

Contents

2	Anglerfish (<i>Lophius budegassa</i> , <i>Lophius piscatorius</i>) in subareas 4 and 6 and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat).....	9
	Assessment in 2022	9
	ICES advice applicable to 2021 and 2022	9
	ICES advice for 2021	9
	ICES advice for 2022	9
	2.1 General.....	9
	Stock description and management units	9
	Management applicable to 2021 and 2022.....	10
	Fishery description	13
	The fishery in 2021	13
	2.2 Data.....	14
	Landings.....	14
	Discards	15
	Length compositions	15
	Biological Data	16
	Research vessel surveys	16
	2.3 Historical stock development	17
	2.4 Application of the rfb advice rule	18
	2.5 Biological reference points	20
	2.6 Management plans	20
	2.7 Uncertainties and bias in assessment and forecast.....	20
	Commercial data	21
	Survey data	21
	Biological information	21
	Stock structure	21
	2.8 Recommendations for next Benchmark	22
	2.9 Management considerations	22
	2.10 References	23

2 Anglerfish (*Lophius budegassa*, *Lophius piscatorius*) in subareas 4 and 6 and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)

Assessment in 2022

The last benchmark for this stock was carried out in February 2018 (ICES, 2018) where it was agreed to provide advice on the basis of the procedure for category 3.2.0 of ICES RGLIFE data-limited stock (DLS) methods as set out in the stock annex. However, in 2022, based on the recommendations of the WKLIFE workshop, ICES decided that this method should no longer be used and future advice should be provided following the *r_{fb}* rule (ICES, 2021).

ICES advice applicable to 2021 and 2022

ICES advice for 2021

ICES advises that when the precautionary approach is applied, catches in 2021 should be no more than 17 645 tonnes.

ICES advice for 2022

ICES advises that when the Precautionary approach is applied, catches in 2022 should be no more than 14 116 tonnes.

2.1 General

Stock description and management units

The anglerfish stock on the Northern Shelf is considered to occur in Division 3.a (Skagerrak and Kattegat), Subarea 4 (the North Sea) and Subarea 6 (West of Scotland plus Rockall). Anglerfish in the North Sea and Skagerrak/Kattegat were considered by this Working Group for the first time in 1999. In 2004 the WGNSSDs considered the stock structure of anglerfish on a wider European scale, and found no conclusive evidence to indicate an extension of the stock area northwards to include Division 2.a. In 2013, Division 2.a was removed from WGCSE ToR.

Management applicable to 2021 and 2022

Council Regulation (EU) 2021/92 of 28 January 2021 fixing for 2021 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters

Species	Anglerfish Lophiidae	Zone:	United Kingdom and Union waters of 4; United Kingdom waters of 2a (ANF/2AC4-C)
Belgium	312 ⁽¹⁾ ⁽²⁾		
Denmark	688 ⁽¹⁾ ⁽²⁾		
Germany	336 ⁽¹⁾ ⁽²⁾		
France	64 ⁽¹⁾ ⁽²⁾		
The Netherlands	236 ⁽¹⁾ ⁽²⁾		
Sweden	8 ⁽¹⁾ ⁽²⁾		
United Kingdom	10 328 ⁽¹⁾ ⁽²⁾		
Union	1 644 ⁽¹⁾ ⁽²⁾		
TAC	11 972		Precautionary TAC

(1) Special condition: of which up to 30% may be fished in United Kingdom, Union and international waters of 6a north of 58°30'N (ANF/*6AN58).

(2) Special condition: of which up to 10 % may be fished in United Kingdom waters of 6a south of 58°30'N; United Kingdom and international waters of 5b; International waters of 12 and 14 (ANF/*56-14).

Species	Anglerfish Lophiidae	Zone:	Norwegian waters of 4 (ANF/04-N.)
Belgium	37	Precautionary TAC	
Denmark	935	Article 3 of Regulation (EC) No 847/96 shall not apply	
Germany	15	Article 4 of Regulation (EC) No 847/96 shall not apply	
The Netherlands	13		
Union	1100		
TAC	Not relevant		

Species	Anglerfish Lophiidae	Zone:	6; Union and international waters of 5.b; international waters of 12 and 14 (ANF/56-14)
Belgium	202 ⁽¹⁾		
Germany	230 ⁽¹⁾		
Spain	216 ⁽¹⁾		
France	2 485 ⁽¹⁾		
Ireland	562 ⁽¹⁾		
The Netherlands	194 ⁽¹⁾		
United Kingdom	2 488 ⁽¹⁾		
Union	3 889 ⁽¹⁾		
TAC	6377	Precautionary TAC	

(1) Special condition: of which up to 20 % may be fished in: United Kingdom and Union waters of 2a and 4 (ANF/*2AC4C).

According to the 'agreed record', the following TACs have been agreed between the EU and UK for 2022. The allocations are as per the EU-UK Trade and Cooperation Agreement (TCA).

ICES areas	TAC	UK allocation	EU allocation
UK & EU waters of 4; UK waters of 2a.	9 014	7 849 ^{1,2}	1 165 ^{1,2}
6; UK & international waters of 5b; interna- tional waters of 12 & 14	5 102	2 060 ³	3 042 ³

1) Special condition: of which up to 30% may be fished in United Kingdom, European Union and international waters of 6a north of 58°30'' (ANF/*6AN58).

(2) Special condition: of which up to 10% may be fished in United Kingdom waters of 6a south of 58°30''; European Union and international waters of 5b; International waters of 12 and 14 (ANF/*56-14)

3: Special condition: of which up to 20% may be fished in United Kingdom and European Union waters of 2a and 4 (ANF/*2AC4C).

Species	Anglerfish Lophiidae	Zone:	Norwegian waters of 4 (ANF/04-N.)
Belgium	37	Precautionary TAC	
Denmark	935	Article 3 of Regulation (EC) No 847/96 shall not apply	
Germany	15	Article 4 of Regulation (EC) No 847/96 shall not apply	
The Netherlands	13		
Union	1000		
TAC	Not relevant		

Management of Northern Shelf anglerfish is based on separate TACs for the North Sea Subarea 4 and West of Scotland Subarea 6. There is no TAC for Skagerrak and Kattegat Division 3.a. Table 4.1 summarises the ICES advice and actual management applicable for Northern Shelf anglerfish for 2003 onwards.

Although there is no minimum landing size for this species, there is an EU minimum weight of 500 g for marketing purposes (EC Regulation 2406/96).

Fishery description

A more detailed description of the fisheries can be found in the Stock Annex. The official national landings as reported to ICES are given in Table 4.2 and the breakdown by country in Tables 4.3–4.5. Total officially reported landings of anglerfish from the Northern Shelf are shown in Figure 4.1.

Trends in nominal international fishing effort in the North Sea and Eastern Channel and the West of Scotland collated by STECF for the Evaluation of Fishing Effort Regimes in European Waters are shown in Figure 4.2. Since 2014, there have been slight increases in TR effort in both the North Sea and West of Scotland, with effort across all gears in the North Sea stable or reducing since 2012 and in the West of Scotland increasing from 2014 driven by marked increases in trawl fisheries. Data for 2017 have not yet been released by STECF although a significant change in the overall observed trend of anglerfish fleets is not anticipated with the introduction of 2017 data.

The fishery in 2021

Official landings in 2021 for subareas 6 and 4 were 19 154 t (5992 t and 13 162 t respectively), giving a 17.5% undershoot of the combined TAC of 22 056 t (81% and 83% TAC uptake respectively). In Subarea 6 Belgium (0%), the Netherlands (0%) and France (37%) had noticeably low uptakes. Belgium was also observed to significantly undertake their quota in Subarea 4 (44%). Denmark (58%) and Germany (65%) both decreased their Subarea 4 uptakes in comparison to 2019, while the United Kingdom increased its uptake (70%). The UK exceeded its quota in Subarea 6 (by 52%), a decrease of 24% compared to 2019. Over quota landings by individual states are most likely due to countries obtaining additional quota from other EU member states, or carrying forward unutilised quota from 2019 and using a flexibility allowance whereby 10% of Subarea 4 TAC can be utilised to reattribute landings from Subarea 6.

Uptake of EC quota in 2021, based on the preliminary officially reported landings, was as follows:

	TAC 6	Lan-dings 6	Uptake (%)	TAC 4 (Norwegian)	TAC 2.a & 4	TAC 2.a & 4(total)	Landings 4	Uptake (%)
Belgium	202	-	0%	37	312	349	290	83%
Denmark	-	-	-	935	688	1623	1 462	90%
France	2 485	1326	53%	-	64	166	108	65%
Germany	230	157	68%	15	336	893	228	65%
Ireland	562	684	122%	-	-	-	-	-
Netherlands	194	-	0%	13	236	249	376	151%
Norway	-	-	-	-	-	-	982	-
Russia	-	-	-	-	-	-	-	-
Spain	216	282	131%	-	-	-	-	-
Sweden	-	-	-	-	8	8	113	1 412%
UK (total)	2 488	3539	142%	-	10 328	10 328	9 604	93%
Total	6 377	6434	101%	1 000	11 972	13 616	13 162	97%

Based on data submitted to ICES, the fishery was principally prosecuted by vessels using demersal trawls (Table 4.6), targeting either white fish (83% of total landings by weight) or *Nephrops* (5%). Alongside these fleets there was also a significant gillnet fishery (11%), as well as an assortment of other gears in which small quantities of anglerfish are caught as bycatch. The latter have been grouped here as miscellaneous gears (1%). Gillnets accounted for smaller proportion of total landings across gear types in 2021 in comparison to 2020.

UK (Scottish) vessels accounted for the majority of reported anglerfish landings from the combined Northern Shelf area, taking approximately 65% of the landings overall. Scottish, Danish and Norwegian vessels took 73%, 11% and 7%, respectively, of the North Sea (Divisions 4.a–4.c) landings. Scottish, French and Irish vessels took 59%, 22% and 11%, respectively, of the West Coast (Subarea 6) landings.

Landings in Division 3.a are not regulated: Table 4.5 shows the official landings which fluctuated between 400–500 t from 2005–2015, but have more than doubled since then. Official landings in 2021 were 912 t, slightly higher than 2020.

2.2 Data

Landings

National landings data as reported to ICES and Working Group estimates of total landings are given in Table 4.2. The working group procedures used to determine the total international landings numbers and weights-at-length are documented in the stock annex. It is acknowledged that throughout the landings time-series, there have consistently been differences between the total

official landings and the landings as estimated by the WG. This is likely due to differences in the data provided to the WG by national scientists and administrators.

Due to restrictive TACs, the likelihood of misreporting and underreporting of anglerfish landings in the past is considered to have been high, particularly during the period 2003–2005. During the benchmark at WKROUND (ICES, 2013), it was agreed that recent landings are likely to be more accurate from 2006 due to, i) less restrictive TACs, ii) the introduction of buyers and sellers legislation in the UK and Ireland and iii) the offshore gillnet fishery for anglerfish historically conducted by Spanish flagged vessels and thought to under-report landings, being much reduced. Anecdotal reports from fisheries officers and catch sampling staff suggest that towards the end of 2016 and into 2017 the high abundance of anglerfish on the grounds, and the restrictive quota were leading to an increase in suspected misreporting, discarding and black landings. There was no new information in 2021 to suggest that these suspected practices continued into 2018, 2019 or 2020, and the lower quota uptake during these years may indicate that the incentives for this behaviour are no longer prevalent. During the period 2005–2010, landings data were not provided to the Working Group by some of the major nations exploiting the fishery; however, the recent data call for the WKAngler benchmark (2018) has meant that WG estimates of subarea 6 and 4 landings have now been calculated for this period.

Discards

Prior to the recent WKAngler benchmark (2018) discard estimates have only been available within InterCatch since 2012. Following the WKAngler data call discard information are now available for some fleets since 2002; however, discard information from UK (Scotland) is not available before 2008. The discard estimates that are available from other nations for the 2002–2007 period are substantially higher than the later UK (Scottish) rates. Given that these (non-Scottish) fleets represent proportionally less of the landings, the discards pre-2008 are considered to be non-representative of the overall fishery (WKAngler 2018).

The breakdown of landings and discards by main gear group and area for 2020 and 2021 is given in Table 4.6. Landings and discards over time are shown in Figure 4.13. Discard data indicate that discarding in this fishery is relatively low due to high market value and no MCRS. Overall discarding was 2.4% of total catch in 2021. Demersal TR2 trawlers had the highest discard rate due to more restrictive quota share, 10.49% in 2021, similar to the value for 2020 (12.7%), but a substantial reduction from 2017 (20.9%) and 2016 (43.9%). In comparison TR1 trawlers, gillnets and miscellaneous gear types typically tend to have much lower discard rates (<2%).

Figures 4.3 (a–c) show the percentage of landed weight by fleet, country and area. Length-frequency samples for catch in 2021 were submitted by Belgium, Denmark, France, Germany, Ireland, Norway, UK (England & Wales) and the UK (Scotland). There was good coverage of both the demersal TR1 and TR2 fleets in Subarea 4 and Division 6.a. There were no samples from UK-flagged gillnet vessels (operating in Subarea 4) which alone accounted for approximately 11% of all landings (Figure 4.3a).

Length compositions

There is now a time-series of commercial catch-at-length data for 2002–2021 (Figure 4.4). The spread of lengths in the landings distributions are wider during the period 2012–2014 after which the distributions are steeper and unimodal. In 2015 the strong 2013 cohort entered the fishery producing a markedly different catch composition of lengths with the bulk of landings being between 30 and 50 cm in length with steep tails either side. Discard rates are lower from 2015 onwards however the landings of <30 cm fish were also lower, suggesting this reduction could be a combination of catch composition and the increase in quota availability. The distribution of

lengths in the landings in 2020 and 2021 have narrowed when compared to 2018 and 2019 with low numbers of landings of fish >75cm notable in 2021.

Biological Data

An anglerfish ageing exchange was held in 2011 to investigate the possibility of the collation of an international landings-at-age dataset of hard structure age readings, however little agreement was found between methods or readers. This was acknowledged in the findings of the WKROUND report on current assessment and issues with data and assessment of this stock (ICES, 2013). Further to this, discussions at WKAngler established that few countries are actively reading anglerfish hard structures, although they continue to be collected, processed and stored. It is unlikely that any developments in regards to an agreed reading criterion will be made in the near future.

Research vessel surveys

The SIAMISS (Scottish Irish Anglerfish Megrim Industry Science Survey) is a dedicated anglerfish survey. It covers much of the known distribution of the northern shelf anglerfish (ICES divisions 4a, 6a and 6b), with the exception of the central and southern parts of Subarea 4 and the Skagerrak and Kattegat (Division 3a). The survey area has been stratified based on knowledge from fishermen with sampling effort within each stratum allocated roughly according to its expected biomass. Given the large spatial coverage of the survey, it is typically carried out by multiple vessels including commercial fishing vessels and both Irish and Scottish research vessels using a standard gear. Abundance and biomass estimates are worked up on the basis of swept-area and account for herding by the trawl doors and sweeps, ii) escapes under the foot-rope and iii) anglerfish abundance and biomass in the southern part of Division 6a were not covered in 2005, 2008 and 2010. Further details regarding the survey design and work up can be found in the stock annex and working document for 2021 (see Barreto *et al.*, 2021).

The survey began in 2005 and is carried out on an annual basis (usually in spring, but sometimes in November). In 2020, however, the Scottish component of the SIAMISS survey (covering the northern North Sea, the north of divisions 6a and 6b) was cancelled due to the COVID-19 pandemic. While the Irish part of the survey did go-ahead (covering the southern part of Division 6a), historical densities and stock trends suggest that extrapolation of this component of the survey to the wider stock area would be inappropriate. Therefore, there is no abundance/biomass estimate from SIAMISS for 2020. In 2022 the anglerfish multi-vessel survey took place from the 12th to 27th of April and involved two vessels: FRV Scotia – surveying Division 4a and Division 6a North of 58°N, and the Irish Marine Institute research vessel FRV Celtic Explorer, surveying Division 6a South of 58°N. One haul with the duration of 60 minutes was made at each sampling station (n=138). Due to a mechanical fault with FRV Scotia the SIAMISS survey did not include Division 6b (Rockall) in 2022.

Figures 4.14 and 4.15 show the 2022 survey haul locations and mean numbers and weight per km² caught at these locations. Larger numbers of anglerfish were caught along the shelf-edge below 58°N with large weights of fish being caught at the same locations. In previous years larger weights of fish have also been caught at Rockall, indicating that the fish at Rockall are larger than those caught on the shelf-edge. In 2022 there was no survey at Rockall so weights for this year are unknown.

Estimated total population numbers and biomass at length by area from the most recent survey in 2022 are shown in Figure 4.7 which show a much higher proportion of large fish in division 4a than in division 6a. In terms of numbers, area 4a has by far the highest value, when compared with areas 6a. Comparison of numbers-at-length and weight-at-length over time for all areas

combined show a slight decrease in numbers but a slight increase in biomass compared to 2021. (Figures 4.8).

A time-series of total biomass is given in Table 4.7 and Figure 4.5. The total biomass estimate for the Northern Shelf in 2022, the most recent survey year was 55 423 t an increase of 14% compared to 2021. A large proportion of total population numbers consisted of individuals <40 cm in 2022, suggesting reasonably strong recruitment.

The breakdown of total numbers and biomass by area (Table 4.8 and Figure 4.6) shows that Division 6b has lower estimated population numbers with less variability over time than in either division 6a or 4a. Division 4a consistently has the highest total biomass of the three areas and shows similar temporal trends to Division 6a.

Estimates of the ratio of survey biomass between subareas 4 and 6 have fluctuated around 1:1, (time-series average of 47.5% in Subarea 4, Table 4.7). The proportion of biomass in Subarea 4 had been steadily increasing since 2013; however, 2017 saw a slight decrease followed by a marked decline in 2018 to a time-series low of 37% (Figure 4.9). 2022 has seen an increase in the proportion of biomass in Subarea 4 moving back towards a 1:1 split.

Additional survey indices were developed during the WKAngler 2018 benchmark after revisiting the anglerfish abundance of several surveys within the stock area (ICES, 2018). Mean weight per hour for both the SCW-IBTS Q1 and Q4 surveys declined in 2018 following time-series highs in 2017 and 2016 respectively (Figure 4.12) which reflects the SIAMISS-Q2 biomass trend (Figure 4.6). The Rockall index (Figure 4.12) has shown an increasing trend since 2005 with a significant peak in 2012 followed by a short period of decline before a continuation of the increasing trajectory from 2016 to 2018, a slight increase again in 2019 and a slight decline in 2020. Although the SIAMISS-Q2 biomass time-series for Division 6.b shows less year to year fluctuation than the Rockall index the increasing trend and magnitude of change for the 2005–2021 period are very similar. In Subarea 4 the NS-IBTS-Q1 and Q3 indices showed declining mean weights per hour until 2020, with a slight increase in 2021 (Figure 4.13).

2.3 Historical stock development

There has been no analytic assessment of Northern Shelf anglerfish since 2003, due to a combination of unreliable commercial data, landings misreporting, uncertain effort data and poor catchability of anglerfish in traditional research surveys. The Scottish Irish anglerfish and megrim industry science survey (SIAMISS-Q2) initiated by Marine Scotland Science in 2005, along with official logbook data and tally-book data schemes have addressed some of these issues, providing valuable information to fishery managers as well as minimum absolute abundance and biomass estimates annually. Between 2012–2021 assessment followed the ICES RGLIFE data-limited stock (DLS) 3.2.0 method of survey based indicative trends (ICES, 2012). Beginning in 2022 the assessment followed the rfb assessment method proposed by WKLIFE (ICES, 2021).

At the benchmark in 2018, it was agreed to use SIAMISS-Q2 survey as an indicator of historical stock development. During the first half of the time-series, the biomass index for the stock fluctuated around 40 kt. Between 2011 and 2017, the total biomass increased significantly (more than doubled) due to very strong recruitment which is first observed in the survey length frequency data in 2013 and can continue to be clearly tracked through these data until 2017. Between 2017 and 2019, the estimated total stock biomass decreased by more than 30% before increasing slightly in 2022.

Figure 4.10 and Table 4.9 shows mean standardised harvest rate (calculated as catch/survey index) by both weight and number of individuals. Whilst there are no reference levels to relate these harvest rates to, trends can still be useful. In terms of biomass, the harvest rate has shown

an increasing trend since 2015 and in 2021 was estimated to be one of the highest values of the time-series. The harvest rate in number has shown a more gradual increase over this time. The marked fall in harvest rate by number from 2013–2014 is likely due to the influx of the substantial 2013 year class (i.e. large increase in survey numbers) and not a change in fishing behaviour. It may be more appropriate to use a harvest rate which is measured over a given length range of commercially exploitable fish.

2.4 Application of the rfb advice rule

Beginning in 2022 advice for this stock is given following the rfb assessment method (ICES, 2022) calculated as the previous year's advice multiplied by a) the index ratio (r) (the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B)); b) a ratio of observed mean length in the catch relative to the target mean length (f); c) a biomass safeguard (b) calculated as either the ratio of the last index value and the index trigger value or 1 where this is lower; and d) a precautionary multiplier (m) based on life history which is fixed over time.

Rfb values are calculated as follows (ICES, 2021):

Component	Definition	Description and use
r	$\frac{\sum_{i=y-2}^{y-1} (I_i/2)}{\sum_{i=y-5}^{y-3} (I_i/3)}$	The rate of change in the biomass index (I), based on the average of the two most recent years of data ($y-2$ to $y-1$) relative to the average of the three years prior to the most recent two ($y-3$ to $y-5$), and termed the "2 over 3" rule.
f	$\frac{\bar{L}_{y-1}}{L_{F=M}}$	The ratio of the mean length (\bar{L}_{y-1}) in the observed catch that is above the length of first capture relative to the target reference length (mean length/target reference length). The target reference length is $L_{F=M} = 0.75L_c + 0.25L_{\infty}$, where L_c is defined as length at 50% of modal abundance (ICES, 2018b).
b	$\min\left\{1, \frac{I_{y-1}}{I_{\text{trigger}}}\right\}$	Biomass safeguard. Adjustment to reduce catch when the most recent index data I_{y-1} is less than $I_{\text{trigger}} = 1.4I_{\text{loss}}$ such that b is set equal to $I_{y-1}/I_{\text{trigger}}$. When the most recent index data I_{y-1} is greater than I_{trigger} , b is set equal to 1. I_{loss} is generally defined as the lowest observed index value for that stock.
m	[0,1]	Multiplier applied to the harvest control rule to maintain the probability of the biomass declining below B_{lim} to less than 5%. May range from 0 to 1.0.
Stability clause	$\min\{\max(0.7C_y, C_{y+1}), 1.2C_y\}$	Limits the amount the advised catch can change upwards or downwards between years. The recommended values are +20% and -30%; i.e. the catch would be limited to a 20% increase or a 30% decrease relative to the previous year's advised catch. The stability clause does not apply when $b < 1$.

Due to the lack of SIAMISS survey data in 2020, the procedure for calculating the index ratio could not be followed exactly. Instead, the rfb framework for category 3 stocks is applied with the 2020 index value treated as missing. This adds a degree of uncertainty as without 2020 data index B has been calculated as the mean of the previous two years (2018 and 2019) instead of three years. Consequently, the 3 over 2 rule was replaced with a 2 over 2 rule in 2022. Furthermore, in 2022 the SIAMISS-Q2 survey did not include division 6.b (Rockall) which in 2021 accounted for 7.9% of landings. The survey estimate for 2021 was used in place of the missing 2022 estimate for division 6.b. This adds a further degree of uncertainty to the assessment, but does not affect the advice as the reduction is capped.

The advice in 2022 is lower than in 2021 due to a decrease in the index ratio (Figure 4.5), an F_{MSY} Proxy value lower than 1 (Figure 4.11) and a precautionary multiplier of 0.95. The mean catch length of fish in this stock has consistently been below the proxy length since at least 2011 (Figure 4.11). Although biomass has declined since 2017 it has remained above the index trigger value since 2014 (Figure 4.5). The stability clause was considered and applied to limit the reduction in catch advice to 30%.

Division 3a46 Anglerfish stock		
Previous catch advice A_y (advised catch for 2022)		14 116 tonnes
Stock biomass trend		
Index A (2021, 2022)		53 222 tonnes
Index B (2018, 2019; 2020 not available)		68 118 tonnes
r: stock biomass trend (index ratio A/B)		0.78
Fishing pressure proxy		
Mean catch length ($L_{mean} = L_{2021}$)		53 cm
MSY proxy length ($L_F = M$)		61 cm
f: Fishing pressure proxy relative to MSY proxy ($L_{2021}/L_F = M$)		0.87
Biomass safeguard		
Last index value (I_{2021})		55 423
Index trigger value ($I_{trigger} = I_{loss} \times 1.4$)		46 554
b: Index relative to trigger value, $\min\{I_{2021}/I_{trigger}, 1\}$		1
Precautionary multiplier to maintain biomass above B_{lim} with 95% probability		
m: multiplier (generic multiplier based on life history)		0.95
RFB calculation**		8 893 tonnes
Stability clause (+20%/-30% compared to A_y , only applied if $b = 1$)	Applied	0.70
Discard rate		1.2%
Catch advice for 2023 ($A_y \times$ stability clause)		9 881 tonnes
Projected landings corresponding to advice***		9 610 tonnes
% advice change^		-30%

* The figures in the table are rounded. Calculations were made with unrounded inputs, and computed values may not match exactly when calculated using the rounded figures in the table.

** $A_{y+1} = A_y \times r \times f \times b \times m$.

*** $[A_{y+1} \times (1 - \text{discard rate})]$.

^ Advice value for 2023 relative to the advice value for 2022 (14 116 tonnes).

2.5 Biological reference points

Biological reference are calculated as follows:

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B_{trigger}	46 554	Biomass index trigger value (I_{trigger}), defined as $I_{\text{trigger}} = I_{\text{loss}} \times 1.4$, where I_{loss} is the lowest observed historical biomass index value (from 2011) from 2005-2022. Value in tonnes.	ICES (2022a, 2022b)
	$F_{\text{MSY proxy}}$	0.87	$L_{\text{mean}}/L_F = M$; Mean catch length divided by MSY proxy reference length ($L_F = M = 61$ cm).	ICES (2022a, 2022b)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

One suggested method for future assessment is a *Nephrops*-like harvest-ratio approach which creates a catch-options table based on a range of harvest ratios. However, to date no MSY reference points have been determined for Northern shelf anglerfish despite further exploration (Hollah, H., 2017). Limited data, dome-shaped selectivity and uncertain life-history parameters continue to be inhibiting factors. Previous attempts to determine suitable harvesting rates, based on a yield-per-recruit analysis, estimated F_{MAX} to be 0.19 (ICES, 2004). The southern Celtic Sea/Bay of Biscay stock has recently been benchmarked and an F_{MSY} of 0.28 was adopted (ICES, 2018a). In the case of *Nephrops* the technical basis for MSY B_{trigger} is the bias-adjusted lowest observed UWTV survey estimate of abundance, however for anglerfish, whilst abundances from SIAMISS-Q2 were initially intended to be an absolute measure of abundance they are now considered to be only a relative index so this may not be appropriate.

2.6 Management plans

ICES is aware of the multiannual management plan (MAP) which has been adopted by the EU for this stock (EU, 2019) and which ICES considers to be precautionary. There is no agreed shared management plan with the UK for this stock, and ICES provides advice according to ICES precautionary approach.

2.7 Uncertainties and bias in assessment and forecast

The WGCSE has previously attempted assessments of the anglerfish stock(s) within its remit using a number of different approaches. As yet none have proved entirely satisfactory. The catch-at-length analysis used in previous years appears to have addressed a number of the suspected problems with the data due to the rapid development of the fishery, and has also provided a satisfactory fit to the catch-at-length distribution data. However, since 2003, the WG has been

unable to present an analytic assessment due to the lack of reliable fishery and insufficient survey information, and in addition it is not known to what extent the dynamic pool assumptions of the traditional assessment model are valid for anglerfish. A catch-at-age model was presented to two benchmark working groups (WKFLAT 2012 and WKROUND 2013) but was not accepted due to concerns over age reading. The SPiCT and ASPIC surplus production models were explored at the WKAngler benchmark (2018) and whilst the models converged, the models were unstable and the uncertainty was large. This is most likely due to the lack of contrast in the catch data.

Commercial data

For a number of years the WG has expressed concerns over the quality of the commercial catch-at-length data because of:

- Accuracy of landings statistics due to species and area misreporting (historically an issue between 1998–2005 and anecdotally again in 2016).
- Lack of information on total catch and catch composition of gillnetters operating on the continental slope to the northwest of the British Isles (See the stock annex for further details of this fishery).

Survey data

There are still several factors which make the survey estimates likely to be underestimates or minimum estimates. Firstly, although experiments have been carried out to estimate escapes from under the footrope, and a model applied to account for this component of catchability, the estimates of smaller anglerfish still look to be underestimated (Figure 4.7). This could be due to either a net selectivity issue, or an availability [to the trawl] issue, as it is known that younger fish occur in shallower water (Hislop *et al.*, 2001), or both. Secondly, the area considered is not complete, as the survey does not cover some of Division 4.a and none of 4.b or 4.c. However, numbers are thought to be low in these areas.

Biological information

Knowledge of the biology of anglerfish has improved, with some basic biological parameters suitable for use in future assessments, such as mean weight-at-length in the stock, now available from the industry–science survey data. Difficulties still remain in finding mature females. A further discussion of the biology can be found in the stock annex.

Life-history parameters of the anglerfish species *Lophius piscatorius* and *Lophius Budegassa* in the Northeast Atlantic were reviewed at the WKAngler benchmark (2018) with appropriate ranges of natural mortality (M) discussed and new approaches to estimating age from mixture modelling of length distributions presented (see WKAngler 2018 report for further details).

Stock structure

Currently, anglerfish on the Northern Shelf are split into Subarea 6 (including 5.b (EC), 7 and 14) and the North Sea (and 2.a (EC)) for management purposes. However, genetic studies have found no evidence of separate stocks over these two regions (including Rockall) and particle-tracking studies have indicated interchange of larvae between the two areas (Hislop *et al.*, 2001). So, at previous WGs, assessments have been made for the whole Northern Shelf area combined. In fact, both microsatellite DNA analysis (O'Sullivan *et al.*, 2005) and particle tracking studies carried out as part of EC 98/096 (Anon, 2001) also suggested that anglerfish from further south (Subarea 7) could also be part of the same stock.

At present, the stock is assessed for the two anglerfish species *L. piscatorius* and *L. budegassa* combined despite differing life-history characteristics and overlap in spatial distribution. This has been the case due to the black anglerfish (*L. Budegassa*) proportionally representing only around 10% of the estimated stock biomass from the SIAMISS-Q2 survey and that the Scottish fleet land the two species for sale combined as “monkfish”. Given that the proportion of black anglerfish has been as high as 28% in Division 6.a and that the Scottish market sampling programme records to species level, a splitting out of black anglerfish in this stock may be a consideration for a future benchmark.

2.8 Recommendations for next Benchmark

This stock was last benchmarked in February 2018 at WKAngler. The recommendations to be carried forward following WKAngler are the following tasks:

- Investigate length-based stock assessment using, for example, the SS3 approach applied to southern anglerfish stocks.
- Investigate growth models appropriate for anglerfish subareas 4 and 6.
- Investigate an age-aggregated production/depletion model.
- Determine the best way to incorporate *Lophius budegassa* into assessment and advice.

The WKAngler data call led to the compilation of commercial sampling data (length, age, weight) previously held internationally, to construct a historical catch-at-length dataset for 2002 to present. At this stage, the focus is currently to utilise this more complete dataset to develop a suitable assessment model for this stock.

2.9 Management considerations

Up to and including 2011, ICES provided qualitative advice regarding the future exploitation of ‘data-limited’ stocks where there was either limited knowledge of their biology or a lack of data on their exploitation. However, in response to a strong interest from advice recipients to base advice on the information available, ICES developed the data-limited stocks (DLS) approach framework, for which anglerfish is a category 3 data-limited stock. This requires considering the application of an uncertainty cap and/or precautionary buffer to a survey adjusted *status quo* catch at each annual advice draft.

The two TACs in this area do not match the stock unit. One TAC area covers Subarea 4 and Division 2.a (EC); the second covers Division 5.b (EC) and subareas 6, 12, and 14. There is no TAC for Division 3.a and landings from this area have increased significantly in recent years. As a result of this mismatch, there is a potential for catches to exceed advice. There is no TAC for the Norwegian fishery in Subarea 4.

The TACs in subareas 4 (including Norwegian waters) and 6 until 2010 were split 67:33%, since 2011 they have been split 64:36%. In 2018, 10% of the TAC for 4 and 2.a could be taken from Division 5.b, or subareas 6, 7 and 9. Over the survey time-series, the stock has been fairly evenly distributed between 4:6, the split has fluctuated around 50:50 (47% on average) (Table 4.7 and Figure 4.9) however in 2018 there was a significant decrease to 38% increasing to 40% in 2019 and 47% in 2021. Note that the North Sea is only partially surveyed: however, the area covered does encompass most of the distribution of anglerfish.

Ideally, the management of the fishery should be based on a specific plan, or harvest control rule, after an evaluation of various stakeholder-led suggestions of alternative options. This still needs

to be pursued in consultation with stakeholders such as the North Western Waters Advisory Council.

2.10 References

- Anon. 2001. The distribution and biology of anglerfish and megrim in waters to the west of Scotland. EC Study Contract 98/096 Final Report August 2001.
- Barreto, E., Clarke, E., Gillseppe-Mules, R., Kelly, E and Gerritsen, H. 2021. WD for WGCSE September 2021: SIAMISS Estimates of Anglerfish Biomass in subareas 4 and 6 for 2021. Working document to the *Celtic Seas Ecosystem Working Group*, ICES 2021, 17 pp.
- Clarke, E., Buch, T., Gillseppe-Mules, R., Drewery, J., Kelly, E and Gerritsen, H. 2018. WD for WGCSE October 2018: SIAMISS Estimates of Anglerfish Biomass in subareas 4 and 6 for 2018. Working document to the *Celtic Seas Ecosystem Working Group*, ICES 2017, 14 pp.
- COUNCIL REGULATION (EU). 2018. No 2018/120 of 23 January 2018 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union vessels, in certain non-Union waters, amending Regulation (EU) No 43/2014 and repealing Regulation (EU) No 2017/127.
- COUNCIL REGULATION (EU). 2019. No 124/2019 of 30 January 2019 fixing for 2019 the fishing opportunities available to EU vessels for certain fish stocks and groups of fish stocks which are not subject to international negotiations or agreements.
- Hislop, J. R. G., Gallego, A., Heath, M. R., Kennedy, F. M., Reeves, S. A., and Wright, P. J. 2001. A synthesis of the early life history of the anglerfish, *Lophius piscatorius* (Linnaeus, 1758) in Northern British waters. *ICES Journal of Marine Science* 58:70–86.
- Historical Nominal Catches 1950–2010. Version 30-11-2011. Accessed 13-05-2019 via <http://ices.dk/marine-data/dataset-collections/Pages/Fish-catch-and-stock-assessment.aspx>. ICES, Copenhagen.
- Holah, H. 2017. Length based indicators and SPiCT in relation to reference points for Anglerfish in subareas 4 and 6, and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat) (anf.27.3a46). Working document. *Celtic Seas Ecosystem Working Group*, ICES 2017.
- ICES. 2004. Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks. *ICES CM 2004/ACFM:01*. 558 pp.
- ICES. 2012. Report of the ICES Advisory Committee on ICES implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. *ICES CM 2012/ACOM:68*. 42 pp.
- ICES. 2012b. Report of the Benchmark Workshop on Flatfish Species and Anglerfish (WKFLAT), 1–8 March 2012, Bilbao, Spain. *ICES CM 2012/ACOM:46*. 283 pp.
- ICES. 2013. Report of the Benchmark Workshop on Roundfish Stocks (WKROUND), 4–8 February, Aberdeen. *ICES CM 2013 / ACOM:47* 213 pp.
- ICES. 2016. Report of the Workshop to consider MSY proxies for stocks in ICES category 3 and 4 stocks in Western Waters (WKProxy), 3–6 November 2015, ICES Head-quarters, Copenhagen. *ICES CM 2015/ACOM:61*. 183 pp.
- ICES. 2018. Report of the Benchmark Workshop on Anglerfish Stocks in the ICES Area (WKANGLER), 12–16 February 2018, Copenhagen, Denmark. *ICES CM 2018/ACOM:31*. 177 pp.
- ICES. 2021. Tenth Workshop on the Development of Quantitative Assessment Methodologies based on LIFE-history traits, exploitation characteristics, and other relevant parameters for data-limited stocks (WKLIFE X)
- ICES. 2022. ICES technical guidance for harvest control rules and stock assessments for stocks in category 2 and 3. In Report of ICES Advisory Committee, 2022. *ICES Advice 2022*, Section 16.4.11.
- Official Nominal Catches 2006–2014. Version 08-05-2019. Accessed 13-05-2019 via <http://ices.dk/marine-data/dataset-collections/Pages/Fish-catch-and-stock-assessment.aspx>. ICES, Copenhagen.

O'Sullivan, M., Wright, P., Vespoor, E., Knox, D. and Piertny, S. 2005. Microsatellite DNA polymorphism indicates an absence of population structure in monkfish *Lophius piscatorius* in its northern distribution. *ICES CM2005/T:18 (poster)*.

Scientific, Technical and Economic Committee for Fisheries (STECF). 2017 – Fisheries Dependent - Information – Classic (STECF-17-09). Publications Office of the European Union, Luxembourg 2017, ISBN 978-92-79-67481-5, doi:10.2760/561459, JRC107598.

Table 4.1. ICES advice and actual management applicable for Northern Shelf anglerfish for 2003 onwards.

YEAR	Catch corresponding to advice	BASIS	WEST OF SCOTLAND (Sub-area 6)	NORTH SEA (Subarea 4)		
			TAC ⁴⁾	WGCSE landings	TAC ⁵⁾	WGCSE landings
2003	<6700 ¹⁾ ^	Reduce F below F _{pa}	3180	3068	7000	8714
2004	<8800 ²⁾ ^	Reduce F below F _{pa} ²⁾	3180	3130	7000	8532
2005	-	No effort increase ²⁾	4686	3747	10 314	9696
2006	-	No effort increase ²⁾	4686	3491	10 314	9564
2007	-	No effort increase ²⁾	5155	4476	11 345	9823
2008	-	No effort increase ³⁾	5155	4847	11 345	10 732
2009	-	No effort increase ³⁾	5567	5192	11 345	9781
2010	-	No effort increase ³⁾	5567	3912	11 345	7900
2011	-	Decrease effort	5456	4693	9643	7920
2012	-	Reduce catches	5183	4372	9161	6412
2013	-	Decrease catches by 20% ²⁾	4924	4727	8703	6306
2014	10 231	Decrease catches by 20% ²⁾	4432	5880	7833	8165
2015	14 702	Increase landings by 20% ²⁾	5313	5008 ⁽⁷⁾	9390	10 243
2016	≤ 18 435	Increase recent advised catch by no more than 20% ²⁾	6375	5966	11267	12 854
2017	≤ 22 007	Precautionary approach	7650	6460	13521	14 508
2018	≤ 26 408	Precautionary approach	9180	6356	16225	14 280
2019	≤ 31 690	Precautionary approach	11453	7912	20237	12674
2020	≤ 22 056	Precautionary approach	7971	6 601	14085	11 582
2021	≤ 17 645	Precautionary approach	6 377		11 972	
2022	≤ 14 116	Precautionary approach				

All values raised to nearest tonne.

^ Landings advice

1) Advice for Division 3.a, Subarea 4 and Subarea 6.a combined.

2) Advice for Division 3.a, Subarea 4 and Subarea 6 combined.

3) Advice for Division 2.a, Division 3.a, Subarea 4 and Subarea 6 combined.

4) applies to 5.b(EC), 6, 7 and 14.

5) TAC applies to 2.a & 4 (EC).

(7) Landings including raised discards.

Although there is no minimum landing size for this species, there is an EU minimum weight of 500 g for marketing purposes (EC Regulation 2406/96).

An additional quota of 1500 t was also available for EU vessels fishing in the Norwegian zone of Subarea 4 in 2011–2018 which was increased to 1700 t in 2018.

Table 4.2. Anglerfish on the Northern Shelf (3.a, 4 & 6). Total official landings by area (tonnes).

	3.a	4.a	4.b	4.c	6.a	6.b	4	6	Total (3.A, 4,6)	WG Landings	WG Discards
1973	140	2085	575	41	9221	127	2701	9348	12189	-	-
1974	202	2737	1171	39	3217	435	3947	3652	7801	-	-
1975	291	2887	1864	59	3122	76	4810	3198	8299	-	-
1976	641	3624	1252	49	3383	72	4925	3455	9021	-	-
1977	643	3264	1278	54	3457	78	4596	3535	8774	-	-
1978	509	3111	1260	72	3117	103	4443	3220	8172	-	-
1979	687	2972	1578	112	2745	29	4662	2774	8123	-	-
1980	652	3450	1374	175	2634	200	4999	2834	8485	-	-
1981	549	2472	752	132	1387	331	3356	1718	5623	-	-
1982	529	2214	654	99	3154	454	2967	3608	7104	-	-
1983	506	2465	1540	181	3417	433	4186	3850	8542	-	-
1984	568	3874	1803	188	3935	707	5865	4642	11075	-	-
1985	578	4569	1798	77	4043	1013	6444	5056	12078	-	-
1986	524	5594	1762	47	3090	1326	7403	4416	12343	-	-
1987	589	7705	1768	66	3955	1294	9539	5249	15377	-	-
1988	347	7737	2061	95	6003	1730	9893	7733	17973	-	-
1989	334	7868	2121	86	5729	313	10075	6042	16451	-	-
1990	570	8387	2177	34	5615	822	10598	6437	17605	-	-
1991	595	9235	2522	26	5061	923	11790	5984	18369	17441	-
1992	938	10209	3053	39	5479	1089	13301	6568	20807	21872	-
1993	843	12309	3143	66	5553	681	15519	6234	22596	23971	-
1994	811	14505	3445	210	5273	909	18162	6182	25155	25057	-
1995	823	17891	2627	402	6354	958	20920	7312	29055	28913	-
1996	702	25176	1847	304	6408	602	27327	7010	35039	35100	-

	3.a	4.a	4.b	4.c	6.a	6.b	4	6	Total (3.A, 4,6)	WG Landings	WG Discards	
1997	776	23425	2172	160	5330	990	25757	6320	32853	32728	-	
1998	626	16859	2088	78	4506	1313	19026	5819	25471	25293	-	
1999	660	13344	1517	24	4284	1401	14885	5685	21230	21854	-	
2000	602	12338	1617	31	3311	1074	13986	4385	18973	19682	-	
2001	621	12861	1832	21	2660	1309	14714	3969	19304	19157	-	
2002	667	11048	1244	21	2280	718	12313	2998	15978	15067	-	
2003	478	8523	847	20	2493	643	9390	3136	13004	12008	-	
2004	519	8987	851	15	2453	671	9853	3124	13496	11976	-	
2005	458	8424	688	5	3019	958	9117	3982	13557	13728	-	
2006	426	10340	683	3	2785	915	11026	3700	15152	13292	-	
2007	433	10632	749	4	3353	1261	11384	4613	16430	14564	490	
2008	486	11038	769	5	3373	1246	11813	4619	16918	15878	903	
2009	478	10067	651	8	2984	1820	10726	4804	16008	15372	38	
2010	433	8190	615	11	3040	1606	8815	4645	13895	12136	69	
2011	405	7760	764	8	2871	1871	8532	4742	13679	12902	95	
2012	423	6459	714	4	2835	1831	7177	4666	12266	11143	590	
2013	407	6393	546	5	2667	2123	6944	4790	12141	11375	687	
2014	440	7633	820	27	2610	1754	8481	4365	13286	14406	448	
2015	478	9690	985	16	3290	1723	10691	5013	16182	15663	395	
2016	586	11680	1196	11	4638	1423	12887	6060	19533	19412	981	
2017	742	13620	1107	7	5024	1504	14733	6528	22023	21719	756	
2018	914	13438	823	11	4369	1932	14274	6303	21487	21572	326	
2019	1029	11155	1303	28	5030	2647	12486	7677	21192	21-	513	
2020*	886	10674	1066	24	4749	1685	11763	6434	19064	19 072	316	
2021*	912	11959	1184		19	4455	1537	13162	5992	20066	20143	249

*Preliminary.

Table 4.3. Anglerfish in Subarea 6. Nominal landings (t) as officially reported to ICES.**Division 6.a (West of Scotland)**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	3	2	9	6	5	-	5	2	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	1	3	4	5	10	4	1	2	1	+	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Faroe Is.	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	2	1	2	4	1	-	-	-	+	1	-	-	-	-	-
France	1910	2308	2467	2382	2648	2899	2058	1634	1814	1132	943	739	1212	1191	1396	1314	1764	1746	1513	1206	1168	1166	1114	1098	1107	1734	1882	1287	1276	1281	1322
Germany	1	2	60	67	77	35	72	137	50	39	11	3	27	39	39	1	-	54	79	79	59	63	48	85	63	81	79	127	94	8	35
Ireland	250	403	428	303	720	717	625	749	617	515	475	304	322	219	356	392	470	295	328	510	488	346	336	410	446	581	579	596	897	698	517
NL	-	-	-	-	-	-	27	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	6	14	8	6	4	4	1	3	1	3	2	1	+	+	1	1	1	2	+	2	1	+	1	1	1	1	1	2	2	1	-
Spain	7	11	8	1	37	33	63	86	53	82	70	101	196	110	83	76	3	174	185	197	138	69	123	54	30	178	173	218	298	232	251
UK(E,W & NI)	270	351	223	370	320	201	156	119	60	44	40	32	31	30	20	24	42	5	12	3	-	12	6	-	-	-	-	-	-	-	-
UK(Scotland)	2613	2385	2346	2133	2533	2515	2322	1773	1688	1496	1119	1100	705	862	1127	974	1071	1096	864	1040	-	1179	1038	-	-	-	-	-	-	-	-
UK (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1016			962	1643	2062	2311	2139	2463	2529	2330

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Total	506 1	547 9	555 3	527 3	6354	6408	5330	450 6	428 4	331 1	266 0	228 0	249 3	245 3	302 4	278 5	335 3	337 3	298 4	304 0	287 1	283 5	266 7	261 0	329 0	463 8	502 4	436 9	503 0	47 49	4456
Unallo- cated	296	263 8	381 6	276 6	5112	1114 8	7506	523 4	379 9	311 4	206 8	187	2	16	-8	-74	145	332	190	56	62	91	115	159 5	68	-58	12	42	290	-6	4
As used by WG	535 7	811 7	936 9	803 9	1146 6	1755 6	1283 6	974 0	808 3	642 5	472 8	246 7	249 5	246 9	301 6	271 1	349 8	370 5	317 4	309 6	293 3	292 6	278 2	420 5	335 8	458 0	503 6	441 1	532 0	47 43	4451

*Preliminary.

Table 4.3. Continued. Anglerfish in Subarea 6. Nominal landings (t) as officially reported to ICES.

Division 6.b (Rockall)/ *Preliminary.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Faroe Is.	-	2	-	-	-	15	4	2	2	-	1	-	-	-	-	-	-	1	4	8	-	5	-	1	+	+	+	-	-	-	-
France	-	-	29	-	-	-	1	1	-	48	192	43	191	175	293	224	327	327	339	168	508	456	663	148	219	-	-	-	17	23	4
Germany	-	-	103	73	83	78	177	132	144	119	67	35	64	66	77	72	222	93	132	87	90	79	88	66	139	177	167	266	340	221	122
Ireland	272	417	96	135	133	90	139	130	75	81	134	51	26	13	35	53	70	76	91	107	108	235	237	162	156	160	214	282	365	202	167
Norway	18	10	17	24	14	11	4	6	5	11	5	3	6	5	4	6	7	5	9	12	7	5	9	3	6	11	4	1	1	2	-
Portugal	-	-	-	132	128	-	91	413	429	20	18	8	4	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	-	-	-	-	-	-	-	-	-	-	1	-	-	2	4	1	1	35	-	-	-	-	-	1	2	-	2	-	1	3	-
Spain	333	263	178	214	296	196	171	252	291	149	327	128	59	43	34	36	12	85	57	32	29	36	-	27	119	56	118	43	60	32	31

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
UK(E,W&NI)	99	173	76	50	105	144	247	188	111	272	197	133	133	54	93	46	-	1	48	15	-	120	395	-	-	-	-	-	-	-	-
UK(Scot)	201	224	182	281	199	68	156	189	344	374	367	317	160	294	355	477	-	624	1141	1177	-	895	732	-	-	-	-	-	-	-	-
UK (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	-	-	-	1129		1347	1081	1018	999	1340	1862	1202	1209	
Total	923	1089	681	909	958	602	990	1313	1401	1074	1309	718	643	671	958	915	1261	1246	1820	1606	1871	1831	2123	1754	1723	1423	1504	1946	2632	1685	1533
Unallocated	-	-	-	-132	-128	-	-91	-413	-9	17	-178	210	70	10	227	136	282	104	-198	791	111	385	178	80	74	37	80	2	140	-115	-28
As used by WG	923	1089	681	777	830	602	899	900	1392	1091	1131	508	573	661	731	779	979	1142	2018	815	1760	1446	1945	1674	1649	1386	1424	1944	2492	1800	1561

Table 4.3. Continued. Anglerfish in Subarea 6. Nominal landings (t) as officially reported to ICES.

Subarea 6 (West of Scotland and Rockall)

^ indicates landings assigned to subarea 6 but not to a division. /*Preliminary.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	3	2	9	6	5	-	5	2	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	1	3	4	5	10	4	1	2	1	+	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Faroe Is.	-	2	-	-	-	15	4	2	2	-	1	-	-	2	2	3	2	2	6	12	1	5	-	1	+	1	+	-	-	-	-
France	191	230	2496	238	2648	2899	2059	1635	181	118	113	782	140	136	1689	153	209	207	185	137	167	162	177	124	132	173	188	128	1293	1	1326
Germany	1	2	163	140	160	113	249	269	194	158	78	38	91	105	116	73	222	146	211	166	149	142	136	151	201	258	246	394	434	2	157
Ireland	522	820	524	438	853	807	764	879	692	596	609	355	348	232	391	445	540	371	419	617	596	581	572	572	602	741	793	878	1262	8	684

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Nether-	-	-	-	-	-	-	27	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	24	24	25	30	18	15	5	9	6	14	7	4	6	5	5	7	8	7	9	14	7	6	10	4	8	12	5	4	2	1	-
Portugal	-	-	-	132	128	-	91	413	429	20	18	8	4	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russia	-	-	-	-	-	-	-	-	-	-	1	-	-	2	4	1	1	35	-	-	-	-	-	1	2	-	2	-	1	3	-
Spain	340	274	186	215	333	229	234	338	344	231	397	229	255	153	117^	112	15	259	242	229	167	105	123	81	149	234	290	261	358	2	282
UK(E,W&NI	369	524	299	420	425	345	403	307	171	316	237	165	164	84	113	70	188	6	60	-	-	132	401	-	-	-	-	-	-	-	-
UK(Scot)	281	260	2528	241	2732	2583	2478	1962	203	187	148	141	865	115	1482	145	154	172	200	-	-	207	177	-	-	-	-	-	-	-	-
UK (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	223	214	220	217	231	272	308	331	347	4322	3	3539
Total	598	656	6234	618	7312	7010	6320	5819	568	438	396	299	313	312	3982	370	461	461	480	464	474	466	479	436	501	606	652	630	7652	6	5989
Unallo-	296	263	3816	263	4984	1114	7415	4821	379	313	189	22	68	6	235	209	137	228	388	733	49	294	63	151	5	94	68	-53	-160	-	-23
As used by WG	628 0	920 6	1005 0	881 6	1229 6	1815 8	1373 5	1064 0	947 5	751 6	585 9	297 6	306 8	313 0	3747	349 1	447 6	484 7	519 2	391 2	469 3	437 2	472 7	588 0	500 8	596 6	646 0	635 6	7812	6 5	6012

Table 4.4. Nominal landings (t) of Anglerfish in the North Sea, as officially reported to ICES.

Northern North Sea (4.a)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
BE	2	9	3	3	2	8	4	1	5	12	-	8	1	-	-	-	-	-	-	-	-	+	-	-	-	1	-	-	-	-	
DK	124 5	1265	946	1157	732	1239	1155	1024	1128	1087	1289	1308	152 3	153 8	137 9	1311	961	1071	1134	114 3	841	821	854	801	962	1506	2002	1790	1669	1058	1140
Faroes	1	-	10	18	20	-	15	10	6	-	2	-	3	11	22	2	-	-	4	-	-	-	-	-	-	-	-	-	1	-	-
FR	124	151	69	28	18	7	7	3	18	8	9	8	8	8	4	7	13	13	20	23	20	14	15	27	26	35	91	141	185	124	108

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
DE	71	68	100	84	613	292	601	873	454	182	95	95	65	20	84	173	186	344	216	124	46	265	274	321	286	208	523	462	547	-	-
NL	23	44	78	38	13	25	12	-	15	12	3	8	9	38	13	14	14	12	5	8	5	5	-	16	-	21	28	68	68	40	10
NO	587	635	1224	1318	657	821	672	954	1219	1182	1212	928	769	999	880	1006	831	860	859	791	494	485	545	524	406	610	840	1230	1267	954	964
ES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
SE	14	7	7	7	2	1	2	8	8	78	44	56	8	6	5	5	20	67	-	-	-	-	-	-	6	4	8	12	17	59	100
UK (E, W&NI)	129	143	160	169	176	439	2174	668	781	218	183	98	104	83	34	99	303	13	320	371	-	248	550	-	-	-	-	-	-	-	-
UK (Scot.)	703 9	7887	9712	11683	15658	22344	18783	13318	9710	9559	10024	8539	603 3	628 4	600 3	7722	8304	8658	7509	573 0	-	462 2	415 4	-	-	-	-	-	-	-	-
UK (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	635 3	487 0	470 4	594 3	800 5	9296	1012 7	9735	7401	8092	
Total	923 5	10209	12309	14505	17891	25176	23425	16859	13344	12338	12861	1104 8	852 3	898 7	842 4	1034 0	1063 2	1103 8	1006 7	819 0	776 0	645 9	639 3	763 3	969 0	1168 0	1362 0	1343 8	1115 5	11739	11959

*Preliminary.

Table 4.4. Continued. Nominal landings (t) of Anglerfish in the North Sea, as officially reported to ICES.

Central North Sea (4.b)

* Preliminary

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	357	538	558	713	579	287	336	371	270	449	579	435	180	260	207	138	179	181	134	124	111	131	135	213	196	251	168	155	249	239	284

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Denmark	345	421	346	350	295	225	334	432	368	260	251	255	191	274	237	276	173	237	248	194	286	301	192	334	369	584	565	411	533	339	322
Faroes	-	-	2	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
France	-	1	-	2	-	-	-	-	-	-	-	-	-	+	-	+	+	-	3	6	2	+-	+-	1	+	+	-	+	-	2	-
Germany	4	2	13	15	10	9	18	19	9	14	9	17	11	11	9	14	12	22	17	21	17	10	10	17	23	18	14	26	27	16	22
Ireland	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	285	356	467	510	335	159	237	223	141	141	123	62	42	25	31	33	61	58	36	46	53	61	41	72	88	120	166	111	310	226	354
Norway	17	4	3	11	15	29	6	13	17	9	15	10	12	22	16	12	24	15	21	10	11	11	26	8	9	16	41	36	22	42	17
Spain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
Sweden	-	-	-	3	2	1	3	3	4	3	2	9	2	1	4	4	6	9	-	-	-	-	-	-	3	7	10	12	19	14	13
UK(E, W&NI)	669	998	1285	1277	919	662	664	603	364	423	475	236	167	120	96	108	-	105	85	88	-	85	70	-	-	-	-	-	-	-	-
UK (Scotland)	845	733	469	564	472	475	574	424	344	318	378	210	241	138	88	98	-	142	108	125	-	115	72	-	-	-	-	-	-	-	-
UK (total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	293	-	-	-	284	200	142	175	297	201	143	72	144	189	172
Total	2522	3053	3143	3445	2627	1847	2172	2088	1517	1617	1832	1244	847	851	688	683	749	769	651	615	764	714	546	820	985	1196	1107	823	1303	1066	1184

Table 4.4. Continued. Nominal landings (t) of Anglerfish in the North Sea as officially reported to ICES.

Southern North Sea (4.c)

* Preliminary.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	13	12	34	37	26	28	17	17	11	15	15	16	9	5	4	3	3	4	6	7	6	2	2	4	5	2	1	1	1	2	5
Denmark	2	+	-	+	+	+	+	+	+	+	+	+	+	+		+	+	-	-	+	+	+	-	-	-	+	-	+	-	-	-
France	-	-	-	-	-	-	-	10	-	+	-	+	-	-	-	+	+	-	1	1	1	+	+	1	+	1	+	+	-	-	+
Germany	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	+	+	-	+	-	+	+	+	+	+	+	-	+	+
Netherlands	5	10	14	20	15	17	11	15	10	15	6	5	1	-	1	-	1	1	-	2	1	1	1	19	10	8	5	8	26	19	11
Norway	-	-	-	-	+	-	-	-	+	-		-	+	-	-	+	-	-	1	-	-	-	-	1	+	-	-	1	-	-	-
UK(E&W&NI)	6	17	18	136	361	256	131	36	3	1	-	-	10	3	-	+	-	+	1	1	-	-	1	-	-	-	-	-	-	-	-
UK (Scotland)	+	+	+	17	+	3	1	+	+	+	-	-	-	7	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UK (Total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	1	1	+	1	2	1	1	+	1	2	1	2
Total	26	39	66	210	402	304	160	78	24	31	21	21	20	15	5	3	4	5	8	11	8	4	5	27	16	11	7	11	29	22	19

Table 4.4. Continued. Nominal landings (t) of Anglerfish in the North Sea as officially reported to ICES.

Subarea 4 (North Sea)

*Preliminary./ ^ indicates landings assigned to Subarea 4 but not to a division.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	372	559	595	753	607	323	357	389	286	476	594	459	190	265	211	141	181	185	140	131	116	133	137	217	200	253	169	156	249	243	290
Denmark	1599	1686	1293	1509	1027	1464	1489	1456	1496	1347	1540	1563	171	181	161	1587	1134	1308	1382	133	112	112	104	113	1331	2090	2567	2201	2202	1398	1462
Faroes	1	-	12	18	20	-	15	10	6	-	2	10	3	11	22	2	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
France	124	152	69	30	18	7	7	13	18	8	9	8	8	8	4	7	14	13	23	30	24	15	15	30	26	36	91	142	186	127	108
Germany	75	70	113	99	623	301	619	892	463	196	104	112	76	31	93	187	198	367	233	145	63	275	284	339	309	226	537	488	574	361	228
Ireland	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	313	410	559	568	363	201	260	238	166	168	132	75	52	63	45	47	76	71	41	56	59	67	42	108	98	148	199	187	405	285	376
Norway	604	639	1227	1329	672	850	678	967	1236	1191	1227	938	781	102	896	1018	855	875	881	802	505	496	572	533	415	626	881	1267	1289	955	982
Sweden	14	7	7	10	4	2	5	11	12	81	46	65	10	7	9	10	26	76	-	-	-	-	-	-	10	11	18	25	36	72	112
UK(E&W&N)	804	1158	1463	1582	1456	1357	2969	1307	1148	642	658	334	281	206	130	207	425	118	406	460	-	333	621	-	-	-	-	-	-	-	-
UK (Scot-)	7884	8620	1018	1226	1613	2282	1935	1374	1005	9877	1040	8749	627	642	609	7820	8476	8800	7617	585	-	473	422	-	-	-	-	-	-	-	-
UK (Total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	663	506	484	612	8303	9498	1027	9808	7545	8282	9604
Total	1179 0	1330 1	1551 9	1816 2	2092 0	2732 7	2575 7	1902 6	1488 5	1398 6	1471 4	1231 3	939 0	985 3	911 7	1102 6	1138 4	1181 3	1072 6	881 5	853 2	717 7	694 4	848 1	1069 1	1288 7	1473 3	1427 4	1248 6	1176 3	1316 2
Unallocated	- 1224	- 1573	- 2441	- 2732	- 5126	1108 7	- 7540	- 4999	- 3166	- 2422	- 2037	600	676	133 0	-579	1462	1561	1081	945	915	612	765	638	316	448	33	225	-6	-176	182	-6
WG esti- mate	1056 6	1172 8	1307 8	1543 0	1579 4	1624 0	1821 7	1402 7	1171 9	1156 4	1267 7	1171 3	871 4	852 3	969 6	9564	9823	1073 2	9781	790 0	792 0	641 2	630 6	816 5	1024 3	1285 4	1450 8	1428 0	1266 2	1158 1	1316 8

Table 4.5. Nominal landings (t) of Anglerfish in Division 3.a, as officially reported to ICES.

*Preliminary.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	15	48	34	21	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	493	658	565	459	312	367	550	415	362	377	375	369	215	311	274	227	255	287	344	270	251	307	298	309	336	389	526	597	692	600	678
France	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	1	-	-	-	-
Germany	-	-	1	+	-	1	1	1	2	1	-	1	-	1	1	2	1	1	1	1	2	1	1	-	1	2	1-	2	1	1	1
Netherlands	-	-	-	-	-	-	-	-	-	-	-	-	3	4	4	3	1	3	-	5	-	-	-	4	9	17	16	16	47	66	46
Norway	64	170	154	263	440	309	186	177	260	197	200	242	189	130	100	139	132	144	134	158	153	115	108	127	90	124	118	204	189	129	116
Sweden	23	62	89	68	36	25	39	33	36	27	46	55	71	73	79	54	44	51	-	-	-	-	-	-	42	53	81	95	100	71	71
UK (Total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Total	595	938	843	811	823	702	776	626	660	602	621	667	478	519	458	426	433	486	478	433	405	423	407	440	478	586	742	914	1029	866	912
Unallocated	-	-	-	-	-	-	-	-	-	-	-	288	252	197	174	189	168	187	79	109	116	63	65	78	66	-5	-911	-22	-34	-22	-30
As used by WG	-	-	-	-	-	-	-	-	-	-	-	379	226	322	284	237	265	299	399	324	289	360	342	362	412	591	751	936	1063	888	942

Table 4.6. Breakdown of WG estimates of commercial catches for 2020 and 2021 by main gear group and area in tonnes.

2020	3.a		4		6.a		6.b		Total	% of Total		
Fleet	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards
Demersal trawl	151	5	8296	86	4521	80	920	6	13888	178	73	56
<i>Nephrops</i> trawl	538	14	257	55	41	4	0	0	837	73	4	23
Gillnets	119	3	2434	40	32	1	817	5	3402	49	18	16
Other/Not specified	80	2	595	10	208	4	62	0	945	16	5	5
Total	888	22	11522	177	4763	88	1799	11	19072	316	100	100
2021												
Fleet	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards	Landings	Discards
Demersal trawl	116	4	10423	95	4361	12	910	14	15810	125	78	50
<i>Nephrops</i> trawl	647	25	363	48	34	0	0	0	1044	73	5	29
Gillnets	107	5	1767	23	35	0	648	9	2557	37	13	15
Other/Not specified	72	5	616	8	9	0	35	0	732	13	4	5
Total	942	39	13169	174	4439	12	1593	23	20143	249	100	100

Table 4.7. Total biomass estimates with confidence intervals and relative standard errors from the 2005–2021 SIAMISS-Q2 surveys.

Year	Number of hauls	Number measured	Biomass (t)	Confidence Interval		RSE	Percentage Biomass in subarea 4
2005			38.617	23.479	53.755	20.0	48.27%
2006			40.985	34.478	47.492	8.1	53.49%
2007	156	1569	50.392	43.676	57.108	6.8	56.62%
2008	167	2219	53.546	42.421	64.671	10.6	55.51%
2009	206	1643	38.060	32.987	43.133	6.8	44.82%
2010	168	1280	42.279	30.429	54.129	14.3	51.90%
2011	153	1037	33.254	24.846	41.662	12.9	44.96%
2012	169	1461	36.325	29.704	42.946	9.3	41.59%
2013	93	984	38.395	31.020	45.770	9.8	37.04%
2014	106	1568	52.884	42.769	62.999	5.2	40.25%
2015	117	2198	67.915	58.782	77.047	6.9	43.66%
2016	108	2025	77.946	66.831	89.060	7.275	56.39%
2017	153	3265	87.896	74.222	101.569	7.937	53.47%
2018	142	2714	77.661	66.258	89.064	7.491	37.80%
2019	128	1860	58.575	46.189	70.962	10.789	40.49%
2021	137	1524	48.355	37.233	59.476	11.734	46.71%
2022	65	687	55.423	40.068	70.779	14.136	54.58%

Table 4.8. Abundance and biomass estimates from the 2005–2021 SIAMISS-Q2 surveys by ICES subareas and divisions.

Year	Month	Numbers (millions)					Biomass (kt)				
		IVa	VIa	VIb	VI	Total	IVa	VIa	VIb	VI	Total
2005	November	11.168	10.866	1.800	12.666	23.834	18.642	14.096	5.879	19.975	38.617
2006	November	12.844	10.459	3.174	13.633	26.477	21.921	12.175	6.889	19.064	40.985
2007	November	15.304	7.956	4.000	11.956	27.26	28.534	11.072	10.786	21.858	50.392
2008	April	12.613	7.718	3.952	11.67	24.283	29.721	14.383	9.442	23.825	53.546
2009	April	8.279	5.144	3.688	8.832	17.111	17.058	8.150	12.852	21.002	38.060
2010	April	7.366	5.161	3.131	8.292	15.658	21.944	11.59	8.745	20.335	42.279
2011	April	5.150	6.057	3.669	9.726	14.876	14.949	9.330	8.974	18.304	33.253
2012	Abril	5.432	4.961	5.135	10.096	15.528	15.106	9.213	12.005	21.218	36.325
2013	October	8.470	8.461	4.885	13.346	21.816	14.369	10.801	13.626	24.427	38.796
2014	April	17.553	16.096	6.488	22.584	40.136	21.284	16.633	14.967	31.60	52.884
2015	April	18.266	28.604	5.496	34.100	52.366	29.653	24.047	14.215	38.262	67.915
2016	April	21.648	14.383	4.538	18.922	40.569	43.956	18.273	15.717	33.99	77.946
2017	April	23.691	16.332	4.360	20.683	44.374	46.995	29.297	11.604	40.901	87.896
2018	April	11.819	13.528	6.240	19.768	31.586	29.353	22.350	25.958	48.308	77.661
2019	April/May	14.606	21.032	3.592	24.624	39.231	23.719	18.864	15.992	34.856	58.575
2021	April	17.371	8.608	3.048	11.656	29.027	22.587	12.74	13.027	25.767	48.355

Year	Month	Numbers (millions)					Biomass (kt)				
		IVa	VIa	VIb	VI	Total	IVa	VIa	VIb	VI	Total
2022	April	13.259	10.283	3.048*	13.331**	26.591**	30.252	12.142	13.027*	25.170**	55.423**

*Value carried over from 2021 due to missing survey data in division 6b in 2022

**Total includes value carried over from 2021 due to missing survey data in division 6b in 2022

Table 4.9. Northern Shelf anglerfish mean standardised harvest rates of catch numbers and biomass 2008–2021.

Year	Mean standardised harvest rate – Number	Mean standardised harvest rate – Biomass
2007	1.019557	0.962803
2008	1.396944	1.010032
2009	1.117361	1.304825
2010	1.307811	0.930318
2011	1.08548	1.259594
2012	1.28022	1.041019
2013	1.058155	1.001878
2014	0.727179	0.938519
2015	0.62145	0.761601

Year	Mean standardised harvest rate – Number	Mean standardised harvest rate – Biomass
2016	0.861419	0.842697
2017	0.760659	0.824041
2018	0.908121	0.908698
2019	0.855643	1.213976
2021	0.855643	1.213976

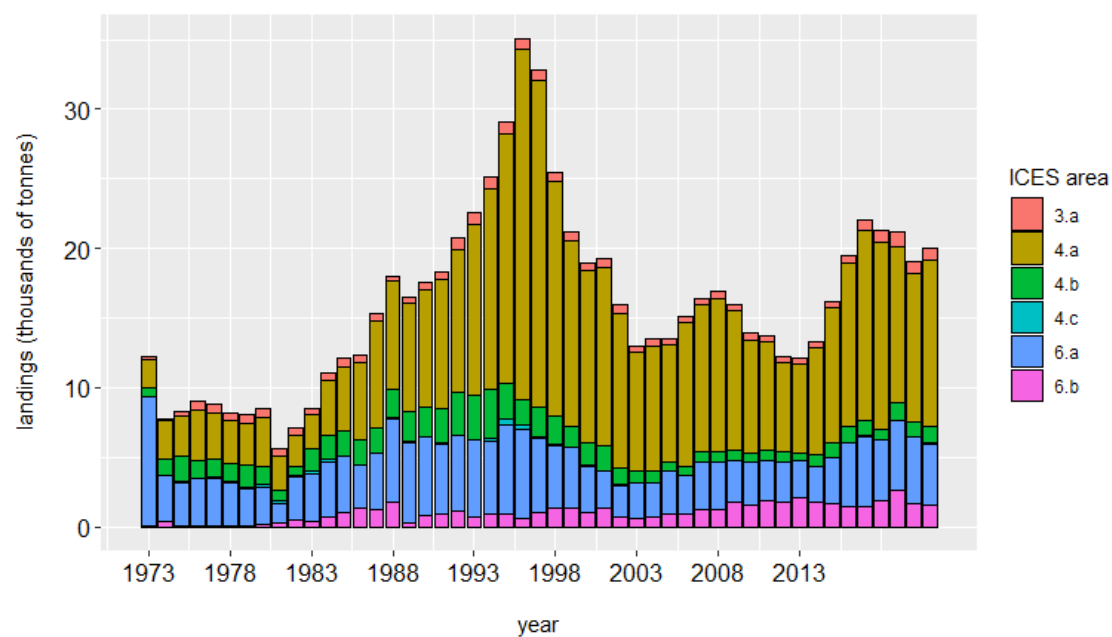


Figure 4.1. Northern Shelf anglerfish. Officially reported landings by ICES area (1973–2021).

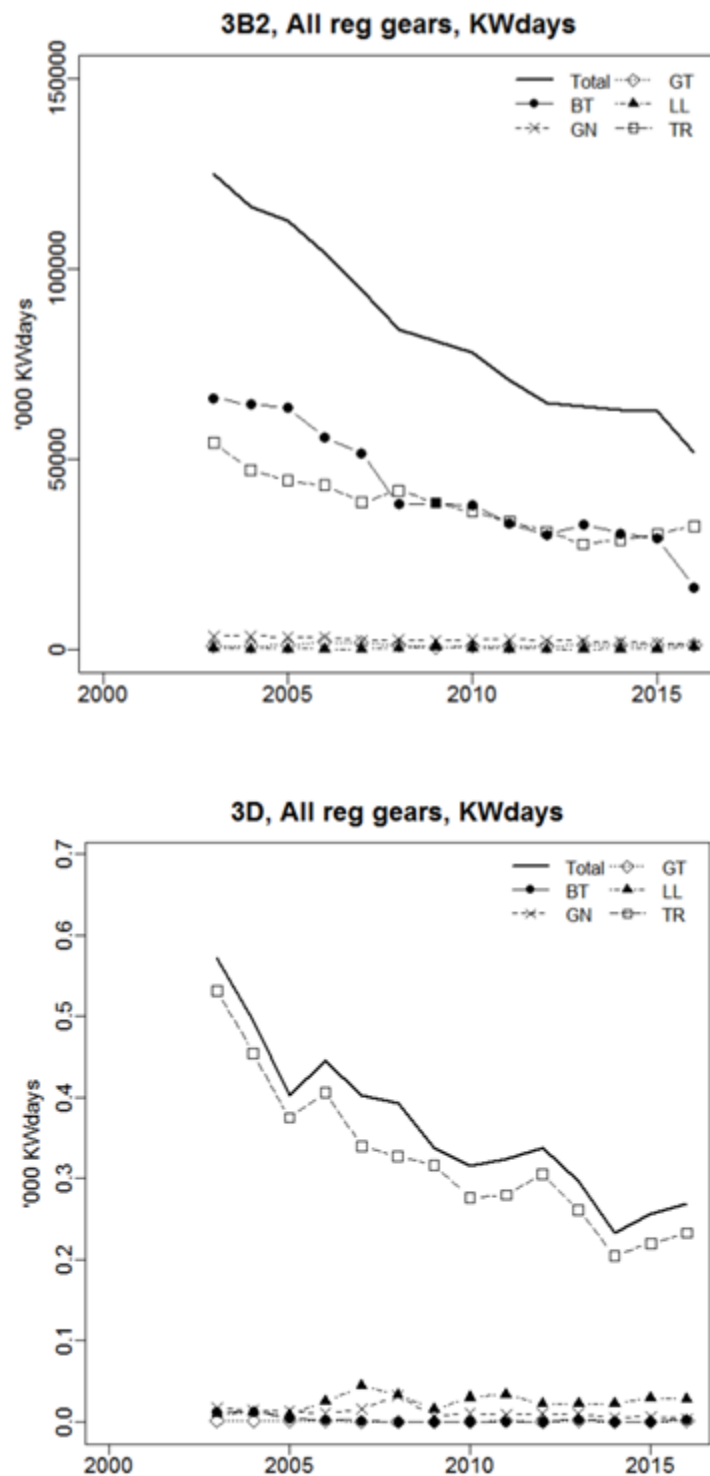


Figure 4.2. Trends in nominal international fishing effort (kW*days at sea) in North Sea and II (EU) (left) and West of Scotland (right) collated by STECF for the Evaluation of Fishing Effort Regimes in European Waters (STECF, 2017).

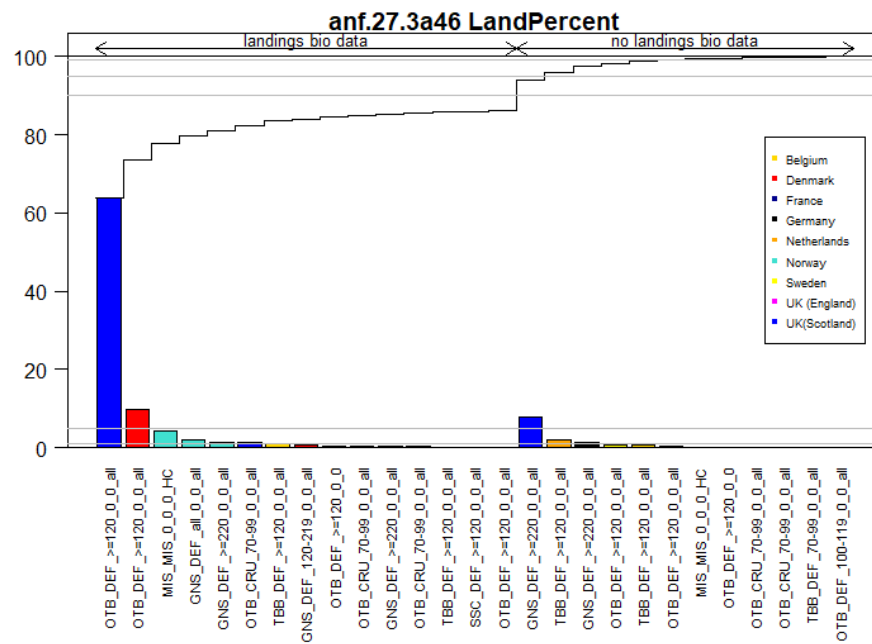


Figure 4.3a. Percentage of total landings weight by fleet and country in 2021; Subarea 4.

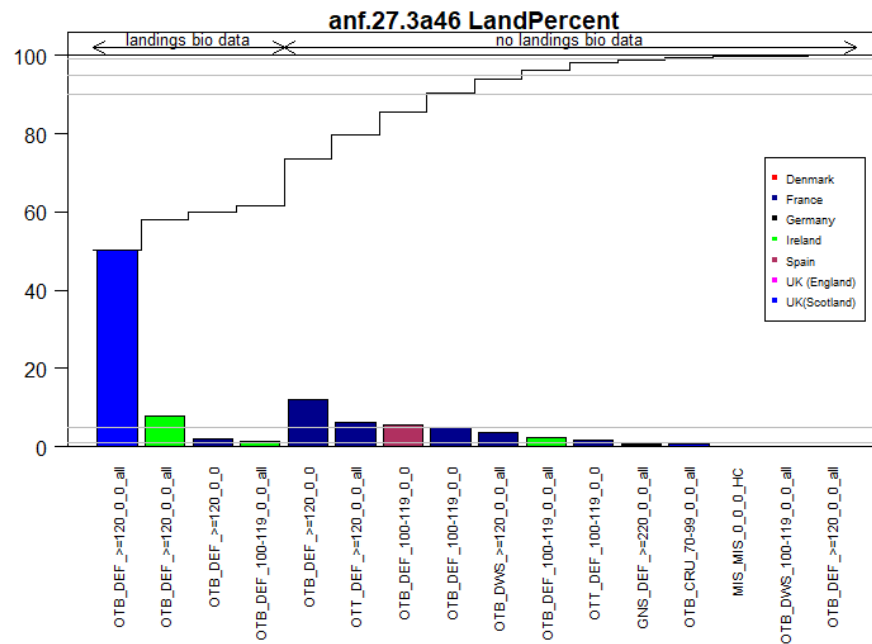


Figure 4.3b. Percentage of total landings weight by fleet and country in 2021; Division 6.a.

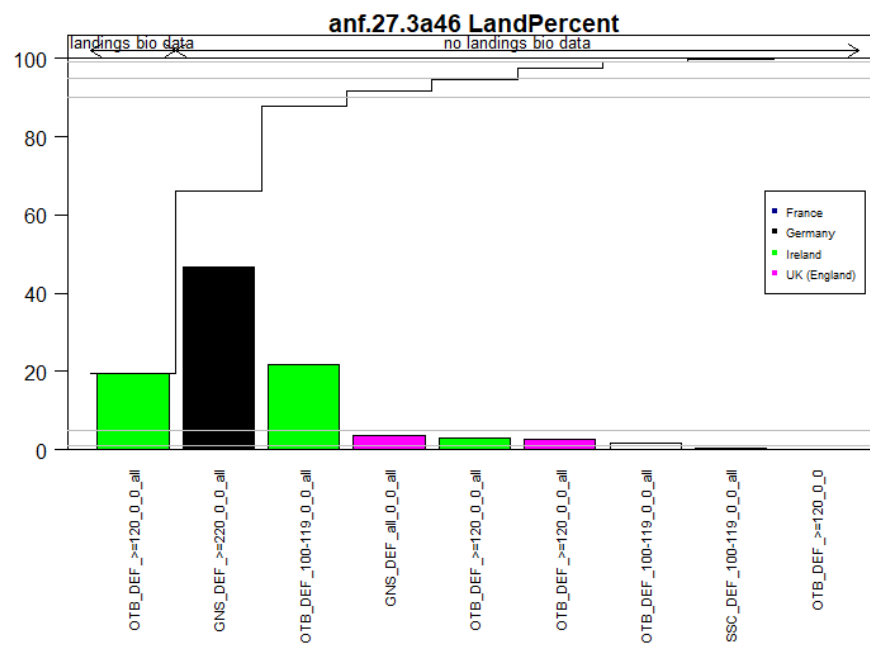


Figure 4.3c. Percentage of landings weight by fleet and country in 2021; Division 6.b.

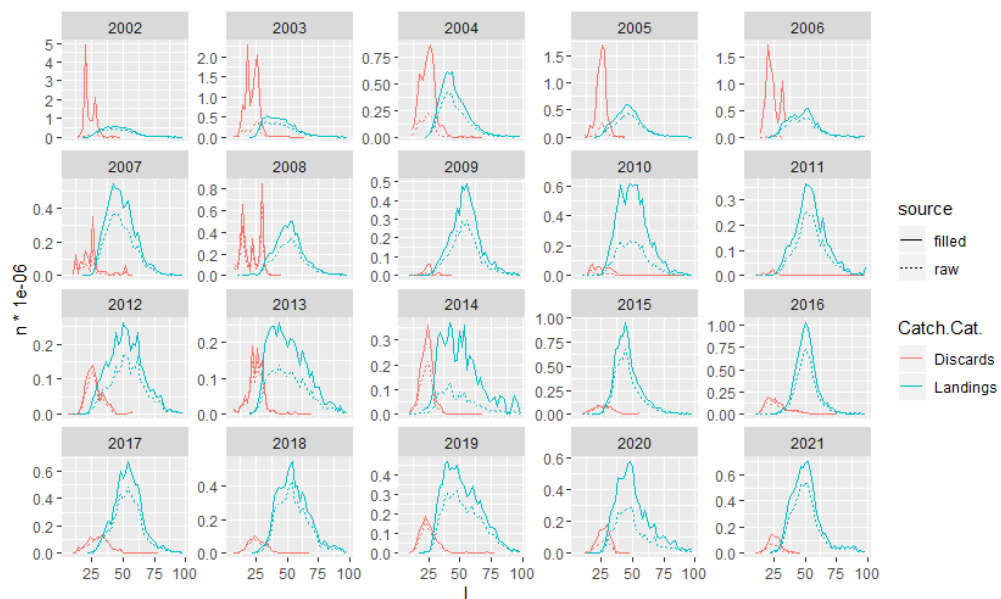


Figure 4.4. WGCSE Landed numbers ('00 thousands) at-length (cm) 2002–2021.

Stock size indicator

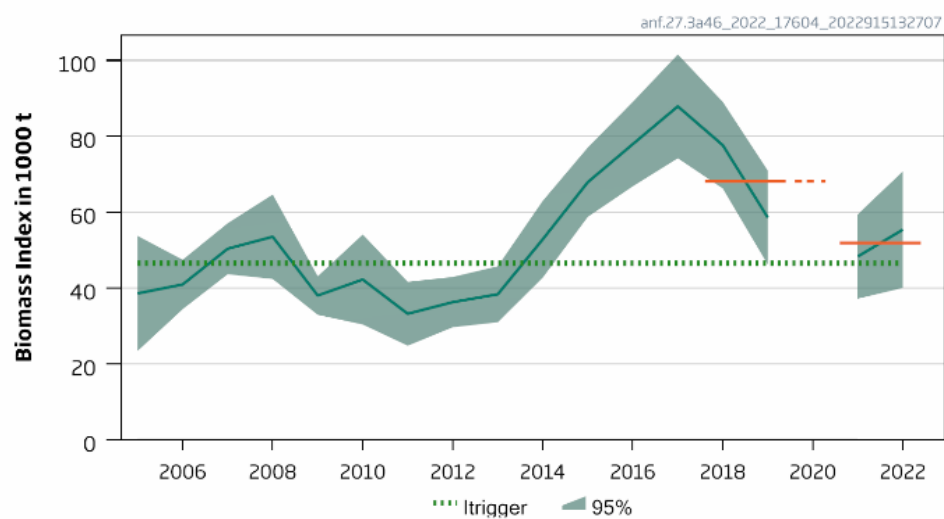


Figure 4.5. SIAMISS-Q2 estimates of total biomass with 95% confidence intervals for subareas 4 and 6 combined, 2005–2021. The horizontal orange lines indicate the average of the most recent two years, and the previous two years (with 2020 not available and hence excluded from the average). The dashed line represents the index trigger value.

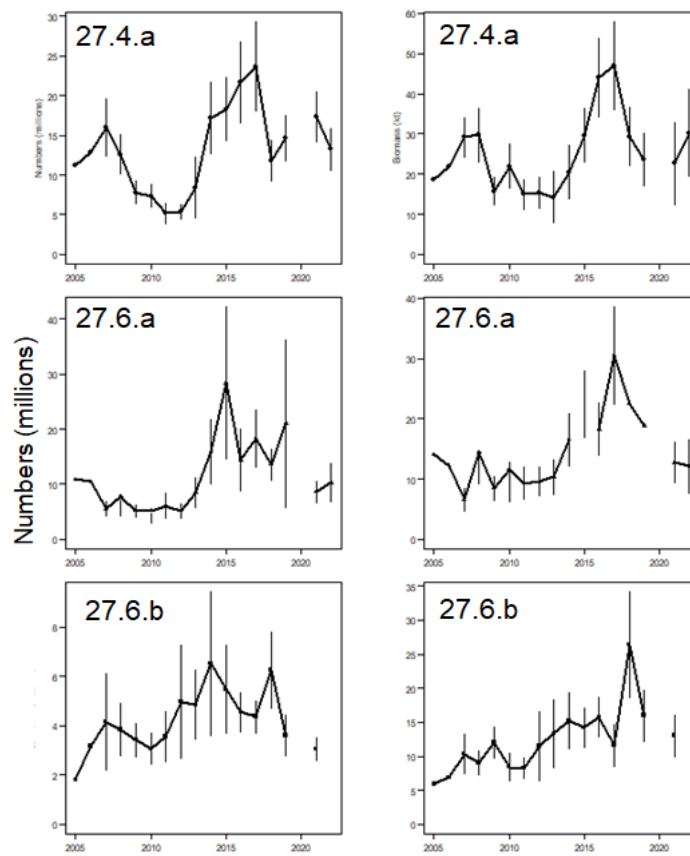


Figure 4.6. SIAMISS-Q2 estimates of total abundance (left) and biomass (right) of anglerfish for the Northern Shelf 2005–2022 provided for ICES Subarea 4a, Division 6.a and Division 6.b.

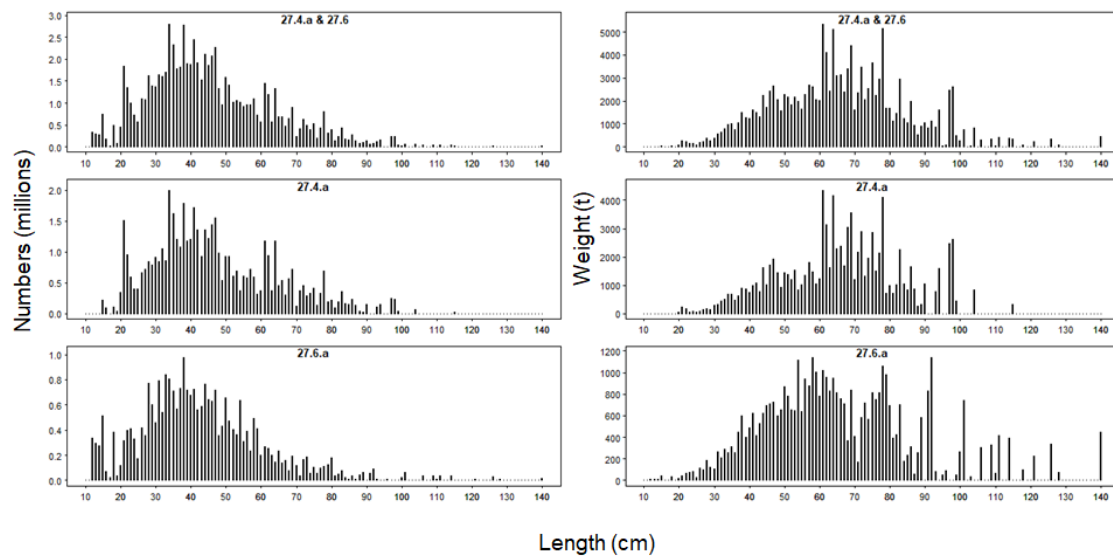


Figure 4.7. SIAMISS-Q2 estimates of total numbers (millions) and weight (t) at-length (cm) for subareas 4.a and 6.a, 2022.

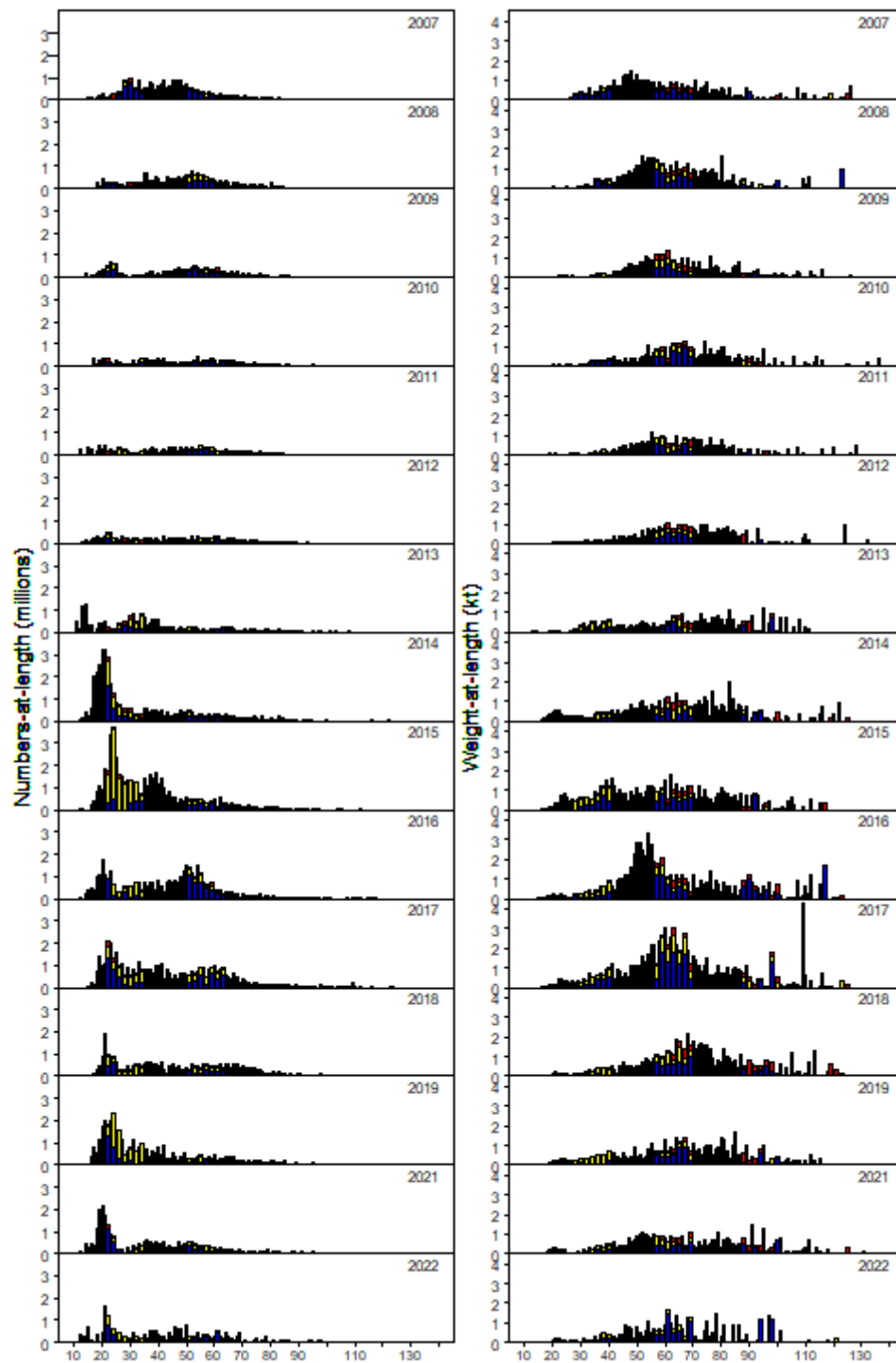


Figure 4.8. SIAMISS-Q2 estimates of total numbers (millions) at-length (cm) (left) and estimates of total biomass (kt) at-length (cm) (right) for subareas 4.a (blue)–c and 6.a (yellow)–b (red) combined, 2007–2022.

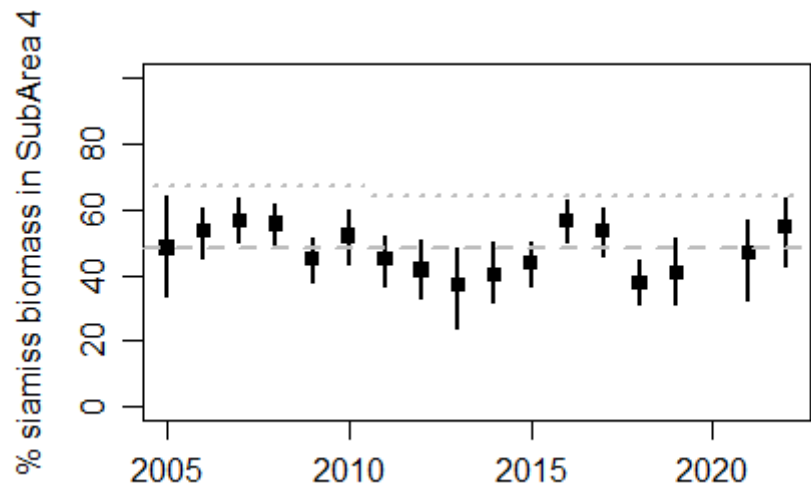


Figure 4.9. Percentage of SIAMISS-Q2 total biomass, with confidence intervals, estimated to be in subareas 4.a–c compared with subareas 4.a–c and 6.a–b combined. The full grey line represents the average of these percentages over the time-series (2005–2022) (48%). The dotted grey lines represent the percentage of TAC allocated for subareas 4.a–c compared to the total of the TAC for subareas 4.a–c and 6.a–b, (67% in 2005–2010, 64% in 2011–2022).

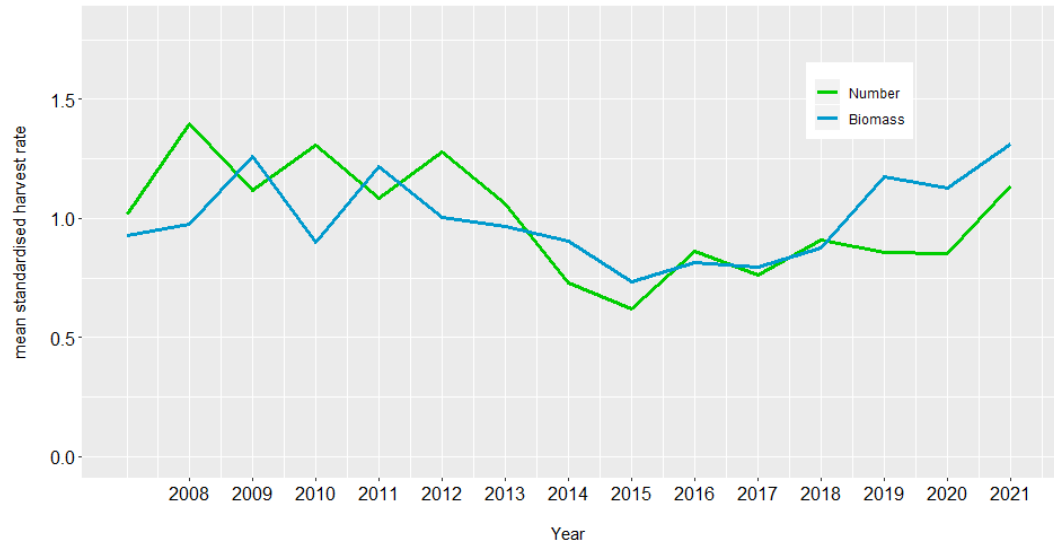


Figure 4.10. Northern Shelf anglerfish harvest rate 2008–2021 (mean standardised WG catch total numbers of biomass / SIAMISS-Q2 total numbers or biomass).

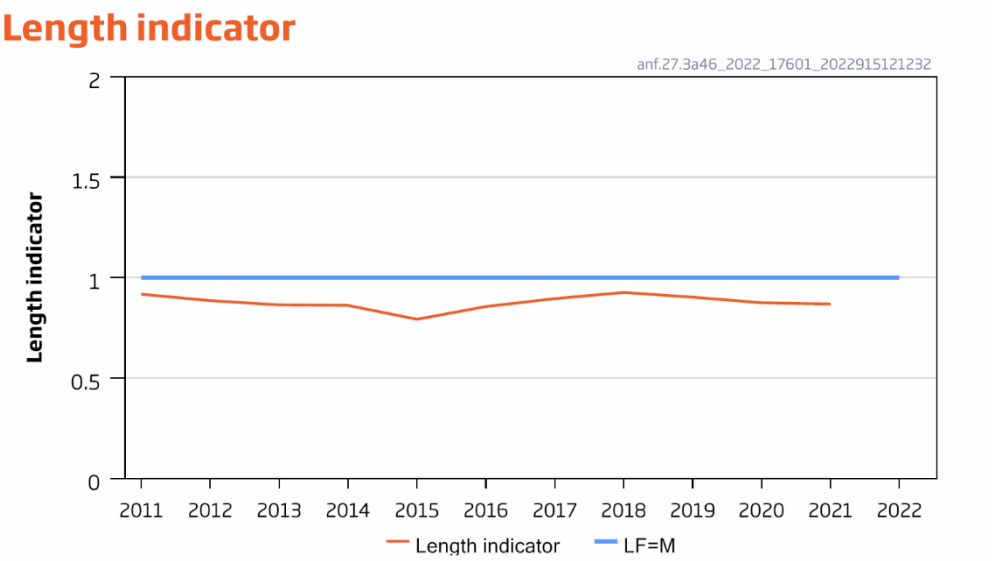


Figure 4.11. Anglerfish in subareas 4 and 6 and in Division 3.a. Length indicator (mean length of fish in the catch above the estimated length of first capture (Lc) normalised to the MSY proxy reference length $LF = M$). The exploitation status is below FMSY proxy when the indicator ratio value is higher than 1 (shown by a blue line).

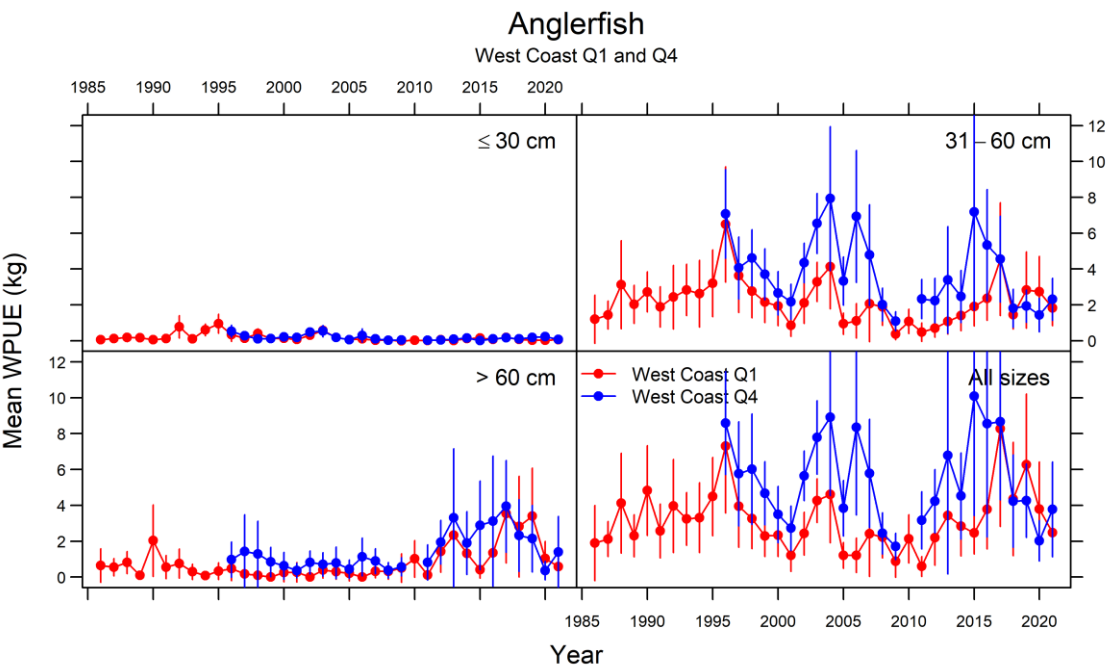


Figure 4.12. Survey indices of mean weight (g) per hour from SWC-IBTS-Q1 (blue) in 6.a, SWC-IBTS-Q4 (red) in 6.a and Rockall (red) in 6.b.

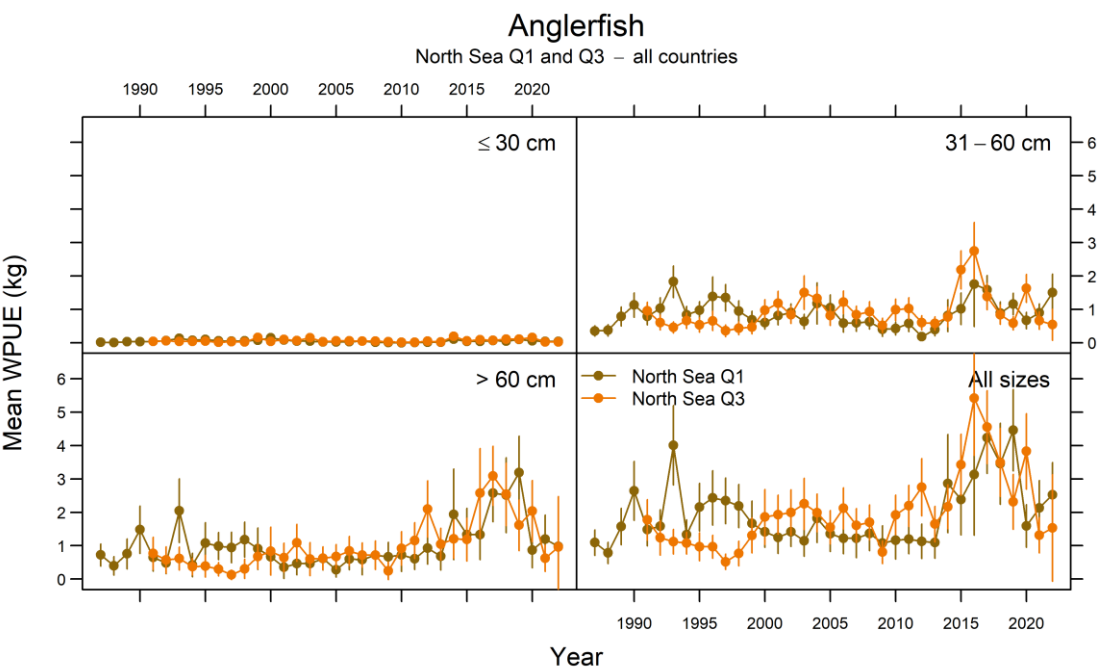


Figure 4.12. Survey indices of mean weight (g) per hour from NS-IBTS-Q1 (brown) and NS-IBTS-Q3 (orange).

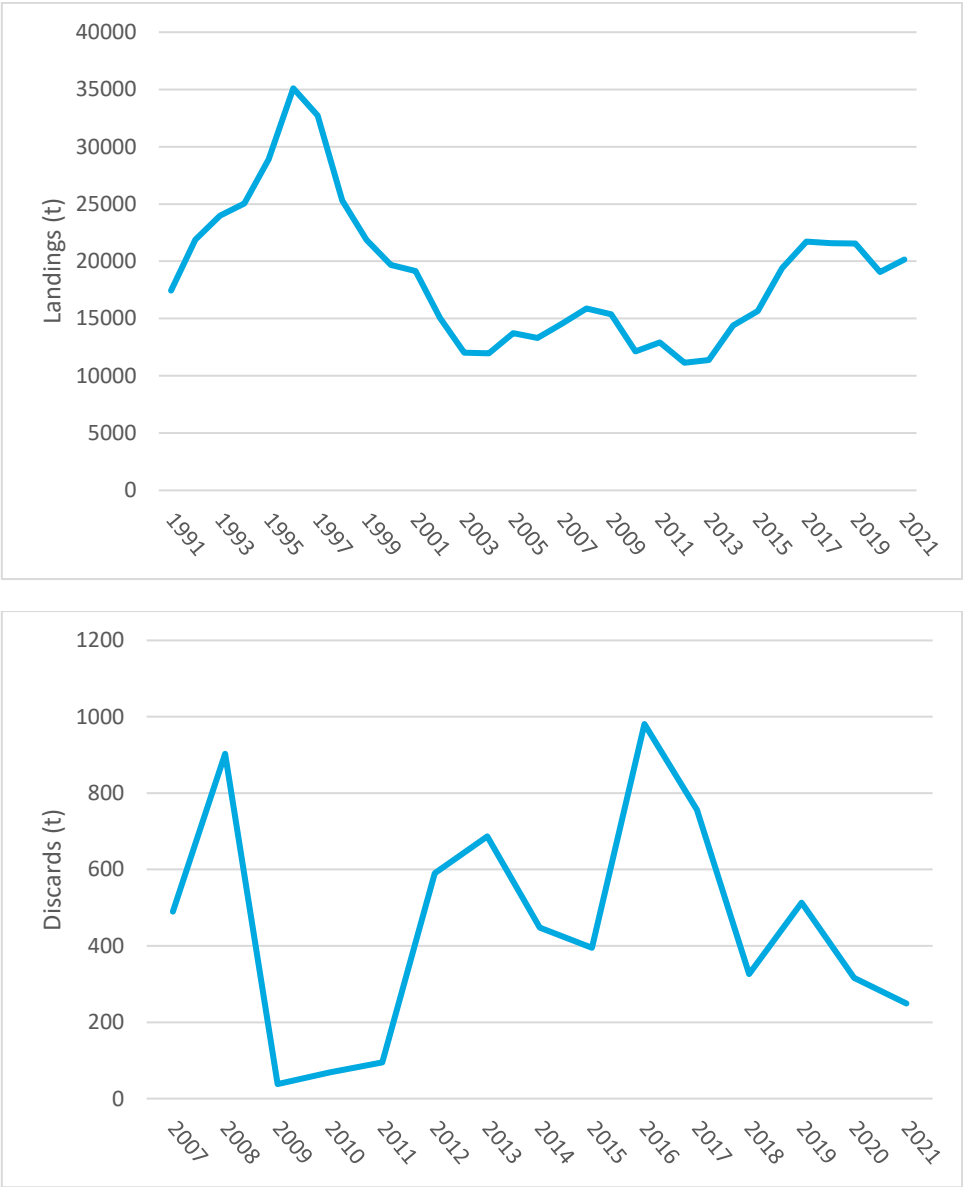


Figure 4.13. ICES landings of anglerfish 1991–2021 (top) and ICES discards of anglerfish 2007–2021 (bottom) in subareas 4 and 6 and in Division 3.a.

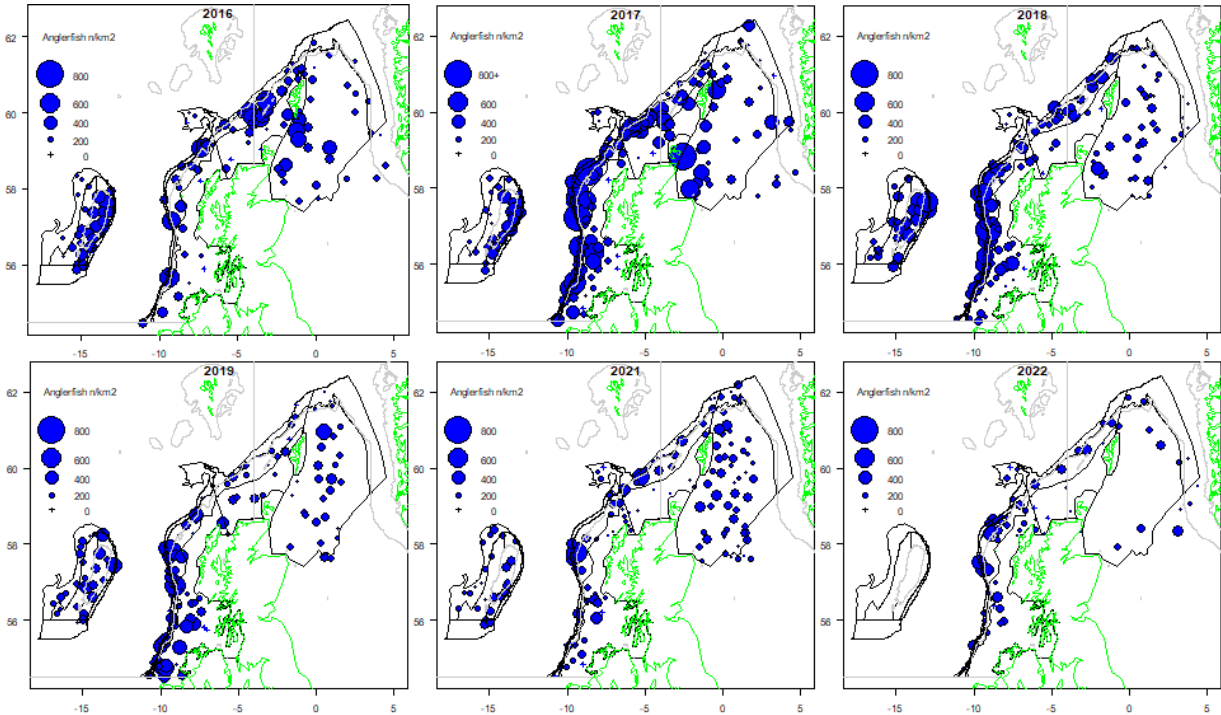


Figure 4.14. Numbers of anglerfish per km² observed by SIAMISS surveys 2016–2022.

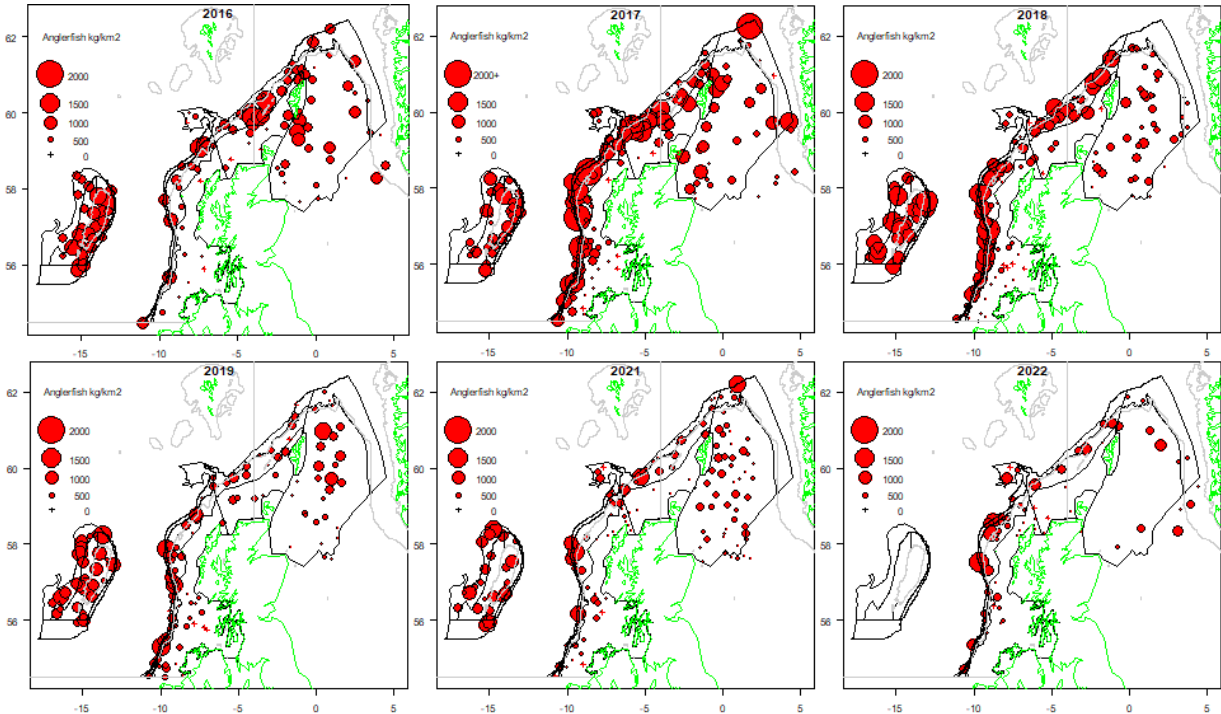


Figure 4.15. Weight of anglerfish (kg) per km² observed by SIAMISS surveys 2016–2022.