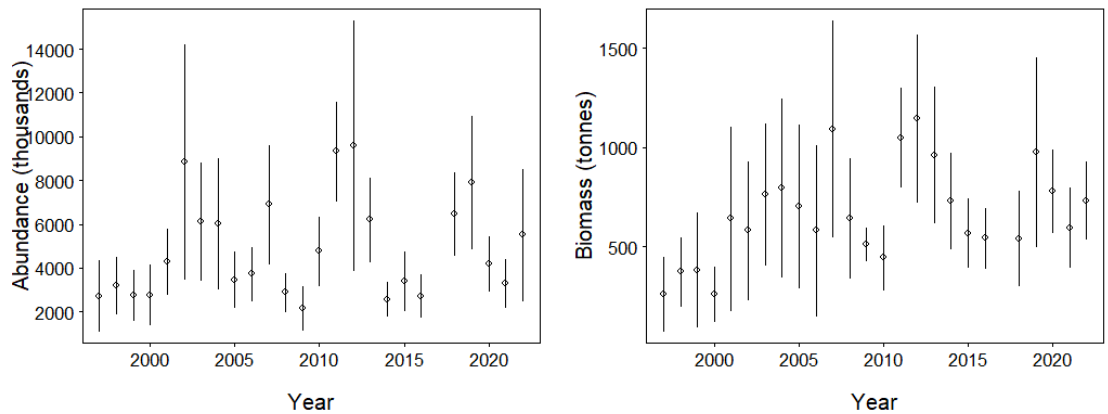


Figure 10.10. Greater forkbeard series of abundance and biomass of the French EVHOE IBTS survey in the Divisions 7.fghj and 8.abd combined until 2022.

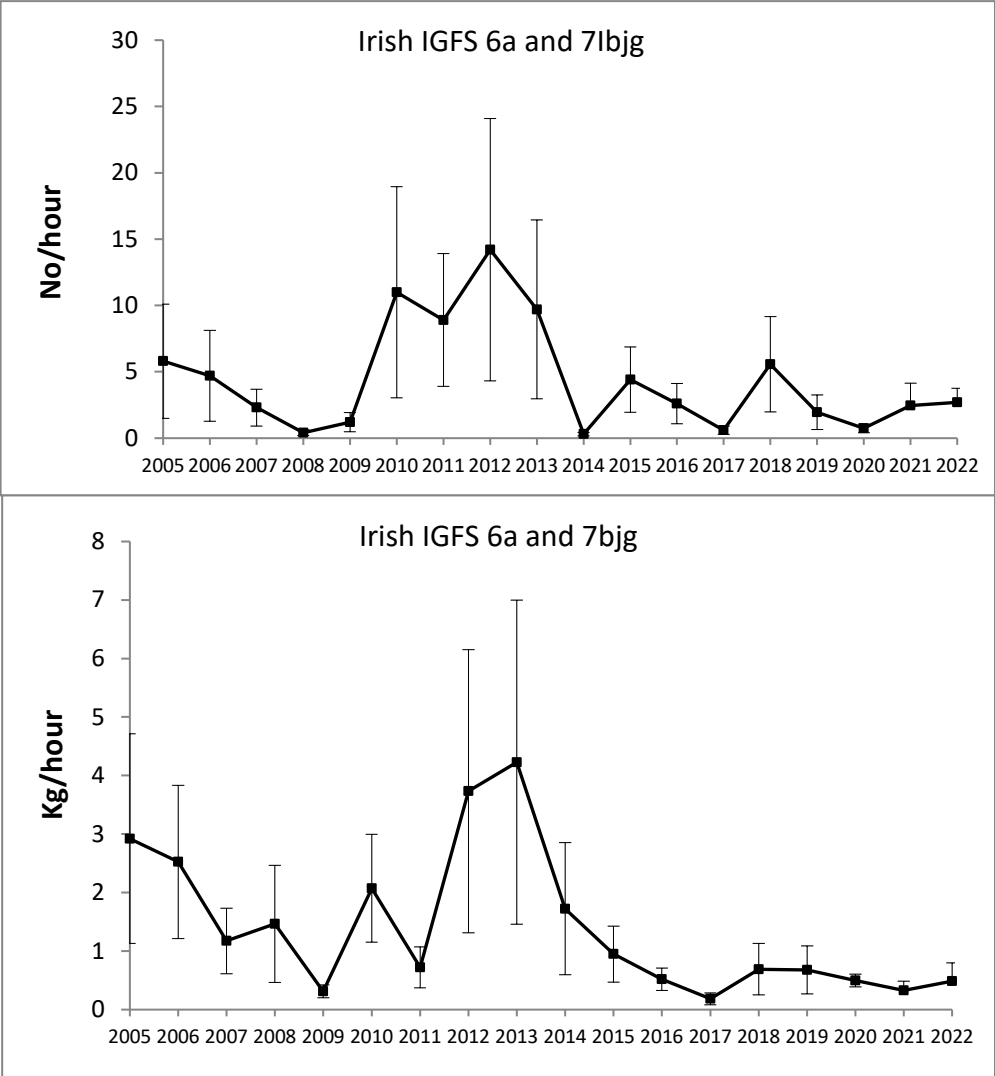


Figure 10.11. Abundance and biomass Indices (no. per hour and kg per hour) of Greater forkbeard total catches of the Irish IGFS Survey in the slope and shelf strata, 2005–2022.

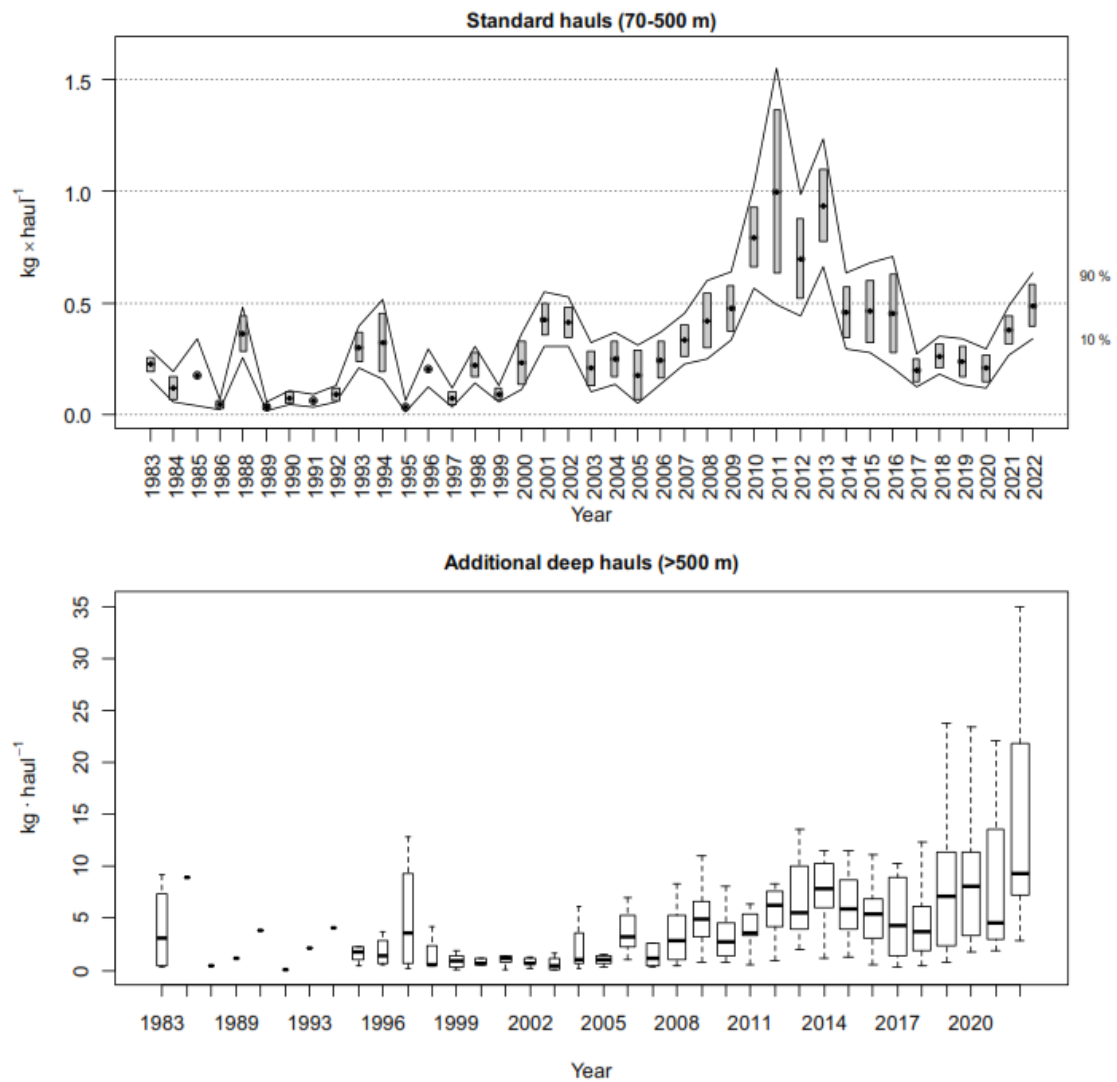


Figure 10.12. Evolution of *Phycis blennoides* stratified biomass index in standard hauls and additional deep hauls during the North Spanish shelf bottom trawl survey time series (1983-2022). For the standard hauls boxes mark parametric standard error of the stratified biomass index. Lines mark bootstrap confidence intervals ($\alpha = 0.80$, bootstrap iterations = 1000). For the additional deep water hauls boxplots represent the median and interquartile of the biomass catches in the deep hauls performed.

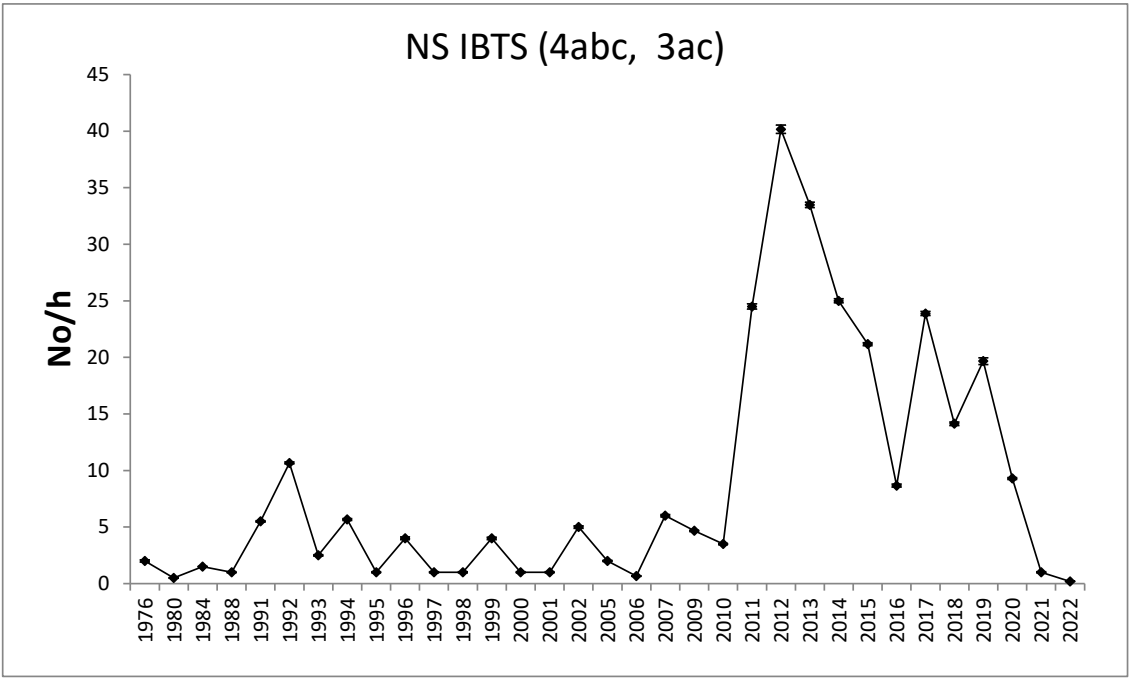


Figure 10.13. Greater forkbeard series of abundance (No/hour) of the North Sea IBTS survey (NS-IBTS) until 2022 in Divisions 4.abc and 3.ac.

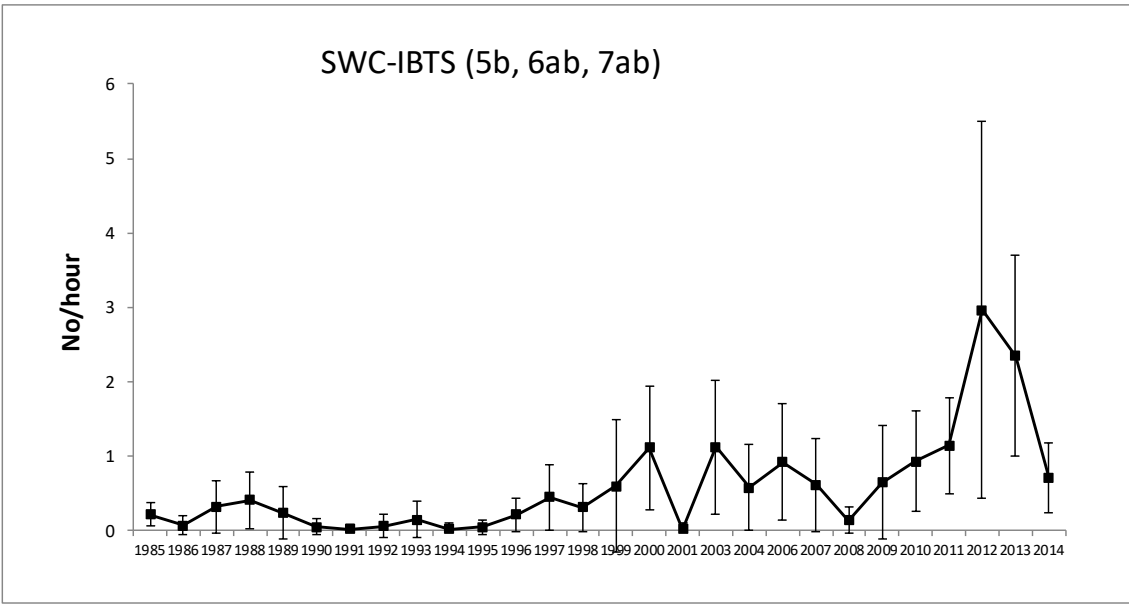


Figure 10.14. Greater forkbeard series of abundance (No/hour) of the Scottish Western Coast Groundfish IBTS survey (SWC-IBTS) until 2014 in Divisions 5.b, 6.ab and 7.ab.

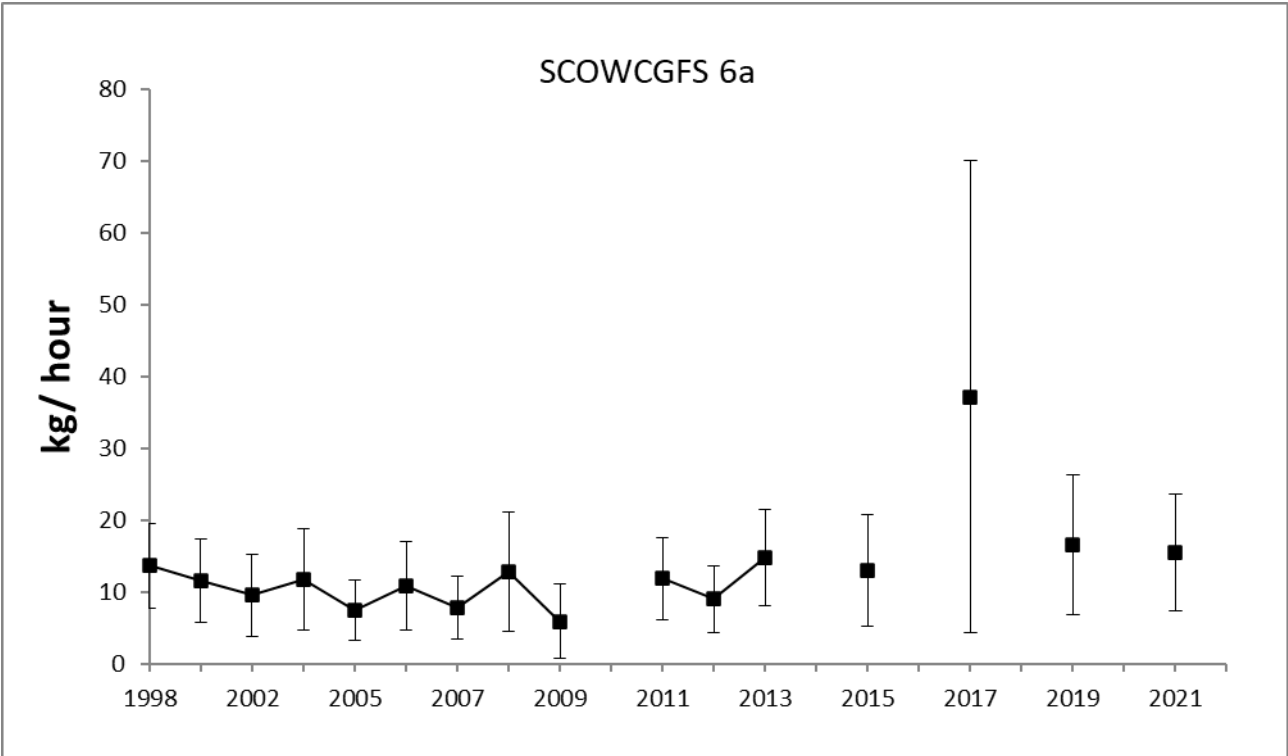


Figure 10.15. Greater forkbeard series of biomass (kg/hour) and abundance (No/hour) of the Scottish Deep-water trawl survey in ICES Division 6.a between 1998 and 2021.

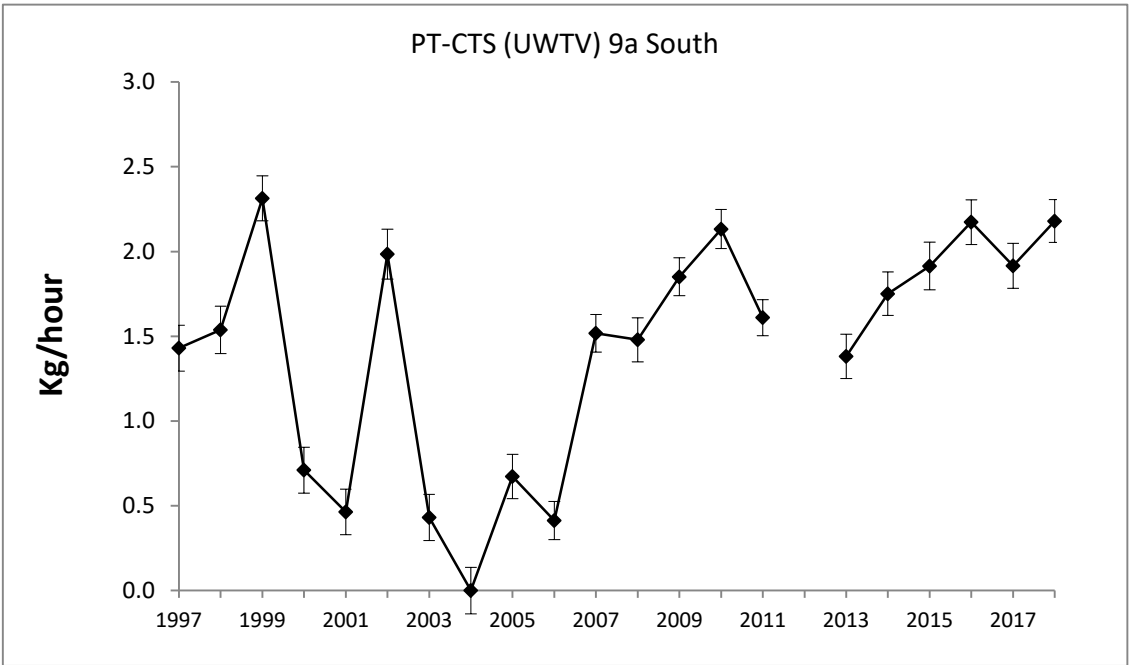


Figure 10.16. Greater forkbeard series of Standardized biomass index (kg.hour-1) of the Portuguese PT-CTS (UWTV (FU 28–29) survey until 2019 in the Division 9.a South. CPUE values estimated for the sector “Milfontes”.

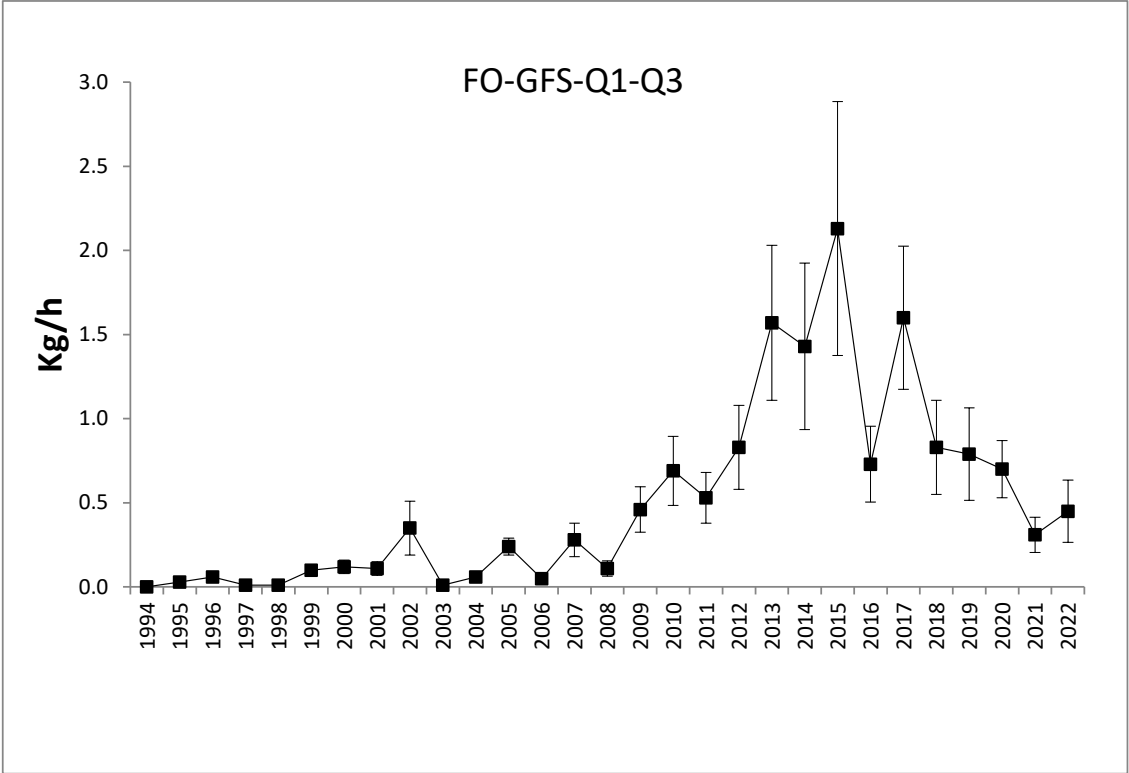


Figure 10.17. Faroe Plateau survey in Division 5b. Data of Biomass (kg/h) from 1994 to 2022 in the combined spring and summer surveys.

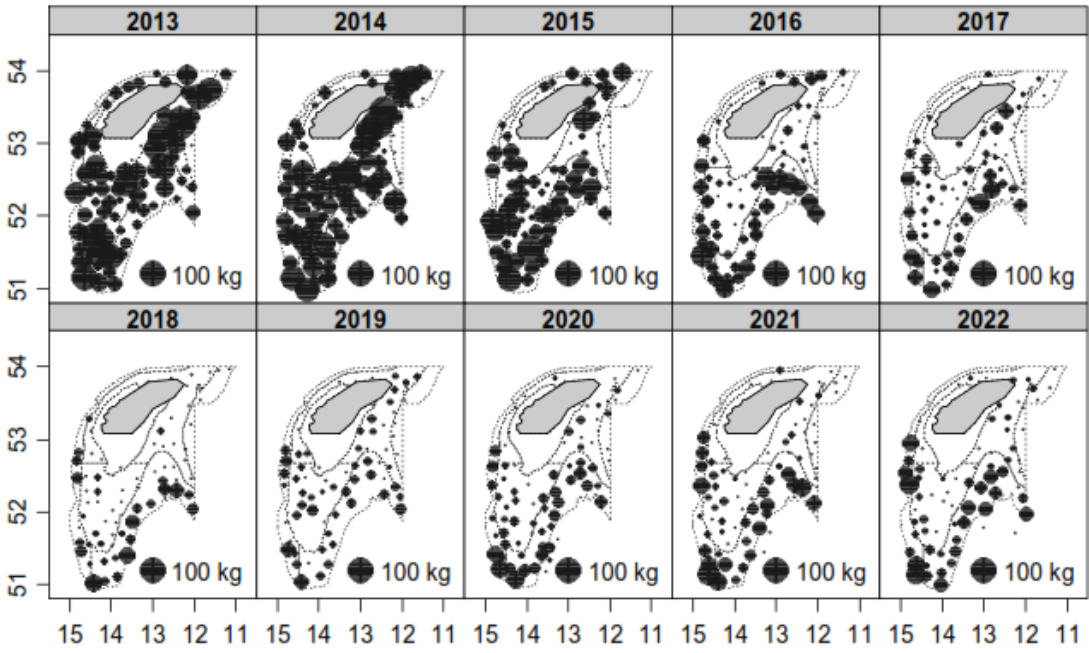


Figure 10.18. Geographic distribution of *Phycis blennoides* catches (kg×30 min haul⁻¹) and recruits (1-25 cm) in the Porcupine surveys (2014-2022).

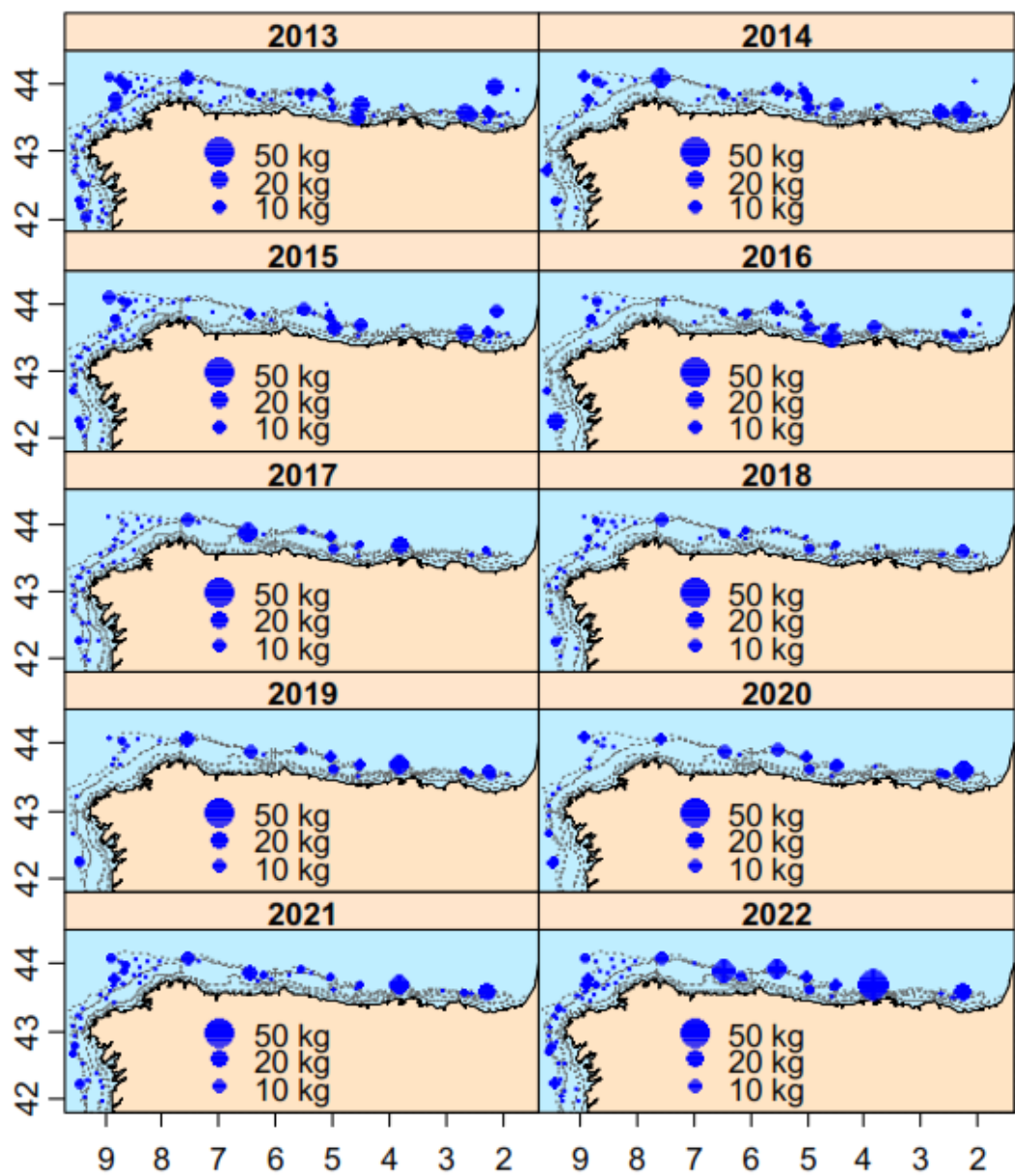


Figure 10.19. Catches in biomass of greater forkbeard on the Northern Spanish Shelf bottom-trawl surveys between 2012 and 2022.

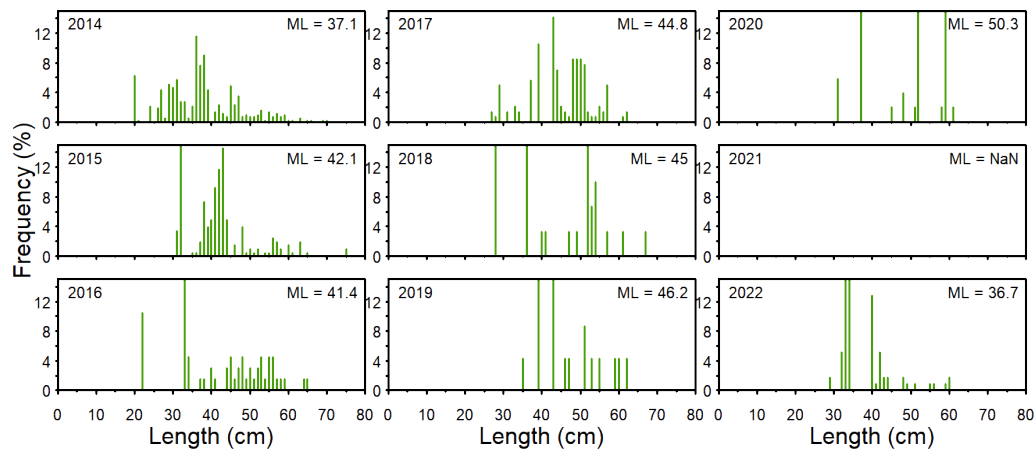


Figure 10.20. Length-frequency distribution from the Faroes deepwater survey from 2014 to 2022 (no survey in 2021).

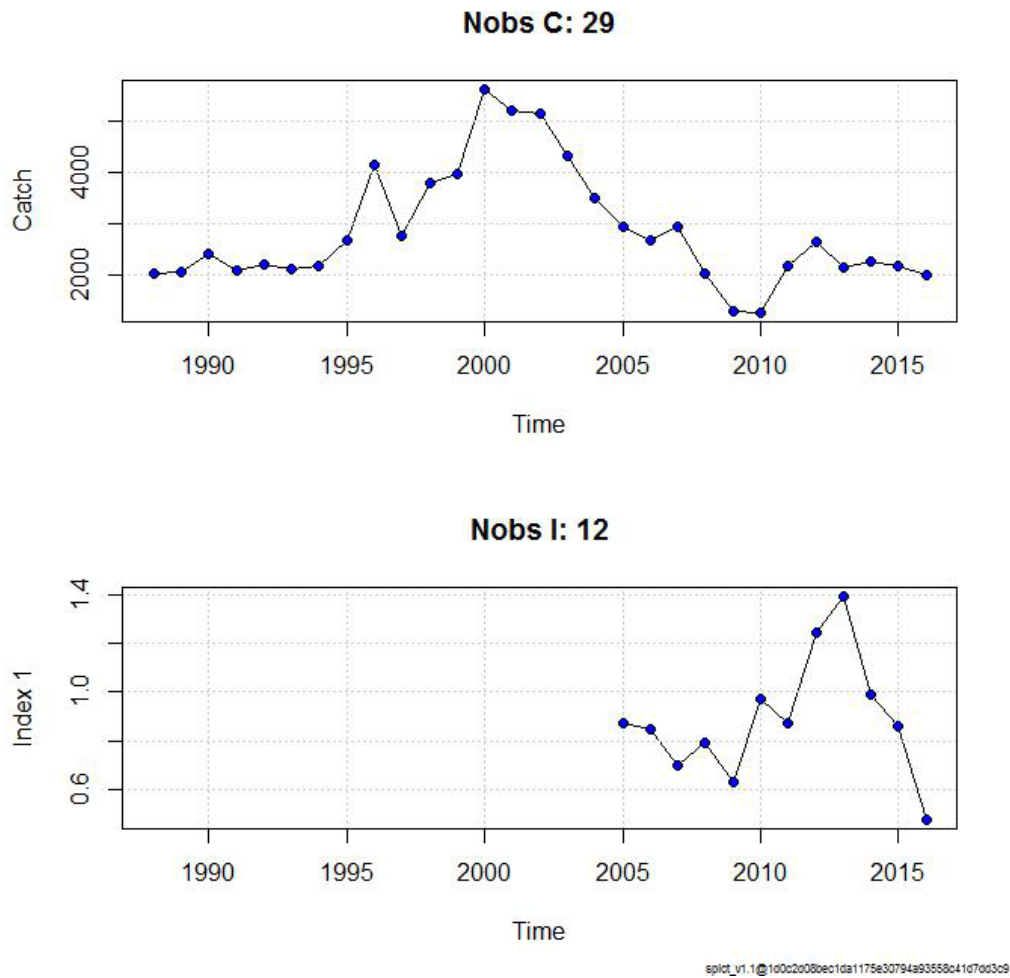


Figure 10.21. Inputs of the SPiCT model used in the Greater Forkbeard stock.

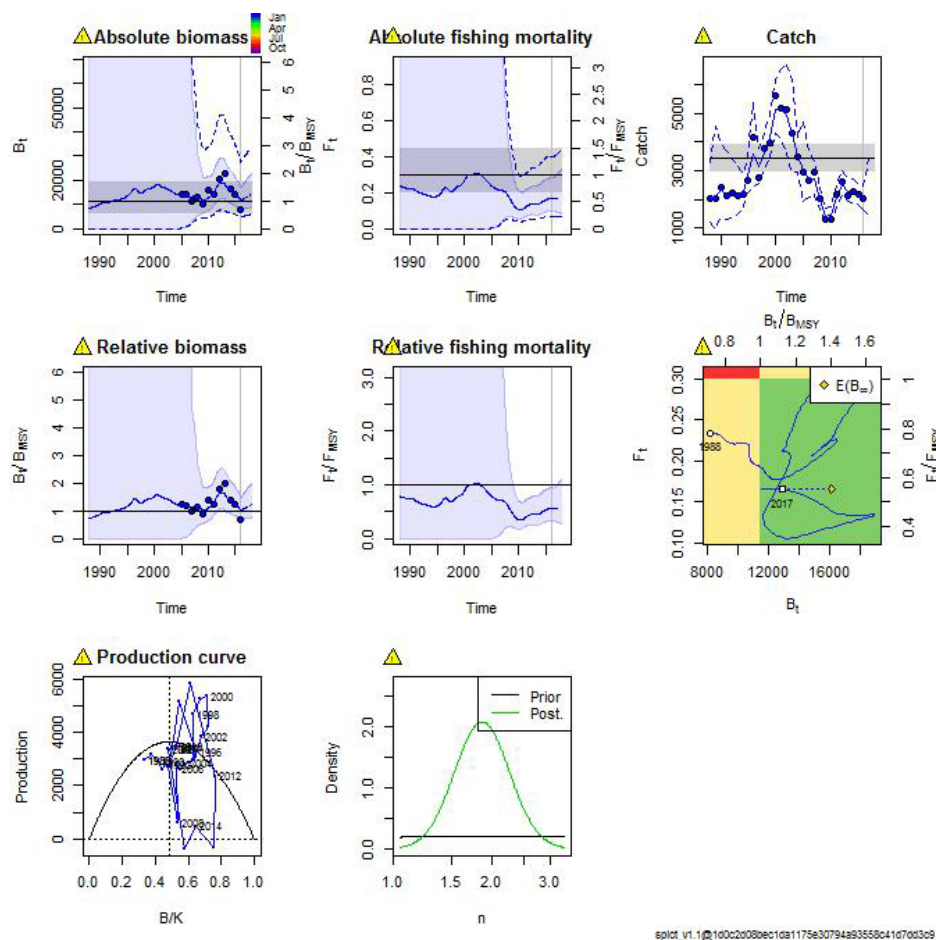


Figure 10.22. Results of the SPICT model for the Greater Forkbeard stock.

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