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Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2017-2018 Joint report of the Dutch and German national sampling programmes

H.M.J. van Overzee, J. Ulleweit, A.TM. van Helmond, T. Bangma

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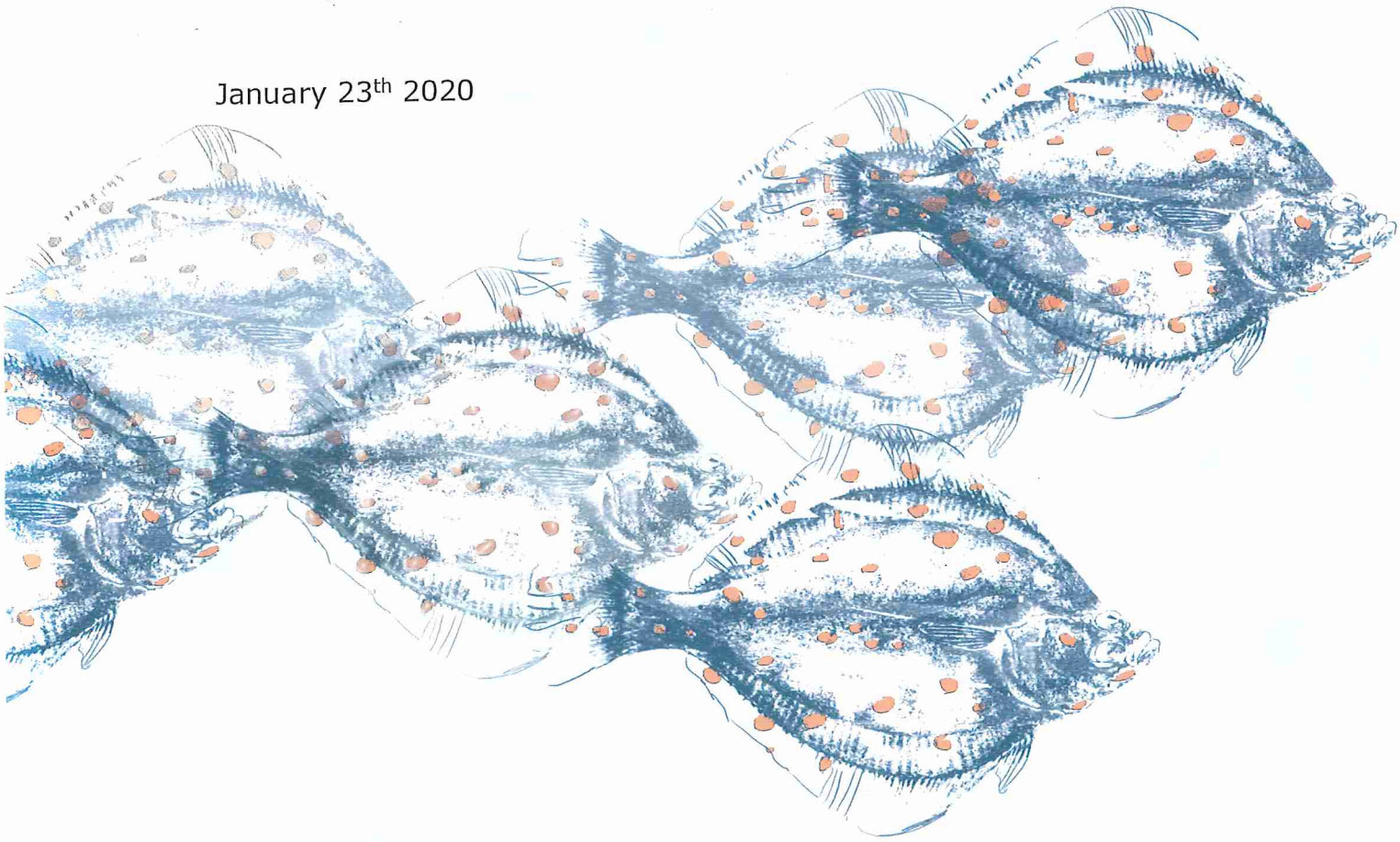

Centrum voor Visserijonderzoek (CVO)

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Summary

The pelagic freezer trawler fishery targets small pelagic species. The economically most important species are: herring (*Clupea harengus*), blue whiting (*Micromesistius poutassou*), horse mackerel (*Trachurus trachurus*), mackerel (*Scomber scombrus*), greater argentine (*Argentina silus*) and pilchard (*Sardina pilchardus*). The annual landings of this fishery follow seasonal patterns; different species are targeted during different parts of the year. The total landings of these target species by the Dutch fleet operating in European waters of were about 245,000 tonnes in 2017 and about 303,000 tonnes in 2018. The total landings of these target species by the German fleet operating in European waters were about 124,000 tonnes in 2017 and about 129,000 tonnes in 2018. Herring, blue whiting, mackerel and horse mackerel were the most abundant landed species.

In the European Union the collection and management of fisheries data is regulated through the Data Collection Framework (DCF) of the European Commission (EC). Within this context, from 2002 onwards catches of the European freezer trawler fleet are sampled by the Netherlands and Germany through two separate observer programmes. A process to harmonize the pelagic on board sampling programmes has started a few years ago and is still continuing. This report presents a summary of the data collected in the two monitoring programmes in European waters during the period 2017 and 2018. The two programmes together correspond with a sampling coverage of around 15% and 11% of the total Dutch and German flagged pelagic freezer trawler fleet effort (expressed in number of trips) in European waters in 2017-2018, respectively.

An important element in the reform of the Common Fisheries Policy (CFP) is the obligation to land all catches, i.e. the landing obligation. Consequently, from 2015 onwards the European pelagic freezer trawler fishery is in principle obliged to keep catches of quota regulated species on board. This has affected the sampling protocols and procedures; sampling has shifted from discards monitoring towards catch monitoring. Furthermore, the CFP also introduced the concept of regionalisation, meaning that Member States which share a fishing area should work together in collecting, managing and making the data available for scientific advice. Regionalisation of data collection was established during the recast of the Council Regulation describing the DCF (EU 2017/1004). Ultimately, under regional sampling, the Dutch and German pelagic sampling programmes are expected to merge together or at least be completely harmonised and thus interchangeable. Currently, the EU regional coordination group for the North Sea/Eastern Arctic & North Atlantic is working on a regional sampling plan for the freezer trawler fleet exploiting pelagic fisheries in the Northeast Atlantic.

Samenvatting

De pelagische vriestrawlervloot vist op een aantal pelagische doelsoorten, namelijk haring (*Clupea harengus*), blauwe wijting (*Micromesistius poutassou*), horsmakreel (*Trachurus trachurus*), mackerel (*Scomber scombrus*), grote zilvesmelt (*Argentina silus*) en pelser (*Sardina pilchardus*). In 2017 en 2018 werd van deze soorten uit Europese wateren respectievelijk 245,000 ton en 303,000 ton aangeland door de Nederlandse vloot. Door de Duitse vloot werd in 2017 en 2018 respectievelijk 124,000 ton en 129,000 ton aangeland. De aanvoer bestond voor het grootste gedeelte uit haring, blauwe wijting, makreel en horsmakreel. De aanvoergegevens laten tevens zien dat de visserij gedurende het jaar varieert in de gerichtheid op doelsoorten.

In de Europese Unie wordt het verzamelen en beheren van visserijgegevens gereguleerd doormiddel van de Data Collecte Verordening (DCF) van de Europese Commissie (EC). Binnen deze regulatie bemonsteren Nederland en Duitsland sinds 2002 jaarlijks de vangsten van de Europese pelagische vriestrawler vloot. Met behulp van twee onafhankelijke waarnemersprogramma worden biologische gegevens over de vangsten verzameld. Een paar jaar geleden is de harmonisatie van deze twee bemonsteringsprogramma's in gang gezet. Dit rapport presenteert de gegevens die verzameld zijn in de periode 2015-2016. Beide programma's dekken ongeveer 15% in 2017 en 11% in 2018 van de totale Nederlandse en Duits gevlagde pelagische vriestrawler vloot (uitgedrukt in aantal reizen) die actief was in Europese wateren.

Een belangrijk element in de herziening van het Gemeenschappelijk Visserij Beleid (GVB) is de verplichting om alle vangsten aan land te brengen. De pelagische visserij is dan ook in 2015 geconfronteerd met de introductie van de aanlandplicht. Dit heeft een effect gehad op de bemonsteringsprotocollen en procedures; de bemonstering is verschoven van een discardsbemonstering naar een vangstbemonstering. Daarnaast heeft de herziening van het GVB het concept *regionalisering* geïntroduceerd. Dit betekent dat alle lidstaten die een gemeenschappelijk visgebied delen samen moeten werken in het verzamelen, beheer en beschikbaar maken van de gegevens. *Regionalisatie* van de dataverzameling is vastgelegd in de herschikking van de DCF (EU 2017/1004). Uiteindelijk zal binnen een regionaal bemonsteringsprogramma de Nederlandse en Duitse pelagische bemonstering samengaan of op zijn minst volledig geharmoniseerd en uitwisselbaar zijn. Momenteel wordt binnen de regionale coördinatie groep van de EU aan een regionaal bemonsteringsplan voor de pelagische vriestrawlervloot die actief is Europese wateren.

Zusammenfassung

Die pelagische Schleppnetzfischerei hat als Zielarten kleinere pelagische Fischarten wie Hering (*Clupea harengus*), Makrele (*Scomber scombrus*), Blauer Wittling (*Micromesistius poutassou*), Stöcker oder Bastardmakrele (*Trachurus trachurus*), Goldlachs (*Argentina silus*) und Sardine (*Sardina pilchardus*). Die jährlichen Anlandungen folgen dabei saisonalen Mustern, da die unterschiedlichen Arten zu unterschiedlichen Zeiten im Jahresverlauf gefangen werden. Die Gesamtanlandungen der niederländischen Flotte betrugen 2017 dabei etwa 245000 Tonnen und 2018 etwa 303000 Tonnen für die oben aufgezählten Arten in europäischen Gewässern. Die Gesamtanlandungen der deutschen Flotte in europäischen Gewässern betrugen 2017 etwa 124000 Tonnen und 2018 etwa 129000 Tonnen. Der Großteil der Anlandungen bestand aus Hering, Blauer Wittling, Makrele und Stöcker.

Die Sammlung von Daten zur Fischerei wie auch das Fischereimanagement sind in der Europäischen Union in der Verordnung zur Fischereidatenerhebung (Data Collection Framework – DCF) der europäischen Kommission (EC) geregelt, die seit 2002 besteht. Seitdem wurden sowohl in den Niederlanden als auch Deutschland Programme etabliert, bei dem wissenschaftliche Beobachter an Fangreisen der pelagischen Fischerei teilnehmen und die Fangzusammensetzung aufnehmen. Seit einigen Jahren wird versucht, diese beiden Programme zu harmonisieren und mehr zusammenzuarbeiten. Dieser Bericht ist eine Zusammenfassung der Aktivitäten innerhalb der Beobachterprogramme in den Jahren 2017 und 2018. Dabei liegt die Abdeckung der durch wissenschaftliche Beobachter begleiteten Teile der Reisen der pelagischen Schleppnetzfischerei in europäischen Gewässern bei etwa 15% für die niederländische und bei etwa 11% für die deutsche Fischerei.

Ein wichtiges Element der Reform der Gemeinsamen Fischereipolitik (Common Fisheries Policy - CFP) ist die Einführung der Anlandepflicht. Aufgrund dessen müssen seit 2015 innerhalb der pelagischen Fischerei alle Fänge von quotierten Arten – die untermaßigen inbegriffen – an Bord behalten und angelandet werden. Dies hatte zur Folge, dass Bearbeitungsprozeduren und Protokolle angepasst werden mussten. Weiterhin ist mit der Reform der CFP das Konzept der Regionalisierung eingeführt worden. Damit soll die Zusammenarbeit von Mitgliedstaaten beim Sammeln, dem Management und der Bereitstellung von Fischereidaten gefördert werden, die eine gemeinsame Fischereiregion teilen. Diese Regionalisierung wurde mit der Umgestaltung der Verordnung zur Fischereidatenerhebung (veröffentlicht im Mai 2017) eingeführt (EU 2017/1004). Deshalb wird letztendlich erwartet, dass die niederländischen und deutschen pelagischen Beobachterprogramme im Rahmen dieser Regionalisierung in ein einziges regionales Stichprobenprogramm zusammen mit den Programmen anderer Mitgliedstaaten integriert werden. Zurzeit wird innerhalb der regionalen Koordinierungsgruppe für den Nordatlantik, die Nordsee und die östliche Arktis der EU ein solch regionaler Beprobungsplan für die pelagische Schleppnetzfischerei im nordöstlichen Atlantik ausgearbeitet.

1 Introduction

Pelagic freezer trawlers use a mid-water pelagic trawl to target pelagic species (Box 1); depending on the season freezer trawlers target herring (*Clupea harengus*), blue whiting (*Micromesistius poutassou*), horse mackerel (*Trachurus trachurus*), mackerel (*Scomber scombrus*), greater argentine (*Argentina silus*) and pilchard (*Sardina pilchardus*). Their most important fishing grounds in European waters are situated on the continental slope west of the British Isles, in the English Channel, along the British eastern coast, the northern North Sea and the Norwegian Sea (ICES divisions 2ab, 4abc, 5b, 6ab, 7bcdefghjk, 8abd; Table 1 and Figure 1). Differences in catch composition are caused by seasonal changes, fishing ground, or changes in the market situation; i.e. market prices fluctuate by season per species. Since the fishing companies concentrate on different markets and have different quota shares, the fleet is usually spread over a number of different areas throughout the year. Discards data of pelagic freezer trawlers have been monitored since 2002 under the European Commission Data Collection Framework (DCF) (Box 2).

Box 1: Pelagic freezer fishery

Pelagic freezer trawlers target schooling fish. Echo-sounding equipment on board of the trawlers provides information on the size and position of a shoal of fish, which makes this fishery very efficient. As a full net is too large to get on board, a hauled net remains in the water, while the catch is pumped on board. Catch is temporally stored in cooling tanks until it can be processed in the factory below deck. In principle all fish is maintained on board and frozen in blocks of 20-25 kg.

The duration of each fishing trip depends mainly on the catch of target species and the storing capacity of the vessel. The vessels usually return when all freezing stores are full. Smaller vessels make trips of 2-4 weeks, larger vessels of 5-6 weeks. A more detailed description of the fishery is given by Couperus *et al* (2004).

Box 2: Data Collection Framework (DCF)

In the European Union (EU) the collection and management of fisheries data is enforced through the Data Collection Framework (DCF) of the European Commission (EC) (EC 1543/2000 and EC 199/2008, from 2017 onwards: EU 2016/1701, EU 2016/1251 and EU 2017/1004). The DCF states which information should be collected, managed and made available by the Member States (MS) for scientific advice regarding the Common Fisheries Policy (CFP). For this purpose all MS are obliged to submit a work plan for data collection in the fisheries and aquaculture sectors on a multiannual basis.

The pelagic freezer trawler fishery is an international fishery, monitored at sea by both the Netherlands and Germany, conducting their own monitoring programmes and sampling protocols (Ulleweit et al., 2010; Verver, 2016; Verver 2017). From the 1st of January 2015 the pelagic freezer trawlers are regulated under the landing obligation. Consequently, the DCF programmes shifted from a discards to a catch monitoring scheme.

The aim of this report is to present an overview of the data that has been collected within the Dutch and German DCF programme of pelagic freezer trawlers, operating in European waters for 2017 and 2018. The data is used for further analyses within different projects, including stock assessment working groups.

2 Methods

Information on landings and effort by the Dutch pelagic freezer fleet in 2017 and 2018 has been derived from the Dutch Wageningen Marine Research (WMR) VISSTAT database (*Visserij Statistieken*). Information on landings and effort by the German pelagic freezer fleet in 2017 and 2018 has been derived from the German FIT database (Fischereistatistik) held by the federal agency for agriculture and food. In both countries this information is based on official logbooks registrations of commercial fishing vessels.

In contrast with landing and effort registration, which is based on a census of logbook information, biological information needs to be sampled to fulfil the obligations of the DCF. Information of the total population (fleet) based on sampled data requires an estimation procedure that respects the sampling design. In the Netherlands and Germany, biological sampling of unsorted catch is carried out on board the vessels through an observer programme.

2.1 Sampling procedures Dutch sampling programme

Annually 12 trips are sampled, homogenously distributed (monthly) over the year. Vessels are selected in cooperation with the pelagic fishery companies. Each company was asked to accommodate for 3-4 observer trips in each year. Selected vessels include both Dutch flagged and foreign flagged vessels. From 2018 onwards, German flagged vessels are no longer selected within the Dutch sampling programme. The selection procedure for 2017 and 2018 was ad hoc with the aim to conduct one trip per month, and, therefore, considered to be non-random. The fishing area is not a consideration in the stratification of sampling trips. The choice of fishing area and target species is usually a last minute decision, and may even change during the trip. It is not uncommon that during one trip several fishing and management areas are visited.

Sampling is conducted by an observer who is instructed to take samples from all hauls. If this is not possible due to working hours or technical issues, non-sampled hauls are not taken into account and are presented as "not sampled" in the results. The following sampling is conducted on a haul basis:

1. Total catch estimate (TCW_h)
   The observer estimates the total catch of the haul (h) from the bridge in cooperation with the skipper and verifies it with the number of cooling tanks that are filled (with help of the fish quality manager). The observer validates his estimates of the total catch, several times during the trip, by comparing his estimates with the actual number of boxes of retained catch on board the vessel.
2. Unsorted catch sample (Cw_h)
   An unsorted catch sample of 30-150 kg (depending on the target species (s); e.g. herring "small" sample and mackerel "large sample") is taken prior to the sorting process. The sample is weighted, weight of each species in the sample is recorded ($Cw_{h,s}$) and all fish are measured to the cm below (herring and sprat from 0.5 cm below).
3. Incidental bycatches
   Incidental bycatches are monitored by the observer in close collaboration with the crew.
4. Discarding
   From 1st of January 2015 the pelagic freezer trawler fleet falls under the landing obligation. This means that in principle the fishery is obliged to keep catches of quota regulated species on board. However, any fish that is still discarded (possibly due to an assigned exemption), is sampled:
   a) Discard percentage (discards%)
   The observer estimates the discard percentage by the ratio between catch and discards.
   b) Discards sample (Dw_h)

Discards sample of the haul is taken of minimal 20 kg (if discarding occurs in these numbers). The sample is weighted, weight of each species in the sample is recorded ($Dw_{h,s}$) and all fish are measured to the cm below (herring and sprat from 0.5 cm below).

During each trip, the data is stored into a computer programme on haul-by-haul basis. After quality control the data is transferred into the central database.

2.2 Sampling procedures German sampling programme

Only one fishing company is involved in the pelagic freezer trawler fleet in Germany. The general sampling scheme is discussed with this company once or twice a year, after which vessels are selected on an ad hoc basis.

Sampling on board is conducted by one observer. The observer is advised to take samples from all hauls. If this is not possible due to working hours or technical issues, non-sampled hauls are not taken into account. On average, the number of non-sampled hauls varies between 2 and 4 within a trip consisting of 25 to 30 hauls. From each sampled haul, an unsorted catch sample (Cw_h) is taken. The total sample size depends on the target species (e.g. herring >50 kg, mackerel >200 kg). The unsorted catch sample is split by the observer into the different fractions according to the crew´s behaviour:

- Landings for human consumption (*LW*)
  The sample is weighted, weight of each species in the sample is recorded ($Lw_{h,s}$) and all fish are measured.
- Landings for non-human consumption (*LnonhW*)
  The sample is weighted, weight of each species in the sample is recorded ($Lnonhw_{h,s}$) and all fish are measured.
- Other components (Ow_h)
  Other components might be related to a discard fraction in the catch or another fraction according to the landing obligation. The sample is weighted, weight of each species in the sample is recorded ($Ow_{h,s}$) and all fish are measured.

If possible, the sample should be taken from different cooling tanks. Total landings of the haul by species ($LW_{h,s}$ $LnonhW_{h,s}$) is estimated after the processing of the haul in cooperation with the skipper. The data are verified with the information by the fish quality manager on the number of cooling tanks which were filled during the processed haul. In addition, the samples are used to estimate the percentage of other components by species in the haul (e.g. discards). This percentage is used to calculate the total weight per species and haul of those components ($OW_{h,s}$). The estimated weight of these other components is also verified with the fish quality manager and skipper in order to avoid later misunderstandings. Subsamples are taken for further age analysis in the laboratory. After each trip, data are stored in a central database.

2.3 Raising procedures Dutch sampling programme

2.3.1 Raising the samples to haul level

Total weight per species

Total catch weight per species and haul ($TCW_{h,s}$) is estimated by multiplying the weight of the species in the catch sample ($Cw_{h,s}$) with the ratio between the estimated total catch weight (TCW_h) and the weight of the catch sample (Cw_h):

$$TCW_{h,s} = Cw_{h,s} \times (TCW_h / Cw_h)$$

Total numbers at length per species
The total numbers caught at length ($TCN_{l,h,s}$) is estimated per species and haul by multiplying the numbers at length (l) in the catch sample ($Cn_{l,h,s}$) with the ratio between the estimated total catch weight (TCW_h) and the weight of the catch sample (Cw_h):

$$TCN_{l,h,s} = Cn_{l,h,s} \times (TCW_h / Cw_h)$$

2.3.2 Raising sampled hauls to trip level

Total weight per species
Total catch weight per species and trip ($TCW_{t,s}$) is estimated by summing the catch weight per species over all hauls:

$$TCW_{t,s} = \sum_h TCW_{h,s}$$

Total numbers at length per species
Total numbers caught at length per species and trip ($TCN_{l,t,s}$) is estimated by summing the numbers at length per species over all sampled hauls:

$$TCN_{l,t,s} = \sum_h TCN_{l,h,s}$$

2.3.3 Not sampled

During the sampled trips it sporadically happens that the observer only estimates the weight of the catch and the discard percentage. Because the species composition and length frequency distribution of the catch for such hauls is unknown, hauls not sampled are presented as a separate component in this report.

2.4 Raising procedure German sampling programme

2.4.1 Raising the samples to haul level

Total weight per species
Total landings weight per haul and species ($LW_{h,s}$) is estimated in cooperation with the skipper after the sampling and processing of the sampled haul.

Total weight per species and haul ($LnonhW_{h,s}$) of other catch fractions (Landings for non-human consumption or other components according to the landings obligation like discards etc.) is estimated by multiplying the estimated total landings per haul (LW_h) with the ratio between the proportion of the specific components and proportion landings:

$$LnonhW_{h,s,} = LW_h \times (LnonhW\%_{h,s} / L\%_{h,s})$$

(in case of more than one additional component the total weight of the specific component is estimated in relation to all components)

Total numbers at length per species
The total numbers of landed fish caught at length ($LN_{l,h,s}$) is estimated per species and haul by multiplying the numbers at length in the landings sample ($Ln_{l,h,s}$) by the ratio of the estimated total landing weight by species ($LW_{h,s}$) to the weight of the landings sample by species ($Lw_{h,s}$):

$$LN_{l,h,s} = Ln_{l,h,s} \times (LW_{h,s}/Lw_{h,s})$$

The total numbers of fish of other catch components (e.g. landings for non-human consumption) caught at length (*LnonhN*$_{l,h,s}$) is estimated per species and haul by multiplying the numbers at length in the sample (*Lnonhn*$_{l,h,s}$) by the ratio between the estimated total discards weight by species (*LnonhW*$_{h,s}$) and the weight of the sample by species (*Lnonhw*$_{h,s}$):

$$LnonhN_{l,h,s} = Lnonhn_{l,h,s} \times (LnonhW_{h,s}/Lnonhw_{h,s})$$

(in case of more than one additional component the total numbers by length of the specific component is estimated in relation to all components)

2.4.2 Raising sampled hauls to trip level

Total weight per species
Total landings weight per species trip (*LW*$_{t,s}$) is estimated by summing the landings weight per species over all sampled hauls:

$$LW_{t,s} = \sum_{h} LW_{h,s}$$

Total weight per species trip of other components (*LnonhW*$_{t,s}$) is estimated by summing the weight per species in those components over all sampled hauls:

$$LnonhW_{t,s} = \sum_{h} LnonhW_{h,s}$$

Total length per species
Total landings numbers caught at length per species and trip (*LN*$_{l,t,s}$) is estimated by summing the numbers at length per species over all sampled hauls:

$$LN_{l,t,s} = \sum_{h} LN_{l,h,s}$$

Total numbers caught at length per species and trip of other components (Lnonh*N*$_{l,t,s}$) is estimated by summing the numbers at length per species in those components over all sampled hauls:

$$LnonhN_{l,t,s} = \sum_{h} LnonhN_{l,h,s}$$

2.4.3 Not sampled

During the sampled trips it sporadically happens that the observer does not sample a haul. Non sampled hauls are mostly hauls with a small catch. Hauls not sampled are excluded from calculations.

2.4.4 Raising the sampled trips to fleet level

In order to raise the total weight per species and trip of other components than the landings ($OW_{t,s}$) to fleet level, first the sampled average weight of those components needs to be estimated (e.g. LnonhW). Note that when target species are not caught during a sampled trip they are marked zero. The sampled average is the total weight of the other component (e.g. landings for non-human consumption or discards) per trip per species ($LnonhW_{t,s}$) divided by the total number of sampled trips (N_s):

$$LnonhW = \sum LnonhW_{t,s} / N_s$$

The calculated weights are then raised to the German fleet level by multiplying the sampled average (OW) with the total number of trips of the entire fleet (N_f):

$$OLnonhWF = N_t \times LnonhW$$

3 Results

3.1 Fleet

Target species of the freezer trawler fleet in European waters differ by season and area. The main target species are greater argentine, herring, horse mackerel, mackerel, pilchard and blue whiting. The total landings of these target species by the Dutch fleet were about 245,000 tonnes in 2017 and 303,000 tonnes in 2018 (in European waters). The total landings of these target species by the German fleet were about 124,000 tonnes in 2017 and 129,000 tonnes in 2018 (in European waters).

Herring, blue whiting, mackerel, and horse mackerel were the most abundant species landed by both countries (Table 1, Figure 2a-d). In addition, pilchard had also a high share in the catches by Germany in 2018. Herring is generally caught in the 2nd half of the year (June to December). The herring fishery is concentrated on North Sea herring during summer, in autumn targeting Atlantoscandian herring in ICES area 2.a and 2.b and in December in the Channel in 7.d (see Figure 1 for an explanation of the ICES areas). Blue whiting was caught throughout the years with peaks in specific months. Most of blue whiting catch was taken from ICES areas 6.a, 7.c and 2.a. Mackerel and horse mackerel are mainly caught in the 1st and 4th quarter of the year, the majority of the mackerel catch originated from the Norwegian sea, North Sea and Celtic Sea and horse mackerel from the Celtic Sea. Greater argentine is targeted in April-June and pilchard throughout the year, with a peak in February for the German flagged vessels in 2018.

In total 46 species were reported by the Dutch and German fleet in the period 2017-2018; 36 and 33 species by the Dutch fleet in 2017 and 2018 respectively, and 15 and 16 species by the German fleet in 2017 and 2018 respectively. Next to the main target species, sprat (*Sprattus sprattus*), hake (*Merluccius merluccius*), boarfish (*Capros aper*), deepwater redfish (*Sebastes mentella*) and saithe (*Pollachius virens*) were frequently caught. A few vessels target sprat for a limited amount of time in the period September-December and deepwater redfish in August-September. Hake, boarfish and saithe, on the other hand, are typical unwanted bycatch species.

3.2 Sampled trips

3.2.1 Number of sampled trips

Within the Dutch programme 12 trips were observed/monitored in 2017, from which 10 trips were on board Dutch flagged vessels, 1 trip on board UK flagged vessel and 1 trip on board a German flagged vessel. In 2018, 12 trips were observed/monitored, from which 11 trips were on board Dutch flagged vessels and 1 trip on board UK flagged vessel (Table 3). It must be noted that the Dutch sampled German flagged vessel was selected based on the ad hoc procedure described in section 2.1. In order to avoid double sampling it was ensured through communication with the industry that the German flagged sampled vessels were sampled either by the Netherlands or Germany in 2017. From 2018 onwards German flagged vessels are no longer sampled within the Dutch programme.

Within the German sampling programme 6 and 3 trips were observed by scientific observers in 2017 and 2018, respectively. In case there was no space for an observer on-board, some additional samples of the target species were obtained by the ship´s crew during those trips (self-sampling) who were advised beforehand to take a random sample. Altogether, 5 self-sampling trips (3 trips in 2017 and 2 trips in 2018) were carried out in this way. All trips were on board German flagged vessels (Table 3).

3.2.2 Sampled fishing grounds

Five different fishing grounds were sampled during the observer trips, namely the Celtic Sea, West of Scotland, North Sea, English Channel and Norwegian Sea (Figures 4a,b and Table 4; ICES divisions 2a, 4abc, 5b, 6ab, 7bcdefghjk, 8).

3.2.3 Sampled hauls

Within the Dutch sampling programme a total of 444 hauls in 2017 and 502 hauls in 2018 were sampled, which was 96% in both years of all hauls of the sampled trips (Table 3).

Within the German sampling programme a total of 193 hauls in 2017 and 149 hauls in 2018 were sampled by observers, which was 79% and 73% respectively of all hauls during the sampled observer trips (Table 3).

3.3 Collected data

During the sampled trips one or several species were targeted (Tables 4,5). In addition, a number of non-target species were caught. Table 6 provides an overview of all observed species that were caught during the sampled trips; in total 92 and 50 different species were observed in the Dutch and German sampling programme, respectively. As the observer is unable to monitor all rare, incidental bycatches, it must be noted that the presented numbers for these species are likely underestimates.

Sampled trips in January - February targeted horse mackerel, mackerel and blue whiting (trips P158, P170-P171, G42-G43, G51). In March the target species in the sampled trips shifted towards blue whiting (trips P159-P160, P172). In April-June the trips targeted blue whiting, greater argentine and horse mackerel (trips P161, P173-P175, G44). Thereafter, during the summer months (June – August) the sampled trips mainly targeted herring (trips P162-P165, P176-P177,G45, G52) with occasional, commercially interesting, bycatches of mackerel. In September-November several species were targeted, namely herring, mackerel, horse mackerel, pilchard and sprat (trips P166-P168, P178-P179, G48). In December the fishers targeted herring in the Eastern Channel (trips P169, P180-P181, G49, G55).

The average length distributions of observed catches of blue whiting, greater argentine, herring, horse mackerel, mackerel and pilchard are presented in Figure 3. The length distributions generally show regular bell-shaped patterns, where each bell-shaped component can most likely be attributed to an age group (i.e. age cohort). The length frequency distributions of herring from the German sampled trips show a second peak for larger, older, herring. This second peak represents the so-called Atlantoscandian herring caught in ICES area 2 which are larger than the North Sea herring despite being the same species. Furthermore, the length frequency distribution of herring for the Dutch sampled trips in 2017 shows a peak for larger, younger herring that have not reached the Minimum Size for human consumption yet.

4 Discussion

4.1 Results of the two sampling programmes

The two sampling programmes together correspond with a sampling coverage of around 15% and 11% of the total Dutch and German flagged pelagic freezer trawler fleet effort (expressed in number of trips) in European waters in 2017-2018, respectively (Table 7). Prior to the discard ban, discard sampling protocols from the Netherlands and Germany differed; samples were directly taken from the discard-gutter discard within the Dutch sampling programme while unsorted catch samples were taken within the German sampling programme. With the introduction of the landing obligation the sampling protocols of the two programmes have been brought closer together; the Dutch sampling programme shifted from a discards monitoring to catch monitoring. However, an important difference between the two programmes is that within the German sampling programme the observer splits the catch sample into the different fractions according to the crew's behaviour, namely landings for human consumption, landings for non-human consumption and discards (if occurring). While the Dutch sampling programme samples the unsorted catch, regardless the subsequent classification by the crew. The Dutch and German results are therefore presented for different type of catch fractions (Table 5a,b).

With this shift (i.e. from discards monitoring towards catch monitoring) it is key that the catch sample is of such a size that the less abundant species, previously discarded species, are sufficiently represented in the sample. At present, the catch sample size within both programmes depends on the target species and corresponding catch composition.

Overall, the species composition of the sampling programme is comparable with the species composition of the landings statistics indicating that the catch samples are reflecting catches of the fleet. In addition, the sampling programmes provide information on a number of species that vessels are obliged to set overboard due to regulation (Table 6a,b).

Observations of the more rare, incidental bycatches indicate that tuna is possibly becoming more abundant in the study area. The first tuna species was observed within the Dutch observer programme in 2014 (Ulleweit et al., 2016; Table 5) and has been observed every year ever since (van Overzee et al., 2017, Table 6).

4.2 Reform of the Common Fishery Policy

An important element in the reform of the CFP is the obligation to land all catches, i.e. a discard ban. From 2015 onwards, all fisheries targeting small pelagics (i.e. fisheries for mackerel, herring, horse mackerel, blue whiting, boarfish, anchovy, argentine, sardine, sprat) are obliged to keep all catches of species which are subject to catch limits (quota) on board the fishing vessels. The obligation to land all catches, or at least the species subjected to this regulation (i.e. quota regulated species), has affected the sampling programme on board pelagic freezer trawlers. Ideally, the different catch fractions (i.e. BMS, landings, discards) should be sampled where BMS (i.e. Below Minimum Size) refers to the fish that would have been discarded prior to the discard ban. The term BMS can cause some confusion within the pelagic fishery as it suggests that it only includes fish that are below minimum size. However, BMS within this fishery may also include damaged fish that is above minimum size.

Within the German catch sampling programme the observer is sampling both the commercial landings as the BMS part (=landings for non-human consumption) of the catch (see section 2.2). In the Dutch sampling programme, on the other hand, the unsorted catch is sampled.

Since the introduction of the landing obligation, it has been becoming increasingly difficult and dangerous for the observers to take unsorted catch samples as the vessels have been modifying their sorting process as well as their equipment to improve efficiency on board. Access to the fish is severely hampered as the equipment only allows little room to access the fish prior to sorting. The need for a larger sample size (see section 4.1) has further complicated this. To anticipate this development we are in the process of developing and describing the potential of using electronic/digital technology for sampling catches on board of the pelagic vessels (e.g. camera's).

4.3 Data Collection Framework

The CFP also introduced the concept of regionalisation. In fisheries data collection, regionalisation means that Member States sharing a fishing area should work together in collecting, managing, sharing and preparing data for scientific advice. In 2017 Council Regulation 199/2008 describing the Data Collection Framework was repealed by Regulation 2017/1004 where the focus indeed shifted towards regionalisation of data collection. Where at present sampling is described in the national work plans, it is stated that "*national work plans should be considered as interim measures only prior to the development and implementation of regional sampling plans through which regionally coordinated sampling and task-sharing would accommodate data collection requirements*" (STECF, 2016). In order to work towards harmonised regional sampling of commercial fisheries, the results for the German and Dutch observer programmes of pelagic freezer trawlers operating in European waters are presented together since 2011 (van Overzee et al., 2013; Ulleweit et al., 2016; van Overzee et al., 2017). Ultimately, under a regional sampling plan the two sampling programmes are expected to merge or at least be completely harmonised and thus interchangeable. In order to do so, the sampling programmes need to be further harmonised; methodology must be similar (i.e. sample size, sample processing) and vessel selection needs to be coordinated regionally rather than nationally. Currently, a pan regional subgroup of the EU regional coordination group for the North Sea/Eastern Arctic & North Atlantic is working on a regional sampling plan for the freezer trawler fleet exploiting pelagic fisheries in the Northeast Atlantic (RCG, 2019). The primary aim of the subgroup is to propose a statistically robust regional sampling scheme for the European pelagic freezer trawler fleet of all countries involved. In future, these regional sampling schemes for all European fisheries are to be developed in order to replace the national sampling plans in the national DCF workplans.

It is necessary to work towards a sampling design that is established according to statistical sound principles (EU 2016/1251). The introduction of a statistically sound sampling scheme would reduce any potential bias in the data and therefore increase the representativeness of the data for the entire fleet. Ideally, a vessel is randomly selected from the sampling population (i.e. a complete list of all pelagic freezer trawlers active in European waters). In order to evaluate possible bias, responses and/or non-responses need to be recorded. In practice such a random approach will introduce some (logistical) challenges. For example, trips need to be arranged with the pelagic fishery companies while ideally trips should be selected on a vessel level rather than a company level. Also, the sampling population is dynamic rather than static as trip duration differs between vessels throughout the year and a number of vessels are also active outside European waters. In 2019 a first attempt to randomize sampling has been made within the Dutch sampling programme.

Since 2017 the EU is enforcing Member States through the DCF to collect data on incidental bycatch of all birds, mammals and reptiles and fish protected under Union legislation and international agreements. At present the observer monitors rare, incidental bycatches. However, the presented numbers in this report lack information on the sampling coverage of these observations. Therefore, from 2017 onwards observers are requested within both sampling programmes to record which percentage, time interval, of the total sorting process has been monitored on rare, incidental bycatches. Furthermore, for each haul

observers are advised to record whether they were able to observe the opening of the net as during the net opening, most larger bycatch is released/removed from the net (Couperus, 2018; Couperus 2019).

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Quality assurance

CVO is certified to ISO 9001:2015 (certificate number: 268632-2018-AQ-NLD-RvA). This certificate is valid until December 15th, 2021. The certification was issued by DNV GL Business Assurance B.V

Appendix: Tables and Figures

Table 1a. Landings (tonnes) per year, species and ICES area by the **Dutch** freezer trawler fleet in **2017**. Data are extracted from VISSTAT database, landings in non-ICES areas are not included. For areas see Figure 1, for species names see Table 2.

	2.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.b	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	61	0	0	0	0	0	0	0	61
ARU	10	0	0	0	2	3501	0	1	0	0	0	0	0	0	0	0	0	0	3514
ARY	0	0	0	0	0	901	0	0	0	0	0	0	0	0	8	0	0	0	909
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOC	0	0	0	0	0	34	0	118	20	0	0	0	0	0	9	0	0	0	182
BON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRB	0	0	0	0	0	0	0	0	0	99	2	0	0	0	0	0	0	0	101
BSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BSS	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
COD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUG	0	2	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	7
GUR	0	2	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	5
GUU	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3
HAD	0	6	8	0	0	31	0	5	0	0	0	0	5	0	0	0	0	0	56
HER	6338	55832	15739	288	0	835	0	0	0	13055	0	0	475	173	0	0	0	0	92734
HKE	0	10	0	0	0	117	0	6	1	0	0	0	0	2	5	0	0	0	141
HOM	0	14	61	479	0	5497	0	5160	470	4657	404	0	0	1788	608	0	313	0	19451
JOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAC	7668	16131	293	0	3	17004	0	841	5	439	4	0	0	2	175	0	0	0	42564
MON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOP	0	1	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	0	6
OFE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIL	0	0	0	0	0	0	0	0	0	121	1247	0	0	0	0	0	0	0	1367
PLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1a. Continued.

	2.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.b	Unknown	Total*
POK	0	112	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	116
REB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REG	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
SBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SFV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SME	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
SNS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPR	0	0	1560	21	0	0	0	0	0	0	235	0	0	0	0	0	0	0	1816
SQR	0	0	0	0	0	4	0	0	0	1	0	0	0	0	1	0	0	0	6
SQS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SQU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UBA	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	1942	1805	0	0	7555	35274	338	272	33888	0	0	0	0	0	81	0	0	0	81156
WHG	0	64	5	3	0	18	0	0	0	3	4	0	18	0	0	0	0	0	114

* Due to rounding this value may differ slightly from when one would sum the values by species and area from this table.

Table 1b. Landings (tonnes) per year, species and ICES area by the **Dutch** freezer trawler fleet in **2018**. Data are extracted from VISSTAT database, landings in non-ICES areas are not included. For areas see Figure 1, for species names see Table 2.

	2.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.b	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARU	0	143	0	0	0	2773	0	1	18	0	0	0	0	0	11	0	0	0	2947
ARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOC	0	0	0	0	0	78	0	9	1	0	0	3	0	46	22	0	14	0	172
BON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRB	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	43
BSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BSS	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	7
COD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUG	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
GUR	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
GUU	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
HAD	0	4	38	0	0	16	0	1	0	0	0	0	0	0	5	0	0	0	65
HER	4290	57443	34088	210	4	945	0	0	0	19611	0	0	253	183	0	0	0	0	117027
HKE	0	11	0	0	0	309	0	0	0	0	0	0	0	6	99	0	0	0	426
HOM	0	6	1	68	0	11922	0	2189	7	5033	622	310	401	7990	2362	0	6	0	30916
JOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
LUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAC	2697	12760	329	3	37	10944	0	29	5	339	1	0	21	1	1358	0	732	0	29258
MON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOP	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4
OFE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIL	0	0	0	9	0	0	0	0	0	753	33	12	0	0	0	0	0	0	807
PLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1b. Continued.

	2.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.b	Unknown	Total*
POK	0	56	0	0	0	81	0	0	0	0	0	0	0	0	0	0	0	0	137
REB	384	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	384
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SFV	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SNS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPR	0	0	1566	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2313
SQR	0	0	0	0	0	12	0	0	0	1	0	0	0	0	0	0	0	0	14
SQS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SQU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	6789	1788	0	0	2842	65475	6928	3	29627	0	0	0	0	0	375	8035	1	0	121864
WHG	0	12	23	0	0	4	0	0	0	1	3	0	0	0	3	0	0	0	46

* Due to rounding this value may differ slightly from when one would sum the values by species and area from this table.

Table 1c. Landings (tonnes) per year, species and ICES area by the **German** freezer trawler fleet in **2017**. Data are extracted from FiStat database, landings in non-ICES areas are not included. For areas see Figure 1, for species names see Table 2.

	2.a	2.b	3.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.a	8.b	8.d	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6
ARU	0	0	0	0	0	0	1	583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	584
ARY	0	0	0	1	0	0	0	785	0	0	1	0	0	0	0	0	3	0	0	0	0	0	790
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOC	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
BON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRB	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	6
BSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BSS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HER	5164	0	0	28935	574	0	0	0	0	0	0	8918	98	0	0	307	0	0	0	0	0	0	43996
HKE	0	0	0	1	0	0	0	1	0	4	3			0	0	0	0	0	0	0	0	0	8
HOM	0	0	0	4	0	0	0	2884	0	2226	1014	933	51	0	0	35	712	5	216	0	0	0	8079
JOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAC	4065	0	0	10923	10	0	21	7949	0	321	1	55	5	0	0	0	45	0	28	1179	37	0	24640
MON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIL	0	0	0	0	0	0	0	0	0	0	0	19	1097	0	0	0	0	0	0	0	0	0	1117
PLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1c. Continued.

	2.a	2.b	3.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.a	8.b	8.d	Unknown	Total*
POK	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
REB	462	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	462
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SFV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SNS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPR	0	0	0	0	785	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	819
SQR	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
SQS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SQU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	5871	0	0	1923	0	0	5046	21267	0	16	10270	0	0	0	0	10	19	1100	0	0	0	0	45522
WHG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Due to rounding this value may differ slightly from when one would sum the values by species and area from this table.

Table 1d Landings (tonnes) per year, species and ICES area by the **German** freezer trawler fleet in **2018**. Data are extracted from FiStat database, landings in non-ICES areas are not included. For areas see Figure 1, for species names see Table 2.

	2.a	2.b	3.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.a	8.b	8.d	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	24
ARU	0	0	0	67	0	0	0	1001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1068
ARY	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOC	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
BON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BRB	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	9
BSF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BSS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HER	1921	0	0	31753	3164	8	0	16	0	0	0	10810	0	0	0	0	0	0	0	0	0	0	47673
HKE	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
HOM	0	0	0	1	0	0	0	2770	0	395	4	2805	315	0	0	650	97	0	549	0	0	1	7585
JOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAC	525	0	0	11541	7	0	0	6532	0	152	0	3	0	0	0	0	12	0	421	0	0	0	19193
MON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIL	0	0	0	0	0	0	0	0	0	0	0	266	220	0	0	0	0	0	0	0	0	6846	7332
PLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1d. Continued.

	2.a	2.b	3.a	4.a	4.b	4.c	5.b	6.a	6.b	7.b	7.c	7.d	7.e	7.f	7.g	7.h	7.j	7.k	8.a	8.b	8.d	Unknown	Total*
POK	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
REB	896	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	896
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SFV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SNS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPR	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
SQR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SQS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SQU	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
UBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	10091	0	87	1025	0	0	3464	24976	292	1581	5004	0	0	0	0	0	1	0	0	0	0	0	46523
WHG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Due to rounding this value may differ slightly from when one would sum the values by species and area from this table.

Table 2. Species names.

Species code	Scientific name	English name
ANE	*Engraulis encrasicolus*	Anchovy
ARU	*Argentina silus*	Greater argentine
ARY	*Argentina sphyraena*	Argentine
BFT	*Thunnus thynnus*	Atlantic bluefin tuna
BOC	*Capros aper*	Boarfish
BON	*Sarda sarda*	Atlantic bonito
BRB	*Spondyliosoma cantharus*	Black sea bream
BSF	*Aphanopus carbo*	Black scabbardfish
BSS	*Dicentrarchus labrax*	Sea bass
COD	*Gadus morhua*	Cod
DAB	*Limanda limanda*	Dab
GAR	*Belone belone*	Garfish
GUG	*Eutrigla gurnardus*	Grey gurnard
GUR	*Eutrigla gurnardus*	Red gurnard
GUU	*Trigla lucerna*	Tub gurnard
HAD	*Melanogrammus aeglefinus*	Haddock
HER	*Clupea harengus*	Herring
HKE	*Merluccius merluccius*	Hake
HOM	*Trachurus trachurus*	Horse mackerel
JOD	*Zeus faber*	Atlantic John Dory
LUM	*Cyclopterus lumpus*	Lumpfish
MAC	*Scomber scombrus*	Mackerel
MON	*Lophius piscatorius*	Anglerfish
MUR	*Mullus surmuletus*	Red mullet
NOP	*Trisopterus esmarkii*	Norway pout
OFE	*Ommastrephes pteropus*	Orangeback flying squid
PIL	*Sardina pilchardus*	Pilchard
PLE	*Pleuronectes platessa*	Plaice
POK	*Pollachius virens*	Saithe
REB	*Sebastes mentella*	Deepwater redfish
REG	*Sebastes marinus*	Golden redfish
SBR	*Pagellus bogaraveo*	Red seabream
SFV	*Sebastes viviparus*	Norway redfish
SME	*Osmerus eperlanus*	Smelt
SNS	*Macroramphosus scolopax*	Longspine snipefish
SPR	*Sprattus sprattus*	Sprat
SQR	*Loligo vulgaris*	European squid
SQS	*Martialia hyadesi*	Sevenstar flying squid
SQU	*Loliginidae*	Squids
UBA	*Cubiceps caeruleus*	Blue fathead
USK	*Brosme brosme*	Tusk
WEG	*Trachinus draco*	Greater weever
WHB	*Micromesistius poutassou*	Blue whiting
WHG	*Merlangius merlangus*	Whiting

Table 3. Overview of sampled trips in **2017** and **2018** in the **Dutch** and **German** observer programme.

Year	Trip	Sampling programme	Flag vessel	Nr of hauls	Nr of hauls sampled **	% of hauls sampled
2017	P158	NLD	NLD	61	58	95%
	P159	NLD	NLD	31	30	97%
	P160	NLD	NLD	33	33	100%
	P161	NLD	DEU	35	35	100%
	P162	NLD	NLD	41	37	90%
	P163	NLD	NLD	31	31	100%
	P164	NLD	GBR	27	27	100%
	P165	NLD	NLD	26	26	100%
	P166	NLD	NLD	36	34	94%
	P167	NLD	NLD	52	52	100%
	P168	NLD	NLD	35	31	89%
	P169	NLD	NLD	55	50	91%
	G42	DEU	DEU	25	25	100%
	G43	DEU	DEU	42	31	74%
	G44	DEU	DEU	62	51	82%
	G45	DEU	DEU	47	41	87%
	G46*	DEU	DEU	NA	5	NA
	G47*	DEU	DEU	NA	1	NA
	G48	DEU	DEU	14	10	71%
	G49	DEU	DEU	53	27	51%
	G50*	DEU	DEU	NA	2	NA
2018	P170	NLD	NLD	18	18	100%
	P171	NLD	NLD	50	49	98%
	P172	NLD	NLD	50	43	86%
	P173	NLD	NLD	31	31	100%
	P174	NLD	NLD	53	53	100%
	P175	NLD	NLD	59	59	100%
	P176	NLD	NLD	35	32	91%
	P177	NLD	NLD	56	56	100%
	P178	NLD	NLD	42	36	86%
	P179	NLD	NLD	29	27	93%
	P180	NLD	NLD	55	52	95%
	P181	NLD	GBR	46	46	100%
	G51	DEU	DEU	48	43	90%
	G52	DEU	DEU	44	41	93%
	G53*	DEU	DEU	NA	3	NA
	G54*	DEU	DEU	NA	6	NA
	G55	DEU	DEU	111	56	50%

* Self-sampling by industry

** Including hauls with zero catch

Table 4. Period, target species and ICES areas of the trips conducted during the **Dutch** and **German** observer programme in **2017** and **2018**.

Year	Trip	Period**	Target species***	ICES areas
2017	P158	Jan, Feb	Horse mackerel, Mackerel, Blue whiting	6.a, 7.b,7.c,7.e,7.k
	P159	Mar	Blue whiting	7.c
	P160	Mar	Blue whiting	6.a
	P161	Apr, May	Greater argentine, Blue whiting	6.a
	P162	Jun, Jul	Herring	4.a
	P163	Jul	Herring	4.a,4.b
	P164	Jul	Herring	4.a
	P165	Aug	Herring	4.a,4.b
	P166	Nov	Horse mackerel, Mackerel, Herring	4.c, 7.d,7.e
	P167	Nov, Dec	Sprat, Herring	4.b, 7.d
	P168	Okt, Nov, Dec	Horse mackerel, Mackerel	4.a,4.c, 6.a, 7.d,7.e,7.j,7.k
	P169	Dec	Herring	7.d
	G42	Jan	Mackerel	6.a
	G43	Feb	Horse mackerel	6.a, 7.b
	G44	May, Jun	Blue Whiting	2.a, 4.a, 5.b, 6.a
	G45	Jul	Herring	4.a
	G46*	Oct	Herring	2.a
	G47*	Oct	Mackerel	4.a
	G48	Nov, Dec	Pilchard	7.e
	G49	Dec	Herring	7.d
	G50*	Nov	Mackerel	6.a
2018	P170	Jan	Horse mackerel, Mackerel	6.a
	P171	Feb	Horse mackerel, Blue whiting	7.h,7.k
	P172	Mar	Blue whiting	6.a,6.b, 7.c
	P173	Apr	Blue whiting	6.a
	P174	Apr	Blue whiting	5.b, 6.a
	P175	May, Jun	Blue whiting, Greater argentine, Horse mackerel	4.a, 6.a, 7.b,7.j, 8
	P176	Jul	Herring	4.a
	P177	Jul	Herring	4.a
	P178	Sept, Okt	Herring, Horse mackerel	4.b, 6.a, 7.d,7.e,7.g,7.j
	P179	Okt, Nov	Horse mackerel, Mackerel	4.a, 7.d
	P180	Dec	Herring	7.d
	P181	Dec	Herring, Horse mackerel	7.d
	G51	Jan	Mackerel	6.a
	G52	Jul, Aug	Herring	4.a
	G53*	Oct	Herring	2.a
	G54*	Nov	Horse mackerel	7.d, 7.e
	G55	Dec	Herring	7.d

* Self-sampling by industry

** During fishing (not steaming)

*** These species are described as target species in the observer journals, based on information prior to the trip. This does not necessarily mean that the species are caught during the trip; if they fail to find the species the catch is zero.

Table 5a. Total catch (tonnes) per sampled pelagic trip within the **Dutch** observer programme in **2017** and **2018**. * During fishing (not steaming). ** See also Table 6 for other species. *** Other species mainly consist of sprat.

Year	Trip	Period*		Blue whiting	Greater argentine	Herring	Horse mackerel	Mackerel	Pilchard	Others**	Total	Not sampled
2017	P158	Jan, Feb	Catch	460.2		0.6	822.7	478.6		5.9	1768.0	14
	P159	Mar	Catch	3425.0							3425.0	20
	P160	Mar	Catch	6149.9	2.0						6151.9	
	P161	Apr, May	Catch	347.0	1010.8			20.7		9.3	1387.8	
	P162	Jun, Jul	Catch			3574.2	0.2	120.3		41.4	3736.1	67
	P163	Jul	Catch			2019.2		12.3		30.9	2062.4	
	P164	Jul	Catch			3364.6		21.8		28.6	3415.0	
	P165	Aug	Catch			2009.5		93.2		1.7	2104.4	
	P166	Nov	Catch			1137.4	678.9	141.5	2.6		1960.4	20
	P167	Nov, Dec	Catch			2281.4	72.0	27.1	1.0	1013.7***	3395.2	
	P168	Okt, Nov, Dec	Catch			616.7	339.9	1237.9	0.1	107.7	2302.2	11
	P169	Dec	Catch			3498.2	28.5	46.6	0.2	54.4	3627.8	240
2018	P170	Jan	Catch				4.4	1761.5		0.5	1766.4	
	P171	Feb	Catch	3849.6			2297.6	2.1		1.2	6150.5	10
	P172	Mar	Catch	3706.0				0.4		42.6	3749.0	323
	P173	Apr	Catch	6136.4							6136.4	
	P174	Apr	Catch	8674.1	98.0			61.2		152.7	8986.0	
	P175	May, Jun	Catch	3468.9	224.0	2.0	343.8	59.1		212.7	4310.5	
	P176	Jul	Catch			3567.1		69.5		142.0	3778.6	110
	P177	Jul	Catch			4101.6		77.2		2.4	4181.2	
	P178	Sept, Okt	Catch			2065.3	752.7	234.1	131.3	122.6	3306.0	28
	P179	Okt, Nov	Catch			145.8	160.2	3333.0		72.3	3711.3	65
	P180	Dec	Catch			1720.5	0.3	1.1		5.9	1727.9	29
	P181	Dec	Catch			3291.3	0.2	4.8	0.4	2.3	3298.9	

Table 5b. Total commercial and non-commercial landings (tonnes) per sampled pelagic trip by species caught for human consumption within the **German** observer programme in **2017** and **2018.** Commercial landings are landings for human consumption, non-commercial landings are landings according to the landing obligation. * During fishing (not steaming). ** See also Table 6 for other species.

Year	Trip	Period*		Blue whiting	Greater argentine	Herring	Horse mackerel	Mackerel	Pilchard	Others**	Total	Not sampled
2017	G42	Jan	Com. Landings		0.3		163.9	1088.9		0.3	1253.5	
			Non Com. Landings	1.6			0.2	4.8		4.1	10.9	
	G43	Feb	Com. Landings				715.7	405.9		0.5	1122.2	
			Non Com. Landings				3.8	1.1		0.6		
	G44	May, Jun	Com. Landings	5464.4	18.9			2.2			5485.6	
			Non Com. Landings	17.7		0.1				0.1	17.9	
	G45	Jul	Com. Landings			4656.2		24.4			4680.6	
			Non Com. Landings			14.7				0.3	15.0	
	G48	Nov, Dec	Com. Landings				10.5		393.3	5.2	408.9	
			Non Com. Landings				2.8				2.9	
	G49	Dec	Com. Landings			770.7	4.7	28.6		1.4	805.4	
			Non Com. Landings							0.1	0.2	
2018	G51	Jan	Com. Landings	0.1			1441.9	3085.5			4527.5	
			Non Com. Landings	1.0				24.0		5.1	30.2	
	G52	Jul, Aug	Com. Landings			4628.6	0.9	81.4		4.3	4715.2	
			Non Com. Landings			10.9		27.1		0.1	38.0	
	G55	Dec	Com. Landings			3403.8	18.9		6.5		3429.2	
			Non Com. Landings					0.9		0.4	1.3	

Table 6a. Total amount of catch (tonnes) or total number of individuals observed during all sampled pelagic trips within the **Dutch** observer programme in **2017** and **2018**. With regards to incidental bycatches note that the total individuals observed may only have occurred during one or a few trips.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Blue whiting	*Micromesistius poutassou*	10382.2	25835.0
Greater argentine	*Argentina silus*	1012.8	322.0
Herring	*Clupea harengus*	18501.7	14893.5
Horse mackerel	*Trachurus trachurus*	1942.3	3559.3
Mackerel	*Scomber scombrus*	2199.9	5604.0
Pilchard	*Sardina pilchardus*	3.9	131.7
Alfonsino	*Beryx decadactylus*		1.4
Anchovy	*Engraulis encrasicolus*	2.7	
Anglerfish	*Lophius piscatorius*	2.4	<0.1
Bib	*Trisopterus luscus*		0.3
Black scabbardfish	*Aphanopus carbo*	<0.1	5.5
Black seabream	*Spondyliosoma cantharus*	35.4	32.1
Blackbelly rosefish	*Helicolenus dactylopterus*		7.2
Blackfish	*Centrolophus niger*		0.2
Bluntsnout smoothhead	*Xenodermichthys copei*		27.3
Boarfish	*Capros aper*	5.1	21.2
Bonito	*Sarda sarda*		10.7
Cod	*Gadus morhua*		2.6
Common cuttlefish	*Sepia officinalis*	0.3	
Conger	*Congridae*	13.0	0.8
Cornish blackfish	*Scheophilus medusophagus*		4.6
Dab	*Limanda limanda*		0.1
Deal-fish	*Trachipterus arcticus*		21.3
European squid	*Loligo vulgaris*	7.8	13.9
Garfish	*Belone belone*	1.2	0.4
Golden redfish	*Sebastes norvegicus*		2.9
Greater forkbeard	*Phycis blennoides*	0.8	8.1

Table 6a. Continued.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Greater weever	*Trachinus draco*		1.2
Greenland argentine	*Nansenia groenlandica*		<0.1
Greenland halibut	*Reinhardius hippoglossoides*		0.7
Grey gurnard	*Eutrigla gurnardus*	4.3	0.8
Hachetfish	*Argyropelecus olfersi*		0.2
Haddock	*Melanogrammus aeglefinus*	4.5	53.7
Hake	*Merluccius merluccius*	8.1	168.4
John Dory	*Zeus faber*	15.9	12.3
Lesser spotted dogfish	*Squalus acanthias*	0.7	1.4
Ling	*Molva molva*	12.0	8.5
Longtooth anglemouth	*Gonostoma elongatum*		<0.1
Lumpsucker	*Cyclopterus lumpus*	16.6	8.7
Norway pout	*Trisopterus esmarkii*		0.7
Pearl side	*Maurolicus muelleri*	<0.1	<0.1
Plaice	*Pleuronectes platessa*	3.1	0.7
Pollack	*Pollachius pollachius*	5.6	
Red gurnard	*Chelidonichthys cuculus*		<0.1
Rough pomfret	*Taractes asper*		1.1
Saithe	*Pollachius virens*	50.8	187.6
Schnakenbeck's searsid	*Sagamichthys schnakenbecki*		<0.1
Sea bass	*Dicentrarchus labrax*	38.0	4.9
Sea breams	*Sparidae*		0.2
Silver pomfret	*Pterycombus barma*		8.5
Silvery pout	*Gadiculus argenteus*		1.6
Smoothhound	*Mustelus mustelus*		3.6
Sprat	*Sprattus sprattus*	1007.1	
Starry smoothhound	*Mustelus asterias*	8.9	9.2
Striped red mullet	*Mullus surmuletus*		1.1
Stingray	*Dasyatis pastinaca*	5.2	
Triggerfish	*Balistes capriscus*	0.8	0.9

Table 6a. Continued.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Tub gurnard	*Chelidonichthys lucerna*	0.2	
Twaite shad	*Alosa fallax*	<0.1	<0.1
Velvet belly	*Etmopterus spinax*	0.3	
Umbrella squid	*Histioteuthis bonnellii*		0.3
Whiting	*Merlangius merlangus*	43.5	82.9
Witch	*Glyptocephalus cynoglossus*	<0.1	
-	*Arctozenus risso*		0.3
-	*Benthodesmus elongatus*		0.2
-	*Centrophorus granulosus*		26.7
-	*Chirostomias pliopterus*		<0.1
-	*Cryptopsaras couesii*		<0.1
-	*Epigonus telescopus*	<0.1	
-	*Gracilechinus elegans*		0.1
-	*Lampanyctus*		<0.1
-	*Maulisia microlepis*		0.2
-	*Muglidae*		2.1
-	*Neiarchus nasutus*		1.4
-	*Notoscopelus kroeyeri*		5.9
-	*Palaemonidae*		<0.1
-	*Stomias boa*		0.3
-	*Tetragonurus atlanticus*		0.1
Basking shark	*Cetorhinus maximus*		3 individuals
Blackbelly rosefish	*Helicolenus dactylopterus*	112 individuals	
Black gemfish	*Nesiarchus nasutus*	1 individual	
Blue shark	*Prionace glauca*		1 individual
Bluefin tuna	*Thunnus thynnus*	6 individuals	21 individuals
Grey seal	*Halichoerus grypus*	1 individual	6 individuals
Leafscale gulper shark	*Centrophorus squamosus*		1 individual
Porbeagle	*Lamna nasus*	6 individuals	50 individuals

Table 6a. Continued.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Sharks unidentified	*Elasmobranchii*	3 individuals	
Shortfin mako	*Isurus oxyrhinchus*	3 individuals	
Slender snipe-eel	*Nemichthys scolopaceus*	1 individual	2 individuals
Spurdog	*Squalus acanthias*	65 individuals	16 individuals
Sunfish	*Mola mola*		1 individual
Thresher shark	*Alopias vulpinus*	1 individual	1 individual

Table 6b. Total amount of catch (tonnes) or total number of individuals observed during all sampled pelagic trips within the **German** observer programme in **2017** and **2018**. With regards to incidental bycatches note that the total individuals observed may only have occurred during one or a few trips.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Blue whiting	*Micromesistius poutassou*	5483.8	1.16
Greater argentine	*Argentina silus*	18.9	
Herring	*Clupea harengus*	6161.4	8663.3
Horse mackerel	*Trachurus trachurus*	929.4	1654.5
Mackerel	*Scomber scombrus*	1818.3	3218.9
Pilchard	*Sardina pilchardus*	393.4	6.5
Anchovy	*Engraulis encrasicolus*	5.2	
Anglerfish	*Lophius piscatorius*	0.01	0.01
Argentine	*Argentina sphyraena*	0.3	
Beaked redfish	*Sebastes mentella*	<0.01	
Black seabream	*Spondyliosoma cantharus*	1.4	0.1
Blackbellied angler	*Lophius budegassa*		<0.01
Blackbelly rosefish	*Helicolenus dactylopterus*		<0.01
Blackspot seabream	*Pagellus bogaraveo*	<0.01	
Boarfish	*Capros aper*	1.1	0.1
Broadtail squid	*Ilex coindeti*		<0.01
Brill	*Scophthalmus rhombus*		<0.01
Cod	*Gadus morhua*	0.02	0.1
Conger	*Conger conger*	<0.01	<0.01
European squid	*Loligo vulgaris*	0.03	0.05
Garfish	*Belone belone*	<0.01	0.02
Greater weever	*Trachinus draco*	<0.01	<0.01
Grey gurnard	*Eutrigla gurnardus*	0.05	4.7
Haddock	*Melanogrammus aeglefinus*	0.02	<0.01
Hake	*Merluccius merluccius*	0.07	0.11
John Dory	*Zeus faber*	0.01	0.01
Lesser flying squid	*Todaropsis eblanae*		<0.01

Table 6b. Continued.

Species	Scientific name	2017 Total weight (tonnes) / total individuals	2018 Total weight (tonnes) / total individuals
Lumpsucker	*Cyclopterus lumpus*	0.05	<0.01
Norway pout	*Trisopterus esmarkii*	3.96	
Plaice	*Pleuronectes platessa*	0.01	0.02
Pollack	*Pollachius pollachius*		<0.01
Plain bonito	*Orcynopsis unicolor*		0.01
Poor cod	*Trisopterus minutus*	<0.01	
Red mullet	*Mullus surmuletus*	<0.01	0.01
Red gurnard	*Astrigla cuculus*		<0.01
Saithe	*Pollachius virens*	0.1	4.4
Sea bass	*Dicentrarchus labrax*	0.03	0.14
Squids	*Loligo* sp.	0.01	<0.01
Streaked gurnard	*Trigloperus lastoviza*		<0.01
Tub gurnard	*Chelidonichthys lucerna*	0.01	<0.01
Twaite shad	*Alosa fallax*	<0.01	
Whiting	*Merlangius merlangus*	0.2	0.05
Bluefin tuna	*Thunnus thynnus*	1 individual	
Common eagle ray	*Myliobatis aquila*	1 individual	
Spurdog	*Squalus acanthias*	55 individuals	118 individuals
Grey seal	*Halichoerus grypus*	1 individual	
Lesser spotted dogfish	*Scyliorhinus canicula*	2 individual	
Starry smoothound	*Mustelus asterias*	16 individuals	20 individuals
Thornback ray	*Raja clavata*	1 individual	
Unidentified sharks	*Elasmobranchii*	1 individual	

Table 7. Overview of number of trips by the Dutch and German pelagic fleet and sampled observer trips within the **Dutch** and **German** observer programme for 2017 and 2018.

Year	Country	Quarter	Nr trips pelagic fleet	Nr trips sampled
2017	NLD	1	18	3
		2	13	2
		3	24	3
		4	18	4
	DEU	1	13	2
		2	12	1
		3	10	1
		4	12	2*
2018	NLD	1	20	3
		2	19	3
		3	24	2
		4	21	4
	DEU	1	13	1
		2	15	1
		3	12	0
		4	10	1**

* In addition three self-sampling trips were carried out in this quarter

** In addition two self-sampling trips were carried out in this quarter

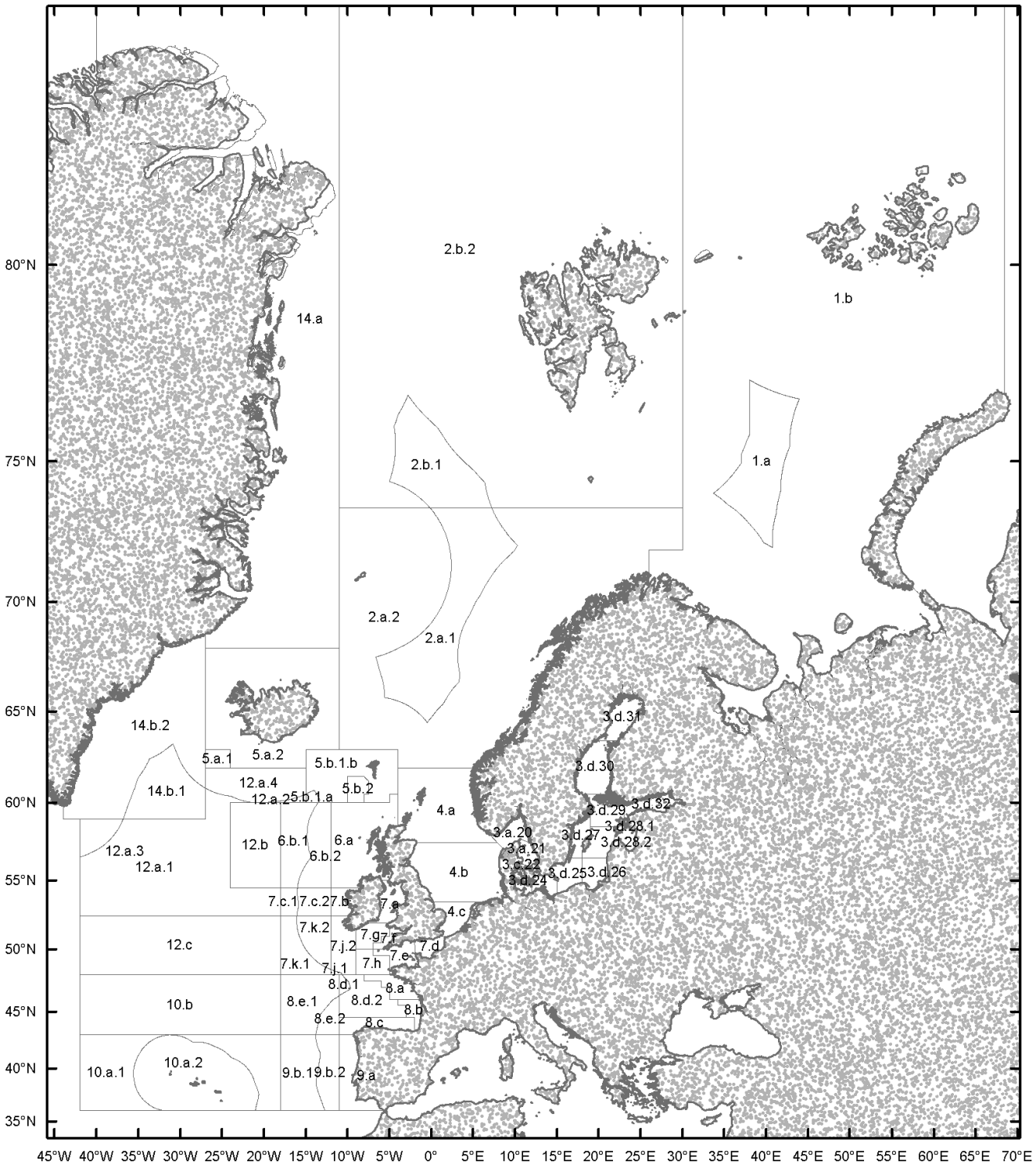

Figure 1. Map of ICES areas (www.ices.dk)

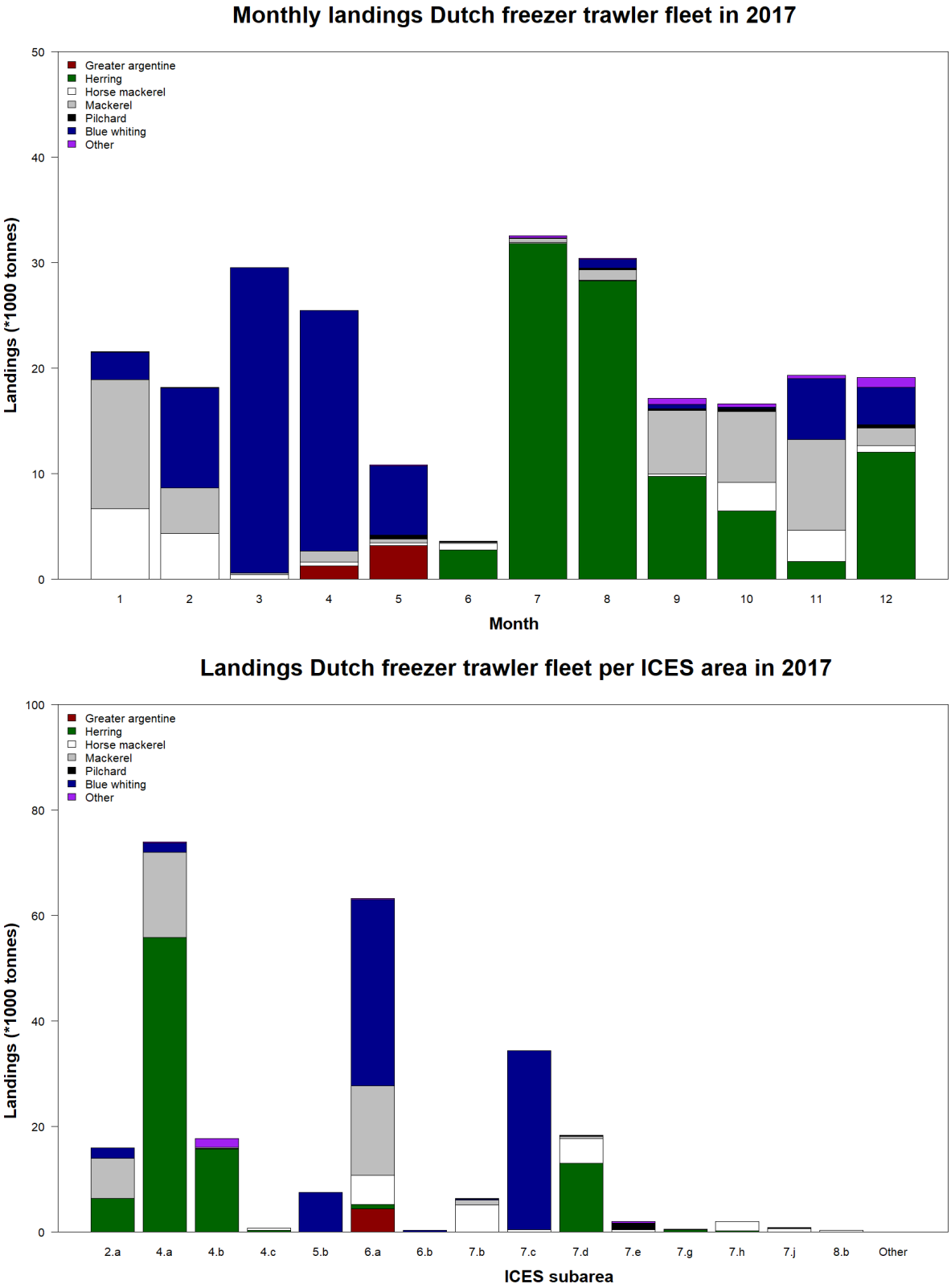

Figure 2a. Landings (*1000 tonnes) from the **Dutch** freezer trawler fleet in **2017**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from VISSTAT database. Note that these two panels panel have a different scale in comparison with the panels in Figures 2cd.

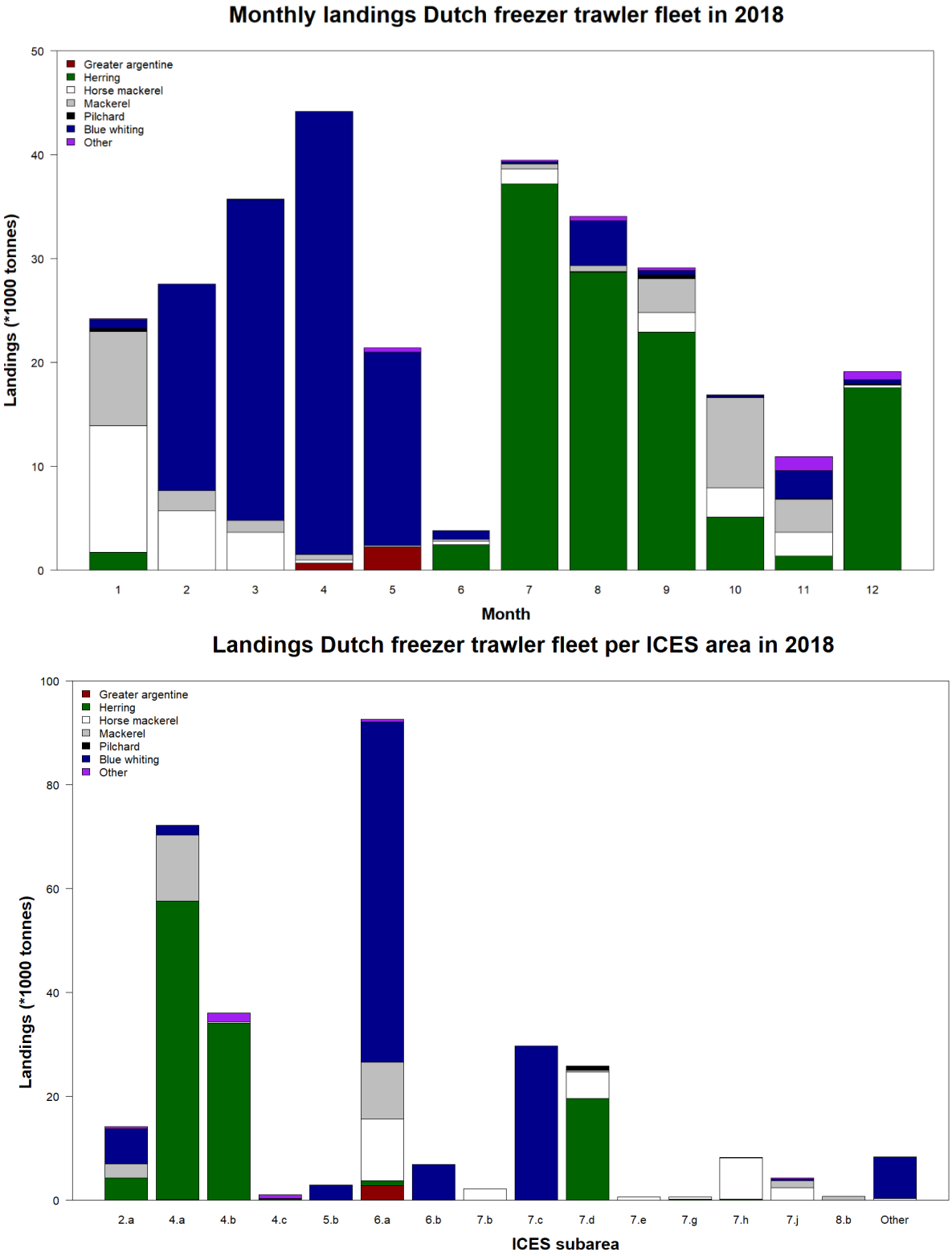

Figure 2b. Landings (*1000 tonnes) from the **Dutch** freezer trawler fleet in **2018**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from VISSTAT database. Note that these two panels panel have a different scale in comparison with the panels in Figures 2cd.

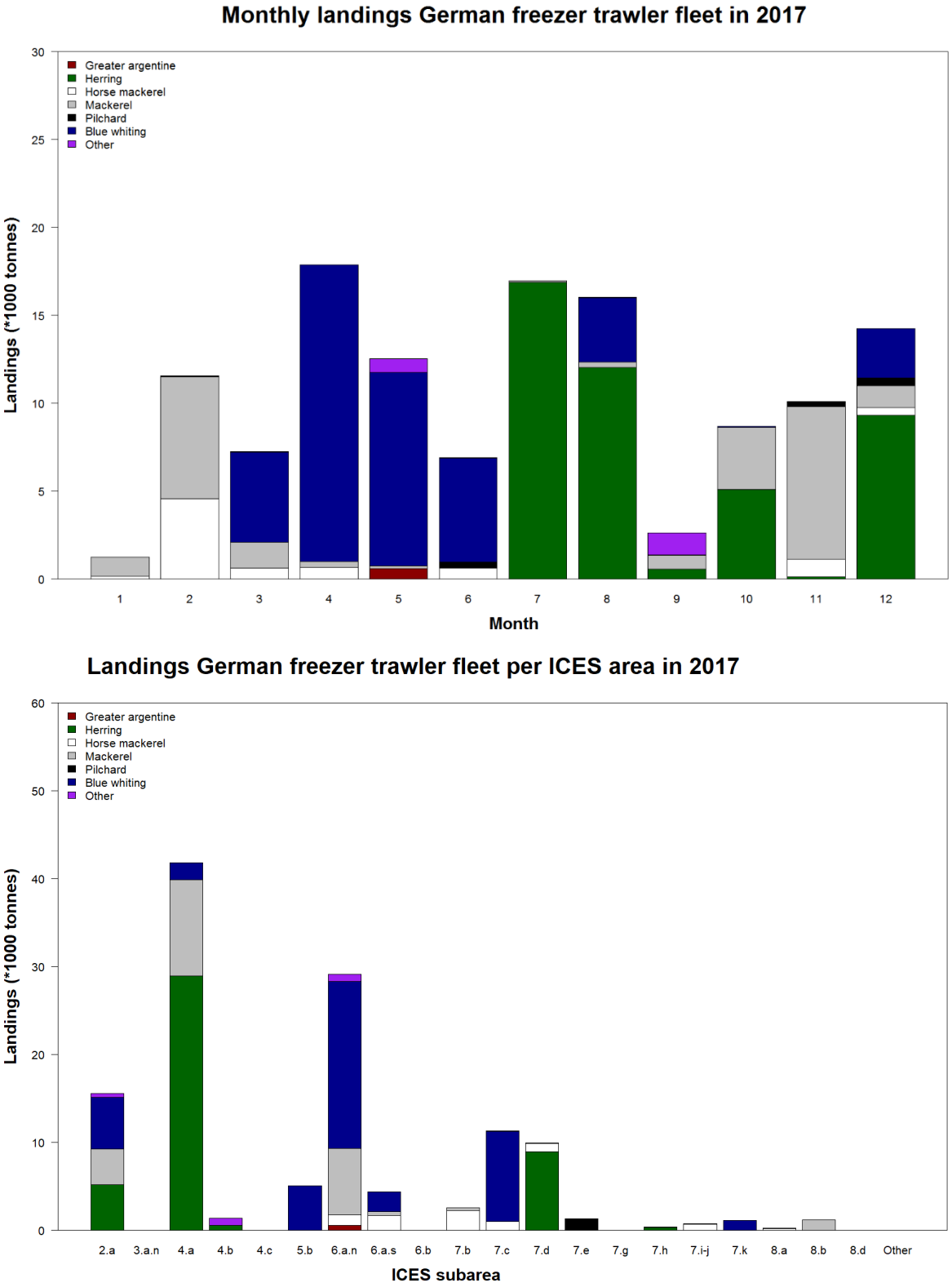

Figure 2c. Landings (*1000 tonnes) from the **German** freezer trawler fleet in **2017**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from FiStat database. Note that these two panels panel have a different scale in comparison with the panels in Figures 2ab.

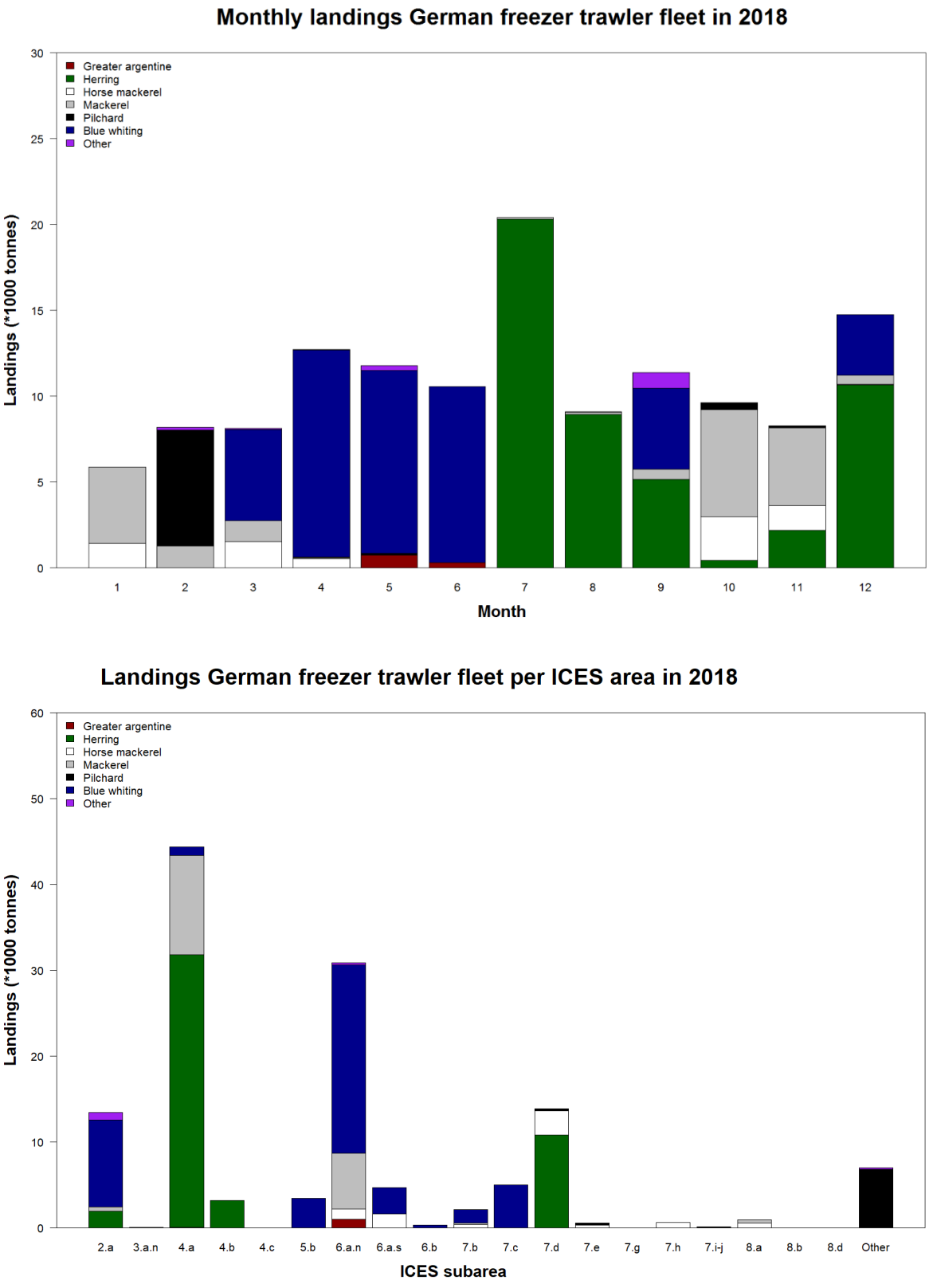

Figure 2d. Landings (*1000 tonnes) from the **German** freezer trawler fleet in **2018**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from FiStat database. Note that these two panels panel have a different scale in comparison with the panels in Figures 2ab.

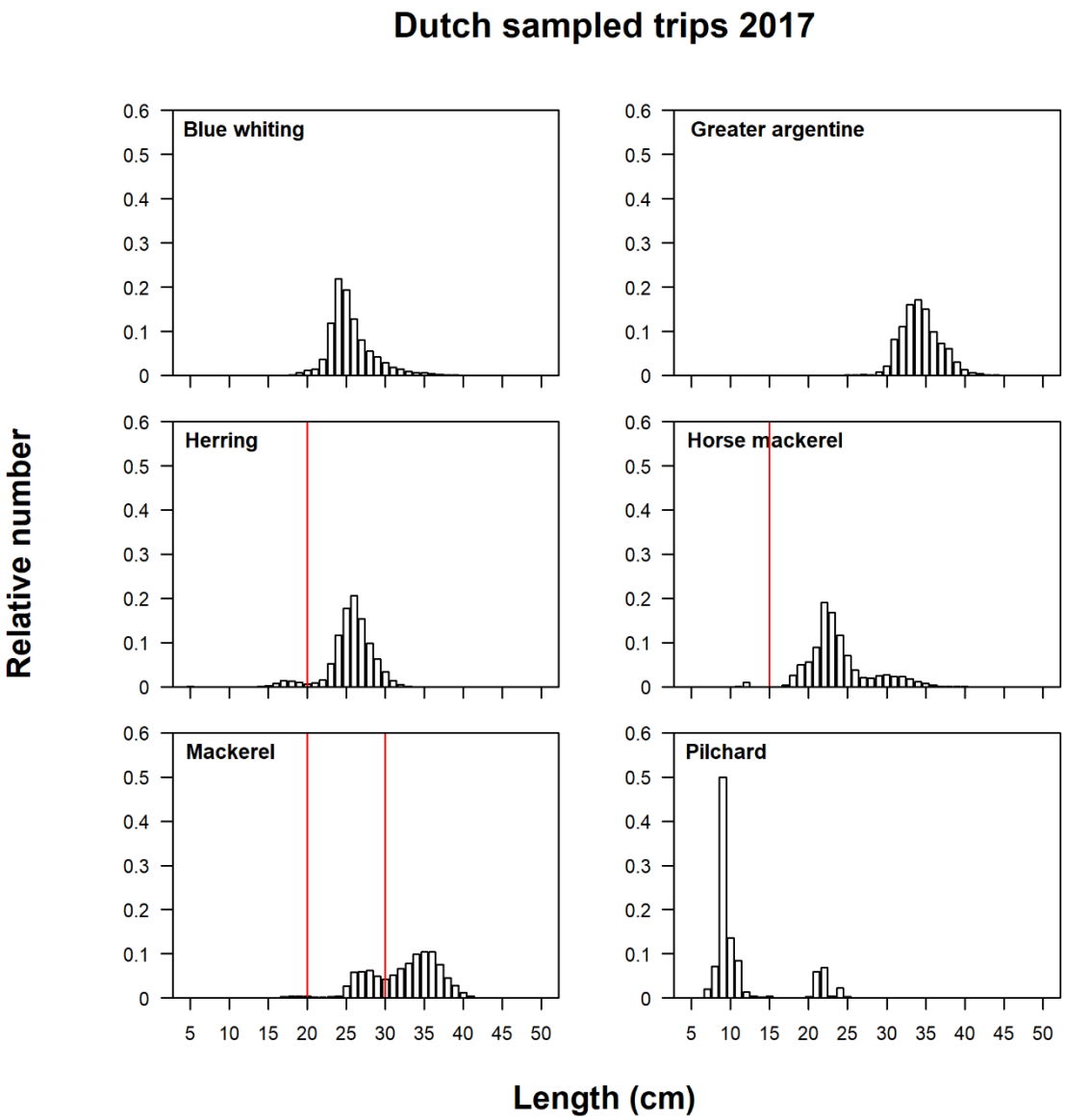

Figure 3a. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **Dutch** observer programme in **2017**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

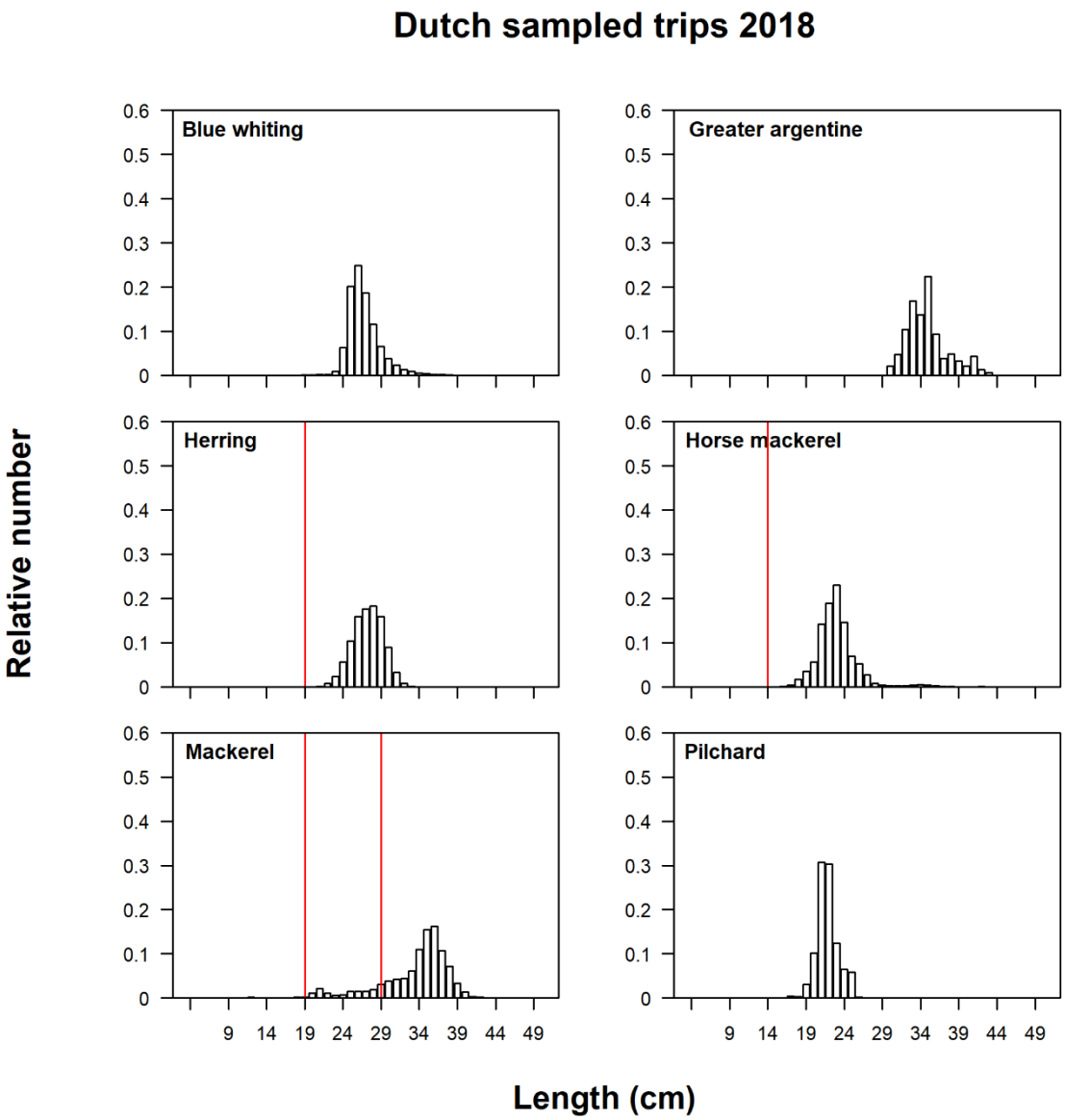

Figure 3b. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **Dutch** observer programme in **2018**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

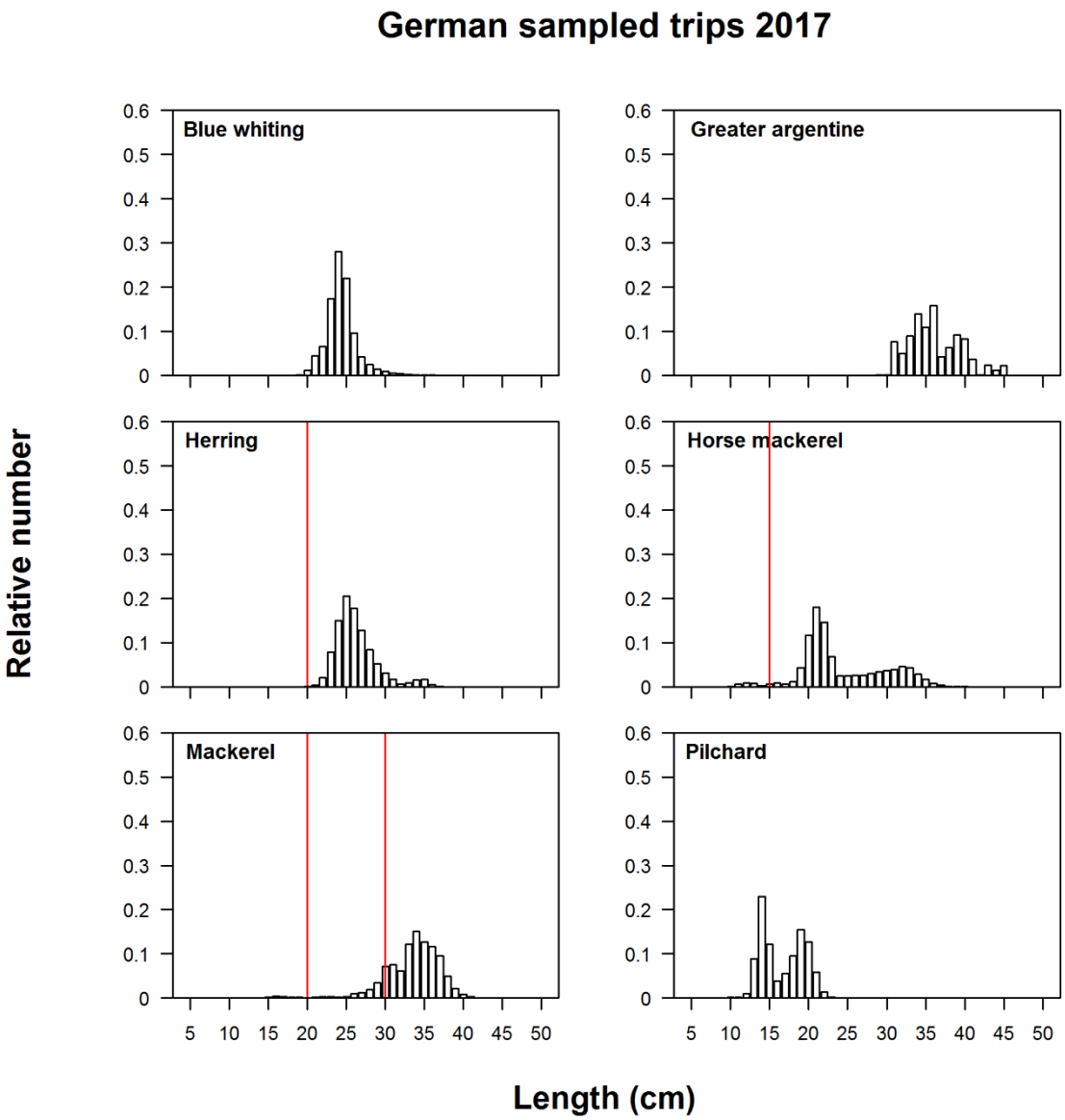

Figure 3c. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **German** observer programme in **2017**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

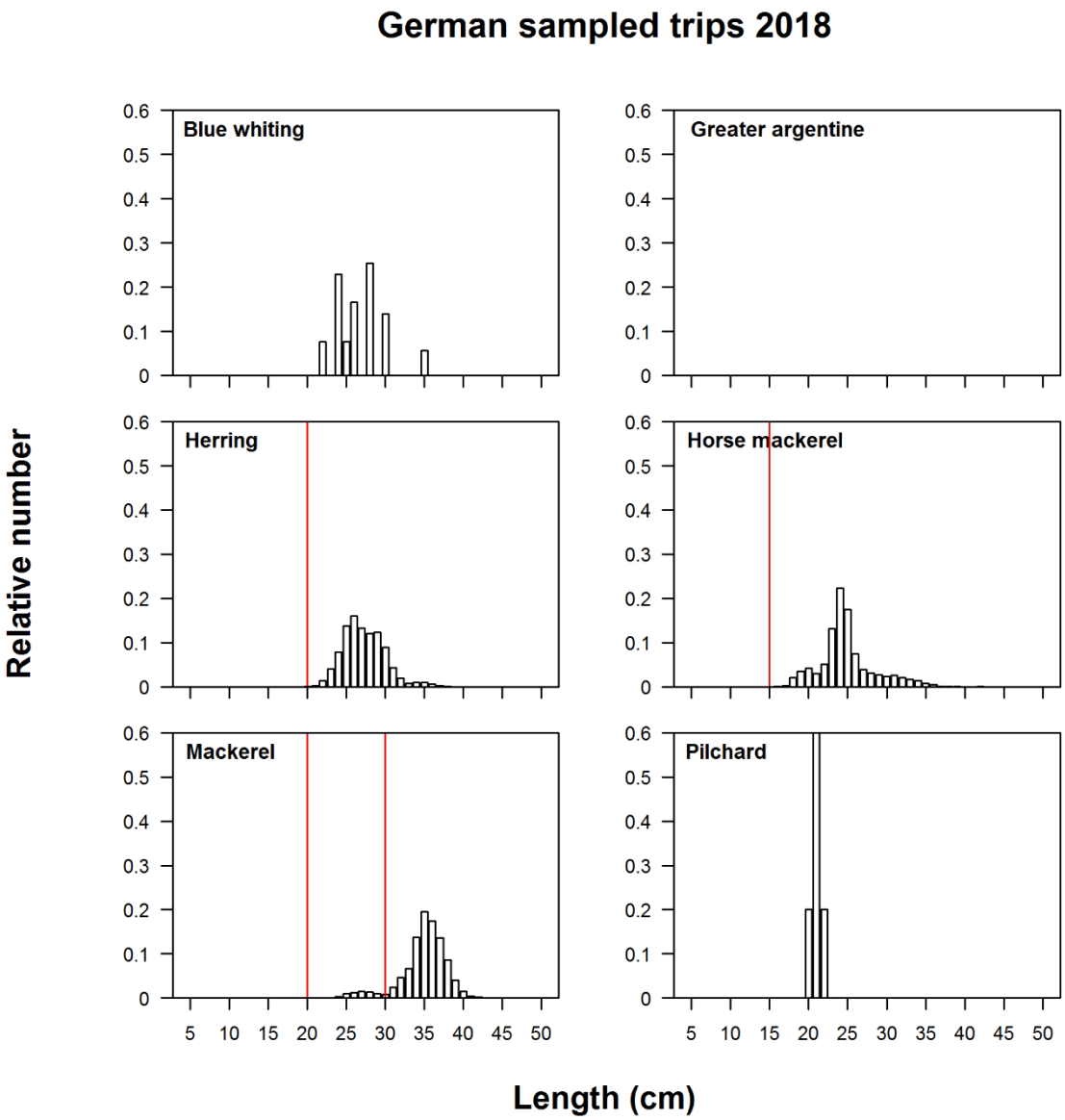

Figure 3d. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **German** observer programme in **2018**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

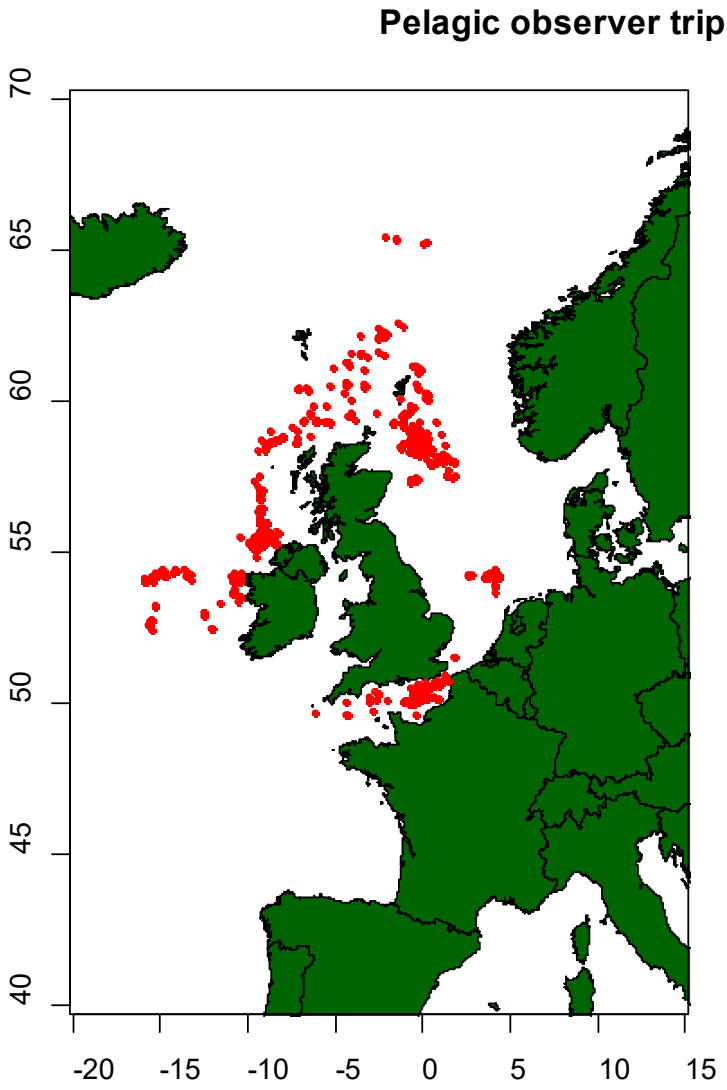

Figure 4a. Positions of sampled pelagic hauls within the **Dutch** and **German** observer programme per haul in **2017**.

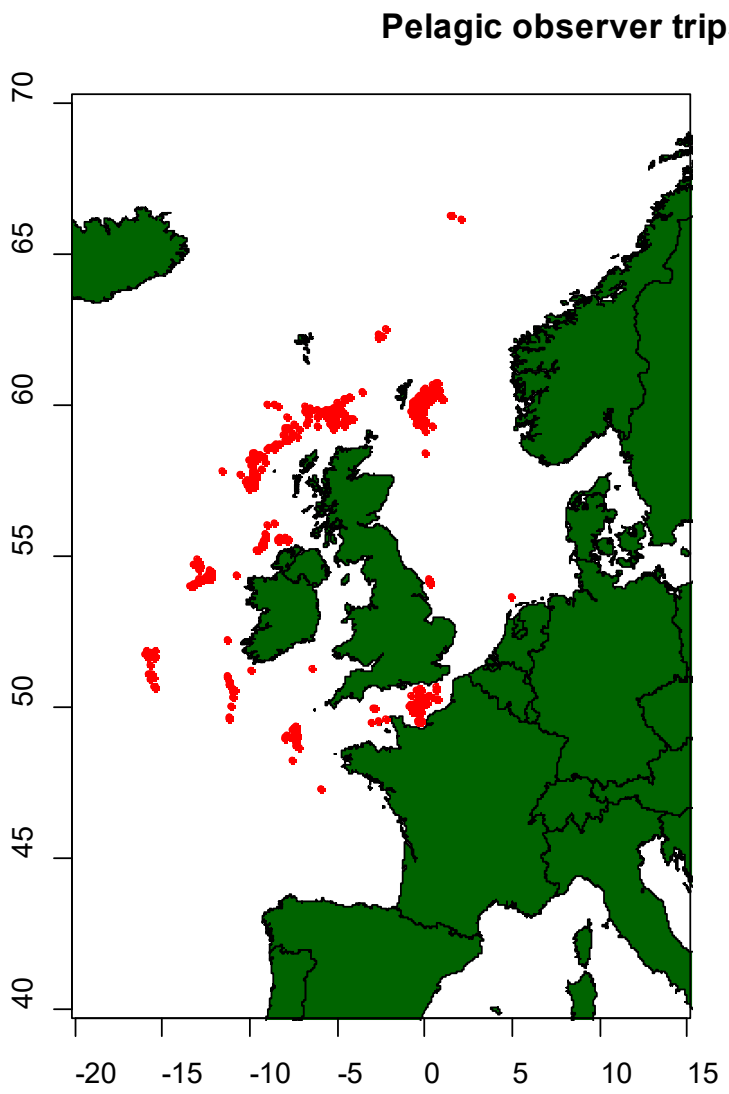

Figure 4b. Positions of sampled pelagic hauls within the **Dutch** and **German** observer programme per haul in **2018**.

Justification

CVO Report: 20.004
Project number: 4311213035 and 4311213036

The quality of this report has been peer reviewed by a colleague scientist and the head of CVO.

Approved by:	Jurgen Batsleer researcher
Signature:	
Date:	23th of January 2020

Approved by:	Ing. S.W. Verver Head Centre for Fisheries Research
Signature:	
Date:	23th of January 2020