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Catch sampling of the pelagic freezer trawler fishery operating in European waters in 2015-2016
Joint report of the Dutch and German national sampling programmes

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Summary

The pelagic freezer trawler fishery targets small pelagic species. The 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 the Dutch fleet operating in European waters of these species were about 208,000 tonnes in 2015 and about 238,000 tonnes in 2016. The total landings of the German fleet operating in European waters were about 116,000 tonnes in 2015 and about 104,000 tonnes in 2016. 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 2015 and 2016. The two programmes together correspond with a sampling coverage of around 17% of the total pelagic freezer trawler fleet effort (expressed in number of trips) in European waters in 2015-2016.

An important element in the reform of the Common Fishery 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 a discards monitoring towards a 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 (published in May 2017). Ultimately, under regional sampling, the Dutch and German pelagic sampling programmes are expected to integrate into a regional sampling programme together with other relevant programmes carried out by other MS.

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 2015 en 2016 werd van deze soorten uit Europese wateren respectievelijk 208,000 ton en 238,000 ton aangeland door de Nederlandse vloot. Door de Duitse vloot werd in 2015 en 2016 respectievelijk 116,000 ton en 114,000 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 voor de periode 2015-2016 17% van de totale 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. Uiteindelijk zal binnen een regionaal bemonsteringsprogramma de Nederlandse en Duitse pelagische bemonstering geïntegreerd moeten worden samen met andere relevante programma's die door andere lidstaten worden uitgevoerd.

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 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 holländischen Flotte betrugen dabei etwa 208000 Tonnen 2015 und etwa 238000 Tonnen 2016 für die oben (*Argentina silus*) aufgezählten Arten in europäischen Gewässern. Die Gesamtanlandungen der deutschen Flotte in europäischen Gewässern betrugen etwa 116000 Tonnen 2015 und etwa 104000 Tonnen 2016. 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 Fischereidatensammlung (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 wenigen Jahren wird versucht, diese beiden Programme zu harmonisieren und mehr zusammenzuarbeiten. Dieser Bericht ist eine Zusammenfassung der Aktivitäten innerhalb der Beobachterprogramme in den Jahren 2015 und 2016. Dabei liegt die Abdeckung bei etwa 17%, d.h. etwa 17% aller Reisen der pelagischen Schleppnetzfischerei in europäischen Gewässern wurden in den Jahren 2015 und 2016 durch wissenschaftliche Beobachter begleitet.

Ein wichtiges Element der Reform der Gemeinsamen Fischereipolitik (Common Fishery Policy - CFP) ist die Einführung der Anlandeverpflichtung. 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, das Bearbeitungsprozeduren und Protokolle angepasst werden mussten. Weiterhin ist mit der Reform der CPF das Konzept der Regionalisierung eingeführt worden. Damit soll die Zusammenarbeit von Mitgliedsländern 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 Fischereidatensammlung (veröffentlicht im Mai 2017) eingeführt. Deshalb wird letztendlich erwartet, dass die holländischen und deutschen pelagischen Beobachterprogramme im Rahmen dieser Regionalisierung in ein einziges regionales Stichprobenprogramm zusammen mit den Programmen anderer Mitgliedstaaten integriert werden.

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. 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 EC DCF (Box 2).

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, 2014; Verver 2015). 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 2015 and 2016. The data is used for further analyses within different projects, including stock assessment working groups.

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 ship. 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.

2 Methods

Information on landings and effort by the Dutch pelagic freezer fleet in 2015 and 2016 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 2015 and 2016 has been derived from the German FiStat 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. The selection procedure is ad hoc, 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 (CW_h)
   The observer estimates the total catch 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 and discard estimates.
2. Unsorted catch sample (Cw_h)
   An unsorted catch sample of 100-150 kg 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 is taken. 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 in the 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 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 ($Lw_{nonhc,s}$) 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 newly implemented landings 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*) is estimated after the processing of the haul in cooperation with the skipper and 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 is stored in a central database.

2.3 Raising procedures Dutch sampling programme

2.3.1 Raising the samples to haul level (see also haul level in Box 2)

Total weight per species

Total catch weight per species and haul ($CW_{h,s}$) 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 (CW_h) and the weight of the catch sample (Cw_h):

$$CW_{h,s} = Cw_{h,s} \times (CW_h / Cw_h)$$

Total length per species

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

$$CN_{l,h,s} = Cn_{l,h,s} \times (CW_h/Cw_h)$$

2.3.2 Raising sampled hauls to trip level (see also trip level in Box 2)

Total weight per species

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

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

Total length per species

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

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

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, not sampled hauls 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 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 ($LnonhN_{l,t,s}$) 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. Not sampled hauls 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):

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

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):

$$OLnonhWF \quad = N_t \times LnonhW$$

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 species by the Dutch fleet were about 208,000 tonnes in 2015 and 238,000 tonnes in 2016 (in European waters). The total landings of the German fleet were about 116,000 tonnes in 2015 and 104,000 tonnes in 2016 (in European waters).

Herring, blue whiting, mackerel and horse mackerel were the most abundant species landed (Table 1, Figure 2a-d). 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 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 targeted during the first half of the year. In 2016 this species was also targeted at the end of the year. Most of the catch was taken from ICES areas 6.a and 7.k. At the end of the year blue whiting was caught in the North Sea and Norwegian Sea (i.e. ICES areas 2.a, 4.a; Figures 2b,d). 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-July and pilchard during the second half of the year.

In total 52 species were reported by the Dutch and German fleet in the period 2015-2016; 34 and 37 species by the Dutch fleet in 2015 and 2016 respectively, and 17 and 20 species by the German fleet in 2015 and 2016 respectively. Next to the main target species, sprat (*Sprattus sprattus*), anchovy (*Engraulis encrasicolus*), hake (*Merluccius merluccius*) and boarfish (*Capros aper*) were frequently caught. A few vessels target sprat and anchovy for a limited amount of time in the period September-December. Hake and boarfish, on the other hand, are typical unwanted bycatch species. Hake is mainly caught as bycatch during the blue whiting fishery in January-July whereas boarfish is caught throughout the year.

3.2 Sampled trips

3.2.1 Number of sampled trips

Within the Dutch programme 12 trips were observed/monitored in 2015, from which 7 trips were on board Dutch flagged vessels, 2 trips on board UK flagged vessels, 2 trips on board French flagged vessels and 1 trip on board a German flagged vessel. In 2016, 12 trips were observed/monitored, from which 7 trips were on board Dutch flagged vessels, 3 trips on board German flagged vessels and 2 trips on board French flagged vessels (Table 3). It must be noted that the Dutch sampled German flagged vessels were 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.
Within the German sampling programme 6 and 5 trips were observed in 2015 and 2016, respectively. In case there is no space for an observer on-board, some additional samples of the target species are obtained by the ship´s crew during those trips (self-sampling) who are advised beforehand to take a random sample. Altogether, 4 self-sampling trips (3 trips in 2015 and 1 trip in 2016) 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 both the Dutch and German observer trips, namely the Celtic Sea, West of Scotland, North Sea, English Channel and Norwegian Sea. In addition, the Dutch sampled trips also visited the Bay of Biscay (Table 4, Figures 4a,b).

3.2.3 Sampled hauls

Within the Dutch sampling programme a total of 401 hauls in 2015 and 432 hauls in 2016 were sampled, which was 84% and 95% respectively of all hauls of the sampled trips (Table 3). During trip P143 it was not possible for the observer to collect samples of the unsorted catches. Therefore, sorted landings were sampled instead.

Within the German sampling programme a total of 211 hauls in 2015 and 163 hauls in 2016 were sampled by observers, which was 82% and 78% 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 40 and 26 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 and March targeted horse mackerel and mackerel (trips P134-P135, P146, G29, G36). In March the target species in the sampled trips shifted towards blue whiting (trips P136, P147) or mackerel (trip P148). In April the trips targeted blue whiting and greater argentine (trips P137, P149-P150, G30). Bycatches of hake could be substantial during these trips. Thereafter, during the summer months (June – September) the sampled trips mainly targeted herring (trips P138-P141, P151-P153, G31-G32, G37-G38) with occasional bycatches of mackerel. Trip P142 in August-September shows a transition in target species from herring to mackerel. Where blue whiting was a substantial bycatch species during the mackerel fishery. In October-November several species were targeted, namely herring, mackerel, horse mackerel, sprat and anchovy (trips P143-P144, P154-P155, G34, G39). In December the fishers targeted herring in the Eastern Channel (trips P145, P156-P157, G34, G39).

The average length distributions of observed 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 distributions of blue whiting and greater argentine in the German sampled trips in 2016 seem to differ from the length distributions for both species from the German sampled trips in 2015 and the Dutch sampled trips in 2015 and 2016. This is probably an artefact of the considerably smaller catches of blue whiting and greater argentine in the German sampled trips in 2016 not representing a normal-distributed catch sample. The length frequency distributions of herring from the German sampled trips in 2015 and 2016 show a second peak for larger herring. This second peak represents Atlantoscandian herring caught in ICES area 2 which are larger than the North Sea herring. Furthermore, the length frequencies of herring show a decrease in average length in both sampling programmes for the sampled years; decrease from 27.2cm to 26.4cm in the Dutch sampling programme and from 28.5cm to 26.7cm in the German sampling programme for 2015 and 2016 respectively. The length distribution of horse mackerel in the Dutch sampled trips in 2016 shows two distinct peaks. These two peaks are to a much lesser extent, or not at all, visible in the length distributions of horse mackerel in the Dutch sample trips in 2016 and in the German sampled trips in 2015 and 2016 respectively. Again, this likely is due to different fishing areas between countries and years resulting in the catch of different age cohorts.

4 Discussion

4.1 Results of the two sampling programmes

The two sampling programmes together correspond with a sampling coverage of around 17% of the total pelagic freezer trawler fleet effort (expressed in number of trips) in European waters in 2015-2016 (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 only samples the unsorted catch, regardless the subsequent classification by the crew.

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 are sufficiently represented in the sample. At present the catch sample size within the Dutch sampling programme is set at 100-150 kg (see section 2.1). Within the German sampling programme the size of the catch sample depends on the target species (see section 2.2). Practically, within the Dutch sampling programme catch sampling appears to be less than ideal; it is intense physical work to take such large samples and it is increasingly difficult and dangerous for the observers to take unsorted catch samples (see also section 4.2).

The results show that overall 40 and 26 species were observed in the Dutch and German sampling programme 2015-2016 respectively. A few interesting observations included anchovy, salmon, truncated sunfish and velvet belly. The first (i.e. anchovy) was caught in considerable amounts during trip P143 in October-November in 2015, while this species was not observed in the sampling programmes in 2013-2014. Salmon, the truncated sunfish and velvet belly were observed for the first time since the start of the observer programme. 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 6ab).

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 now also been observed in 2015 and 2016 (Table 6). The truncated sunfish and velvet belly were observed for the first time since the start of the Dutch and German observer programmes in 2002.

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 on board the fishing vessels. These catches must be recorded, landed and counted against the quotas. Landed catches of species below their minimum conservation reference size cannot be marketed for human consumption purposes. Details of the implementation the landing obligation are defined in the multiannual plans for pelagic fisheries in north-western waters (EU 1393/2014), south-western waters (EU 1394/2014; EU 2016/2377) and the North Sea (EU 1395/2014).

These details include the species covered for a specific region and/or fishery, provisions on catch documentation, minimum conservation reference sizes, and exemptions (for species that show ‘high’ survivability, or a specific *de minimis* discard allowance under certain conditions has been assigned).

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 able to sample 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, this was difficult as it appears that for some Dutch companies the purpose of damaged fish that has been assigned to be BMS on board the vessel may alter once landed in the harbour. Consequently, at present only unsorted catch is sampled within the Dutch sampling programme.

Since 2015, 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 due to the introduction of the landing obligation. 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 currently in the process of developing and describing the potential of using electronic/digital technology for sampling catches on board of the pelagic vessels.

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 and making the data available 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). Ultimately, under a regional sampling plan the two sampling programmes are expected to merge together 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.

Furthermore, we need 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 pose 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.

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 lacks information on the sampling coverage of these observations. Therefore, from 2017 onwards observers are advised within the German and Dutch sampling programme to record which percentage of the sorting process has been monitored on rare, incidental bycatches. Furthermore, for each haul observers record whether they are present during opening of the net.

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Quality assurance

CVO utilises an ISO 9001:2015 certified quality management system (certificate number: 187378CC1-2015-AQ-NLD-RvA). This certificate is valid until 15 September 2018. 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 **2015**. 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.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
ANE	0	0	0	0	1245	0	0	0	0	0	0	0	219	0	0	95	0	0	0	5	0	0	1564
ARU	0	0	0	0	0	0	0	2151	0	0	<1	0	0	0	0	0	2	0	0	0	0	0	2154
ARY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BIB	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	74	0	<1	1	0	20	0	0	<1	6	0	0	185	0	0	287
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	36	14	0	0	0	0	0	0	0	0	0	49
BSF	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
BSS	0	0	0	0	0	0	0	0	0	0	0	3	<1	0	0	0	0	0	0	0	0	0	3
COD	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
DAB	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
DGS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAP	0	0	0	0	<1	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	1
GAR	0	0	0	0	<1	0	0	0	0	0	0	<1	<1	0	0	0	0	0	0	0	0	0	1
GUG	0	0	0	<1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
GUR	<1	0	0	3	1	1	0	4	0	<1	0	0	0	0	<1	0	0	0	0	0	0	0	10
GUU	0	0	0	0	0	0	0	0	0	0	0	<1	<1	0	0	0	0	0	0	0	0	0	1
GUX	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	1	7	0	0	10	0	2	0	0	0	0	<1	0	1	0	0	<1	0	0	21
HER	4478	0	30	44100	10556	9	0	954	0	0	0	15091	111	14	1201	92	0	0	0	0	0	0	76636
HKE	0	0	0	8	0	0	0	278	0	15	21	0	0	0	0	0	235	3	0	10	0	0	569
HOM	0	0	0	10	1	53	0	6179	0	7319	1721	2900	856	69	<1	121	7831	74	0	633	0	0	27767
HUU	0	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	<1
JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEE	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	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
MAC	6989	1	16	16187	278	12	0	6288	0	3986	235	150	20	0	1	125	2664	9	0	1497	0	0	38456

Table 1a. Continued.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
MAS	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	15	1	0	0	1	0	0	0	0	<1	0	<1	0	0	0	0	0	0	0	17
OTH	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	2	0	0	0	0	0	36	1048	5	0	66	0	0	0	<1	0	0	1156
POK	0	0	0	41	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49
POL	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
REB	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
RED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REG	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
SAA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBG	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
SOL	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
SPG	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
SPR	0	0	0	<1	1206	1214	0	0	0	0	0	0	346	0	0	0	0	0	0	0	0	0	2766
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
SQT	0	0	0	0	0	0	0	69	0	<1	6	0	<1	0	0	0	31	0	0	0	0	0	106
SQU	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
WHB	504	8	0	3	0	0	0	30987	1319	27	5506	0	<1	0	0	0	134	17767	0	0	0	0	56255
WHG	0	0	0	30	6	7	0	10	0	<1	1	4	2	2	19	2	0	0	0	0	0	0	84

* 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 **2016**. 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.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8c	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	1	211	0	0	0	0	0	0	0	0	0	212
ARU	0	0	0	12	0	0	31	2488	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	2531
ARY	0	0	0	0	0	0	0	1	0	<1	<1	0	0	0	0	0	0	0	0	0	0	0	1
BFT	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
BIB	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	45	0	35	<1	0	<1	0	0	0	90	0	0	0	0	0	171
BON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
BRB	0	0	0	0	0	0	0	0	0	0	0	29	1	0	0	0	0	0	0	0	0	0	30
BSF	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
BSS	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
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	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
DGS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
GAP	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	<1	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	1
GUG	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8
GUR	0	0	0	1	1	0	0	1	0	2	<1	0	0	0	0	0	0	0	0	0	0	0	6
GUU	0	0	0	0	0	<1	0	1	0	<1	0	<1	0	0	0	0	0	0	0	0	0	0	1
GUX	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	5	32	0	0	28	0	19	<1	0	0	0	0	0	5	0	0	0	0	0	89
HER	3267	0	0	66645	17227	153	99	361	0	5	0	14663	0	0	903	121	1	0	0	0	0	<1	103444
HKE	0	0	0	6	<1	0	0	608	0	7	2	0	0	0	0	0	122	0	0	0	0	0	745
HOM	<1	0	0	129	1	39	<1	9218	0	8275	2070	3473	252	0	0	0	3724	0	0	1	0	14	27196
HUU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1
LUM	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
MAC	8593	0	0	10128	203	3	5	13462	0	826	1	568	120	0	0	0	2310	0	0	207	0	0	36425

Table 1b. Continued.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
MAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	711	711
NOP	0	0	0	8	<1	0	0	1	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	8
OTH	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	29	0	0	0	0	0	0	521	4102	0	0	4	0	0	0	67	0	1511	6234
POK	0	0	0	70	<1	0	1	212	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	82
POL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REB	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
RED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
SAE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
SBG	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1
SFV	0	0	0	0	0	0	0	<1	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	<1
SOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPG	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	951	812	0	0	0	0	0	0	231	0	0	0	0	0	0	0	0	0	1994
SQR	0	0	0	<1	<1	0	0	2	0	<1	<1	<1	0	0	0	0	0	0	0	0	0	<1	3
SQS	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1
SQT	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
USK	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
WHB	2404	0	0	6889	0	0	5113	29033	0	22	5213	0	0	0	0	0	69	8211	0	1009	0	2	57966
WHG	0	0	0	37	11	1	0	47	0	2	<1	1	4	0	5	0	1	0	0	0	0	0	110

* 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 **2015**. 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.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARU	0	0	0	0	0	0	40	1027	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1066
ARY	0	0	0	0	0	0	56	978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1035
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BIB	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	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	5
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	0	0	0	0	0	0	0	0	0	0	5
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
DGS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAP	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
GUX	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	2660	0	128	32070	106	0	0	3292	0	0	0	12006	0	0	0	477	0	0	0	0	0	0	50739
HKE	0	0	0	0	0	0	0	48	0	0	3	0	0	0	0	0	21	0	0	0	0	0	72
HOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JAX	0	0	0	6	0	0	0	1980	0	2034	588	644	345	0	0	66	4349	0	44	0	4	0	10061
LEE	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	2963	0	1	6041	0	0	0	11599	0	709	0	21	0	0	0	0	2050	0	1113	1731	2016	0	28243

Table 1c. Continued.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
MAS	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	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
OTH	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
PIL	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
POK	0	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
POL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RED	231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	231
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBG	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
SOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPG	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	24	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
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
SQT	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	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	20
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	108	0	0	0	0	0	1851	11897	766	1	2849	0	0	0	0	0	247	6388	0	0	0	0	24107
WHG	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18

* 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 **2016**. 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.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
ANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5
ARU	0	0	0	39	0	0	38	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	305
ARY	0	0	0	93	0	0	80	590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	762
BFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BIB	0	0	0	19	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
BOC	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
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	7	0	0	0	0	0	0	0	0	0	0	7
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	1	0	0	0	0	0	0	0	0	0	0	1
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
DGS	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
FRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAP	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
GUX	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAD	0	0	0	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
HER	2582	0	125	27926	3368	0	0	1028	0	0	0	12871	0	0	419	0	0	0	0	0	0	0	48319
HKE	0	0	0	0	0	0	0	46	0	1	2	0	0	0	0	0	0	0	0	0	0	0	50
HOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JAX	0	0	0	34	0	0	0	4069	0	3892	367	1873	0	0	0	92	1716	0	0	0	0	0	12043
LEE	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	<0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAC	3499	0	0	10169	1	0	0	7075	0	402	0	288	0	0	0	0	707	0	0	0	0	0	22141

Table 1d. Continued.

	2a	2b	3a	4a	4b	4c	5b	6a	6b	7b	7c	7d	7e	7f	7g	7h	7j	7k	8a	8b	8d	Unknown	Total*
MAS	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	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
OTH	0	0	0	<0.1	<0.1	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	332	0	0	0	93	0	0	0	0	0	0	425
POK	0	0	0	6	2	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
POL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBG	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
SOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPG	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	110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110
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
SQT	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
USK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WHB	1739	0	0	3541	0	0	1992	6042	0	1	4200	0	0	0	0	0	7	2503	0	0	0	0	20025
WHG	0	0	0	50	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51

* 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
BIB	*Trisopterus luscus*	Bib
BOC	*Capros aper*	Boarfish
BON	*Sarda sarda*	Atlantic bonito
BRB	*Spondyliosoma cantharus*	Black sea bream
BSC	*Pagrus caeruleostictus*	Bluespotted seabream
BSF	*Aphanopus carbo*	Black scabbardfish
BSS	*Dicentrarchus labrax*	Sea bass
COD	*Gadus morhua*	Cod
DAB	*Limanda limanda*	Dab
DGS	*Squalus acanthias*	Spurdog
FRI	*Auxis thazard*	Frigate tuna
GAP	*Galeus boardmani*	Australian sawtail catshark
GAR	*Belone belone*	Garfish
GUG	*Eutrigla gurnardus*	Grey gurnard
GUR	*Eutrigla gurnardus*	Red gurnard
GUU	*Trigla lucerna*	Tub gurnard
GUX	*Triglidae*	
HAD	*Melanogrammus aeglefinus*	Haddock
HER	*Clupea harengus*	Herring
HKE	*Merluccius merluccius*	Hake
HOM	*Trachurus trachurus*	Horse mackerel
HUU	*Cheilinus trilobatus*	Tripletail wrasse
JAX	*Trachurus* spp.	Scads and horse mackerels
LEE	*Lichia amia*	Leerfish
LUM	*Cyclopterus lumpus*	Lumpfish
MAC	*Scomber scombrus*	Mackerel
MAS	*Scomber japonicus*	Chub mackerel
NOP	*Trisopterus esmarkii*	Norway pout
OTH		Unidentified
PIL	*Sardina pilchardus*	Pilchard
POK	*Pollachius virens*	Saithe
POL	*Pollachius pollachius*	Pollack lythe
REB	*Sebastes mentella*	Deepwater redfish
RED	*Sebastes* sp.	Sebastes
REG	*Sebastes marinus*	Golden redfish
SAA	*Sardinella aurita*	Round sardinella
SAE	*Sardinella maderensis*	Short-body sardinella
SBG	*Sparus aurata*	Gilt head
SFV	*Sebastes viviparus*	Norway redfish
SOL	*Solea solea*	Sole
SPG	*Sebastes pinniger*	Chilipepper rockfish
SPR	*Sprattus sprattus*	Sprat
SQR	*Loligo vulgaris*	European squid

Table 2. Continued.

Species code	Scientific name	English name
SQS	*Martialia hyadesi*	Sevenstar flying squid
SQT	*Lolliguncula* spp	Thumbstall squids
SQU	*Loliginidae*	Squids
USK	*Brosme brosme*	Tusk
WHB	*Micromesistius poutassou*	Blue whiting
WHG	*Merlangius merlangus*	Whiting

Table 3. Overview of sampled trips in **2015** and **2016** in the **Dutch** and **German** observer programme.

Year	Trip	Sampling programme	Flag vessel	Nr of hauls	Nr of hauls sampled **	% of hauls sampled
2015	P134	NLD	NLD	42	42	100%
	P135	NLD	NLD	27	26	96%
	P136	NLD	FR	34	29	85%
	P137	NLD	DEU	74	74	100%
	P138	NLD	FR	28	28	100%
	P139	NLD	NLD	42	37	88%
	P140	NLD	NLD	25	22	88%
	P141	NLD	UK	33	32	97%
	P142	NLD	NLD	47	47	100%
	P143	NLD	NLD	61	***	
	P144	NLD	NLD	48	48	100%
	P145	NLD	UK	16	16	100%
	G27*	DEU	DEU	NA	6	NA
	G28*	DEU	DEU	NA	3	NA
	G29	DEU	DEU	25	23	92%
	G30	DEU	DEU	25	19	76%
	G31	DEU	DEU	55	41	75%
	G32	DEU	DEU	49	42	86%
	G33*	DEU	DEU	NA	5	NA
	G34	DEU	DEU	42	36	86%
	G35	DEU	DEU	62	50	81%
2016	P146	NLD	DEU	34	26	77%
	P147	NLD	NLD	32	30	94%
	P148	NLD	DEU	25	23	92%
	P149	NLD	NLD	30	30	100%
	P150	NLD	NLD	59	57	97%
	P151	NLD	FR	30	30	100%
	P152	NLD	NLD	35	34	97%
	P153	NLD	NLD	22	22	100%
	P154	NLD	FR	27	26	96%
	P155	NLD	NLD	39	36	92%
	P156	NLD	DEU	68	68	100%
	P157	NLD	NLD	55	50	91%
	G36	DEU	DEU	70	48	69%
	G37	DEU	DEU	30	27	90%
	G38	DEU	DEU	28	20	71%
	G39	DEU	DEU	46	39	85%
	G40*	DEU	DEU	NA	2	NA
	G41	DEU	DEU	34	29	85%

* Self-sampling by industry

** Including hauls with zero catch

*** During this trip it was not possible for the observer to sample unsorted catches. Therefore, sorted landings were sampled.

Table 4. Period, target species and ICES areas of the trips conducted during the **Dutch** observer programme in **2015** and **2016**.

Year	Trip	Period**	Target species***	ICES areas
2015	P134	Jan, Feb	Horse mackerel, mackerel	7bhj, 8
	P135	Feb, Mar	Horse mackerel, mackerel	7e, 8
	P136	Mar, Apr	Blue whiting, horse mackerel, mackerel	6a, 7bcej
	P137	May, Jun	Blue whiting, greater argentine	5b, 6a
	P138	Jun	Herring	4a
	P139	Jul	Herring	4a
	P140	Jul-Aug	Herring	4a
	P141	Aug	Herring	4b, 6a
	P142	Aug, Sep	Herring	4ab, 2a
	P143	Oct, Nov	Anchovy, herring, horse mackerel, mackerel, sprat	4abc, 6a, 7b
	P144	Oct, Nov	Horse mackerel	4ab, 7deg
	P145	Dec	Herring, horse mackerel	7de
	G27*	Jan	Mackerel	6a
	G28*	Jan	Mackerel	6a
	G29	Feb	Horse mackerel, mackerel	7bj
	G30	Apr	Blue whiting, greater argentines	5b, 6a
	G31	Jul	Herring	4a, 6a
	G32	Aug	Herring	4a
	G33*	Sep, Oct	Herring	2a
	G34	Oct	Mackerel, herring	2a, 4a
	G35	Dec	Herring	7d
2016	P146	Jan	Horse mackerel, mackerel	6a, 7d
	P147	Feb, Mar	Horse mackerel, blue whiting	6a, 7bcjk
	P148	Mar	Mackerel, horse mackerel	8
	P149	Apr	Blue whiting, greater argentine	6a
	P150	Apr, May	Blue whiting, greater argentine	6a
	P151	Jun	Herring	4a
	P152	Jul	Herring	4ab
	P153	Aug, Sep	Herring	4ab
	P154	Oct	Herring, mackerel	4ab
	P155	Nov	Sprat, herring, horse mackerel, mackerel	4bc, 7de
	P156	Dec	Herring	7d
	P157	Nov, Dec	Herring, horse mackerel	6a, 7cdej
	G36	Jan, Feb	Mackerel, horse mackerel	6a, 7bc
	G37	Jul	Herring	4ab
	G38	Sep	Herring	I5b, 6a
	G39	Oct	Mackerel, herring	2a, 4a
	G40*	Oct	Herring, horse mackerel	7de
	G41	Dec	Herring	7d

* 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 **2015** and **2016**.

Year	Trip	Month		Blue whiting	Greater argentine	Herring	Horse mackerel	Mackerel	Pilchard	Others*	Total	Not sampled
2015	P134	1,2	Catch	17.5			3087.2	242.6	0.3	67.0	3414.6	0
	P135	2,3	Catch			0.1	402.1	1454.5		1.5	1858.2	40
	P136	3,4	Catch	1372.1	3.4		1.5	163.5		0.2	1540.7	50
	P137	5,6	Catch	3104.6	2025.2					35.4	5165.2	0
	P138	6	Catch			1621.8		13.4			1635.2	0
	P139	7	Catch	0.8		3372.2		103.8		6.3	3483.1	5
	P140	7,8	Catch			1968.1	2.6	4.4			1975.1	29
	P141	8	Catch			3274.9		108.3		1.4	3384.6	0
	P142	8,9	Catch	247.1		616.0		2277.8		2.0	3142.9	0
	P143	10,11	Catch			196.3	437.2	886.8		1382.2	2902.5	0
	P144	10,11	Catch			630.7	802.7	887.3	412.9	156.5	2890.1	0
	P145	12	Catch			1450.2		3.9	<0.1	0.2	1454.3	0
2016	P146	1	Catch	0.1		14.2	402.2	831.0		1.8	1249.3	18
	P147	2,3	Catch	1945.8		41.0	258.4	890.9		36.7	3172.8	21
	P148	3	Catch				4.2	1255.0		4.6	1263.8	9
	P149	4	Catch	1466.0	297.0					130.0	1893.0	
	P150	4,5	Catch	2005.7	1257.9		160.0	141.8		207.0	3772.4	20
	P151	6	Catch			1584.6		1.9			1586.5	
	P152	7	Catch			3693.7	0.4	32.4		30.7	3757.2	15
	P153	8,9	Catch			2091.4	0.8	17.9			2110.1	
	P154	10	Catch			310.8	1.5	1245.8			1558.1	3
	P155	11	Catch			960.4	179.1	34.7	5.6	689.0	1868.8	37
	P156	12	Catch			3151.1	2.6	38.1	0.4	6.1	3198.3	
	P157	11,12	Catch			3568.8	26.0	13.1	2.9	58.4	3669.2	49

* Other species include: anchovy, anglerfish, black scabberdfish, black seabream, blackfish, boarfish, dab, European squid, garfish, golden redfish, grey gurnard, haddock, hake, John Dory, lumpsucker, Norway pout, pollack, poor cod, saithe, salmon, sea bass, sprat, squids, tope, tub gurnard, velvet belly and whiting. See also table 6a.

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 **2015** and **2016.** Commercial landings are landings for human consumption, non-commercial landings are landings according to the landing obligation.

Year	Trip	Month		Blue whiting	Greater argentine	Herring	Horse mackerel	Mackerel	Pilchard	Others*	Total	Not sampled
2015	G29	2	Com. Landings	4.6	0		883.8	329.7		5.4	1223.5	
			Non Com. Landings	<0.1	<0.1		3.6	1.1		4.1	8.8	
	G30	4	Com. Landings	1965.0	185.2					33.4	2183.6	
			Non Com. Landings	0	0					0	0	
	G31	7	Com. Landings			4096.0		124.7		4.2	4224.9	
			Non Com. Landings			1.1		0.4		0	1.5	
	G32	8	Com. Landings			4761.3	0	25.9		3.6	4790.8	
			Non Com. Landings			5.9	<0.1	0		0.1	6.0	
	G34	10	Com. Landings	66.7		1319.6	4.3	3212.7		1.6	4604.9	
			Non Com. Landings	0		0.8	0	4.6		<0.1	5.4	
	G35	12	Com. Landings			1295.0		1.9		<0.1	1296.9	
			Non Com. Landings			9.6		0		0	9.6	
2016	G36	1,2	Com. Landings	7.3	1.4	0.2	1702.4	2137.1		15.1	3863.5	
			Non Com. Landings	0.5	0	0	0	0.2		0.3	1.0	
	G37	7	Com. Landings			1386.7	0.5	5.8		0	1393.0	
			Non Com. Landings			1.6	0	0		0.1	1.7	
	G38	9	Com. Landings			1309.2		0.6		0	1309.8	
			Non Com. Landings			3.5		0		<0.1	3.5	
	G39	10	Com. Landings	82.6		1224.6		3422.1		0.2	4729.5	
			Non Com. Landings	0		4.4		8.0		0	12.4	
	G41	12	Com. Landings			993.5				1.3	994.8	
			Non Com. Landings			6.3				0	6.3	

* Other species include: anglerfish, beaked redfish, black seabream, cod, dab, grey gurnard, haddock, hake, John Dory, ling, lumpsucker, Norway pout, saithe, squids, tub gurnard and whiting. See also Table 6b.

Table 6a. Average amount of catch (tonnes) per sampled pelagic trip or total number observed for all sampled pelagic trips within the **Dutch** observer programme in **2015** and **2016**.

Species	Scientific name	2015 Average weight (tonnes)	2016 Average weight (tonnes)
Blue whiting	*Micromesistius poutassou*	395.2	450.8
Greater argentine	*Argentina silus*	169.1	129.6
Herring	*Clupea harengus*	1094.2	1284.7
Horse mackerel	*Trachurus trachurus*	394.4	86.3
Mackerel	*Scomber scombrus*	512.2	375.2
Pilchard	*Sardina pilchardus*	34.4	0.7
Anchovy	*Engraulis encrasicolus*	114.3	<0.1
Anglerfish	*Lophius piscatorius*		<0.1
Beaked redfish	*Sebastes mentella*		
Black scabbardfish	*Aphanopus carbo*		0.1
Black seabream	*Spondyliosoma cantharus*	1.3	0.5
Blackfish	*Centrolophus niger*	<0.1	
Boarfish	*Capros aper*	2.7	4.4
Cod	*Gadus morhua*		
Dab	*Limanda limanda*	<0.1	
European squid	*Loligo vulgaris*		<0.1
Garfish	*Belone belone*		0.2
Golden redfish	*Sebastes norvegicus*		0.3
Grey gurnard	*Eutrigla gurnardus*		0.9
Haddock	*Melanogrammus aeglefinus*	0.3	0.3
Hake	*Merluccius merluccius*	4.2	18.1
John Dory	*Zeus faber*		0.1
Ling	*Molva molva*		
Lumpsucker	*Cyclopterus lumpus*		<0.1
Norway pout	*Trisopterus esmarkii*	<0.1	
Pollack	*Pollachius pollachius*	0.1	0.2
Poor cod	*Trisopterus minutus*	<0.1	
Saithe	*Pollachius virens*		2.6
Salmon	*Salmo salar*		0.1

Sea bass	*Dicentrarchus labrax*	0.4	0.4

Table 6a. Continued.

Species	Scientific name	2015 Average weight (tonnes)	2016 Average weight (tonnes)
Sprat	*Sprattus sprattus*	11.7	57.2
Squids	*Loligo* sp.	1.7	0.1
Tope	*Galeorhinus galeus*	0.1	
Tub gurnard	*Chelidonichthys lucerna*		<0.1
Velvet belly	*Etmopterus spinax*		0.3
Whiting	*Merlangius merlangus*	0.8	0.2
Basking shark	*Halichoerus grypus*	4 individuals	
Bluefin tuna	*Thunnus Thynnus*	6 individuals	3 individuals
Bonito	*Sarda sarda*	1 individual	
Common dolphin	*Delphinus delphi*	1 individual	
Dogfish	*Squalus acanthias*		
Porbeagle	*Lamna nasus*		
Truncated sunfish	*Ranzania laevis*		2 individuals
Tuna	*Thunnus*	4 individuals	
Yellowfin tuna	*Thunnus albacaris*		2 individuals

Table 6b. Average amount of catch (tonnes) per sampled pelagic trip or total number observed for all sampled pelagic trips within the **German** observer programme in **2015** and **2016**.

Species	Scientific name	2015 Average weight (tonnes)	2016 Average weight (tonnes)
Blue whiting	*Micromesistius poutassou*	339.4	18.8
Greater argentine	*Argentina silus*	30.9	0.3
Herring	*Clupe harengus*	1944.4	986.0
Horse mackerel	*Trachurus trachurus*	148.6	341.4
Mackerel	*Scomber scombrus*	836.9	1115.9
Pilchard	*Sardina pilchardus*		
Anchovy	*Engraulis encrasicolus*		
Anglerfish	*Lophius piscatorius*		<0.1
Beaked redfish	*Sebastes mentella*	0.3	
Black scabbardfish	*Aphanopus carbo*		
Black seabream	*Spondyliosoma cantharus*	0.1	0.3
Blackfish	*Centrolophus niger*		
Boarfish	*Capros aper*	0.7	<0.1
Cod	*Gadus morhua*		<0.1
Dab	*Limanda limanda*		<0.1
European squid	*Loligo vulgaris*		
Garfish	*Belone belone*		
Golden redfish	*Sebastes norvegicus*		
Grey gurnard	*Eutrigla gurnardus*	<0.1	1.2
Haddock	*Melanogrammus aeglefinus*	<0.1	<0.1
Hake	*Merluccius merluccius*	11.1	2.0
John Dory	*Zeus faber*		<0.1
Ling	*Molva molva*	<0.1	
Lumpsucker	*Cyclopterus lumpus*		<0.1
Norway pout	*Trisopterus esmarkii*		<0.1
Pollack	*Pollachius pollachius*		
Poor cod	*Trisopterus minutus*		
Saithe	*Pollachius virens*	1.3	1.3
Salmon	*Salmo salar*		

Sea bass	*Dicentrarchus labrax*		

Table 6b. Continued.

Species	Scientific name	2015 Average weight (tonnes)	2016 Average weight (tonnes)
Sprat	*Sprattus sprattus*		
Squids	*Loligo* sp.	0.7	0.2
Tope	*Galeorhinus galeus*		
Tub gurnard	*Chelidonichthys lucerna*		<0.1
Velvet belly	*Etmopterus spinax*		
Whiting	*Merlangius merlangus*	<0.1	
Basking shark	*Halichoerus grypus*		
Bluefin tuna	*Thunnus Thynnus*		
Bonito	*Sarda sarda*		
Common dolphin	*Delphinus delphi*		17 individuals
Dogfish	*Squalus acanthias*	1 individual	9 individuals
Porbeagle	*Lamna nasus*		1 individual
Truncated sunfish	*Ranzania laevis*		
Tuna	*Thunnus*		1 individual
Yellowfin tuna	*Thunnus albacaris*		

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 2015 and 2016.

Year	Country	Quarter	Nr trips pelagic fleet	Nr trips sampled
2015	NLD	1	15	3
		2	10	2
		3	18	4
		4	20	3
	DEU	1	10	1*
		2	5	1
		3	12	2**
		4	12	2**
2016	NLD	1	13	3
		2	8	3
		3	21	2
		4	19	4
	DEU	1	10	1
		2	8	0
		3	12	2
		4	11	2**

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

** In addition one self-sampling trip was carried out in this quarter

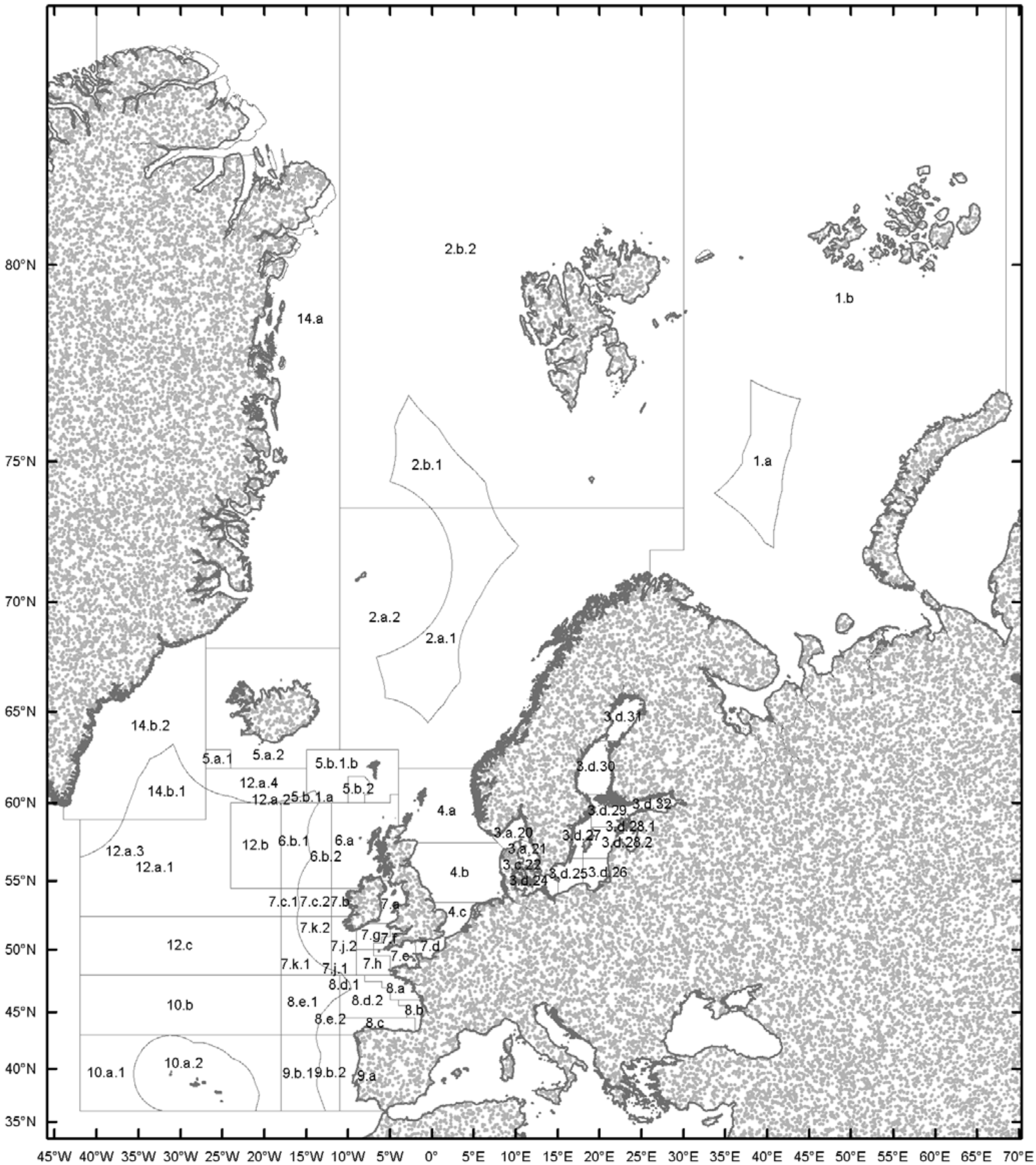
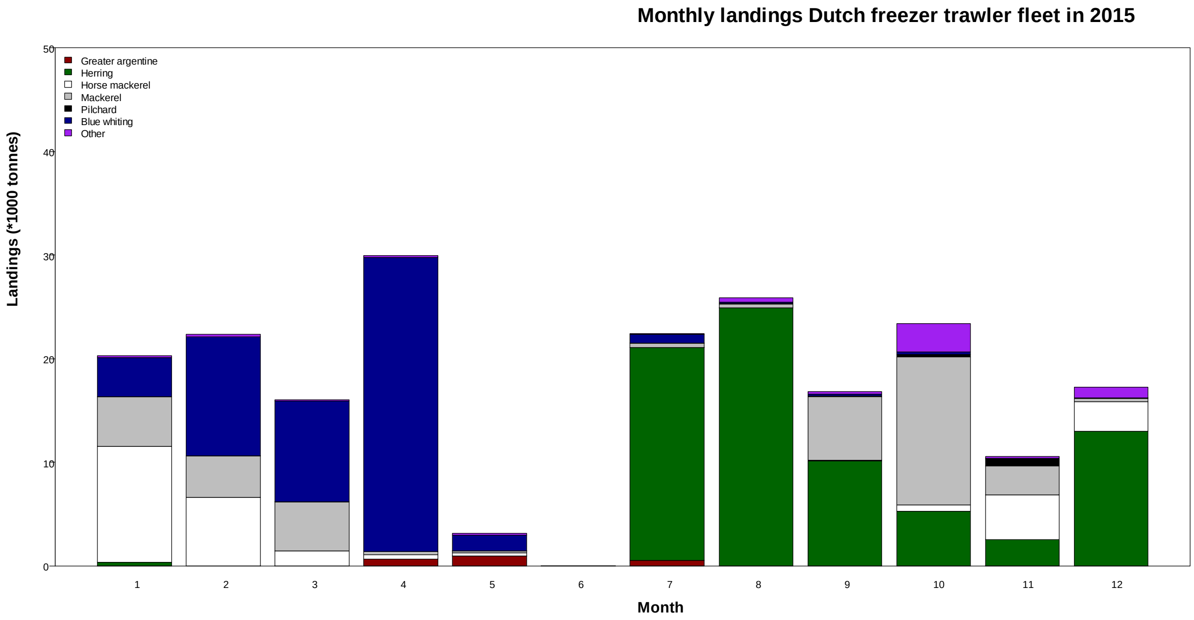


Figure 1. Map of ICES areas (www.ices.dk)



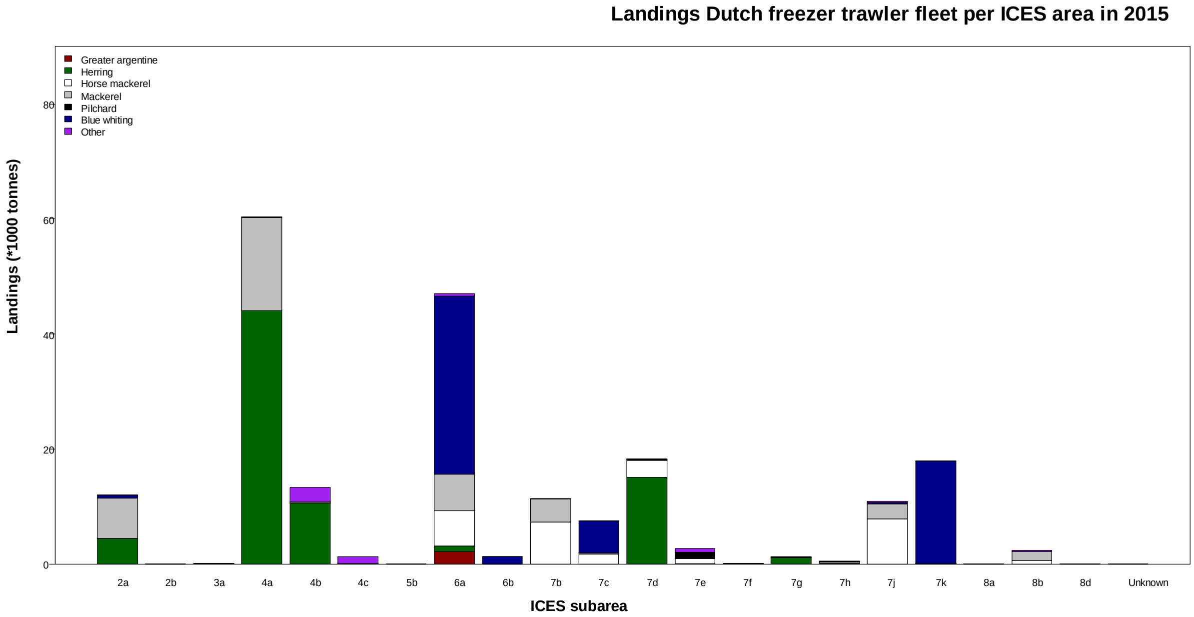
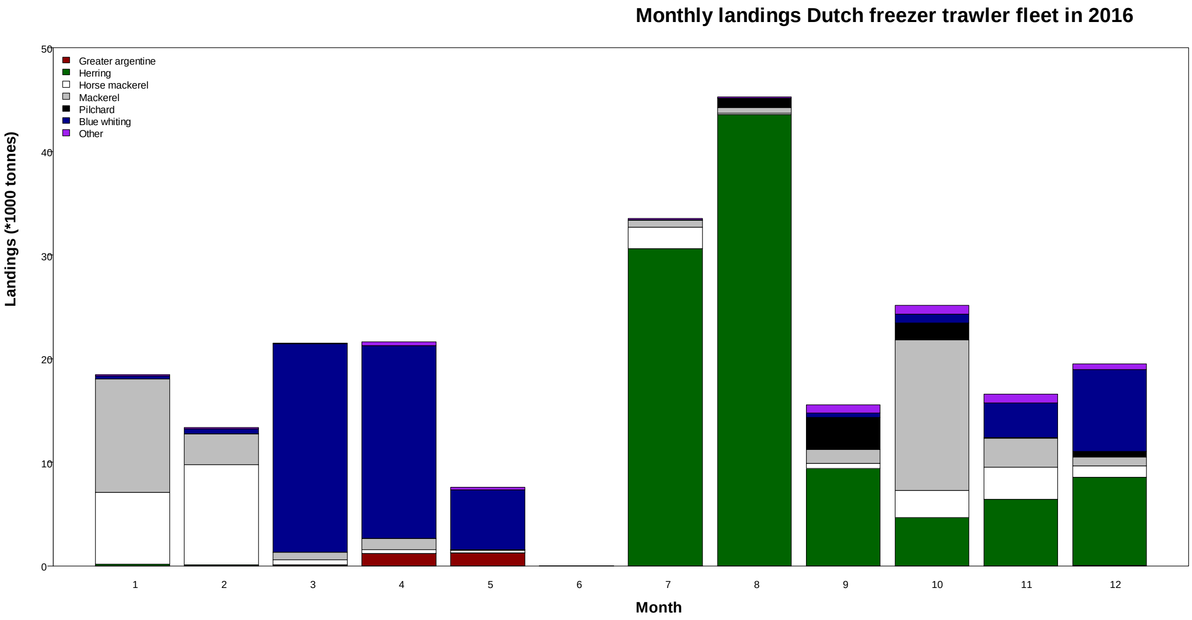


Figure 2a. Landings (*1000 tonnes) from the **Dutch** freezer trawler fleet in **2015**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from VISSTAT database.



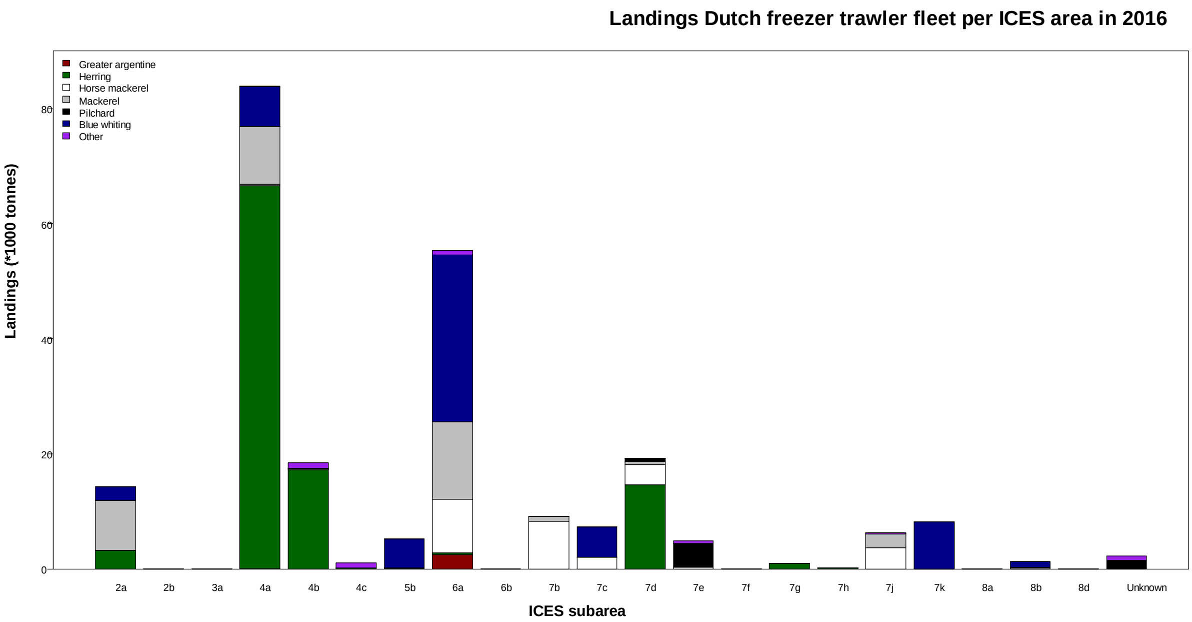


Figure 2b. Landings (*1000 tonnes) from the **Dutch** freezer trawler fleet in **2016**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from VISSTAT database.

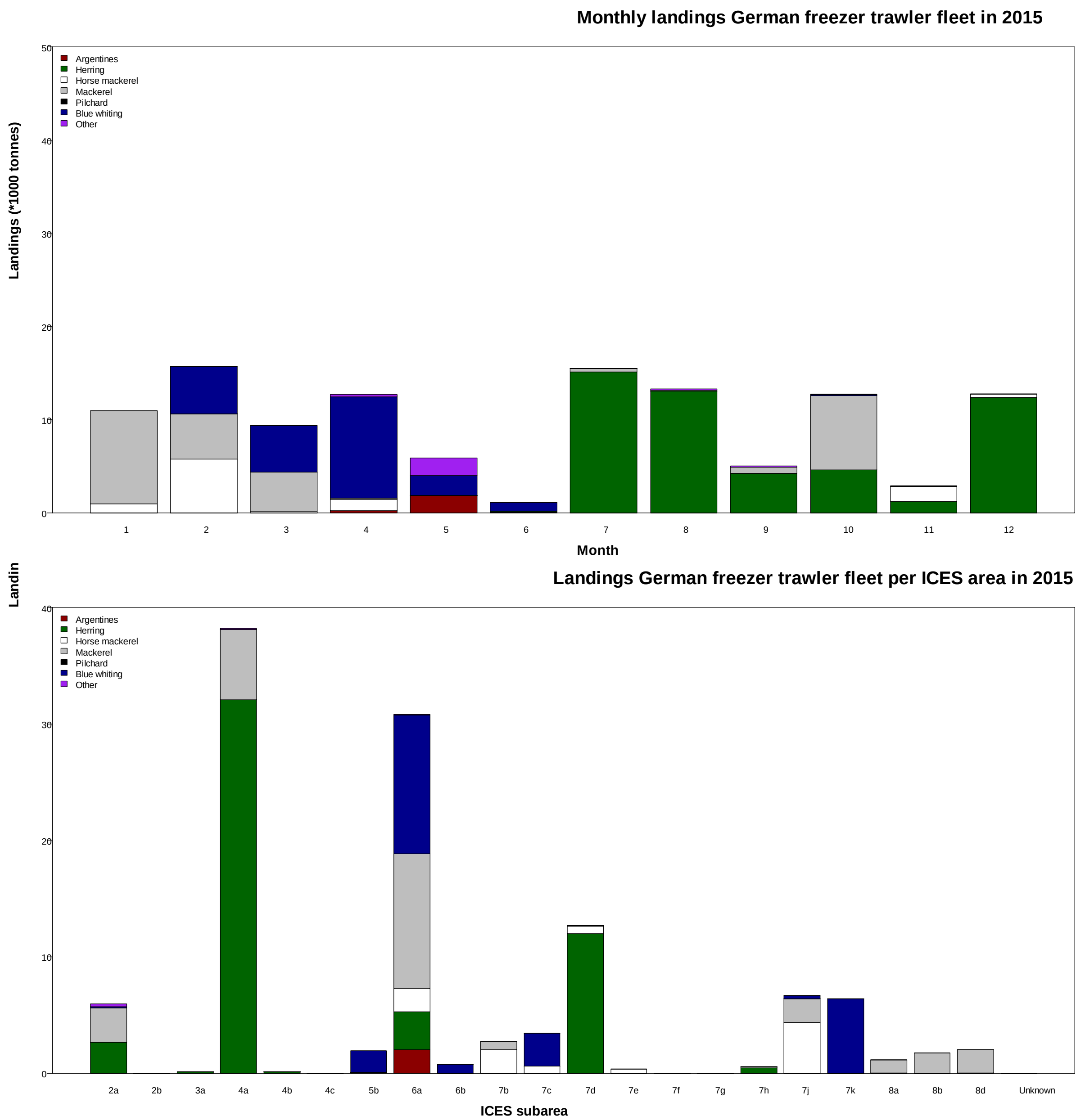


Figure 2c. Landings (*1000 tonnes) from the **German** freezer trawler fleet in **2015**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from FiStat database. Note that the lower panel has a different scale in comparison with the lower panels in Figures 2ab.

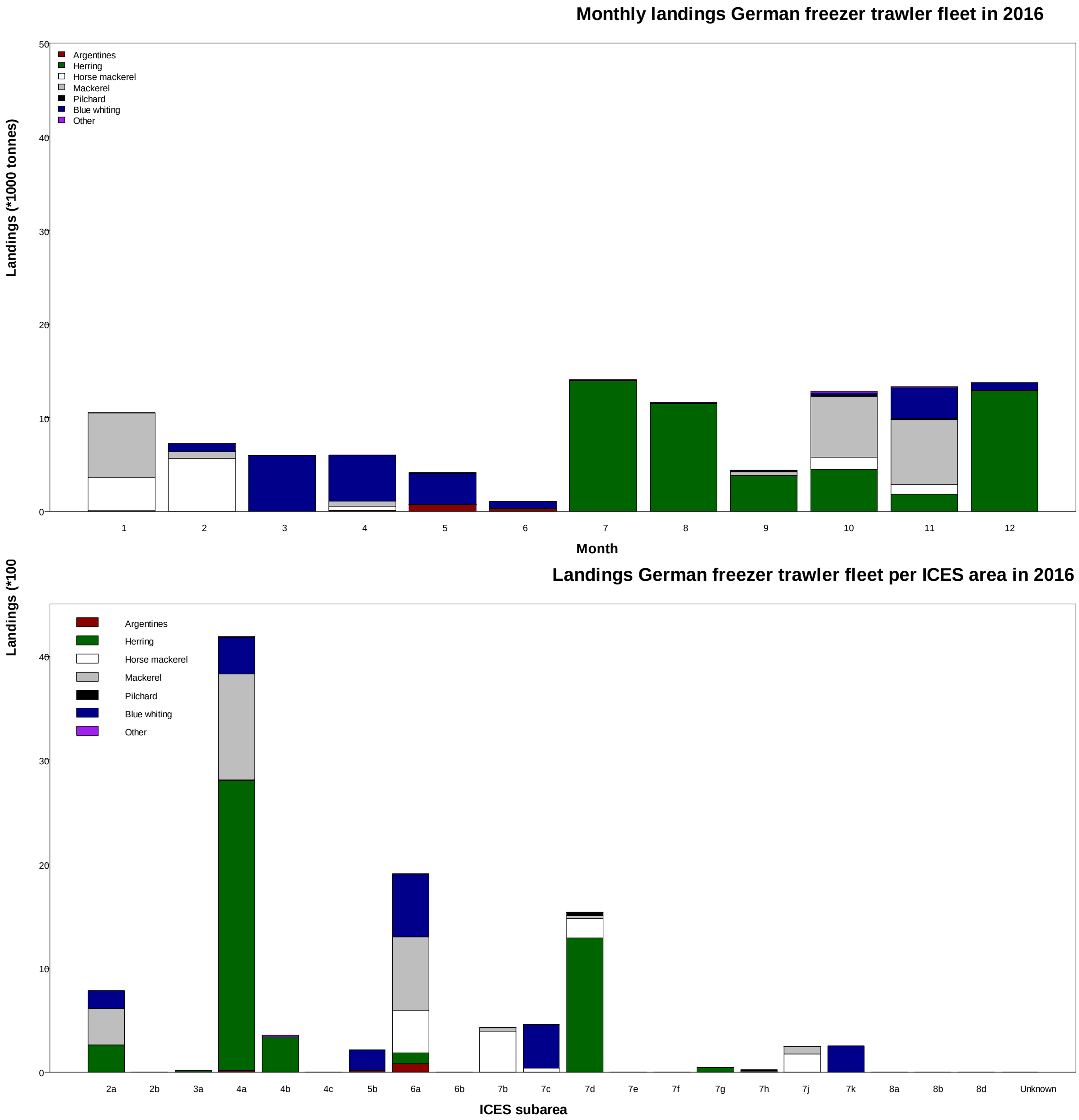


Figure 2d. Landings (*1000 tonnes) from the **German** freezer trawler fleet in **2016**. Upper panel shows monthly landings by species, lower panel shows landings per ICES subarea (Figure 1) by species. Data extracted from FiStat database. Note that the lower panel has a different scale in comparison with the lower panels in Figures 2ab.

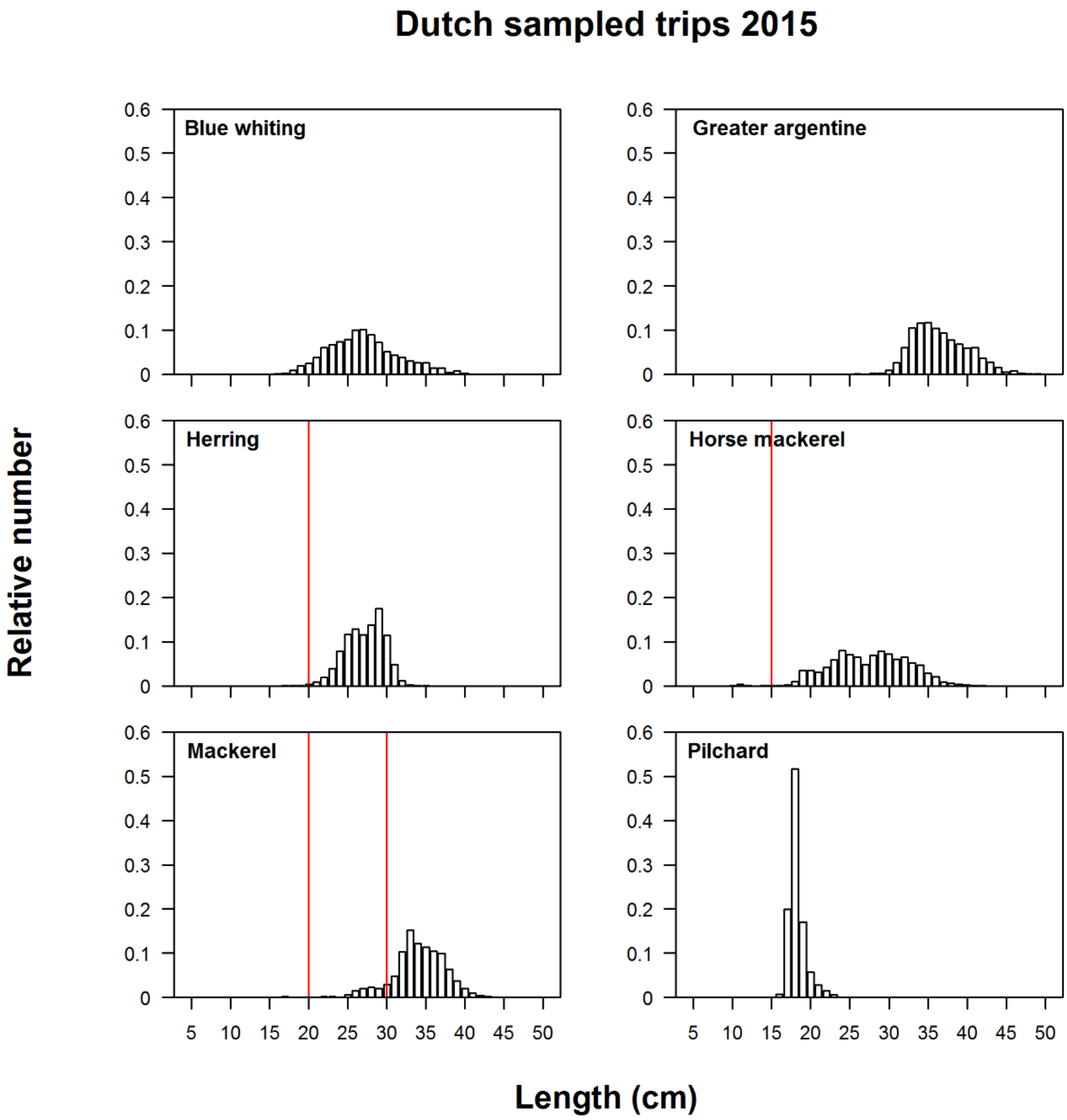


Figure 3a. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **Dutch** observer programme in **2015**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

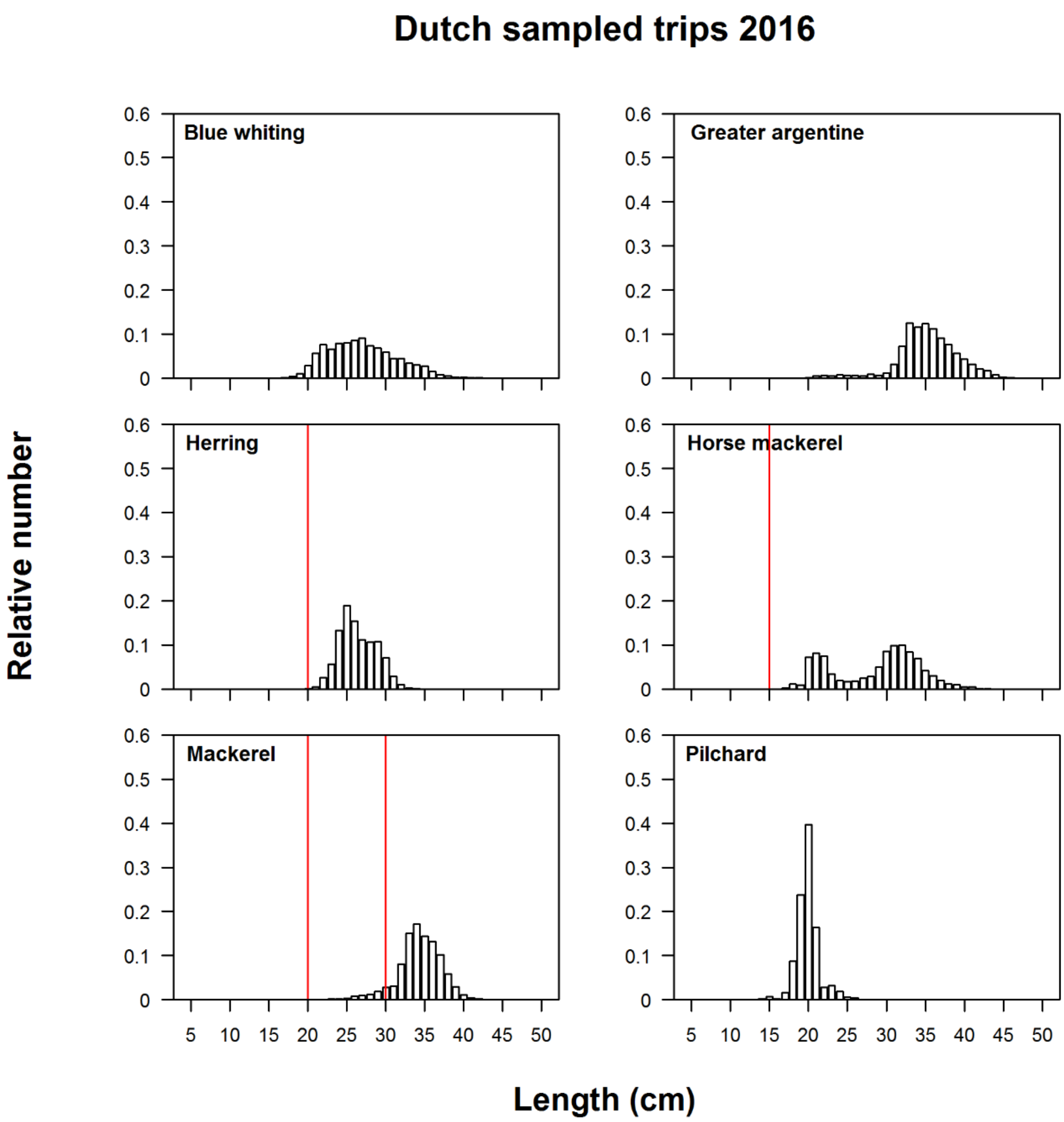


Figure 3b. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **Dutch** observer programme in **2016**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

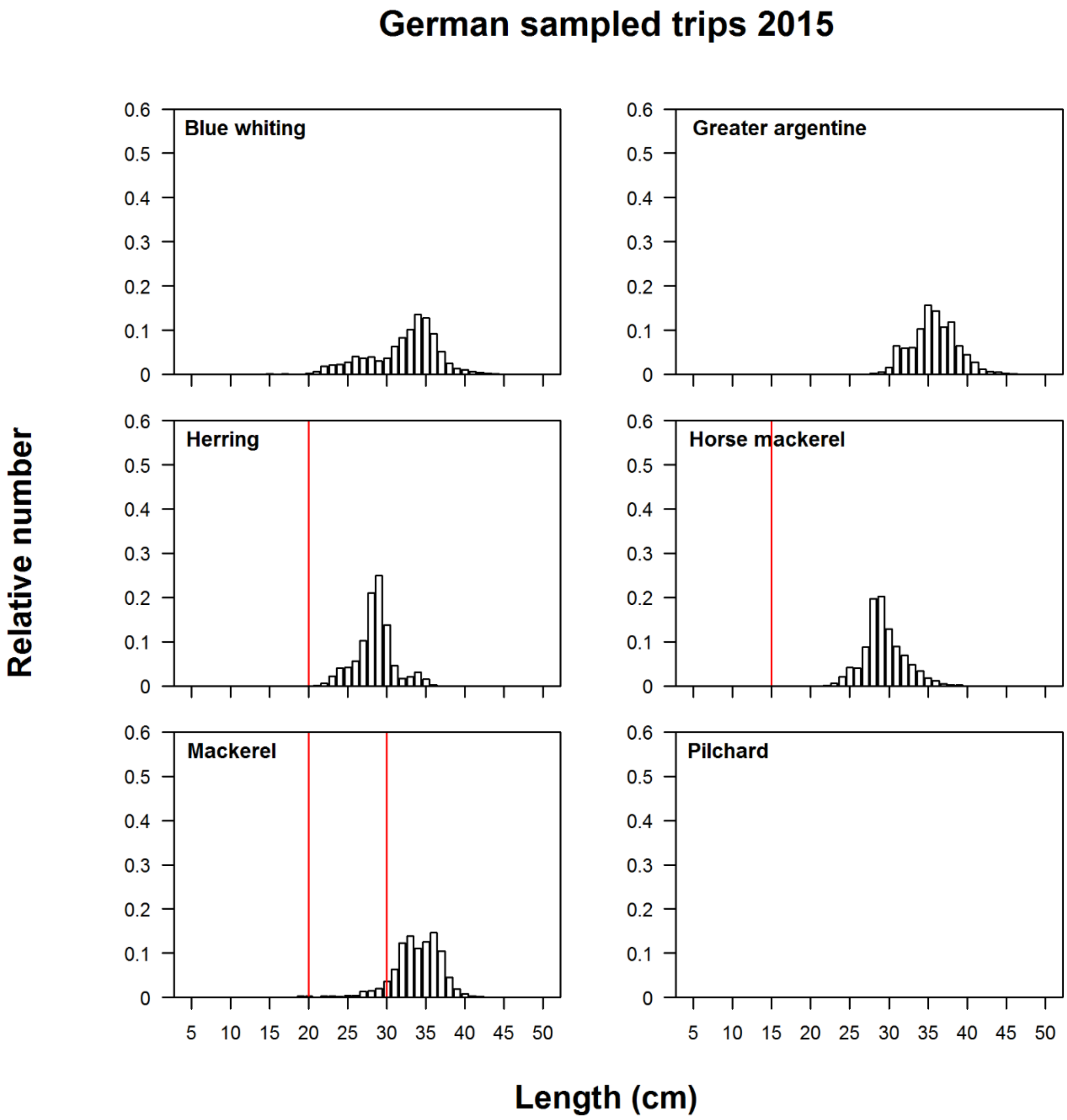


Figure 3c. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **German** observer programme in **2015**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

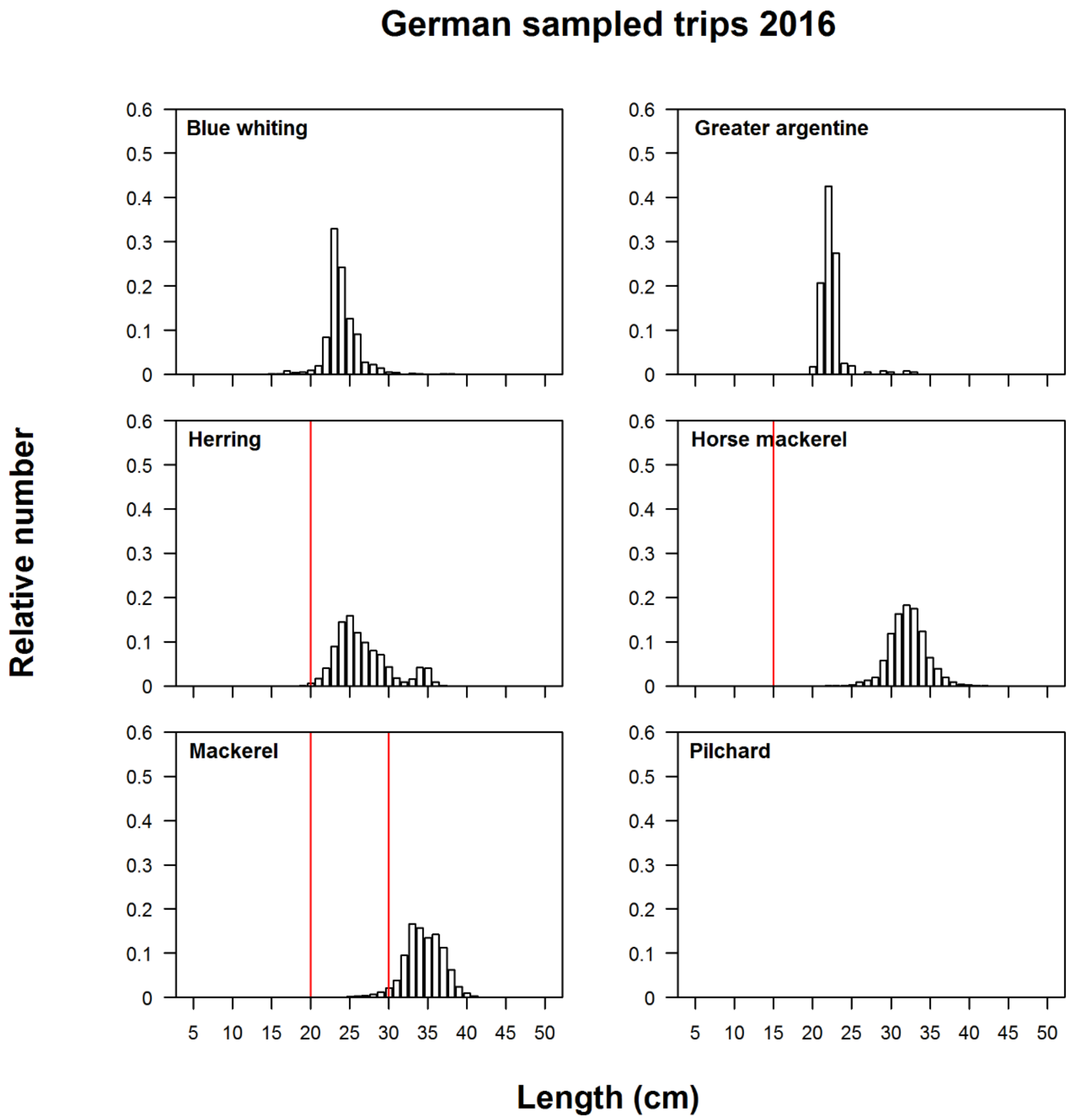


Figure 3d. Relative number of blue whiting (top left), greater argentine (top right), herring (middle left), horse mackerel (middle right), mackerel (bottom left) and pilchard (bottom right) caught against length (cm) during the sampled trips within the **German** observer programme in **2016**. Red lines indicate minimum size (herring = 20 cm, horse mackerel = 15 cm, North Sea mackerel = 30 cm, non-North Sea mackerel = 20 cm).

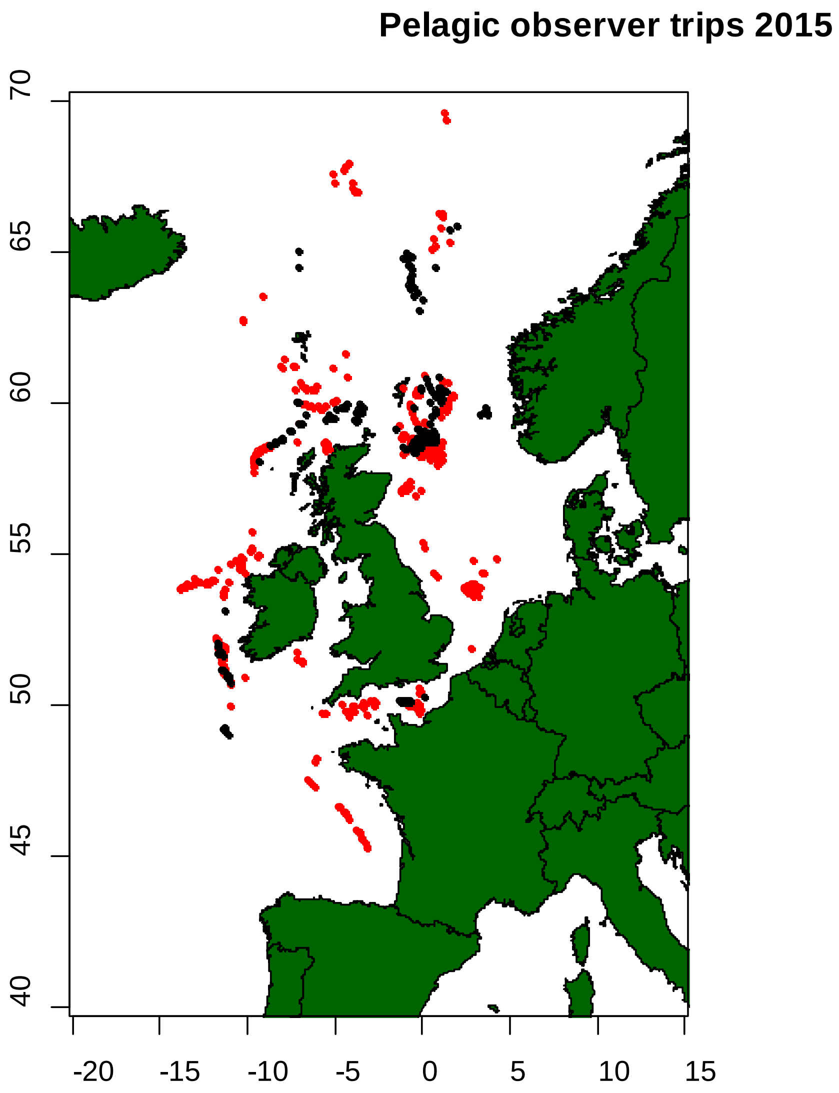


Figure 4a. Positions of sampled pelagic trips within the **Dutch** (red dots) and **German** (black dots) observer programme per haul in **2015**.

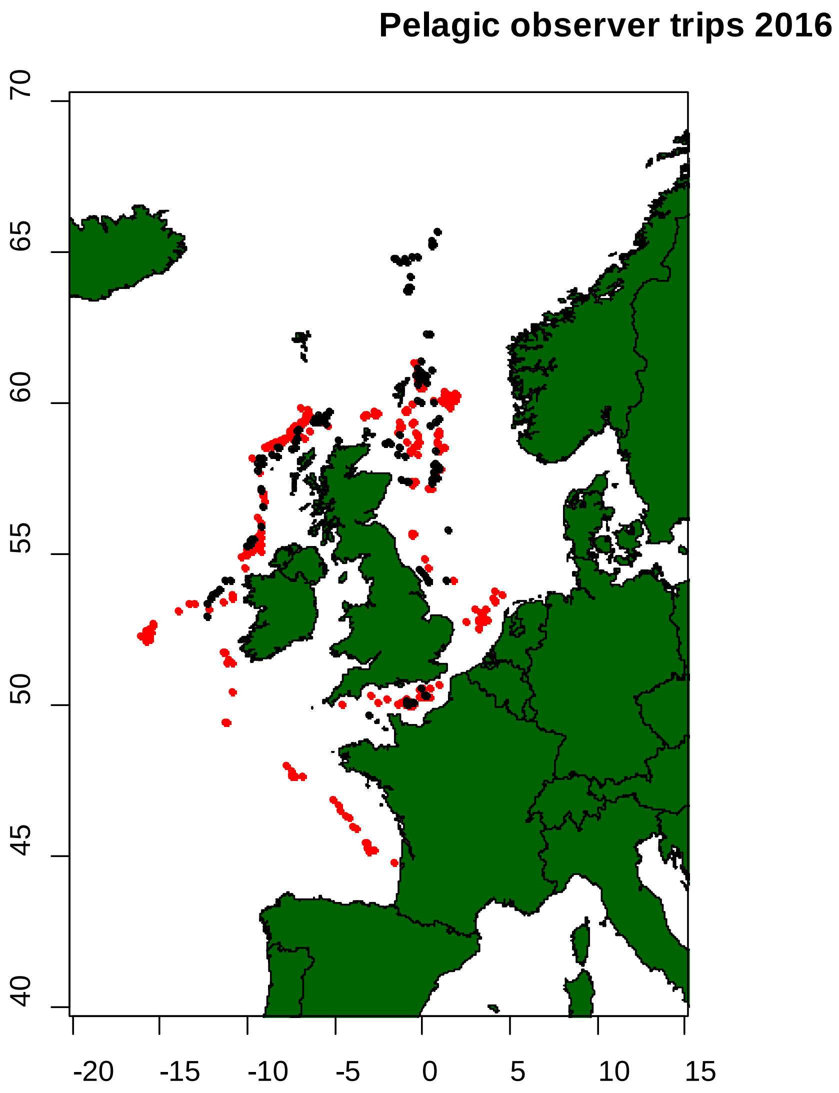


Figure 4b. Positions of sampled pelagic trips within the **Dutch** (red dots) and **German** (black dots) observer programme per haul in **2016**.

Signature

CVO Report: 17.021
Project number: 4311213018 and 4311213019

Approved by: Ing. S.W. Verver
Head WOT, Centre for Fisheries Research

Signature:

Date: 5th of December 2017