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Discard self-sampling of Dutch bottom-trawl and seine fisheries in 2013

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CVO report: 14.007

Commissioned by:
Ministerie van EZ, directie DAD
C.J.M Verbogt
Postbus 20401
2500 EK Den Haag

Project number: 4301213028

BAS code: WOT-05-406-004

Publication date: 19th of November 2014

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CVO rapport UK V6

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Summary

In the European Union, the collection of discard data is enforced through the Data Collection Regulation Framework (DCF) of the European Commission (EC). To comply with these requirements, the Institute for Marine Resources and Ecosystem Studies (IMARES, part of Wageningen University and Research) coordinates a discards monitoring programme in collaboration with the Dutch fishing industry. Within this project, a 'reference fleet' of vessel owners, willing to participate in a self-sampling programme, has been recruited. Fishermen are requested to collect discard samples for a definite number of trips per year. After the discard samples are brought to shore, IMARES collects and analyses these samples. This report summarizes data from this monitoring programme of Dutch demersal fisheries operating in the North Sea (ICES subarea IV) in 2013.

In 2013, the reference fleet consisted of 23 vessels. In total, 140 trips were sampled, of which 8 (5.7 %) were considered invalid due to missing or incomplete information. During the 132 valid self-sampling trips 263 hauls were sampled, typically two hauls per trip. While the majority of observations (57 trips) were done on-board beamtrawl vessels with mesh sizes ranging between 70 and 99 mm (>300hp), data were collected from additional metiers as well. These metiers included beamtrawlers with larger mesh sizes, seines (100-119mm and >=120mm), otter-trawlers (100-119mm, >=120mm) and otter trawlers (70-99mm) with a different target species assemblages (i.e. mixed crustaceans (MCD) in stead of demersal fish (DEF)).

For all metiers with mesh sizes of 70-99mm, combined fish and benthos discards exceeded the landings. In contrast, large meshed beam, otter and seine trawls (>100mm) landed on average more than they discarded. The majority of discards comprised of fish, consisting of commercially valuable species like common dab (*Limanda limanda*) and European plaice (*Pleuronectes platessa*) and non-commercially valuable species like dragonet (*Callionymus lyra*), grey gurnard (*Eutrigla gurnardus*), scaldfish (*Arnoglossus laterna*), solenette (*Buglossidium luteum)* and lemon sole (*Microstomus kitt*). Most frequently discarded benthos (invertebrate) species included several starfish and brittle star species (*Asteria rubens, Ophiura ophiura, Astropecten irregularis, Ophiothrix fragilis*), swimming crab species (*Liocarcinus sp.*), hermit crab (*Pagurus bernhardus*), sea potato (*Echinocardium cordatum*) and helmet crabs (*Corystes cassivelaunus*).

Samenvatting

In het kader van de EU Data Collectie Verordening (DCF) is iedere lidstaat verplicht gegevens te verzamelen van vangst die niet wordt aangevoerd – zogenaamde "discards"- in de belangrijkste commerciële visserijen. Om aan deze eisen te kunnen voldoen werkt IMARES (Institute for Marine Resources and Ecosystem Studies, onderdeel van Wageningen University and Research) nauw samen met de visserijsector bij het verzamelen van discardsgegevens in het zogeheten zelfbemonsteringsproject. In dit project wordt gebruik gemaakt van een referentievloot, bestaande uit een groep Nederlandse commerciële vissers die zich willen inzetten voor het onderzoek. Deze vissers wordt gevraagd om een deel van de discards aan boord te houden, waarna dit wordt opgehaald en geanalyseerd door IMARES. Dit rapport vat de resultaten samen van dit zelfbemonsteringsproject op de Nederlandse demersale vloot opererend in de Noordzee (ICES deelgebied IV) in 2013.

In totaal zijn in 2013 tijdens 140 reizen van 23 schepen monsters door de vissers meegenomen, waarvan de data van 8 reizen (5.7%) uitgesloten moesten worden van verdere analyse vanwege ontbrekende of foutieve informatie. Tijdens de overige 132 reizen zijn 263 trekken correct bemonsterd. Hoewel in het zelfbemonsteringsprogramma het merendeel van de bemonstering (57 reizen) is uitgevoerd aan boord van boomkorschepen met maaswijdte 70 tot 99 mm, zijn in het programma ook gegevens verzameld van andere vlootsegmenten. Hieronder vallen boomkorschepen met grotere maaswijdtes, flyshooters (100-119mm, >=120mm), otter trawlers (100-119mm, >=120mm) en otter trawlers (70-99mm) met een andere doelsoortensamenstelling (Noorse kreeft (MCD) in plaats van demersale vis (DEF)).

Binnen alle vlootsegmenten met een maaswijdte van 70-99mm was de hoeveelheid discards (vis en benthos discards gecombineerd) groter dan de aanlandingen. De vlootsegmenten met een maaswijdte groter dan 100mm vingen gemiddeld lagere hoeveelheden discards ten opzichte van hun aanlandingen. Het merendeel van de discards bestond uit vissen, welke was samengesteld uit commercieel interessante soorten zoals schar (*Limanda limanda*) en schol (*Pleuronectes platessa*) en commercieel niet interessante soorten zoals pitvis (*Callionymus lyra*), grauwe poon (*Eutrigla gurnardus*), schurftvis (*Arnoglossus laterna*), dwergtong (*Buglossidium luteum)* en tongschar (*Microstomus kitt*). Tot de meest frequente bijgevangen benthos soorten behoren onder andere verschillende zeester-soorten (*Asteria rubens, Ophiura ophiura, Astropecten irregularis, Ophiothrix fragilis*), zwemkrabsoorten (*Liocarcinus sp.*), heremietkreeft (*Pagurus bernhardus*), zeeklit (*Echinocardium cordatum*) en helmkrab (*Corystes cassivelaunus*).

1. Introduction

Discarding unwanted organisms in European fisheries is an inevitable consequence in mixed fisheries. Reasons for discarding may be for economic reasons (if there is no commercial value for the species caught) or because of regulatory measures (such as minimum landing size or catch limits (quota)). Keeping record of quantities being discarded may improve scientific stock assessments and advice on quota, enabling more accurate estimates of total fishing mortality. These estimates may also become important for the possible implementation of catch quotas under the European landing obligation from 2016 onwards (EEC, 2011; Uhlmann et al., 2013).

In the European Union, the collection of discard data is enforced through the Data Collection Regulation or Framework (DCF) of the European Commission (EC). The DCF requires the implementation of at-sea monitoring programmes, which deliver discard estimates with an acceptable level of precision. In the Netherlands, a cost-effective, so-called self-sampling programme is implemented for demersal fisheries in the North Sea. Since 2011, self-sampled discard data have been used in the stock assessment for North Sea plaice (see chapter 8, ICES 2014).

Discard data are collected for Dutch bottom-trawl and seine fisheries, according to DCF requirements. Based on DCF classifications, nine metiers are distinguished for the Dutch bottom-trawl and seine fisheries, based on gear type, target species assemblage, and mesh size characteristics (Commission Decision, 2009 (Appendix IV)). These metiers originate from three fleet segments: TBB (beamtrawlers), OTT/OTB (otter trawlers) and SSC (Scottish seines) with three distinct mesh size ranges (70-99mm (OTT/OTB only), 100-119mm and ≥120mm (SSC only)). In the OTT/OTB 70-99mm segment, distinction is made between two metiers, based on target species assemblages (DEF (demersal fish species) and MCD (mixed fisheries for Norway lobster and demersal fish)). Within the Dutch beamtrawl metier (TBB_DEF _70-99mm), an additional metier is created based on the vessel's engine power, due to regulations allowing only vessels with an engine power of <300hp (so called "Eurocutters") to fish in a marine protected area ("plaice box") and the Dutch 12-mile Exclusive Economic Zone. This additional metier is not used by the DCF, but solely to create a more precise overview. In 2013, samples were collected from nine metiers (table 2b).

Additionally, 10 observer trips were carried out onboard of self-sampling trips. These observer trips performed a similar sampling protocol, for at least 60% of the hauls, including the two self-sampled hauls. The observer programme was initially set up as a statistical validation tool of the self-sampling data. Due to practicalities and low number of observer trips no statistical validation was possible. However, the observer trips have proven to be of importance, as the self-sampling protocol is fine-tuned by the observers. Moreover, the observer trips are appreciated by the skipper and the members of the reference fleet.

The current report provides an overview of the data collected during the self-sampling programme in 2013. Sampling effort and landed weights and discarded numbers and (where possible in) weights are presented by trip (Appendix A) and as means by metier and quarter (Appendix B). This research is part of the statutory research programme WOT *"Wettelijke onderzoekstaken"* which is funded by the Dutch Ministry of Economic Affairs and conducted by IMARES.

2. Methods

2.1. Discard self-sampling programme

2.1.1. Reference fleet

A 'reference fleet' of 23 vessels with protocol-instructed fishers collected discard samples according to a predefined schedule during their regular commercial operations throughout the year. Within the Dutch beamtrawl metier (TBB_DEF 70-99mm), distinction is made based on the vessel's engine power, due to regulations allowing only vessels with an engine power of <300hp (so called "Eurocutters") to fish in a marine protected area ("plaice box") and the Dutch 12-mile Exclusive Economic Zone. To reflect this spatial difference of the fleet -which also has implications on their discarding pattern- in the following analysis, summaries of the discard data are presented separately for Eurocutters (termed TBB_DEF_70-99mm_≤300hp) and the remaining part of the beamtrawl fleet (termed TBB_DEF_70-99mm_>300hp; Table 1).

Sampling was done on board vessels from nine different metiers: beamtrawlers (with 70-99, 100-119, and ≥120 mm meshes), Scottish seiners (100-119, and ≥120 mm), otter trawlers (70-99 (MCD and DEF) and 100-119 mm) and Eurocutters (i.e. beamtrawlers with 70-99 mm, <=300hp). Total number of samples per metier reflected actual fleet composition. Prior to sampling, fishers were provided with all necessary equipment (labels, plastic sampling bags, sealing cable ties, and sampling sheets) and written instructions.

2.1.2. Sampling and data collection procedures

Operational and biological data were collected at the time of each gear deployment ('haul') during a particular fishing trip. With each haul, the following information was registered: vessel start position; haul duration; gear characteristics; weather conditions; volume of the catch (estimated by the skipper) and volume of the landings per species. The total volume of discards of each haul was calculated by subtracting the total landings from the total catch volume.

Within a trip, the crew retained a sample of two boxes of discards (one box equals approx. 40 kg) during two separate hauls, thus constructing two independent samples. These boxes were filled by scooping discards randomly at regular intervals from the processing conveyer belt. The samples were collected in large plastic bacs which were then sealed off using a cable tie, labelled and cool-stored until the vessel returned to the port. Back on land, the discard samples were collected by IMARES research staff and returned to the laboratory for analysis. Landings were not sampled.

All species of discards within each sample were identified. Numbers at length were recorded for all fish species, Norway lobster *(Nephrops norvegicus,* hereafter termed Nephrops) and edible crab (*Cancer pagurus)*. Numbers without length measurements were recorded for all remaining (benthos) species. Data management software was used to enter and subsequently audit all data before the data were stored in the centralised IMARES database.

2.2. Raising procedures

See figure 1 for a flow-chart of the raising procedure. Numbers (at length) were registered for all (fish) species for each sample. Whenever a species was very abundant within the sample, a fraction of this species was counted. Then, the numbers (at length) were multiplied with the fraction to estimate total numbers (at length) within the sample. The numbers (at length) in the

samples were multiplied with the volume ratio between discard sample and total discards to estimate total numbers (at length) within that haul.

Next, length/weight-relationships (for plaice, sole (*Solea solea*), turbot (*Scophthalmus maxima*), brill (*Scophthalmus rhombus*) and tickbacksole (*Microchirus variegatus*) these are based on IMARES' own data, for all other species these relations are based on literature) were applied to convert numbers at length to weight at length for all fish species. Both numbers (fish and benthos) and weights (fish) for the two samples were summed up. Also, the duration of both measured hauls was summed up. Total numbers and weights per fishing trip were calculated by multiplying the summed sample weights and numbers with the ratio between duration of both sampled hauls and the duration of all hauls.

2.3. Fleet effort

Fleet effort was calculated using the IMARES VISSTAT database containing the official Dutch logbook information. In this database, all Dutch fishing vessels are registered at the time of port departure and arrival. Time between these was multiplied with the engine power of each vessel, resulting in a measure of fishing effort expressed as kilowatt*days-at-sea (kWdays) (see figure 1). The fleet effort is used for a visual inspection of the representativeness of the sampling locations. Moreover, the ratio between fleet effort and sampling effort is used to calculate total discards for the Dutch demersal fleet (not shown in this report), which are sent to the Working Group for the assessment of demersal stocks in the North Sea and the Skagerrak (WGNSSK) (figure 1). These data are also sent to the Scientific, Technical and Economic Committee for Fisheries (STECF).

3. Results

The results are summarized per metier to provide a complete overview for each separate metier in the Dutch demersal fisheries. It should be noted that for some metiers (TBB_DEF_>=120mm/ SSC_DEF_100-119mm/ SSC_DEF_>=120mm), this view is based on a small number of trips. For this reason, some figures aggregate multiple metiers. However, that will be mentioned in the figure caption. All remarkable results are highlighted and an explanation for these observations is given based on metier- or species-specific knowledge below

3.1. TBB_DEF_70-99mm_>300hp

3.1.1. Sampling effort

The (large) beamtrawlers compromise the majority of the Dutch demersal fisheries, with a fleet effort of 24382000 kWdays; more than 4 times the effort of the second largest metier (table 2a, table 3). This is reflected in the self-sampling programme, with a sampling effort of 525000 kWdays during a total of 57 sampled trips in 2013 (table 2b, table 3). Still, total sampling coverage (2.2%) remains low for this metier (table 3). All these trips were equally distributed over the year, although a peak can be observed in the 4th quarter. This peak is similar to previous sampling years (table 2b), but cannot be observed in fleet effort (table 2a). Total fleet effort has decreased since 2011 (table 2a). This might be due to a reduction in the number of vessels. Possibly, this may also depict the transition towards the innovative pulse gear, which does not require the high engine powers of the traditional beamtrawl.

Within the beamtrawlers, all sorts of innovative gears are deployed besides the conventional beamtrawlers with tickler chains. The innovations are aimed to reduce fuel consumption and environmental impact. The sumwing is such an innovation, which is replacing the traditional beam of the beamtrawlers with a wing-based device. This device is designed to "fly" over the bottom, whereas traditional beamtrawls have shoes that touch the bottom (van Marlen 2009). As mentioned above, pulse gear is emerging, mostly because of the increased sole catches and the decreased fuel use (van Marlen 2014). Pulse trawlers have replaced their tickler chains by electrical stimulation. Pulse gear is produced by two separate companies, resulting in two types of pulse gear: HFK and Delmeco (van Marlen 2014). Sometimes, pulse gear is combined with a sumwing, resulting in a pulsewing. In this report, the TBB_DEF_70-99mm metiers are comprised of traditional and innovative gears, resulting in a general overview of this fishery instead of gear-specific representations. Next year, IMARES will aim to have such gear-specific overviews.

Beamtrawl fisheries are spread widely over the North sea with intensively fished fishing grounds in the southern North sea and northeast of the Netherlands (figure 2a). In quarter 2, the north-eastern fishing grounds are less frequently visited. This is reflected in overall fleet effort seasonality as well (table 2a).

3.1.2. Catch composition

Beamtrawlers on average have a landing percentage of 28% with plaice and sole being the most frequently landed species (figure 3a, table 4). Dab, turbot, brill and various species, for instance edible crab, make up the rest of the landings. A dip in plaice landings is observed in quarter 2 (table 5a). This is just after the spawning period of plaice, which takes place in quarter 1 (van Walraven 2010). This might result in less fit plaice which have a lower commercial value and consequently results in a changed fishing pattern of the fishermen.

The remaining part of the catch consists of fish (48%) and benthos discards (23%). Almost halve of the fish discards comprise undersized plaice and around a third consists of (small) dab

(figure 3a). Whereas undersized plaice is not allowed to be landed, (small) dab has a low commercial value. Most other fish species that are discarded are flatfishes (scaldfish, solenette) or benthic oriented species (grey gurnard, dragonet) (table 6a). Infrequently, some pelagic oriented species like herring, cod or whiting are encountered in the discards. The discard rates for sole, plaice, dab and whiting are within similar range as previous years (tables 7a, 7b). Benthos discards comprised 23% of the catch, with the majority being echinoderms (sand sea star, serpent star) and crustacea (swimming crab, hermit crab) species (table 6b).

Multiple species, such as red gurnard, John Dory, common cuttlefish and thickbacksole are only caught in this metier (tables 6a, 6b). However, no (spatial) analyses have been conducted to investigate whether this is due to the specific gear deployed in this metier, or due to species-specific distribution patterns.

3.2. TBB_DEF_70-99mm_<=300hp

3.2.1. Sampling effort

Eurocutters are the only vessels allowed to fish in the Dutch 12-mile Exclusive Economic Zone and the Plaice box. This is reflected in the distribution of the fleet effort and the sampling locations (figure 2b). During fall and winter (quarter 4 and 1), the Eurocutters move a little more offshore than in spring and summer (figure 2b). This might be a reaction of fishermen on seasonal variation in sole and plaice distribution (Poos 2007). Within the beamtrawling fleet, Eurocutters have the smallest kWeffort per year (table 2a). This is congruent with the restrictions in engine power.

3.2.2. Catch composition

Landings comprise only the minority of the catch of Eurocutters, with 11% of the catch being landed (figure 3b). Benthos and debris make up the majority of the catch (49%). Halve of the landings consist of sole. Plaice (23%) and various other species (13%) are caught as well in high numbers. Dab and undersized plaice are the fish species most frequently discarded in this metier (figure 4b, table 4). Also undersized sole is discarded frequently (table 6a, figure 4b). As undersized fishes are not allowed to be landed, this explains the high discard rates (table 4). Eurocutters catch relatively a lot of benthos. Especially echinoderms are caught (80%), with the highest frequencies observed for the serpent star, the common starfish, serpent's table brittlestar (figure 3b, table 6b). Crustaceans are caught less frequently (18%), with the swimming crab being the most important crustacean discard (figure 3b, table 6b).

The netted (*Nassarius reticlatus*) and the thick-lipped dogwhelk (*N. incrassatus*) are almost exclusively caught by the Eurocutters (table 6b). Likewise, other small gastropods and bivalves are caught (almost) exclusively by Eurocutters as well. This may reflect a distributional effect, since Eurocutters are the only metier allowed in the Dutch 12 mile Economic Exclusive Zone (figure 2b). Examples of above described species are: *Abra prismatica, Chamelea gallina, Euspira pulchella, Macoma balthica* and *Spisula sp.* (table 6b). This pattern can be observed in several fish species as well. Hooknose, bull-rout, pomatoschistus sp. and tub gurnard are fishes that are discarded more frequently by Eurocutters than any other metier (table 6a). However, the sea mouse (*Aphrodita aculeata*) is not caught by Eurocutters (table 6b). The sea mouse lives buried, but as no individuals are caught in this metier, the species apparently does not occur in the shallow coastal waters.

3.3. TBB_DEF_100-119mm

3.3.1. Sampling effort

The large mesh size beamtrawlers are a seasonal fishery, with a peak in effort in quarter 2, some effort in quarter 3 and low effort in quarter 1 and 4 (table 2a, figure 2c). This can partly be explained by the increase in fleet effort of the TBB_DEF_70-99mm_>300hp in quarters 1 and 4. During winter, sole is caught more easily and of better quality, which has a positive effect on the price. Therefore, several fishermen switch from 100mm to 80mm during winter, to target sole. In spring and summer, this fishery targets plaice at the Doggersbank (figure 2c).

3.3.2. Catch composition

The effect of the larger mesh sizes can be observed in catch composition and discard quantity. With a percentage of 62%, the majority of the catch consists of landings, which –in turn -mostly consists of plaice (94%) (figure 3c). As this figure is an aggregation of both the TBB_DEF_100-119mm and the TBB_DEF_>120mm metier, the actual composition per metier might deviate lightly. Turbot is the second most frequently landed species, with a landing rate of 10kg per hour (table 4).

Fish discards consist of dab and undersized plaice as most frequently caught fish species (table 6a). However, discards rates of these species are up to three times lower than those of small mesh size beamtrawlers (TBB_DEF_70-99mm). Benthos discards are dominated by sand sea star and the common starfish (table 6b). Relatively many common whelks (*Buccinum undatum*) are caught. This edible snail is sometimes landed as well.

3.4. TBB_DEF_>=120mm

3.4.1. Sampling effort

Beamtrawlers with large mesh sizes are an upcoming fisheries, with more than a fourfold in fleet effort since 2011 (table 2a). As the TBB_DEF_100-119mm, the TBB_DEF_>120mm is a seasonal fishery, with peaking effort in spring and summer (quarter 2 and 3). Almost all effort is concentrated at the Doggersbank and northeast of the Doggersbank (figure 2d). In winter, effort is reduced to almost non-existing (table 2a). This probably reflects a (seasonal) shift towards the deployment of small meshed nets (TBB_DEF_70-99mm), which target sole. In 2013, only 2 trips are sampled for discards (table 2b), resulting in the lowest sampling cover (table 3). Therefore, information of discards in this metier can only be used as an indication for discard patterns, and not as exact discard rates.

3.4.2. Catch composition

Landings comprise the majority of the total catch, with plaice being the dominating species. Fish discards comprise undersized plaice and dab, but grey gurnards are caught almost as frequent (table 6a). Frequently discarded benthos species are sand sea star, hermit crab and sea mouse (table 6b). A benthos species which is relatively encountered most in this metier is the bryozoan species sea chervil (*Alcyonidium diaphanum*) (table 6b). This species is responsible for dermatitis, an eczema that was well spread under fishermen, the so-called "Doggers bank itch" (Pathmanaban et al. 2005). The results from this discard monitoring programme would suggest that especially employers of the TBB_DEF_>=120mm metier are susceptible for this disease. This dermatitis is prevailing less nowadays. Probably because fishermen are sorting the catch while wearing gloves.

3.5. SSC_DEF_100-119mm

3.5.1. Sampling effort

Flyshooters belong to a relatively small metier, deploying a fishing method that is promoted as 'clean' by several fishing companies (see websites of Osprey group B.V., ORION B.V.). This fishing technique is developed to catch both pelagic and demersal fish, while the time the fish are in the net is as short as possible. Long lines are attached to the net doors. In a circle or square, the net is set by the fishermen. Then, when hauling the lines, the circle/square closes in and the lines herd the fish towards the middle of the circle/square. There they are caught by the net. With this practice, the distance of actively pulling the net trough the water (and over the bottom) is lowest, and fish damage from the net is virtually non-existing.

Due to this deviating practice, the target species are different from target species in the 'normal' demersal fisheries. Flyshooters target fish species gurnard and mullet species in winter in the English Channel and more southwards. In summer and spring, several flyshooters enter the North sea near the Doggersbank (SSC_DEF_100-119mm) or even up to the Skagerrak (SSC_DEF_>120mm), targeting plaice or cod (figures 2e and 2f, table 4).

Only the flyshooter trips within the North Sea and Skagerrak are taken into account in this monitor programme. As the SSC_DEF_100-119mm metier is relatively small, the sampling coverage is acceptable with only few sampled trips. In 2013, this metier was sampled twice. Therefore, the discard rates should be interpreted as an indicator and not as exact discard rates. Moreover, the skipper of one of these trips notified IMARES directly after that week, that during that specific trip the catches were exceptional in composition and in total mass (Appendix A, tables 9a and 9b). The results for this metier should be treated with precaution.

3.5.2. Catch composition

Although table 5 clearly shows different target species for the SSC_DEF_100-119mm (plaice) and the SSC_DEF_>=120mm (cod), both metiers are aggregated in figure 3d. A different catch composition than 'normal' demersal fisheries can be observed (figure 3d). Cod and plaice are the main species landed (table 4, figure 3d). Discards comprise mostly benthic (SSC_DEF_100-119mm) and pelagic (SSC_DEF_>=120) fish (figure 3d, table 6a), with the main species being grey gurnard and plaice for the SSC_DEF_100-119mm. Almost no benthos is caught, which is clearly reflected in the low discard rates in table 6b, even for the benthos species most frequently encountered (edible crab; *Cancer pagurus*).

3.6. SSC_DEF_>=120mm

3.6.1. Sampling effort

See section 3.5.1. for a general description of the flyshooter fisheries. The SSC_DEF_>120mm is a seasonal fishery in summer, targeting cod in the Skagerrak (figure 2f, table 2a, table 4). In 2013, 5 trips have been sampled, resulting in a sampling coverage of 6.6% (table 2b, table 3).

3.6.2. Catch composition

Landings comprise mainly cod with some plaice and dab (table 4). This pattern is less clear from figure 2d, as this is based on the aggregated data from both the SSC_DEF_>120mm and the SSC_DEF_100-119mm metier. The fish species with the highest discard rates are long rough dab, herring and starry rays. As other metiers catch much less long rough dab and starry rays, these catches probably depend on the fishing location. The more pelagic oriented fish species that are also exclusively observed (in such high quantities) in this metier are likely a result of the fishing location as well. For instance saithe, cod, pollack, Norway pout and hake are observed in relatively high numbers in this metier (table 6a).

Benthos comprises the minority of the catch, resulting in low discard rates, even for the species most abundant in the benthos discards. The red (*Neptunea antiqua*) and the common (*Buccinum undatum*) whelk are frequently encountered (and sometimes landed as well) (table 6b). The soft-coral species 'dead man's fingers' (*Alcyonium digitatum*) is encountered more frequent in this specific metier, which again probably reflects species distribution (table 6b).

3.7. OTB_MCD_70-99mm

3.7.1. Sampling effort

Otter trawlers with small mesh size (OTB_70-99mm) operate with similar gears, but the target species might differ; some target mainly plaice, while others target a mixture of Nephrops and plaice. To discriminate between both fisheries, the metiers are classified based on landing data per trip. When >=30% of the landings consist of Nephrops, the target composition of the trip is classified as mixed crustacean and demersal (OTB_MCD), otherwise, the trip is classified as OTB_DEF. This results in a knowledge deficiency of the initial purpose of the fishing trip (which is probably linked to fishing location), as an unsuccessful trip for Nephrops will be classified as OTB_DEF and vice versa.

In 2013, 18 trips have been sampled in the OTB_MCD_70-99mm, resulting in a sampling coverage of almost 7% (table 3). No trips were sampled in winter, Q1 (table 2b). When shrimps (*Crangon crangon*) have a good price, most otter trawlers shift gear to beamtrawl with small mesh sizes and target shrimp. In 2013, this was the case for all the collaborative OTB_MCD_70-99mm fishermen. This shift can also be observed in fleet effort, as quarters 1 and 2 have a much lower effort (table 2a). Nephrops occur at specific habitats, which are depicted clearly in figure 2g. All trips are focussed on only some ICES rectangles, covering "Botney gut & Silverpit (37F2)", "het grid/ de slapte" (36F3, 37F3, 37F4), and "het trappetje" (39F5, 40F4, 41F4).

3.7.2. Catch composition

As expected, this metier lands most Nephrops of the Dutch demersal fisheries (table 4), with half of the landings (53%) consisting of Nephrops (figure 3e). Also plaice comprise a large part (33%) of the landings (figure 3e). Of the 73% discards, fish is dominant (62%) with undersized plaice and dab as most frequently discarded species (table 6a, figure 3g). Especially in quarter 3, the numbers of discarded dab are high (table 5b). As the total weight of these individuals is lower than the total weight of the (less) individuals in quarter 4, the high number of discarded dab in quarter 3 most likely comprise juvenile 0-yearclass dab (table 5a, table 5b). The benthos species that is discarded most is Nephrops (table 6b), and these are mostly of landable size (figure 3g), which are probably damaged and therefore of less commercial value. The common starfish and the harbour crab are discarded frequently too (table 6b).

3.8. OTB_DEF_70-99mm

3.8.1. Sampling effort

See section 3.7.1. for the differences with the OTB_MCD metier. The shift towards a shrimp-targeted fishery in winter as described in section 3.7.1. can also be observed in this metier. A peak in fleet effort is observed in quarters 2 and 3, but that peak is not as clear as with the Nephrops fisheries (table 2a). In relation to the fleet effort of 2012, a shift can be observed in fishing effort in quarter 4 between OTB_DEF and OTB_MCD. In quarter 4 of 2012, fleet effort of the OTB_MCD was much lower than OTB_DEF, while in quarter 4 of 2013, this pattern is turned around with a much higher fleet effort in OTB_MCD and a decrease in fleet effort for OTB_DEF (table 2a). No explanation for this phenomenon can be given.

3.8.2. Catch composition

Some clear differences can be seen between OTB_DEF and OTB_MCD catch compositions (figures 3e, 3f). OTB_MCD lands more Nephrops, while OTB_DEF lands more plaice (table 4). As the trips are classified based on their landings, this observation is quite obvious. Likewise, in discard composition this pattern is visible as well. OTB_DEF has more plaice discards, of which a larger part is undersized plaice (figure 3f, 4g). Benthos discards comprise more echinoderms than crustaceans (figure 3f). The most frequently discarded benthos species is the common starfish. The harbour crab, Nephrops, swimming crab and sand star fish are the second most frequently discarded species (table 6b).

3.9. OTB_DEF_100-119mm

3.9.1. Sampling effort

The large mesh-size otter trawlers operate in a seasonal fishery, with a peak in fleet effort in quarters 2 and 3 (table 2a). This peak is represented in the self-sampling programmes as well (table 2b). With 13 trips in 2013, this metier had the highest sampling cover (table 3). This metier is targeting plaice, at the Doggersbank (table 4, figure 2i).

3.9.2. Catch composition

As with the beam trawlers with large mesh sizes (TBB_DEF_100-119mm, TBB_DEF_>120mm), landings comprised the majority of the total catch, with 59% of the total catch being landed (figure 3g). Landings consist mainly of plaice, with a minor part for dab, turbot and various species (figure 3g, table 4). Discards are dominated by fish species, with (undersized) plaice and dab as the most frequently discarded species (figure 3g, figure 4i). Fish discards comprise elasmobranches as well, consisting mainly of starry ray (*Amblyraja radiata*) (table 6a, figure 3g). Benthos discards only represent a minor part of the total catch (10%), with echinoderms and various as most frequently encountered classes (figure 3g). The common brittle star (*Ophiothrix fragilis*), colonies of breadcrumb sponge (*Halichondria panacea*) and hermit crab (*Pagurus bernhardus*) are the frequently found species (table 6b).

4. Conclusion

Discard patterns are quite similar between all metiers; the majority of the discards comprised of fish, except for the Eurocutters and the large mesh size beam trawlers (TBB_DEF_>=100mm). Eurocutters fish with a small mesh size close to the shore, resulting in high catches of serpent stars. The TBB_DEF_>=100mm catch relatively few discards, with less undersized fishes. Herefore, the few benthos discards comprise a relative large part of the total discards, although discard rates are lower than in other metiers.

Apart from flyshooters, undersized plaice and dab are the most frequently discarded fish species (flyshooters: 100-119mm: plaice and grey gurnard, >=120mm: long rough dab and herring). For the beam trawlers, echinoderms are the benthos class most discarded, with sand sea star, serpent star and the common starfish as most frequently encountered species. The crustacean species with the highest discard rate is the swimming crab. Otter trawlers targeting Nephrops discard in general more crustaceans, caused by the high discard rate for Nephrops. Otter trawlers targeting plaice and Nephrops have similar quantities of crustacean and echinoderm discards, with the harbour crab and Nephrops as most discarded crustaceans and the common starfish and the sand sea star as most frequently encountered echinoderms. Otter trawlers with large mesh size have very low discard rates overall, with breadcrumb sponge and the common brittle star as most often discarded species.

Dutch demersal fisheries are widespread over the North sea, with vessels fishing near the Skagerak, at the Doggersbank and near the coast of Belgium and East of England (figures 2a-i). However, some spatial patterns can be observed for the different metiers: Eurocutters fish close to the Dutch shore; fisheries with large mesh sizes (>=100mm) are mainly located offshore, at the central and northern North sea. Nephrops fisheries are located at specific regions, caused by very specific habitat requirements of the target species Nephrops. The sole and plaice targeting beam trawlers (TBB_DEF_70-99mm_>300hp) are more uniformely spread over the North sea, though some 'hotspots' can be identified as well. It would be interesting to investigate whether these hotspots are (sub)gear specific.

Seasonal trends are present in fisheries as well. Flyshooters are (almost) not present in the North sea during winter (quarter 1 and 4), and the large mesh size beam trawlers have reduced effort in winter as well. Both fisheries shift target species, but whereas flyshooters are located in the Channel during winter, large mesh size beam trawlers deploy gear with 70-99mm mesh sizes, resulting in a shift towards the TBB_DEF_70-99mm_>300hp metier. Such a shift towards a different metier can be assigned to the OTB_70-99mm metiers as well. Nephrops catches are reduced during winter, while shrimp prices are in general higher. Therefore, the OTB_DEF_70-99mm and the OTB_MCD_70-99mm have reduced effort in winter.

When looking at catch composition, several distinct patterns can be observed for the different metiers. For all metiers with large mesh sizes (>=100mm), landings constitute the majority of the total catch (figures 3a-g). When mesh size is small (<100mm), landings only comprise up to 30% of the total catch. Landings mainly consist of plaice. Sole is caught almost exclusively by the TBB_DEF_70-99mm metiers, while Nephrops is landed solely by the OTB_ 70-99mm metiers, mainly by OTB_MCD_70-99mm. Flyshooters with the largest mesh size (>=120mm) are specifically targeting cod, while flyshooters with mesh size 100-119mm are targeting plaice. In this report, data of both metiers are taken together to create an overview of catch composition, due to a very low number of sampled trips. However, as both fisheries have different target species and fishing locations, it would be interesting to increase sample size, and create separate overviews next year.

5. Discussion

The new Common Fisheries Policy (EEC, 2011) has a strong focus on discards reduction by introducing a landings obligation. Under this landing obligation, discarding is prohibited and there will probably be a change in fishermen's behaviour. At the moment, it is uncertain what the effect of the landing obligation will be on the discards monitoring programme. The discard estimates obtained under the self-sampling programme may become increasingly important components of possible catch quotas, increasing the importance of data-validation. For this purpose, it would be useful to explore new validation methods.

As mentioned in the introduction, 10 observer trips were carried out in 2013, onboard of self-sampling trips. These trips are used by IMARES to fine-tune the sampling protocol and to be able to validate the self-sampling data. For the participing skippers, the observer trips are an unique opportunity to gain insight in the sample processing. Additionally, a letter with (preliminary) results of the observer-data is sent to the skipper for feedback. Likewise, during these observer trips, the scientific community gets a better understanding of commercial fisheries practices.

Much (observer-)data has already been collected and it would be interesting to explore the potential of this data further. A granted KB-WOT proposal for developing a statistical method for validation of the self-sampling data using the observer data will stimulate this process. Under

the new CFP, the role of observers may (undesirably) become one of lawful control in stead its former observer role. It is important to stress that independent scientific research should remain possible.

Acknowledgements

This report would not have been possible without the hard work by the many skippers and crew. For the species identification, otolith sampling and analysis at IMARES, we thank our colleagues in IJmuiden, Yerseke and Den Helder. The efforts by the companies Kay and Van Malsen assisting with sample processing, species identification and measurement and data entry are also greatly appreciated.

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Tables

Table 1. List of Dutch bottom-trawl and seine metiers. Note that not all metiers are sampled for discards each year. These have been classified according to European Union (EU) definitions (EU Council Regulation 409/2009) requiring information about gear type (i.e. demersal beam – TBB; otter trawl - OTB/OTT; and Scottish seine – SSC; level 4), target species assemblage (i.e. demersal fish - DEF, mixed crustaceans and demersal fish – MCD; level 5), and mesh size ranges (in mm; level 6).

	Level 4	**Level 5**	**Level 6**
	Gear type	**Target assemblage**	**Mesh size**
1	TBB (>300 hp)	DEF	70-99
2	TBB (≤300 hp)*	DEF	70-99
3	TBB	DEF	100-119
4	TBB	DEF	≥120
5	SSC	DEF	100-119
6	SSC	DEF	≥120
7	OTB **	MCD	70-99
8	OTB **	DEF	70-99
9	OTB **	DEF	100-119
10	OTB**	DEF	≥120

* Note that the TBB metier is further subdivided on a national level in the Netherlands based on engine size (horse power, hp): vessels with ≤ 300hp engine power are so called "Eurocutters".

** In this report, all OTB should be read as OTB/OTT, as in logbook data otter (OTB) and pair trawl (OTT) gear can be used interchangeably.

Table 2a. Summary of the total hpeffort (in kWdays *1000) for the fleet per between 2011 and 2013, for each quarter separate and the total fleet effort (in kWdays *1000) per year.

Metier \ Year	2011					2012					2013				
Quarter	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	
TBB_DEF_70-99mm_>300hp	8720	6438	7102	7832	**30092**	7699	4959	5813	7260	**25732**	7298	4880	5729	6475	**24382**
TBB_DEF_70-99mm_≤300hp	301	404	280	235	**1219**	272	267	244	199	**982**	208	257	225	167	**856**
TBB_DEF_100-119mm	79	523	179	17	**798**	279	1521	554	136	**2490**	98	1550	582	30	**2260**
TBB_DEF_>=120mm	10	310	23	1	**344**	76	507	593	15	**1192**	53	676	560	0	**1289**
SSC_DEF_100-119mm	0	122	187	54	**362**	0	87	260	84	**431**	1	129	152	64	**346**
SSC_DEF_>=120mm	0	45	144	10	**198**	0	58	123	29	**211**	0	10	244	40	**294**
OTB _MCD_70-99mm	18	86	253	119	**475**	70	145	312	40	**566**	23	61	350	151	**586**
OTB _DEF_70-99mm	100	237	157	116	**610**	114	191	227	103	**636**	81	130	234	82	**527**
OTB _DEF_100-119mm	18	289	340	15	**662**	80	474	493	59	**1106**	30	272	313	121	**736**
OTB _DEF_>=120mm	21	86	136	16	**259**	44	170	12	10	**236**	76	62	50	2	**191**
Total					**35019**					**33583**					**31467**

Table 2b. Summary of the total number of valid self-sampled trips per metier between 2011 and 2013, for each quarter separate and the total number of trips per year.

Metier \ Year / Quarter	2011					2012					2013				
	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	
TBB_DEF_70-99mm_>300hp	14	14	15	18	**61**	13	14	16	18	**61**	13	11	13	20	**57**
TBB_DEF_70-99mm_≤300hp	3	6	4	5	**18**	4	7	6	3	**20**	2	6	5	4	**17**
TBB_DEF_100-119mm	1	3	1	0	**5**	4	9	3	0	**16**	0	6	2	1	**9**
TBB_DEF_>=120mm	0	0	0	0	**0**	0	0	0	0	**0**	0	2	0	0	**2**
SSC_DEF_100-119mm	0	0	0	1	**1**	0	3	0	2	**5**	0	1	1	0	**2**
SSC_DEF_>=120mm	0	0	3	0	**3**	0	0	3	0	**3**	0	0	4	1	**5**
OTB_MCD_70-99mm	2	2	4	6	**14**	0	6	8	1	**15**	0	4	8	6	**18**
OTB_DEF_70-99mm	3	4	1	1	**9**	6	5	1	2	**14**	4	4	1	0	**9**
OTB_DEF_100-119mm	1	5	3	1	**10**	0	4	3	0	**7**	1	6	6	0	**13**
OTB_DEF_>=120mm	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**
Total					**121**					**142**					**132**

Table 3. Sampling and fleet effort (in kWdays *1000), and sampling coverage (% of kWdays) per self-sampled metier in 2013. NS= not sampled.

Metier	Sampling effort (kWdays)	Fleet effort (kWdays)	Sampling coverage kWdays (%)
TBB_DEF_70-99mm_>300hp	525	24382	2.2
TBB_DEF_70-99mm_≤300hp	165	856	1.9
TBB_DEF_100-119mm	86	2260	3.8
TBB_DEF_>=120mm	19	1289	1.5
SSC_DEF_100-119	6	346	1.7
SSC_DEF_≥=120	16	294	5.6
OTB_MCD_70-99mm	26	586	4.5
OTB_DEF_70-99mm	14	527	2.7
OTB_DEF_100-119mm	86	736	11.7
OTB_DEF_>=120mm	NS	191	0

Table 4. Average weights (Wt (in kg)) and numbers (Nb) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod, whiting (WHG) and Norway lobster (NEP) by metier in 2013. N= number of sampled trips; Nm= not measured (No length-weight key was used on Nephrops data).

	Metier	N	Dis DAB	Lan DAB	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis BLL	Lan BLL	Dis TUR	Lan TUR	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis NEP	Lan NEP
Wt	TBB_DEF_70-99mm_>300hp	57	84	8	106	81	5	35	1	4	1	6	1	1	3	1	Nm	1
	TBB_DEF_70-99mm_<=300h	17	63	4	38	11	10	22	1	1	1	1	1	1	1	1	Nm	1
	TBB_DEF_100-119mm	9	30	2	38	292	1	1	1	1	0	10	1	0	1	3	Nm	0
	TBB_DEF_>=120mm	2	11	0	15	264	0	0	0	5	0	4	0	0	0	0	Nm	0
	SSC_DEF_100-119mm	2	75	29	167	477	0	0	0	0	0	0	1	3	1	0	Nm	0
	SSC_DEF_>=120mm	5	5	67	1	45	0	0	0	0	0	0	16	183	4	0	Nm	0
	OTB_MCD_70-99mm	18	64	2	64	23	1	1	0	1	1	3	1	2	2	1	Nm	35
	OTB_DEF_70-99mm	9	56	3	47	55	1	2	1	1	0	4	1	1	5	1	Nm	10
	OTB_DEF_100-119mm	13	45	4	55	204	1	0	0	1	0	5	1	1	0	1	Nm	1
Nb	TBB_DEF_70-99mm_>300hp	57	1543	Nm	1189	Nm	52	Nm	1	Nm	1	Nm	3	Nm	42	Nm	10	Nm
	TBB_DEF_70-99mm_<=300h	17	1020	Nm	600	Nm	150	Nm	3	Nm	3	Nm	3	Nm	16	Nm	0	Nm
	TBB_DEF_100-119mm	9	376	Nm	269	Nm	1	Nm	1	Nm	0	Nm	1	Nm	1	Nm	1	Nm
	TBB_DEF_>=120mm	2	101	Nm	100	Nm	0	Nm	0	Nm	0	Nm	0	Nm	0	Nm	0	Nm
	SSC_DEF_100-119mm	2	613	Nm	1109	Nm	0	Nm	0	Nm	0	Nm	2	Nm	3	Nm	0	Nm
	SSC_DEF_>=120mm	5	35	Nm	2	Nm	0	Nm	0	Nm	0	Nm	56	Nm	31	Nm	4	Nm
	OTB_MCD_70-99mm	18	853	Nm	463	Nm	1	Nm	0	Nm	1	Nm	3	Nm	23	Nm	612	Nm
	OTB_DEF_70-99mm	9	794	Nm	407	Nm	1	Nm	1	Nm	0	Nm	2	Nm	49	Nm	62	Nm
	OTB_DEF_100-119mm	13	464	Nm	360	Nm	1	Nm	0	Nm	0	Nm	1	Nm	0	Nm	2	Nm

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Table 5a. Average weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod, whiting (WHG) and Norway lobster (NEP) by metier and quarter (Q) in 2013. Nm= not measured (No length-weight key was used on Nephrops data).

Metier	Q	N	Dis DAB	Lan DAB	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis BLL	Lan BLL	Dis TUR	Lan TUR	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis NEP	Lan NEP
TBB_DEF_70-99mm_>300hp	1	13	101	16	93	77	5	27	1	3	1	5	1	2	4	2	Nm	1
TBB_DEF_70-99mm_>300hp	2	11	105	8	94	29	7	32	1	3	1	5	1	1	2	1	Nm	0
TBB_DEF_70-99mm_>300hp	3	13	95	8	95	64	4	38	1	3	1	7	1	1	2	1	Nm	1
TBB_DEF_70-99mm_>300hp	4	20	55	2	129	124	5	40	1	4	1	6	1	1	4	1	Nm	1
TBB_DEF_70-99mm_<=300h	1	2	144	9	22	3	7	13	0	1	0	1	0	0	0	0	Nm	0
TBB_DEF_70-99mm_<=300h	2	6	77	5	36	11	14	26	1	1	0	1	0	0	1	0	Nm	1
TBB_DEF_70-99mm_<=300h	3	5	36	2	37	9	7	22	1	1	1	2	0	0	1	0	Nm	0
TBB_DEF_70-99mm_<=300h	4	4	37	4	50	16	11	20	0	1	2	2	1	1	4	1	Nm	0
TBB_DEF_100-119mm	2	6	32	3	40	274	1	1	1	1	0	9	1	0	1	0	Nm	0
TBB_DEF_100-119mm	3	2	18	0	15	255	0	3	0	2	0	15	0	0	0	10	Nm	0
TBB_DEF_100-119mm	4	1	45	0	74	473	0	2	0	0	0	3	0	0	0	8	Nm	0
TBB_DEF_>=120mm	2	2	11	0	15	264	0	0	0	0	0	3	0	0	0	8	Nm	0
SSC_DEF_100-119mm	2	1	22	15	30	257	0	0	0	0	0	0	1	0	1	0	Nm	0
SSC_DEF_100-119mm	3	1	129	57	304	918	0	0	0	0	0	0	0	8	1	0	Nm	0
SSC_DEF_>=120mm	3	4	4	35	1	54	0	0	0	0	0	0	20	191	4	0	Nm	0
SSC_DEF_>=120mm	4	1	9	196	1	10	0	0	0	0	0	0	1	151	2	0	Nm	0
OTB_MCD_70-99mm	2	4	31	1	71	15	1	1	0	1	0	3	1	4	6	1	Nm	25
OTB_MCD_70-99mm	3	8	72	2	50	16	1	1	0	1	1	4	1	1	2	1	Nm	28
OTB_MCD_70-99mm	4	6	75	2	78	38	1	1	0	1	0	2	1	1	1	1	Nm	51
OTB_DEF_70-99mm	1	4	60	3	54	76	1	2	0	1	0	1	6	2	0	1	Nm	7
OTB_DEF_70-99mm	2	4	50	4	43	33	1	2	1	2	0	7	1	1	2	1	Nm	4
OTB_DEF_70-99mm	3	1	62	1	36	63	0	0	0	1	0	2	2	0	15	0	Nm	47

Table 5a. (cont).

Metier	Q	N	Dis DAB	Lan DAB	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis BLL	Lan BLL	Dis TUR	Lan TUR	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis NEP	Lan NEP
OTB_DEF_100-119mm	1	1	42	7	93	31	0	0	0	0	0	0	0	0	0	0	Nm	0
OTB_DEF_100-119mm	2	6	67	5	79	182	0	0	0	1	0	4	1	1	0	1	Nm	1
OTB_DEF_100-119mm	3	6	23	2	25	254	1	0	0	1	0	6	1	1	0	0	Nm	0

12 **Table 5b.** Average numbers per hour for discarded commercially-important target species: dab (DAB), plaice (PLE), sole, (SOL), brill (BLL), turbot (TUR), cod, whiting (WHG) and Norway lobster (NEP) by metier and quarter (Q) in 2013.

Metier	Q	N	DAB	PLE	SOL	BLL	TUR	COD	WHG	NEP
TBB_DEF_70-99mm_>300hp	1	13	1683	1043	53	1	2	3	36	7
TBB_DEF_70-99mm_>300hp	2	11	1926	1260	75	1	1	2	14	0
TBB_DEF_70-99mm_>300hp	3	13	1805	1156	31	2	2	1	19	7
TBB_DEF_70-99mm_>300hp	4	20	1071	1266	52	1	1	6	77	19
TBB_DEF_70-99mm_<=300h	1	2	2238	287	86	0	0	0	0	0
TBB_DEF_70-99mm_<=300h	2	6	1199	510	197	4	0	0	1	0
TBB_DEF_70-99mm_<=300h	3	5	656	655	107	5	4	0	4	0
TBB_DEF_70-99mm_<=300h	4	4	595	823	167	0	6	12	63	0
TBB_DEF_100-119mm	2	6	378	280	1	1	0	1	1	1
TBB_DEF_100-119mm	3	2	240	121	0	0	0	0	0	0
TBB_DEF_100-119mm	4	1	636	501	0	0	0	0	0	0
TBB_DEF_>=120mm	2	2	101	100	0	0	0	0	0	0
SSC_DEF_100-119mm	2	1	219	187	0	0	0	3	3	0
SSC_DEF_100-119mm	3	1	1006	2031	0	0	0	0	3	0
SSC_DEF_>=120mm	3	4	28	3	0	0	0	69	36	5
SSC_DEF_>=120mm	4	1	60	2	0	0	0	2	13	0
OTB_MCD_70-99mm	2	4	552	518	1	0	0	2	60	1078
OTB_MCD_70-99mm	3	8	1034	430	1	0	1	3	18	439
OTB_MCD_70-99mm	4	6	812	471	1	0	0	4	5	531
OTB_DEF_70-99mm	1	4	737	451	1	0	0	1	58	40
OTB_DEF_70-99mm	2	4	868	416	1	1	0	1	18	66
OTB_DEF_70-99mm	3	1	727	196	0	0	0	3	138	135

Table 5b. (cont.)

Metier	Q	N	DAB	PLE	SOL	BLL	TUR	COD	WHG	NEP
OTB_DEF_100-119mm	1	1	441	686	0	0	0	0	0	0
OTB_DEF_100-119mm	2	6	647	512	0	0	0	2	0	4
OTB_DEF_100-119mm	3	6	284	153	1	0	0	1	0	1

Table 6a. Average numbers per hour of discarded fish species in Dutch bottom beamtrawl (TBB), otter trawl (OTB) and Scottish seine (SSC) fisheries in 2013.

Metier / Species	TBB_DEF 70-99mm >300hp	TBB_DEF 70-99mm <=300hp	TBB_DEF 100-119mm	TBB_DEF >=120mm	SSC_DEF 100-119mm	SSC_DEF >=120mm	OTB_MCD 70-99mm	OTB_DEF 70-99mm	OTB_DEF 100-119mm
Ammodytes sp.	11	12	19	0	0	0	0	0	1
Argentina sp.	0	0	0	0	0	1	0	0	0
Bib	3	0	0	0	0	0	0	1	1
Blonde ray	1	0	0	0	0	0	0	0	0
Brill	1	3	1	0	0	0	0	1	0
Bull-rout	13	55	3	1	10	0	3	6	2
Cod	3	3	1	0	2	56	3	2	1
Dab	1543	1020	376	101	613	35	853	794	464
Dragonet	74	53	9	7	0	0	18	16	1
Five-bearded rockling	1	0	0	0	0	0	0	0	0
Flounder	3	5	0	0	10	0	1	1	1
Four-bearded rockling	9	0	1	0	0	0	6	3	0
Greater pipefish	1	2	0	0	0	0	0	0	0
Greater sand-eel	8	4	0	0	0	0	0	0	0
Greater weever	1	0	0	0	0	0	0	0	0
Grey gurnard	83	6	66	96	1203	46	90	73	34
Haddock	0	0	0	0	0	58	1	0	0
Hake	0	0	0	0	0	26	0	0	0
Herring	8	6	0	0	0	89	1	3	1
Hooknose	18	61	2	2	0	0	2	1	1
Horse mackerel	1	1	0	0	0	0	0	0	0
John Dory	1	0	0	0	0	0	0	0	0
Lemon sole	23	1	27	10	10	5	13	19	24
Lesser spotted dogfish	2	0	0	0	0	0	1	2	1
Lesser weever	22	4	1	0	0	0	0	0	0
Ling	0	0	0	0	0	1	0	0	0
Long rough dab	5	1	2	1	3	151	31	11	13
Lumpsucker	0	0	0	3	0	0	0	0	1
Mackerel	1	0	1	0	0	1	0	1	0
Mustelus sp.	1	0	0	0	0	0	0	0	1
Nilsson's pipefish	1	1	0	0	0	0	0	0	0
Norway pout	0	0	0	0	0	7	0	0	0
Norwegian topknot	1	0	1	0	0	0	1	1	0
Pandora	1	0	0	0	0	0	0	0	0
Plaice	1189	600	269	100	1109	2	463	407	360
Pollack	0	0	0	0	0	2	0	0	0
Pomatoschistus sp.	4	29	1	0	0	0	0	0	0
Poor cod	3	2	0	0	0	0	0	0	0

Table 6a. (cont)

Species \ Metier	TBB_DEF 70-99mm >300hp	TBB_DEF 70-99mm <=300hp	TBB_DEF 100-119mm	TBB_DEF >=120mm	SSC_DEF 100-119mm	SSC_DEF >=120mm	OTB_MCD 70-99mm	OTB_DEF 70-99mm	OTB_DEF 100-119mm
Raja sp.	0	0	1	0	0	0	0	0	1
Red gurnard	1	0	0	0	0	0	0	0	0
Reticulated dragonet	1	0	0	0	0	0	0	0	0
Roker	2	0	0	0	0	0	0	1	1
Saithe	0	0	0	0	0	13	0	0	0
Scaldfish	166	84	8	0	0	0	6	18	1
Sea-snail	1	3	0	0	0	0	0	0	0
Sea scorpion	0	1	0	0	0	0	0	0	0
Smoothhound	0	0	0	0	0	0	0	1	1
Snake pipefish	1	0	0	0	0	0	0	0	0
Sole	52	150	1	0	0	0	1	1	1
Solenette	130	85	25	0	0	0	3	4	1
Spotted dragonet	1	1	0	0	0	0	0	0	0
Spotted ray	3	0	0	0	0	0	1	1	1
Sprat	4	4	0	0	0	0	1	1	1
Starry ray	1	1	5	18	14	82	1	4	41
Striped red mullet	4	1	0	0	0	0	0	0	0
Thickback sole	1	0	0	0	0	0	0	0	0
Tub gurnard	11	24	0	0	0	0	2	0	1
Turbot	1	3	0	0	0	0	1	0	0
Twaite shad	1	0	0	0	0	0	0	0	0
Whiting	42	16	1	0	3	31	23	49	0
Witch	0	0	0	0	0	22	5	1	1

Table 6b. Average numbers per hour of discarded benthic species in Dutch bottom beamtrawl (TBB) , otter trawl (OTB) and Scottish seine (SSC) fisheries in 2013.

Metier / Species	TBB_DEF 70-99mm >300hp	TBB_DEF 70-99mm <=300hp	TBB_DEF 100-119mm	TBB_DEF >=120mm	SSC_DEF 100-119mm	SSC_DEF >=120mm	OTB_MCD 70-99mm	OTB_DEF 70-99mm	OTB_DEF 100-119mm
Abra alba	1	1	0	0	0	0	0	0	0
Abra prismatica	1	12	0	0	0	0	0	0	0
Abra sp.	1	1	0	0	0	0	0	0	0
Acanthocardia echinata	78	0	22	13	0	3	1	1	1
Aequipecten opercularis	1	0	2	1	0	0	1	1	0
Alcyonidium diaphanum	2	1	6	65	0	0	5	1	3
Alcyonium digitatum	4	0	9	2	2	14	3	8	4
Alloteuthis subulata	1	1	0	0	0	0	0	0	0
Anthozoa	3	3	1	1	0	14	1	1	1
Aphrodita aculeata	185	0	51	100	0	5	37	54	11
Arctica islandica	16	0	5	11	5	1	1	1	1
Ascidiacea	1	0	0	0	0	0	0	0	0
Ascidiella scabra	1	0	0	0	0	0	0	0	0
Asterias rubens	925	5154	291	83	19	8	208	202	11
Astropecten irregularis	5245	38	2500	158	10	2	51	56	6
Atelecyclus rotundatus	1	0	1	0	0	1	0	0	0
Buccinum undatum	12	1	49	40	0	22	5	1	10
Cancer pagurus	7	2	10	7	45	1	14	6	3
Carcinus maenas	1	1	0	0	0	0	0	0	0
Cerastoderma edule	1	0	1	0	0	0	0	0	0
Chamelea gallina	1	10	1	0	0	0	0	0	0
Ciona intestinalis	1	0	0	0	0	0	0	0	0
Colus gracilis	2	0	1	0	0	5	1	0	1
Corystes cassivelaunus	261	43	22	24	3	1	16	5	8
Crangon crangon	14	63	0	0	0	0	2	2	0
Crepidula fornicata	1	9	1	0	0	0	0	0	0
Donax vittatus	0	1	0	0	0	0	0	0	0
Dosinia exoleta	2	1	1	0	0	0	0	1	0
Echinidae	1	0	0	0	0	0	0	0	0
Echinocardium cordatum	206	47	31	1	0	1	19	14	1
Echiurus echiurus	0	0	1	0	0	0	0	0	0
Ectopleura larynx	6	5	1	0	0	0	0	0	0
Eledone cirrhosa	0	0	1	0	0	0	1	0	1
Ensis sp.	0	1	3	0	0	0	0	0	0
Euspira pulchella	7	60	3	0	0	0	1	0	1
Flustra foliacea	1	0	2	0	0	0	1	2	1

Table 6b. (cont.)

Species \ Metier	TBB_DEF 70-99mm >300hp	TBB_DEF 70-99mm <=300hp	TBB_DEF 100-119mm	TBB_DEF >=120mm	SSC_DEF 100-119mm	SSC_DEF >=120mm	OTB_MCD 70-99mm	OTB_DEF 70-99mm	OTB_DEF 100-119mm
Gari fervensis	1	1	2	1	0	0	0	0	0
Geryon trispinosus	0	0	0	0	0	1	1	0	0
Gonatus fabricii	1	0	0	0	0	0	0	0	0
Goneplax rhomboides	34	0	0	0	0	0	2	17	0
Grote rode zeekomkommer	0	0	0	0	0	2	0	0	0
Halecium halecinum	1	0	1	0	0	0	1	0	0
Halichondria panicea	20	0	23	30	5	0	16	20	30
Hyas araneus	1	0	1	0	0	0	0	1	0
Hyas coarctatus	1	0	0	0	0	5	1	0	0
Hyas sp.	1	2	1	1	0	0	0	0	1
Hydrallmania falcata	1	0	0	0	0	0	1	0	0
Hydrozoa	1	0	0	0	0	0	0	0	0
Laevicardium crassum	0	0	3	0	0	0	0	0	0
Liocarcinus depurator	202	220	5	1	0	2	131	70	1
Liocarcinus holsatus	1709	2351	94	65	6	3	42	54	4
Liocarcinus marmoreus	28	6	1	0	0	0	0	0	0
Liocarcinus navigator	1	1	0	0	0	0	0	0	0
Liocarcinus pusillus	0	1	0	0	0	0	0	0	0
Lithodes maja	0	0	0	0	0	0	0	0	1
Loligo forbesi	0	0	0	0	0	0	1	1	1
Loligo sp.	1	0	1	0	0	0	0	0	0
Loligo vulgaris	1	1	0	0	0	0	1	0	0
Luidia ciliaris	0	0	0	0	0	0	0	0	1
Luidia sarsii	0	0	0	0	0	0	0	1	0
Macoma balthica	1	133	0	0	0	0	0	0	0
Macropodia rostrata	1	0	0	0	0	0	0	0	0
Macropodia tenuirostris	0	1	0	0	0	0	0	0	0
Mactra corallina	12	1	2	0	0	0	0	0	0
Mya truncata	0	0	0	0	0	0	1	1	0
Mytilus edulis	2	50	1	2	0	0	0	0	10
Nassarius incrassatus	0	2	0	0	0	0	0	0	0
Nassarius reticlatus	1	160	0	0	0	0	0	0	0
Necora puber	5	1	1	0	0	0	0	0	0
Nemertesia antennina	1	0	0	0	0	0	0	0	0
Nemertesia sp.	2	0	0	0	0	0	1	0	0
Nephrops norvegicus	10	0	1	0	0	4	612	62	2
Neptunea antiqua	1	0	31	18	0	29	3	1	10
Nereis sp.	0	0	0	0	0	0	1	0	0

Table 6b. (cont.)

Species \ Metier	TBB_DEF 70-99mm >300hp	TBB_DEF 70-99mm <=300hp	TBB_DEF 100-119mm	TBB_DEF >=120mm	SSC_DEF 100-119mm	SSC_DEF >=120mm	OTB_MCD 70-99mm	OTB_DEF 70-99mm	OTB_DEF 100-119mm
Octopus vulgaris	0	0	0	0	0	0	0	1	0
Ophiothrix fragilis	71	0	18	9	16	0	114	7	53
Ophiura albida	118	1097	0	0	0	0	3	6	0
Ophiura ophiura	1723	13659	29	0	0	0	1	4	1
Pagurus bernhardus	340	822	118	115	2	8	89	30	13
Palaemon sp.	1	1	0	0	0	0	0	0	0
Pisidia longicornis	0	0	1	0	2	0	0	0	0
Priapulus caudatus	0	0	0	0	0	0	1	0	0
Psammechinus miliaris	85	371	12	1	0	4	1	0	1
Psolus phantapus	0	0	0	0	0	2	0	0	0
Sabellaria alveolata	1	0	0	0	0	0	0	0	0
Scalibregma inflatum	1	1	2	1	0	1	1	1	1
Scaphander lignarius	0	0	1	0	0	0	0	0	0
Sepia officinalis	2	0	0	0	0	0	0	0	0
Sepiola sp.	1	1	0	0	0	0	0	0	0
Solen marginatus	2	7	1	2	0	0	0	0	1
Spatangus purpureus	0	0	5	0	0	0	0	0	0
Spisula solida	0	0	1	0	0	0	0	0	0
Spisula sp.	10	106	7	0	0	0	0	0	0
Thia scutellata	1	0	0	0	0	0	0	0	0
Turritella communis	0	0	0	0	0	0	1	0	0
Venerupis corrugata	0	4	0	0	0	0	0	0	0

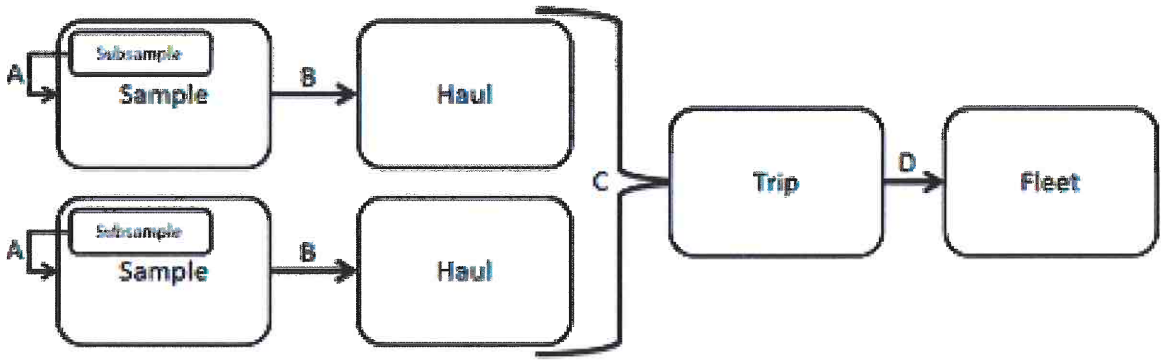
Table 7a. Average weights (kg) and numbers per hour of landed (L) and discarded (D) plaice (PLE) and sole (SOL, top) in the beamtrawl fisheries (TBB_DEF_70-99mm_>300hp) between 1976 and 2013. Nm, not measured; n/a, not available. (Before 2009, data is based on observer trips. 2009 and onwards is based on self-sampling trips.)

Year/		PLE						SOL					
		Numbers			Weight			Numbers			Weight		
Period	N trips	L	D	%D	L	D	%D	L	D	%D	L	D	%D
1976-1979	21	253	185	42%	108	28	20%	116	8	6%	32	1	4%
1980-1983	24	309	418	57%	99	51	34%	85	24	22%	19	3	15%
1989-1990	6	392	330	46%	104	46	30%	286	83	22%	48	12	20%
1999	3	145	181	55%	42	18	29%	112	16	13%	32	2	5%
2000	12	194	601	76%	50	47	48%	90	25	22%	22	2	10%
2001	4	364	1184	76%	84	89	51%	82	17	17%	17	1	6%
2002	6	263	868	77%	69	71	51%	126	38	23%	18	3	13%
2003	9	196	945	83%	52	70	57%	95	32	25%	20	3	14%
2004	8	158	792	83%	42	57	57%	175	69	28%	31	7	17%
2005	8	143	710	83%	47	51	52%	99	29	23%	20	2	11%
2006	9	166	997	86%	57	67	54%	64	26	29%	16	2	13%
2007	10	214	700	77%	67	57	46%	94	27	23%	22	2	10%
2008	10	169	902	84%	61	69	53%	95	16	16%	23	1	6%
2009	48	189	917	83%	61	76	55%	113	34	23%	25	3	11%
2010	74	201	872	81%	82	68	45%	132	42	24%	22	4	14%
2011	67	Nm	921	n/a	72	85	54%	Nm	50	n/a	23	5	18%
2012	61	Nm	934	n/a	90	87	49%	Nm	72	n/a	29	6	17%
2013	57	Nm	1189	n/a	81	106	57%	Nm	52	n/a	35	5	13%

Table 7b. Average weights (kg) and numbers per hour of landed (L) and discarded (D) dab (DAB) and whiting (WHG) in the beamtrawl fisheries (TBB_DEF_70-99mm_>300hp) between 1976 and 2013. Nm, not measured; n/a, not available. (Before 2009, data is based on observer trips. 2009 and onwards is based on self-sampling trips.)

Year/ Period	N trips	DAB						WHG					
		Numbers			Weight			Numbers			Weight		
		L	D	%D	L	D	%D	L	D	%D	L	D	%D
1976-1979	21	12	917	99%	4	65	95%	10	34	78%	3	5	62%
1980-1983	24	31	796	96%	7	60	90%	21	89	81%	5	11	69%
1989-1990	6	15	2147	99%	2	123	98%	5	122	96%	1	17	95%
1999	3	112	1411	93%	13	106	89%	Nm	77	n/a	<1	10	93%
2000	12	28	951	97%	6	49	89%	Nm	117	n/a	2	9	85%
2001	4	125	2268	95%	12	97	89%	Nm	69	n/a	1	9	86%
2002	6	92	934	91%	11	57	84%	14	104	88%	1	7	85%
2003	9	60	1166	95%	8	64	89%	2	40	96%	<1	3	86%
2004	8	54	1037	95%	7	51	87%	0	46	100%	<1	2	92%
2005	8	25	492	95%	6	52	90%	3	18	85%	<1	2	85%
2006	9	46	2335	98%	9	79	90%	Nm	36	n/a	<1	3	74%
2007	10	81	1196	94%	12	62	83%	0	10	100%	<1	3	87%
2008	10	51	905	95%	8	49	87%	0	15	100%	<1	3	93%
2009	48	31	1221	98%	33	62	65%	Nm	58	n/a	<1	5	89%
2010	74	48	1178	96%	10	65	87%	Nm	70	n/a	1	5	82%
2011	67	Nm	1350	n/a	12	74	86%	Nm	54	n/a	3	4	57%
2012	61	Nm	1106	n/a	8	63	89%	Nm	73	n/a	2	6	75%
2013	57	Nm	1543	n/a	8	84	91%	Nm	42	n/a	1	3	75%

Figures



$$\mathbf{A:}\ number\ in\ subsample * subsample\ fraction$$

$$\mathbf{B:}\ number\ in\ sample * \frac{Volume\ of\ (total\ catch\ of\ haul - total\ landings\ in\ haul)}{volume\ of\ discard\ sample}$$

$$\mathbf{C:}\ sum\ of\ numbers\ in\ both\ samples * \frac{Total\ duration\ all\ hauls\ of\ the\ trip}{Duration\ both\ sampled\ hauls}$$

$$\mathbf{D:}\ number\ per\ trip * \frac{effort\ (kWDays)\ national\ fleet\ (per\ métier)}{effort\ (kWDays)\ sampled\ trips\ (per\ métier)}$$

Figure 1. Flowchart of the raising process.

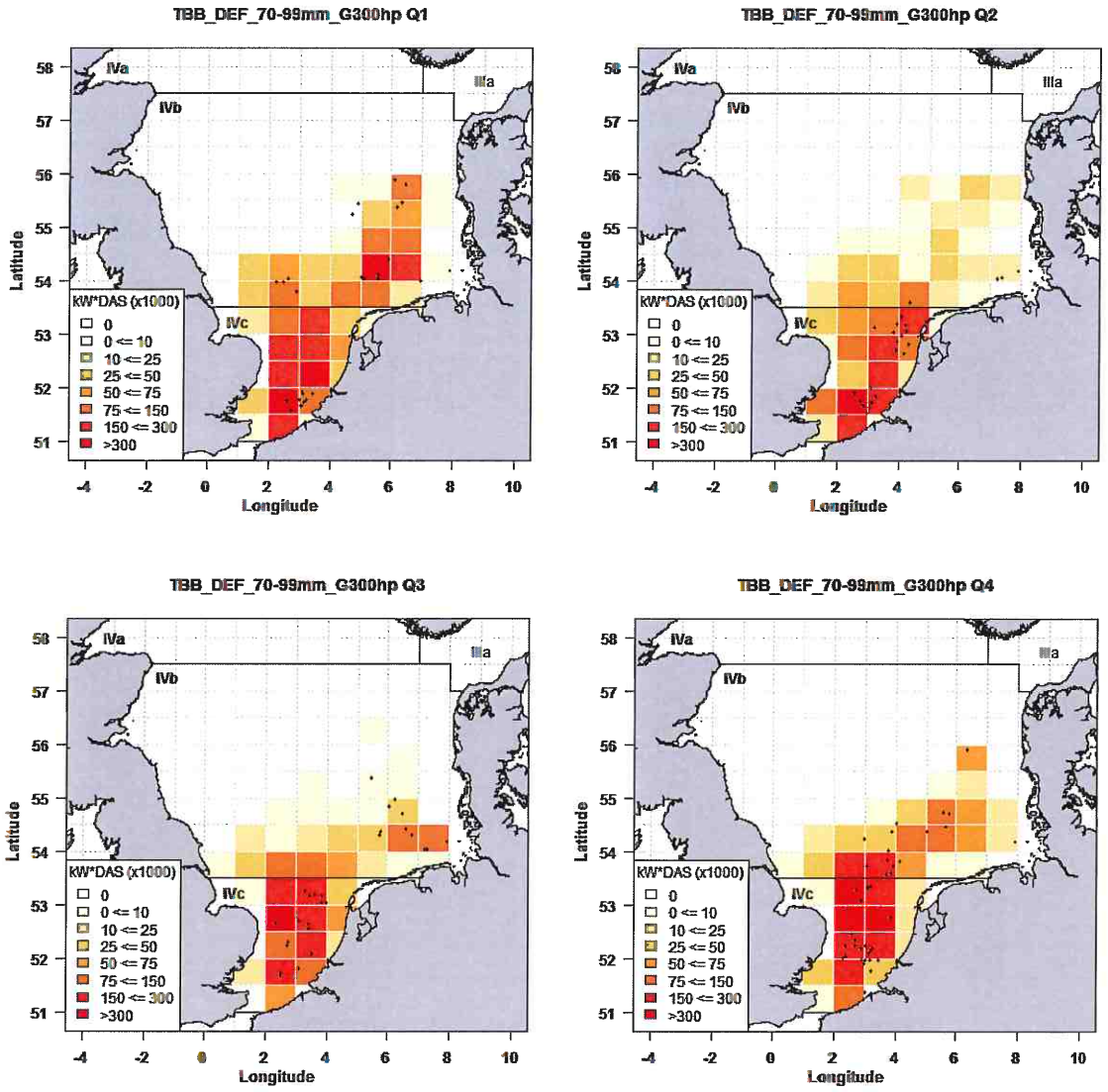


Figure 2a. Distribution of total effort (in kw*days (x1000) at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for TBB_DEF_70-99mm_>300hp.

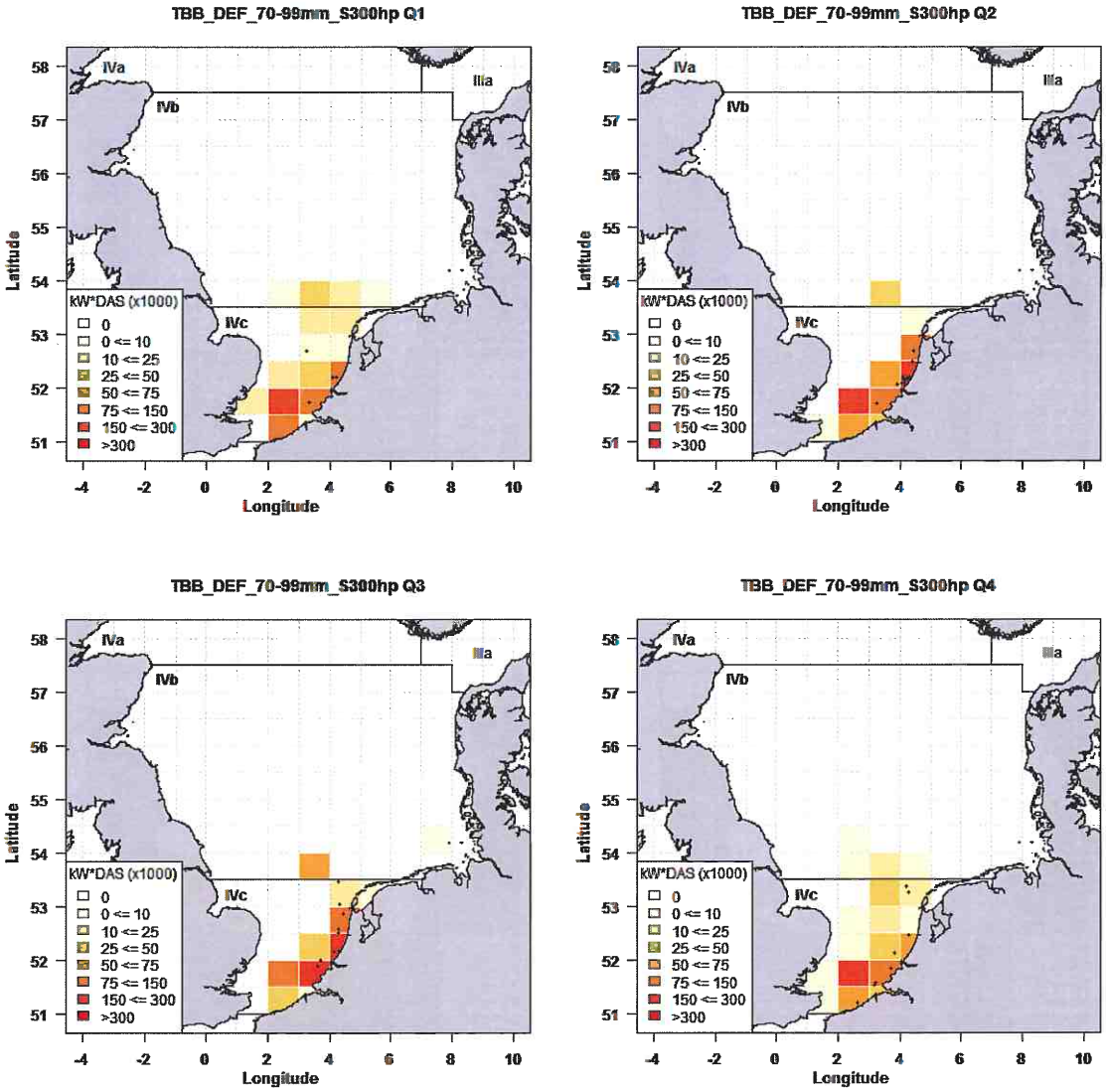


Figure 2b. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for TBB_DEF_70-99mm_<=300hp.

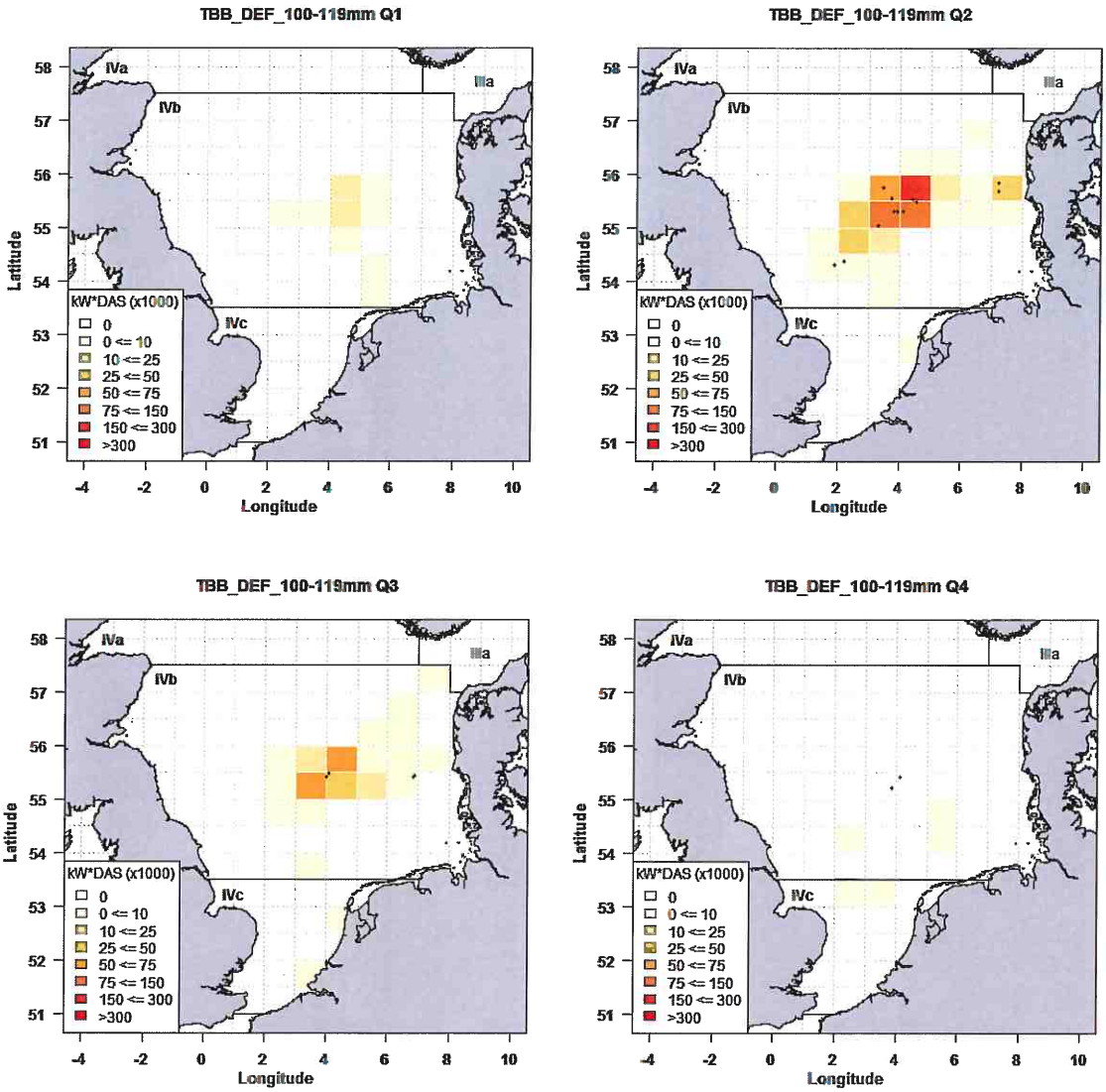


Figure 2c. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for TBB_DEF_100-119mm.

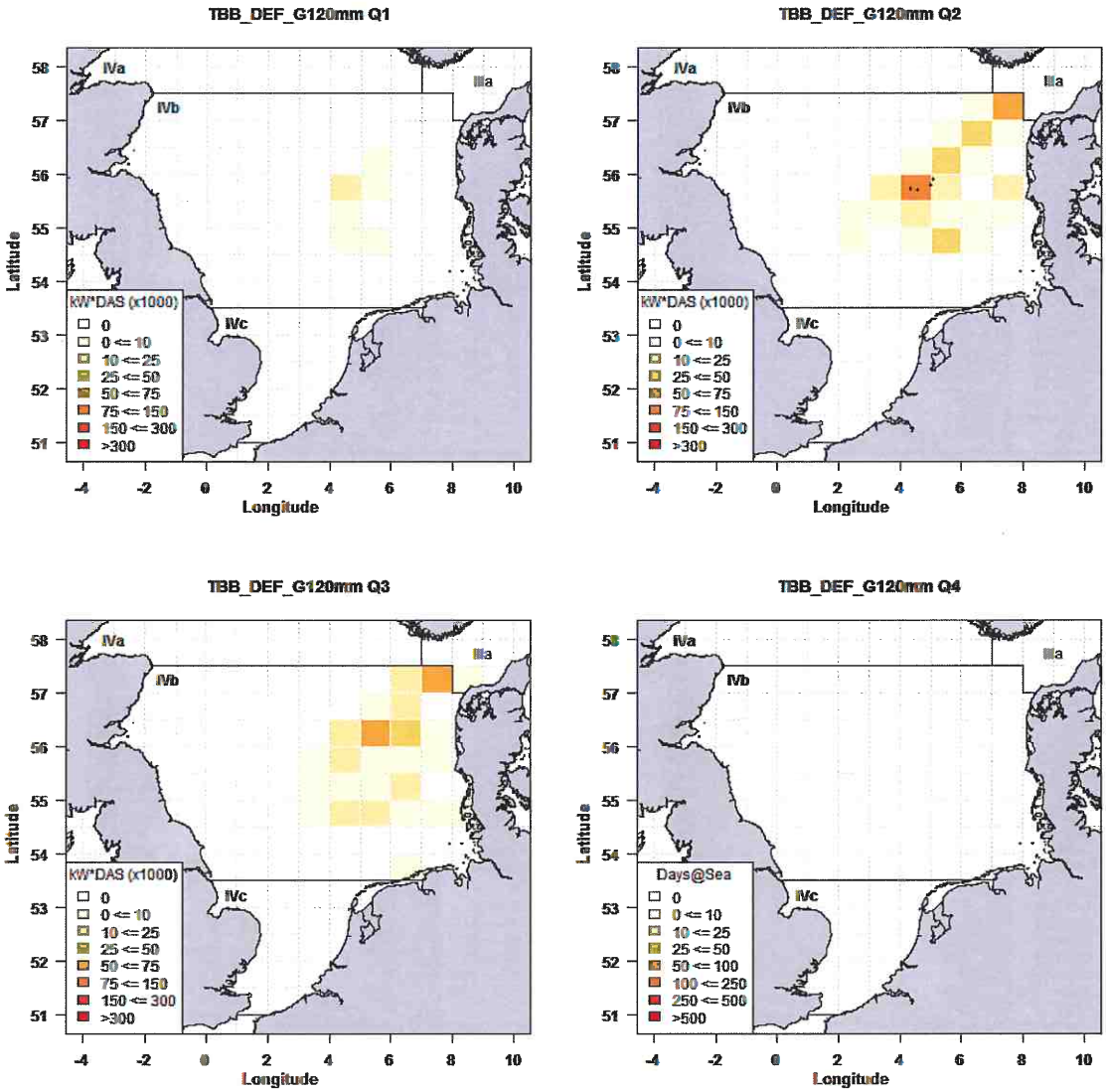


Figure 2d. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for TBB_DEF_>=120mm.

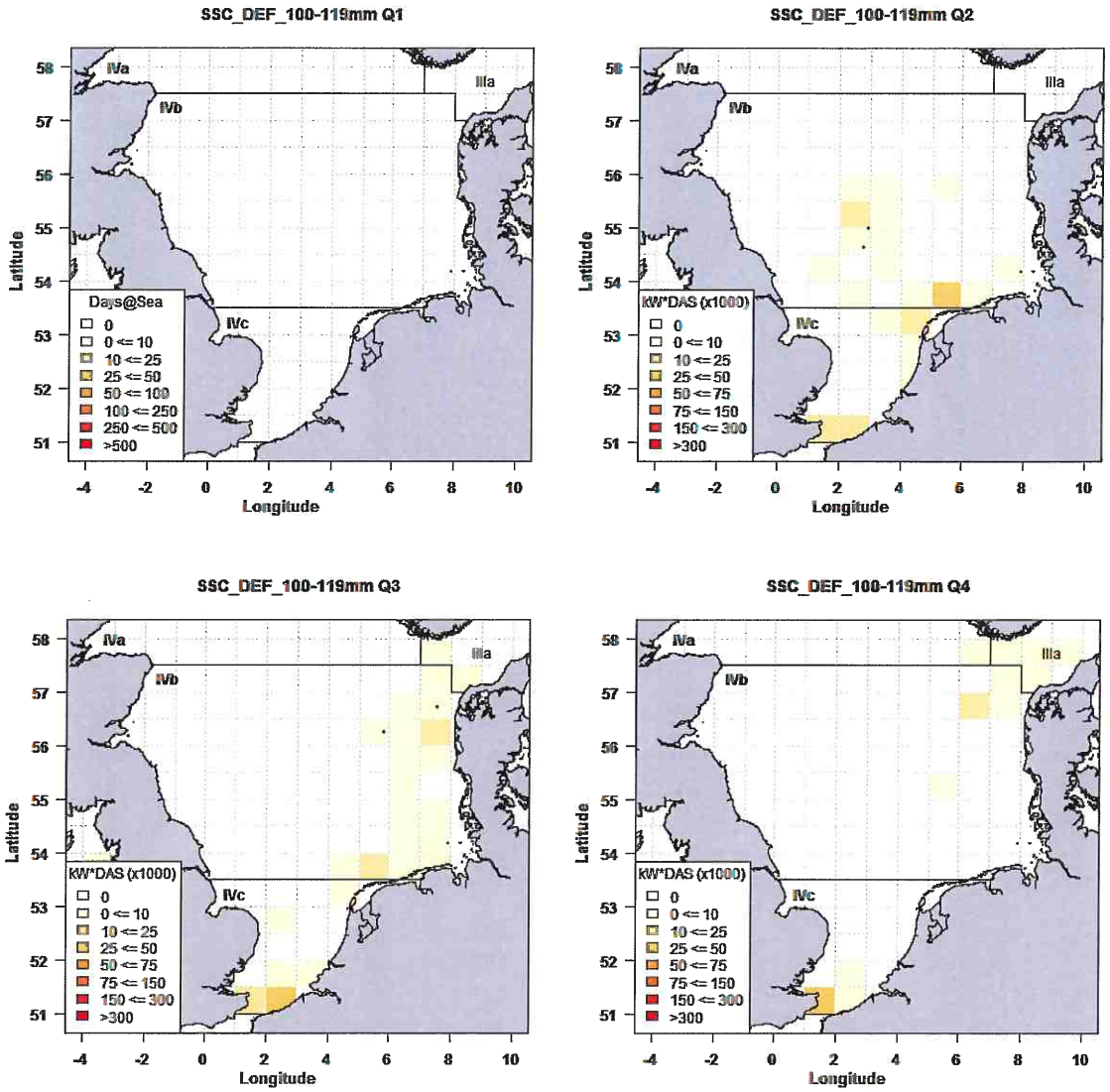


Figure 2e. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for SSC_DEF_100-119mm.

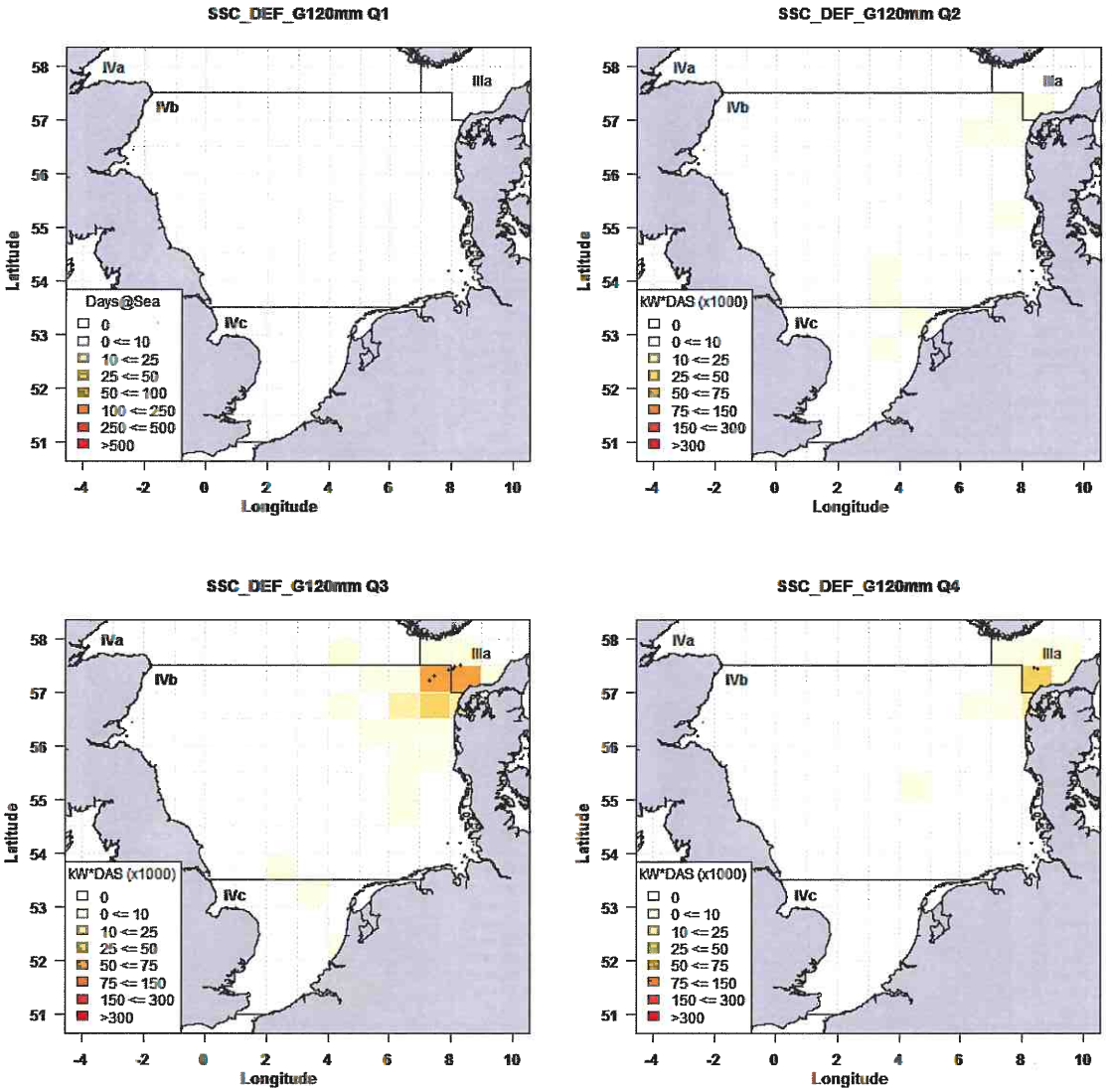


Figure 2f. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for SSC_DEF_>=120mm.

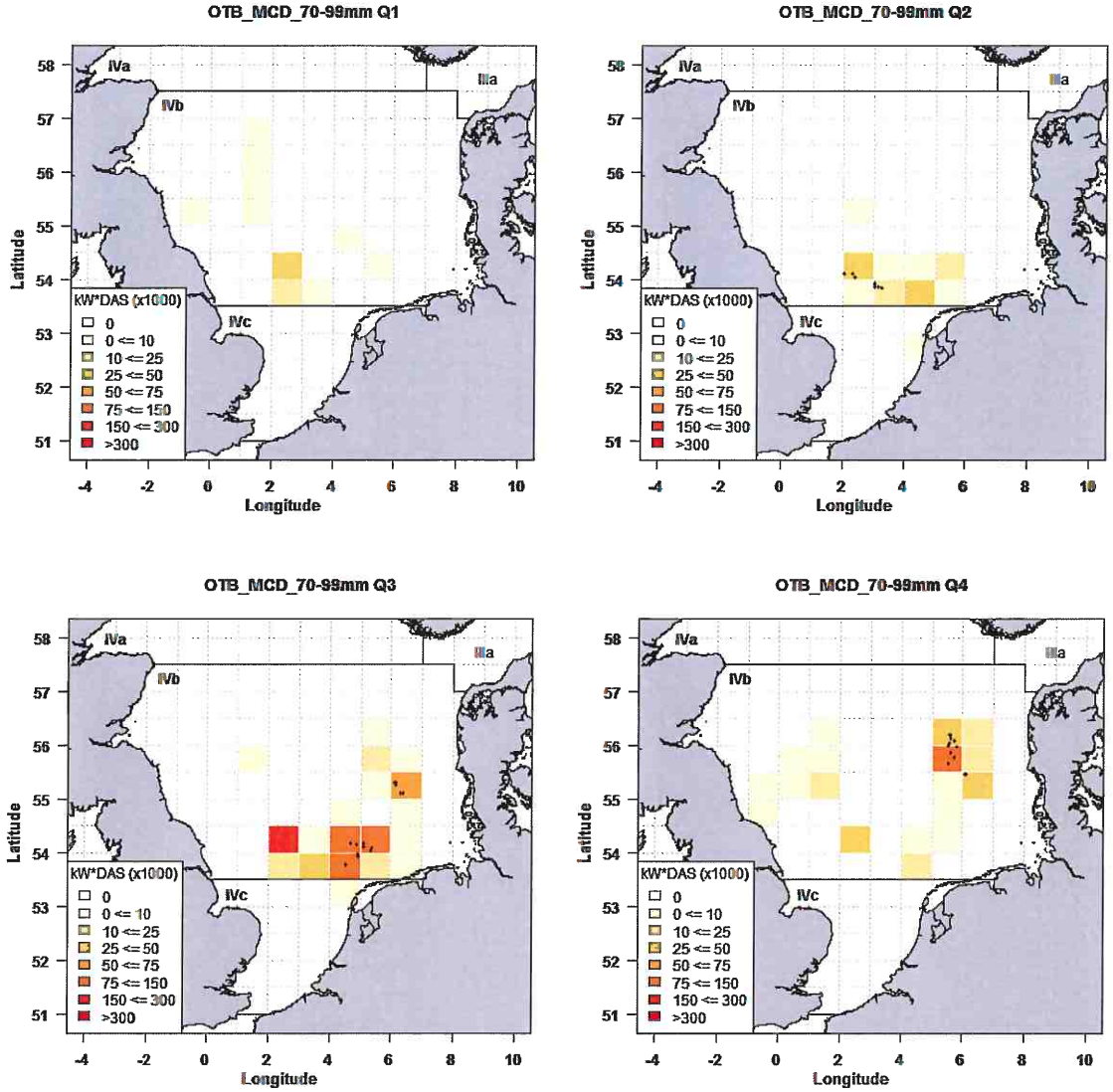


Figure 2g. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for OTB_MCD_70-99mm.

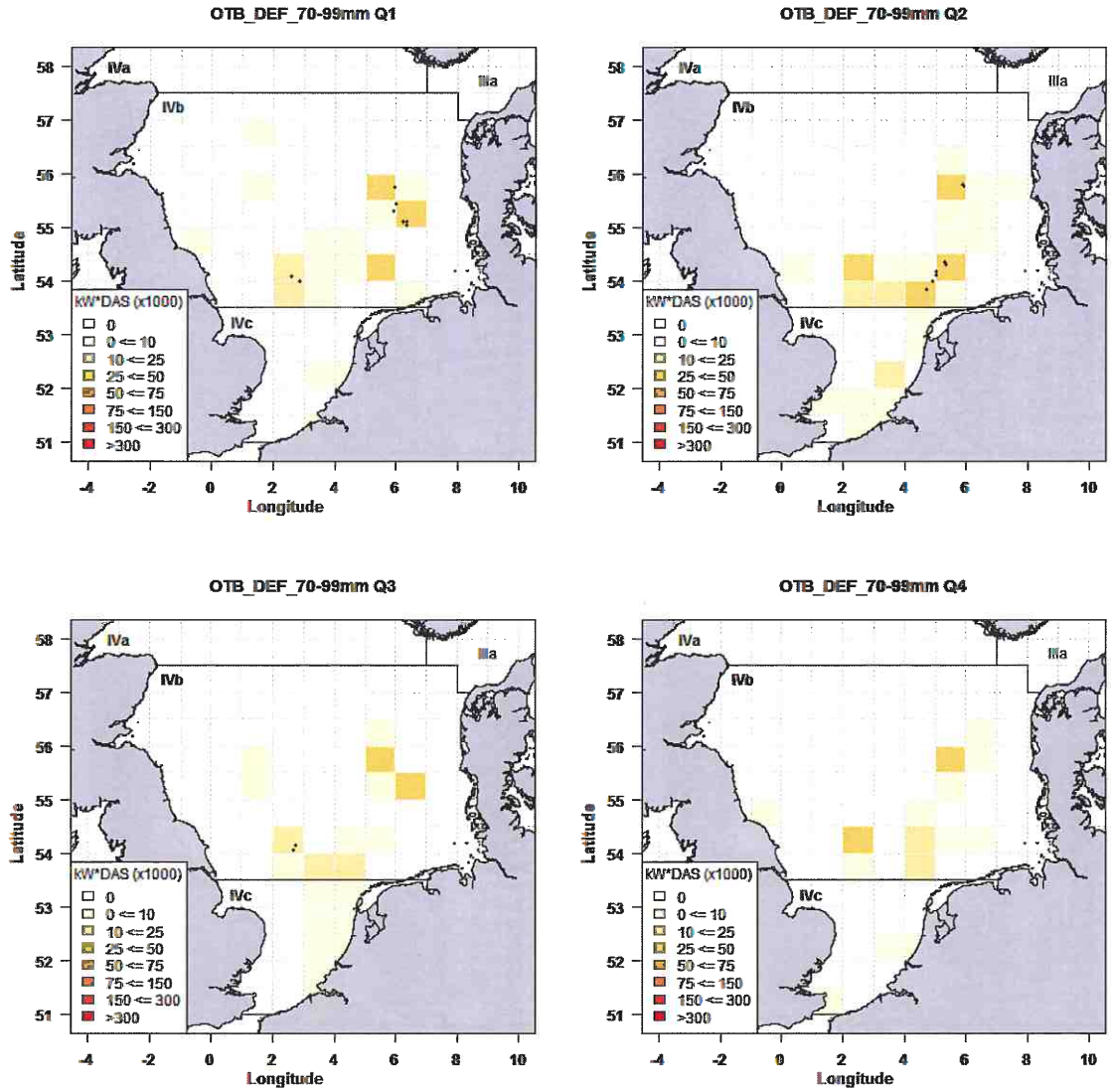


Figure 2h. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for OTB_DEF_70-99mm.

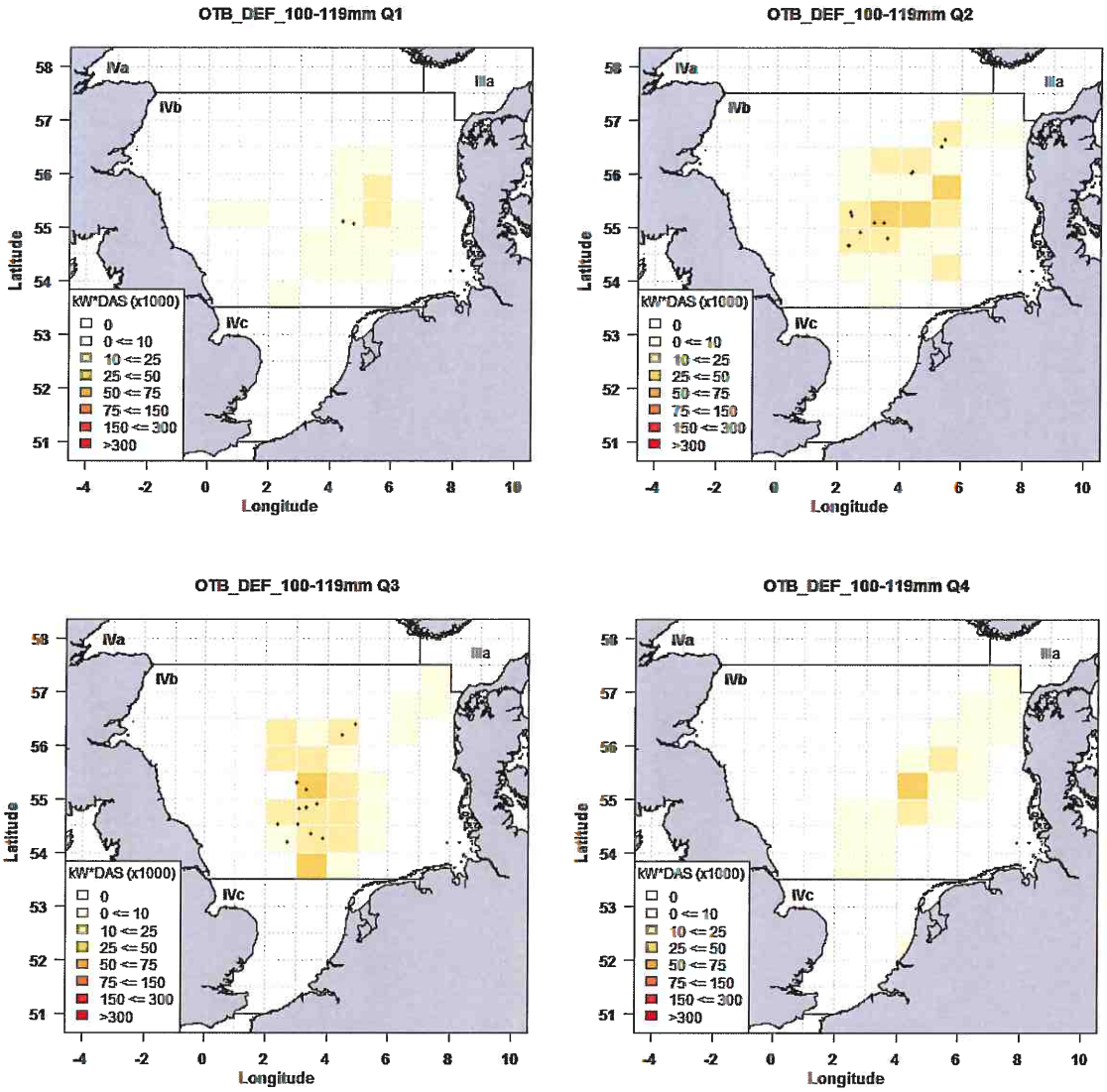


Figure 2i. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for OTB_DEF_100-119mm.

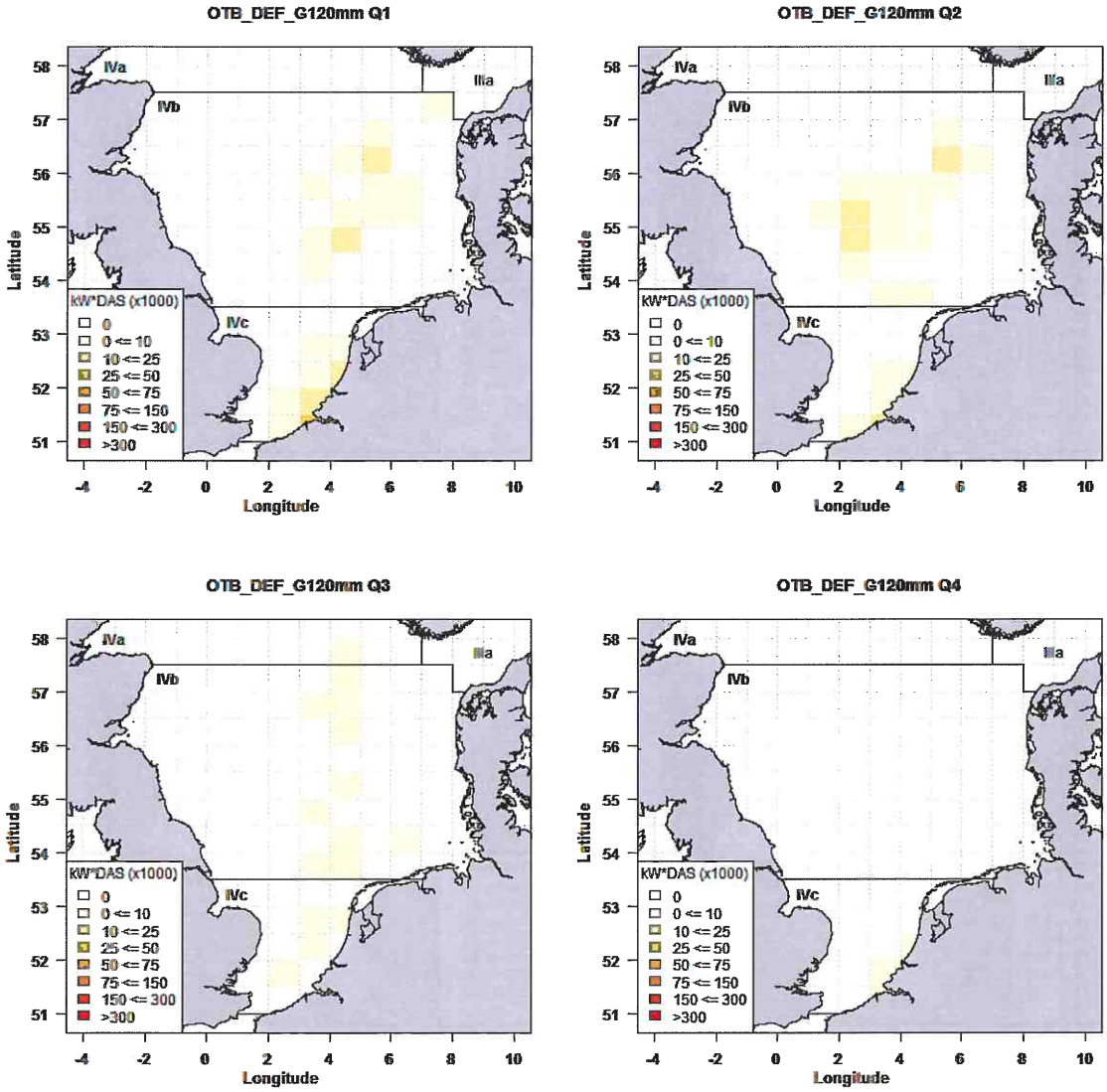
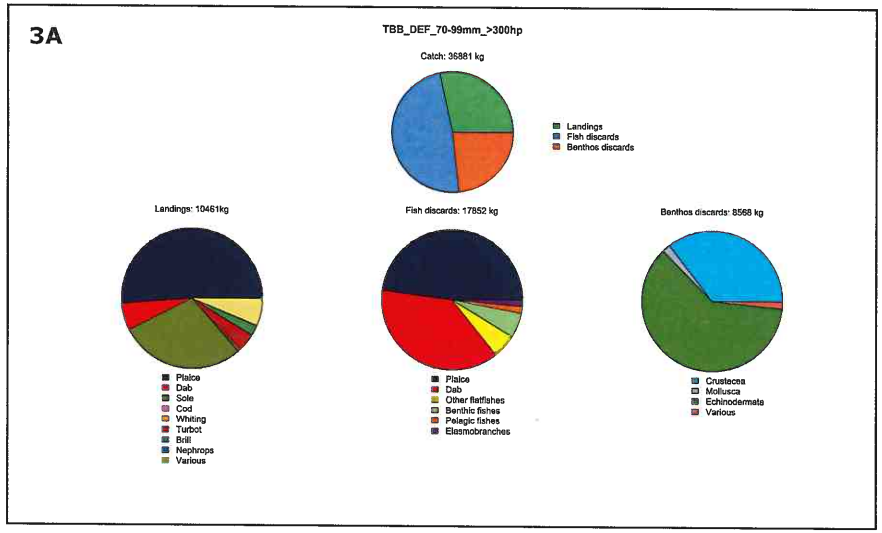
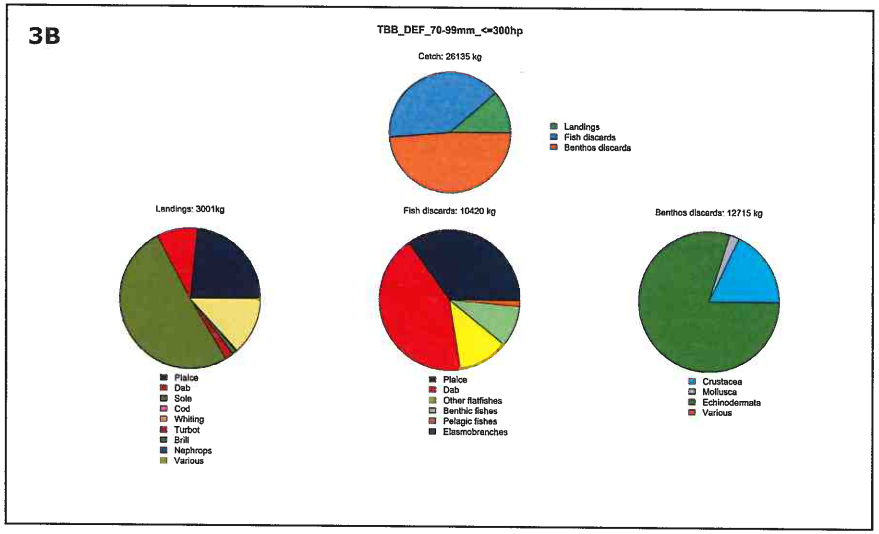
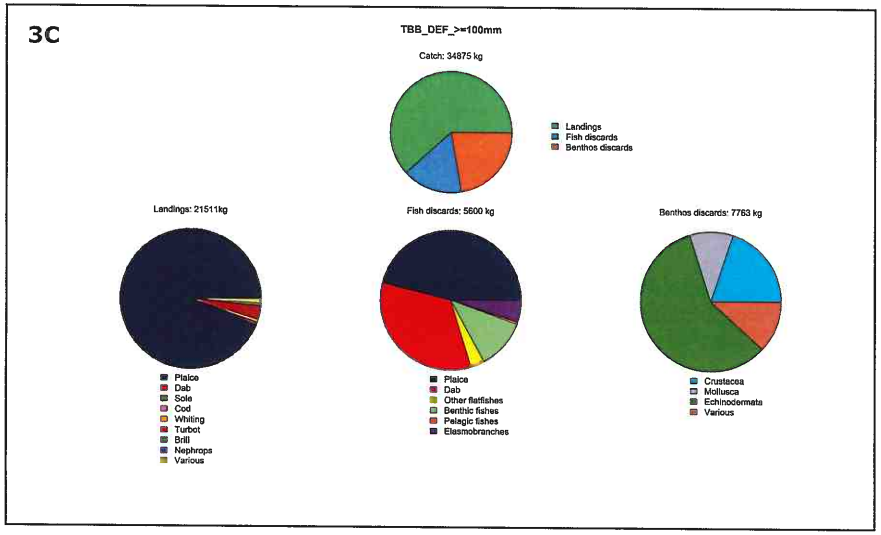
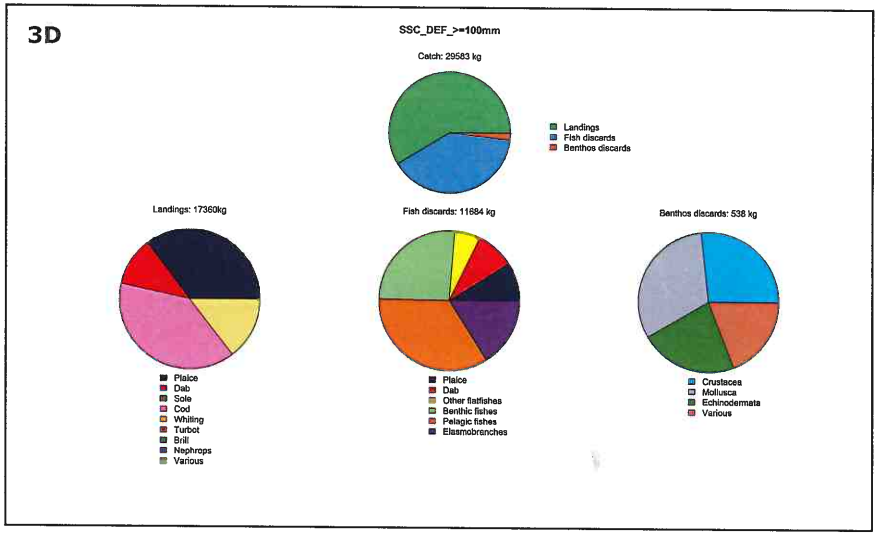


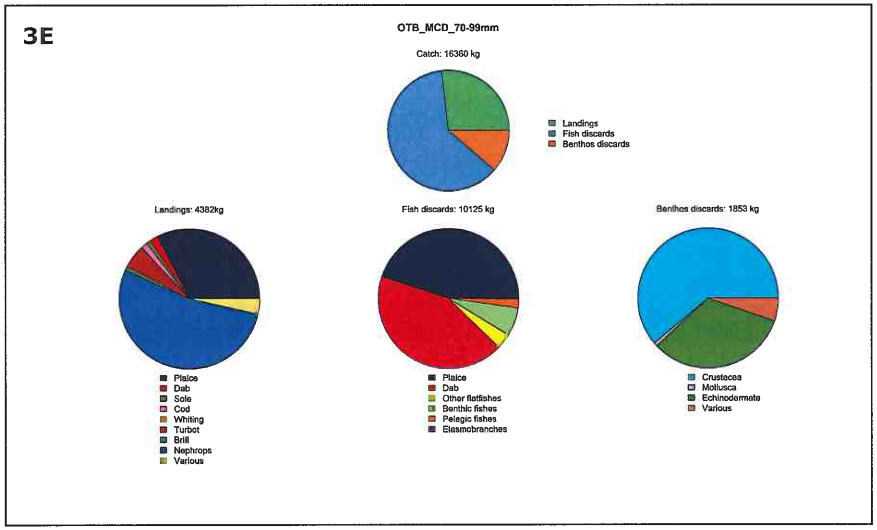
Figure 2j. Distribution of total effort (in kw*days at sea, shaded colours per ICES rectangle) and positions of sampled trawls (black dots) in 2013 per quarter for OTB_DEF_>=120mm.

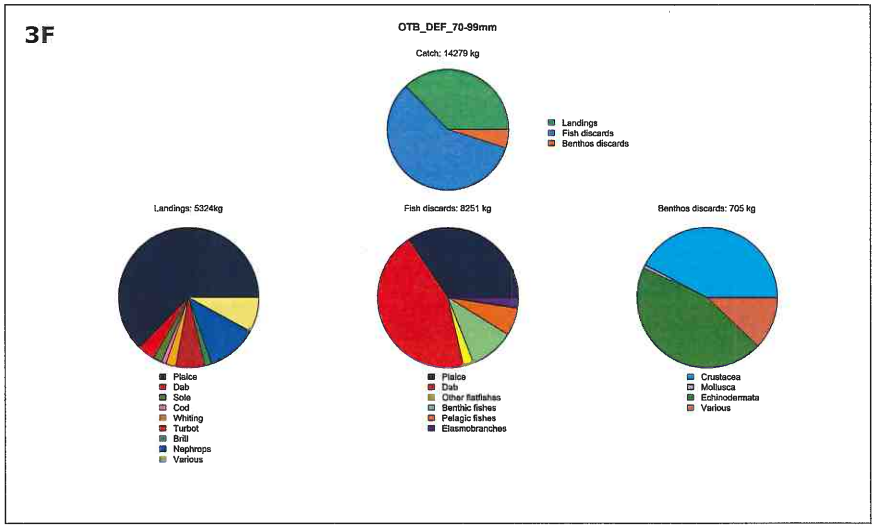

3A
TBB_DEF_70-99mm_>300hp
Catch: 36881 kg
Landings
Fish discards
Benthos discards
Landings: 10461kg
Fish discards: 17852 kg
Benthos discards: 8568 kg
Plaice
Dab
Sole
Cod
Whiting
Turbot
Brill
Nephrops
Various
Plaice
Dab
Other flatfishes
Benthic fishes
Pelagic fishes
Elasmobranches
Crustacea
Mollusca
Echinodermata
Various


3B
TBB_DEF_70-99mm_<=300hp
Catch: 26135 kg
Landings
Fish discards
Benthos discards
Landings: 3001kg
Fish discards: 10420 kg
Benthos discards: 12715 kg
Plaice
Dab
Sole
Cod
Whiting
Turbot
Brill
Nephrops
Various
Plaice
Dab
Other flatfishes
Benthic fishes
Pelagic fishes
Elasmobranches
Crustacea
Mollusca
Echinodermata
Various


3C
TBB_DEF_>=100mm
Catch: 34875 kg
Landings
Fish discards
Benthos discards
Landings: 21511kg
Fish discards: 5600 kg
Benthos discards: 7763 kg
Plaice
Dab
Sole
Cod
Whiting
Turbot
Brill
Nephrops
Various
Plaice
Dab
Other flatfishes
Benthic fishes
Pelagic fishes
Elasmobranches
Crustacea
Mollusca
Echinodermata
Various


3D
SSC_DEF_>=100mm
Catch: 29583 kg
Landings
Fish discards
Benthos discards
Landings: 17360kg
Fish discards: 11684 kg
Benthos discards: 538 kg
Plaice
Dab
Sole
Cod
Whiting
Turbot
Brill
Nephrops
Various
Plaice
Dab
Other flatfishes
Benthic fishes
Pelagic fishes
Elasmobranches
Crustacea
Mollusca
Echinodermata
Various





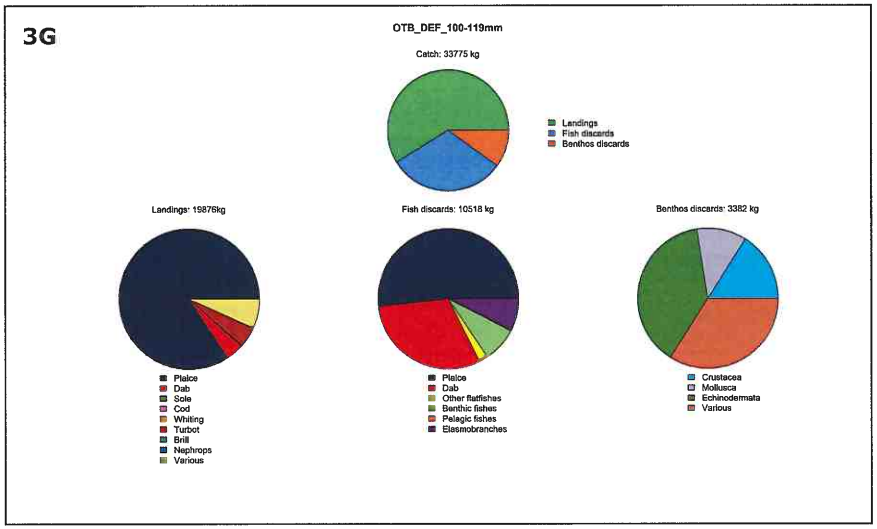


Figure 3. Piecharts of the catch composition and the proportional distribution of landings, discarded fish and discarded benthos for A) TBB_DEF_70-99mm_>300hp, B) TBB_DEF_70-99mm_<=300hp, C) TBB_DEF_>=100mm, D) SSC_DEF_>=100mm, E) OTB_MCD_70-99mm, F) OTB_DEF_70-99mm and G) OTB_DEF_100-119mm. It should be noted that in the current monitoring protocol, debris is not accounted for (weighted) separately and so, the part of the catch composition referred to as "discarded benthos" should be read as "discarded benthos and debris". This results in an overpresentation of benthos discards in these figures, which should only be regarded as generally indicative of catch compositions. The further separation of composition of benthos discards by species classes is based on observed ratios of numbers (counts) of individuals; i.e. differences in size/weight are not accounted for. Note that figures 3c and 3d are based on aggregated data of the 100-119mm and the >=120mm metiers.

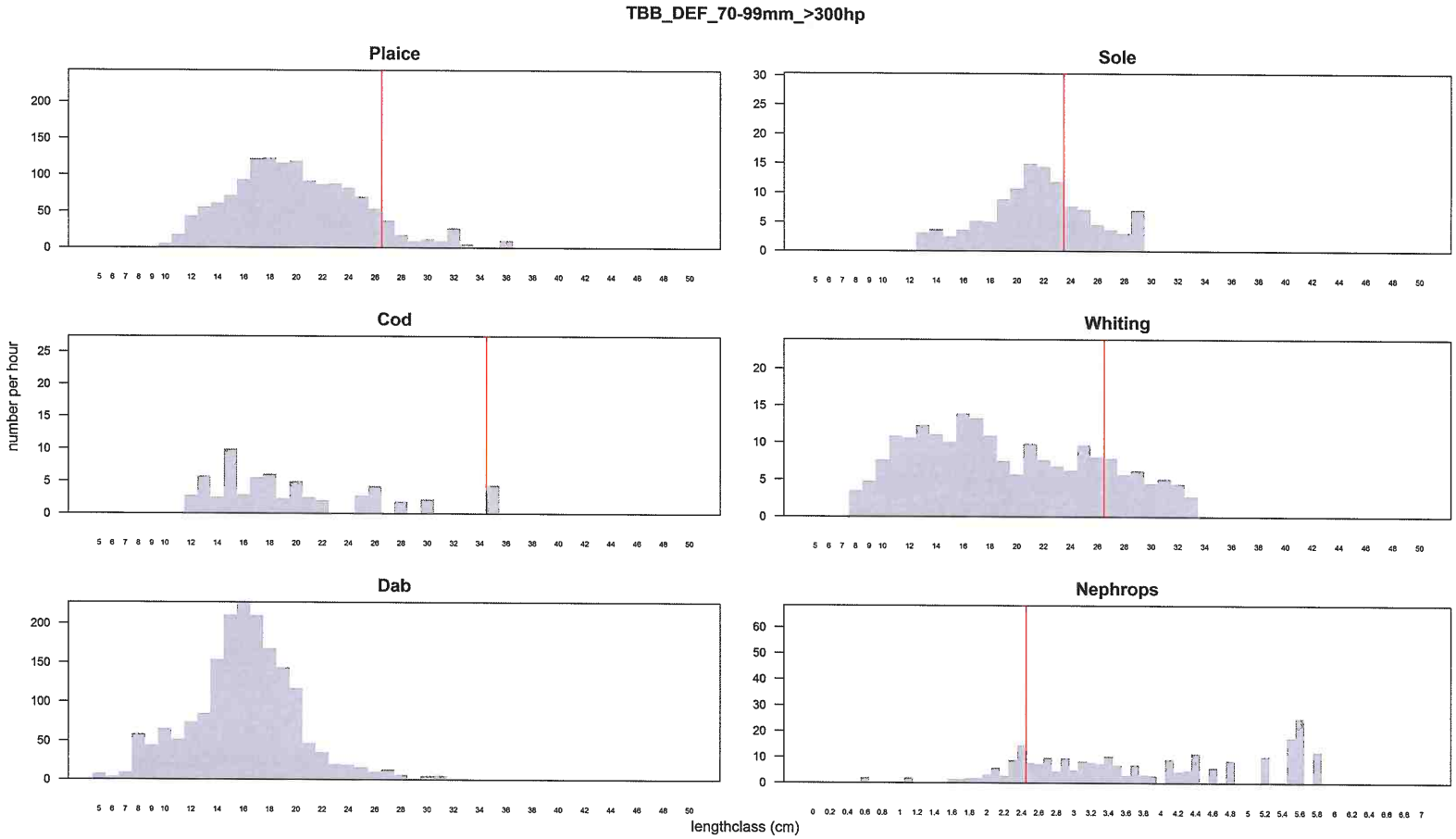


Figure 4a. Length frequency distribution for several discarded species in the TBB_DEF_70-99mm_>300hp metier. (red line = Minimum Landing Size)

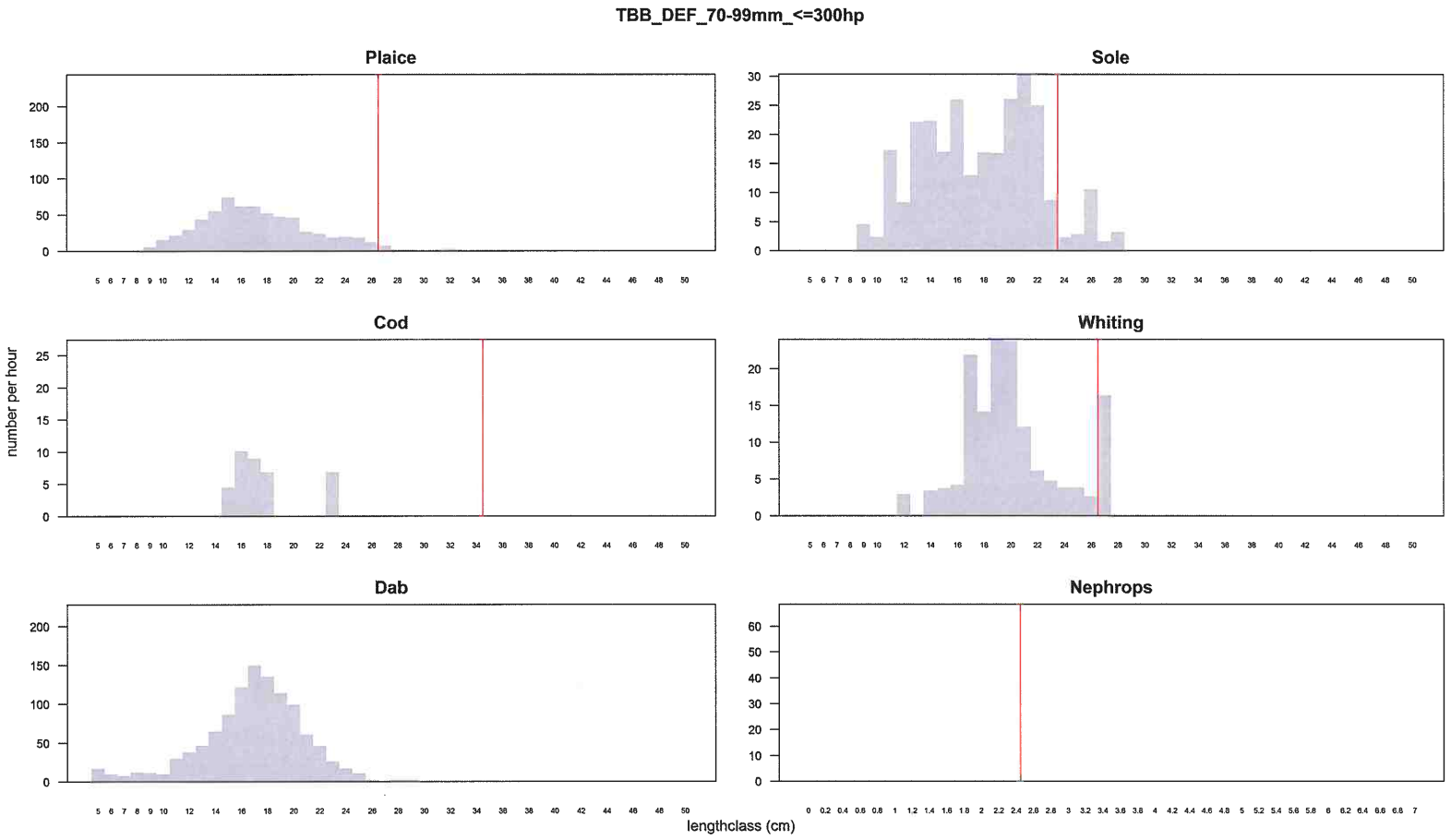


Figure 4b. Length frequency distribution for several discarded species in the TBB_DEF_70-99mm_<=300hp metier. (red line = Minimum Landing Size)

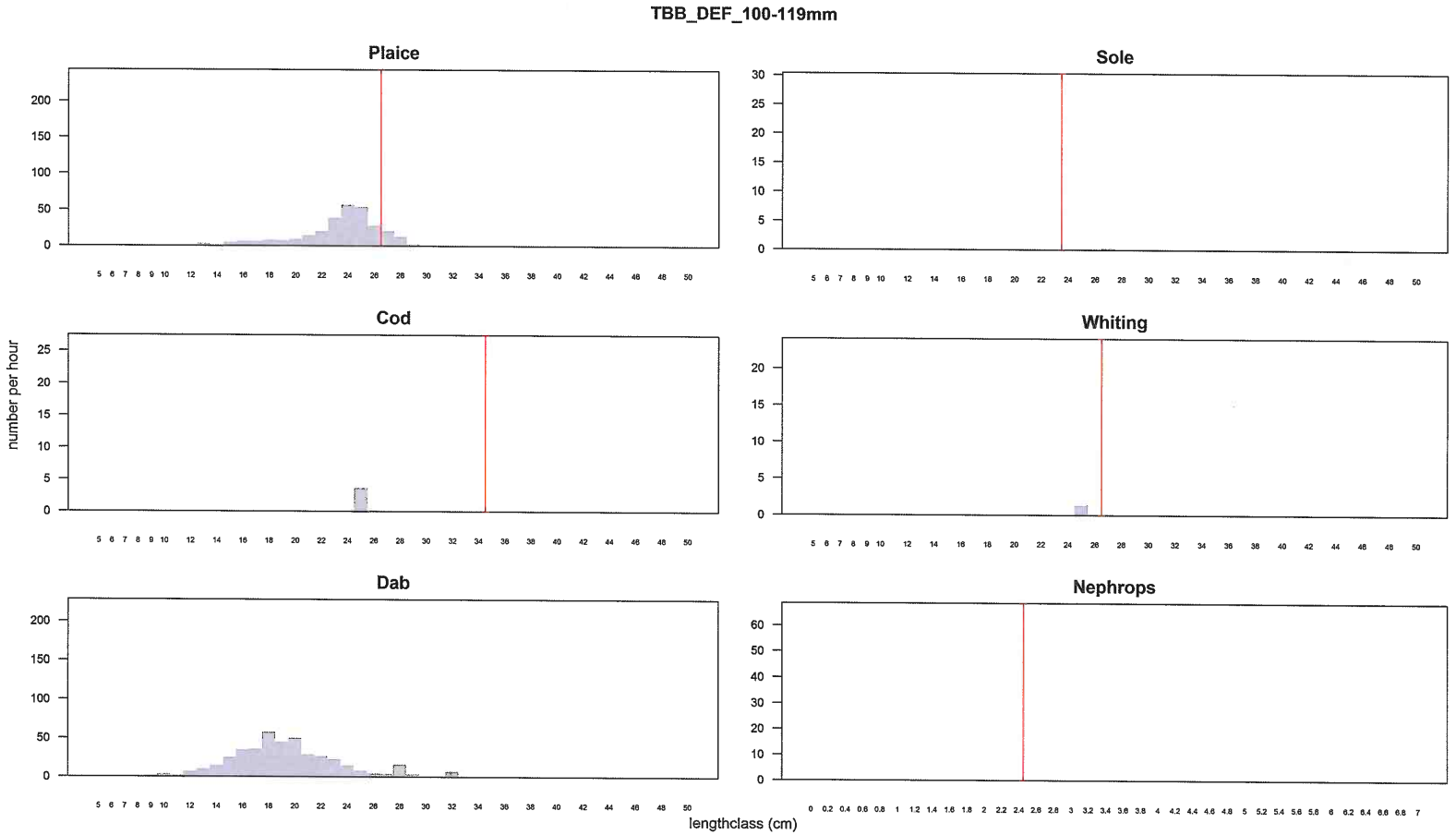


Figure 4c. Length frequency distribution for several discarded species in the TBB_DEF_100-119mm metier. (red line = Minimum Landing Size)

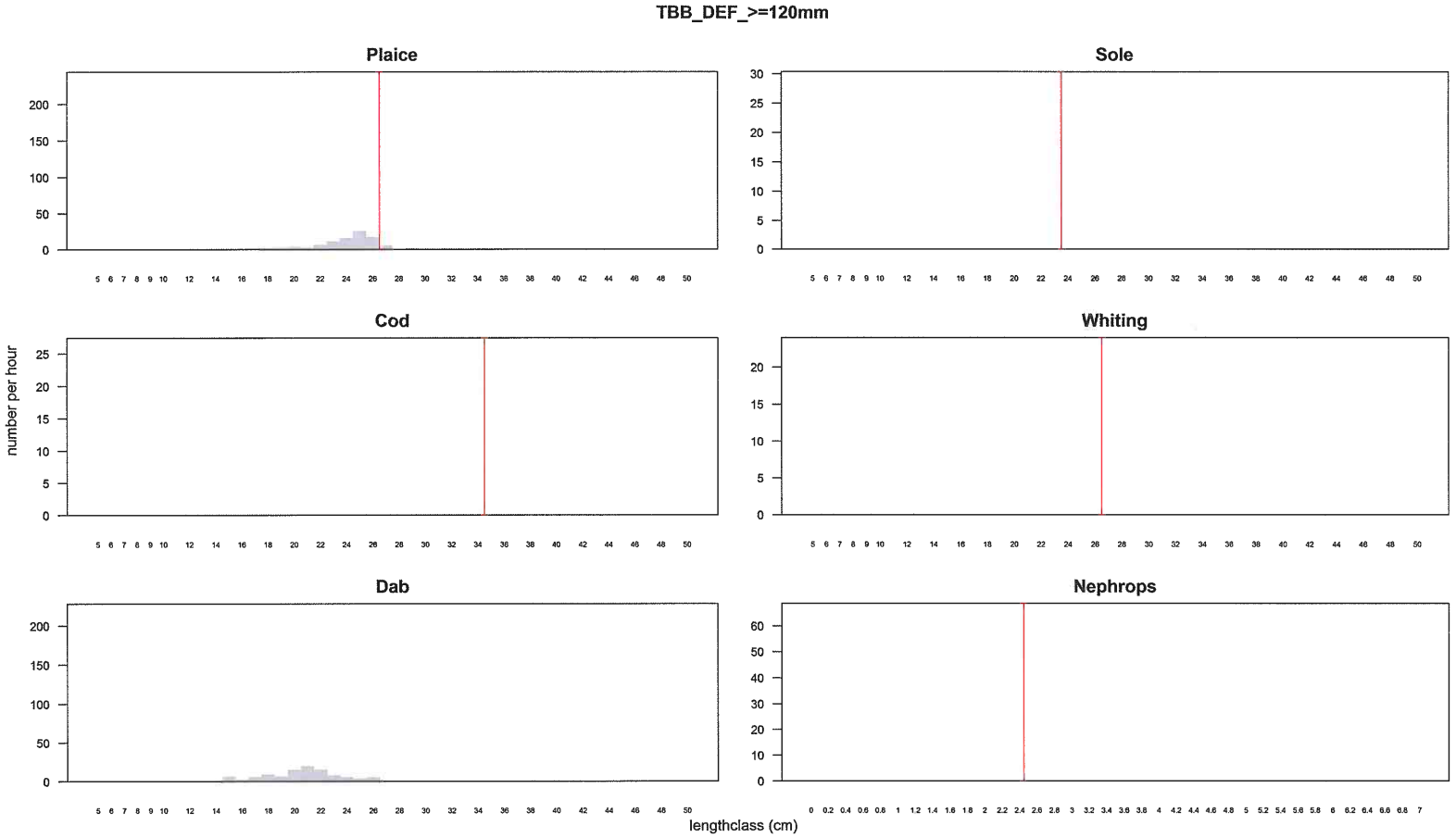


Figure 4d. Length frequency distribution for several discarded species in the TBB_DEF_>=120mm metier. (red line = Minimum Landing Size)

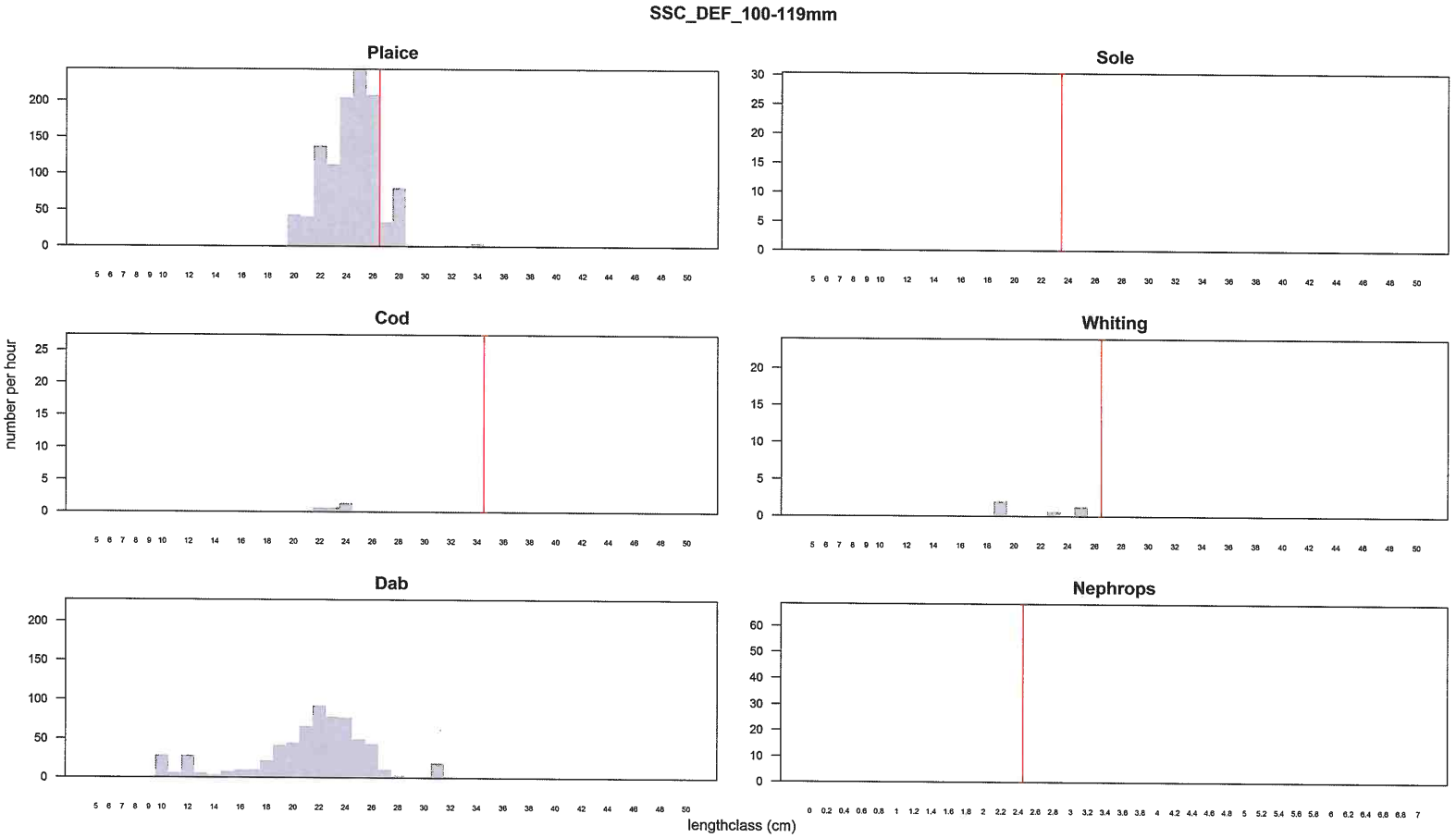


Figure 4e. Length frequency distribution for several discarded species in the SSC_DEF_100-119mm metier. (red line = Minimum Landing Size)

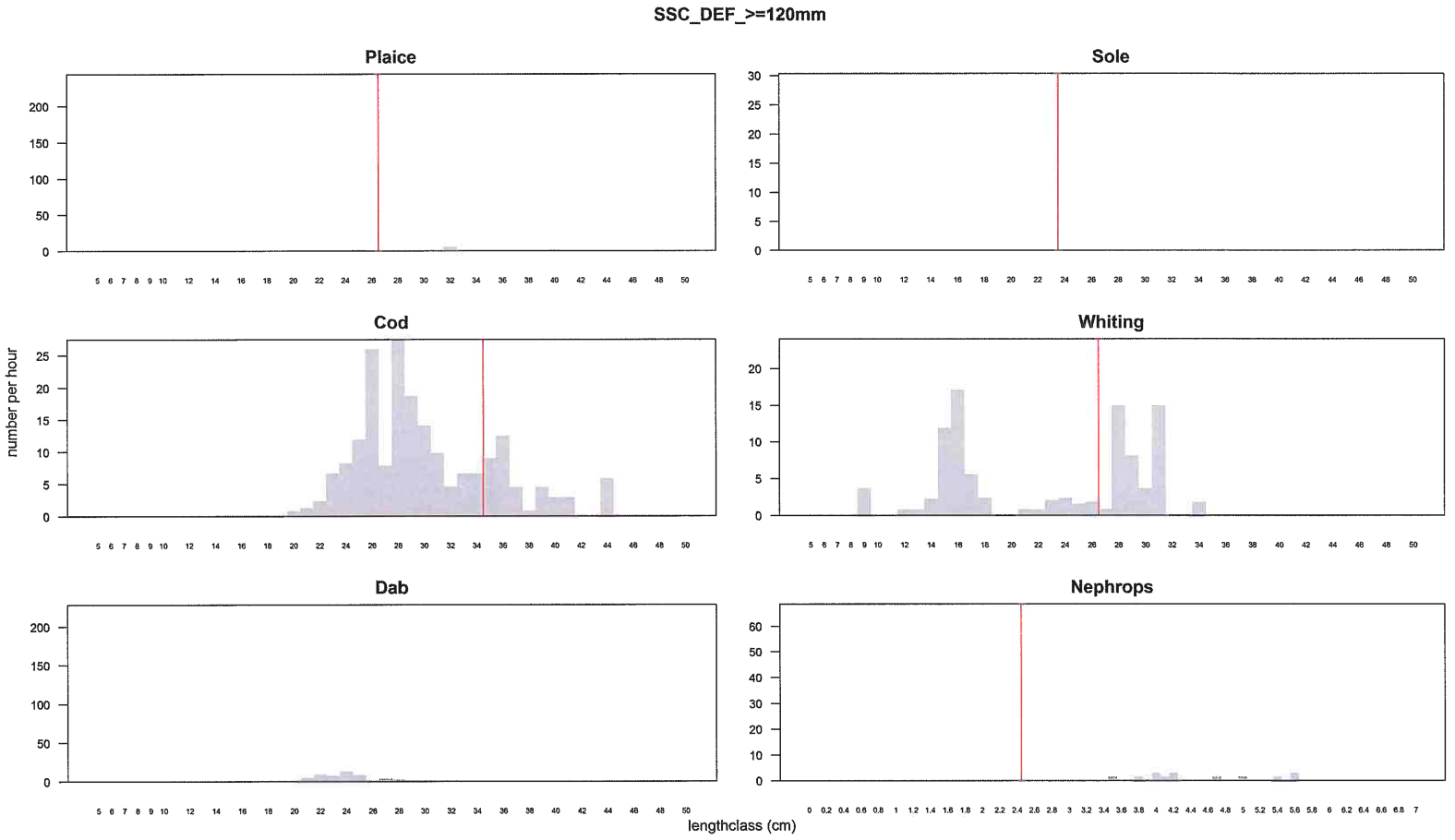


Figure 4f. Length frequency distribution for several discarded species in the SSC_DEF_>=120mm metier. (red line = Minimum Landing Size)

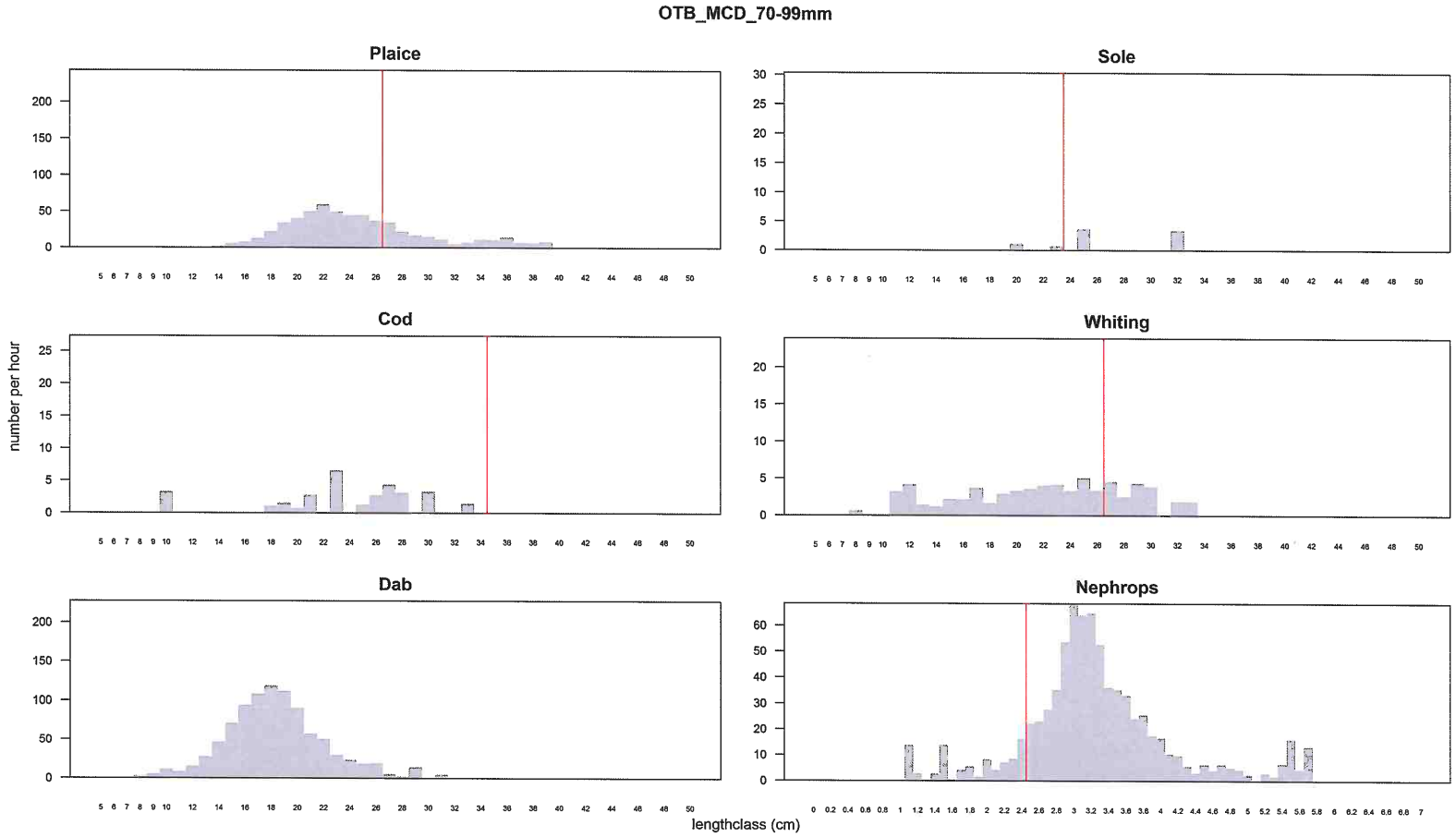


Figure 4g. Length frequency distribution for several discarded species in the OTB_MCD_70-99mm metier. (red line = Minimum Landing Size)

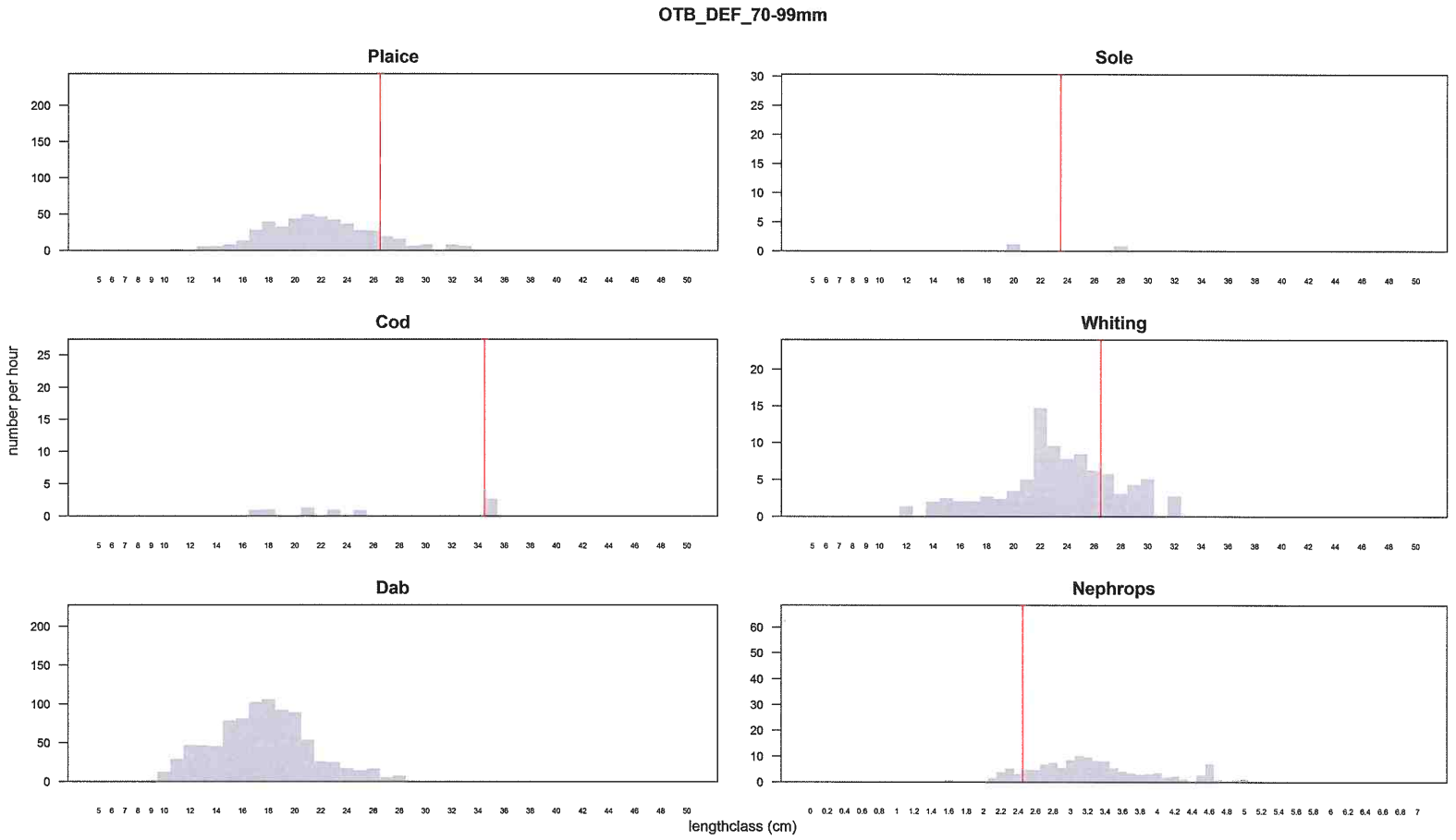


Figure 4h. Length frequency distribution for several discarded species in the OTB_DEF_70-99mm metier. (red line = Minimum Landing Size)

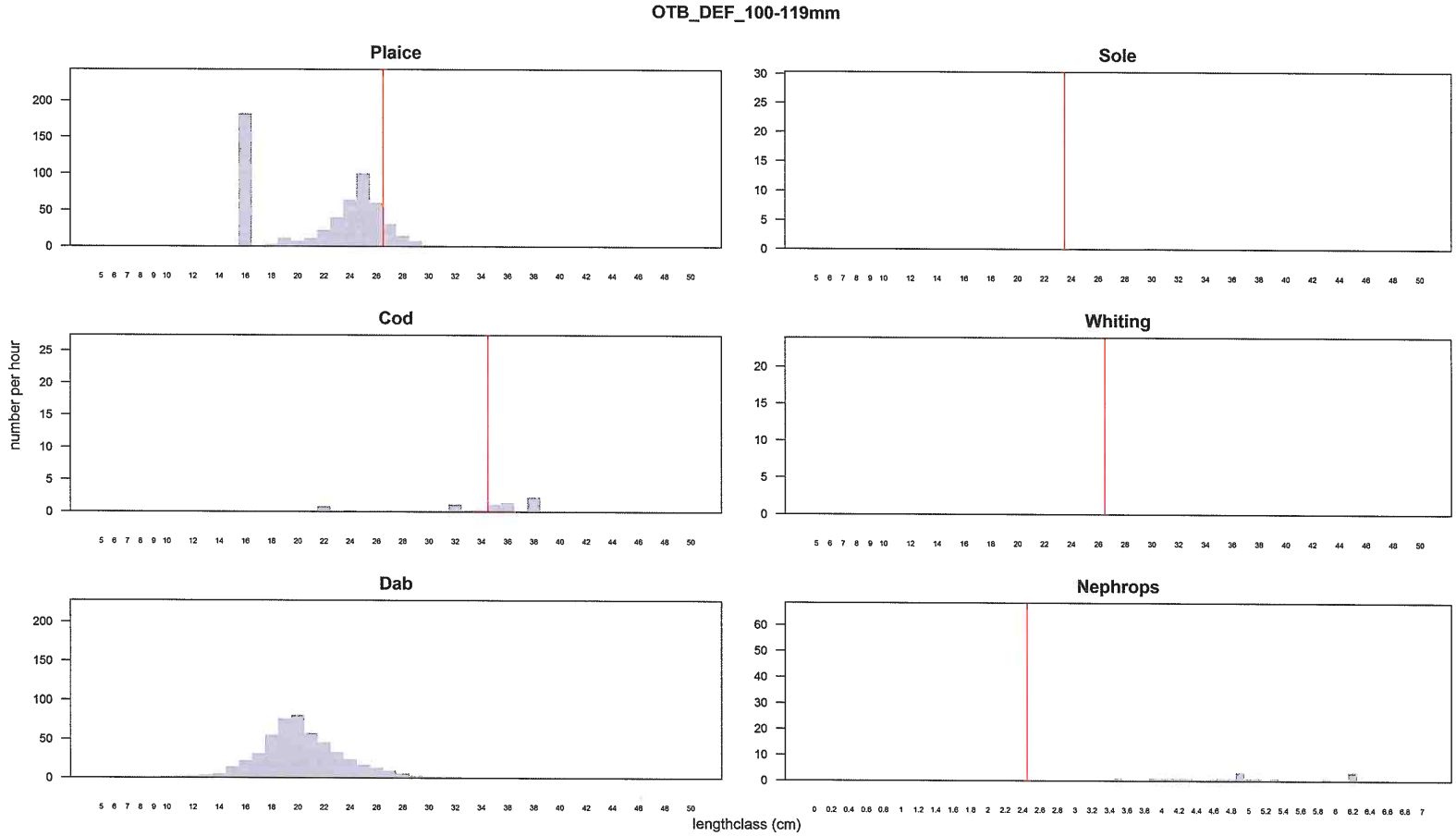


Figure 4i. Length frequency distribution for several discarded species in the OTB_DEF_100-119mm metier. (red line = Minimum Landing Size)

Appendix A

Table 9a. Weights (kg) per hour of discarded (Dis) and landed (Lan) plaice (PLE), sole (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) for each self-sampled trip in 2013.

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
769.2	TBB_DEF_70-99mm_>300hp	1	64	119	1	23	40	5	0	4	2	2	0	4	0	6	Nm	0
770.2	TBB_DEF_70-99mm_>300hp	1	131	31	8	30	135	15	0	0	1	0	0	2	0	4	Nm	0
772	TBB_DEF_70-99mm_>300hp	1	109	30	23	33	218	19	0	2	0	0	3	2	0	5	Nm	0
773	TBB_DEF_70-99mm_>300hp	1	97	25	8	30	171	12	0	0	3	0	2	2	0	5	Nm	0
774	TBB_DEF_70-99mm_>300hp	2	92	34	17	22	164	6	0	0	4	1	0	4	0	4	Nm	0
775	TBB_DEF_70-99mm_>300hp	2	72	35	20	25	69	5	0	0	2	0	2	5	0	4	Nm	0
776	TBB_DEF_70-99mm_>300hp	1	132	12	3	47	30	10	2	4	24	11	0	1	0	1	Nm	0
777	TBB_DEF_70-99mm_>300hp	2	60	16	11	59	90	7	1	1	5	3	0	2	0	3	Nm	0
778	TBB_DEF_70-99mm_>300hp	2	90	47	4	43	21	4	2	0	2	1	0	5	0	5	Nm	0
781	TBB_DEF_70-99mm_>300hp	1	26	17	1	24	35	3	0	0	1	0	0	0	0	0	Nm	0
782	TBB_DEF_70-99mm_>300hp	2	121	25	1	17	56	5	0	0	1	0	1	3	0	2	Nm	0
783	TBB_DEF_70-99mm_>300hp	2	50	17	2	35	67	5	0	0	0	0	0	4	1	3	Nm	0
784	TBB_DEF_70-99mm_>300hp	2	27	12	3	23	24	3	0	0	0	0	1	6	1	3	Nm	0
789	TBB_DEF_70-99mm_>300hp	1	76	42	8	27	109	22	0	2	2	1	0	2	1	5	Nm	0
799	TBB_DEF_70-99mm_>300hp	1	53	21	1	18	77	9	1	3	2	0	0	6	0	4	Nm	0
800	TBB_DEF_70-99mm_>300hp	2	272	45	9	40	180	7	0	0	2	0	0	2	0	3	Nm	0
802	TBB_DEF_70-99mm_>300hp	2	145	38	3	25	101	7	0	0	1	0	0	6	0	2	Nm	0
804	TBB_DEF_70-99mm_>300hp	1	292	88	7	26	171	1	0	1	12	7	0	5	0	3	Nm	2
805	TBB_DEF_70-99mm_>300hp	1	129	123	2	18	136	12	0	2	0	0	0	7	0	4	Nm	0
806	TBB_DEF_70-99mm_>300hp	2	82	33	3	35	111	8	0	0	1	0	0	3	0	1	Nm	0

Table 9a. (cont.)

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
807	TBB_DEF_70-99mm_>300hp	1	11	237	1	21	18	20	0	0	1	0	0	4	0	6	Nm	0
812	TBB_DEF_70-99mm_>300hp	1	23	79	1	34	105	44	1	0	1	0	0	14	0	0	Nm	0
813	TBB_DEF_70-99mm_>300hp	1	61	178	4	19	68	39	0	0	1	0	0	10	0	0	Nm	0
823	TBB_DEF_70-99mm_>300hp	3	99	49	7	25	61	6	0	0	1	0	0	6	0	4	Nm	0
824	TBB_DEF_70-99mm_>300hp	3	184	70	6	34	75	3	0	0	0	0	5	6	0	2	Nm	0
825	TBB_DEF_70-99mm_>300hp	4	124	105	5	44	42	6	0	0	1	0	0	4	0	3	Nm	0
826	TBB_DEF_70-99mm_>300hp	3	130	52	5	59	17	4	3	0	3	1	0	3	0	3	Nm	0
827	TBB_DEF_70-99mm_>300hp	3	228	66	11	77	68	7	0	1	6	0	0	9	0	6	Nm	0
828	TBB_DEF_70-99mm_>300hp	4	150	98	6	109	39	2	0	1	5	0	0	7	0	6	Nm	0
829	TBB_DEF_70-99mm_>300hp	3	80	42	2	23	50	6	0	0	0	0	1	5	0	2	Nm	0
830	TBB_DEF_70-99mm_>300hp	3	15	39	1	43	29	9	0	0	1	0	1	2	0	0	Nm	0
831	TBB_DEF_70-99mm_>300hp	3	68	42	2	29	105	11	0	0	0	0	1	11	0	4	Nm	0
840	TBB_DEF_70-99mm_>300hp	3	115	26	3	27	152	6	0	0	0	0	0	7	0	3	Nm	0
841	TBB_DEF_70-99mm_>300hp	3	96	48	5	41	168	5	0	0	0	0	0	6	4	2	Nm	0
842	TBB_DEF_70-99mm_>300hp	4	143	82	5	32	52	0	0	0	1	0	0	11	0	3	Nm	0
851	TBB_DEF_70-99mm_>300hp	3	64	70	2	39	116	0	0	0	3	0	0	16	0	0	Nm	0
852	TBB_DEF_70-99mm_>300hp	3	73	63	1	28	68	3	0	0	3	0	0	10	0	3	Nm	4
853	TBB_DEF_70-99mm_>300hp	3	44	21	3	36	265	29	0	0	1	0	0	9	0	3	Nm	0
854	TBB_DEF_70-99mm_>300hp	3	44	243	0	30	61	12	0	0	0	0	0	6	0	2	Nm	0
865	TBB_DEF_70-99mm_>300hp	4	193	153	6	34	24	0	1	0	2	0	0	6	0	7	Nm	0
866	TBB_DEF_70-99mm_>300hp	4	248	146	3	31	40	3	1	0	2	0	0	4	0	4	Nm	0
867.2	TBB_DEF_70-99mm_>300hp	4	70	44	28	58	16	0	2	0	13	1	0	4	0	4	Nm	0
868	TBB_DEF_70-99mm_>300hp	4	92	95	26	93	10	0	3	0	26	1	0	7	2	10	Nm	0

Table 9a. (cont.)

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
869	TBB_DEF_70-99mm_>300hp	4	29	100	1	31	25	0	0	0	2	0	0	6	0	0	Nm	0
870	TBB_DEF_70-99mm_>300hp	4	42	37	1	48	8	0	0	0	1	0	0	0	0	0	Nm	0
871	TBB_DEF_70-99mm_>300hp	4	136	123	3	29	46	4	1	0	1	0	0	9	0	9	Nm	0
875	TBB_DEF_70-99mm_>300hp	4	154	85	3	40	56	4	0	0	1	0	0	3	2	3	Nm	0
876	TBB_DEF_70-99mm_>300hp	4	77	130	1	30	15	3	0	0	1	0	1	4	0	3	Nm	0
877	TBB_DEF_70-99mm_>300hp	4	117	111	1	45	23	5	1	1	1	0	0	5	1	4	Nm	0
880.2	TBB_DEF_70-99mm_>300hp	4	203	235	0	23	63	0	0	0	0	0	0	10	0	10	Nm	0
883	TBB_DEF_70-99mm_>300hp	4	62	149	1	30	37	1	0	0	8	0	0	8	0	3	Nm	0
884	TBB_DEF_70-99mm_>300hp	4	107	88	2	24	57	3	1	0	1	0	0	6	0	2	Nm	0
886	TBB_DEF_70-99mm_>300hp	4	148	231	0	25	217	0	0	3	5	2	0	7	0	2	Nm	2
887.2	TBB_DEF_70-99mm_>300hp	4	38	136	2	22	92	3	0	0	7	0	0	10	0	4	Nm	0
888	TBB_DEF_70-99mm_>300hp	4	401	126	3	25	50	0	1	0	1	0	0	11	0	4	Nm	0
889.2	TBB_DEF_70-99mm_>300hp	4	47	210	1	34	188	3	1	0	1	0	0	5	0	2	Nm	0
899	TBB_DEF_70-99mm_>300hp	2	26	19	2	24	274	31	0	0	1	0	0	13	0	5	Nm	0
765.2	TBB_DEF_70-99mm_<=300hp	2	11	13	2	22	20	5	0	0	1	0	0	0	0	0	Nm	0
791	TBB_DEF_70-99mm_<=300hp	1	15	4	5	11	20	6	0	0	0	0	0	1	0	1	Nm	0
792	TBB_DEF_70-99mm_<=300hp	2	36	16	5	20	23	4	0	0	1	0	0	2	0	2	Nm	0
794	TBB_DEF_70-99mm_<=300hp	2	17	10	8	30	34	4	0	0	0	0	0	0	0	0	Nm	0
795	TBB_DEF_70-99mm_<=300hp	2	8	13	2	23	11	8	0	0	0	0	0	0	1	0	Nm	0
796	TBB_DEF_70-99mm_<=300hp	1	29	3	9	16	268	12	0	0	0	0	0	0	0	0	Nm	0
797	TBB_DEF_70-99mm_<=300hp	2	84	6	36	32	238	6	0	0	0	0	0	3	0	2	Nm	3
798	TBB_DEF_70-99mm_<=300hp	2	62	5	33	30	136	5	0	0	0	0	0	1	2	1	Nm	0
835	TBB_DEF_70-99mm_<=300hp	3	37	18	8	23	31	5	0	0	1	0	0	2	0	2	Nm	0
839	TBB_DEF_70-99mm_<=300hp	3	31	3	17	30	39	4	0	0	0	0	1	2	3	1	Nm	0

Table 9a. (cont.)

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
862	TBB_DEF_70-99mm_<=300hp	3	16	6	3	23	15	0	0	0	0	0	0	0	1	0	Nm	0
863	TBB_DEF_70-99mm_<=300hp	3	25	7	1	17	14	0	0	0	0	0	1	0	1	0	Nm	0
864	TBB_DEF_70-99mm_<=300hp	3	75	12	7	14	82	2	0	0	1	0	0	3	0	0	Nm	0
878	TBB_DEF_70-99mm_<=300hp	4	82	27	4	18	40	5	0	0	1	0	1	2	0	2	Nm	0
881	TBB_DEF_70-99mm_<=300hp	4	27	2	34	24	12	4	1	0	11	1	0	1	0	0	Nm	0
882	TBB_DEF_70-99mm_<=300hp	4	26	18	4	22	57	5	3	1	4	0	4	2	0	0	Nm	0
893	TBB_DEF_70-99mm_<=300hp	4	63	17	2	15	40	0	0	0	0	0	1	1	0	0	Nm	0
793	TBB_DEF_100-119mm	2	47	9	0	0	53	0	0	0	0	0	0	1	0	1	Nm	0
801	TBB_DEF_100-119mm	2	92	311	0	0	76	9	0	0	0	0	0	7	0	0	Nm	0
808	TBB_DEF_100-119mm	2	18	357	1	1	4	7	0	0	0	0	0	6	0	1	Nm	0
850	TBB_DEF_100-119mm	3	12	177	0	0	15	0	0	0	0	0	0	22	0	3	Nm	0
879	TBB_DEF_100-119mm	4	74	473	0	2	45	0	0	0	0	8	0	3	0	0	Nm	0
895	TBB_DEF_100-119mm	2	40	399	0	0	36	0	0	0	0	0	0	4	0	4	Nm	0
896	TBB_DEF_100-119mm	2	19	305	0	0	13	0	0	0	1	0	0	14	0	0	Nm	0
897	TBB_DEF_100-119mm	3	18	334	0	6	21	0	0	0	0	19	0	9	0	0	Nm	0
898	TBB_DEF_100-119mm	2	21	262	0	0	11	0	1	0	0	0	0	24	1	0	Nm	0
814	TBB_DEF_>=120mm	2	10	294	0	0	5	0	0	0	0	0	0	0	0	10	Nm	0
815	TBB_DEF_>=120mm	2	19	234	0	0	16	0	0	0	0	0	0	8	0	0	Nm	0
803	SSC_DEF_100-119mm	2	30	236	0	0	22	10	1	0	1	0	0	0	0	0	Nm	0
848	SSC_DEF_100-119mm	3	304	918	0	0	129	57	0	8	1	0	0	0	0	0	Nm	0
843	SSC_DEF_>=120mm	3	4	5	0	0	2	0	63	238	3	0	0	0	0	0	Nm	0
844	SSC_DEF_>=120mm	3	0	66	0	0	11	6	13	154	9	0	0	0	0	0	Nm	0
847	SSC_DEF_>=120mm	3	0	81	0	0	3	54	1	47	2	0	0	0	0	0	Nm	0
849	SSC_DEF_>=120mm	3	0	64	0	0	1	79	1	323	3	0	0	0	0	0	Nm	0

Table 9a. (cont.)

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
885	SSC_DEF_>=120mm	4	1	10	0	0	9	196	1	151	2	0	0	0	0	0	Nm	0
819	OTB_MCD_70-99mm	2	121	18	2	1	27	1	1	1	6	1	0	4	0	1	Nm	36
820	OTB_MCD_70-99mm	2	32	20	0	1	21	1	1	5	3	1	0	2	0	0	Nm	20
821	OTB_MCD_70-99mm	2	24	14	0	1	30	1	0	5	7	0	0	4	0	1	Nm	17
822	OTB_MCD_70-99mm	2	107	9	0	1	44	0	0	1	8	0	0	5	0	1	Nm	25
845	OTB_MCD_70-99mm	3	27	28	0	1	134	2	1	1	1	1	0	3	0	1	Nm	32
846	OTB_MCD_70-99mm	3	146	27	0	2	71	1	0	1	4	1	0	7	0	2	Nm	48
856	OTB_MCD_70-99mm	3	65	11	0	0	150	0	3	0	4	0	0	2	0	0	Nm	21
857	OTB_MCD_70-99mm	3	17	4	0	2	11	0	1	1	2	0	1	5	0	2	Nm	28
858	OTB_MCD_70-99mm	3	54	20	1	1	90	1	0	0	2	1	0	4	0	1	Nm	26
859	OTB_MCD_70-99mm	3	28	16	0	1	37	3	0	0	1	0	0	5	0	2	Nm	28
860	OTB_MCD_70-99mm	3	29	11	0	1	55	4	0	0	1	0	0	3	0	1	Nm	21
861	OTB_MCD_70-99mm	3	31	11	0	2	31	4	0	0	1	1	2	4	0	2	Nm	22
872	OTB_MCD_70-99mm	4	46	29	0	2	180	0	0	0	1	2	0	2	0	1	Nm	47
873	OTB_MCD_70-99mm	4	80	33	0	1	74	1	1	0	1	0	0	2	0	1	Nm	52
874	OTB_MCD_70-99mm	4	25	53	1	0	15	1	1	0	1	0	0	2	0	1	Nm	35
890	OTB_MCD_70-99mm	4	95	62	0	1	67	4	0	1	0	0	0	2	0	1	Nm	53
891	OTB_MCD_70-99mm	4	118	41	0	1	67	4	0	1	0	0	0	2	0	1	Nm	56
892	OTB_MCD_70-99mm	4	106	13	0	1	49	0	3	1	1	0	0	3	0	1	Nm	62
766.2	OTB_DEF_70-99mm	2	95	62	0	3	71	5	0	2	1	1	0	3	0	2	Nm	1
809	OTB_DEF_70-99mm	1	68	82	0	3	86	10	0	1	1	0	0	2	0	1	Nm	1
810	OTB_DEF_70-99mm	2	20	25	0	3	29	6	1	1	1	1	0	9	0	2	Nm	1
811	OTB_DEF_70-99mm	2	43	14	0	1	31	1	1	1	5	1	0	12	0	2	Nm	10
816	OTB_DEF_70-99mm	1	92	121	0	0	88	0	1	1	1	0	0	0	0	0	Nm	9
817	OTB_DEF_70-99mm	1	6	8	1	1	8	1	1	2	21	8	0	1	0	1	Nm	11

Table 9a. (cont.)

TripID	Metier	Q	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
818	OTB_DEF_70-99mm	2	13	29	1	2	68	2	0	1	1	0	0	2	1	1	Nm	2
834	OTB_DEF_70-99mm	3	36	63	0	0	62	1	2	0	15	0	0	2	0	1	Nm	47
855	OTB_DEF_70-99mm	1	49	92	0	2	57	2	1	3	1	0	0	1	0	1	Nm	6
768.2	OTB_DEF_100-119mm	3	51	328	0	0	100	4	0	0	0	0	0	0	0	0	Nm	0
779	OTB_DEF_100-119mm	2	204	304	0	0	233	4	0	0	0	0	0	0	0	0	Nm	0
780	OTB_DEF_100-119mm	2	41	379	0	0	68	8	1	0	0	0	0	2	0	0	Nm	0
785	OTB_DEF_100-119mm	1	93	31	0	0	42	7	0	0	0	0	0	0	0	0	Nm	0
786	OTB_DEF_100-119mm	2	119	130	0	0	24	5	3	0	0	4	0	2	0	1	Nm	0
787	OTB_DEF_100-119mm	2	47	118	0	0	19	8	0	1	0	0	0	7	0	1	Nm	0
788	OTB_DEF_100-119mm	2	39	163	0	0	51	2	0	1	0	0	0	6	0	1	Nm	3
790	OTB_DEF_100-119mm	2	21	0	0	0	10	5	1	0	0	0	0	10	0	0	Nm	0
832	OTB_DEF_100-119mm	3	6	164	1	0	17	2	0	0	0	0	0	7	0	1	Nm	0
836	OTB_DEF_100-119mm	3	43	366	0	0	6	2	0	2	0	0	0	7	0	0	Nm	0
837	OTB_DEF_100-119mm	3	19	251	0	0	4	2	1	2	0	0	0	7	0	0	Nm	0
838	OTB_DEF_100-119mm	3	16	253	0	0	5	4	1	3	0	0	0	7	0	1	Nm	0
894	OTB_DEF_100-119mm	3	14	162	0	0	8	1	0	0	0	0	0	5	0	1	Nm	0

Table 9b. Numbers per hour of discarded plaice (PLE), sole (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) for each self-sampled trip in 2013. No landing-numbers were measured.

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
769.2	TBB_DEF_70-99mm_>300hp	1	497	6	643	0	14	0	0	0
770.2	TBB_DEF_70-99mm_>300hp	1	1677	87	2039	0	8	0	0	0
772	TBB_DEF_70-99mm_>300hp	1	1458	252	3173	0	0	11	0	0
773	TBB_DEF_70-99mm_>300hp	1	1164	75	2864	0	23	6	0	0
774	TBB_DEF_70-99mm_>300hp	2	1301	192	3137	0	34	0	0	0
775	TBB_DEF_70-99mm_>300hp	2	783	215	1513	0	16	5	0	0
776	TBB_DEF_70-99mm_>300hp	1	1347	31	430	18	221	0	0	0
777	TBB_DEF_70-99mm_>300hp	2	888	139	1243	2	42	0	0	0
778	TBB_DEF_70-99mm_>300hp	2	928	35	356	10	14	0	0	0
781	TBB_DEF_70-99mm_>300hp	1	324	4	577	0	6	0	0	0
782	TBB_DEF_70-99mm_>300hp	2	1470	4	973	0	5	2	0	0
783	TBB_DEF_70-99mm_>300hp	2	670	14	1279	0	0	0	3	0
784	TBB_DEF_70-99mm_>300hp	2	409	32	447	0	0	1	1	0
789	TBB_DEF_70-99mm_>300hp	1	1061	80	1818	0	11	0	4	0
799	TBB_DEF_70-99mm_>300hp	1	916	8	1393	4	20	0	0	0
800	TBB_DEF_70-99mm_>300hp	2	3685	106	3355	0	17	0	0	0
802	TBB_DEF_70-99mm_>300hp	2	2119	26	1814	0	10	0	0	0
804	TBB_DEF_70-99mm_>300hp	1	2641	72	3211	0	129	0	0	0
805	TBB_DEF_70-99mm_>300hp	1	1292	19	2140	0	0	0	0	0
806	TBB_DEF_70-99mm_>300hp	2	1090	42	2082	0	5	0	0	0
807	TBB_DEF_70-99mm_>300hp	1	139	6	279	0	2	0	0	0
812	TBB_DEF_70-99mm_>300hp	1	349	5	2063	9	9	0	0	0
813	TBB_DEF_70-99mm_>300hp	1	692	38	1246	0	18	0	0	0
823	TBB_DEF_70-99mm_>300hp	3	1030	65	986	0	6	0	0	0

Table 9b. (cont.)

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
824	TBB_DEF_70-99mm_>300hp	3	2187	48	1252	0	0	16	0	0
825	TBB_DEF_70-99mm_>300hp	4	1111	47	686	0	6	0	0	0
826	TBB_DEF_70-99mm_>300hp	3	1777	38	255	7	28	0	0	0
827	TBB_DEF_70-99mm_>300hp	3	1764	105	880	0	40	0	0	0
828	TBB_DEF_70-99mm_>300hp	4	1006	47	486	0	43	0	0	0
829	TBB_DEF_70-99mm_>300hp	3	984	14	915	0	0	3	0	0
830	TBB_DEF_70-99mm_>300hp	3	143	2	392	0	2	1	0	0
831	TBB_DEF_70-99mm_>300hp	3	855	10	1775	0	0	6	0	0
840	TBB_DEF_70-99mm_>300hp	3	2010	32	2697	0	0	0	0	0
841	TBB_DEF_70-99mm_>300hp	3	1303	44	3050	0	0	0	16	0
842	TBB_DEF_70-99mm_>300hp	4	1344	46	964	0	7	0	0	0
851	TBB_DEF_70-99mm_>300hp	3	844	14	3130	0	56	0	0	0
852	TBB_DEF_70-99mm_>300hp	3	917	5	1653	0	103	0	0	0
853	TBB_DEF_70-99mm_>300hp	3	791	28	4984	0	7	0	0	0
854	TBB_DEF_70-99mm_>300hp	3	417	0	1491	0	0	0	0	0
865	TBB_DEF_70-99mm_>300hp	4	1696	64	376	5	44	0	0	0
866	TBB_DEF_70-99mm_>300hp	4	2463	33	694	10	33	0	0	0
867.2	TBB_DEF_70-99mm_>300hp	4	516	329	212	19	154	0	0	0
868	TBB_DEF_70-99mm_>300hp	4	670	289	102	29	422	0	6	0
869	TBB_DEF_70-99mm_>300hp	4	246	4	399	0	50	0	0	0
870	TBB_DEF_70-99mm_>300hp	4	389	3	96	0	2	0	0	0
871	TBB_DEF_70-99mm_>300hp	4	1421	32	749	12	9	0	0	0
875	TBB_DEF_70-99mm_>300hp	4	1726	28	935	0	4	0	4	0
876	TBB_DEF_70-99mm_>300hp	4	637	7	217	0	6	2	0	0

Table 9b. (cont.)

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
877	TBB_DEF_70-99mm_>300hp	4	1374	11	326	3	3	0	2	0
880.2	TBB_DEF_70-99mm_>300hp	4	1785	0	1306	0	0	0	0	0
883	TBB_DEF_70-99mm_>300hp	4	425	12	663	0	276	0	0	0
884	TBB_DEF_70-99mm_>300hp	4	1443	30	1202	9	14	0	0	0
886	TBB_DEF_70-99mm_>300hp	4	1165	0	4444	0	151	0	0	0
887.2	TBB_DEF_70-99mm_>300hp	4	305	25	2078	0	269	0	0	0
888	TBB_DEF_70-99mm_>300hp	4	5142	24	962	27	12	0	0	0
889.2	TBB_DEF_70-99mm_>300hp	4	449	13	4529	6	27	0	0	0
899	TBB_DEF_70-99mm_>300hp	2	515	18	4989	0	7	0	0	0
765.2	TBB_DEF_70-99mm_<=300hp	2	136	19	406	0	2	0	0	0
791	TBB_DEF_70-99mm_<=300hp	1	218	68	391	0	0	0	0	0
792	TBB_DEF_70-99mm_<=300hp	2	464	48	398	0	4	0	0	0
794	TBB_DEF_70-99mm_<=300hp	2	214	96	599	0	0	0	0	0
795	TBB_DEF_70-99mm_<=300hp	2	107	15	178	0	0	0	2	0
796	TBB_DEF_70-99mm_<=300hp	1	356	104	4086	0	0	0	0	0
797	TBB_DEF_70-99mm_<=300hp	2	949	410	3118	0	0	0	0	0
798	TBB_DEF_70-99mm_<=300hp	2	1188	592	2496	0	0	0	20	0
835	TBB_DEF_70-99mm_<=300hp	3	522	88	577	0	8	0	0	0
839	TBB_DEF_70-99mm_<=300hp	3	539	323	796	0	0	13	15	0
862	TBB_DEF_70-99mm_<=300hp	3	251	29	301	0	0	0	2	0
863	TBB_DEF_70-99mm_<=300hp	3	445	14	298	0	0	5	5	0
864	TBB_DEF_70-99mm_<=300hp	3	1521	83	1309	0	9	0	0	0
878	TBB_DEF_70-99mm_<=300hp	4	1508	41	654	0	7	2	0	0
881	TBB_DEF_70-99mm_<=300hp	4	493	535	179	8	169	0	0	0
882	TBB_DEF_70-99mm_<=300hp	4	406	73	775	40	74	14	0	0

Table 9b. (cont.)

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
893	TBB_DEF_70-99mm_<=300hp	4	883	19	773	0	0	6	0	0
793	TBB_DEF_100-119mm	2	347	0	675	0	0	0	0	0
801	TBB_DEF_100-119mm	2	600	0	709	0	0	0	0	0
808	TBB_DEF_100-119mm	2	138	1	57	0	0	0	0	0
850	TBB_DEF_100-119mm	3	113	0	204	0	0	0	0	0
879	TBB_DEF_100-119mm	4	501	0	636	0	0	0	0	0
895	TBB_DEF_100-119mm	2	306	0	549	0	0	0	0	0
896	TBB_DEF_100-119mm	2	146	0	187	0	2	0	0	0
897	TBB_DEF_100-119mm	3	129	0	277	0	0	0	0	0
898	TBB_DEF_100-119mm	2	142	0	93	4	0	0	5	0
814	TBB_DEF_>=120mm	2	70	0	48	0	0	0	0	0
815	TBB_DEF_>=120mm	2	130	0	153	0	0	0	0	0
803	SSC_DEF_100-119mm	2	187	0	219	3	3	0	0	0
848	SSC_DEF_100-119mm	3	2031	0	1006	0	3	0	0	0
843	SSC_DEF_>=120mm	3	9	0	11	208	29	0	0	0
844	SSC_DEF_>=120mm	3	0	0	75	60	45	0	0	0
847	SSC_DEF_>=120mm	3	0	0	21	7	10	0	0	0
849	SSC_DEF_>=120mm	3	0	0	6	2	58	0	0	0
885	SSC_DEF_>=120mm	4	2	0	60	2	13	0	0	0
819	OTB_MCD_70-99mm	2	871	4	411	4	53	0	0	0
820	OTB_MCD_70-99mm	2	263	0	442	2	26	0	0	0
821	OTB_MCD_70-99mm	2	137	0	547	0	80	0	0	0
822	OTB_MCD_70-99mm	2	799	0	805	0	81	0	0	0
845	OTB_MCD_70-99mm	3	230	0	2216	4	10	0	0	0
846	OTB_MCD_70-99mm	3	1198	0	1152	0	37	0	0	0

Table 9b. (cont.)

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
856	OTB_MCD_70-99mm	3	540	0	2028	14	38	0	0	0
857	OTB_MCD_70-99mm	3	167	0	187	2	24	2	0	0
858	OTB_MCD_70-99mm	3	413	4	1046	0	17	0	0	0
859	OTB_MCD_70-99mm	3	272	0	467	0	5	0	0	0
860	OTB_MCD_70-99mm	3	274	0	722	0	4	0	0	0
861	OTB_MCD_70-99mm	3	347	0	453	0	6	4	0	0
872	OTB_MCD_70-99mm	4	282	0	1866	0	11	0	0	0
873	OTB_MCD_70-99mm	4	503	0	836	4	5	0	0	0
874	OTB_MCD_70-99mm	4	219	2	168	3	3	0	0	0
890	OTB_MCD_70-99mm	4	601	0	736	0	0	0	0	0
891	OTB_MCD_70-99mm	4	801	0	743	0	0	0	0	0
892	OTB_MCD_70-99mm	4	423	0	525	15	13	0	0	0
766.2	OTB_DEF_70-99mm	2	838	0	1155	0	5	0	0	0
809	OTB_DEF_70-99mm	1	626	0	1067	0	3	0	0	0
810	OTB_DEF_70-99mm	2	180	0	326	1	3	0	0	0
811	OTB_DEF_70-99mm	2	488	0	487	2	50	0	0	0
816	OTB_DEF_70-99mm	1	744	0	1168	2	11	0	0	0
817	OTB_DEF_70-99mm	1	40	1	100	2	210	0	0	0
818	OTB_DEF_70-99mm	2	158	2	1504	0	16	0	1	0
834	OTB_DEF_70-99mm	3	196	0	727	3	138	0	0	0
855	OTB_DEF_70-99mm	1	394	0	613	1	9	0	0	0
768.2	OTB_DEF_100-119mm	3	314	0	1269	0	0	0	0	0
779	OTB_DEF_100-119mm	2	1461	0	2209	0	0	0	0	0
780	OTB_DEF_100-119mm	2	250	0	819	2	0	0	0	0
785	OTB_DEF_100-119mm	1	686	0	441	0	0	0	0	0

Table 9b. (cont.)

TripID	Metier	Q	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
786	OTB_DEF_100-119mm	2	763	0	219	6	0	0	0	0
787	OTB_DEF_100-119mm	2	251	0	94	0	0	0	0	0
788	OTB_DEF_100-119mm	2	215	0	455	0	0	0	0	0
790	OTB_DEF_100-119mm	2	132	0	86	1	0	0	0	0
832	OTB_DEF_100-119mm	3	31	1	192	0	0	0	0	0
836	OTB_DEF_100-119mm	3	287	0	91	0	0	0	0	0
837	OTB_DEF_100-119mm	3	119	0	54	1	0	0	0	0
838	OTB_DEF_100-119mm	3	95	0	46	1	0	0	0	0
894	OTB_DEF_100-119mm	3	71	0	55	0	0	0	0	0

Appendix B

Table 10a. Standard deviations of the weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: plaice (PLE), sole, (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) by metier in 2013. n/a, not applicable.

Metier	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis DAB	Lan DAB	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis TUR	Lan TUR	Dis BLL	Lan BLL	Dis NEP	Lan NEP
TBB_DEF_70-99mm_>300hp	75	64	7	18	66	10	1	1	5	2	1	4	1	3	n/a	1
TBB_DEF_70-99mm_<=300h	26	7	12	7	79	3	1	1	3	1	1	1	1	1	n/a	1
TBB_DEF_100-119mm	29	135	1	2	24	4	1	0	1	7	0	9	1	2	n/a	0
TBB_DEF_>=120mm	7	43	0	0	8	0	0	0	0	0	0	6	0	7	n/a	0
SSC_DEF_100-119mm	194	383	0	0	76	25	1	5	1	0	0	0	0	0	n/a	0
SSC_DEF_>=120mm	2	36	0	0	5	80	27	104	3	0	0	0	0	0	n/a	0
OTB _MCD_70-99mm	42	16	1	1	48	2	1	3	3	1	1	2	0	1	n/a	15
OTB _DEF_70-99mm	33	39	1	2	28	4	1	1	8	3	0	5	1	1	n/a	15
OTB _DEF_100-119mm	56	122	1	0	64	3	1	1	0	2	0	4	0	1	n/a	1

Table 10b. Standard deviations of the numbers per hour of discarded commercially-important target species: plaice (PLE), sole, (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) by metier in 2013.

Metier	Dis PLE	Dis SOL	Dis DAB	Dis COD	Dis WHG	Dis TUR	Dis BLL	Dis NEP
TBB_DEF_70-99mm_>300hp	868	72	1274	7	82	3	3	31
TBB_DEF_70-99mm_<=300h	452	190	1128	10	44	5	6	0
TBB_DEF_100-119mm	182	1	264	2	1	0	2	1
TBB_DEF_>=120mm	43	0	75	0	0	0	0	0
SSC_DEF_100-119mm	1304	0	557	2	1	0	0	0
SSC_DEF_>=120mm	4	0	32	89	21	0	0	9
OTB _MCD_70-99mm	291	2	606	5	26	1	0	663
OTB _DEF_70-99mm	285	1	459	1	75	0	1	87
OTB _DEF_100-119mm	399	1	638	2	0	0	0	6

Table 11a. Standard deviations of the weights (kg) per hour of discarded (Dis) and landed (Lan) commercially-important target species: plaice (PLE), sole, (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) by metier in 2013. n/a, not applicable.

Metier	Q	N	Dis DAB	Lan DAB	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis BLL	Lan BLL	Dis TUR	Lan TUR	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis NEP	Lan NEP
TBB_DEF_70-99mm_>300hp	1	13	93	77	5	27	101	16	1	2	4	2	1	5	1	3	n/a	1
TBB_DEF_70-99mm_>300hp	2	11	94	29	7	32	105	8	1	1	2	1	1	5	1	3	n/a	0
TBB_DEF_70-99mm_>300hp	3	13	95	64	4	38	95	8	1	1	2	1	1	7	1	3	n/a	1
TBB_DEF_70-99mm_>300hp	4	20	129	124	5	40	55	2	1	1	4	1	1	6	1	4	n/a	1
TBB_DEF_70-99mm_<=300h	1	2	22	3	7	13	144	9	0	0	0	0	0	1	0	1	n/a	0
TBB_DEF_70-99mm_<=300h	2	6	36	11	14	26	77	5	0	0	1	0	0	1	1	1	n/a	1
TBB_DEF_70-99mm_<=300h	3	5	37	9	7	22	36	2	0	0	1	0	1	2	1	1	n/a	0
TBB_DEF_70-99mm_<=300h	4	4	50	16	11	20	37	4	1	1	4	1	2	2	0	1	n/a	0
TBB_DEF_100-119mm	2	6	40	274	1	1	32	3	1	0	1	0	0	9	1	1	n/a	0
TBB_DEF_100-119mm	3	2	15	255	0	3	18	0	0	0	0	10	0	15	0	2	n/a	0
TBB_DEF_100-119mm	4	1	74	473	0	2	45	0	0	0	0	8	0	3	0	0	n/a	0
TBB_DEF_>=120mm	2	2	15	264	0	0	11	0	0	0	0	0	0	4	0	5	n/a	0
SSC_DEF_100-119mm	2	1	30	257	0	0	22	15	1	0	1	0	0	0	0	0	n/a	0
SSC_DEF_100-119mm	3	1	304	918	0	0	129	57	0	8	1	0	0	0	0	0	n/a	0
SSC_DEF_>=120mm	3	4	1	54	0	0	4	35	20	191	4	0	0	0	0	0	n/a	0
SSC_DEF_>=120mm	4	1	1	10	0	0	9	196	1	151	2	0	0	0	0	0	n/a	0
OTB _MCD_70-99mm	2	4	71	15	1	1	31	1	1	4	6	1	0	3	0	1	n/a	25
OTB _MCD_70-99mm	3	8	50	16	1	1	72	2	1	1	2	1	1	4	0	1	n/a	28
OTB _MCD_70-99mm	4	6	78	38	1	1	75	2	1	1	1	1	0	2	0	1	n/a	51
OTB _DEF_70-99mm	1	4	54	76	1	2	60	3	1	2	6	2	0	1	0	1	n/a	7
OTB _DEF_70-99mm	2	4	43	33	1	2	50	4	1	1	2	1	0	7	1	2	n/a	4
OTB _DEF_70-99mm	3	1	36	63	0	0	62	1	2	0	15	0	0	2	0	1	n/a	47

Table 11a. (cont).

Metier	Q	N	Dis DAB	Lan DAB	Dis PLE	Lan PLE	Dis SOL	Lan SOL	Dis BLL	Lan BLL	Dis TUR	Lan TUR	Dis COD	Lan COD	Dis WHG	Lan WHG	Dis NEP	Lan NEP
OTB _DEF_100-119mm	1	1	93	31	0	0	42	7	0	0	0	0	0	0	0	0	n/a	0
OTB _DEF_100-119mm	2	6	79	182	0	0	67	5	1	1	0	1	0	4	0	1	n/a	1
OTB _DEF_100-119mm	3	6	25	254	1	0	23	2	1	1	0	0	0	6	0	1	n/a	0

Table 11b. Standard deviations of the weights (kg) per hour of discarded commercially-important target species: plaice (PLE), sole, (SOL), dab (DAB), cod, whiting (WHG), turbot (TUR), brill (BLL) and Norway lobster (NEP) by metier in 2013. n/a, not applicable. Landings-numbers were not measured.

Metier	Q	N	PLE	SOL	DAB	COD	WHG	TUR	BLL	NEP
TBB_DEF_70-99mm_>300hp	1	13	1043	53	1683	3	36	2	1	7
TBB_DEF_70-99mm_>300hp	2	11	1260	75	1926	2	14	1	1	0
TBB_DEF_70-99mm_>300hp	3	13	1156	31	1805	1	19	2	2	7
TBB_DEF_70-99mm_>300hp	4	20	1266	52	1071	6	77	1	1	19
TBB_DEF_70-99mm_<=300h	1	2	287	86	2238	0	0	0	0	0
TBB_DEF_70-99mm_<=300h	2	6	510	197	1199	0	1	0	4	0
TBB_DEF_70-99mm_<=300h	3	5	655	107	656	0	4	4	5	0
TBB_DEF_70-99mm_<=300h	4	4	823	167	595	12	63	6	0	0
TBB_DEF_100-119mm	2	6	280	1	378	1	1	0	1	1
TBB_DEF_100-119mm	3	2	121	0	240	0	0	0	0	0
TBB_DEF_100-119mm	4	1	501	0	636	0	0	0	0	0
TBB_DEF_>=120mm	2	2	100	0	101	0	0	0	0	0
SSC_DEF_100-119mm	2	1	187	0	219	3	3	0	0	0
SSC_DEF_100-119mm	3	1	2031	0	1006	0	3	0	0	0
SSC_DEF_>=120mm	3	4	3	0	28	69	36	0	0	5
SSC_DEF_>=120mm	4	1	2	0	60	2	13	0	0	0
OTB_MCD_70-99mm	2	4	518	1	552	2	60	0	0	1078
OTB _MCD_70-99mm	3	8	430	1	1034	3	18	1	0	439
OTB _MCD_70-99mm	4	6	471	1	812	4	5	0	0	531
OTB _DEF_70-99mm	1	4	451	1	737	1	58	0	0	40
OTB _DEF_70-99mm	2	4	416	1	868	1	18	0	1	66
OTB _DEF_70-99mm	3	1	196	0	727	3	138	0	0	135

Table 11b. (cont).

Metier	Q	N	DAB	PLE	SOL	BLL	TUR	COD	WHG	NEP
OTB _DEF_100-119mm	1	1	686	0	441	0	0	0	0	0
OTB _DEF_100-119mm	2	6	512	0	647	2	0	0	0	4
OTB _DEF_100-119mm	3	6	153	1	284	1	0	0	0	1

CVO Report:	14.007
Project number:	4301213028
BAS code:	WOT-05-406-004
Approved by:	Ing S.W. Verver Head Centre for Fisheries Research
Signature:	
Date:	19th of November 2014